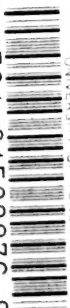


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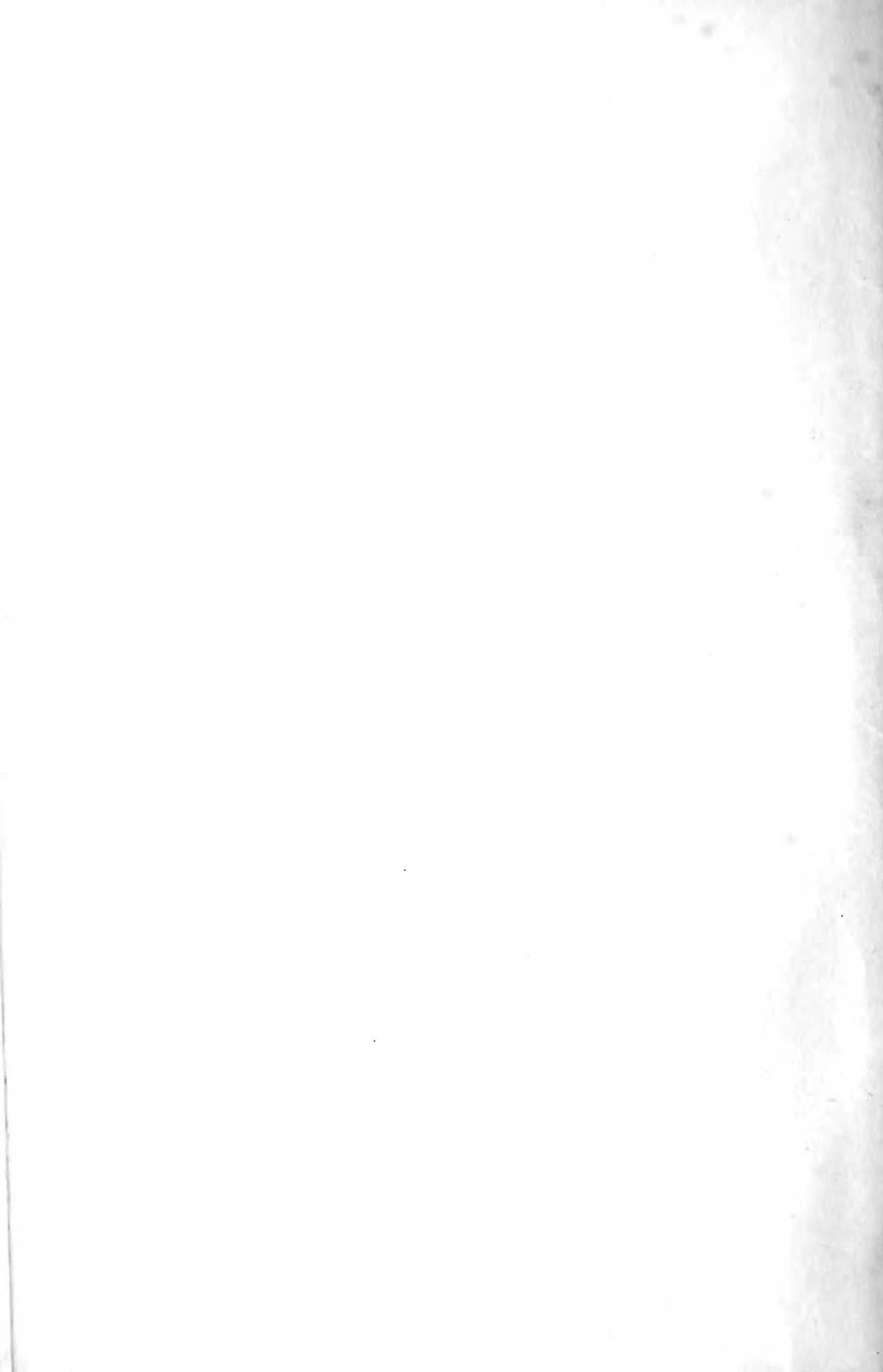
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MEMOIRS
OF THE
NEW YORK BOTANICAL GARDEN
VOL. V.

FLORA
OF THE VICINITY OF NEW YORK
A CONTRIBUTION TO PLANT GEOGRAPHY

BY
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CURATOR AT THE BROOKLYN BOTANIC GARDEN
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PREFACE

This book deals chiefly with the distribution of the flora near New York. Taxonomy and nomenclature are considered only as fundamentals upon which the phytogeographical structure of the book has been reared. This has been done because of the belief that local flora lists and manuals are significant chiefly as they are projectors of ideas rather than mere records of species, be those records ever so accurate. The attempt to explain the origin of the flora centering near the city, and the factors that have played their part in shaping its present composition, has, it seems to the writer, greater value than any enumeration of the species could possibly have.

The opportunity for deductive reasoning on the distribution of our flora can be rightly based only on a complete and accurate record of the occurrence of individual species, authenticated by herbarium specimens and reliable field notes. Our knowledge, therefore, is limited by the amount and the availability of such information, and, in the present instance, no one is so conscious of the scarcity of such material as the writer. The book, therefore, is not so much a local flora as a method of writing one,—in some ways it is little more than a record of the incompleteness of our present knowledge.

The work was begun at the New York Botanical Garden, in January, 1909, and continued until March, 1911. Since then it has been carried on at the Brooklyn Botanic Garden, where a division of time between it and increasing administrative duties became necessary. To the directors of both institutions grateful acknowledgement is due for much help and encouragement.

The book has been greatly strengthened by many notes on distribution and other matters contributed by Messrs. E. P. Bicknell and K. K. Mackenzie and by Dr. Britton, all of whom have read the proofs. Without their help the book must have been deficient in many respects, and the writer gratefully acknowledges their cooperation.

To others who have also helped by the collection of specimens, notes and other information, the writer is glad to make acknowledgments. Among those who have helped in various ways are: Professor M. L. Fernald, Stewardson Brown, Bayard Long, Dr. Witmer Stone, Miss F. A. Mulford, Harold W. Pretz, Dr. F. W. Pennell, Dr. Roland M. Harper, Dr. Philip Dowell, and Dr. G. E. Nichols. To Dr. Arthur Hollick the writer is under great obligations for much aid in the considerable geological data used in the book. He is also indebted to Mr. Sereno Stetson for making the original base map which has been used in a number of ways in the book. Several genera and families, and a bibliography, have been contributed by specialists and such contributions are noted in the text. Mr. Percy Wilson, of the New York Botanical Garden, has kindly aided in the determination of many specimens, and in other ways.

In order to base the book on a descriptive illustrated work, the taxonomy and nomenclature have been brought into substantial accord with the second edition of "Illustrated Flora of the Northern States and Canada," which was published about the time the manuscript of the present book was completed, and to which reference is made for additional synonyms. This does not imply, however, that the writer favors all the generic and specific delimitations of that work, nor all the nomenclatorial changes there proposed.

The interest of Dr. N. L. Britton has been continued until the completion of the work, and the author takes great pleasure in acknowledging his help and valued criticism, without which the book could scarcely have been written.

NORMAN TAYLOR.

BROOKLYN BOTANIC GARDEN,
30 July, 1914.

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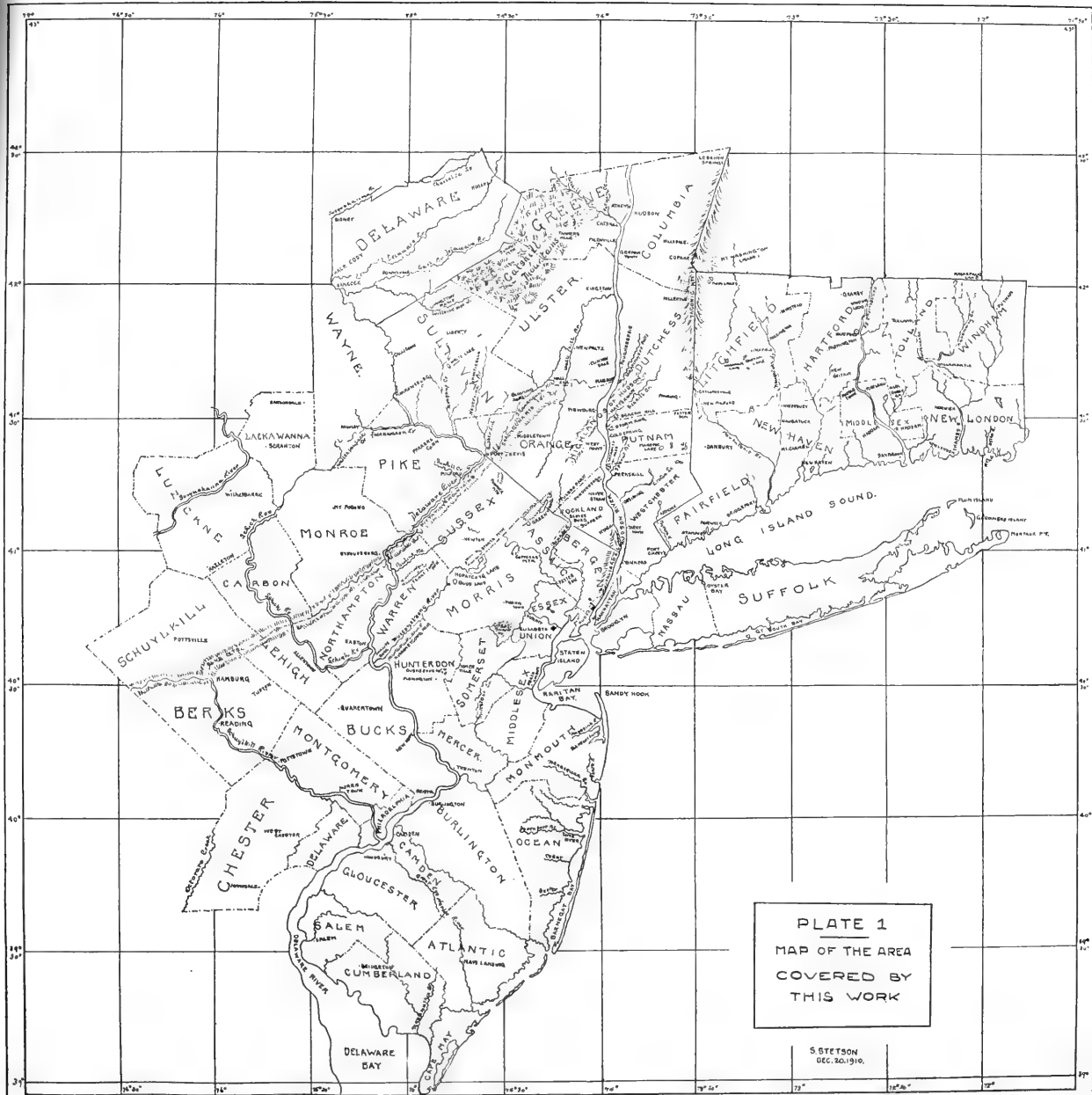
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INTRODUCTION*

1. The range covered by this book is that laid down by the committee on local flora of the Torrey Botanical Club in their Preliminary Catalogue of 1888. It comprises all of the state of Connecticut; Long Island; in New York the counties bordering the Hudson River up to and including Columbia and Greene, also Sullivan and Delaware counties; all of New Jersey; and Pike, Wayne, Monroe, Lackawanna, Luzerne, Northampton, Lehigh, Carbon, Bucks, Berks, Schuylkill, Montgomery, Philadelphia, Delaware and Chester counties in Pennsylvania. (See map, *pl. I.*) When making a botanical survey, an area such as this, determined wholly by political boundary lines has many disadvantages over purely natural vegetation-regions, such as the pine-barrens, for instance. But it has seemed advisable to adopt the range as outlined by the committee in spite of obvious drawbacks.

2. The method of working out the problem of the distribution of our local plants has been, after determining what species actually occurred in the range, to list all the localities for which specimens were extant. Published records, of whatever sort, have been closely studied, and the results of such studies have been added to the records substantiated by specimens, wherever, in the judgment of the writer, these records were deemed reliable. Such published records have, however, been very sparingly used in the grasses, sedges, *Crataegus*, *Rubus*, *Rosa* and *Viola*. Recent studies in these groups make it unsafe to base conclusions upon the old records of species, many of which are not today tenable or are regarded in a new or restricted sense. The writer has made no effort to include records published since January 1, 1914, although some of these recent records are noted. All of the native and introduced species contained in the manuals have been included, besides many more, mentioned in notes, that are little more than waifs. All the genera and species are provided with keys, which have been omitted for waifs and other plants mentioned only in

* Much of this introductory matter was completed with the aid of a grant from the Esther Herrman Research Fund, of the New York Academy of Sciences.

notes. The keys and general ranges have been copied from "Illustrated Flora," except where simplicity demanded a different key owing to the limited number of species in our area. There are 2,651 species admitted into the work, excluding waifs. Subtracting also the 613 weeds of introduction we have 2,038 native species in the area. No species are described as new.

3. With this information as a basis, the distributional trends of each species, except the commonest or those introduced, have been given for the states of Connecticut and New Jersey, and for those parts of the states of New York and Pennsylvania contained in the range. Wherever a state or part of it is omitted from the discussion of the distribution, it is understood that the species has not been recorded from the omitted area. Besides this, the distribution of each species as affected by the geological history, the temperature, and the altitudinal limits of the area has been given. The latter features of the work will be explained subsequently.

FACTORS AFFECTING THE DISTRIBUTION OF OUR LOCAL FLORA

4. The composition of the flora of a region such as ours has been determined by many agencies, some now operative, many of them long since inactive, but leaving indelible traces of their former importance. For all practical purposes, these agencies may be divided into (I) edaphic factors and (II) climatic ones. Under the first category must be considered all questions of the relation of our flora to the soil and available water supply, both past and present,—which *ipso facto* have been determined by the geological history of the region. Thus it is only by some knowledge of the geology of the area that we can arrive at conclusions of value in regard to the complexion of our flora as affected by these historical factors. Under the second category (climatic factors) will be considered the relation of our flora to temperature, rainfall and winds, although in a temperate region such as ours the last two are of very little significance. We have, then, the edaphic or historical factors, which may be said to have exercised more influence in the past than now, and the climatic factors which are still operative. The mental convenience of considering these two sets of factors by themselves is apt to create the feeling that there is some rather sharp line of demarcation between them. Of

course, any such idea is wholly inaccurate, and the difficulty of determining, in any given instance, which factor has been most potent must be obvious to those who appreciate the complexity of the relationship between these historical and present-day agencies.

I. EDAPHIC FACTORS (GEOLOGY OF THE RANGE)

(a) *The Glaciated Region*

5. Perhaps nowhere in eastern North America are there so many features of geological interest as within the area covered by this work. Within forty miles of the city the terminal moraine, the upper edge of the coastal plain, the northern edge of the Cretaceous deposits all converge. On Long Island is the unique juxtaposition of the coastal plain and the glaciated country. The variety of conditions and immensity of age differences postulated by these facts help to explain the fact that more than 400 species reach their distribution outposts within the area covered by this book.

6. For the purposes of the phytogeographer the range covered by the work may be divided into glaciated and unglaciated. The extreme southern limit of the several encroachments of the different continental ice sheets, known as the terminal moraine, extends, roughly speaking, from Montauk, through Long Island and Staten Island, to upper New Jersey and Pennsylvania. (See map, *pl. 2.*) Everything north of this line was once covered by ice, varying in thickness from almost nothing near the edge to some thousands of feet in the north towards the centers of glaciation. It is obvious that this ice sheet, being approximately the most recent geological phenomenon, nullifies completely what might have been the very considerable effects of the much older geological formations north of the terminal moraine on the vegetation. Geologically the area north of the moraine is of greater antiquity than anything else in our range; practically, so far as vegetative covering is concerned, it is the most recent, for the recession of the ice is the last major geological phenomenon operative hereabouts. An exception to the statement that the ice-sheet nullifies the older geological formations north of the moraine, are the somewhat extensive limestone areas in the glaciated

country, notably in Columbia, and Dutchess counties in New York, Sussex Co. in New Jersey, and some parts of Connecticut and Pennsylvania. While it is true that these peculiar limestone outcrops maintain a characteristic flora, it is doubtful if there are any species of plants endemic upon them. The limestone thus appears rather as maintaining an aggregate of characteristic species than as definitely controlling the distribution or evolutionary history of any particular species. I think there is no species in our area that has been collected only on limestone, but many that seem to predominate there, notably some *Crataegus*, *Amelanchier*, sedges, *Camplosorus*, *Asplenium*, and a few others.

7. The glaciated part of our range contains many ponds, swamps, and bogs and it is the latter that are of chief interest to the botanist. These undrained areas, usually, though not always, deficient in lime, and exhibiting a high degree of acidity, maintain a flora quite characteristic. It has been shown that that section of our area which was neither glaciated nor on the coastal plain does not contain the plants characteristic of the glacial bogs of the north and also found in the typical cranberry bogs of the coastal plain. It is certainly true that bogs are unknown in this region (see map, *pl. 2*), and that it contains no lakes or ponds of any size. It is significant that the following plants are found in the bogs of the coastal plain, mainly in the pine-barrens, and also north of the moraine, but unknown in the intervening unglaciated Piedmont Plateau in New Jersey; in Pennsylvania further study is necessary on this point.

<i>Chamaecyparis thyoides</i> (see <i>pl. 6</i>),	<i>Blephariglottis cristata</i> ,
<i>Panicum linearifolium</i> ,	<i>Blephariglottis blephariglottis</i> ,
<i>Carex trisperma</i> ,	<i>Arethusa bulbosa</i> ,
<i>Carex Collinsii</i> ,	<i>Sarracenia purpurea</i> ,
<i>Xyris Congdoni</i> ,	<i>Drosera intermedia</i> ,
<i>Helonias bullata</i> ,	<i>Oxycoccus macrocarpus</i> ,
<i>Gyrotheca tinctoria</i> ,	<i>Aster spectabilis</i> .

There are many others,* and future studies may be able to show that there is some other reason for the non-occurrence of these plants than the failure of this unglaciated area north of the coastal plain to develop bogs and ponds.

* Harper, R. M. Coastal plain plants in New England. *Rhodora* 7: 69-80. 1905. *Rhodora* 8: 27. 1906.

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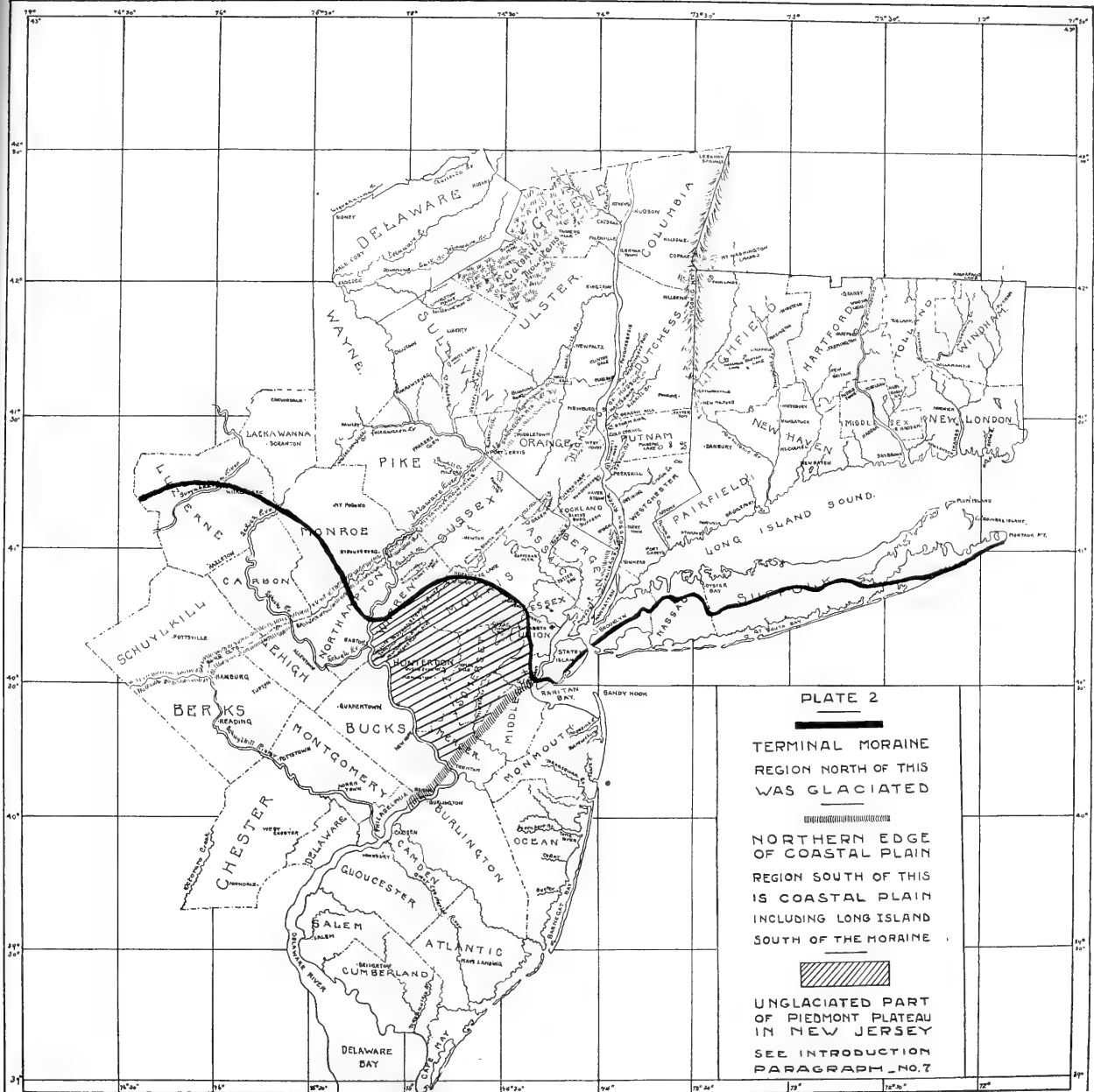


PLATE 2

TERMINAL MORaine
 REGION NORTH OF THIS
 WAS GLACIATED

NORTHERN EDGE
 OF COASTAL PLAIN
 REGION SOUTH OF THIS
 IS COASTAL PLAIN
 INCLUDING LONG ISLAND
 SOUND SOUTH OF THE MORaine

UNGLACIATED PART
 OF PIEDMONT PLATEAU
 IN NEW JERSEY
 SEE INTRODUCTION
 PARAGRAPH No. 7

8. It will give some idea of the profound influence the continental glacier has probably had on the vegetation in the range to record the large number of species that are now found only north of the moraine. The following are unknown, in our area, south of this line, although some are found further south in the mountains outside of our region. Those marked with an asterisk have been found only at elevations in excess of 1,000 ft.

Plants Found Exclusively North of the Moraine in Our Area

<i>Botrychium silaifolium</i> ,	<i>Poa debilis</i> ,
* <i>Polystichum Braunii</i> ,	<i>Poa alsodes</i> ,
<i>Cryptogramma Stelleri</i> ,	<i>Poa triflora</i> ,
<i>Equisetum pratense</i> ,	<i>Koeleria cristata</i> ,
<i>Lycopodium porophyllum</i> ,	<i>Eleocharis ovata</i> ,
† <i>Lycopodium annotinum</i> ,	<i>Eleocharis intermedia</i> ,
* <i>Isoetes macrospora</i> ,	<i>Fimbristylis geminata</i> ,
<i>Isoetes Eatoni</i> ,	<i>Eriophorum alpinum</i> ,
<i>Isoetes Tuckermanni</i> ,	<i>Eriophorum callithrix</i> ,
<i>Pinus resinosa</i> ,	<i>Carex siccata</i>
* <i>Abies Balsamea</i> (see pl. 7),	<i>Carex diandra</i> ,
<i>Thuja occidentalis</i> ,	<i>Carex prairea</i> ,
<i>Sparganium acaule</i> ,	<i>Carex brunnescens</i> ,
<i>Sparganium angustifolium</i> ,	<i>Carex Deweyana</i> ,
<i>Sparganium minimum</i> ,	<i>Carex Crawfordii</i> ,
<i>Sagittaria cuneata</i> ,	<i>Carex Bebbii</i> ,
<i>Potamogeton lateralis</i> ,	* <i>Carex aena</i> ,
<i>Potamogeton angustifolius</i> ,	<i>Carex pauciflora</i> ,
<i>Potamogeton praelongus</i> ,	* <i>Carex novae-angliae</i> ,
<i>Panicum flexile</i> ,	<i>Carex aurea</i> ,
<i>Panicum boreale</i> ,	<i>Carex Crawei</i> ,
<i>Milium effusum</i> ,	* <i>Carex formosa</i> ,
<i>Oryzopsis pungens</i> ,	* <i>Carex castanea</i> ,
<i>Oryzopsis asperifolia</i> ,	<i>Carex paupercula</i> ,
<i>Sporobolus cryptandrus</i> ,	<i>Carex lenticularis</i> ,
<i>Sporobolus heterolepis</i> ,	<i>Carex Oederi</i> ,
* <i>Cinna latifolia</i> ,	<i>Carex cryptolepis</i> ,
<i>Trisetum spicatum</i> ,	<i>Carex vesicaria</i> ,

* Found only at elevations in excess of 1,000 ft.

† Except for one doubtful record from Delaware Co., Pa.

- Carex Tuckermanni*,
Carex oligosperma,
Carex Baileyi,
Carex Schweinitzii,
Carex Pseudo-Cyperus,
Arisaema Stewardsonii,
Calla palustris,
 **Xyris montana*,
 **Juncus filiformis*,
 **Juncus trifidus*,
Juncus Dudleyi,
Allium sibiricum,
Vagnera trifolia,
Streptopus amplexifolius,
Streptopus roseus,
Sisyrinchium albidum,
Cypripedium reginae,
Cypripedium candidum,
Limnorchis hyperborea,
Limnorchis dilatata,
Lysias Hookeriana,
 **Ibidium strictum*,
Ophrys cordata,
Peramium ophioides,
Peramium tessellatum,
Malaxis monophylla,
Corallorhiza Corallorhiza,
Salix lucida,
Salix serissima,
Salix pedicellaris,
Salix squamata,
Salix candida,
Betula pumila,
Betula alleghaniensis,
Betula lutea,
Ulmus Thomasi,
Celtis canina,
Celtis georgiana,
Razoumofskya pusilla,
Claytonia caroliniana,
Arenaria groenlandica,
Nymphaea rubrodiscalis,
Nymphaea microphylla,
Aconitum noveboracense,
Anemone cylindrica,
Ranunculus micranthus,
Ranunculus allegheniensis,
Cardamine pratensis,
Cardamine purpurea,
Arabis viridis,
Arabis Drummondii,
Dentaria maxima,
Dentaria incisifolia,
Dentaria anomala,
 **Mitella nuda*,
 **Ribes glandulosum*,
Comarum palustre,
 **Fragaria canadensis*,
 **Fragaria terrae-novae*,
 **Sibbaldiopsis tridentata*,
Dasiphora fruticosa,
Spiraea alba,
Rubus pergratus,
 **Rubus frondosus*,
Rubus canadensis,
Rubus plicatifolius,
Rosa nitida,
 **Sorbus scopulina*,
 **Amelanchier sanguinea*,
Crataegus Brainerdi,
Crataegus Stonei,
Crataegus Boyntoni,
Crataegus Grayana,
Ilex monticola,
Rhamnus alnifolia,
Hypericum Bissellii,
 **Viola nephrophylla*,
Viola septentrionalis,

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| * <i>Viola Selkirkii</i> , | <i>Halenia deflexa</i> , |
| * <i>Viola renifolia</i> , | <i>Polemonium Van-Bruntiae</i> , |
| <i>Viola incognita</i> , | <i>Blephilia hirsuta</i> , |
| <i>Epilobium strictum</i> , | <i>Viburnum alnifolium</i> , |
| <i>Ligusticum scoticum</i> , | <i>Lonicera coerulea</i> , |
| * <i>Pyrola oxypetala</i> , | <i>Lonicera canadensis</i> , |
| * <i>Moneses uniflora</i> , | * <i>Adoxa Moschatellina</i> , |
| * <i>Ledum groenlandicum</i> , | * <i>Valeriana uliginosa</i> , |
| <i>Azalea canescens</i> , | <i>Lobelia Dortmanna</i> , |
| <i>Rhodora canadensis</i> , | <i>Solidago uliginosa</i> , |
| <i>Kalmia polifolia</i> , | * <i>Solidago macrophylla</i> , |
| <i>Andromeda canescens</i> , | <i>Aster junceus</i> , |
| * <i>Vaccinium canadense</i> , | <i>Bidens Beckii</i> , |
| * <i>Vaccinium Brittonii</i> , | * <i>Petasites palmata</i> , |
| <i>Chiogenes hispidula</i> , | <i>Lactuca Morssii</i> . |
| <i>Naumburgia thyrsoiflora</i> , | |

Of the 2,038 species, excluding weeds, in the range, the above constitute 8.22 per cent. of the total.

9. The glaciated portion of our range, besides being the home of so many native plants not found elsewhere, is typified by the large percentage of hard-wood trees, the relative scarcity, numerically, of coniferous trees, and above all by the great number (595) of species that are introduced. Perhaps three fourths of all adventive and naturalized species find their greatest development in this area. That there is some relation between the vegetative newness of this region and the preponderance of these adventive weeds seems likely, and the much greater agricultural development has undoubtedly had something to do with the weediness of the region. It is significant that, in our range, the percentage of weeds on the coastal plain is nothing like so great as in the glaciated region.

10. In speaking of the distribution of the species from a geological standpoint, it has seemed best to refer to all formations north of the coastal plain simply as "Older Formations," notwithstanding the fact that the glaciated part of the area thus characterized is more recent phytogeographically, than the coastal plain. (See paragraph 6.)

(b) The Coastal Plain

11. The area comprising the coastal plain, includes all that territory lying south of a line extending approximately from Trenton, N. J., through Staten Island to Long Island. (See map, *pl. 2.*) All of this region is geologically the most recent in our area, having been the last to be laid down before the era of the ice which directly affected, with exceptions already noted, only the area mentioned in paragraphs 5-10. An exception to this statement is Long Island, where we have the terminal moraine abutting directly on the coastal plain for nearly the whole length of the island,—a geologically unique feature in this country.

12. Whether the region south of the moraine on Long Island is mostly overlaid by overwash material from the glacier or whether the sands and gravels of the "South Side" are the underlying Tertiary formations may be matter of doubt. It would make an interesting future study to determine the effect, if any, of the distribution of these different sands and gravels on the distribution of the plants on the island. A study of this sort was found to be too intensive for this work and the writer has usually confined himself to a statement as to whether the species is found north or south of the moraine.

13. It is in New Jersey that the coastal plain exhibits its chief interest to the botanist, for this is the region of the pine-barrens, the peculiarly characteristic features of which have always attracted the interest of botanists and zoologists. Indeed, the region is so unusual that the ordinary traveler is at once struck with the difference between these sandy plains and pine-tree vegetation, and the richer flora further north. The excellent flora* of this region by Dr. Witmer Stone has renewed interest in this botanically unique country.

14. The true limits of the pine-barrens are perhaps for the first time clearly drawn by Stone in this work, there having been previously considerable difference of opinion as to how far south in New Jersey the true pine-barren element extended. Formerly the pine-barrens were supposed to consist of all the remainder of the state south of their northern edge, but explorations of the botanists of Philadelphia have resulted in a final delimitation of

* Stone, W. The plants of southern New Jersey, with especial reference to the flora of the pine-barrens. *Ann. Rept. N. Jersey State Mus.* 1910: 25-828. 1912.



PLATE 3. Map of southern New Jersey. The unshaded area is all pine-barren; the shaded areas are not pine-barrens. Note the shaded areas along the coast and at Cape May. See Introduction paragraph 14.

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this interesting region. The map (*pl. 3*) copied from Stone's book well shows the limits of the pine-barrens. The darker colored portion surrounding the white is not pine-barren in character, and maintains a very different flora from the pine-barrens.

15. The writer in 1912 (*Torrey* 12: 229-242) has attempted to show that the pine-barrens are the result of geologic processes, and part of that paper is here utilized. Dr. Stone in his flora of the pine-barrens, perhaps the best local flora ever written in America, has said: "Some attempt has been made to correlate these areas or parts of them (the coastal plain, including the pine-barrens) with the underlying geological formation, but . . . such correlation is not possible."

16. It is the firm conviction of the writer that notwithstanding this assertion, it will be found that a geological explanation is the only one that will fit the facts and serve to elucidate the peculiarly local, often endemic, nature of the pine-barren flora. Others have also sought geological explanation for the origin of this region, and a paleobotanist was the first to suggest the possibility of there being any relationship between the flora and the geology of southern New Jersey.* It was Hollick's suggestion that the pine-barrens are co-extensive with the Tertiary sands and gravels that Stone has shown must be revised. Recent collections, the significance of which was, of course, unknown to Hollick in 1899, have led to the abandonment of his theory that the pine-barrens or "coniferous zone" are co-extensive with the Tertiary sands and gravels.

17. Much later, we find Harshberger† attributing the vegetation about the edges of the pine-barrens to the "post Pensauken uplift of the New Jersey geologists." But he follows Hollick in saying that "the Tertiary soils extend southward along the Atlantic Ocean to Florida and are occupied by a pine-barren flora."‡ This, as Stone's work has shown, must be modified. But this statement of Hollick's, subsequently used in Harshberger's work, contains such a large measure of truth in relation to the origin of this unique region, that it is only to be abandoned

* Hollick, A. The relation between forestry and geology in New Jersey. *Am. Nat.* 33: 1-14. 1899. See also *Ann. Rept. N. J. State Geologist for 1899. Report on Forests.*

† Harshberger, J. W. *Phytogeographic Survey of N. Am.* 219. 1911.

‡ Harshberger, J. W. *Loc. cit.* 218.

upon presentation of a theory more nearly fitting the known facts. While the pine-barrens do occupy Tertiary soils, they do not occupy all of them. It is just this lack of co-extensiveness of the pine-barrens in New Jersey with the Tertiary that has led to Dr. Stone's scepticism.

18. At the risk of burdening the present work with more of technical geological matters than are usually found in a purely botanical survey, the writer feels it is only by a knowledge of what the geological changes have been, on the coastal plain in New Jersey, that we can arrive at the facts in the distribution of the plants of the region. For here, it seems, the whole make-up of the flora is directly attributable to the geological processes that are described in the next succeeding paragraphs.

19. Going back to the time when all the coastal part of New Jersey south of a line from Jersey City to Flemington (see map, *pl. 1*) was under water, owing to the last great general submergence of the continent, we find that during this period a great deal of erosion of the unsubmerged land took place. This sinking of the coastal part of New Jersey, and of course elsewhere, known to geologists as the Miocene sinking,* had a profound influence on the configuration of the lower part of the state. All the material from the north and northwest that was washed down, or eroded, went out with the water and was finally deposited over this submerged area, and this deposition went on for countless ages. Ultimately this Beacon Hill formation, as the deposited material is called, became very thick, covering practically all the lower part of the state.

20. "After the deposition of the Beacon Hill formation, the area over which it had been spread was again elevated, and the history of the topography of all that part of the state, which was covered by the formation, . . . dates from this reëmergence of the surface covered by the Beacon Hill formation."† This emergence of the land is spoken of by geologists as the Post-Miocene uplift or Pre-Pensauken cycle of erosion. Whatever the terminology used, the result was to bring above water most of the land that had been previously submerged. Not quite all of it, however, for the land was not perfectly level, and only the highest portions

* Salisbury, R. D. Final Rept. Geol. Survey of New Jersey 4: 92. 1898.

† Salisbury, R. D. *Loc. cit.* 93.

came out of the water. Some of what is now the coastal strip of New Jersey, all the Cape May region, some of the territory just north of the pine-barrens, and much of the lower Delaware Valley, was either not above water at all, or only slightly so, and in the latter case was soon considerably eroded. This cutting down of the emerged Beacon Hill by erosion, particularly to the south and east, was very great, so that finally it was a very different region from the great upland plain it is supposed to have been immediately after the Post-Miocene uplift.

21. This erosion of the Beacon Hill formation was brought to an end finally by the gradual subsidence of the whole region. Little by little the lower part of New Jersey sank so that ultimately everything except the then upland Beacon Hill formation (the present pine-barrens) was submerged (Pensauken Submergence). It is curious to note, by the way, that the encroachment of the sea thus occasioned by this submergence has been marked by several plants that are normally salt-marsh species, which seem to have followed this ancient marine shore-line. On the northern and southern edges of the dotted area on the map (*pl. 4*), have been found *Hibiscus Moscheutos* (see *pl. 9*) and *Ptilimnium capillaceum*, and there may be others. This dotted area is the old Pensauken Sound and it is significant that these maritime species should be found today miles from the sea and evidently relics of their migration along the shores of Pensauken Sound. At least, the *Hibiscus* has spread so that it occupies some stations in the middle of the old Sound bed, notably near Spotswood, Middlesex Co., and near Princeton Junction.

22. The map (*pl. 4*) shows the extent of this submergence, as everything covered by the dotted area was under water. The undotted light area was not submerged, and has never since been submerged. After an indefinite period of subsidence the whole dotted area was again raised so that all of lower New Jersey as we know it today came out of the water. The Pensauken formation, which is the geologists' name for most of the material eroded from the uninterruptedly emerged Beacon Hill, was itself subject to erosion, giving us the present characteristic stream beds of the coastal plain in the state.

23. The next step of serious significance was the encroachment of the ice-sheet, which came down to Perth Amboy, not more

than 12-20 miles north of the Beacon Hill formation. At the final recession of the ice there is some evidence of another slight subsidence of the lower part of the state and the coastal region, but not enough to have brought the Beacon Hill formation anywhere near down to sea level. This last subsidence of the coastal strip and the Cape May region had a significant influence upon the distribution of the plants of the area. It seems very probable that a gradual sinking of this region has been going on ever since, as the sea has constantly encroached upon the land throughout maritime New Jersey, as indeed it has in Staten Island, Long Island, and further north.

24. Whether one follows Johnson* in believing that this subsidence of the coastal part of our area is not recent or continuing or Bartlett† that it is both recent and continuing, does not matter so much for our present purposes. Both agree, and the evidence is of such a nature that it appears incontestable, that there was a great deal of ancient subsidence. In Cape May County this has been of such an extent that whole regions covered by forests of white cedar (*Chamaecyparis thyoides*) have been submerged, emerged, and submerged again. This, repeated several times, has resulted in a great accumulation of buried forests. "Trunks of trees are found buried at all depths beneath the surface, quite down to the gravel."‡ This and "numerous facts of the same kind . . . collected along the shores of the Delaware Bay and River, in Salem and Cumberland Counties, and on the sea-shore in Atlantic, Ocean, Monmouth, and Middlesex Counties," all seem to point to a decided ancient submergence of the area surrounding the Beacon Hill formation.

25. So much for a brief outline of the geological sequence of events in the pine-barren area. For the phytogeographer, the salient features of these changes are that Beacon Hill has been uninterruptedly out of the water since upper Miocene times, and that it has several times been partly, and often entirely surrounded by water. These facts, together with the encroachment of the glacier, and its recession, with the probable deposition of a great

* Johnson, D. W. Botanical evidence of coastal subsidence. *Science* II. 37: 721 1910. *Science* II. 38: 300. 1911. See also *Bot. Gaz.* 54: 449-468. 1913.

† Bartlett, H. H. *Science* II. 38: 300. 1911.

‡ *Geology of the county of Cape May* 62 and 39.



PLATE 4. Map of southern New Jersey, at the period of Beacon Hill. Note submergence (dotted section) of what is now Cape May. The undotted area is the Beacon Hill Formation; the dotted area was under water, the northern part of it constituting Pensauken Sound. See Introduction paragraph 18.



deal of morainic material around Beacon Hill, makes this formation the oldest in New Jersey, either on the coastal plain or in the glaciated regions northward, that could have been continuously covered with vegetation. This, it would seem, is why the Beacon Hill formation is the controlling factor in the origin and present distribution of the pine-barrens. The area of the pine-barrens (see *pl. 3*) is not exactly coextensive with Beacon Hill (see *pl. 4*), but the differences are so slight that recent and local erosion of the formation would account for the failure of the two regions to superimpose, as it were.

26. In other words, the New Jersey pine-barrens exist exclusively on this Beacon Hill formation, an area isolated by geological processes, and maintaining a relict or climax flora, the antiquity of which greatly antedates any of the rest of our vegetation hereabouts, so far as permanency of position and phytogeographical isolation are concerned. This undoubtedly accounts for the composition of the flora, and it is interesting to note that zoölogists have found this same apparent isolation, the same endemism noted above. The sphagnum frog, *Rana virgatipes*, described by Cope and collected only thrice since, is unknown outside of this region,* and the late John B. Smith in his work on the insects of New Jersey has figured the "entomological pine-barrens" as very nearly coinciding with the floral pine-barrens.†

Effects of the Geologic Changes Described Above

27. In the light of this historical outline it should be easy to trace the development of the vegetation of the coastal plain from the Miocene uplift until the present. Ancestrally it must have consisted of purely American plants, and many of these, in all probability, were of southern extraction.‡ Of the 565 species found growing here, not counting weeds, 386 are listed as truly pine-barren. This does not mean that they are found nowhere else, but that so far as New Jersey is concerned these plants find their greatest development in the pine-barrens. There is a small element among them practically unknown outside of the pine-

* Fowler, H. W. Proc. Acad. Nat. Sci. Philadelphia 57: 662-664. 1905.

† Ann. Rept. New Jersey State Mus. 1909. Map (frontispiece) 1910.

‡ Over 180 species of the present flora of the pine-barrens range from New Jersey to Virginia and Florida.

barrens of New Jersey, such as *Abama americana*, *Sporobolus Torreyanus*, *Eupatorium resinosum*,* and *Juncus caesariensis*.*

28. Many species of southern affinities still reach their northern distribution outposts in or near the pine-barrens, or on Staten Island, or Long Island. Others, undoubtedly of southern affinity, reach their northern distribution in other parts of our area.

Southern Species Reaching Their Northern Distribution Point Within the Range of This Book

<i>Asplenium Bradleyi</i> ,	<i>Panicum ensifolium</i> ,
<i>Cheilanthes lanosa</i> ,	<i>Panicum lucidum</i> ,
<i>Lycopodium carolinianum</i> ,	<i>Panicum coeruleascens</i> ,
<i>Pinus virginiana</i> ,	<i>Panicum annulum</i> ,
<i>Pinus echinata</i> ,	<i>Panicum octonodum</i> ,
<i>Pinus pungens</i> ,	<i>Panicum paucipilum</i> ,
<i>Pinus serotina</i> ,	<i>Panicum leucothrix</i> ,
<i>Pinus Taeda</i> ,	<i>Panicum lanuginosum</i> ,
<i>Potamogeton confervoides</i> ,	<i>Panicum Commonsianum</i> ,
<i>Sagittaria subulata</i> ,	<i>Panicum oligosanthos</i> ,
<i>Sagittaria pubescens</i> ,	<i>Panicum scabriusculum</i> ,
<i>Sagittaria longirostra</i> ,	<i>Panicum cryptanthum</i> ,
<i>Coelorachis rugosa</i> ,	<i>Panicum aculeatum</i> ,
<i>Erianthus divaricatus</i> ,	<i>Sacciolepis striata</i> ,
<i>Erianthus saccharoides</i> ,	<i>Chaetochloa magna</i> ,
<i>Paspalum dissectum</i> ,	<i>Cenchrus tribuloides</i> ,
<i>Paspalum pubescens</i> ,	<i>Aristida oligantha</i> ,
<i>Paspalum laeve</i> ,	<i>Aristida lanosa</i> ,
<i>Paspalum plenipilum</i> ,	<i>Sporobolus clandestinus</i> ,
<i>Paspalum circulare</i> ,	<i>Agrostis altissima</i> ,
<i>Paspalum difforme</i> ,	<i>Danthonia epilis</i> ,
<i>Paspalum floridanum</i> ,	<i>Spartina cynosuroides</i> ,
<i>Panicum hemitonum</i> ,	<i>Gymnopogon ambiguus</i> ,
<i>Panicum amarum</i> ,	<i>Gymnopogon brevifolius</i> ,
<i>Panicum condensum</i> ,	<i>Uniola laxa</i> ,
<i>Panicum stipitatum</i> ,	<i>Poa autumnalis</i> ,
<i>Panicum angustifolium</i> ,	<i>Poa brachyphylla</i> ,
<i>Panicum aciculare</i> ,	<i>Elymus glabriflorus</i> ,
<i>Panicum polyanthes</i> ,	<i>Cyperus microdontus</i> ,

* Apparently unknown elsewhere in the world.

- Cyperus pseudovegetus*,
Cyperus refractus,
Cyperus retrofractus,
Cyperus lancastriensis,
Cyperus hystricinus,
Cyperus Torreyi,
Cyperus ovalaris,
Eleocharis flaccida,
Eleocharis simplex,
Eleocharis Torreyana,
Fimbristylis castanea,
Fimbristylis Baldwiniana,
Fimbristylis puberula,
Fimbristylis autumnalis,
Rynchospora pallida,
Rynchospora oligantha,
Rynchospora Kneiskernii,
Rynchospora axillaris,
Rynchospora filifolia,
Rynchospora gracilentia,
Rynchospora Smallii,
Rynchospora cymosa,
Rynchospora rariflora,
Psilocarya nitens,
Scleria setacea,
Carex nigromarginata,
Carex Meadii,
Carex striatula,
Carex styloflexa,
Carex debilis,
Carex caroliniana,
Carex Barrattii,
Carex Frankii,
Xyris fimbriata,
Xyris arenicola,
Xyris elata,
Eriocaulon decangulare,
Eriocaulon compressum,
Eriocaulon Parkeri,
Juncus gymnocarpus,
Juncus setaceus,
Juncus aristulatus,
Tofieldia racemosa,
Xerophyllum asphodeloides,
Helonias bullata,
Oceanorus leimanthoides,
Melanthium latifolium,
Uvularia nitida,
Clintonia umbellulata,
Smilax laurifolia,
Smilax Walteri,
Lophiola aurea,
Gymnadeniopsis integra,
Gymnadeniopsis nivea,
Blephariglottis cristata,
Pogonia divaricata,
Ibidium praecox,
Ophrys australis,
Tipularia unifolia,
Corallorhiza Wisteriana,
Saururus cernuus,
Myrica cerifera,
Castanea pumila,
Quercus triloba,
Quercus pagodaefolia,
Quercus marylandica,
Quercus Phellos,
Quercus nigra,
Quercus Michauxii,
Quercus imbricaria,
Quercus lyrata,
Quercus nigra,
Celtis georgiana,
Boehmeria Drummondiana,
Phoradendron flavescens,
Rumex altissimus,
Persicaria portoricensis,
Sesuvium maritimum,

- Talinum teretifolium*,
Alsine pubera,
Arenaria caroliniana,
Magnolia tripetala,
Viorna Viorna,
Viorna ochroleuca,
Ranunculus pusillus,
Cardamine arenicola,
Dentaria heterophylla,
Micranthes micranthidifolia,
Hydrangea arborescens,
Itea virginica,
Liquidambar Styraciflua,
Agrimonia rostellata,
Agrimonia parviflora,
Geum hirsutum,
Malus coronaria,
Aronia arbutifolia,
Crataegus uniflora,
Crataegus Canbyi,
Crataegus Boyntoni,
Aeschynomene virginica,
Stylosanthes biflora,
Meibomia ochroleuca,
Meibomia stricta,
Meibomia viridiflora,
Lespedeza repens,
Lespedeza oblongifolia,
Strophostyles umbellata,
Bradburya virginiana,
Galactia volubilis,
Xanthoxalis filipes,
Polygala lutea,
Polygala mariana,
Phyllanthus carolinensis,
Crotonopsis linearis,
Tithymalopsis Ipecacuanhae,
Tithymalus Darlingtonii,
Toxicodendron Toxicodendron,
Acer carolinianum,
Tilia Michauxii,
Vitis cordifolia,
Ascyrum stans,
Hypericum virgatum,
Hypericum gymnanthum,
Viola Stoneana,
Viola emarginata,
Viola striata,
Viola Rafinesquii,
Lechea racemulosa,
Ammannia Koehnei,
Lythrum lineare,
Rhexia mariana,
Rhexia aristosa,
Ludwigiantha brevipes,
Ludwigia linearis,
Ludwigia hirtella,
Raimannia humifusa,
Raimannia laciniata,
Kneiffia longipedicellata,
Kneiffia linearis,
Aralia spinosa (?),
Hydrocotyle ranunculoides,
Eryngium virginianum,
Eryngium aquaticum,
Oxypolis rigidior,
Pyxidantha barbulate,
Dodecatheon Meadia,
Fraxinus Michauxii,
Fraxinus biltmoreana,
Chionanthus virginica,
Sabbatia lanceolata,
Dasystephana villosa,
Dasystephana Porphyrio,
Obolaria virginica,
Nymphoides aquaticum,
Asclepias lanceolata,
Asclepias variegata,

<i>Vincetoxicum obliquum</i> ,	<i>Lobelia Nuttallii</i> ,
<i>Stylisma Pickeringeri</i> ,	<i>Lobelia Canbyi</i> ,
<i>Phlox paniculata</i> ,	<i>Vernonia glauca</i> ,
<i>Phacelia dubia</i> ,	<i>Eupatorium album</i> ,
<i>Scutellaria serrata</i> ,	<i>Eupatorium altissimum</i> ,
<i>Salvia lyrata</i> ,	<i>Eupatorium coelestinum</i> ,
<i>Monarda punctata</i> ,	<i>Kuhnia eupatorioides</i> ,
<i>Koellia aristata</i> ,	<i>Lacinaria graminifolia</i> ,
<i>Cunila origanoides</i> ,	<i>Chrysopsis mariana</i> ,
<i>Pentstemon pallidas</i> ,	<i>Solidago stricta</i> ,
<i>Gratiola sphaerocarpa</i> ,	<i>Solidago fistulosa</i> ,
<i>Gratiola pilosa</i> ,	<i>Euthamia floribunda</i> ,
<i>Micranthemum micranthemoides</i> ,	<i>Aster Lowrieanus</i> ,
<i>Agalinis Holmiana</i> ,	<i>Aster concinnus</i> ,
<i>Stomoisia juncea</i> ,	<i>Aster gracilis</i> ,
<i>Stomoisia virgatula</i> ,	<i>Gnaphalium Helleri</i> ,
<i>Utricularia fibrosa</i> ,	<i>Pluchea foetida</i> ,
<i>Bignonia radicans</i> ,	<i>Rudbeckia triloba</i> ,
<i>Ruellia parviflora</i> ,	<i>Rudbeckia fulgida</i> ,
<i>Oldenlandia uniflora</i> ,	<i>Rudbeckia speciosa</i> ,
<i>Diodia teres</i> ,	<i>Bidens bidentoides</i> ,
<i>Diodia virginiana</i> ,	<i>Mesadenia reniformis</i> ,
<i>Galium bermudense</i> ,	<i>Synosma suaveolens</i> ,
<i>Viburnum nudum</i> ,	<i>Senecio tomentosus</i> ,
<i>Viburnum prunifolium</i> ,	<i>Senecio Smallii</i> ,
<i>Viburnum Canbyi</i>	<i>Lactuca villosa</i> ,
<i>Triosteum perfoliatum</i> ,	<i>Lactuca floridana</i> ,
<i>Triosteum angustifolium</i> ,	<i>Nabalus virgatus</i> .
<i>Lobelia puberula</i> ,	

This southern element constitutes about 13 per cent. of our wild flora.

29. It would seem that many of these, and some northern species that are pine-barren plants, but are now found elsewhere on the coastal plain, have spread there since the release of the Beacon Hill formation from its last isolation. There are many species found now on the coastal plain of New Jersey and on Long Island whose distribution center, so far as our range is concerned, seems to have been the pine-barrens. Among those that give indication, by

their present extra-pine-barren distribution, of having spread from the pine-barrens since the last release of the Beacon Hill formation may be mentioned *Lycopodium carolinianum*, *Panicum oligosanthes*, *Amphicarpum Amphicarpum*, *Panicum ensifolium*, *Eriocaulon decangulare*, *Juncus caesariensis*, *Xerophyllum asphodeloides*, and *Agalinis Holmiana*.

30. At the advance of the ice there must have been a great invasion of this region by northern species, many of which are still to be found within our area. Just what the character of these plants was it is impossible to say with any degree of definiteness, although specimens of Canadian inter-glacial fossils indicate many genera, perhaps even species that exist in the north today. In the absence of any definite information, as to what this pre-glacial flora consisted of, it seems best to append a list of plants that while not certainly referable to pre-glacial conditions, are now known only from the north, reaching their southerly distribution point, at the present time, within the area covered by this work.

Northern Species Whose Southerly Distribution Outposts, in the East, Are Within Our Area

<i>Botrychium lanceolatum</i> ,	<i>Potamogeton natans</i> ,
<i>Botrychium silaifolium</i> ,	<i>Potamogeton Oakesianus</i> ,
<i>Polystichum Braunii</i> ,	<i>Potamogeton lateralis</i> ,
<i>Equisetum pratense</i> ,	<i>Potamogeton compressus</i> ,
<i>Equisetum littorale</i> ,	<i>Triglochin maritima</i> ,
<i>Equisetum variegatum</i> ,	<i>Scheuchzeria palustris</i> ,
<i>Lycopodium inundatum</i> ,	<i>Sagittaria Engelmanniana</i> ,
<i>Lycopodium alopecuroides</i> ,	<i>Poa debilis</i> ,
<i>Lycopodium adpressum</i> ,	<i>Panicularia laxa</i> ,
<i>Lycopodium annotinum</i> ,	<i>Panicularia canadensis</i> ,
<i>Isoetes macrospora</i> ,	<i>Panicularia grandis</i> ,
<i>Isoetes ambigua</i> ,	<i>Panicularia borealis</i> ,
<i>Isoetes Eatoni</i> ,	<i>Bromus Kalmii</i> ,
<i>Isoetes canadensis</i> ,	<i>Agropyron biflorum</i> ,
<i>Isoetes Tuckermanni</i> ,	<i>Panicum spretum</i> ,
<i>Pinus resinosa</i> ,	<i>Panicum boreale</i> ,
<i>Sparganium angustifolium</i> ,	<i>Panicum languidum</i> ,
<i>Sparganium fluctuans</i> ,	<i>Panicum xanthophysum</i> ,

- Savastana odorata*,
Milium effusum,
Oryzopsis pungens,
Oryzopsis asperifolia,
Sporobolus uniflorus,
Eriophorum alpinum,
Eriophorum callithrix,
Eriophorum tenellum,
Scirpus paludosus,
Scirpus fluviatilis,
Scirpus microcarpus,
Rynchospora capillacea,
Carex cephaloidea,
Carex diandra,
Carex exilis,
Carex sterilis,
Carex Howei,
Carex Crawfordii,
Carex Bebbii,
Carex Bicknellii,
Carex aena,
Carex pauciflora,
Carex novae-angliae,
Carex umbellata,
Carex abdita,
Carex tonsa,
Carex aurea,
Carex livida,
Carex formosa,
Carex castanea,
Carex pallescens,
Carex limosa,
Carex paupercula,
Carex Haydeni,
Carex Goodenowii,
Carex lenticularis,
Carex lasiocarpa,
Carex Oederi,
Carex cryptolepis,
Carex flava,
Carex monile,
Carex vesicaria,
Carex Tuckermani,
Carex retrorsa,
Carex oligosperma,
Carex Schweinitzii,
Carex Pseudo-Cyperus,
Arisaema Stewardsonii,
Xyris montana,
Juncus filiformis,
Juncus brachycephalus,
Juncus trifidus,
Juncus Greenei,
Juncus pelocarpus,
Vagnera trifolia,
Cypripedium candidum,
Limnorchis hyperborea,
Limnorchis dilatata,
Lysias Hookeriana,
Serapias Helleborine,
Ibidium strictum,
Peramium tessellatum,
Malaxis monophylla,
Corallorhiza Corallorhiza,
Salix lucida,
Salix pedicellaris,
Salix Bebbiana,
Salix candida,
Betula pumila,
Razoumofskya pusilla,
Dondia maritima,
Alsine borealis,
Moehringia lateriflora,
Nymphaea rubrodisca,
Nymphaea microphylla,
Actaea rubra,
Halerpestes Cymbalaria,
Thalictrum dasycarpum,

Cardamine pratensis,
Arabis viridis,
Arabis Drummondii,
Mitella nuda,
Ribes lacustre,
Ribes glandulosum,
Argentina littoralis,
Comarum palustre,
Fragaria canadensis,
Fragaria terrae-novae,
Geum Meyerianum,
Rubus pubescens,
Rubus pergratus,
Rubus Randii,
Rubus plicatifolius,
Rubus heterophyllus,
Rubus nigricans,
Rubus setosus,
Rosa gemella,
Rosa nitida,
Sorbus scopulina,
Amelanchier Bartramiana,
Crataegus Jesupi,
Crataegus filipes,
Crataegus Pringlei,
Lathyrus maritimus,
Astragalus carolinianus,
Hypericum majus,
Viola latiuscula,
Viola septentrionalis,
Viola Selkirkii,
Viola renifolia,
Viola incognita,

Epilobium adenocaulon,
Myriophyllum verticillatum,
Chamaepericlymenum canadense,
Moneses uniflora,
Ledum groenlandicum,
Rhodora canadensis,
Kalmia polifolia,
Andromeda canescens,
Vaccinium Brittonii,
Naumbergia thyrsiflora,
Cynoglossum boreale,
Lycopus membranaceus,
Limosella aquatica,
Rhinanthus Crista-galli,
Utricularia intermedia,
Utricularia minor,
Plantago maritima,
Galium labradoricum,
Lonicera hirsuta,
Lonicera canadensis,
Adoxa Moschatellina,
Campanula rotundifolia,
Lobelia Dortmanna,
Lobelia Kalmii,
Solidago macrophylla,
Aster junceus,
Aster Faxoni,
Aster longifolia,
Antennaria canadensis,
Bidens Beckii,
Petasites palmata,
Lactuca Morssii,
Hieracium canadense.

This northern element constitutes 8.32 per cent. of the wild flora.

31. Besides all these, there are hundreds more that are to be considered as of northern extraction, but are today found further south than our range. At the encroachment of the ice southward, all of these northern species or their progenitors must have been driven, so to speak, south of the edge of the terminal moraine,

there mingling with the then native flora, which in the case of the pine-barrens was isolated upon the Beacon Hill formation.

32. If, as seems probable, no very great refrigeration took place in this area,* it is within the realm of probability that the pine-barren vegetation existing then on the Beacon Hill formation was not very seriously disturbed climatically. We have geological evidence that this area was never subjected to any deposition of glacial material or over-wash; it contains no glacial terraces, for its elevation, perhaps greater then than now, precluded this. But the region surrounding Beacon Hill was in no such fortunate position. Having only recently emerged, comparatively, and boasting only a meager altitude it was more or less overrun with the material from the ice. The glacial terraces of the lower Delaware, the nature of the material deposited near Cape May and in Cumberland County all point to a local, or widespread subsidence of the region, which, however, did not affect the Beacon Hill formation as far as possible glacial influence is concerned. Furthermore, there is evidence in the sunken forests at Cape May mentioned above, and in the character of the present vegetation, of the effects of the encroachment of glacial material from the north, by way of the Delaware Valley.

33. In the region of these glacial terraces of the lower Delaware Valley and near Cape May, a few northern plants have been collected that seem to argue their glacial or at any rate northern, origin. Among the following list it is doubtful if any of the species are truly wild in the pine-barrens, but they have all been detected by Dr. Stone at Cape May.

<i>Botrychium virginianum,</i>	<i>Veratrum viride,</i>
<i>Calamagrostis canadensis,</i>	<i>Uvularia perfoliata,</i>
<i>Trisetum pennsylvanicum,</i>	<i>Allium canadense,</i>
<i>Poa brachyphylla,</i>	<i>Blephariglottis lacera,</i>
<i>Panicularia septentrionalis,</i>	<i>Blephariglottis peramoena,</i>
<i>Carex Buxbaumii,</i>	<i>Corallorhiza odontorhiza,</i>
<i>Arisaema Dracontium,</i>	<i>Peramium pubescens,</i>

* This is a conclusion warranted by our knowledge of modern glaciers. While the refrigeration must be very great near the source of glaciers, it is a well-known fact that at the edges, refrigeration diminishes greatly, particularly where the ice is thin, as it was in all probability near the moraine in New Jersey. It is a common characteristic of glaciers that plants are found almost up to the edge of the ice and sometimes on it. See Muhlenbergia 7: 103, 111, 121. 1912.

<i>Carpinus caroliniana,</i>	<i>Sanicula marilandica,</i>
<i>Betula nigra,</i>	<i>Angelica villosa,</i>
<i>Fagus grandifolia,</i>	<i>Cynoxylon floridum,</i>
<i>Quercus rubra,</i>	<i>Fraxinus pennsylvanica,</i>
<i>Aristolochia Serpentaria,</i>	<i>Menyanthes trifoliata,</i>
<i>Tovara virginiana,</i>	<i>Phlox maculata,</i>
<i>Liriodendron tulipifera,</i>	<i>Scutellaria pilosa,</i>
<i>Cimicifuga racemosa,</i>	<i>Scutellaria galericulata,</i>
<i>Anemone virginiana,</i>	<i>Koellia flexuosa,</i>
<i>Ranunculus hispidus,</i>	<i>Cunila origanoides,</i>
<i>Thalictrum revolutum,</i>	<i>Chelone glabra,</i>
<i>Menispermum canadense,</i>	<i>Pedicularis lanceolata,</i>
<i>Sanguinaria canadensis,</i>	<i>Pedicularis canadensis,</i>
<i>Micranthes pennsylvanica,</i>	<i>Galium circaezans,</i>
<i>Micranthes virginiensis,</i>	<i>Viburnum prunifolium,</i>
<i>Heuchera americana,</i>	<i>Triosteum perfoliatum,</i>
<i>Geum canadense,</i>	<i>Campanula aparinoides,</i>
<i>Agrimonia pubescens,</i>	<i>Aster macrophyllus,</i>
<i>Cassia marilandica,</i>	<i>Erigeron pulchellus,</i>
<i>Meibomia nudiflora,</i>	<i>Senecio aureus.</i>
<i>Ionoxalis violacea,</i>	<i>Cynthia virginica,</i>
<i>Cathartolinum virginianum,</i>	<i>Lactuca spicata,</i>

34. The distribution of *Tsuga canadensis* in lower New Jersey is, it seems to me, directly attributable to the glacial terraces found along the small depression areas in the lower Delaware River where the tree is now found. It is known only at one other station elsewhere on the coastal plain, in Maryland, but is, of course, common northward. There are a few more plants with a somewhat similar distribution in southern New Jersey, notably *Cercis canadensis*, which ranges southward, east of the Alleghanies, from these New Jersey and Pennsylvania stations.

35. Of the peculiar flora of the eastern side of the pine-barrens, called by Stone the "coastal strip," it is difficult to do more than give the list of species found there. None of these are known in the pine-barrens, some are found in the region of glacial terraces in the western part of the Cretaceous region, and others further north. That the coastal strip was ever affected by glacial material in any way seems very doubtful, as the drainage from the front

of the ice-sheet seems to have been via the Delaware. It is significant that so many northern plants have been found on this strip, and it seems very probable that all those "West Jersey" species found along the coast are migrants around the Beacon Hill formation since the final rising of the coastal plain as described in paragraphs 20 and 21. The list of these apparently extra-territorial species as detected by Dr. Stone follows:

<i>Ophioglossum vulgatum</i> ,	<i>Fragaria virginiana</i> ,
<i>Lycopodium complanatum</i>	<i>Sanguisorba canadensis</i> ,
<i>Potamogeton pectinatus</i> ,	<i>Rosa virginiana</i> ,
<i>Cinna arundinacea</i> ,	<i>Crataegus Crus-galli</i> ,
<i>Bromus purgans</i> ,	<i>Falcata comosa</i> ,
<i>Elymus striatus</i> ,	<i>Phaseolus polystachyus</i> ,
<i>Cyperus diandrus</i> ,	<i>Robertiella Robertiana</i> ,
<i>Carex lanuginosa</i> ,	<i>Polygala verticillata</i> ,
<i>Juncus articulatus</i> ,	<i>Celastrus scandens</i> ,
<i>Vagnera stellata</i> ,	<i>Hypericum boreale</i> ,
<i>Unifolium canadense</i> ,	<i>Myriophyllum tenellum</i> ,
<i>Liparis Loeselii</i> ,	<i>Samolus floribundus</i> ,
<i>Ibidium plantagineum</i> ,	<i>Sabbatia angularis</i> ,
<i>Populus tremuloides</i> ,	<i>Gentiana crinita</i> ,
<i>Morus rubra</i> ,	<i>Dasystephana Andrewsii</i> ,
<i>Parietaria pennsylvanica</i> ,	<i>Lycopus uniflorus</i> ,
<i>Silene stellata</i> ,	<i>Scrophularia leporella</i> ,
<i>Sagina procumbens</i> ,	<i>Helianthus giganteus</i> ,
<i>Moehringia lateriflora</i> ,	<i>Cirsium discolor</i> ,
<i>Aquilegia canadensis</i> ,	<i>Cirsium muticum</i> .
<i>Arabis lyrata</i> ,	

So much for the probable effects of the glacier on the coastal plain excluding the pine-barrens.

36. If the ice did not affect the pine-barrens geologically, so much as it did the surrounding country, there seems little doubt that it was at this time that many additions were made to the flora of that region. All of the following species, ranging as they do from the north to the pine-barrens of New Jersey show unmistakable evidences of having come down with the glacier. Many of them became isolated in bogs and other edaphically favorable places, such as were probably only to be found on or

near Beacon Hill at that time. Some have since spread from the true pine-barrens, but, as shown in paragraph 29, this was to be expected. The list of these northern species follows:

<i>Scheuchzeria palustris,</i>	<i>Mitella diphylla,</i>
<i>Panicularia obtusa,</i>	<i>Nemopanthus mucronata,</i>
<i>Carex exilis,</i>	<i>Zizia aurea,</i>
<i>Malaxis unifolia,</i>	<i>Gentiana crinita,</i>
<i>Anemone canadensis,</i>	<i>Aster nemoralis.</i>

37. There are doubtless other species and the same phenomenon has been noted by entomologists. Professor Smith writes of *Trechus chalybeus*, and a few other insects, "that the only trace of real boreal species has been found in the deep cold swamps (bogs) of Ocean County."

38. In this connection the distribution of the most remarkable plant of the pine-barrens, *Schizaea pusilla*, is very interesting. It is found only in the pine-barrens and in Nova Scotia and Newfoundland, and is unknown between these points. If Dr. Scharff's recently proposed theory* that perhaps parts of Nova Scotia and Newfoundland remained unglaciated through all the period of the Pleistocene is correct, then it is not impossible that *Schizaea* is a relict in the pine-barrens of its southern migration, and that it is also a relict in the north, all the intervening territory having been preempted first by the ice, secondarily by more "aggressive" plants after the recession of the ice. This is little more than interesting speculation, but Scharff, whether wrong or right in his contention, has opened up a wide field of discussion. It is certainly significant that *Schizaea* is not found in the unquestionably glaciated country, and is found only in the pine-barrens and in the [probably] unglaciated northeast. An almost similar distribution is that of *Aster nemoralis*, which is lacking in the intervening territory between its northern outposts in northern New York and Newfoundland and its southerly stations in New Jersey. All of these evidences—the geological history of the country, the isloa-

* Scharff, R. F. Distribution and origin of life in North America. New York. 1912. For further data on this point see also Adams, C. C. The Post-glacial dispersal of the North American Biota. Rept. Int. Geog. Cong. 8: 623-637. 1904. Allan, J. A. The geographical distribution of N. Am. Mammals. Bull. Am. Museum Nat. History 4: 199-243. 1892. Transeau, E. N. On the geographic distribution and ecological relations of the bog-plant societies in N. Am. Bot. Gaz. 36: 401-420. 1903.

tion of Beacon Hill and the consequent isolation of the ancient pine-barren flora upon it, the post-glacial migration of some of the pine-barren species, and finally the present distribution of the pine-barrens—coinciding as it does so closely with the Beacon Hill formation—seem incontestably to point to a geological explanation of the origin and present distribution of the pine-barrens. Such a conception of the origin of this phytogeographical region entails a readjustment of our ideas as to the relative age of the flora and of some related phenomena; for, if this theory is correct, then the pine-barrens can no more be considered as a new or pioneer vegetation, but rather as an old and climax condition, ancestrally infinitely more ancient than anything in the surrounding area.

39. Another feature of the flora of the coastal plain that seems to owe its existence to the action of the glacier is the finding on Long Island of *Pyrola chlorantha*, *Caltha flabellifolia*, *Linnaea americana* and *Campanula rotundifolia*. Whether there existed on Long Island, at the time of the glacier's extreme southern movement, any vegetation or not, is a matter that will be considered presently. But it is significant that these northern plants should have been found on the island. They are, or were, all rare on Long Island, but not so northward.

40. The extra-territorial distribution of some of the typical pine-barren plants throws some additional light on the theory that the pine-barrens are a phytogeographically isolated and ancient region. Particularly the finding of *Xerophyllum*, *Helonias*, and *Oceanorus*, to mention only a few, on the mountains of eastern Tennessee, is of interest. These and many more were found by Kearney* and more recently by Small, in geologically the most ancient area in America (Archaean). The hiatus in the distribution of these plants between the pine-barrens and these very old mountains is easily explainable by the isolation theory above advocated. The fact that they are wanting or very rare in the intervening territory would seem to present strong evidence of the unavailability of this intermediary area (most of it was under water), during the geological changes described above, for the perpetuation of the species now so far isolated. Furthermore, this

* The pine-barren flora in the East Tennessee Mountains. *Plant World* 1: 33-35. 1897. See also *Science* II. 12: 830-842. 1900.

southern isolation strongly favors the statement made above that most of the pine-barren flora was of southern extraction, for it is quite reasonable that the species found on the Tennessee mountains and in the pine-barrens of New Jersey are simply relicts of an ancient American southern flora that must, at one time, have covered a vastly greater area than it does today. The present nearly complete isolation and the post-glacial distribution of this southern flora, both it seems to me, favor this view.

41. There remains still to be considered the "pine-barren" plants of Long Island and Staten Island, not to mention regions further east. As Stone has shown, a good many of these alleged "pine-barren" plants are only coastal plain plants,* which are found, it is true, in the pine-barrens; but more commonly in the area surrounding them, frequently throughout the Atlantic seaboard from Massachusetts to Florida. It should be remembered in this connection that neither Long Island nor Staten Island are in the same geological category as Beacon Hill. For both the former were in part covered by the glacier and both were more or less within the influence of glacial activity.† It is, of course, a matter of pure speculation whether any vegetation persisted on Long Island during the Pleistocene or not, but the evidence, except for a few minor exceptions, seems to point to a negative probability. The admittedly fanciful picture drawn by Dr. Nichols of a supposed post-glacial tundra vegetation on Long Island‡ has practically nothing to support it. While it is true the three plants mentioned in paragraph 39 suggest a glacial origin, they may well have followed a regular migration path via Staten Island. The fact that *Linnaea*, *Pyrola chlorantha*, *Caltha flabellifolia* and *Campanula rotundifolia* are not now found on Staten Island means nothing, as they might readily have traversed the island long ago, and have been destroyed by conditions that are now unfavorable.

42. If, as seems probable, Long Island was without vegetative covering just after the final recession of the ice, then all of the New Jersey flora now found on Long Island must have had a post-glacial origin. The distribution of *Pinus echinata*, and the red

* Stone, W. *Loc. cit.* 73.

† Long Island was probably not covered wholly by glacial drift, but the sandy plain south of the moraine received considerable overwash material, now mixed with the underlying Tertiary sand and gravel.

‡ Nichols, G. E. The vegetation of Connecticut. *Torreyia* 13: 92-93. 1913.

squirrel may throw some light on the post-glacial chronology of events on Long Island. This pine is found in the region surrounding the pine-barrens, but is unknown, or very rare in them. *Pinus rigida*, the predominant tree of the barrens, is common on Long Island, but *Pinus echinata* mentioned above and the red squirrel are not known on the island.* From the geological outline given above it is very probable that *P. echinata* must have occupied the region surrounding the pine-barrens long after the last effects of the ice were past. This may also have been true of the red squirrel. At any rate, after a large post-glacial migration of alleged "pine-barren" plants, the avenue of migration must have been broken. The discontinuance of this passageway must, it seems to me, in all probability have been the controlling factor in the failure of *Pinus echinata* and the red squirrel to reach Long Island. It is curious in this connection that the pine, but not the animal, are found on Staten Island. There are, of course, many more species than this pine, which apparently reach their northern distribution point in the region surrounding Beacon Hill, or in Staten Island, never having been reported from Long Island. It seems probable that they came northward in post-glacial times, too late to avail themselves of the already destroyed avenue of migration. The following list gives some idea of the variety of plants that are found on Staten Island but are not definitely known on Long Island. That all these cases are attributable to the agency sketched above, may be doubtful, but at any rate the list is suggestive of what variation there is in the flora of the two islands.

Species Found on Staten Island But Not Known from Long Island

<i>Filix fragilis</i> ,	<i>Bromus purgans</i> ,
<i>Dryopteris Goldieana</i> ,	<i>Carex striatula</i> ,
<i>Pinus virginiana</i> ,	<i>Arisaema Dracontium</i> ,
<i>Pinus echinata</i> ,	<i>Lemna trisulca</i> ,
<i>Panicum polyanthes</i> ,	<i>Wolffia columbiana</i> ,
<i>Panicum commutatum</i> ,	<i>Helonias bullata</i> ,
<i>Agrostis Schweinitzii</i> ,	<i>Corylus rostrata?</i> ,
<i>Panicularia borealis</i> ,	<i>Asarum canadense</i> ,
<i>Panicularia septentrionalis</i> ,	<i>Coptis trifolia</i> ,

* The reported occurrence, also, of *Pinus virginiana* in Suffolk Co., L. I., by Miller and Young has not been verified.

<i>Caulophyllum thalictroides</i> ,	<i>Hydrophyllum virginicum</i> ,
<i>Podophyllum peltatum</i> ,	<i>Stachys arenicola</i> ,
<i>Bicuculla cucullaria</i> ,	<i>Stachys aspera</i> ,
<i>Bicuculla canadensis</i> ,	<i>Monarda punctata</i> ,
<i>Mitella diphylla</i> ,	<i>Koellia clinopodioides</i> ,
<i>Opulaster opulifolius</i> ,	<i>Mimulus alatus</i> ,
<i>Meibomia viridiflora?</i> ,	<i>Castilleja coccinea</i> ,
<i>Galactia regularis</i> ,	<i>Conopholis americana</i> ,
<i>Tithymalopsis corollata</i> ,	<i>Houstonia coerulea</i> ,
<i>Callitriche Austinii</i> ,	<i>Diervilla Diervilla?</i> ,
<i>Staphylea trifolia</i> ,	<i>Eupatorium rotundifolium</i> ,
<i>Cornus stolonifera</i> ,	<i>Eupatorium pubescens</i> ,
<i>Pyrola secunda</i> ,	<i>Aster Tradescanti</i> .

43. Of much less significance, geologically, are the following, which from their distribution should be found on Staten Island but are not recorded from there. They are all found on Long Island or recorded from there.

<i>Botrychium simplex</i> ,	<i>Eleocharis rostellata</i> ,
<i>Botrychium tenebrosum</i> ,	<i>Scirpus planifolius</i> ,
<i>Juniperus sibirica</i> ,	<i>Scirpus subterminalis</i> ,
<i>Sparganium lucidum</i> ,	<i>Scirpus Torreyi</i> ,
<i>Najas gracillima</i> ,	<i>Rynchospora corniculata</i> ,
<i>Helianthium parvulum</i> ,	<i>Rynchospora axillaris</i> ,
<i>Sagittaria teres</i> ,	<i>Psilocarya nitens</i> ,
<i>Panicum spretum</i> ,	<i>Scleria reticularis</i> ,
<i>Panicum implicatum</i> ,	<i>Scleria setacea</i> ,
<i>Panicum Addisonii</i> ,	<i>Scleria pauciflora</i> ,
<i>Panicum aculeatum</i> ,	<i>Scleria verticillata</i> ,
<i>Panicum Bicknellii</i> ,	<i>Carex incompta</i> ,
<i>Panicum lucidum</i> ,	<i>Carex atlantica</i> ,
<i>Panicum Wrightianum</i> ,	<i>Carex projecta</i> ,
<i>Muhlenbergia capillaris</i> ,	<i>Carex festucacea</i> ,
<i>Sporobolus uniflorus</i> ,	<i>Carex alata</i> ,
<i>Agrostis altissima</i> ,	<i>Carex nigro-marginata</i> ,
<i>Danthonia compressa</i> ,	<i>Carex abdita</i> ,
<i>Panicularia grandis</i> ,	<i>Carex tonsa</i> ,
<i>Eleocharis Robbinsii</i> ,	<i>Carex hirtifolia</i> ,
<i>Eleocharis tricostata</i> ,	<i>Carex polymorpha</i> ,

<i>Carex Shriveri</i> ,	<i>Lespedeza Stuevi</i> ,
<i>Carex oblita</i> ,	<i>Cathartolinum intercursum</i> ,
<i>Carex scabrata</i> ,	<i>Polygala incarnata</i> ,
<i>Carex Barrattii</i> ,	<i>Impatiens pallida</i> ,
<i>Carex Buxbaumii</i> ,	<i>Tilia Michauxii</i> ,
<i>Carex lacustris</i> ,	<i>Kosteletzkyia virginica</i> ,
<i>Carex Walteriana</i> ,	<i>Rhexia mariana</i> ,
<i>Carex lasiocarpa</i> ,	<i>Kneiffia linearis</i> ,
<i>Carex bullata</i> ,	<i>Pyrola chlorantha</i> ,
<i>Orontium aquaticum</i> ,	<i>Asclepias rubra</i> ,
<i>Xyris Congdoni</i> ,	<i>Onosmodium virginianum</i> ,
<i>Eriocaulon septangulare</i> ,	<i>Agalinis Holmiana</i> ,
<i>Chrosperma muscaetoxicum</i> ,	<i>Agalinis decemloba</i> ,
<i>Smilax tamnifolia</i> ,	<i>Lecticula resupinatu</i> ,
<i>Gyrotheca tinctoria</i> ,	<i>Vesiculina purpurea</i> ,
<i>Arethusa bulbosa</i> ,	<i>Utricularia geminiscapa</i> ,
<i>Myrica Gale</i> ,	<i>Utricularia fibrosa</i> ,
<i>Rumex hastatulus</i> ,	<i>Utricularia minor</i> ,
<i>Persicaria Careyi</i> ,	<i>Viburnum venosum</i> ,
<i>Amaranthus pumilus</i> ,	<i>Campanula americana</i> ,
<i>Sesuvium maritimum</i> ,	<i>Lobelia Nuttallii</i> ,
<i>Halerpestes Cymbalaria</i> ,	<i>Solidago speciosa</i> ,
<i>Adlumia fungosa</i> ,	<i>Solidago rigida</i> ,
<i>Arabis glabra</i> ,	<i>Euthamia floribunda</i> ,
<i>Drosera filiformis</i> ,	<i>Euthamia minor</i> ,
<i>Rubus Enslenii</i> ,	<i>Doellingeria infirma</i> ,
<i>Meibomia grandiflora</i> ,	<i>Helianthus angustifolius</i> ,
<i>Lespedeza Nuttallii</i> ,	<i>Coreopsis rosea</i> .

The much smaller size of Staten Island, and its consequently limited diversity of habitat, undoubtedly accounts for the failure of most of the plants in the above list to be found on the island. More knowledge on this point is, however, necessary, before we can assume mere chance or accident to have played such a large part in this curious relationship between the flora of Long Island and Staten Island.

47. There are still some features of the coastal plain vegetation that demand attention. One of these, the Hempstead Plains, near the western end of Long Island, forms an almost unique

region in the eastern states. There has been some difference of opinion as to whether this treeless area should be called a prairie or not, but at any rate the natural condition of the tract seems to be without shrubs or trees, except along the few water courses, both glacial and modern, that are found there. It has been suggested that the peculiar soil conditions are to be accounted for by an ice-jam, just to the north of the area in glacial times, which at the recession of the ice debouched a great amount of sand and gravel over what is now the Hempstead Plains. There seems to be some evidence of a congestion of morainic material towards the north, through which, owing to the great pressure of water and ice to the northward, a glacial stream, loaded with sand and gravel, is assumed to have forced its way. That such an assumption may be gratuitous in no way disposes of the very remarkable soil condition now found on this area, supporting as it does a flora that is characteristic. As in the case of the limestone regions in the north, it is doubtful if there are any endemic plants on the plains. But that there are many plants on this treeless area that are rare or perhaps wanting on other parts of our coastal plain is the fact. Some of these include the following, which are more common on or near the plains than in the surrounding region:

<i>Panicum lucidum,</i>	<i>Cathartolinum medium,</i>
<i>Panicum aculeatum,</i>	<i>Kneiffia riparia</i> (?),
<i>Fimbristylis puberula,</i>	<i>Dasystephana Saponaria,</i>
<i>Rubus flagellaris,</i>	<i>Agalinis decemloba</i> .*
<i>Lespedeza angustifolia,</i>	

There are many others and future exploration of this very interesting region will doubtless bring to light more information in regard to the origin of this peculiarly local prairie-condition.†

49. A peculiar condition has been noted in Connecticut by Dr. Nichols,‡ in regard to some coastal plain species. He has recorded among others the occurrence of the following in or near coastal Connecticut that are unknown on Long Island. They are all coastal plain species found southward, but not recorded from Long Island: *Meibomia sessilifolia*, *Myriophyllum pinnatum*,

* Apparently its only station in our range.

† Harper, R. M. The Hempstead Plains of Long Island. *Torreyia* 12: 277-287. 1912.

‡ Nichols, G. E. The vegetation of Connecticut. *Torreyia* 13: 89-112. 1913.

and *Schwalbea americana*. There are perhaps others and it has been suggested that these coastal plain species together with many more that are also found on Long Island, have reached Connecticut via a land bridge that is supposed to have stretched from Long Island to the Connecticut mainland in post-glacial times.* That such an assumption is necessary seems doubtful. It is easily understood how such coastal species found in Connecticut and not on Long Island might have followed along the north side of the Sound.

50. One other extra-territorial occurrence of coastal plain species should also be noted. Dr. N. L. Britton was the first to show that there existed in northern New Jersey and adjacent New York a small group of plants that are usually considered only coastal plain or pine-barren species.† This paper has been widely quoted as illustrating the distributional instability of some pine-barren species, but careful reading of Dr. Britton's paper shows that all the plants mentioned there, with one exception, are not pine-barren plants, strictly speaking, at all. They are all merely plants of the sandy coastal plain, *Corema Conradii*, a true pine-barren plant, being the one exception. The distribution of this species and of the many others now found isolated outside of the pine-barrens or the coastal plain is to be sought in the post-glacial history of the region to the north. In the general vegetative scramble, so to speak, to cover the country uncovered by the retreating ice, it seems natural that those plants whose ancestral home had been in sand, should "choose" sand as a stopping place. It would, in reality, be strange if they had done anything else, and it is significant that all the plants mentioned by Britton are sand plants. A list of those species that are found on the coastal plain and in locally sandy areas in the Kittatinny mountains in northwestern New Jersey and adjacent New York follows:

Pinus rigida,‡
Scleria pauciflora,
Juncus Greenei,

Polygonella articulata,
Cracca virginiana,
Lupinus perennis.

* Hollick, A. Plant distribution as a factor in the interpretation of geological phenomena, with special reference to Long Island and vicinity. Trans. N. Y. Acad. Sci. 12: 189-202. 1893.

† Britton, N. L. On the existence of a peculiar flora on the Kittatinny mountains of northwestern New Jersey. Bull. Torrey Club 11: 126-128. 1884, 14: 187. 1887.

‡ Reported as making a more exclusive growth than it usually does in the north.

Of course some of these are found in the intervening territory between the sandy stretches of northern New Jersey and adjacent New York and the coastal plain. But they are relatively scarce in this intermediate country.

51. That the distribution of all of the species mentioned in the preceding paragraphs has been controlled entirely by edaphic or historical factors is very doubtful. So many other minor considerations, such as methods of seed dispersal, longevity of seeds, the relative percentage of annuals, biennials, perennials, shrubs and trees, and so forth, may have been contributory factors that it would be dogmatic to assign the distribution trends of any one of them wholly to edaphic factors. But it seems as if these earth and water factors have been, on the whole, most active in deciding the general composition and complexion of the vegetation in our area. There are a few species that appear to be endemic in the range, but as to the factors contributing to this endemism nothing is known. The following are the species endemic in the area:

<i>Amphicarpon Amphicarpon,</i>	<i>Hypericum Bissellii,</i>
<i>Calamovilfa brevipilis,</i>	<i>Ludwigiantha brevipes,</i>
<i>Savastana Nashii,</i>	<i>Kneiffia Allenii,</i>
<i>Sporobolus Torreyanus,</i>	<i>Pyrola oxypetala,</i>
<i>Juncus caesariensis,</i>	<i>Vaccinium caesariense,</i>
<i>Uvularia nitida,</i>	<i>Dendrium buxifolium,</i>
<i>Salix squamata,</i>	<i>Stachys atlantica,</i>
<i>Dentaria incisifolia,</i>	<i>Eupatorium resinosum,</i>
<i>Dentaria anomala,</i>	<i>Euthamia floribunda,</i>
<i>Prunus Gravesii,</i>	<i>Helianthus Dalyi.</i>
<i>Hibiscus oculiroseus,</i>	<i>Senecio Crawfordii.</i>

It is of interest to note that of these 22 endemic species, 7 are peculiar to the pine-barrens, 9 to the glaciated region and 6 to the coastal plain, but the latter are not pine-barren species. However, the frequency of occurrence of these endemic species is greater with the pine-barren and coastal plain species than with those of the glaciated region, many of which have been collected only once or twice. As a criterion of endemism in our area the list is open to the objection, of course, that some plants here recorded as species would not be accepted as such by all writers. But as

illustrating a tendency towards the production of new *forms* the list is open to no such objection.

II. CLIMATIC FACTORS

52. In considering the effect of climate on the distribution of our flora we have to remember the salient fact, that, while it has not been so much of an ancient factor in deciding the general composition of the area as edaphic influences have been, it is very much of a controlling agency at the present day. Even in such a limited area as this there appear to be well marked climatic barriers, through which certain species are scarcely ever known to go.

53. To dispose at once of rainfall and the winds, which, in a temperate climate such as ours, are almost negligible, it is only necessary to record that the amount and distribution of the rainfall is such that, in any one part of our area, as against any other part, the differences are so slight, so much above minimum requirements, and so far below a maximum of the rain-forest conditions of the tropics, that it can be ignored; and that we have nothing in any way suggesting an aeolian influence affecting the distribution of our plants, with the possible exception of the purely local sand-drifting along the coast dunes. The highly suggestive results obtained by some observers, on the distribution of our native flora as affected by the varying degree of evaporation of available water, are not yet sufficiently comprehensive to be used in the present work.

54. The chief climatic factor then is temperature, and in attempting to arrive at some conclusion as to its effect on the distribution of the plants growing within the area many interesting problems have arisen. The most obvious method of taking the annual mean temperature as a basis of calculation comes to nothing as the differences in this are too slight to account for the very different vegetation in the Catskills where the mean temperature is 45° , and at Cape May, N. J., where the mean temperature is only 53° . The comparative similarity in the temperatures of the two places mentioned does not begin to express the great dissimilarity in the vegetation, nor does this similarity of mean temperature imply anything like a sufficiently operative climatic barrier, to maintain the *status quo* of the vegetation, so to speak.

55. Following the method used by some investigators of similar problems, who have held that the average maximum temperatures were the controlling factors, these were taken. But here again the comparative equality could offer no satisfactory solution, as in both places the maximum is about 90° . Then, too, the maximum temperatures in a region such as ours are so much below the physiological optimum, that it is difficult to conceive of their being operative on a sufficiently large scale to affect the distribution of the flora.

56. Reversing the process, and taking the average minimum temperatures, a procedure followed by still others, netted more suggestive results. The differences here are considerable, as the average minimum at Windham in the Catskills is -12° , while at Cape May in southern New Jersey it is 8° , a discrepancy of about 20° . This, however, is vitiated by the protective nature of the snow blanket which covers the colder region for the greater part of the winter; an advantage lacking in lower New Jersey, where, however, the increased temperatures during winter about equalize matters. Then, too, it has been shown that seeds can stand artificial temperatures enormously lower than are ever found in nature, so that plants which rely on their seeds for perpetuation must be indifferent to any natural minima. Against this average minimum temperature as a delimiting factor in the distribution of our local plants, also, is the protective dormancy of all the woody plants in the region, during the cold weather.

57. Merriam's "life zones," an attempt to plot out the more prominent belts of animal and vegetable life in North America upon the basis of temperature, was found to come more nearly to the known facts of the distribution of our local plants, than any of the above hypotheses. But while its general principles were found to hold good, the difficulty of using a scheme of continental scope upon a limited area was such that accuracy seemed unlikely.

58. Many investigators have thought that some method of reckoning the accumulated temperatures of a part of a season, or of all of it, would throw light on the problem, but the dangers here are many. Such a scheme, particularly when there is a large percentage of woody plants in the flora under consideration, leaves out of the calculation the stored up effect of heat units, generated during the previous season, when the very important operation

of the "setting" of the buds is originated. The writer regrets that he has not had the necessary time to apply, for at least a part of our flora, the very interesting results of Raunkiaer's "Growth Forms" to the present book. The recent appearance of this work and the great labor necessary for its application to our area, precluded what, it is hoped, may be the most effective study of the relationship between a flora and the climatic factors that has yet appeared.* It may form the basis of a future study.

59. During 1905 Dr. Cleveland Abbe brought out his work on the effect of climate on crops,† in which he treated the temperature factor from a somewhat different viewpoint. He satisfied himself that maximum and minimum temperatures, and that any method of reckoning accumulative temperatures were not the vital factors in this problem. His method, in short, was to take account not of the severity of the frosts but of the length of the growing season.

60. Experimental proof of the very close relation between the length of the growing season and crops is not lacking. The government, by moving northward certain strains of wheat to regions with a progressively diminishing growing season, has been able to get crops in regions, that, if the move had been made in one season, would have been impossible. The method of determining this length of the growing season is to add the number of days between the last killing frost in the spring and the first killing frost of autumn.

61. The application of this idea to our local flora range has brought out some interesting points. Examination of the map (*pl. 5*) shows that the length of the growing season in the Catskills and mountains of Pennsylvania is 117-123 days, at Cape May it is 220 days. Here is a difference of over three months in the growing season. All the figures have been determined by averaging the number of days between the killing frosts, for every station in the range, where records have been kept for ten years or more.

62. On the map (*pl. 5*) will be found a dark line running in a northeast-southwest direction. Every weather station north of

* Raunkiaer, C. Bot. Tidssk. 26: 1904; 30: 1909; 33: 1912. And other papers. See also Jour. Ecol. 1: 16-26. 1913. and Paulsen, O. Studies on the vegetation of the Transcasian lowlands. Second Danish Pamir Expedition Reports. Copenhagen, 1912.

† Abbe, C. First report on the relation between climate and crops. Bull. U. S. Weather Bureau 36: 1-386. 1905.

this line has a growing season of 153 days or less, everything south of it a growing season of 164 days, or more, usually much more. This arbitrarily drawn line seems to separate, roughly speaking, the northern plants from those more generally distributed. Of course there are many exceptions, but, so far as our area is concerned, it marks the southern limit of present distribution for many of our plants. The list of plants in paragraph 8, that are marked with an asterisk, are all plants that are found to the north of this line. They are all plants of the higher elevations of our range which, as it happens, are correlated with the shorter growing season. There are, however, no true alpine conditions to be found in this area.

63. In making use of this factor of the length of the growing season in the body of the work, the writer has added to the treatment of the distribution of each species on the different geological formations, two figures, thus: 117-220 days. This indicates that the species under discussion has been found, in our area, in regions with these extremes of growing season. It actually means that this particular species has been found from the Catskills to Cape May. In many species, one of these figures will be in bold faced type which, throughout the book, indicates that the species is more common in the region where the growing season approximates the bold-faced figure than elsewhere. The map (*pl.* 5) will have to be consulted, until one becomes familiar with these figures, in order to properly interpret this data.

SUMMARY

64. The relationship of the edaphic and climatic factors treated in the preceding paragraphs is an exceedingly complex one. To what proportion of either of these sets of factors, or to their combination, is to be attributed the distribution of any particular species, it is practically impossible to say. All that can be attempted is to set down the facts so far as we now know them. It is quite obvious that in a book such as this, the introduction to which is mostly, and the body of the work wholly, devoted to floristic plant-geography, the minute study of smaller categories of vegetation, such as associations and the like, must be omitted.

The study of a flora from the standpoint of its fitness for its environment, and the intimately related study of the environment

20°

10°

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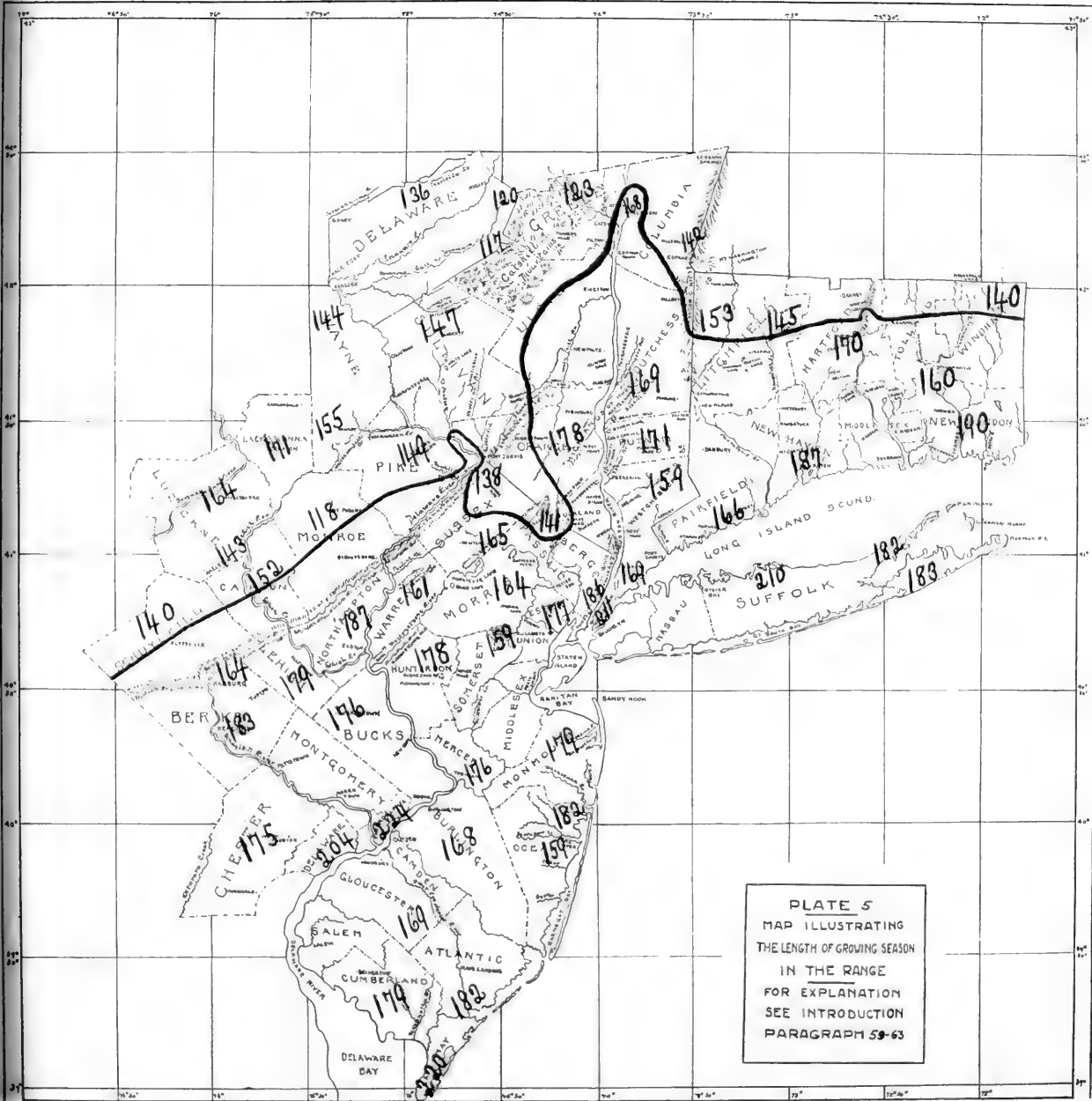
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as fitted to the existing flora, must help our understanding of the problems of agriculture and horticulture. For cultivated, as well as wild plants, respond to their environment, and any study of such response and the conditions that cause it, will help to solve the many, unsolved problems of cultivation. The relation of local floras to crop possibilities lies outside the scope of this book, but that there is such a relation and that our local flora can be used, to some extent, as a crop indicator, seems quite certain.

LIST OF LOCAL FLORAS OF THE TORREY CLUB RANGE

BY JOHN HENDLEY BARNHART

For the benefit of those who might be surprised at the brevity of this list, it may be well to explain that it is intended to enumerate only those publications which include all flowering plants known to their authors to occur within their respective areas.

GENERAL

(INCLUDING LOCALITIES IN MORE THAN ONE STATE)

1. **Barton, William Paul Crillon** (1786-1856). *Florae philadelphicae prodromus*. 100 pages. Philadelphia, 1815.

Area: "within ten miles around Philadelphia."

2. **Barton, William Paul Crillon** (1786-1856). *Compendium florae philadelphicae*: containing a description of the indigenous and naturalized plants found within a circuit of ten miles around Philadelphia. 2 vols. (Vol. 1. viii+251 pages. Vol. 2. 234 pages.) Philadelphia, 1818.

3. **Torrey, John** (1796-1873); **Eddy, Caspar Wistar** (1790-1828); **Knevels, D'Jurco V.** A catalogue of plants, growing spontaneously within thirty miles of the city of New York. 102 pages. Albany, 1819.

Published by the Lyceum of Natural History of New York.

4. [**Leggett, William Henry** (1816-1882).] [A revised catalogue of the plants, native and naturalized, within thirty-three miles of New York.] *Bull. Torrey Club* 1: 2. Ja; 7, 8. F; 9-11. Mr; 15, 16. Ap; 17, 18. My; 23, 24. Je; 25, 26. Jl; 32. Au; 33, 34. S; 40. O; 41, 42. N; 47, 48. D 1870; 2: 3, 4. Ja; 5, 6. F; 11, 12. Mr; 13, 14. Ap; 19, 20. My; 21, 22. Je; 28. Jl; 29, 30. Au; 35, 36. S; 37. O; 43. N; 44. D 1871; 3: 3, 4. Ja; 5, 6. F; 20. "Mr" [Ap]; 21. Ap; 28. My; 29. Je; 44. S; 45, 46. O; 52. N; 53. D 1872; 4: 3, 4. Ja; 5. F; 16. Ap; 17. My; 23, 24. Je; 25. Jl 1873; 5: 28. Je; 29. Jl; 36. Au; 37. S 1874.

5. [**Eaton, Daniel Cady** (1834-1895), and others.] A catalogue of the flowering plants and higher cryptogams growing without cultivation within thirty miles of Yale College. 72 pages. *map.* New Haven, 1878.

Published by the Berzelius Society, and commonly known as the "Berzelius Catalogue." Area includes most of Connecticut, and a part of Suffolk County, New York. Supplementary notes by **D. C. Eaton**, *Bull. Torrey Club* 10: 102 (S 1883) and by **Elihu Sanford Miller** (1848-), *Bull. Torrey Club* 10: 120, 121 (N 1883).

6. **Poggenburg, Justus Ferdinand** (1840-1893); **Britton, Nathaniel Lord** (1859-); **Sterns, Emerson Ellick, Brown, Addison** (1830-1913); **Porter, Thomas Conrad** (1822-1901); **Hollick, Charles Arthur** (1857-). Preliminary catalogue of Anthophyta and Pteridophyta reported as growing spontaneously within one hundred miles of New York City. xviii+90 pages. *map.* New York, 25 Ap 1888.

Published by the Torrey Botanical Club. Nomenclature revised and corrected by Britton, Sterns, and Poggenburg. Area the same as that of the present work.

7. **Keller, Ida Augusta** (1866-); **Brown, Stewardson** (1867-). Handbook of the flora of Philadelphia and vicinity, containing data relating to the plants within the following radius: eastern Pennsylvania, north to the Blue Mountains, and west to the Susquehanna; all of New Jersey except the northern counties; and New Castle County, Delaware. 360 + viii pages. Philadelphia, 1905.

Published by the Philadelphia Botanical Club.

CONNECTICUT

(See also nos. 5 and 6)

8. **Ives, Eli** (1779-1861). [Account of vegetable productions, found in New-Haven.] In: **Dwight, Timothy** (1752-1817). A statistical account of the city of New-Haven, pages 29-34. New Haven, 1811.

9. **Brace, John Pierce** (1793-1872). List of plants growing spontaneously in Litchfield and in its vicinity. *Am. Jour. Sci.* 4: 69-86, 292-309. 1822.

10. [**Ives, Eli** (1779-1861); **Tully, William** (1785-1859); **Leavenworth, Melines Conklin** (1796-1862).] Catalogue of the phenogamous plants, and of the ferns, found within five miles of Yale College. In: **Baldwin, Ebenezer** (1790-1837). *Annals of Yale College*, pages 264-302. New Haven, 1831.

Also as a re-paged separate, 38 pages, New Haven, 1831. Also reprinted in the second edition of the same work, on the same pages, New Haven, 1838.

11. **Case, George Reynolds** (1840-); **Setchell, William Albert** (1864-). A catalogue of wild plants growing in Norwich and vicinity, arranged in the order of flowering for the year 1882. 12 pages. Norwich, 1883.

Not seen; there were also two supplementary lists.

12. **Bishop, James Nathaniel** (1851-1906). A catalogue of all phaeogamous plants at present known to grow without cultivation in the state of Connecticut. *Rep. Conn. Board Agric.* 18: 317-332. 1885.

Also issued as a re-paged separate, 18 pages, Hartford, 1885. For second and third editions, see nos. 14 and 16.

13. **Leonard, Emily Josephine** (1837-1884). Catalogue of the phae-nogamous and vascular cryptogamous plants found growing in Meriden, Conn. (Incompleted.) Trans. Meriden Sci. Assoc. 1: i-iv, 1-40. 1885.

Posthumous. A supplementary list, by **Ella Bagnell Kendrick**, was published in Trans. Meriden Sci. Assoc. 2: 54-57. 1887.

14. **Bishop, James Nathaniel** (1851-1906). A catalogue of all phae-nogamous and vascular cryptogamous plants at present known to grow without cultivation in the state of Connecticut. 22 pages. Hart-ford, 1896.

[Second edition.] Also published, at about the same time, in Rep. Conn. Board Agric. 29: 236-256 (1896). For first edition, see no. 12; for third, no. 16. Additions and corrections appeared in Rep. Conn. Board Agric. 31: 258-261 (1898), also issued as a re-paged separate, 6 pages, Hartford, 1898.

15. **Andrews, Luman** (1839-). A list of the flowering plants and higher cryptogams growing upon the summit of Meriden Mountain, Conn. [13] pages. *photograph*. Southington, 1900.

Reprinted in Rep. Board Educ. Conn. 1901: 349-357 (1901).

16. **Bishop, James Nathaniel** (1851-1906). A catalogue of all phae-nogamous and vascular cryptogamous plants at present known to grow without cultivation in the state of Connecticut. 57 pages. Hartford, 1901.

[Third edition.] A separate, issued in advance, from Rep. Conn. Board Agric. 35: (1902), with which it appeared, in unchanged form, as a supplement. Additions, by **Alfred Waldo Driggs** (1875-), in Rhodora 4: 36-39 (10 F 1902), under the title: Notes on the flora of Connecticut.

17. **Rogers, Edna Eliza (Miner)** (1862-). Flora of Norwich. 33 pages. Hartford, 1902.

Conn. School Doc. 1902, no. 6, whole no. 213.

18. **Bissell, Charles Humphrey** (1857-); **Andrews, Luman** (1839-). Flora of the town of Southington, Conn., and its vicinity; a list of the fern and seed plants growing without cultivation. 118 pages. *map*. [Hartford,] 1902.

Conn. School Doc. 1902, no. 15 [whole no. 222].

19. **Graves, Charles Burr** (1860-); **Eames, Edwin Hubert** (1865-); **Bissell, Charles Humphrey** (1857-); **Andrews, Luman** (1839-); **Harger, Edgar Burton** (1861-); **Weatherby, Charles Alfred** (1876-). Catalogue of the flowering plants and ferns of Connecticut growing without culti-vation. 569 pages. Hartford, 1910.

Conn. Geol. Nat. Hist. Surv. Bulletin no. 14.

NEW YORK

(See also nos. 3, 4, 5, and 6)

20. **Colden, Cadwallader** (1688-1776). *Plantae Coldenhamiae in provincia noveboracensi amercies sponte crescentes*. Acta Soc. Sci. Upsal. 1743: 81-136. 1749; 1744-50: 47-82. 1751.

21. **Eddy, Caspar Wistar** (1790-1828). *Plantae plandomenses, or a catalogue of the plants growing spontaneously in the neighborhood of Plandome, the country residence of Samuel L. Mitchill*. Med. Repos. II. 5: 123-131. N 1807.

22. **LeConte, John Eatton** (1784-1860). *Catalogus plantarum quas sponte crescentes in insula noveboraco, observavit*. Am. Med. & Phil. Reg. 2: 134-142. O 1811.

23. **Mead, Samuel Barnum** (1799-1880). *A catalogue of plants growing spontaneously in the vicinity of North-Salem Academy*. Ann. Rep. Regents Univ. N. Y. 1831: 89-97. 1831; 1832: 101. 1832.

24. **Zabriskie, John Barrea** (1805-1848). *A catalogue of plants, indigenous and cultivated, found in the vicinity of Erasmus Hall*. Ann. Rep. Regents Univ. N. Y. 1835: 176-181. 1835.

25. **Torrey, John** (1796-1873). *Catalogue of plants [of New York State]*. Ann. Rep. Geol. Surv. N. Y. [4:] 117-197. [1840.]

26. **Torrey, John** (1796-1873). *A flora of the state of New-York*. 2 vols. (Vol. 1: ix+484 pages. plates 1-72. Vol. 2. 572 pages. plates 73-161.) Albany, 1843.

Constituting Part 2 of the Natural History of New York. In most copies the plates are plain, in some colored.

27. **Paine, John Alsop** (1840-1912). *Catalogue of plants found in Oneida county and vicinity*. Ann. Rep. Cab. Nat. Hist. N. Y. 18: 53-192. 1865.

Not a county flora, as implied by its title; it cites definite localities from all parts of the state except the coastal islands. Also issued as a re-paged separate. 140 pages.

28. **Miller, Elihu Sanford** (1848-); **Young, Henri Wilson** (1847-). *Catalogue of the phaenogamous and acrogenous plants of Suffolk County, Long Island*. 15 pages. Port Jefferson, [Ja] 1874.

Addenda by **H. W. Young**, Bull. Torrey Club 5: 33, 34 (Au 1874), and by **E. S. Miller**, Bull. Torrey Club 6: 155, 156 (My), 157 (Je), 171, 172 (Au 1877), 258, 259 (S 1878); 7: 17, 18 (F 1880).

29. **Hoysradt, Lyman Henry** (1848-). *Catalogue of the phaenogamous and acrogenous plants growing without cultivation within five miles of Pine Plains, Dutchess Co., N. Y.* xxxii pages. [1875-79].

Bull. Torrey Club 6: Supplement. Published at considerable intervals, in 8 parts of 4 pages each.

30. **Hollick, Charles Arthur** (1857-); **Britton, Nathaniel Lord** (1859-). The flora of Richmond County, New York. 36 pages. Staten Island, 1879.

Supplementary lists (mostly existing also as separates) by the authors in Bull. Torrey Club 7: 11, 12 (Ja 1880); 8: 48 (Ap 1881); 9: 149, 150 (D 1882); 12: 38-40 (Ap 1885); 13: 83, 84 (My 1886); 16: 132-134 (8 My 1889); 18: 213, 214 (1 Jl 1891); 22: 460-462 (30 N 1895); by **William Thompson Davis** (1862-), Proc. Nat. Sci. Assoc. Staten Isl. 3: (Ap and O 1893); 4: 83 (S 1895); 8: 5 (9 F 1901), 30, 31 (8 F 1902); 9: 22, 23 (14 My 1904); Proc. Staten Isl. Assoc. 1: 27, 28 (9 Jl 1906); by **C. A. Hollick**, Proc. Nat. Sci. Assoc. Staten Isl. 4: 55 (Ja 1895); and by **Philip Dowell** (1864-), Proc. Nat. Sci. Assoc. Staten Isl. 9: 41, 42 (Mr 1905); Proc. Staten Isl. Assoc. 1: 37-43 (9 Jl 1906); 3: 156-162 (25 Ap 1912).

31. **Stearns, Winfrid Alden** (1852-). List of plants of Fishkill, N. Y., and vicinity. 23 pages. [1880.]

32. **Willis, Oliver Rivington** (1815-1902). Report on the flora of Westchester County. In: **Bolton, Robert** (1814-1877). The history of the several towns, manors and patents of the County of Westchester. [Ed. 2.] 1: 771-826. New York, 1881.

Also issued separately, with a sheet of errata and additions. Additions by **Elizabeth Gertrude (Knight) Britton** (1858-), Bull. Torrey Club 13: 6, 7 (Ja 1886); and by **Edward Hartsinck Day** (1833-1895), Bull. Torrey Club 13: 94, 95 (Je 1886).

33. **Jelliffe, Smith Ely** (1866-). The flora of Long Island. xvi+160 pages. Lancaster, Pa., 1899.

Additions by **Abel Joel Grout** (1867-), Torreya 2: 49-53 (12 Ap 1902), and by **S. E. Jelliffe**, Torreya 4: 97-100 (21 Jl 1904).

NEW JERSEY

(See also nos. 1, 2, 3, 4, 6, and 7)

34. **Knieskern, Peter D.** (1798-1871). A catalogue of plants growing without cultivation in the counties of Monmouth and Ocean, New Jersey. 41 pages. Trenton, 1857.

Ann Rep. Geol. Surv. N. J. 1856: Suppl. Also issued as a separate.

35. **Willis, Oliver Rivington** (1815-1902). Catalogue of plants growing without cultivation in the state of New Jersey. xxi+71 pages. New York, 1874.

36. **Willis, Oliver Rivington** (1815-1902). Catalogue of plants growing without cultivation in the state of New Jersey. Revised and enlarged edition. xxx+88 pages. *map.* New York, [1877].

Additions in Bull. Torrey Club 6: 252. Au 1878.

37. **Britton, Nathaniel Lord** (1859-). A preliminary catalogue of the flora of New Jersey. xiii+233 pages. New Brunswick, 1881.

A publication of the Geological Survey of New Jersey.

38. **Britton, Nathaniel Lord** (1859). Catalogue of plants found in New Jersey. Geol. Surv. N. J. Final Rep. State Geol. 2: 25-642. "1889" [My 1890!].

Also issued as a separate, with original pagination, "1889" [1890].

39. **Stone, Witmer** (1866-). The plants of southern New Jersey, with especial reference to the flora of the pine barrens and the geographic distribution of the species. Ana. Rep. N. J. State Mus. 1910: 23-828. *plates 1-129*. "1911" [26 Ja 1912].

Also as a separate, with original pagination, on thicker paper, with title-pages for two volumes; these also erroneously dated 1911.

PENNSYLVANIA

(See also nos. 1, 2, 6, and 7)

40. **Darlington, William** (1782-1863). *Florula cestricea: an essay towards a catalogue of the phenogamous plants, native and naturalized, growing in the vicinity of the borough of West Chester, in Chester County, Pennsylvania*. xv+152 pages. West Chester, 1826.

41. **Darlington, William** (1782-1863). *Flora cestricea: an attempt to enumerate and describe the flowering and filicoid plants of Chester County, in the state of Pennsylvania*. xxiii+640 pages. *map*. West Chester, 1837.

42. **Darlington, William** (1782-1863). *Flora cestricea: an herborizing companion for the young botanists of Chester County, state of Pennsylvania*. Third edition. c+498 pages. *map*. Philadelphia, 1853.

In counting this as the "third" edition, the author reckoned the *Florula* of 1826 as the first edition of the *Flora*.

43. **Smith, George** (1804-1882). *Botany of Delaware County*. In his: *History of Delaware County, Pennsylvania*, pages 416-433. Philadelphia, 1862.

44. **Moyer, Isaac Shoemaker** (1838-1898). An enumeration of the indigenous and naturalized plants found growing in Bucks County. In: **Davis, William Watts Hart** (1820-1910). *The history of Bucks County, Pennsylvania, Appendix*, pages 3-27. Doylestown, Pa., 1876.

The appendix containing this flora was also issued as a separate. For a revised edition, see no. 48.

45. **Dudley, William Russel** (1849-1911). A preliminary list of the vascular plants of the Lackawanna and Wyoming valleys. *Proc. & Coll. Lackawanna Inst.* 1: 29-112. 1887.

46. **Dudley, William Russel** (1849-1911); **Thurston, Charles Orion** (1857-). A catalogue of the flowering plants and vascular cryptogams found in and near Lackawanna and Wyoming valleys, Pa. xvi+96 pages. Wilkesbarre, Pa., 1892.

Additions by **C. O. Thurston**, 15 pages, Ap 1895, Wyo. Sem. Sci. Dep. Bull. no. 1.

47. **Porter, Thomas Conrad** (1822-1901). Flora of Pennsylvania. xv+352 pages. *map*. Easton, Pa., [15 Au] 1903.

Posthumous; edited by **John Kunkel Small** (1869-).

48. **Moyer, Isaac Shoemaker** (1838-1898). Flora. An enumeration of indigenous and naturalized plants found growing in Bucks County, Pennsylvania. In: **Davis, William Watts Hart** (1820-1910). History of Bucks County, Pennsylvania. Second edition. 2: Appendix, pages 3-54. 1905.

Revised by **Clayton Detweiler Fretz** (1844-). Also in a separate (including zoological lists).

49. **Fussell, Linnaeus** (1842-1907). List of Delaware county plants. Proc. Delaware Co. Inst. Sci. 1: 49-76. Ap 1906.

Additions by **Francis Whittier Pennell** (1886-) in Proc. Delaware County Inst. Sci. 4: 68-74. 23 Mr 1909.

50. **Pennell, Francis Whittier** (1886-). Flora of the Conowingo Barrens of southeastern Pennsylvania. Proc. Acad. Nat. Sci. Phila. 62: 541-566. 13 D 1910; 567-584. 14 Ja 1911.

Additions by **F. W. Pennell** in Proc. Acad. Sci. Phila. 64: 520-534 (30 Ja); 535-539 (13 F 1913).

51. **King, Wilbur Lewis** (1871-). The flora of Northampton county, Pennsylvania. Torreyia 12: 97-107. 10 My; 124-132. 11 Je; 165-173. 11 Jl; 183-189. 9 Au; 208-215. 3 S 1912.

Additions by **Eugene Abraham Rau** (1848-), in Torreyia 12: 287-289 (13 D 1912).

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EXPLANATORY NOTE

Bold face type, used as a designation for a region or part of one, indicates greater frequency of occurrence than in regions not so designated. The terms Tertiary, Cretaceous and so forth do not apply to fossil species, only to the distribution of the present flora on the different geological formations as exposed in the area.

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CATALOGUE OF PLANTS

PTERIDOPHYTA*

OPHIOGLOSSACEAE

Veins reticulate; sporanges cohering in a distichous spike.

1. OPHIOGLOSSUM.

Veins free; sporanges distinct, borne in spikes or panicles.

2. BOTRYCHIUM.

1. *Ophioglossum* [Tourn.] L.

1. *O. vulgatum* L. (*O. arenarium* E. G. Britton). In moist meadows and thickets: Me. and Que. to Alask., south to Tex.

Scattered throughout the range, except the pine-barrens.

2. *Botrychium* Sw.

Buds of the following season wholly concealed within the base of the common stalk; sterile blade more or less fleshy; cells of the epidermis straight.

Sporophyl and sterile blade both erect in the bud.

1. *B. simplex*.

Sporophyl or sterile blade, or both, at least slightly bent over in the bud.

Buds glabrous; sterile blade usually pinnate or in No. 6 sometimes subternate; spores maturing in early summer.

Sterile blade with the tip bent over in the bud, clasping the erect sporophyl, entire or with 1-3 pairs of small segments.

2. *B. tenebrosum*.

Sterile blade and sporophyl both bent over in the bud.

Sterile blade distinctly stalked.

3. *B. neglectum*.

Sterile blade closely sessile.

6. *B. lanceolatum*.

Buds pilose; sterile blades subternately divided; spores maturing in late summer or fall.

Sterile blades membranous in drying; segments mostly acutish, serrulate to lacinate.

Segments mostly acute or acutish, serrulate-dentate.

4. *B. obliquum*.

Segments lacinate, often deeply so.

5. *B. dissectum*.

Sterile blades thick, leathery in drying, 10-20 cm. broad; segments obtuse, crenate to sinuate.

7. *B. silaifolium*.

Buds of the following season exposed along one side; sterile blade very thin; cells of the epidermis flexuose.

8. *B. virginianum*.

* Taxonomic treatment contributed by Miss Margaret Slosson. The general distribution, as stated for the first three families, follows *North American Flora*, the remaining families mainly "Illustrated Flora."

1. **B. simplex** E. Hitchcock. In meadows and pastures: N. S. to Pa. and westward. Also in Europe.

N. Y. On L. I. and up the Hudson Valley to Dutchess Co.

N. J. Near Plainfield; reported from near Newton, Sussex Co.

PA. Monroe, Northampton, Berks and Montgomery counties.

A rare and scattered species whose distribution is not fully understood; perhaps not distinct from the next.

2. **B. tenebrosum** A. A. Eaton. In rich moist woods and swamps: N. Eng. to Pa. Rare in our area, and scattered.

CONN. Granby, Goshen, West Goshen, Oxford and New Milford.

N. Y. Near Riverhead, L. I.

PA. Near Mountainville, Lehigh Co.

3. **B. neglectum** Wood. In grassy woods and swamps: N. S. to Pa., west to Ohio and Sask. Also in Europe.

CONN. Rare, but throughout the state.

N. Y. Reported but not definitely known from L. I., otherwise known only from northern Westchester Co. **northward**.

N. J. Cranberry Lake, Sussex Co. (according to Mackenzie); reported from near Riddleton, Salem Co.

PA. Wayne, Monroe, and Lehigh counties.

Tertiary, 0: Cretaceous, 0: Older Formations, increasing **northward**. 117-210 days.* Sea level-4,020 ft.

4. **B. obliquum** Muhl.: Willd. In moist woods or thickets: N. H. to Wisc. south to Ga. and Ark. Also in Jamaica.

Widely distributed throughout the range except the pine-barrens.

5. **B. dissectum** Spreng. In low woods or thickets or on wooded slopes: N. Eng. to Va., Ky. and Ind.

Throughout the range, less common in the pine-barrens than elsewhere.

6. **B. lanceolatum** (S. G. Gmel.) Angs. In meadows and moist woods: Greenl. and N. S. to Pa., west to Colo., Wash. and Alask. Also in Eu. and Asia.

CONN. Rare and local over most of the state.

N. Y. Westchester and Rockland counties, increasing and becoming common **northward**.

N. J. Bergen, Passaic, Morris, Warren and Sussex counties. Rare.

* For explanation of these figures see Introduction paragraphs 59-63.

PA. Near Mt. Pleasant, Wayne Co., and Fleetwood, Berks Co.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Not south of the moraine. 117-189 days. Sea level-4,020 ft.

7. **B. silaifolium** Presl. In moist open places: N. Eng. and N. Y., to Wisc., west to Alaska and U. Calif. Rare in our area.

CONN. Fairfield, Litchfield and New Haven counties.

N. J. Newton. N. Y. Westchester, Columbia and Greene counties.

8. **B. virginianum** (L.) Sw. In rich woods: B. Col., south to Mex. and the W. I. Also in Eu. and Asia.

Throughout the range, except in the pine-barrens; always increasing **northward**.

The reported occurrence in Conn. of *B. Lunaria* (L.) Sw. has not been verified. It is otherwise unknown in our area.

OSMUNDACEAE

1. *Osmunda* [Tourn.] L.

Blades bipinnate, some of them fertile at the apex.

1. *O. regalis*.

Herbaceous blades bipinnatifid.

Pinnae of sterile blade with a tuft of tomentum at the base; blades normally dimorphous.

2. *O. cinnamomea*.

Pinnae of sterile blade not so tufted; blades normally fertile only in the middle.

3. *O. Claytoniana*.

1. ***O. regalis*** L. In low swamps, woods or marshes: E. N. Am., Mex. and the W. I. Also in S. Am., Eu., Asia and S. Af.

Common throughout the range.

2. ***O. cinnamomea*** L. In low places: Eastern N. Am., Mex. and the W. I. Also in Asia.

Common throughout the range.

3. ***O. Claytoniana*** L. In swamps and moist woods: Newf. to Minn., south to N. Car. and Mo. Also in India and China.

Throughout the range, except in the pine-barrens and east and south of them; always increasing **northward**.

SCHIZAEACEAE

Leaves short, tufted, rigid, the sterile simple.

1. SCHIZAEA.

Leaves elongate, climbing, compound; leaflets palmately lobed.

2. LYGODIUM.

1. *Schizaea* J. E. Smith.

1. *S. pusilla* Pursh. In wet pine-barrens: N. J. Also in Newf. and N. S.

Locally common in and, in our area, confined exclusively to the pine-barrens of New Jersey,* and to Seaside Park along the coast in Ocean Co.

2. *Lygodium* Sw.

1. *L. palmatum* (Bernh.) Sw. In low woods and thickets: N. H. and Mass., south to Fla., Ky. and Tenn.

CONN. Rare in the eastern part of the state.

N. J. Saddle River, Bergen Co., rare; increasing **southward**; not recorded along the coast and at Cape May.

PA. Monroe, Luzerne, Carbon, Bucks, and Schuylkill counties.

A rare scattered plant.

POLYPODIACEAE

Leaves strongly dimorphous, the fertile ones with divisions greatly contracted, brownish, berry-like or necklace-like.

Sterile blades deeply pinnatifid; veins freely anastomosing.

Sterile blades deeply 2-pinnatifid; veins free.

Leaves mostly uniform, or if dimorphous the fertile blades flat, the divisions green, not as above.

Sori dorsal upon the veins, not marginal.

Sori roundish.

Indusium wholly or partially inferior.

Indusium wholly inferior, the divisions stellate or spreading.

Indusium attached by its base at one side of the sorus, hood-shaped, withering.

Indusium, if present, superior.

Stipes jointed to the rootstock; indusia wanting.

Stipes continuous with the rootstock; indusia present in most species.

Indusium (in our species) orbicular-peltate, centrally attached.

Indusium, if present, orbicular-reniform, attached at its sinus.

Sori oblong to linear.

Sori in chain-like rows parallel to the midrib and rachises.

Leaves uniform; veins free between the sori and margin.

1. ONOCLEA.

2. MATTEUCCIA.

3. WOODSIA.

5. FILIX.

18. POLYPODIUM.

6. POLYSTICHUM.

7. DRYOPTERIS.

8. ANCHISTEA.

* See introduction paragraph 38.

- Leaves dimorphous; veins of sterile blade freely anastomosing.
- Sori oblique to the midribs or irregularly disposed.
- Veins free; sori all oblique to the midribs, single on the side of the veinlets next a midvein, or crossing the veinlets and recurved.
- Sori with rare exceptions single.
- Sori often single, often recurved.
- Veins freely anastomosing; sori variously disposed.
- Sori borne at or very near the margin.
- Sporanges borne within a special cup-shaped indusium.
- Sporanges not borne within a special cup-shaped indusium; sori with indusia formed entirely or in part by the revolute or reflexed more or less modified leaf-margins.
- Sori distinct, borne on the under side of the reflexed lobes.
- Sori wholly or partially confluent.
- Sori borne on a vein-like receptacle connecting the ends of the free veinlets; indusium double.
- Sori borne at or near the ends of the free veinlets; indusia single.
- Leaves dimorphous.
- Leaves uniform or nearly so.
- Sori confluent, forming a wide sub-marginal band; segments smooth or nearly so.
- Sori distinct or contiguous; segments usually pubescent, tomentose or scaly.
9. LORINSERIA.
11. ASPLENIUM.
12. ATHYRIUM.
10. CAMPTOSORUS.
4. DENNSTAEDIA.
13. ADIANTUM.
14. PTERIDIUM.
15. CRYPTOGRAMMA.
16. PELLAEA.
17. CHEILANTHES.

I. *Onoclea* L.

- I. *O. sensibilis* L. In moist soil: Newf. to Sask., south to Okl. and the Gulf States.

Common throughout the range except the pine-barrens.

2. *Matteuccia* Todaro (*Struthiopteris* Willd.)

- I. *M. Struthiopteris* (L.) Todaro. In moist thickets, especially along streams: N. S. to Va., west to Br. Col. and Iowa. Also in Eu. and Asia.

CONN. Throughout the state but rare, more common in the Connecticut River Valley and northward than elsewhere.

N. Y. The region of the Catskills, in Delaware and Greene counties.

N. J. Reported from but not recently collected in northern Bur-

lington Co., thence unknown except in Sussex, Warren and Hunterdon counties, all within the drainage of the Delaware. PA. Monroe, Northampton and Bucks counties.

Tertiary, o: Cretaceous, o: Older Formations, rare and local, apparently increasing **northward**, especially up the valley of the Delaware. 123-189 days. Sea level-2,300 ft.

3. *Woodsia* R. Br.

Indusium small and inconspicuous, the divisions narrow or filiform; stipes jointed near the base; blades with more or less rusty chaff beneath.

1. *W. ilvensis*.

Indusium ample, the divisions broad, early spreading; stipes not jointed.

2. *W. obtusa*.

1. *W. ilvensis* (L.) R. Br. On exposed rocks: Lab. to Alaska, south to N. Car., Ky. and Iowa. Also in Greenl., Eu. and Asia.

CONN. Throughout the state, nowhere common.

N. Y. Reported but not definitely known from L. I., unknown on S. I., rare and local in Westchester and Rockland counties, increasing **northward**.

N. J. Hunterdon, Somerset and Union counties, **northward**.

PA. Pike, Wayne, Monroe, Luzerne, Northampton, Montgomery and Bucks counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 118-189 days. Sea level-3,900 ft.

2. *W. obtusa* (Spreng.) Torrey. On rocks: N. S. and Me. to Wisc., south to Ga., Ala. and Tex. Also in Alaska and Br. Col.

CONN. Throughout the state, not common.

N. Y. Near Greenport, L. I., rare on S. I., thence increasing **northward**.

N. J. Monmouth, Hunterdon, and Somerset counties **northward**.

PA. Northampton, Lehigh, Bucks, Delaware and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 117-220 days. Sea level-4,020 ft.

4. *Dennstaedtia* Bernh.

1. *D. punctilobula* (Michx.) Moore. In various situations: N. S. and N. B. to Ont. and Minn., south to Ga., Ala. and Mo.

Throughout the range, except in the pine-barrens; rare on L. I. and S. I. and southern New Jersey.

5. *Filix* Adans. (*Cystopteris* Bernh.)

Blades broadest at the base, long-tapering, bearing bullbeets beneath, minutely glandular.

1. *F. bulbifera*.

Blades lanceolate, short-pointed, without bullbeets or glands.

2. *F. fragilis*.

1. **F. bulbifera** (L.) Underw. On wet rocks and in ravines: Newf. to Man., Wisc. and Iowa, south to northern Ga., Ala. and Ark. Also in Utah.

CONN. Rare and local near the coast and in the eastern part of the state, increasing **northward**.

N. Y. Dutchess, Columbia and Greene counties in the Hudson Valley, not reported from the Catskills.

N. J. Warren, Morris, Bergen, Passaic and Sussex counties.

PA. Monroe, Northampton and Bucks counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**, and especially on limestone. 123-189 days. Sea level-2,580 ft.

2. **F. fragilis** (L.) Gilib. On rocks and in moist grassy woods: Newf. and Lab. to Alask., south to Ga., Ala., Kan., Ariz. and S. Cal. Also in Greenland and the Old World.

CONN. Throughout the state.

N. Y. Unknown on L. I., rare on S. I., thence increasing **northward**.

N. J. Reported from Camden and Monmouth counties, north and west of the pine-barrens, thence increasing **northward**.

PA. Pike, Luzerne, Monroe, Northampton and Lehigh counties.

Tertiary, o: Cretaceous, very rare and perhaps only adventive: Older Formations, increasing **northward**. 118-189 days. Sea level-3,800 ft.

6. *Polystichum* Roth.

Leaves normally simply pinnate, the upper pinnae soriferous and contracted.

1. *P. achrostichoides*.

Leaves bipinnatifid or bipinnate, the soriferous pinnae not contracted.

2. *P. Braunii*.

1. **P. achrostichoides** (Michx.) Schott. In woods and on hill-sides: N. S. to Ont. and Wisc., south to Tex. and the Gulf States.

Throughout the range except the pine-barrens.

2. **P. Braunii** (Spenner) Fée. In rocky woods: N. S. to Alask., to northern N. Eng., the mountains of Pa. to Mich. and Br. Col.

N. Y. The Catskills in Ulster, Delaware and Greene counties.
PA. The mountains of Luzerne Co.

Tertiary, 0; Cretaceous, 0; Older Formations, rare and local at high elevations. Not south of the moraine. 117-143 days. 1450-4020 ft.

7. *Dryopteris* Adans.

Indusia present.

Texture membranous; veins simple or once forked.

Lower pinnae gradually and conspicuously reduced.

Lower pinnae scarcely or not reduced.

Veins once or twice forked, at least in the sterile leaves.

Veins simple.

Texture firmer, sometimes subcoriaceous; veins freely branched.

Blades 2-pinnatifid or 2-pinnate; segments not spinulose, leaves $1\frac{1}{2}$ '-5' high; rachis naked or deciduously chaffy; indusia not glandular.

Indusia flat, thin.

Blades narrow, linear-oblong to lanceolate; sori nearly medial; scales at base of stipe light brown, concolorous.

Blades broader, narrowly oblong, ovate or triangular ovate; sori near the midvein.

Apex not abruptly acuminate, pinnae broadest at base; sori 3-7 pairs; scales at base of stipe brown with dark centers.

Apex short-acuminate, often abruptly so; pinnae broadest above the base; sori 6-10 pairs, scales of stipe more or less blackish-brown.

Indusia convex, firm; sori close to the margin.

Blades 2-3-pinnate; segments spinulose or mucronate; blades ovate-lanceolate, triangular, or broadly oblong, usually not narrowed below.

Indusia glabrous or nearly so; pinnae usually somewhat oblique to the rachis, the lowest broadly and unequally ovate to triangular.

Pinnules flat, decurrent; sori terminal on the veinlets; indusia glabrous; scales pale, concolorous; leaves $3\frac{1}{2}$ '-9' broad.

Pinnules concave, some not decurrent; sori mostly subterminal; indusia glabrous or with a few glands; scales dark brownish; leaves ample, 4'-16' broad.

Indusia glandular; pinnae usually at right angles, the lowest unequally lanceolate to ovate-lanceolate.

1. *D. noveboracensis*.

2. *D. Thelypteris*.

3. *D. simulata*.

4. *D. cristata*.

5. *D. Clintoniana*.

6. *D. Goldieana*.

7. *D. marginalis*.

8. *D. spinulosa*.

9. *D. dilatata*.

10. *D. intermedia*.

Indusia wanting.

Basal pinnae sessile or partially adnate; rachis more or less alate.

Blades usually longer than broad; rachis and midveins freely chaffy; under surfaces pilose.

11. *D. Phegopteris*.

Blades usually broader than long; rachis and midveins scarcely scaly; under surfaces slightly pubescent.

12. *D. hexagonoptera*.

Basal pinnae long-stalked, approaching the terminal portion in size; rachis not alate.

13. *D. Dryopteris*.

1. **D. noveboracensis** (L.) A. Gray. In moist woods and thickets: Newf. to Ont. and Minn., south to Ga., Ala. and Ark.
Common throughout the range except the pine-barrens.
2. **D. Thelypteris** (L.) A. Gray. In marshes and wet woods; rarely in dry soil: N. B. to Man., south to Fla., La. and Tex. Also in Europe and Asia.
Throughout the range, but less common in the pine-barrens than elsewhere.
3. **D. simulata** Davenp. In swamps: Me. to Md. Reported from Mo.
Rare and scattered over most of our area, more common in the pine-barrens than elsewhere.
4. **D. cristata** (L.) A. Gray. In wet woods and swamps: Newf. to Sask., south to Va., Ky., Ark., Neb. and Idaho. Also in Eu. and Asia.
Throughout the range, except in the pine-barrens.
5. **D. Clintoniana** (D. C. Eaton) Dowell. In swampy woods: Me. and Ont. to Wisc. and N. Car.
Throughout the range, except on the coastal plain of New Jersey, there recorded from a single station in Camden Co., from which it has not been recently collected.
6. **D. Goldieana** (Hook.) A. Gray. In rich woods: N. B. to Minn., south to N. Car., Tenn. and Iowa.
CONN. Scattered over most of the state, but rare, increasing **northwestward**.
N. Y. Rare and local on S. I., not reported from L. I., increasing **northward**.
N. J. Hunterdon, Warren, Morris (according to Mackenzie) and Essex counties; reported from Sussex Co.
PA. Northampton, Lehigh, Bucks, Montgomery, Berks, Delaware and Chester counties.
Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 117-220 days. Sea level-3,900 ft.

7. *D. marginalis* (L.) A. Gray. In rocky woods and on banks: N. S. to Br. Col., south to Ga., Ala., Ark., Kan. and Okl.
Common throughout the range except in the pine-barrens and east and south of them, there not recorded.
8. *D. spinulosa* (Mull.) Kuntze. In rich low woods: Lab. to Selkirk and Idaho to Va. and Ky. Also in Europe.
Common throughout Conn., N. Y., and Pa.
N. J. Rare and local in Gloucester, Burlington and Ocean counties, north and west of the pine-barrens, thence increasing **northward**.
Tertiary, 0: Cretaceous, rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,980 ft.
9. *D. dilatata* (Hoffm.) A. Gray. In mountains: Newf. to Alaska, Calif., Idaho, Tenn. and N. Car. Also in Eurasia, Greenland, Japan and the Madeira Islands.
N. Y. The higher Catskills in Greene and Delaware counties.
N. J. Sussex, Warren and Morris counties.
PA. Lackawanna, Pike and Monroe counties.
Tertiary, 0: Cretaceous, 0: Older Formations, confined to the north. Not south of the moraine. 117-138 days. 800-4,020 ft.
10. *D. intermedia* (Muhl.) A. Gray. In moist woods: Newf. to Wisc., south to N. Car. and Tenn.
Common throughout the range, except in the pine-barrens.
11. *D. Phegopteris* (L.) C. Ch. Moist woods and thickets: Newf. to Alask., Va., Mich. to Wash. Also in Greenl., Eu. and Asia.
CONN. Rare along the coast, increasing **northward**.
N. Y. Not definitely known from L. I. or S. I., reported from the former; rare and local in northern Westchester Co., increasing **northward**.
N. J. Local in Sussex Co. and Warren Co. (according to Mackenzie); unknown elsewhere.
PA. Luzerne, Pike, Monroe and Schuylkill counties.
Tertiary, 0: Cretaceous, 0: Older Formations, rare and local **northward**. 117-140 days. Sea level-3,980 ft.
12. *D. hexagonoptera* (Michx.) C. Ch. In dry woods and on hillsides; Que. to Minn., Fla., La., Kan. and Okl.
CONN. Rare near the coast, increasing **northwestward**.
N. Y. Rare on L. I. and S. I., increasing **northward**, and becoming common in the Catskills.

N. J. Rare and very local in Gloucester, Ocean and Monmouth counties, thence increasing **northward**; not recorded from the pine-barrens.

PA. Throughout the range.

Tertiary, 0: Cretaceous, rare: Older Formations, increasing **northward**. 117-220 days. Sea level-4,020 ft.

13. **D. Dryopteris** (L.) Britton. In moist woods and thickets: Newf. and Lab. to Alask., south to Va., Kan., Colo. and Ore. Also in Greenland, Eu. and Asia.

CONN. Rare over most of the state, increasing **northwestward**.

N. Y. Reported from, but doubtfully on L. I., otherwise recorded only from the Catskills.

N. J. From Hunterdon, Somerset and Union counties, northward; also at "Calico" in the pine-barrens, but surely there adventive. Rare and local.

PA. Throughout the area, except in Chester, Delaware and Philadelphia counties, there not recorded.

Tertiary, 0: Cretaceous, 0: Older Formations, increasing **northward**. 117-189 days. Sea level-3,900 ft.

The following hybrids have been described and are to be looked for wherever, in our range, both the supposed parents occur:

DRYOPTERIS CLINTONIANA × GOLDIEANA Dowell.

DRYOPTERIS CLINTONIANA × INTERMEDIA Dowell.

DRYOPTERIS CLINTONIANA × MARGINALIS Slosson.

DRYOPTERIS CLINTONIANA × SPINULOSA Benedict.

DRYOPTERIS CRISTATA × GOLDIEANA Benedict.

DRYOPTERIS CRISTATA × INTERMEDIA Dowell, = *D. Boottii*.

(Tuckerm.) Underw.

DRYOPTERIS CRISTATA × MARGINALIS Davenport.

DRYOPTERIS CRISTATA × SPINULOSA (Milde) C. Chr.

DRYOPTERIS GOLDIEANA × INTERMEDIA Dowell.

DRYOPTERIS GOLDIEANA × MARGINALIS Dowell.

DRYOPTERIS GOLDIEANA × SPINULOSA Benedict.

DRYOPTERIS INTERMEDIA × MARGINALIS Benedict.

DRYOPTERIS MARGINALIS × SPINULOSA Slosson.

8. **Anchistea** Presl.

1. **A. virginica** (L.) Presl. In swamps, often in deep water: N. S. to Ont. and Mich., south to Fla., La. and Ark. Also in Bermuda.

Throughout the range, rare in the north, increasing **southward**, specially in the pine-barrens.

9. *Lorinseria* Presl.

1. *L. areolata* (L.) Presl. In swamps and moist soil: Me. to Fla., Tenn., La. and Ark., also in Mich.

CONN. Not uncommon along the coast, decreasing inland and perhaps wanting northward.

N. Y. Common on L. I. and S. I., not certainly known elsewhere.

N. J. Rare in Bergen, Essex, Morris (according to Mackenzie), Union, Mercer and Somerset counties, increasing and common **southward**, especially in the pine-barrens.

PA. Bucks and Delaware counties, mostly on Trenton gravels.

Tertiary, common: Cretaceous, common: Older Formations, scattered, increasing **southward**. 158-220 days. About sea level.

10. *Camptosorus* Link.

1. *C. rhizophyllus* (L.) Link. In shaded situations; usually on rocks: Que. to Minn., Ga., Ala. and Kan.

CONN. Throughout the state, but rare, increasing **northwestward**.

N. Y. From Westchester and Rockland counties, **northward**.

N. J. Union and Hunterdon counties, increasing **northward**.

PA. Throughout the range.

Tertiary, 0: Cretaceous 0: Older Formations, most common on limestone, but found on a large variety of rocks and even on wood. 117-220 days. Sea level-3,900 ft.

11. *Asplenium* L.*

Blades pinnatifid or pinnate only below, the apices long-attenuate; stipe dark brownish below, green above; rachis green.

Blades 1-3-pinnate, the apices not long attenuate.

Blades normally 1-pinnate only.

Stipe and rachis blackish, reddish or purplish-brown throughout; sori medial or nearer the midvein.

Fertile leaves rigidly erect; pinnae more or less auriculate.

Fertile leaves spreading like the sterile; pinnae not auriculate.

Stipe dark only at the base, green above like the rachis; blades 12-25 dm. long.

Blades 2-3-pinnatifid.

Stipe and rachis green throughout.

Stipe dark brownish, at least towards the base.

Stipe dark at base, greenish above; rachis green; blades deltoid-ovate to deltoid-lanceolate.

Stipe and lower rachis, at least, dark chestnut-brown.

1. *A. pinnatifidum*.

2. *A. platyneuron*.

3. *A. Trichomanes*.

4. *A. pycnocarpon*.

5. *A. Ruta-muraria*.

6. *A. montanum*.

7. *A. Bradleyi*.

* See Introduction paragraph 6.

1. **A. pinnatifidum** Nutt. On rocks: Conn. and N. Y. to Mo., south to Ga., Ala., and Ark.

A very rare species recorded in our area near Southington and Sharon, Conn., Blairstown, Warren Co., N. J., and in Chester and Philadelphia counties in Pa. Most common on limestone, but by no means confined to it.

2. **A. platyneuron** (L.) Oakes. On rocks and banks: Me. and Ont. to Colo., south to the Gulf States. Also in S. Africa.

Common throughout the range, less so in the pine-barrens than elsewhere; more common, in the north, on limestone than on other rocks.

3. **A. Trichomanes** L. On rocks: nearly throughout N. Am., except Mex. and Arctic Am. Also in Eu. and Asia.

Throughout our range except in N. J., south of New Brunswick, Middlesex Co.; not uncommon; reaching its best development on limestone.

4. **A. pycnocarpon** Spreng. (*A. angustifolium* Michx.). In moist woods and shaded ravines: Que. to Wisc., south to Ga., Ala., Mo. and Kan.

CONN. Rare in New Haven, Hartford and Litchfield counties, increasing **northwestward**.

N. Y. The Catskills in Greene and Delaware counties.

PA. Berks Co.

Tertiary, o: Cretaceous, o: Older Formations, rare and scattered, most common on limestone. 117-189 days. Sea level-3,980 ft.

5. **A. Ruta-muraria** L. Usually on limestone: Vt. to S. Ont. and Mich., south to Ala. and Mo. Also in Eu., Asia and N. Africa.

CONN. Rare and local in northern New Haven counties, increasing **northwestward**; unknown from the east or along the coast.

N. Y. Westchester and Rockland counties, **northward**.

N. J. Sussex, Warren, Passaic and Morris counties.

PA. Northampton, Lehigh and Bucks counties.

Tertiary, o: Cretaceous, o: Older Formations, almost exclusively confined to limestone rocks, but also on trap rock in N. Y. and Conn. 117-189 days. Sea level-3,080 ft.

6. **A. montanum** Willd. On dry and moist rocks: Conn. and N. Y. to Ohio, Ga., Ala. and Ark.

CONN. Rare and scattered over most of the state, more common **northwestward** than elsewhere.

N. Y. Ulster, Sullivan, Delaware and Greene counties.

N. J. Mt. Tammany and above Philipsburg, Warren Co., otherwise unknown.

PA. Pike, Lackawanna, Carbon, Monroe, Lehigh and Northampton counties.

Tertiary, 0: Cretaceous, 0: Older Formations, increasing generally westward and northward. 117-189 days. Sea level-3,980 ft.

7. **A. Bradleyi** D. C. Eaton. On rocks: N. Y. to Ga., Ala., Ark. and Mo.

Known in our area only from the predominately limestone region in the Shawangunk Mountains in Ulster Co., N. Y., an area north of the moraine with a growing season of about 128-140 days.

A hybrid, *Asplenium platyneuron* × *Camptosorus rhizophyllus*, long known as *Asplenium ebenoides* R. R. Scott, has been recorded. It is to be looked for in our area wherever both the parent plants occur.

12. *Athyrium* Roth.

Blades bipinnatifid; segments lightly crenate-serrate.

1. *A. thelypteroides*.

Blades bipinnate; segments variously incised or deeply serrate.

2. *A. Filix-foemina*.

1. **A. thelypteroides** (Michx.) Desv. (*A. acrostichoides* (Sw.) Diels). In rich moist woods: N. S. to Minn., Mo. and Ga.

CONN. Rare southward, increasing northwestward.

N. Y. Rare on L. I. and S. I., increasing northward.

N. J. Very rare in Monmouth Co., increasing northward, unknown elsewhere.

PA. Throughout the area.

Tertiary, 0: Cretaceous, very rare; Older Formations; increasing northward. 117-220 days. Sea level-3,850 ft.

2. **A. Filix-foemina** (L.) Roth. In woods and thickets: Newf., B. Col., the Gulf States and Cal. Also in Eu. and Asia.

Throughout the range, less common southward, especially in the pine-barrens.

13. *Adiantum* [Tourn.] L.

1. **A. pedatum** L. In woods: N. S. and Que. to Alaska, south to Ga., La., Kan.; Rocky Mts. to Utah and Cal. Also in Asia.

Throughout the range except in the pine-barrens and the region east and south of them, there not recorded.

14. *Pteridium* Scop. (*Pteris* L.)

1. *P. aquilinum* (L.) Kuhn. In thickets or open situations: throughout most of N. Am. Nearly cosmopolitan.

Throughout the range in some of its numerous forms, apparently less common in Conn. than elsewhere in our range.

15. *Cryptogramma* R. Br.

1. *C. Stelleri* (S. G. Gmel.) Prantl. On rocks: Lab. to Alaska, Pa., Iowa, Wisc. and Colo. Also in Asia.

A rare and local species, confined in our area to regions with limestone or trap-rock formations, but not coextensive with these formations in the range. It has so far been collected only from New Haven, Kent, Brookfield and Salisbury, Conn., and from Godwinville, Morton and Dyke, Bergen Co., N. J.

16. *Pellaea* Link.

1. *P. atropurpurea* (L.) Link. On rocks: Ont. to Br. Col. and Mackenzie, Ga., Miss., Tex. and Cal. Reported from Mex.

CONN. Bolton and Guilford, thence increasing **northwestward** towards the limestone regions.

N. Y. Orange, Dutchess, Greene and Ulster counties.

N. J. Sussex, Morris, Warren and Hunterdon counties.

PA. Northampton, Monroe, Lehigh and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, most common on limestone, but found also on gneiss and trap rocks. 123-220 days. Sea level-2,700 ft.

17. *Cheilanthes* Sw.

1. *C. lanosa* (Michx.) Watt. On rocks: Conn. and southern N. Y. to Ga., west to Kan. and Tex.

CONN. New Haven.

N. Y. Not uncommon in Manhattan and the Bronx and up the Hudson Valley to near Poughkeepsie; unknown elsewhere.

N. J. Scattered from Hunterdon, Union and Essex counties **northward**.

PA. Monroe, Northampton, Bucks, Berks and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, more common on limestone and on trap than other rocks. 123-220 days. Sea level-2,980 ft.

18. *Polypodium* [Tourn.] L.

1. *P. vulgare* L. On rocks or rocky banks: Lab. and Newf. to Man., south to Ga., Ala. and Mo.

Common throughout the range, except in the pine-barrens and east and south of them, there not recorded.

MARSILEACEAE

1. *Marsilea* L.

1. *M. quadrifolia* L. Locally rare in eastern U. S. Native of Asia and Europe.

Known in our area only from Bantam Lake, Litchfield Co., and North Cromwell, Middlesex Co., Conn. and from a few scattered pools where it has been unquestionably introduced. Very doubtfully endemic in Am.

SALVINIACEAE

Leaves 12-18 mm. long, 2-ranked, on mostly simple stems.

1. SALVINIA.

Leaves minute, closely imbricated on pinnately branching stems.

2. AZOLLA.

1. *Salvinia* Adans.

1. *S. natans* (L.) Hoffm. Perry Co., Mo., and near Minneapolis, Minn. Reported from Central N. Y. Also Europe and Asia.

Known in our area only from near Silver Lake, S. I., N. Y., where it is introduced.

2. *Azolla* Lam.

1. *A. caroliniana* Willd. Floating on still water: Ont. and Mass. to Br. Col., south to Fla., Ariz. and Mex. Also in Trop. Am.

Known in our area only from a small pond in Clove Valley, S. I., N. Y., there introduced; and in the Morris Canal near Bloomfield, N. J.

EQUISETACEAE

1. *Equisetum* L.

Stems annual; stomata scattered.

Stems of two kinds, the fertile appearing in early spring, before the sterile.

Fertile stems simple, soon withering; branches of sterile stems solid, 3-angled, their sheaths 4-toothed; silex in punctiform dots.

Fertile stems branched when old, only the apex withering.

1. *E. arvense*.

Branches simple, solid, 3- or 4-5-angled, their sheaths 3-toothed, their first internodes not exceeding the stem-sheath; silex in flat spines arranged in threes. 2. *E. pratense*.

Branches compound, solid, the primary 4-5-angled, the secondary 3-angled; silex in double rows of hooked spinules. 3. *E. sylvaticum*.

Stems all alike; spores maturing in summer; branches simple or none.

Sheaths rather loose; branches usually long; stems bushy below, attenuate upwards.

Central cavity of stem very small, spike long; branches hollow, 4-7-angled, their sheaths mostly 5-toothed; silex in cross-bands. 4. *E. palustre*.

Central cavity of stem larger, the other air-cavities usually present under both the ridges and grooves of the stem; spike short, commonly with abortive spores lacking elaters; branches simple, 3-5-angled, hollow or solid. 5. *E. littorale*.

Sheaths appressed, branches usually short; central cavity of stem very large, cavities present under the ridges, lacking under the grooves; branches hollow. 6. *E. fluvatile*.

Stems mostly perennial, evergreen; spikes tipped with a rigid point; stomata in regular rows.

Stems 0.8-1.2 m. long, usually many-grooved, rarely with a few branches; teeth of the leaves soon deciduous; silex in two indistinct lines of tubercles. 7. *E. hyemale*.

Stems very slender, 1.5-9 dm long, tufted, usually 5-10-grooved; central cavity small; teeth tipped with a deciduous bristle. 8. *E. variegatum*.

1. ***E. arvense* L.** In sandy soil, along roadsides, etc.: Newf. and Greenl. to Alaska, south to Va. and Cal. Also in Eu. and Asia.

Scattered throughout the range.

2. ***E. pratense* Ehrh.** In sandy places: N. S. and Rupert River to Minn. and Alaska, south to N. J. Iowa and Colo. Also in Eu. and Asia.

CONN. Rare; in the Housatonic Valley near Oxford and Newton. N. Y. Perhaps near N. Y., but not definitely known.

N. J. Closter, Bergen Co., rare; Sparta, Sussex Co.

A rare and scattered species, perhaps more widely distributed than seems apparent.

3. ***E. sylvaticum* L.** In moist sandy woods and thickets: Newf. and Greenl. to Alaska, south to Va. and Iowa. Also in Eu. and Asia.

Scattered in most parts of our range.

4. *E. plaustre* L. In wet places: N. S. to Alaska, Conn., western N. Y., Ill. and Ariz. Also in Eu. and Asia.

Reported in our area, only from Lyme and East Windsor, Conn., on the banks of the Connecticut River.

5. *E. littorale* Kuehl. On sandy river and lake shores: N. B. and Ont. to N. J. and Pa. west to Br. Col. Also in Europe.

Known only from the banks of the Delaware in Hunterdon and Warren counties in N. J. and Bucks and Delaware counties in Pa.

6. *E. fluviatile* L. In swamps and along borders of streams. N. S. to Alaska south to Va., Neb. and Wash. Also in Eu. and Asia.

Scattered throughout the range, except the pine-barrens and the region east and south of them, there not recorded.

7. *E. hyemale* L. In wet places and on banks; especially along rivers: throughout nearly all N. Am., Eu. and Asia.

Scattered throughout the range, except the pine-barrens and the region east and south of them, there not recorded.

8. *E. variegatum* Schleich. Lab. and Greenl. to Alaska south to Conn., western N. Y., Neb. and Nev. Also in Eu. and Asia.

CONN. Rare in Litchfield Co. Unknown elsewhere.

Known elsewhere in our area only at Closter, Bergen Co., N. J.

Equisetum scirpoides Michx. has been collected as a waif in Conn. The record of *E. laevigatum* A. Br. from N. J. is unverifiable.

LYCOPODIACEAE

I. *Lycopodium* L.

Sporophylls not closely associated in terminal spikes.

Leaves distinctly broadest above the middle, there usually erose-denticulate.

Leaves linear or nearly so, entire or minutely denticulate.

Sporophylls closely associated in terminal spikes.

Sporophylls similar to the foliar leaves in form and texture; sporanges subglobose.

Sporophylls linear-deltoid, mostly entire; peduncles one or rarely two.

Sporophylls linear to lanceolate from a broader base; peduncles usually several.

Peduncles slender; the leaves incurved and mostly appressed; spikes slender.

Peduncles stout; the leaves more numerous and mostly ascending; spikes stout.

1. *L. lucidulum*.

2. *L. porophyllum*.

3. *L. inundatum*.

4. *L. adpressum*.

5. *L. alopecuroides*.

Sporophylls bract-like, very unlike the foliar leaves; sporanges reniform.

Stems with numerous erect or assurgent leafy aerial branches, the spikes terminal upon some of these.

Leaves of the ultimate aerial branches in more than five rows.

Main stem creeping deep in the ground; aerial branches few, tree-like.

6. *L. obscurum*.

Main stem prostrate; aerial branches numerous, not tree-like.

Spikes solitary, sessile.

7. *L. annotinum*.

Spikes solitary to several, on elongate peduncles.

8. *L. clavatum*.

Leaves of the ultimate aerial branches in four rows, adnate considerably more than half their length; spikes borne upon bracteate peduncles, these terminal upon leafy branches.

Ultimate aerial branches conspicuously flattened; leaves of the under row greatly reduced, minute, deltoid-cuspidate.

9. *L. complanatum*.

Ultimate aerial branches narrower and less flattened; leaves of the under row scarcely reduced, acicular.

10. *L. tristachyum*.

Stems without leafy aerial branches, the elongate peduncles arising directly from the prostrate stem.

11. *L. carolinianum*.

1. ***L. lucidulum*** Michx. In cold damp woods: Newf. to B. Col. south to S. Car., Tenn. and Iowa.

CONN. Scattered over the state.

N. Y. Dutchess, Ulster, Greene and Delaware counties, and near Baldwins, L. I.

N. J. Rare and local in Gloucester and Camden counties, near the Delaware, increasing **northward**; not in the pine-barrens.

PA. Throughout.

Tertiary, 0: Cretaceas, rare; Older Formations increasing **northward**. 117-207 days. Sea level-3,365 ft.

2. ***L. porophilum*** Lloyd & Underw. On partially shaded rocks, especially on sandstone: Pa. to Wisc., Ind. and Ala.

Known in our area only from Raymond's Kill Falls, Pike Co., Pa., a region underlain by shale.

3. ***L. inundatum*** L. In sandy bogs: Newf. to Alaska, south and west to N. J., Pa., Ill., Mich., Idaho and Wash. Also in Europe and Asia.

CONN. Southington.

N. J. (C. F. Austin.)

PA. Monroe, Carbon, Schuylkill, and Luzerne counties.

4. *L. adpressum* (Chapm.) Lloyd & Underw.* Wet sandy soil: Conn. to the Gulf States.

Occasional near the coast: Conn. to S. N. J. and at Tullytown, Pa.

5. *L. alopecuroides* L. In swamps: N. Y. to Fla., near the coast, west to Miss. Also in trop. Am.

N. Y. Babylon, L. I.,

N. J. Common in the pine-barrens.

6. *L. obscurum* L. In moist woods: Newf. and Lab. to Alaska, south to N. Car. and Ind. Also in Asia.

Common throughout the range, except the pine-barrens, there rare.

7. *L. annotinum* L. In woods and thickets, usually in dry soil: Lab. to Alaska, south to Pa., Colo. and Wash. Also in Eu. and Asia.

CONN. Rare and scattered in the **northern** part of the state.

N. Y. In the Catskills.

N. J. Reported from Bergen Co.

PA. Monroe and Carbon counties.

Tertiary, o: Cretaceous, o: Older Formations, scattered **northward**, and predominating on trap rock. Not south of the moraine. 117-179 days. Sea level-3,980 ft.

8. *L. clavatum* L. In woods: Lab. to Alask., south to N. Car., Mich. and Wash. Also in Eu., Asia and trop. Am.

Throughout the range except the pine-barrens and the region east and south of them; increasing **northward**.

9. *L. complanatum* L. In woods and thickets: Newf. to Alask., south to N. Car., Ind., Minn., and Idaho. Also in Eu. and Asia.

Throughout the range except the pine-barrens.

10. *L. tristachyum* Pursh. In open woods or clearings: Me. to Minn. and Ga. Also in Europe.

Throughout the range except the coastal plain of N. J., there known only from Shark River, and Farmingdale, Monmouth Co.

* Much of the so-called *L. inundatum* var. *Bigelovii* probably belongs here.—M.S.

11. **L. carolinianum** L. In moist pine-barrens, N. J. to Fla. and La. near the coast.
N. J. Common in the pine-barrens, rare along the coast and at Cape May.*

SELAGINELLACEAE

1. *Selaginella* Beauv.

Stem-leaves all alike, many-ranked.

1. *S. rupestris*.

Stem-leaves of two kinds, 4-ranked, spreading in 2 planes.

2. *S. apus*.

1. **S. rupestris** (L.) Spring. On dry rocks: N. Eng. and Ont. to Ga. and the middle West.
Scattered throughout the range, except the N. J. coastal plain and L. I., there not recorded.
2. **S. apus** (L.) Spring. In moist open places, often among grass: Me. and Ont. to the N. W. Terr., south to Fla., La. and Tex. Throughout the range, except the pine-barrens.

ISOETACEAE

1. *Isoetes* L.

Sporangium spotted with sharply defined brown or lighter cells.

Macrospores somewhat flattened on one hemisphere, averaging less than $450\ \mu$ in diameter.

Spots of sporangium scattered, mostly 1- or 2-celled; macrospores covered beneath with thick-walled reticulations, the openings resembling small pits, and between the commissures with more open reticulations.

6. *I. foveolata*.

Sporangium densely brown-spotted; macrospores densely covered with low simple truncate columns or labyrinthiform convolute ridges on both.

8. *I. Eatoni*.

Macrospores not flattened, averaging more than $475\ \mu$ in diameter.

Spots of sporangium scattered, many 1- or 2-celled; stomata and peripheral bast-bundles absent;† macrospores covered beneath with an irregular network, and between the commissures with wavy, somewhat parallel or branching, wall-like ridges.

2. *I. Tuckermanni*.

Spots of sporangium mostly several-many-celled; stomata present.

Peripheral bast-bundles sometimes present, sometimes absent; sporangium pale-spotted; macrospores

* See Introduction paragraph 29.

† It is doubtful if the presence or absence of stomata or peripheral bast-bundles is more than a variable character in many species of *Isoetes*. This genus is in need of careful revision. M.S.

sparingly covered with rather low irregular often elongate sometimes confluent crests serrate or spinulose at apex and resembling cockscombs.

7. *I. canadensis*.

Peripheral bast-bundles absent.

Macrospores covered with tall simple or forked spinules often recurved at apex and sometimes slightly confluent.

3. *I. ambigua*.

Macrospores sprinkled with distinct low granules resembling grains of sugar.

4. *I. saccharata*.

Macrospores covered with tall jagged, straight or curved, isolated or somewhat confluent crests; spots of sporangium often composed of cells fitted together in broad bands.

5. *I. riparia*.

Sporangium not spotted.

Macrospores 600–800 μ in diameter, covered with thickened continuous crests occasionally anastomosing and forming an irregular meandriform network.

1. *I. macrospora*.

Macrospores 300–570 μ in diameter, delicately honeycomb-reticulated; stomata and peripheral bast-bundles present.

9. *I. Engelmanni*.

1. *I. macrospora* Durieu. Distribution not known.

Type locality "lake in the Catskills"; not since recorded with certainty in our area.

2. *I. Tuckermani* A. Br. In ponds: Newf. to Mass., Conn. and N. Y.

CONN. Ledyard; reported also from North Stonington, East Lyme and Lyme.

N. Y. Lake Ronkonkoma, L. I.; also Peekskill, Westchester Co.

3. *I. ambigua* A. Br.; Engelm. (*I. Braunii* Durieu). Lab. and Greenland to Alaska, south to N. J., Pa. and Cal.

CONN. Scattered, but rare.

N. Y. Rare on L. I., known otherwise only from Westchester and Ulster counties.

N. J. Bergen Co. and at Budd's Lake, Morris Co., also at Tom's River, Ocean Co.

PA. Pocono, Monroe Co.; reported also in Wayne, Lackawanna and Carbon counties.

4. *I. saccharata* Engelm. Eastern Maryland, and District of Columbia. Also in New Jersey? Limits of distribution not known. Said to intergrade with *I. canadensis*.

N. J. Reported from Camden Co., and Mantoloking, Ocean Co.

5. ***I. riparia*** Engelm. Borders of the lower Delaware River.
In our range known only in the Delaware in Bucks, Philadelphia and Delaware counties, Pa., and Bordentown, Burlington Co., and Camden Co., N. J.
6. ***I. foveolata*** A. A. Eaton. New Hampshire to Connecticut and New Jersey.
CONN. Reported.
N. J. Oradell, Closter and Bergen Co., also a doubtful specimen from Pompton, River, Passaic Co.
7. ***I. canadensis*** (Engelm.) A. Br.; A. A. Eaton (*I. Dodgei* A. A. Eaton). Borders of ponds and streams: Me. to Br. Col., south to Pa.
CONN. Reported only from Windsor, Fairfield and Westport.
N. Y. Tyrol Lake, Dutchess Co.
N. J. Lake Hopatcong, also reported from Fish House, Camden Co.
PA. Point Pleasant, Bucks Co.; also reported from Mount Pleasant, Philadelphia Co.
8. ***I. Eatoni*** Dodge (*I. Gravesii* A. A. Eaton). In mud flats: N. H. to N. J.
CONN. Tyler Pond, Bantam Lake; also reported scattered over the state.
N. Y. Carmel, Putnam Co.
N. J. Morris Pond, Sussex Co. and at Lake Hopatcong.
9. ***I. Engelmanni*** A. Br. In ponds and ditches rooting in mud: Me. to Va. and Pa., Ill. and Mo.
CONN. Scattered throughout, but rare.
N. Y. On S. I. and in the Bronx, unknown elsewhere.
N. J. Bergen, Morris, Passaic and Sussex counties; also reported from Camden Co.
PA. Monroe, Lehigh and Bucks counties.

SPERMATOPHYTA

GYMNOSPERMAE

PINACEAE

Scales of the cone numerous (except in *Larix*); leaf-buds scaly.

Cone-scales woody; leaves needle-shaped, 2-5 in a sheath.

1. PINE S.

Cone-scales thin; leaves linear-filiform, scattered or fasciated, not in sheaths.

Leaves fasciated on very short branchlets, deciduous.

2. LARIX.

- Leaves scattered, persistent.
 Cones pendulous; leaves jointed to short persistent sterigmata.
 Leaves sessile, tetragonal. 3. PICEA.
 Leaves short-stalked, flat. 4. TSUGA.
 Cones erect, sterigmata inconspicuous or none. 5. ABIES.
- Scales of the cone few (3-12); leaf-buds naked.
 Cone oblong, its scales not peltate. 6. THUJA.
 Cone globose, its scales peltate. 7. CHAMAECYPARIS.
 Fruit fleshy, berry-like, a modified cone. 8. JUNIPERUS.

I. *Pinus* L.

- Leaves 5 in a sheath; cone-scales little thickened at the tip. 1. *P. Strobus*.
 Leaves less than 5 in a sheath; cone-scales prominently thickened at the tip.
 Cones terminal or sub-terminal; scales pointless; leaves in 2's. 2. *P. resinosa*.
 Cones lateral; scales prickle-tipped or spine-tipped.
 Leaves predominately in 2's.
 Cones 3-7 cm. long, the scales prickle-tipped.
 Leaves stout, 3-6 cm. long. 3. *P. virginiana*.
 Leaves slender, 7-13 cm. long; bark in large plates. 4. *P. echinata*.
 Cones 8-12 cm. long, the scales with stout spine. 5. *P. pungens*.
 Leaves predominately in 3's.
 Cones ovoid, globose, or broader than long.
 Leaves 12 cm. long or less; cone-scales with stiff prickles. 6. *P. rigida*.
 Leaves 15-25 cm. long; cone-scales with slender, often deciduous prickles. 7. *P. serotina*.
 Cones conic or oblong-conic; leaves 15-30 cm. long. 8. *P. Taeda*.

1. *P. Strobus* L. On hillsides and mountain slopes, sometimes in swampy situations in the southerly part of its range: Newf. to Man., south along the mountains to Ga., west to Ill. and Iowa.

CONN. Throughout, decreasing near the coast.

N. Y. Throughout, rare on S. I.; uncommon south of the moraine on L. I., but at West Hempstead and Jamaica (according to Bicknell); and near Riverhead.

N. J. Frequent in northern counties, decreasing southward; Swedesboro, Gloucester Co., Whitings, Ocean Co.

PA. Throughout.

Tertiary, rare: Cretaceous, more common: Older formations, ubiquitous. 120-186 days. Sea level-2,100 ft.

2. *P. resinosa* Ait. Hillsides and mountain slopes: Newf. to Man., Mass., Pa., Wisc. and Minn.

CONN. Salisbury and Granby.

N. Y. Otis Summit, Greene Co. *Inwood* (N. Y. C.) record *unverified*.

PA. Wayne and Luzerne counties.

Tertiary, o: Cretaceous, o: Older Formations, not rare. 123-143 days. 685-1,723 ft.

3. **P. virginiana** Mill. In rocky or sandy soil: L. I. (?) to S. Car., Ala., southern Ind. and Tenn.

N. Y. West side of S. I.; *L. I. record unverified*.

N. J. Milford, Hunterdon Co., Riegelsville, Warren Co.; common along the edges but rare within the pine-barrens.

PA. Chester, Bucks, Montgomery, Northampton, Carbon and Lehigh counties.

Tertiary, rare: Cretaceous, common: Older Formations, limited to eastern Pa. and the N. J. stations. Not north of the moraine except on S. I. 175-189 days. Sea level-439 ft.

4. **P. echinata** Mill. In sandy or clayey soil: southern N. Y. to Fla., Ill., Kansas and Texas.

N. Y. Tottenville, Giffords, and New Dorp, S. I.; also near the mouth of the Croton River (according to A. K. Fisher).

N. J. Middlesex, Burlington, Cumberland, Atlantic, Ocean and Monmouth counties; common along the edges but decreasing within the pine-barrens.

Tertiary, scattered: Cretaceous, common: Older Formations, o. Not north of the moraine. 175-189 days. About sea level.

5. **P. pungens** Mill. In rocky or loose soil: Western N. J. and central Pa. to Ga. and Tenn.

N. J. Sergeantsville, Hunterdon Co.; perhaps not native.

PA. Schuylkill and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, not common. Not north of the moraine. 171-183 days. About sea level.

6. **P. rigida** Mill. In poor, often somewhat sterile soil: N. B. to Ont., W. Va., Ga., Ala. and Tenn.

CONN. Throughout, decreasing northwestward.

N. Y. Throughout, decreasing northward; common south of the moraine on L. I., and forming pine-barrens east of Central Park.

N. J. Throughout, decreasing northward;* forming exclusive forests in the pine-barrens.

PA. Throughout, decreasing northward.

* See Introduction paragraph 50.

Tertiary, common: Cretaceous, less common: Older Formations, scattered. 120-210 days. Sea level-2,100 ft.

7. *P. serotina* Michx. In sandy swamps, sometimes in drier situations: Southern N. J., to Va. and Fla.

N. J. Swedesboro, Gloucester Co. and Town Bank, Cape May Co.

Tertiary, very rare: Cretaceous, a few trees: Older Formations, o. 172 days. About sea level.

8. *P. Taeda* L. Southern N. J. to Fla. and Texas, north to Ark. N. J. Cape May County.

Tertiary, limited to Southern N. J.: Cretaceous, o: Older Formations, o. 182-220 days. About sea level.

The Scotch Pine, *Pinus sylvestris* L., has been reported as an established escape.

2. *Larix* [Tourn.] Mill.

1. *L. laricina* (Du Roi) Mill. In swampy places: Newf. to the N. W. Territory, south to N. J., Md., Pa., Ind., and Minn.

CONN. Rare in the eastern part, perhaps absent from the coast, increasing **northward**.

N. Y. Throughout, except the lower Hudson Valley, L. I., and S. I., increasing **northward**.

N. J. Ironia and Lake Hopatcong, Morris Co.; Closter, Bergen Co.; New Durham, Hudson Co.; increasing **northward**.

PA. Pike, Carbon, Monroe and Luzerne counties, increasing **northward**.

Tertiary, o: Cretaceous, o: Older Formations, common. Not south of the moraine except in Pa. 117-160 days. Sea level-1,933 ft.

The European larch, *L. decidua* Mill., has been reported as an established escape.

3. *Picea* Link.

Cones ovate, the stalks strongly incurved; cone-scales erose or dentate;

leaves glaucous, about 14 mm. long or less, somewhat appressed. 1. *P. mariana*.

Cones oblong-ovate; cone-scales entire or denticulate; leaves yellow-

green, about 10 mm. long, spreading. 2. *P. rubens*.

1. *P. mariana* (Mill.) B. S. P. Swampy places, sometimes on hillsides: Lab., south in the mountains to W. Va., N. Car., westward to Alberta and N. W. Territory.

CONN. Litchfield, Litchfield Co.

N. Y. Greene, Delaware and Ulster counties.

N. J. Reported from Ironia, Morris Co.; perhaps in Sussex Co.

PA. Monroe and Pike counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing at higher elevations. Not south of the moraine. 117-149 days. 740-2,400 ft.

2. **P. rubens** Sargent. In moist places in our range, forming exclusive forests northward: Newf. to northern N. Y., Minn., south in the mountains to Va. and Ga.

CONN. Wanting near the coast, increasing **northward**.

N. Y. Throughout, except south of the Hudson Highlands and on S. I., increasing **northward**; rare at Orient, L. I.

N. J. New Durham, Hudson Co.; Palisades, Bergen Co.; Ironia, Morris Co., and Knighton, Hunterdon Co.; increasing **northward**.

PA. Carbon, Luzerne, Monroe and Pike counties, increasing **northward**.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Not south of the moraine, except in eastern Pa. 118-186 days. Sea level-2,100 ft.

The white spruce, *P. canadensis* (Mill.) B. S. P., and the Norway spruce, *P. Abies* (L.) Karst., have both been reported as established escapes.

4. **Tsuga** Carr.

1. **T. canadensis** (L.) Carr. In rocky situations, rarely in rich swales, forming exclusive forests northward but more local southward: New Brunswick to Ala., Ont. and Wisc.

CONN. Throughout, increasing **northward**.

N. Y. A single tree at Old Place, S. I.; Roslyn, L. I. (according to Bicknell); common throughout the rest of the state, increasing **northward**.

N. J. From Salem to Middlesex counties exclusively north and west of the Tertiary sands and gravels; in small swales along the Delaware River; common and increasing **northward**.

PA. Throughout, increasing **northward**.

Tertiary, o: Cretaceous, mostly in local depression areas, specially in the region of glacial terraces:* Older Formations, common. 117-186 days. Sea level-2,400 ft.

5. **Abies** [Tourn.] Hill. (See *pl.* 7)

1. **A. balsamea** (L.) Mill. Mostly in cold swamps: Lab. to Va., westward to Minn. and Athabasca.

* See Introduction paragraph 34.

CONN. Litchfield Co. increasing **northwestward**.

N. Y. Greene, Delaware and Ulster counties. "*Highlands of the Hudson*" record *unverified*.

PA. Monroe and Luzerne counties.

Tertiary, 0: Cretaceous, 0: Older Formations, increasing at higher elevations. Not south of the moraine. 117-153 days. 1,200-3,500 ft.

6. *Thuja* L.

1. *T. occidentalis* L. In wet situations: New Bruns. to Minn., Manitoba, south to N. J., N. Car. and Tenn., Ill. and Minn.

CONN. Northwestern Litchfield Co.

N. Y. Westchester (probably now extinct), Putnam and Orange counties, increasing **northward**.

N. J. Recorded from Bergen, Warren, and Sussex counties, not recently collected.

Tertiary, 0: Cretaceous, 0: Older Formations, increasing **northward**, particularly along the Hudson Valley. Not south of the moraine, 123-169 days. Sea level-1,420 ft.

7. *Chamaecyparis* Spach. (See *pl. 6*)

1. *C. thyoides* (L.) B. S. P. Swamps and wet woods: Southern Me. along the coast to western Miss.

CONN. Danbury and New Fairfield, increasing **southeastward**.

N. Y. Scattered on western L. I., and on S. I., and near the N. J. state line in Orange Co., also in Westchester and Putnam counties, increasing **southward**.

N. J. Not recorded from Warren, Hunterdon, Mercer and Somerset counties; rare and local elsewhere in the north, increasing **southward**, and forming exclusive stands in the pine-barrens.

PA. Bucks Co.

Tertiary, common: Cretaceous, less common: Older Formations, scattered in edaphically favorable situations. Rare north of the moraine,* and apparently wanting on the unglaciated portion of the Piedmont plateau. 141-220 days. Sea level-618 ft.

8. *Juniperus* [Tourn.] L.

Flowers terminal; leaves of two kinds, scale-like and awl shaped; always a tree.

Flowers axillary; leaves awl-shaped.

1. *J. virginiana*.

* See Introduction paragraph 7.

42°
30'

42°

41°
30'

41°

40°
30'



Leaves straight or nearly so, not saccate, divaricate, 10-15 mm. long; a tree or usually a shrub.

2. *J. communis*.

Leaves prominently curved and saccate at the base, somewhat appressed, 7-12 mm. long; always a shrub 1-1.5 m. high.

3. *J. sibirica*.

1. *J. virginiana* L. In poor or somewhat sterile soil, often in rocky situations: Nova Scotia to Ont. and S. Dak., south to Fla., Ala. and Tex.

CONN. Throughout.

N. Y. Throughout, decreasing south of the moraine on L. I.

N. J. Rare and local in the pine-barrens, increasing **northward**.

PA. Monroe, Northampton, Montgomery and Chester counties.

Tertiary, rare: Cretaceous, common: Older Formations, ubiquitous. 117-220 days. Sea level-2,500 ft.

2. *J. communis* L. Greenland and Alaska to Pa., Neb. and New Mex. Also in Europe and Asia.

CONN. New London, Hartford and Litchfield counties, increasing **northwestward**.

N. Y. Unknown on L. I. and S. I. Rare in the south, increasing **northward**.

N. J. Rare or wanting in the pine-barrens, increasing but local **northward**.

PA. Monroe to Chester and Delaware counties.

Tertiary, perhaps wanting on Beacon Hill, rare elsewhere: Cretaceous, not common: Older Formations, increasing **northward**. 123-204 days. Sea level-1,800 ft.

3. *J. sibirica* Burgs. (*J. nana* of Britton's manual in part.) Lab. to Conn. and N. Y., westward to the Great Lakes, Colo. and Utah.

CONN. Fairfield and New Haven counties.

N. Y. L. I. and up the Hudson Valley to Dutchess Co.

Tertiary, o: Cretaceous, o: Older Formations, more common. 169-210 days. Sea level-1,000 ft.

The reported occurrence of *Taxodium distichum* (L.) L. C. Richard. in New Jersey as a wild plant has not been satisfactorily established.

TAXACEAE

1. *Taxus* [Tourn.] L.

1. *T. canadensis* Marsh. In rocky situations: Newf. to Manitoba, N. J., Va. and Iowa.

CONN. Rare or wanting near the coast, increasing **northwestward**.
 N. Y. Throughout, except on L. I. and S. I., rare southward,
 increasing **northward**.

N. J. Bergen Co., increasing **northward**.

PA. Not recorded from Delaware Co., increasing and common
northward.

Tertiary, 0: Cretaceous, only in Bucks Co., Pa.: Older Formations,
 common, particularly **northward**. 117-179 days. Sea level-3,900
 ft.

ANGIOSPERMAE

MONOCOTYLEDONES

TYPHACEAE

1. *Typha* [Tourn.] L.

Racemes with staminate and pistillate portions usually separated;
 pollen of simple grains; fruiting pedicels short, rigid, 1 mm. long
 or less.

1. *T. angustifolia*.

Racemes with staminate and pistillate portions usually contiguous;
 pollen grains in 4's; fruiting pedicels bristle-like, 2-3 mm. long.

2. *T. latifolia*.

1. *T. angustifolia* L. Marshes, chiefly along the coast: Nova
 Scotia to Fla., westward to Cal. Also in Tropical Am.,
 Europe and Asia.

Throughout the range, always decreasing inland.

2. *T. latifolia* L. In marshes: Throughout the United States
 and most of Canada. Also in Europe and Asia.

Throughout the range.

SPARGANIACEAE

1. *Sparganium* [Tourn.] L.*

Achenes broadly obovoid or cuneate-obpyramidal, sessile, dis-
 tinctly beaked; inflorescence compound; fruiting heads 2-3
 cm. in diameter; leaves somewhat keeled.

1. *S. eurycarpum*.

Achenes fusiform (in *S. minimum* somewhat obovoid, but then
 short beaked and short stipitate).

Stipes and beaks each 2 mm. long or more; fruiting heads 1.5
 cm. in diameter or more; anthers 3-4 times as long
 as broad.

* The difficulty of correlating ecological factors in aquatic or semi-aquatic genera, and the comparatively limited material, make it advisable to omit such data in *Sparganium*, *Potamogeton*, *Sagittaria*, *Utricularia* and a few others.

Beaks straight or slightly curved; stigmas linear.

Heads all axillary; beaks shorter than the bodies of the achenes; leaves more or less keeled.

Achenes dull; stigmas 2 mm. long or less.

Inflorescence branched.

2. *S. androcladum*.

Inflorescence mostly simple.

3. *S. americanum*.

Achenes glossy; stigmas 2.5-3.5 mm. long.

4. *S. lucidum*.

Heads, at least some of them, supra-axillary.

Leaves, at least the middle ones, strongly triangular keeled; stem erect.

5. *S. acaule*.

Leaves not keeled; stem slender, usually floating.

6. *S. angustifolium*.

7. *S. fluctuans*.

Beaks gladiate curved; stigmas short, oblong.

Stipes and beaks less than 1 mm. long; fruiting heads about 1.5 cm. in diameter or less.

8. *S. minimum*.

1. ***S. eurycarpum*** Engelm. Borders of water: Newf. to Fla., Cal. and British Columbia.

CONN. Rare or local over most of the state, decreasing westward along the coast.

N. Y. Throughout, but rare; most common in the Hudson Valley.

N. J. Along the Delaware at Camden, increasing **northward**; not common.

PA. From Northampton to Delaware counties.

2. ***S. androcladum*** (Engelm.) Morong. Shallow water: Newf. to Fla., Ala. and Minn.

CONN. Throughout, not common.

N. Y. Throughout, apparently rare northward.

N. J. Throughout, decreasing southward.

PA. Northampton to Delaware counties, not common.

3. ***S. americanum*** Nutt. Bogs and muddy shores: Nova Scotia to S. Car., Indian Territory and Iowa.

CONN. Throughout, not common.

N. Y. Throughout, apparently decreasing northward.

N. J. Throughout, apparently decreasing northward.

PA. Philadelphia Co.

4. ***S. lucidum*** Fernald & Eames. Ponds and streams: Mass. and N. Y. to Mo. and Ill.

CONN. Hartford and Southington.

N. Y. Cypress Hills, L. I., and at Jamaica (according to Bicknell).

5. ***S. acaule*** (Beeby) Rydberg. Muddy shores and swamps: Newf. to Va., Iowa and S. Dak.

- N. Y. Greene Co. and at Valley Stream, L. I. (according to Bicknell).
 N. J. Sussex Co.
 PA. Pocono Mt. Monroe Co.
6. **S. angustifolium** Michx. Ponds and slow streams: Newf. to Conn., Pa., Col., Cal. and British Columbia.
 CONN. Canaan and West Goshen, not recently collected.
 N. Y. Catskill Mts. near " Pine Orchard " (old undated specimen, not recently collected).
 N. J. Green Pond, Morris Co.
7. **S. fluctuans** (Morong) B. L. Robinson. Cold lakes and ponds: Me. to Pa. and Minn.
 CONN. Norfolk, not recently collected.
 PA. Wayne, Monroe and Schuylkill counties.
8. **S. minimum** Fries. Lab. to N. J., Tenn., Utah, Oregon and Alaska; also in Europe and Asia. Rare in our range.
 CONN. Twin Lake, Salisbury.
 N. J. Green Pond, Morris Co.

ZANNICHELLIACEAE

Plants monoecious; stamen 1.

1. ZANNICHELLIA.

Plants perfect; stamens more than 1.

Stamens 2; connective of the anther not dilated; fruit stipitate.

2. RUPPIA.

Stamens 4; connective of the anther dilated and perianth-like; fruit sessile.

3. POTAMOGETON.

1. *Zannichellia* L.*

1. **Z. palustris** L. In fresh or brackish water: Nearly throughout North America, except the extreme north.
 CONN. Common along the coast, decreasing inland, perhaps wanting in the north.
 N. Y. Local along the coast, decreasing up the Hudson, not recorded north of Hyde Park, Dutchess Co.
 N. J. Local along the coast and up the rivers within the influence of the tides.
 PA. Luzerne, Northampton, Philadelphia and Chester counties.
 Apparently the only extra-tidal stations are in Luzerne and Northampton counties, Pa.

* See foot-note, page 76.

2. *Ruppia* L.*

1. *R. maritima* L. Atlantic and Pacific coasts of North America, and in saline pools in the interior.

Throughout the range along the coasts, and up the brackish rivers within the influence of the tides. No definite records from Pa., but probably along the Delaware River below Philadelphia.

3. *Potamogeton* [Tourn.] L.*

4. With floating and submerged leaves. (Floating leaves rarely wanting in Nos. 9, 10 and 11.)

Mature submerged leaves linear or linear-lanceolate, never more than 4 mm. wide, sometimes mere phylloidia.

The straight apex of the embryo pointing towards the base or outside it.

Submerged leaves reduced to phylloidia; floating leaf-blades more than 3 cm. long. Nutlets pitted; peduncles as thick as the petioles.

Nutlets smooth; peduncles twice as thick as the petioles.

Submerged leaves with a proper blade; floating leaves less than 1.2 cm. long.

The curved apex of the embryo pointing inside the base.

Embryo coiled once, the apex pointing downward.

Embryo coiled $1\frac{1}{2}$ times; the apex transverse or pointing upward.

Floating leaf-blades less than 2.5 cm. long; submerged leaves without cellular reticulation along the midrib.

Submerged peduncles 4-6.5 mm. long; submerged leaves 0.4-0.9 mm. wide.

Submerged peduncles 0.3-1.5 mm. long; submerged leaves 1-1.4 mm. wide.

Floating leaf-blades more than 2.4 cm. long; submerged leaf with cellular reticulation along the midrib.

Mature submerged leaves lanceolate, ovate or elliptic, never linear or more than 4 mm. wide except in forms of *P. heterophyllus*.

Floating leaves 32-many nerved.

1. *P. natans*.

2. *P. Oakesianus*.

3. *P. lateralis*.

4. *P. Vaseyi*.

5. *P. diversifolius*.

6. *P. dimorphus*.

7. *P. epihydrus*.

8. *P. amplifolius*.

* See footnote, page 76.

- Floating leaves fewer nerved.
 Submerged leaves mostly 7-nerved, at least the lowest sessile.
 Submerged leaves serrulate at apex. 9. *P. angustifolius*.
 Submerged leaves entire.
 Plant green; submerged leaves narrower than the floating. 10. *P. heterophyllus*.
 Plant reddish, submerged leaves as wide as or wider than the floating. 11. *P. alpinus*.
 Submerged leaves more than 7-nerved; all petiolate.
 Floating leaf bases merely rounded, not cordate; submerged leaves as wide as the floating or nearly so. 12. *P. americanus*.
 Floating leaf bases cordate or sub-cordate. 13. *P. pulcher*.
- B. With only submerged leaves.
 Leaves of a lanceolate, ovate or orbicular type, never linear.
 Leaves stalked or merely sessile, not perfoliate.
 Without propagating buds; the elliptic-ovate leaves serrulate only at the apex. 14. *P. lucens*.
 With propagating buds; the oblong-lanceolate leaves serrulate throughout. 15. *P. crispus*.
 Leaves perfoliate.
 Leaves cucullate; the straight apex of the embryo pointing towards the base. 16. *P. praelongus*.
 Leaves not cucullate; the curved apex of the embryo pointing inside the base. 17. *P. perfoliatus*.
- Leaves all linear.
 Stipules adnate to the leaf bases.
 Leaves at least 1 mm. wide, serrulate. 18. *P. Robbinsii*.
 Leaves capillary, less than 0.5 mm. wide, entire. 19. *P. pectinatus*.
 Stipules free from the leaf bases.
 Leaves at least 1.6 mm. wide.
 The straight apex of the embryo pointing towards the base. 20. *P. foliosus*.
 The curved apex of the embryo pointing inside the base.
 Keels of the fruit undulate or toothed.
 Without propagating buds; leaves 3-nerved. 21. *P. Hillii*.
 With propagating buds; leaves many-nerved. 22. *P. compressus*.
 Keels of the fruit smooth. 23. *P. obtusifolius*.
 Leaves all capillary, less than 0.9 mm. wide.
 Nutlets without keels or obscurely keeled. 24. *P. pusillus*.
 Nutlets keeled, or at least with two grooves culminating in three ridge like keels.
 The straight apex of the embryo pointing towards the base, or outside it. 20. *P. foliosus*.

The curved apex of the embryo pointing inside the base.

Keels of the fruit dentate or crisped. 25. *P. confervoides*.

Keels of the fruit, if any, smooth. 24. *P. pusillus*.

1. ***P. natans*** L. N. S. to B. C., south to N. J., Pa., Mo., Neb. and Southern Cal. Also in Europe and Asia.
 CONN. Rare or local, increasing in New London Co.
 N. Y. From Peekskill, Westchester Co., **northward**. Rare and local.
 N. J. Budd's Lake and vicinity; not recorded south of Morris Co.
 PA. Northampton Co., rare.
2. ***P. Oakesianus*** Robbins. Me. to Wisc., south to N. J.
 CONN. Stafford and Middlebury.
 N. Y. Common on L. I.; Otis Summit, Greene Co.; perhaps in the intervening territory.
 N. J. Bergen, Middlesex, Burlington and Atlantic counties.
 PA. Pocono Plateau, Monroe Co., Broad Mt., Carbon Co.
3. ***P. lateralis*** Morong. Mass. and Conn.
 CONN. Salisbury, not recently collected.
4. ***P. Vaseyi*** Robbins. Quebec to Wisc., south to southern N. Y.
 CONN. Lake Saltonstall, Milford and Plymouth.
 N. Y. Greenwood Lake, Orange Co.
5. ***P. diversifolius*** Raf. N. H. to Cal., south to Fla. and northern Mex. Also in Cuba.
 CONN. In the coastal counties.
 N. Y. L. I. and S. I., and at Riverdale, N. Y. City (according to Bicknell); not recorded northward.
 N. J. Throughout the state, except the pine-barrens, increasing **southeastward**.
 PA. Monroe, Northampton and Chester counties.
6. ***P. dimorphus*** Raf. (*P. Spirillus* Tuckerm.). N. S. to Minn. and Cal., south to Va. and Mo.
 CONN. Throughout.
 N. Y. Throughout, increasing **southward**.
 N. J. Throughout, increasing **southward**; but unrecorded from the pine-barrens.
 PA. Delaware Water Gap to Bucks and Delaware counties.

7. *P. epihydrus* Raf. (*P. Nuttallii* Cham. & Schlecht.). Newf. to Br. Col., south to N. Car. and Iowa.
 CONN. Throughout, increasing **southward**.
 N. Y. Throughout, increasing **southward**.
 N. J. Throughout, increasing **southward**, but decreasing within the pine-barrens.
 PA. Luzerne, Monroe, Northampton, Lehigh and Chester counties, apparently increasing **westward**.
8. *P. amplifolius* Tuckerm. N. B. to B. Col., south to Ga. and Neb.
 CONN. Litchfield Co.
 N. Y. Clove Lake, S. I., increasing up the Hudson Valley.
 N. J. Gloucester and Camden counties, increasing **northward**; not recorded from the pine-barrens.
 PA. Lehigh, Northampton and Bucks counties.
9. *P. angustifolius* Berch. & Presl (including *P. lucens connecticutensis* Robbins). Me. to Cal., south to Fla., Mex. and Guatemala. Also in Europe.
 CONN. Fairfield and New Haven counties.
 N. Y. Westchester, Rockland and Orange counties.
 N. J. Sussex and Warren counties.
10. *P. heterophyllus* Schreb. Throughout North America, except Central America and the West Indies. In the larger Bahamas; also in Europe.
 CONN. Throughout, in some of its numerous forms.
 N. Y. Common throughout, except on L. I. and S. I.
 N. J. Common in the north, decreasing southward; not definitely known south of Bergen Co.
11. *P. alpinus* Balbis. Lab. to the Yukon, south to Fla. and Cal.
 CONN. Reported from Plainville, Hartford Co.
 N. J. Reported from Belvidere, Warren Co.
12. *P. americanus* Cham. & Schlecht. (*P. lonchites* Tuckerm.). Vt. to Wash., south to Va., Southern Cal., Tex. and Mex. Also in Cuba, Haiti, and Jamaica.
 CONN. Local in the Saugatuck, Connecticut and Housatonic rivers, increasing near the coast.
 N. Y. The Hudson Valley.
 N. J. Warren and Sussex to Gloucester and Salem counties.
 PA. Northampton to Delaware counties.

13. **P. pulcher** Tuckerm. Mass. to Br. Col., south to Ga. and Ark.
 CONN. In the coastal counties.
 N. Y. L. I. and S. I., Rockland and Westchester counties.
 N. J. Reported as rare in the north; increasing in Middlesex, Ocean and Atlantic counties.
 PA. Pike, Northampton, Lehigh and Bucks counties.
14. **P. lucens** L. Mass. to Cal., south to Fla., Mex., Costa Rica and Cuba. Also in Europe.
 CONN. Middlesex, New Haven, Hartford and Litchfield counties.
 N. Y. Pine Plains, Dutchess Co.
 N. J. Andover, Sussex Co.
15. **P. crispus** L. Ont. to Del. and eastern Pa. Obviously introduced from the Old World.
 Probably to be found in ponds throughout the range near the larger settlements. Definite records exist from Central Park, N. Y. City, Clifton, Plainfield, Green Pond, Philipsburg, and Camden, N. J., and Cold Spring Harbor, L. I. An aggressive migrant.
16. **P. praelongus** Wolfg. Mass. to Br. Col., south to Pa. and Cal. Also in Europe.
 CONN. New Haven, Fairfield and Litchfield counties.
 N. Y. Pine Plains, Dutchess Co.
 N. J. Budd's Lake, Morris Co.
17. **P. perfoliatus** L. (including *P. bupleuroides* Fernald and *P. Richardsonii* (Benn.) Rydb.). Throughout North America, except Mex. and the W. I.
 CONN. Throughout, decreasing northward.
 N. Y. Throughout.
 N. J. Throughout, not recorded from the pine-barrens.
 PA. Northampton to Delaware counties.
18. **P. Robbinsii** Oakes. Me. to Br. Col., south to Pa. and Wash.
 CONN. Hartford; rare or local in the rest of the state, according to Conn. Bot. Soc. Catalog of Connecticut Plants.
 N. Y. Orange Co. (C. F. Austin.)
 N. J. Sussex, Morris and Bergen counties.
 PA. Lehigh River, Northampton Co.

19. *P. pectinatus* L. Throughout North America except Central America and the West Indies. Also in Europe.
 CONN. Hartford, Fairfield and Litchfield counties, not common.
 N. Y. L. I., S. I., decreasing up the Hudson Valley to Pine Plains, Dutchess Co.
 N. J. Sussex, Hunterdon, Bergen, Monmouth and Ocean counties.
 PA. Northampton to Chester counties.
20. *P. foliosus* Raf. New Bruns. to Br. Col., south to Fla., Mex. Also in Cuba, Porto Rico and Jamaica.
 CONN. New London, Hartford and Litchfield counties.
 N. Y. L. I., S. I., to Westchester and Dutchess counties.
 N. J. Common in the north, decreasing southward from Bergen to Salem county. Not known from the pine-barrens.
21. *P. Hillii* Morong. N. Y. to Mich. and Lake Superior, south to Pa. and Wisc. Rare in our area.
 CONN. Salisbury, Litchfield Co.
 N. Y. Pine Plains, Dutchess Co.
22. *P. compressus* L. (*P. Zosteraefolius* Schum.). N. B. to Br. Col., south to N. J. and Ore.
 CONN. Litchfield Co.
 N. Y. Jamaica, L. I., and in Westchester, Putnam and Dutchess counties. Rare.
 N. J. Bergen and Sussex counties.
23. *P. obtusifolius* Mert. & Koch. Quebec to Minn., south to N. Y. and Kan.
 CONN. Newtown, Fairfield Co.
 PA. Northampton and Wayne counties.
24. *P. pusillus* L. (including *P. gemmiparus* Morong). Throughout the United States and northern Mexico.
 Almost throughout the range, one of the commonest pondweeds.
25. *P. confervoides* Reich. N. Eng. to N. J. and Pa. Perhaps in Fla.
 Known definitely only from Ocean, Burlington, Atlantic and Gloucester counties, N. J.

The reported occurrence of *P. nitens* Webb. in the range has never been satisfactorily established.

ZOSTERACEAE

1. *Zostera* L.*

1. *Z. marina* L. Atlantic coast from Greenland to Fla.; Pacific coast, Alaska to Calif.

Throughout the coasts and up the brackish rivers.

NAIADACEAE

1. *Naias* L.*

Leaf-sheaths merely rounded, not auriculate; leaves 0.5 mm. wide or more.

1. *N. flexilis*.

Leaf-sheaths auriculate; leaves 0.2 mm. wide or less.

2. *N. gracillima*.

1. *N. flexilis* (Willd.) Rost. & Schmidt. In ponds and streams: Quebec to Br. Col., south to Fla. and Tex.

CONN. Throughout, increasing **northwestward**, not common.

N. Y. L. I.; Westchester and Rockland counties.

N. J. Common in the north, decreasing southward, perhaps wanting in the pine-barrens.

PA. Northampton, Bucks, Chester and Delaware counties.

2. *N. gracillima* (A. Br.) Magnus. In pools: Mass. to Mo., south to N. J. and Pa.

CONN. New London, Tollund, New Haven and Fairfield counties.

N. Y. Valley Stream and Rockville Centre, L. I.

N. J. Woodstown and Palatine, Salem Co., and Spotswood, Middlesex Co.

PA. Bristol, Bucks Co.

SCHEUCHZERIACEAE

Leaves all basal; flowers numerous on naked scapes, ebracteate, spicate or in spike-like racemes.

1. TRIGLOCHIN.

Stem leafy; flowers few in a loose raceme.

2. SCHEUCHZERIA.

1. *Triglochin* L.*

1. *T. maritima* L. Lab. to Alaska, south to N. J., western N. Y., Ohio, Wisc., Neb., N. Mex., Cal., northern Mex. and Lower Cal. Also in Europe and Asia.

* See footnote, page 76.

CONN. Common along the coast.

N. Y. Along the coasts of L. I., N. Y. City and S. I.

N. J. Hudson Co. to Ocean Co. along the coast; reported also from Sussex Co.

The reported occurrence of *T. palustris* L. at Pine Plains, Dutchess Co., has never been satisfactorily established.

2. *Scheuchzeria* L.

1. *S. palustris* L. In cold bogs: Labrador to Alaska, N. J., Pa., Wisc., Mont., Cal. Also in Europe and Asia.

CONN. New Haven, Hartford and Litchfield counties, increasing **northwestward**.

N. Y. Bingham Mt., Dutchess Co., and Tannersville, Greene Co.

N. J. Budd's Lake, Morris Co., decreasing southward and local in Camden and Gloucester counties.

PA. Pike, Wayne, Monroe and Carbon counties.

Tertiary, o: Cretaceous, localized in thermally favorable bogs:* Older Formations, common, increasing **northward**. 123-176 days. Sea level-1,824 ft.

ALISMACEAE

Carpels borne in 1 series; achenes verticillate.

1. *ALISMA*.

Carpels borne in several series; achenes capitate.

Flowers perfect.

2. *HELIANTHIUM*.

Flowers polygamous, monoecious or dioecious, the lower perfect or pistillate, the upper staminate.

Lower flowers of inflorescence perfect.

3. *LOPHOTOCARPUS*.

Lower flowers of inflorescence pistillate.

4. *SAGITTARIA*.

1. *Alisma* L.*

1. *A. subcordatum* Raf. (not the Old World *A. Plantago-aquatica* L. until recently credited to America). In mud or shallow water: Mass., Minn., Fla. and Tex.

Common throughout the range in favorable situations.

2. *Helianthium* Engelm.*

1. *H. parvulum* (Engelm.) Small. (*H. tenellum* Britton). A rare and local plant: Mass. to western Ont., Minn., Fla., Tex. and Mex. Also in Cuba and Porto Rico.

Maple Grove and Flushing, L. I., and Delanco, Burlington Co., N. J., are the only stations known in our area.

* See Introduction paragraph 36.

† See footnote, page 76.

3. *Lophotocarpus* T. Durand.*1. *L. spongiosus* (Engelm.) J. G. Smith. Mass. to Va.

CONN. Along the coast, not common.

N. Y. Reported along the coast; and up the Hudson within the influence of brackish tide water.

N. J. Known only from the Hackensack marshes and as reported from Camden Co. in Britton's N. J. flora. Also along the Raritan from New Brunswick to South Amboy, but rare (according to Mackenzie).

4. *Sagittaria* L.*

Fruit-bearing pedicels reflexed or recurved.

Filaments about as long as the anthers; achenes with 3 undulate or slightly toothed crests.

1. *S. subulata*.

Filaments much longer than the anthers; achenes with 5-7 tuberculate or prominently toothed crests.

2. *S. lorata*.

Fruit-bearing pedicels ascending.

Leaf-blades without basal lobes.

Pedicels of the pistillate flowers as long as the staminate ones, or nearly so.

Leaf-blades terete or 3-sided, often imperfectly developed.

3. *S. teres*.

Leaf-blades flat.

4. *S. Eatoni*.

Pedicels of the pistillate flowers very short or nearly wanting.

5. *S. rigida*.

Leaf-blades with basal lobes (reduced to phyllodia in No. 6).

Achenes minutely or inconspicuously beaked.

Beak horizontal.

6. *S. graminea*.

Beak erect.

7. *S. cuneata*.

Achenes prominently long beaked.

Beak horizontal.

Inflorescence pubescent.

8. *S. pubescens*.

Inflorescence glabrous.

9. *S. latifolia*.

Beak erect.

Achenes cuneate, usually with 2 prominent facial wings.

10. *S. Engelmanniana*.

Achenes obovate or orbicular-obovate, usually with 1 facial wing.

11. *S. longirostra*.

1. *S. subulata* (L.) Buch. In tide water mud: Conn. and N. Y. to Fla. and Ala.

CONN. Along the coast and up the brackish rivers.

N. Y. Along the coast and up the Hudson as far as Peekskill.

N. J. Along the coast and up the brackish rivers, but apparently wanting in the pine-barrens.

* See footnote, page 76.

- PA. Along the Delaware River in Philadelphia and Delaware counties.
2. **S. lorata** (Chapm.) Small. (*S. subulata gracillima* Wats.). Del. and S. Car. to Fla.; also in Mass., R. I., Conn. and N. J. as far as the form *S. subulata gracillima* is concerned. A rare plant.
CONN. Windsor and East Windsor (Bissell).
N. J. Clifton, Passaic Co.
PA. Bristol, Bucks Co.
3. **S. teres** S. Wats. Mass. to S. Car. Rare in our area.
Wading River, L. I., Peekskill, N. Y., and Hammonton, N. J.
4. **S. Eatoni** J. G. Smith. Mass., Conn. and Long Island.
Reported from the shores of L. I. and Conn. by J. G. Smith in Rep. Mo. Bot. Gard. 11: 151. 1900. A specimen approximating this conception was recently collected at Kinkora, Burlington Co., N. J., by K. K. Mackenzie. Not otherwise known.
5. **S. rigida** Pursh. Quebec to Minn., N. J., Tenn. and Neb.
CONN. Rare or local in New Haven, Hartford and New London counties.
N. Y. Orange Co.
N. J. From Clifton, Passaic Co., to Westville, Gloucester Co., apparently not in the pine-barrens.
PA. Northampton, Bucks, Philadelphia and Delaware counties.
6. **S. graminea** Michx. Newf. to Saskatch., Fla. and Tex.
CONN. Apparently throughout.
N. Y. Common in the south, decreasing and perhaps wanting in the north.
N. J. Common in the northern counties, becoming scattered and local southward.
PA. Pike, Northampton, Berks and Delaware counties.
7. **S. cuneata** Sheldon. N. S. and Me. to Quebec, Br. Col., Conn., Kan., New Mex. and Cal.
CONN. Rare; wet alluvial soil on the banks of the Connecticut River at Windsor and Hartford (Bissell). Not otherwise known.
8. **S. pubescens** Muhl. N. J. and Pa. to western Tenn., Ala. and Fla.
N. J. Credited to the state in N. Am. Flora 17: 60. 1909. No specimens or records are available.
PA. Philadelphia, Chester and Delaware counties.

9. **S. latifolia** Willd. N. B. and N. S. to Br. Col., Fla., Cal., Mex. and Central America.
Common in some of its numerous forms throughout the range.
10. **S. Engelmanniana** J. G. Smith. Mass., R. I., Conn. and N. Y.
CONN. New London Co.
N. Y. Lynbrook and Lake Ronkonkoma, L. I. (According to Bicknell.)
11. **S. longirostra** (Micheli) J. G. Smith. N. J. and Pa. to Fla. and Ala.
N. J. Middlesex Co. and **southward**, especially in the pine-barrens.
PA. Delaware Co.
Reported from but doubtfully in Conn.

ELODEACEAE

Leaves ribbon-like, floating, 15 cm. long or more; staminate flower with 1-3 stamens.

1. VALLISNERIA.

Leaves not ribbon-like, submerged, 3 cm. long or less; staminate flowers (where known) with 9 stamens.

2. PHILOTRIA.

1. *Vallisneria* L.*

1. **V. spiralis** L. In water: Nova Scotia to Va., Ind. and S. Dak. Also in Europe and Asia.
Throughout the range, apparently decreasing northward.

2. *Philotria* Raf.*

Leaves oblong or ovate-oblong, mostly obtuse.

1. *P. canadensis*.

Leaves linear or oblong, acute.

Leaves oblong or linear-oblong, 2-3 mm. wide; spathe of staminate flower 5-6 mm. long; anthers, 2-2.5 mm. long.

2. *P. Nuttallii*.

Leaves linear, 1.5 mm. wide or less, staminate spathe 2-3 mm. long; anthers about 1 mm. long.

3. *P. angustifolia*.

1. **P. canadensis** (Michx.) Britton. Slow streams and ponds: Quebec to Va. and Minn. Also in Europe.
Reported from nearly throughout the range but no specimens are at hand. Most of the old records of this species refer to *P. angustifolia*.
2. **P. Nuttallii** (Planch.) Rydb. Slow streams: N. Y. to Va. N. Y. L. I. and S. I. and up the Hudson Valley to Fishkill.
N. J. Passaic Co. **southward**.
PA. Chester and Philadelphia counties.

* See footnote, page 76.

3. *P. angustifolia* (Muhl.) Britton. Slow streams: N. Y. and Pa. to Fla.
 N. Y. Throughout, increasing southward.
 N. J. Morris Co., apparently increasing southward.
 PA. Bucks Co.

HYDROCHARITACEAE

I. *Limnobium* Rich.

1. *L. Spongia* (Bosc.) Rich. Shallow water: N. J. and Ont. to Fla., Tex., Mo. and Ill.
 Reported by Knieskern from Swimming River, Monmouth Co., N. J. Not recently collected and otherwise unknown in the range.

POACEAE*

- A. Spikelets articulated below the empty scales or a subtending involucre, or attached to and deciduous with the internodes of a readily disarticulating rachis, 1-flowered, or if 2-flowered the lower imperfect, usually staminate; rachilla not extending beyond the uppermost scale.
 Spikelets round or dorsally compressed; hilum punctiform.
 Fruiting scale and palet hyaline, thin, much more delicate in structure than the thick membranous to coriaceous empty scales.
 Spikelets unisexual, the pistillate borne in the lower, the staminate in the upper, part of the same spike.
 Spikelets in pairs, one sessile, perfect, the other pedicellate, perfect, staminate or empty, sometimes reduced to a single scale or wanting.
 Fruiting scale and palet never hyaline and thin, as firm as the empty scales, or firmer.
 Fruiting scale and palet membranous; spikelets naked, spiny (in ours).
 Fruiting scale and palet chartaceous or coriaceous, differing in color and appearance from the remaining scales; spikelets sometimes enclosed in an involucre.
 Spikelets laterally compressed; hilum linear.
- B. Spikelets articulated above the empty scales (below them in nos. 32, 34, 41, and 50) which are persistent, 1-many-flowered; rachilla sometimes extending beyond the uppermost scale.

I. MAYDEAE.

II. ANDROPOGONEAE.

III. ZOYSIEAE.

IV. PANICEAE.

V. ORYZEAE.

* Taxonomic treatment contributed by Mr. G. V. Nash.

Spikelets in panicles or racemes, usually upon distinct and often long pedicels.

Spikelets 1-flowered.

Empty scales 4; palets 1-nerved.

VI. PHALARIDEAE.

Empty scales 2 (rarely 1); palet usually 2-nerved.

VII. AGROSTIDEAE.

Spikelets 2-many-flowered.

Flowering scales usually shorter than empty ones, awn dorsal, bent.

VIII. AVENEAE.

Flowering scales usually longer than the empty ones, awnless, or if awned the awn terminal and straight, rarely dorsal.

X. FESTUCEAE.

Spikelets borne in 2 rows:

On one side of a continuous axis, forming 1-sided spikes or racemes.

IX. CHLORIDEAE.

On opposite sides of a continuous or sometimes articulated axis, forming equilateral spikes.

XI. HORDEAE.

Tribe I. MAYDEAE

Represented only by

1. TRIPSACUM.

Tribe II. ANDROPOGONEAE

Internodes of the rachis of the racemes thickened, appressed to the pedicels of the primary spikelets, thus forming excavations for the reception of the secondary or sessile spikelets; fertile flowering scales awnless.

2. COELORACHIS.

Internodes not thickened, and without excavations for the reception of the spikelets.

Spikelets all perfect, awned.

Rachis of the racemes continuous; panicle axis short, racemes subilabellate.

3. MISCANTHUS.

Rachis articulated; panicle axis elongated.

4. ERIANTHUS.

Sessile spikelets perfect, the pedicellate staminate or empty, awnless, sometimes wanting.

Inflorescence simple or compound, made up of 1 or more spike-like racemes which are sessile or on very short peduncles.

5. SCHIZACHYRIUM.

Raceme single; pedicels and internodes of the rachis clavate, spongy, usually stout, with a deep cup-shaped depression at the top.

Racemes not single; pedicels and rachis-internodes filiform, or flat and linear, not spongy, nor appendaged at the apex.

6. ANDROPOGON.

Inflorescence decomposed.

Pedicellate spikelet wanting.

7. SORGHASTRUM.

Pedicellate spikelet present.

8. HOLCUS.

Tribe III. ZOYSIEAE

Represented only by

9. NAZIA.

Tribe IV. PANICEAE

Spikelets without a subtending involucre of bristles or valves.

Spikelets all alike.

Fruiting scale chartaceous, the margins hyaline and flat.

Spikelets in slender racemes, borne towards the summit.

Spikelets in an open panicle on long pedicels.

Fruiting scale indurated, the margins inrolled and not hyaline.

Spikelets plano-convex, in secund racemes, usually of 3 scales.

Spikelets unequally bi-convex, in panicles, rarely in secund racemes.

Scales or some of them awned; fruiting scale cuspidate.

Scales awnless.

Second scale like the third, few nerved, not broad and saccate.

Second scale unlike the third, 11-13 nerved, broad, saccate.

Spikelets of 2 kinds, one paniculate and infertile, the other subtterranean and fertile.

Spikelets with an involucre

Of bristles, persistent.

Of 2 spine-bearing valves, enclosing the spikelets.

10. SYNTERISMA.

11. LEPTOLOMA.

12. PASPALUM.

13. ECHINOCHLOA.

14. PANICUM.

15. SACCIOLEPIS.

16. AMPHICARPON.

17. CHAETOCHELOA.

18. CENCHRUS.

Tribe V. ORYZEAE

Spikelets unisexual; plants monoecious; tall aquatic grasses. Spikelets all perfect.

19. ZIZANIA.

20. HOMALOCENCHRUS.

Tribe VI. PHALARIDEAE

Third and fourth scales

Small and empty, or rudimentary, not awned; stamens 3.

Empty, awned upon the back; stamens 2.

Subtending staminate flowers; stamens 3; fertile flower, stamens 2.

21. PHALARIS.

22. ANTHOXANTHUM.

23. SAVASTANA.

Tribe VII. AGROSTIDEAE

Flowering scale indurated at maturity, firmer than the empty scales.

Spikelets with no basal callus; flowering scale awnless, margins inrolled.

Spikelets with a basal callus; flowering scale awned, the margins flat.

Awn simple.

Flowering scale broad, the awn deciduous; callus short, obtuse.

Flowering scale narrow, awn persistent; callus commonly acute.

24. MILIUM.

25. ORYZOPSIS.

26. STIPA.

Awn 3-parted.

Flowering scale membranous, not firmer than the empty scales.

Flowering scale with a terminal awn or awn-pointed, tightly enclosing the grain.

Rachilla not prolonged beyond the base of the flowering scale; empty scales usually evident.

Rachilla extending beyond the base of the flowering scale as a bristle-like appendage; empty scales minute, the first sometimes wanting.

Flowering scale awnless, or with a dorsal awn, loosely enclosing the grain.

Spikelets readily deciduous, entire at maturity.

Empty scales awnless.

Empty scales awned.

Spikelets not deciduous entire, the empty scales persistent, flowering scales usually deciduous.

Empty scales awned.

Empty scales awnless.

Flowering scales 1-nerved.

Panicle dense and spike-like, the spikelets markedly compressed laterally, ciliate on the keel.

Panicle open or narrow, the spikelets not markedly laterally compressed, the keel glabrous.

Grain loosely enclosed in the pericarp, from which it readily separates and falls at maturity; flowering scales with no hairs at the base.

Grain adherent to the pericarp and not separating from it at maturity; flowering scale with a ring of long hairs at the base.

Flowering scales 3-5-nerved.

Stamen 1; flowering scale stipitate; palea usually 1-nerved.

Stamens 3; flowering scale sessile; palea 2-nerved.

Rachilla not prolonged beyond the flowering scale.

Rachilla prolonged beyond the flowering scale.

Prolongation of the rachilla glabrous; flowering scale glabrous at the base, and with a long awn just below the bifid apex.

27. *ARISTIDA*.

28. *MUHLENBERGIA*.

29. *BRACHYELYTRUM*.

32. *ALOPECURUS*.

34. *POLYPOGON*.

31. *PHLEUM*.

30. *HELEOCHLOA*.

33. *SPOROBOLUS*.

39. *CALAMOVILEA*.

35. *CINNA*.

36. *AGROSTIS*.

40. *APERA*.

Prolongation of the rachilla with long hairs; flowering scale awned at or below the middle.

Flowering scale membranous; spikelets 8 mm. long or less.

Flowering scale chartaceous; spikelets 10–12 mm. long.

37. CALAMAGROSTIS.

38. AMMOPHILA.

Tribe VIII. AVENEAE

Spikelets deciduous; lower flower perfect, upper staminate, awned.

Spikelets not deciduous; empty scales persistent, flowering ones deciduous.

Spikelets of 2 perfect flowers; rachilla not prolonged beyond the upper one.

Spikelets 2–many-flowered; rachilla prolonged beyond the upper scale.

Awn of flowering scale dorsal, inserted below the teeth.

Flowers all perfect, or the upper ones staminate or wanting.

Spikelets less than 12 mm. long; grain free, unfurrowed.

Flowering scales convex; awn arising from or below the middle.

Awns articulated, the apex club-shaped.

Awns not articulated, nor club-shaped.

Flowering scales keeled; awn arising from above the middle.

Spikelets over 12 mm. long; grain furrowed, usually adherent to the scales.

Upper flower perfect, lower staminate, its scale strongly awned.

Awn from between the lobes or teeth of flowering scale, generally twisted.

41. NOTHOHOLCUS.

42. ASPRIS.

43. CORYNEPHORUS.

44. DESCHAMPSIA.

45. TRisetum.

46. AVENA.

47. ARRHENATHERUM.

48. DANTHONIA.

Tribe IX. CHLORIDEAE

Spikelets deciduous, entire.

Spikelets not deciduous entire, empty scales persistent; flowering scales deciduous.

One perfect flower in each spikelet (rarely 2 in No. 49).

No empty scales above the flower.

One to several empty scales above the flower.

Spikelets scattered or remote in long filiform spikes.

50. SPARTINA.

49. CAPRIOLA.

51. GYMNOPOGON.

- Spikelets crowded in short dense, stout spikes.
- 2—several perfect flowers in each spikelet.
- Spikes with terminal spikelets.
- Spikes with rachis extending beyond the spikelets in a naked point.

Tribe X. FESTUCEAE

Rachilla with hairs longer than flowering scales enveloping them.

Rachilla and flowering scales glabrous, or if hairy the hairs shorter than the scales.

Spikelets of 2 forms, the fertile 1-3-flowered.

Spikelets all alike.

Flowering scales 1-3 nerved, rarely with intermediate additional faint ones.

Lateral nerves of the flowering scales pilose.

Internodes of the rachilla long, the deeply 2 lobed flowering scale attached by a long-pointed callus.

Internodes of rachilla and callus of flowering scale short.

Spikelets on pedicels of varying length.

Spikelets on short pedicels of about the same length.

Lateral nerves of the flowering scale glabrous.

Second empty scale very dissimilar from the first.

Second empty scale similar to the first.

Panicle narrow, branches appressed.

Panicle dull, interrupted; rachilla articulated.

Panicle shining, dense, spike-like; rachilla continuous.

Panicle open, the branches more or less spreading.

Flowering scales 5-many-nerved.

Stigmas placed at or near the apex of the ovary.

Scales more or less strongly compressed and keeled.

Empty basal scales 3-6; spikelets flat, 2-edged.

Empty basal scales 2; spikelets somewhat flattened.

Spikelets unisexual; plant dioecious.

Spikelets perfect.

Spikelets arranged in 1-sided dense capitate clusters; flowering scales awned.

52. *ATHEROPOGON*.

53. *ELEUSINE*.

54. *DACTYLOCTENIUM*.

55. *PHRAGMITES*.

67. *CYNOSURUS*.

57. *TRIPPLASIS*.

56. *TRIDENS*.

58. *DIPLACHNE*.

61. *SPHENOPHOLIS*.

59. *AIRA*.

62. *KOELERIA*.

60. *ERAGROSTIS*.

63. *UNIOLA*.

64. *DISTICHLIS*.

66. *DACTYLIS*.

- Spikelets not as above;
flowering scales awnless.
- Spikelets cordate at
base, large. 65. BRIZA.
- Spikelets not cordate,
usually small. 68. POA.
- Scales rounded on the back; at least below.
Flowering scales obtuse or subacute
at the apex.
- Flowering scales prominently
5-7 nerved; styles present. 69. PANICULARIA.
- Flowering scales obscurely 5
nerved; styles wanting. 70. PUCCINELLIA.
- Flowering scales acute, pointed or
apex awned. 71. FESTUCA.
- Stigmas arising below apex of ovary; scales
rarely awnless. 72. BROMUS.

Tribe XI. HORDEAE

- Spikelets solitary at the notches of the rachis.
- Flowering scales with their backs turned to the rachis. 73. LOLIUM.
- Flowering scales with their sides turned to the rachis. 74. AGROPYRON.
- Spikelets 2-6 at each joint of the rachis.
- Spikelets 1 flowered, or with a rudiment of a second
flower. 75. HORDEUM.
- Spikelets 2-many-flowered.
- Empty scales conspicuous. 76. ELYMUS.
- Empty scales very small or none. 77. HYSTRIX.

1. *Tripsacum* L.

1. *T. dactyloides* L. In swamps or along streams: R. I. to Neb.,
south to Fla., Tex. and Mex., the southern Bahamas, Haiti
and S. Am.

Borders of the coastal marshes, unknown elsewhere.

2. *Coelorachis* Brongn.

1. *C. rugosa* (Nutt.) Nash. In wet soil along the coast: southern
N. J. to Md., Fla. and Tex.

Known only from Bennett, Cape May Co., N. J., in boggy meadow.

3. *Miscanthus* Anderss.

1. *M. sinensis* Anderss. Native of China, Japan and the
Celebes. Sometimes escaping from cultivation in E. U. S.
Very rare as an escape on L. I., not recently collected.

4. **Erianthus** Michx.

Awns flat, closely spiral at the base, geniculate; apex of the fourth scale deeply 2-cleft.

1. *E. divaricatus*.

Awns terete or flat only at the very base, not spiral at the base; fourth scale usually entire, rarely 2-toothed.

2. *E. saccharoides*.

1. ***E. divaricatus*** (L.) Hitchc. In damp soil: N. J. to Okl. south to Fla., and Tex.

Known in our area only from Hammonton, N. J.; not recently collected.

2. ***E. saccharoides*** Michx. In moist sandy soil: southern N. J. to Md., Fla. and Tex. Also in Cuba.

N. J. Throughout the coastal plain, increasing **southward**.

PA. Berks and Chester counties.

Tertiary, common: Cretaceous, less common: Older Formations, rare and scattered, most common on Serpentine. 159-220 days. About sea level.

5. **Schizachyrium** Nees.

Hairs at the apex of the rachis internodes 2-4 mm. long.

1. *S. scoparium*.

Hairs at the apex of the rachis internodes 6-8 mm. long.

2. *S. littorale*.

1. ***S. scoparium*** (Michx.) Nash. (*Andropogon scoparium* Michx.). In dry sandy fields: Me. to Sask. and Wash., south to Fla., Tex. and N. Mex.

CONN. Throughout.

N. Y. Throughout.

N. J. Rare in Camden, Ocean, Gloucester and Burlington counties, increasing **northward**; perhaps only adventive in the pine-barrens.

PA. Throughout.

2. ***S. littorale*** (Nash) Bicknell (*Andropogon littoralis* Nash). In sand along the coast: Nantucket to N. Y., south to Va.

CONN. Near Fairfield on the beach.

N. Y. L. I. and S. I.; unknown elsewhere.

N. J. Common along the coast dunes and in the pine-barrens near the coast.

6. **Andropogon** [Royer] L.

Pedicellate spikelets empty, of 1 or 2 scales, much smaller than the sessile spikelets, or wanting.

Sheaths at the upper part of the culm not enlarged; racemes equally exerted.

Inflorescence oblong; branches divided into corymbiform masses.

1. *A. glomeratus*.

Inflorescence long, linear, little divided, not in corymbiform masses.

2. *A. virginicus*.

Sheaths at the summit or upper part of the stem much enlarged; racemes on one of the branches exerted much beyond the others.

3. *A. Elliottii*.

Pedicellate spikelets staminate, of 3 or 4 scales, equalling or exceeding the sessile spikelets.

4. *A. furcatus*.

1. **A. glomeratus** (Walt.) B. S. P. In damp soil: Nantucket to southern N. Y., south to Fla. and Miss.

N. Y. The south side of L. I. and near Tottenville, S. I.

N. J. Throughout the coastal plain and at Clifton.

PA. Bucks, Montgomery, Delaware and Chester counties.

Tertiary, common: Cretaceous, less common: Older Formations, scattered. 150-220 days. Sea level-800 ft.

2. **A. virginicus** L. In dry or moist soil: Mass. to Ill., Fla. and Tex.; in the Bermudas, Bahamas and tropical Am.

Throughout the range, rare northward, becoming common southward, and along the coasts.

3. **A. Elliottii** Chapm. In dry or moist places: southern N. J. to Mo., south to Fla. and Tex.

N. J. Rare in Camden, Gloucester, Salem and Cape May counties, not in the pine-barrens.

PA. Rare near Ashbourne, Montgomery Co.

4. **A. furcatus** Muhl. In dry or moist soil: Me. to Assin., south to Fla., Tex. and northern Mex.

Scattered throughout the range except the pine-barrens and the strip to the east of them.

7. **Sorghastrum** Nash.

1. **S. nutans** (L.) Nash. (*S. avenaceum* (Michx.) Nash). In dry places: Me. to Manitoba, south to Florida and northern Mex.

Not uncommon in most parts of our range.

8. **Holcus** L. (*Sorghum* Moench.)

1. **H. halepensis** L. In fields and waste places: E. N. Am. Native of Europe and Asia.

Rare as a scattered waif.

Holcus Sorghum L. has been collected as a waif on S. I. and L. I.

9. **Nazia** Adans.

1. **N. racemosa** (L.) Kuntze. Occasional in ballast: E. N. Am.
Native of Europe and Asia.

Rare as a weed in our area.

Nazia aliena (Spreng.) Scribn. has been collected as a waif near Yonkers.

10. **Syntherisma** Walt.

Rachis of the racemes wingless; first scale of spikelet wanting or rudimentary.

1. *S. filiforme*.

Rachis of the racemes with the lateral angles broadly winged.

Leaves glabrous; first scale wanting the second as long as spikelet.

2. *S. Ischaemum*.

Leaves pubescent; first scale present, the second shorter than spikelet.

3. *S. sanguinale*.

1. **S. filiforme** (L.) Nash. Dry sandy soil: N. H. to Mich., south to Fla. and Mex.

CONN. Throughout.

N. Y. Common on L. I. and S. I., decreasing and perhaps wanting northward.

N. J. Scattered over most of the state, increasing southward.

PA. Lehigh, Bucks, Philadelphia, Delaware and Chester counties.

Apparently weedy with us.

2. **S. Ischaemum** (Schreb.) Nash (*S. humifusum* (Pers.) Rydb.).
In cultivated grounds and waste places: N. S. to S. Dak., south to Fla. and Tex. Naturalized from Europe.

Not uncommon as a weed.

3. **S. sanguinale** (L.) Dulac. In cultivated or waste places: throughout N. Am. Native of Europe.

Throughout the range as a weed.

11. **Leptoloma** Chase.

1. **L. cognatum** (Schultes) Chase. N. H. to Fla., Ill., Minn., and northern Mex.

Known only from near Riverhead, L. I. and New Haven, Conn.

12. **Paspalum** L.

Wings of the rachis broad, membranous, inrolled on the spikelet. 1. *P. dissectum*.

Wings of the rachis narrow, not membranous, nor inrolled on the spikelet.

One to several raceme-bearing naked branches arising from the uppermost leaf-sheath.

- Pubescence of leaves of copious soft short appressed hairs. 2. *P. psammophilum*.
- Pubescence of leaves of long stiff spreading hairs. 3. *P. pubescens*.
- Culms long hirsute below the racemes. 4. *P. setaceum*.
- Culms glabrous. 5. *P. Muhlenbergii*.
- Spikelets 1-1.5 mm. long.
- Spikelets 2-2.5 mm. long.
- No branches arising from the uppermost leaf-sheath.
- Spikelets 3 mm. long or less.
- Spikelets oval $\frac{1}{2}$ as thick as broad or more, the outer scales firm.
- Leaf-sheaths glabrous, or sometimes ciliate; blades glabrous or hirsute on upper surface. 6. *P. laeve*.
- Leaf-sheaths as well as the blades hirsute. 7. *P. plenipilum*.
- Spikelets circular or nearly so $\frac{1}{4}$ - $\frac{1}{3}$ as thick as broad, the outer scales thin and usually wrinkled. 8. *P. circulare*.
- Spikelets more than 4 mm. long.
- Leaf-blades short, the larger ones 15 cm. or less. 9. *P. difforme*.
- Leaf-blades long, exceeding 20 cm. 10. *P. floridanum*.
1. *P. dissectum* Walt. (*P. membranaceum* Walt.). Moist or wet ground: N. J. to Fla. and Tex.
 N. J. Rare from Camden Co., **southward** along the Delaware, and at Cape May, unknown elsewhere.
 PA. In ballast near Philadelphia.
 A rare and scattered species, perhaps only adventive with us.
2. *P. psammophilum* Nash. In dry sandy soil: Mass., southern N. Y. to Del.
 Rare in Conn.; near Kingsbridge and Arlington, N. Y. City, and on L. I.; and Fisher's Island, and scattered over the coastal plain of N. J.
3. *P. pubescens* Muhl. In fields and dry woods: Conn., N. Y. and N. J. to Tex.
 Conn. Reported but stations unknown.
 N. Y. Rare in northern Westchester Co., increasing **southward**.
 N. J. Scattered and local from Passaic Co. southward, except Cape May.
 PA. Montgomery, Bucks, Delaware and Chester counties.
 A rare and local species.
4. *P. setaceum* Michx. In fields: N. H. to Neb., Fla. and Tex.
 Scattered throughout the northern part of the range, increasing and common **southward**.

5. **P. Muhlenbergii** Nash. In fields or in sandy or stony grounds: N. H. to Fla. and Tex.
Common along and near the coasts of our area and at Albion, Camden Co., N. J., inland; also along the lower Hudson.
6. **P. laeve** Michx. In fields and sandy places: N. J. to Md. and Tex.
N. J. Frequent along and near the coast from southern Ocean Co. to Cape May, and in the counties bordering the Delaware north to Camden Co., not in the pine-barrens.
PA. Northampton, Montgomery, Philadelphia, Delaware and Chester counties.
Tertiary, not on Beacon Hill, scattered elsewhere: Cretaceous scattered. Older Formations, rare in the eastern part of Pa. 159-220 days. Sea level-950 ft.
7. **P. plenipilum** Nash. In fields and along roadsides: Conn. to Mo., south to Fla. and Ala.
CONN. Rare at Orange.
N. Y. Rare as a wild plant at the New York Botanical Garden, unknown elsewhere.
N. J. Rare at Clifton, Passaic Co., wanting thence to the coastal plain, there rare and scattered but increasing **southward**.
A rare and local species whose distribution is little understood.
8. **P. circulare** Nash. In fields: Conn. to Mo., south to N. Car. and Tex.
CONN. Groton and Franklin.
N. Y. Rare in Bronx and Westchester counties and on S. I.
N. J. Sussex, Bergen, and Middlesex counties, and along the coast in Ocean and Atlantic counties.
PA. Delaware Co.
A curious distribution unlike any other wild plant in our area.
9. **P. difforme** Le Conte. In sandy soil: N. J. and Md. to Fla. and Tex.
Known only as a ballast weed in Camden Co., N. J.
10. **P. floridanum** Michx. In dry or moist soil: N. J. to Kan. south to Fla. and Tex.
Known, according to Stone, only from Anglesea, Cold Spring and Cape May, all in Cape May Co., N. J.

13. *Echinochloa* Beauv.

Sheaths glabrous.

Sheaths, at least the lower ones, densely papillose-hirsute.

1. *E. Crus-galli*.

2. *E. Walteri*.

1. *E. Crus-galli* (L.) Beauv. In cultivated and waste places; nearly throughout N. Am. Native of Europe.

Common as a weed.

2. *E. Walteri* (Pursh.) Nash. In marshes and ditches along the coast: Ont. to R. I., Fla. and Tex.

Common along the coasts, decreasing inland and not recorded from the northern part of our range; rare in the pine-barrens.

E. frumentacea (Roxb.) Link has been collected as a waif.

14. *Panicum* L.

Spikelets on one side of the rachis on short pedicels forming 1-sided racemes.

Spikelets arranged in panicles, the divisions sometimes strict and narrow but not 1-sided.

Basal leaf-blades long and narrow, similar to those of the stem; no rosulate tufts of leaves in the fall; spikelets lanceolate to ovate, acute to acuminate; rarely obtuse.

Spikelets manifestly tuberculate.

Spikelets not tuberculate.

Basal leaf-sheaths round or but little flattened, not keeled.

Annuals.

Perennial by long rootstocks or stolons.

Rootstocks and stolons naked or with a few large scales.

Rootstocks and stolons with numerous small broad scales.

Basal leaf-sheaths much compressed, broad, keeled, often equitant.

Basal leaf-blades unlike those of the culm, ovate to ovate-lanceolate; perennial by rosulate tufts which form in the fall at the base of the culms; spikelets elliptic to spheric, usually obtuse, rarely acute, never acuminate.

I. PASPALOIDEA.

II. VERRUCOSA.

III. CAPILLARIA.

IV. HALOPHILA.

V. VIRGATA.

VI. AGROSTOIDEA.

VII. DICHOTOMA.

I. PASPALOIDEA

Represented only by

1. *P. hemitomon*.

II. VERRUCOSA

Represented only by

2. *P. verrucosum*.

III. CAPILLARIA

Spikelets lanceolate or elliptic, 3 mm. long or less.

Leaves glabrous.

3. *P. dichotomiflorum*.

Leaves pubescent.

Spikelets 2.5 mm. long or less; panicles broad.

Panicle large and diffuse.

Panicle small, not occupying over one third of the plant.

Spikelets about 2 mm. long; culms stout; blades about 1 cm. wide.

Spikelets less than 2 mm. long; blades about 5 mm. wide.

Spikelets 3 mm. long; panicle narrow.

Spikelet ovate, about 5 mm. long.

4. *P. capillare*.

5. *P. Gattingeri*.

6. *B. philadelphicum*.

7. *P. flexile*.

8. *P. miluaceum*.

IV. HALOPHILA

Represented only by

9. *P. amarum*.

V. VIRGATA

Represented only by

10. *P. virgatum*.

VI. AGROSTOIDEA

Rootstocks present.

Rootstocks wanting.

Fruiting scale sessile.

Panicle broad, open, its branches spreading.

Ligule naked; culms much branched; spikelets numerous.

Ligule ciliate; culms simple or sparingly branched; spikelets few.

Panicles narrow, oblong, dense, its branches erect.

Fruiting scale distinctly stalked.

11. *P. anceps*.

12. *P. agrostoides*.

14. *P. longifolium*.

13. *P. condensum*.

15. *P. stipitatum*.

VII. DICHOTOMA

A. Culms simple, or with basal branches and panicles only; not fasciculately branched later.

Spikelets acute, the second and third scales extending beyond the fruiting scale.

Spikelets obtuse, the outer scales not exceeding fruiting scale.

Secondary panicles present.

Secondary panicles wanting.

Spikelets less than 2 mm. long.

Panicle much longer than broad; upper blades not smaller than lower ones.

Panicle nearly as long as broad; upper blades smaller than lower ones.

Spikelets 2 mm. long or more.

Blades linear, less than 5 mm. wide.

Blades linear-lanceolate, 6-10 mm. wide.

Panicle narrow, its branches appressed.

Panicle broad, open, its branches spreading.

16. *P. depauperatum*.

17. *P. linearifolium*.

23. *P. polyanthes*.

22. *P. sphaerocarpon*.

18. *P. Werneri*.

54. *P. xanthophysum*.

19. *P. Bucknellii*.

B. Culms simple only at first, later with fasciculate branches at the upper nodes.

- I. Middle blades of the main culm less than 1.5 cm. wide, the base rounded to subcordate.
 Blades of the main culm usually elongated and narrowed at both ends.
 Plants large; culms 80–100 cm. high; leaf blades 11–20 cm. long.
 Spikelets ovate, 2.5 mm. long or less.
 Sheaths or some of them hispid; autumnal form with crowded branchlets. 56. *P. scabriusculum*.
 Sheaths glabrous; autumnal form sparingly branching. 57. *P. cryptanthum*.
 Spikelets elliptic, 3 mm. long. 58. *P. aculeatum*.
 Plants small; culms 40–80 cm. high; leaf-blades scarcely over 9 cm. long.
 Mature state of blades involute; spikelets 2 mm. long. 21. *P. aciculare*.
 Mature blades flat or merely involute on margins; spikelets 2.5 mm. long. 20. *P. angustifolium*.
 Blades of the culm not elongated or conspicuously narrowed at the base.
 a. Spikelets less than 3 mm. long.
 Spikelets glabrous.
 Spikelets strongly nerved, acute; blades up to 20 cm. long. 56. *P. scabriusculum*.
 Spikelets relatively obscurely nerved; blades rarely exceeding 10 cm. long.
 Nodes densely barbed; spikelets about 1.5 mm. long. 29. *P. microcarpon*.
 Nodes naked or rarely the lowermost ones sparingly barbed.
 Ligule 2–3 mm. long. 33. *P. octonodum*.
 Ligule short, less than 1 mm. long.
 Spikelets 1.5 mm. long. 27. *P. coerulescens*.
 Spikelets 2 mm. long; sheaths not spotted.
 Culms erect, the branches fasciculate near the middle. 25. *P. dichotomum*.
 Culms prostrate, trailing. 26. *P. lucidum*.
 Spikelets 2.2 mm. long; sheaths spotted. 28. *P. yadkinense*.
 Spikelets pubescent.
 Sheath glabrous but ciliate, or the basal ones sometimes pubescent.
 Blades velvety. 30. *P. annulum*.
 Blades not velvety.
 Ligule 1 mm. long or less.
 Spikelets less than 2 mm. long.
 Culms slender, the blades 2.5 cm. long or less. 24. *P. ensifolium*.
 Culms stouter, the blades larger.

- Panicle longer than broad. 23. *P. polyanthes.*
 Panicle nearly as long as
 broad. 22. *P. sphaerocarpon.*
- Spikelets over 2 mm. long.
 Culms puberulent. 59. *P. Ashei.*
 Culms glabrous. 60. *P. commutatum.*
 Leaf-blades cordate.
 Leaf-blades not cordate.
 Blades erect, ciliate
 toward the base. 31. *P. boreale.*
 Blades spreading,
 glabrous. 32. *P. mattamuskeetense.*
- Ligule 2-5 mm. long.
 Spikelets over 2 mm. long. 40. *P. scoparioides.*
 Spikelets less than 2 mm. long.
 Panicle much longer than
 broad.
 Spikelet almost globose,
 less than 1.5 mm. long. 34. *P. paucipilum.*
 Spikelet elliptic, densely
 pubescent, over 1.5 mm.
 long. 35. *P. spretum.*
 Panicle as long as broad. 36. *P. Lindheimeri.*
- Sheaths pubescent.
 Sheaths merely puberulent. 59. *P. Ashei.*
 Sheaths pubescent with longer hairs.
 Plants velvety. 55. *P. scoparium.*
 Spikelets over 2 mm. long.
 Spikelets less than 2 mm. long.
 Hairs on the sheath long and
 shaggy. 47. *P. lanuginosum.*
 Hairs on the sheath short and
 inconspicuous. 30. *P. annulum.*
- Plants not velvety.
 Spikelets ovate, pointed. 56. *P. scabriusculum.*
 Spikelets not as above.
 Spikelets less than 2 mm.
 long.
 Pubescence spreading.
 Blades glabrous above
 or nearly so. 46. *P. tennesseense.*
 Blades pubescent on
 the upper sur-
 face.
 Upper surface of
 blades with short
 appressed hairs. 39. *P. huachucae.*
 Upper surface of
 blades with
 long erect
 hairs.

- Panicle 2.5-4
cm. long, its
axis minute-
ly pubescent. 45. *P. meridionale*.
- Panicle 5-7.5
cm. long; axis
hirsute. 44. *P. implicatum*.
- Pubescence not spreading.
Ligule short; culms
villous puber-
ulent. 50. *P. columbianum*.
- Culms erect, rigid. 51. *P. tsugetorum*.
- Culms weak, fas-
ciculately de-
cumbent. 51. *P. tsugetorum*.
- Ligule 2 mm. long or
more; culms with
long, stiff, ap-
pressed hairs.
- Blades glabrous on
the upper
surface.
- Spikelets 1.2-
1.3 mm. long. 37. *P. leucothrix*.
- Spikelets not
over 1 mm.
long. 38. *P. Wrightianum*.
- Blades pubescent
on the upper
surface. 45. *P. meridionale*.
- Spikelets 2 mm. long or more. 41. *P. languidum*.
- Spikelets pointed.
- Spikelets not pointed.
- Ligule 2-5 mm. long.
- Pubescence spread-
ing. 42. *P. villosissimum*.
- Pubescence not
spreading.
- Pubescence
sparse and
stiff; upper
internodes
shortened. 40. *P. scoparioides*.
- Pubescence
silky; upper
internodes
not short-
ened. 43. *P. pseudopubescens*.
- Ligule short.
- Panicle 4-5.5 cm.
long, oblong,
dense. 48. *P. Addisoni*.

Panicle 6.5-8.5 cm.
long, broadly
ovoid, open.

49. *P. Commonsianum*.

b. Spikelets 3 mm. long or more.

Panicle narrow, its branches usually appressed.

54. *P. xanthophysum*.

Panicle broad, nearly as wide as long.

Spikelets 3 mm. long; blades commonly
much elongated.

58. *P. aculeatum*.

Spikelets over 3 mm. long; blades not
elongated.

Blades softly and densely pubescent
beneath.

53. *P. oligosanthes*.

Blades glabrous or rarely puberulent
beneath.

52. *P. Scribnerianum*.

II. Middle blades of the main culm more than 1.5 cm.
wide, usually cordate and clasping at the base.

Spikelets less than 3 mm. long.

Blades glabrous on both surfaces.

Spikelets less than 2 mm. long; culms simple.

23. *P. polyanthes*.

Spikelets more than 2 mm. long; culms
branched.

Sheaths papillose-hispid, especially the ter-
minal ones.

63. *P. clandestinum*.

Sheaths glabrous.

60. *P. commutatum*.

Blades densely villous on both surfaces.

55. *P. scoparium*.

Spikelets 3 mm. long or more.

Panicle narrow, its branches appressed.

54. *P. xanthophysum*.

Panicle open, its branches spreading.

Nodes barbed.

62. *P. Boscii*.

Nodes naked.

61. *P. latifolium*.

1. **P. hemitomom** Schult. In water: N. J. to Fla. and Tex.

Known in our area only from West Cape May, and Bennett, Cape
May Co., N. J.

2. **P. verrucosum** Muhl. In moist soil: Mass. to Mo., south to
Fla. and Tex., mostly near the coast.

CONN. Rare at New Haven.

N. Y. On L. I. and S. I., unknown elsewhere.

N. J. Throughout the coastal plain, unknown elsewhere.

PA. Delaware and Bucks counties, rare.

Not uncommon on the coastal plain, very rare elsewhere in our
area.

3. **P. dichotomiflorum** Michx. (*P. proliferum* of various Am. Auth.
not of Lam.). In wet soil: Me. to Neb., Fla., Tex. and Cal.
Also in Trop. Am.

Throughout the range, except the pine-barrens, always increasing
southward.

4. **P. capillare** L. In dry soil, as a weed: N. S. to N. Dak., south to Fla. and Tex. Also in Bermuda.
Throughout the area, except the pine-barrens, always as a weed.
5. **P. Gattingeri** Nash. In moist places: Me. to N. Car., Iowa and Mo.
CONN. Rare at West Goshen.
N. Y. Rare in Westchester and Columbia counties; and at Cypress Hills, L. I. (according to Bicknell).
N. J. Passaic and northern Middlesex counties.
PA. Philadelphia, Chester and Montgomery counties.
More common south of our area than in it.
6. **P. philadelphicum** Bernh. (*P. minus* Nash). In dry woods and thickets: N. B. to Wisc., Ga., Tex. and Okl.
Scattered throughout the range; locally common.
7. **P. flexile** (Gattinger) Scribn. In dry or moist soil: Ont. to S. Dak., south to Fla. and Tex.
Known in our area only from a limestone sink hole near White Pond, Sussex Co., N. J., a region north of the moraine with a growing season of about 145 days.
8. **P. miliaceum** L. In waste places: Me. to Fla., Mich. and Cal. Native of Europe.
Not uncommon as a weed; not reported from L. I.
9. **P. amarum** Ell. (*P. amaroides* Scribn. and Merr.). In sands along the coast: Conn. and L. I. to Fla. and Miss.
CONN. Scattered at Guildford, Lyme and New Haven, increasing westward along the coast.
N. Y. Rare along the shores of L. I. and S. I., unknown elsewhere.
N. J. Sandy Hook to Cape May along the coast, and up the bay shore to Town Bank (according to Mackenzie).
PA. Philadelphia (according to Porter).
Practically confined to coastal sands.
10. **P. virgatum** L. (*P. virgatum cubense* Griseb.). In moist or dry soil: Me. to Sask., south to Fla., Ariz. and Costa Rica.
Common throughout the range, specially along the coast.
11. **P. anceps** Michx. In moist soil: R. I. to Kan., south to Fla. and Tex.

In our area known only from the drainage area of the Delaware River, from Hunterdon Co., N. J., and Northampton Co., Pa., **southward**; and at Cape May; not in the pine-barrens.

12. **P. agrostoides** Spreng. Wet ground: Me. to Minn., south to Fla. and Tex.

Throughout the range except at Cape May and east of the pine-barrens.

13. **P. condensum** Nash. Wet places and along streams: southern N. J. and Pa. to Fla. and Tex.; also in the Bahamas, Cuba and Guadeloupe.

Known only from the southern part of Cape May Co., N. J.

14. **P. longifolium** Torr. In moist soil: R. I. to Md., Fla., Miss. and Tex.

CONN. Rare along the coast at Groton, Montville and Fairfield. N. Y. On L. I. and S. I. and in the Bronx, unknown northward.

N. J. Rare in Bergen and northern Middlesex counties, increasing **southward**, especially in the pine-barrens.

PA. Philadelphia Co.

Tertiary, common: Cretaceous, common: Older Formations, rare and scattered. 179-220 days. About sea level.

15. **P. stipitatum** Nash. In moist soil: Conn. and N. J. to Ky., Mo., Ga. and Tex.

CONN. Rare at Lyme, unknown elsewhere.

N. Y. Bronx Park, N. Y. City; and near Kingsbridge.

N. J. Rare in Passaic, Bergen, and Middlesex counties, increasing **southwestward** and becoming frequent in the counties bordering the Delaware; not in the pine-barrens nor south of them.

PA. Northampton, Philadelphia and Chester counties.

Tertiary, 0: Cretaceous, frequent; Older Formations, scattered. 159-220 days. About sea level.

16. **P. depauperatum** Muhl. In dry places: Me. to Minn., south to Ga. and Tex.

Throughout the range, except the pine-barrens, there less common and perhaps adventive.

17. **P. linearifolium** Scribn. In dry soil: N. S. to Mich., south to Ga., Ark. and Tex.

CONN. Throughout.

N. Y. On L. I. and S. I., increasing **northward**.

- N. J. Very rare near Wildwood, Cape May Co., otherwise known only from Morris, Sussex, Warren and Passaic counties.*
- PA. Northampton, Bucks, Berks, Chester and Delaware counties.
- Tertiary, unknown on Beacon Hill, very rare off it: Cretaceous, O: Older Formations, rare and scattered; predominating on limestone and Serpentine. 118-220 days. Sea level-2,900 ft.
18. **P. Wernerii** Scribn. Dry knolls in swamps: Me. to Minn., Ohio, Mo. and Tex.
- CONN. Rare; Voluntown, Ledyard, Waterford, Southington and Franklin.
- N. Y. Near Van Courtlandt Park, N. Y. City.
- N. J. Rare at Berkeley Heights, Union Co.
- PA. Near Easton.
- A rare and local species in our area.
19. **P. Bicknellii** Nash. Dry wooded hills: Conn., N. Y. and Pa. to Ga. and Mo.
- CONN. Norwich and New Haven, rare.
- N. Y. Not uncommon in the Bronx and on the coastal plain of L. I.
- PA. Rare in Chester Co.
- A rare and local species.
20. **P. angustifolium** Ell. In dry soil: N. J. and Pa. to Fla. and Tex.
- N. J. Green Creek, Cape May Co.
- PA. "Banks of the Schuylkill, below Reading." Not recently collected and perhaps introduced.
- Very rare in our range, common in the southern states.
21. **P. aciculare** Desv. Dry or moist soil: N. J. to Fla. and Tex. Recorded from W. I.
- Known, in our area, only from Cape May Co., N. J.
22. **P. sphaerocarpon** Ell. In dry soil: Vt. to Kan., south to Fla., Tex. and Mex., northern S. Am.
- Throughout the range, increasing and common **southward**.
23. **P. polyanthes** Schult. In woods and along thickets: southern N. Y. to Okl., south to Ga. and Tex.
- N. Y. Rare on S. I. and in the Bronx, unknown elsewhere.
- N. J. Rare in Middlesex Co., increasing **southwestward** to Salem Co.; not in the pine-barrens; at Cape May.

* See Introduction paragraph 7.

PA. Monroc, Philadelphia, Bucks, Delaware and Chester counties.

Tertiary, not on Beacon Hill, rare off it: Cretaceous, common: Older Formations, rare and scattered. 123-220 days. Sea level-2,100 ft.

24. **P. ensifolium** Baldw. In moist places, pine-barrens: N. J. to Fla. and Miss.

N. J. Common in the pine-barrens, also at Lawnside, Camden Co., and Cape May.*

Tertiary, common on Beacon Hill, rare off it: Cretaceous, very rare:* Older Formations, o. 159-220 days. About sea level.

25. **P. dichotomum** L. (*P. barbuiatum* Michx. not of many Am. Auct.). In woodlands and thickets: N. B. to Mich., Fla. and Tex.

Rare in the pine-barrens and the southern part of the range generally, increasing and common northward.

26. **P. lucidum** Ashe. Sphagnum bogs and wet soil: N. Y. and N. J. to Fla. and Tex.

N. Y. On the coastal plain in western L. I.

N. J. Throughout the coastal plain, specially common in the pine-barrens, unknown elsewhere.

Tertiary, common: Cretaceous, less common: Older Formations, rare. 168-220 days. About sea level.

27. **P. coeruleascens** Hack. Moist places: N. J. to Fla., and Miss. Known in our area only from Cape May Co., N. J.

28. **P. yadkinense** Ashe. Moist woods and thickets: Pa. to Ga., Ill. and La.

Known in our area only from near Sellersville, Bucks Co., Pa., a region underlaid by Mesozoic red sandstone, south of the moraine, with an elevation of about 200 ft. and a growing season of 176 days: reported also from near Easton, Pa.

29. **P. microcarpon** Michx. (*P. barbuiatum* Am. Auth. not of Michx.). In moist soil: Mass. to Mo., south to Fla. and Tex.

Throughout the range, except the pine-barrens, there rare.

30. **P. annulum** Ashe. In dry rocky woods: N. J. and Pa. to Ga., Mo. and Miss.

* See Introduction paragraph 29.

- N. J. Milburn, Essex Co., rare.
 PA. Bucks, Chester and Delaware counties.
 A rare and local species in our range.
31. *P. boreale* Nash. In moist soil: Newf. to Ont., south to N. Y., N. J., Ind. and Minn.
 CONN. Rare along the coast, increasing **northward**.
 N. Y. Rare in the Bronx, increasing **northward**.
 N. J. Rare in Morris Co., its most southerly distribution point, increasing **northward**.
 PA. Pike Co., rare.
 Tertiary, 0: Cretaceous, 0: Older Formations, rare but increasing **northward**. Not south of the moraine. 118-169 days. Sea level-3,190 ft.
32. *P. mattamuskeetense* Ashe (*P. Clutei* Nash). Sandy borders of swamps and bogs: Mass. to N. Car.
 N. Y. Common on L. I., rare on the southern end of S. I., unrecorded elsewhere.
 N. J. Common throughout the coastal plain, not known elsewhere. Apparently confined to the coastal part of our range.
33. *P. octonodum* J. G. Smith. In wet places: N. J. to Fla. and Tex.
 Known in our area only from Tuckerton, Ocean Co., N. J., rare.
34. *P. paucipilum* Nash. In wet soil: N. J. to Fla. and Miss.
 Known in our range only from Wildwood, Cape May Co., N. J., its type locality; and from Folsom, Hammonton and Winslow Junction, in the pine-barrens.
35. *P. spretum* Schult. Along the coast, in damp or wet places: Me. to N. J. and Pa. and northern Ind.
 CONN. Rare along the coast in New Haven Co. and reported from Columbia, Tolland Co., inland.
 N. Y. Riverhead, L. I.
 N. J. Not infrequent in the pine-barrens and at Cape May, unknown elsewhere.
 PA. Chester Co.
 Tertiary, common: Cretaceous 0: Older Formations, rare and local, mostly near the coast. 169-220 days. About sea level.
36. *P. Lindheimeri* Nash. (*P. nitidum* of many earlier local floras, not of Lam.) In dry sandy soil: Me. to Ont. and Cal., south to Fla. and Tex.
 Common throughout the range.

37. **P. leucothrix** Nash. In dry sandy soil: N. J. to Fla. and Miss., Cuba.

Confined, in our area, to the southern part of the pine-barrens of N. J., a region with a growing season of about 200 days, at about sea level and underlain by the Beacon Hill formation.

38. **P. Wrightianum** Scribn. In sandy or mucky soil: Mass. to Fla., west to Tex., Cuba.

Known, in our range, only from Wading River, L. I. and near Bennett, Cape May Co., N. J.

39. **P. huachucae** Ashe (*P. huachucae silvicola* Hitchc. & Chase. *P. unciophyllum* of some local floras, not of Trin.). In dry soil: Me. to S. Dak., Fla., Tex. and Cal.

Common throughout the range, except the pine-barrens, there not recorded.

40. **P. scoparioides** Ashe. In dry soil: Vt. to Pa., Del. and Minn.

Rare; known only from Southington and East Lyme, Conn. and from Bull's Island (in the Delaware) Hunterdon Co., N. J.

41. **P. languidum** Hitchc. & Chase. Open woods: Me., Mass. and E. N. Y.

Known in our range only from Platte Clove, in the Catskills, a region at about 2,500 ft., north of the moraine and with a growing season of about 120 days.

42. **P. villosissimum** Nash (*P. atlanticum* Nash). In dry soil: Mass. to Minn., Fla. and Tex.

CONN. Franklin, Old Lyme, East Hartford, Southington and Southbury; rare.

N. Y. L. I., S. I., the Bronx and Westchester Co.; rare.

N. J. Rare in Passaic and Bergen counties, increasing southward and common on the coastal plain.

PA. Northampton, Delaware and Chester counties, rare.

Tertiary, common: Cretaceous, less common: Older Formations scattered: 159-220 days. About sea level.

43. **P. pseudopubescens** Nash. In dry soil: Conn. to Ill., Fla. and Miss. Rare in our range, and scattered.

Known in our area only from South Britain and Southbury, Conn., and Clementon, Atsion, Wildwood, Mickleton and Camden, N. J.

44. **P. implicatum** Scribn. In dry soil: N. S. to Minn., D. C. and Ky.
 CONN. Throughout, but rare.
 N. Y. On L. I., and in Bronx and Westchester Co.
 N. J. Bergen and Sussex counties.
 PA. Northampton and Monroe counties.
 A rare *Panicum*.
45. **P. meridionale** Ashe (*P. oricola* Hitchc. & Chase. *P. subvillosum* Ashe. *P. albemarlense* Ashe). In sandy places: N. S. to Minn., Ga. and Mo.
 Throughout the coastal part of our range, decreasing inland and wanting northward; common in the pine-barrens.
46. **P. tennesseense** Ashe. In moist ground or in woods: Me. to Minn., south to Ga. and Tex.
 CONN. Rare and local throughout the state.
 N. Y. On L. I. and S. I. and in the Bronx, not recorded elsewhere.
 N. J. Rare in Morris, Sussex, Passaic and Middlesex counties, thence increasing southward, but not in the pine-barrens.
 PA. Pike, Northampton, Lehigh, Philadelphia and Chester counties.
47. **P. lanuginosum** Ell. In dry sandy soil: N. J. to Fla., La. and Tex.
 N. J. Common along the coastal marshes from Ocean Co. southward.
48. **P. Addisonii** Nash. In sandy soil: Mass. to S. Car.
 CONN. East Lyme and East Hartford.
 N. Y. Rare on L. I., unknown elsewhere.
 N. J. Common throughout the coastal plain, specially in the pine-barrens.
 PA. Chester Co.
 A typical coastal plain species.
49. **P. Commonsianum** Ashe. In dry sandy soil, near the coast; Conn. to N. Car. and Fla.
 CONN. North Haven, South Windsor and East Lyme.
 N. Y. Known only from L. I. and S. I.
 N. J. Common throughout the coastal plain, except the region bordering the Delaware, there not recorded.
 PA. Delaware Co.
 Typically a coastal plain *Panicum*.

50. **P. columbianum** Scribn. (*P. psammophilum* Nash. *P. columbianum thinium* Hitchc. & Chase). Fields and open woods: Me. to Va.
Common throughout the range, especially in the pine-barrens.
51. **P. tsugetorum** Nash. In dry woods; Me. to Va., Ill. and Tenn.
Throughout the range.
52. **P. Scribnerianum** Nash. In dry or moist soil: Me. to Br. Col., south to Va., Tex. and Ariz.
CONN. Throughout.
N. Y. Throughout, but rare northward.
N. J. Rare and local in the northern counties except in the Delaware Valley, and scattered on the coastal plain, but not in the pine-barrens, or east or south of them.
PA. Pike, Northampton, Lehigh, Bucks, Philadelphia, Delaware and Chester counties.
Tertiary, o: Cretaceous, scattered: Older Formations, not very common. 138-220 days. Sea level-1,080 ft.
53. **P. oligosanthos** Schult. In dry soil: N. J. to Fla., Ill. and Tex.
N. J. Rare and local in Camden, Burlington and Cape May counties. Interesting as being more common out of the pine-barrens than in them.*
54. **P. xanthophysum** A. Gray. In dry soil: Que. and Man. to Pa.
CONN. Stafford and South Windsor.
N. Y. Mt. Riga, Pine Plains, Dutchess Co., and in the Catskills.
N. J. High Point, Sussex Co.
PA. Luzerne and Monroe counties; reported also from Bucks Co. but probably incorrectly.
Tertiary, o: Cretaceous, o: Older Formations, scattered **northward**. Not south of the moraine. 117-168 days. Sea level-3,900 ft.
55. **P. scoparium** Lam. In moist soil: Mass. to N. J., Pa., Fla., Okla. and Tex. Also in Cuba.
N. J. Throughout the coastal plain, specially along the courses of streams; not recorded northward.
PA. Tinicum, Delaware Co.

* See Introduction paragraph 29.

Tertiary, common: Cretaceous, common: Older Formations: known only on the "River Mud," underlying Tinicum, Delaware Co., Pa., in our area. 159-220 days. About sea level.

56. *P. scabriusculum* Ell. In swampy places and ponds: N. J. to W. Va., Fla. and Tex.
 N. J. At Hospitality Bridge, Folsom, Pleasant Mills and north of Atsion in the pine-barrens and at Atlantic City (according to Hitchcock & Chase). A rare and apparently northward migrating species.
57. *P. cryptanthum* Ashe. In dry or moist soil: N. J. to Fla. and Tex.
 N. J. From Atlantic City southward along the coast, and at Folsom in the pine-barrens; very rare.
58. *P. aculeatum* Hitchc. & Chase. In open sandy places: N. Y. to D. C. and N. Car.
 N. Y. Rockville Centre and Hempstead, L. I., on or near the Hempstead Plains.
 N. J. Reported from Cape May, and Albion, Camden Co.; rare.
59. *P. Ashei* Pearson. In dry woods: Mass. to Mich., south to Fla., Miss. and Mo.
 Throughout the range, less common in the north, increasing southward.
60. *P. commutatum* Schult. In dry woods and thickets: Mass. to Mo., Fla. and Tex.
 N. Y. Rare on S. I., and at the New York Botanical Garden, not recorded elsewhere in our area.
 N. J. Rare at Rosemont, Hunterdon Co., and at Bennett, Cape May.
 PA. Recorded from Northampton, Bucks, and Delaware counties.
61. *P. latifolium* L. (*P. macrocarpon* Le Conte). In woods: Me. to Minn., south to N. Car. and Kan.
 CONN. Throughout.
 N. Y. Common on L. I. (according to Bicknell); and S. I., in Westchester Co., thence increasing northward.
 N. J. Rare in Gloucester Co., near the Delaware, not recorded thence to Essex Co., thence increasing northward.
 PA. Chester, Philadelphia, Bucks, Northampton, Monroe and Luzerne counties.

Tertiary, o: Cretaceous, rare: Older Formations, increasing northward. 117-220 days. Sea level-4,050 ft.

62. **P. Boscii** Poir. (*P. Porterianum* Nash. *P. pubifolium* Nash).
In woods: Mass. to Mo., Okl., Fla. and Tex.

Throughout the range except the pine-barrens and the region east of them.

63. **P. clandestinum** L. (*P. decoloratum* Nash). In thickets and moist places: Me. to Kan., south to Fla. and Tex.

Throughout the range, except the pine-barrens.

P. barbipulvinatum Nash has recently been reported from Rockaway Peninsula and Long Beach, L. I. by E. P. Bicknell. *Rhodora* 16: 82. May 1914.

15. **Sacciolepis** Nash.

1. **S. striata** (L.) Nash. In swamps: N. J. to Okl., south to Fla. and Tex. Also in the W. I.

Known only from Cape May Point, N. J., in our area.

16. **Amphicarpon** Raf.

1. **A. Amphicarpon** (Pursh) Nash. In moist pine-barrens; N. J. N. J. Common in the pine-barrens, decreasing southward to Cape May.

Tertiary, common on Beacon Hill, rare elsewhere*: Cretaceous, o: Older Formations, o. 159-220 days. About sea level.

17. **Chaetochloa** Scribn. [*Setaria* Beauv.]

Bristles downwardly barbed.

1. *C. verticillata*.

Bristles upwardly barbed.

Inflorescence racemose; second scale shorter than the spikelet; bristles 5-16, involucrate.

Annual; spikelets exceeding 3 mm. long; bristles yellowish brown.

2. *C. glauca*.

Perennial; spikelets 3 mm. long or less; bristles green, yellowish, or purple.

3. *C. imberbis*.

Inflorescence paniculate; second scale as long as the spikelet; bristles 1-3, not involucrate.

Fruiting scales dull, faintly rugose, obtuse, rather thin.

Inflorescence 2.5-7 cm. long, 1.25 cm. thick or less; spikelets about 2 mm. long; bristles green.

4. *C. viridis*.

Inflorescence 10-20 cm. long, 1.25-5 cm. thick; spikelets about 3 mm. long; bristles usually purple.

5. *C. italica*.

Fruiting scales shining, perfectly smooth, very acute, hard.

6. *C. magna*.

* See Introduction paragraph 29.

1. *C. verticillata* (L.) Scribn. About dwellings and in waste places: N. S. and Ont. to N. J., Mo. and Neb. Naturalized from Europe.
Not uncommon as a weed in cities.
2. *C. glauca* (L.) Scribn. In waste places: nearly throughout N. Am. Native of Europe.
Common as a weed, in most parts of our area.
3. *C. imberbis* (Poir.) Scribn. (*C. versicolor* Bicknell). In moist soil: Mass. to Kan., south to Fla. and Tex. Also in tropical Am. and the Bahamas.
CONN. Rare along the coast, unknown elsewhere.
N. Y. Along the shores of L. I. and S. I. and near Van Courtlandt Park, and Kingsbridge, N. Y. City, not recorded elsewhere.
N. J. Common along the coast, rare inland at Pemberton Junction, Delanco and Camden, unknown elsewhere.
PA. Delaware Co. (according to Pennell).
Confined mostly to the coastal region of our range.
4. *C. viridis* (L.) Scribn. In waste places: nearly throughout N. Am. Native of Europe.
Locally common as a weed.
5. *C. italica* (L.) Scribn. In waste places and escaped from cultivation: Que. to Minn., south to Fla. and Tex.
Rare as an escaped weed.
6. *C. magna* (Griseb.) Scribn. In swamps: N. J. and Del. to Fla. and Tex. Also in Cuba.
N. J. Localized in Cape May Co. (according to Stone).

18. *Cenchrus* L.

Body of the involucre 6-8 mm. broad, pubescent with very long hairs, the spines commonly 5-8 mm. long.

1. *C. tribuloides*.

Body of the involucre rarely exceeding 5 mm. broad, pubescent, the spines 3-4 mm. long.

2. *C. carolinianus*.

1. *C. tribuloides* L. In sands along the coast: L. I. and N. J. to Fla. and Miss.
N. Y. Rare along the shore of western L. I. and on S. I., not reported elsewhere.
N. J. Common along the sea coast especially **southward**.
Practically confined to the coastal region of our range.

2. **C. carolinianus** Walt. (*C. tribuloides* of many earlier authors, not of L.). In dry sandy places: Me. to Wisc. and Cal. south to Fla. and Mex.; also in the Bahamas and Mex.
Common in most parts of the range.

19. *Zizania* [Gronov.] L.

1. **Z. aquatica** L. In swamps: N. B. to Man., south to Fla. and Tex.

CONN. Common near the coast, decreasing inland.

N. Y. On western L. I., rare on S. I., and scattered on the banks of and on islands in the Hudson, up to Greene Co.

N. J. Scattered throughout, except the pine-barrens, there not recorded.

PA. Bucks, Philadelphia, Delaware and Chester counties.

Tertiary, not on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, decreasing northward. 159-220 days. About sea level.

20. *Homalocenchrus* Wieg.

Spikelets 2.5-3 mm. long; panicle-branches usually rigid.

1. *H. virginicus*.

Spikelets 4-5 mm. long; panicle-branches usually lax.

2. *H. oryzoides*.

1. **H. virginicus** (Willd.) Britton. In swamps or wet woods: Me. to Ont., Fla. and Tex.

Throughout the range, except in the pine-barrens, and east of them, there not recorded.

2. **H. oryzoides** (L.) Poll. In swamps and along streams: Newf. to Ore., south to Fla. and Tex. Also in Eu. and Asia.

Common throughout the range, except the pine-barrens.

21. *Phalaris* L.

Outer scales not winged; inflorescence a narrow panicle.

1. *P. arundinacea*.

Outer scales broadly winged; inflorescence a spike or spike-like panicle.

2. *P. canariensis*.

1. **P. arundinacea** L. In moist or wet soil: N. S. to Br. Col., south to N. J. and Colo. Also in Eu. and Asia.

In most parts of our range.

2. **P. canariensis** L. In waste places: N. S. to Ont., Va., Mo. and Colo. Native of Europe.

Locally rare as a weed.

22. *Anthoxanthum* L.

Perennial; third and fourth scales pubescent nearly to the apex, the awn of the latter arising about one-fifth above the base.

1. *A. odoratum*.

Annual; third and fourth scales pubescent only below the middle, the awn of the latter arising about one-third above the base.

2. *A. Puelii*.

1. *A. odoratum* L. In fields and meadows: Nearly throughout N. Am. Native of Europe.

Common everywhere except the pine-barrens, there local.

2. *A. Puelii* Lecoq. & Lamotte. Escape from cultivation or introduced: N. Eng. to Ont. and Pa. Native of Europe.

Rare as a weed.

23. *Savastana* Schrank. [*Hierochloë* R. Br.]

Panicle 1 dm. long or less, its branches short, 5 cm. long or less; leaves short and broad.

1. *S. odorata*.

Panicle 1.5-5 dm. long, its branches capillary, drooping; leaves long and narrow.

2. *S. Nashii*.

1. *S. odorata* (L.) Scribn. In open places: Lab. and Newf. to Alask., south to N. J., Iowa and Colo. Also in Eu. and Asia.

CONN. Not uncommon along the coast, decreasing inland.

N. Y. On L. I., S. I. and in the Bronx and Westchester Co., not certainly known northward.

N. J. Rare in Bergen, Essex, and Hudson counties, and at Morgan, Middlesex Co. (according to Mackenzie); from Sandy Hook to Cape May and up the Delaware to Salem Co., unknown elsewhere.

More common near the coast than elsewhere in our range.

2. *S. Nashii* Bicknell. In brackish marshes: adjacent to N. Y. City.

Known only from Van Courtlandt Park, N. Y. City, and Como, Monmouth Co., N. J.

24. *Milium* L.

1. *M. effusum* L. In woods: Cape Breton Is. to Ont., south to Mass., Pa. and Ill. Also in northern Europe and Asia.

N. Y. The higher Catskills of Greene and Delaware counties.

PA. Wayne Co.; reported also from Chester Co., but record unverifiable.

Tertiary, o: Cretaceous, o: Older Formations, at high elevations.

117-123 days. 2,200-3,365 ft.

25. *Oryzopsis* Michx. [*Urachne* Trin.]

Spikelets, exclusive of awn, 2.5-4 mm. long.

1. *O. pungens*.

Spikelets, exclusive of awn, 6-8 mm. long.

Culm nearly naked, leaves all crowded at the base; panicle branches erect.

2. *O. asperifolia*.

Culm leafy to the top; panicle branches spreading.

3. *O. racemosa*.

1. ***O. pungens*** (Torr.) Hitchc. In dry rocky places: Pa. to Lab. and Br. Col.

CONN. Rare in New London Co., known otherwise only from northern Tolland and Windham counties.

N. Y. Dutchess Co., increasing in the higher elevations of the Catskills.

N. J. High Point, Sussex Co. (Essex Co. record unverified.)

PA. Monroe and Luzerne counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Not south of the moraine. 117-168 days. Sea level-3,665 ft.

2. ***O. asperifolia*** Michx. In woods: Newf. to Br. Col., south to N. J., Pa., Minn. and in the Rocky Mts. to N. Mex.

CONN. Rare along the coast, increasing **northwestward**.

N. Y. Pine Plains, Dutchess Co.

N. J. Near Plainfield (old specimen), not recently collected.

PA. Monroe and Luzerne counties; rare.

A scattered and local species, known only north of the moraine, in our range.

3. ***O. racemosa*** (J. E. Smith) Ricker. In rocky woods: Me. to Ont., south to Md. and Ky.

CONN. Scattered throughout, rare in the southeast.

N. Y. Rockland Co., increasing **northward**; reported also from Van Courtlandt Park, by E. P. Bicknell.

N. J. Scattered throughout the region north of the coastal plain.

PA. Throughout.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 117-207 days. Sea level-2,900 ft.

26. *Stipa* L.

1. ***S. avenacea*** L. In dry woods: Mass. to Wisc., Fla. and Tex.

CONN. Not uncommon along the coast, unknown elsewhere.

N. Y. L. I., S. I., and up the Hudson Valley to Yonkers, unknown northward.

N. J. Rare and local in Passaic and Hudson counties, increasing southward and common on the coastal plain.

PA. Philadelphia, Delaware and Chester counties.

Tertiary, common: Cretaceous, common: Older Formations, scattered. 159-220 days. About sea level.

27. *Aristida* L.

Awns not articulated to the scale.

Central awn coiled at the base.

1. *A. dichotoma*.

Central awn not coiled at the base.

Spikelets exceeding 2 cm. long; first scale 5-7 nerved.

2. *A. oligantha*.

Spikelets less than 1.5 cm. long; first scale 1-3 nerved.

Leaf-sheaths glabrous or sparsely pubescent.

First scale generally shorter than or equalling the second.

3. *A. gracilis*.

First scale exceeding the second.

4. *A. purpurascens*.

Leaf-sheaths, at least the lower ones, densely woolly.

5. *A. lanosa*.

Awns articulated to the scale, united at the base into a spiral column.

6. *A. tuberculosa*.

1. *A. dichotoma* Michx. Dry sandy soil: Me. to Neb., south to Ga. and Tex.

Throughout the range except the coastal region east of the pine-barrens.

2. *A. oligantha* Michx. In dry soil: N. J. to Neb. and Tex.

N. J. Salem, Gloucester and Camden counties near the Delaware; reported from the streets of East Orange, by K. K. Mackenzie.

PA. Philadelphia, Chester and Delaware counties.

Tertiary, 0: Cretaceous, rare: Older Formations, rare, most common on serpentine. 168-220 days. About sea level.

3. *A. gracilis* Ell. In dry soil: N. H. to Mo., south to Fla. and Tex.

CONN. Not uncommon along the coast, decreasing inland.

N. Y. Rare on L. I., and S. I., unknown elsewhere.

N. J. Throughout the state, rare northward.

PA. Northampton, Bucks, Montgomery, Philadelphia, Delaware and Chester counties.

A plant whose distribution is not fully understood.

4. *A. purpurascens* Poir. In dry soil: Mass. to Minn., south to Fla. and Tex.

Throughout the range, more common southward.

5. **A. lanosa** Muhl. In dry sandy soil: N. J. to Fla., Okla. and Tex.

N. J. Scattered locally in Camden Co., and at Cape May (according to Stone).

6. **A. tuberosa** Nutt. Sandy soil especially on beach dunes: Mass. to Ga. Also about the Great Lakes.

CONN. Known only along the beach from Orange westward.

N. Y. Rockaway Point and Coney Island, L. I. and on S. I.

N. J. Common along the coast and scattered through the interior from South Amboy, southward.

Confined mostly to the sea beaches but encroaching inland in New Jersey.

28. *Muhlenbergia* Schreb.

Panicle contracted, narrow, often slender, its branches erect or appressed.

Outer scales $\frac{1}{4}$ as long as the flowering scale or less.

1. *M. Schreberi*.

Outer scales more than $\frac{1}{4}$ as long as the flowering scale.

Flowering scales awnless or sometimes short awned.

Outer scales ovate to broadly lanceolate, cuspidate, about $\frac{1}{2}$ as long as the flowering scale.

2. *M. sobolifera*.

Outer scales subulate, equalling or exceeding the flowering scale.

Outer scales about 3 mm. long.

3. *M. mexicana*.

Outer scales about 5 mm. long.

4. *M. racemosa*.

Flowering scales long-awned.

Outer scales $\frac{1}{2}$ - $\frac{2}{3}$ as long as the flowering scale, ovate to broadly lanceolate, cuspidate.

5. *M. tenuiflora*.

Outer scales equalling the flowering scale, subulate.

6. *M. umbrosa*.

Panicle open, its branches long and spreading, slender.

7. *M. capillaris*.

1. **M. Schreberi** Gmel. On dry hills and in woods and waste places: Me. to Minn., south to Fla. and Tex.

Frequent in most parts of our range, except the pine-barrens, decreasing southward.

2. **M. sobolifera** (Muhl.) Trin. In rocky woods: N. H. to Minn., south to Va., Tenn. and the Ind. Terr.

CONN. Throughout, but rare, more common southwestward.

N. Y. From the Bronx northward, not common.

N. J. Hudson, Essex and Hunterdon counties, increasing northward.

PA. Northampton, Bucks, Philadelphia, Delaware, and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing northward. 138-207 days. Sea level-1,980 ft.

3. **M. mexicana** (L.) Trin. (*M. foliosa* Trin.). In swamps and borders of fields: N. B. to Wyoming south to N. Car. and Tex.
Throughout the range, except the coastal plain of N. J., there rare or wanting.
4. **M. racemosa** (Michx.) B. S. P. In wet places: Newf. to Br. Col., south to N. J., Md. and N. Mex.
CONN. Very rare in the south, increasing **northwestward**.
N. Y. Dutchess and Columbia counties, and in the Catskills, and at Woodmere, L. I.
N. J. Bergen, Morris and Warren Counties, increasing **northward**.
PA. Pike, Monroe, Chester and Bucks counties.
5. **M. tenuiflora** (Willd.) B. S. P. In rocky woods: Mass. to Minn., Ala. and Tex.
CONN. Throughout.
N. Y. Rare and local in the Bronx, increasing **northward**.
N. J. Rare at Swedesboro, Gloucester Co., thence unknown to Bergen and Morris counties, thence increasing **northward**; reported by Kneiskern from Ocean and Monmouth counties.
PA. Northampton, Bucks, Delaware, and Chester counties.
6. **M. umbrosa** Scribn. (*M. sylvatica* Torr.). In moist woods and along streams: N. B. to S. Dak., south to N. Car. and Okl.
Throughout the range, except the coastal plain of N. J., there reported only from Landisville.
7. **M. capillaris** (Lam.) Trin. In dry sandy or rocky soils: Mass. to Kan., Fla. and Tex.
CONN. Rare at New Haven and Hamden, on rocky cliffs.
N. Y. Known only from Wading River, L. I.
N. J. Little Snake Hill, Bergen Co., Woodbury, Camden Co. and Hammonton, Atlantic Co.; reported also from Milburn, Essex Co. and Wright's Pond, Sussex Co.
Very rare and local in our range.

29. **Brachyelytrum** Beauv.

1. **B. erectum** (Schreb.) Beauv. Newf. to Minn., south to Ga. and Kan.
CONN. Rare along the coast, increasing **northwestward**.
N. Y. Westchester Co., Pine Plains, Dutchess Co. and in the Catskills; also on the coastal plain of L. I.

N. J. Rare in the region north and west of the pine-barrens, thence increasing **northward**.

PA. Throughout.

Tertiary, 0: Cretaceous, rare: Older Formations, increasing **northward**. 117-207 days. Sea level-3,668 ft.

30. *Heleochloa* Host.

1. *H. schoenoides* (L.) Host. In waste places: southern N. Y. to Del. and Pa. Native of Europe.

Not very common as a weed.

31. *Phleum* L.

1. *P. pratense* L. In fields and meadows: nearly throughout N. Am. Also in Eu. and Asia.

Common everywhere as a weed.

32. *Alopecurus* L.

Outer scales of the spikelet united for half their length; keel smooth to hispid.

1. *A. myosuroides*.

Outer scales of the spikelet united for one quarter their length, or less, long ciliate on the keel.

Scales 2-2.5 mm. long.

Awn inserted at $\frac{1}{4}$ above the base of the flowering scale, exerted from the spikelet about 2 mm.

2. *A. geniculatus*.

Awn inserted at or about the middle of the flowering scale, scarcely exerted.

3. *A. aristulatus*.

Scales 4-6 mm. long.

4. *A. pratensis*.

1. *A. myosuroides* Huds. In waste places and ballast: southern Mass., N. Y., N. J. and Pa. Adventive from Europe.

Not uncommon as a weed.

2. *A. geniculatus* L. In wet soil or on ballast: Newf. to Kan., south to Fla. and Tex. Also in Europe and Asia.

Locally abundant as a weed but not definitely reported from L. I.

3. *A. aristulatus* Michx. In wet meadows: Me. to Alask., Pa. and Cal.

Scattered throughout our range, except the pine-barrens, always with the aspect of a weed.

4. *A. pratensis* L. In meadows: Newf. to southern N. Y., N. J. and Ohio. Naturalized from Europe.

Local as a weed, often wanting.

33. *Sporobolus* R. Br.

Panicle contracted.

Annuals.

Spikelets 3.5-5 mm. long; flowering scale pubescent.

1. *S. vaginaeflorus*.

Spikelets 2.5-3 mm. long; flowering scales glabrous.

2. *S. neglectus*.

Perennials.

Flowering scale pubescent.

3. *S. clandestinus*.

Flowering scale glabrous.

4. *S. asper*.

Panicle open, its branches spreading, at least at maturity.

Annuals.

5. *S. uniflorus*.

Perennials.

Culms tufted; no rootstocks.

Spikelets 2-3 mm. long; empty scales ovate to lanceolate.

6. *S. cryptandrus*.

Spikelets 5-6 mm. long; first scale subulate, much narrower than the second.

7. *S. heterolepis*.

Culms from long running rootstocks

8. *S. Torreyanus*.

1. *S. vaginaeflorus* Torr. In dry soil: southern Me. to S. Dak., south to Ga. and Tex.

Throughout the range except the pine-barrens, there rare and probably introduced, most common **northward**.

2. *S. neglectus* Nash. In dry soil: N. B. to S. Dak., Va. and Mo.

CONN. Oxford; rare.

N. Y. Near the northern end of Manhattan, unknown elsewhere.

N. J. Woodruff's Gap, Sussex Co.

A rare and local species, with us.

3. *S. clandestinus* (Spreng.) Hitchc. (*S. asper* of many older works not of Michx.). In dry soil: Conn. to Mo., south to Fla. and Tex.

CONN. New Haven; rare.

N. Y. Reported from Westchester Co.

N. J. Recorded from Warren, Hunterdon and Bergen counties; occasional on the coastal plain where it is scattered throughout, except in the pine-barrens.

A rare and scattered species finding its northern distribution point in our area.

4. *S. asper* (Michx.) Kunth. (*S. longifolius* (Torr.) Wood.). In dry soil: Me. to S. Dak. and Tex.

CONN. Common along the coast, decreasing northward.

N. Y. Common on L. I. and S. I., also in the Bronx.

N. J. Known only from Cape May.

PA. Northampton, Bucks, and Montgomery counties.

A curious distribution, perhaps not fully known.

5. **S. uniflorus** Muhl. (*S. serotinus* Gray). In wet sandy soil: Me. to Ont. and Mich., south to N. J.

CONN. Not uncommon in the eastern part of the state, decreasing westward to Southington, Waterbury and Norfolk.

N. Y. Known from near Riverhead, and in southwestern L. I. (according to Bicknell); reported from Westchester Co.

N. J. Common in the pine-barrens, and at Griffith's Swamp, Lindenwold, outside them; unknown elsewhere.

Tertiary, common on Beacon Hill, wanting elsewhere: Cretaceous, very rare: Older Formations, scattered north of the moraine in Conn. and on L. I. 159-220 days. About sea level.

6. **S. cryptandrus** (Torr.) A. Gray. In sandy soil: Mass. to Mont., Pa. and Mex.

Known only from Fairfield Co., Conn., in our area, perhaps there introduced.

7. **S. heterolepis** A. Gray. In dry soil: Que. to Sask., south to Conn., Pa., Mo. and Tex.

In our range known only from near New Haven, Conn., and on serpentine barrens at Nottingham, Chester Co., Pa. (according to Pennell).

8. **S. Torreyanus** (Schultes) Nash. In bogs: L. I. (?) and in the pine-barrens of N. J.

N. Y. No records or specimens from L. I. are available.

N. J. Throughout the pine-barrens and at Cape May; unknown elsewhere.

Tertiary, scattered on Beacon Hill, rare elsewhere: Cretaceous, o: Older Formations, o: 159-220 days. About sea level.

S. indicus (L.) R. Br. has been collected as a waif in Pa.

34. **Polypogon** Desf.

1. **P. monspeliensis** (L.) Desf. In waste places: Me. to Ga. and in Tex., mostly near the coast.

Uncommon as a weed.

35. *Cinna* L.

Panicle narrow at maturity, its filiform branches erect or drooping; spikelets 5-6 mm. long; first scale much shorter than the second. 1. *C. arundinacea*.
 Panicle open, its capillary branches flexuous and drooping; spikelets 3-4 mm. long; first scale about equalling the second. 2. *C. latifolia*.

1. *C. arundinacea* L. In moist woods and swamps: N. S. to Ont., Ga. and Tex.

Common throughout the range, except the pine-barrens.

2. *C. latifolia* (Trev.) Griseb. In damp woods: Newf. to Br. Col., N. J. and Wash. and in the Alleghanies to N. Car. and in the Rockies to Colo. and Utah.

CONN. Northern Hartford and Litchfield counties.

N. Y. Pine Plains, Dutchess Co. and in the Catskills.

N. J. Northern Sussex Co.

PA. Pike, Monroe and Lackawanna Co.

Tertiary, o: Cretaceous, o: Older Formations, scattered northward. Not south of the moraine. 117-158 days. 1,060-4,020 ft.

36. *Agrostis* L.

Palet conspicuous, at least one-half as long as the scale.

Panicle open in flower, branches long and spreading; upland grass.

1. *A. alba*.

Panicle dense and contracted; brackish marsh and wet sand grass.

2. *A. maritima*.

Palet inconspicuous, minute or wanting.

Flowering scale awned.

3. *A. canina*.

Flowering scales awnless, or very rarely with a short awn.

Culms weak, decumbent or prostrate at the base; blades lax.

4. *A. Schweinitzii*.

Culms and blades erect.

Branches of the panicle capillary, elongated, usually dividing above the middle.

Spikelets 1.5-2 mm. long; leaves short.

5. *A. hyemalis*.

Spikelets 2.5-3 mm. long; leaves elongated.

6. *A. altissima*.

Branches of the panicle not elongated, divided at or below the middle.

Spikelets about 2 mm. long; a grass of low elevations.

7. *A. perennans*.

Spikelets 2.5-3 mm. long; a high mountain grass.

8. *A. oreophila*.

1. *A. alba* L. (*A. alba aristata* Gray). In fields and meadows nearly throughout N. Am. Native of Europe.

Throughout the range as a weed.

2. **A. maritima** Lam. Wet sands or brackish marshes: Me. and Que. to Del. Also in Europe.
 CONN. Not uncommon along the coast, rare or wanting inland.
 N. Y. S. I. and the south shore of L. I.; reported from the north shore, and along the lower Hudson by E. P. Bicknell.
 N. J. Along the sea coast; and at Folsom in the pine-barrens (according to Stone).
 Confined for the most part to sea beaches and salt marshes.
3. **A. canina** L. In meadows: Newf. to Alaska, south to Pa. and Tenn.; native northward, naturalized from Eu. southward.
 Rare, as a naturalized grass, in our area.
4. **A. Schweinitzii** Trin. (*A. perennans* of many writers, not of Walt.). In shaded damp places: Que. to Wisc., south to S. Car. and Kan.
 CONN. In the western half of the state, rare, increasing **northwestward**.
 N. Y. S. I., the Bronx and Westchester Co., **northward**.
 N. J. Bergen, Morris and Passaic counties.
 PA. Throughout.
 Apparently increasing **westward** in our range.
5. **A. hyemalis** (Walt.) B. S. P. In dry or moist soil: Nearly throughout N. Am.
 Common throughout the range.
6. **A. altissima** (Walt.) Tuckerm. (*A. elata* Pursh). In swamps: L. I. and N. J. to Fla. and Miss.
 N. Y. Edgemere, L. I.; reported as common in southwestern L. I. by E. P. Bicknell.
 N. J. Throughout the pine-barrens, and at Cape May.
 PA. Reported from Montgomery Co.
 Tertiary, common on Beacon Hill, rare elsewhere: Cretaceous, 0: Older Formations, rare and local. 159-220 days. About sea level.
7. **A. perennans** (Walt.) Tuckerm. In dry soil: Mass. and N. Y. to N. J., Tenn. and Mo.
 CONN. Throughout.
 N. Y. Throughout, rare in the south, increasing **northward**.
 N. J. Rare and local at Cape May and along the western edge of the pine-barrens, thence increasing **northward**.
 PA. Throughout.

Tertiary, unknown on Beacon Hill, rare elsewhere: Cretaceous, scattered: Older Formations, increasing **northward**. 117-220 days. Sea level-3,365 ft.

8. **A. oreophila** Trin. Newf. south to the mountains of N. Eng., N. Y. and N. Car.

Known in our area only from Mt. Beacon, near Fishkill, N. Y., and as a waif from near Easton and Bethlehem, Pa.

Agrostis antecedens Bicknell, a recently described species, has been collected on L. I. and S. I. and on the serpentine barrens in Delaware and Chester counties, Pa.

37. *Calamagrostis* Adans.

Prolongation of the rachilla hairy its whole length.

Panicle open, the lower rays widely spreading.

Panicle more or less contracted.

Prolongation of the rachilla hairy only at the summit.

1. *C. canadensis*.

2. *C. inexpansa*.

3. *C. cinnoides*.

1. **C. canadensis** (Michx.) Beauv. In swamps and wet soil: Newf. to Br. Col., south to N. Car., N. Mex. and Cal.

Throughout the range, except the pine-barrens.

2. **C. inexpansa** A. Gray. In bogs: N. Y. and N. J. to S. Dak. and Colo.

N. J. Reported, but the record not verified.

PA. Known only from Pocono, Monroe Co.

A rare and local species.

3. **C. cinnoides** (Muhl.) Scribn. (*C. Nuttalliana* Steud.). In moist soil; Me. to Ohio, south to Ga. and Ala.

Common throughout the range.

Calamagrostis Langsdorfii (Link) Trin. and *C. hyperborea* Lange, both of which should be expected in the area, have not been recorded. *Calamagrostis Pickeringii* Gray has been reported as collected at Valley Stream, L. I.

38. *Ammophila* Host.

1. **A. arenaria** (L.) Link. In sands of the sea-coast: Newf. to N. Car. and inland along the shores of the Great Lakes. Also in Europe.

Common throughout the coastal dunes.

39. *Calamovilfa* Hack.

1. **C. brevipilis** (Torr.) Hack. In pine-barren swamps: N. J.

Not uncommon in the pine-barrens of N. J., unknown elsewhere. Endemic in our area.

40. *Apera* Adans.

1. **A. Spica-venti** (L.) Beauv. In waste places and on ballast: Me. to southern N. Y. and Pa. Native of Europe.
Rare as a weed in waste places.

41. *Nothoholcus* Nash.

1. **N. lanatus** (L.) Nash. In fields, meadows and waste places: N. S. to Ont. and Ill., N. Car. and Tenn. Also on the Pacific Coast. Native of Europe.
Not uncommon as a weed.

42. *Aspris* Adans. [*Aira* L. in part]

Panicle open; flowering scales about 2 mm. long; plants 1.25-2.5 dm. tall.

1. *A. caryophyllea*.

Panicle contracted; flowering scales about 3 mm. long; plants 5-10 cm. tall.

2. *A. praecox*.

1. **A. caryophyllea** (L.) Nash. In fields and waste places: Mass. to Ohio and Va. Also on the Pacific Coast. Native of Europe.
Rare as a weed in our area.
2. **A. praecox** (L.) Nash. In dry fields: southern N. J. and Pa. to Va. Naturalized from Europe.
Rare and local as a weed in southern N. J. and Pa.

43. *Corynephorus* Beauv.

1. **C. canescens** Beauv. In waste places: N. Y. and Mass. Native of southern Europe.
Rare on western L. I.

44. *Deschampsia* Beauv.

Flowering scales about 2.5 mm. long, crose-truncate.

1. *D. caespitosa*.

Flowering scales about 4 mm. long, acute or obtuse.

2. *D. flexuosa*.

1. **D. caespitosa** (L.) Beauv. Newf. to Alask., south to N. J., Ill., Minn. and in the mountains to N. Mex. and Cal. Also in Eu. and Asia.
Throughout the range, except the coastal plain in N. J. and L. I., there not recorded.
2. **D. flexuosa** (L.) Trin. In dry soil: Greenl. and Newf. to Ont., south to N. Car. and Tenn.
Throughout the range, perhaps only adventive in the pine-barrens.

45. *Trisetum* Pers.

Flowering scales all bearing long dorsal awns.

1. *T. spicatum*.

Lower flowering scale not bearing a long dorsal awn, a rudiment sometimes present.

2. *T. pennsylvanicum*.

1. ***T. spicatum*** (L.) Richter. In rocky places: Lab. to Alask., south on the mountains to N. Car., N. Mex. and Cal. Also in Eu. and Asia.

CONN. Limestone ridges, Salisbury; rare.

N. Y. Montgomery, Orange Co., rare.

Predominating on limestone, but very rare in our area.

2. ***T. pennsylvanicum*** (L.) Beauv. (*Spenopholis palustris* (Michx.) Scribn.). In swamps and wet meadows: Mass. to Ill., south to Fla. and La.

Throughout the range, except the pine-barrens, there not recorded; rare on L. I.

T. flavescens (L.) R. & S. has been found at Bedford, Westchester Co., N. Y., presumably as a waif.

46. *Avena* [Tourn.] L.

1. ***A. sativa*** L. Persisting as a weed along roadsides and in fields. Native of Europe.

Not uncommon as a sporadic escape.

Avena pubescens Hudson and *A. sterilis* L. both of Europe are reported as waifs from N. J.

47. *Arrhenatherum* Beauv.

1. ***A. elatius*** (L.) Beauv. In fields and waste places: Newf. to Ont. and Minn., Ga., Tenn. and La. Native of Europe.

Common throughout the range as a weed.

48. *Danthonia* DC.

Spikelets, exclusive of the awns, less than 12 mm. long.

Teeth of the flowering scales merely acute, not awned.

1. *D. spicata*.

Teeth of the flowering scales long awned.

2. *D. compressa*.

Spikelets, exclusive of the awns, exceeding 12 mm. long.

Foliage and flowering scales pubescent.

3. *D. sericea*.

Foliage glabrous; flowering scales partly ciliate.

4. *D. epilis*.

1. ***D. spicata*** (L.) Beauv. In dry soil: Newf. to S. Dak., south to N. Car. and Tex.

Throughout the range, rare in the pine-barrens.

2. **D. compressa** Austin. In woods: Me. to N. Y., south to N. Car. and Tenn.
 CONN. Scattered throughout, more common southward than elsewhere.
 N. Y. On L. I., unknown on S. I., thence increasing up the Hudson Valley, but not known from the Catskills.
 N. J. Morris, Warren and Sussex counties.
 PA. Pike, Monroe, Lackwanna and Berks counties.
 Tertiary, o: Cretaceous, o: Older Formations, not very common.
 127-189 days. Sea level-2,900 ft.
3. **D. sericea** Nutt. In dry sandy soil: Mass. to Pa., south to Fla. and Miss.
 In our area known only from the coastal plain of N. J., there common, except at Cape May, especially in the pine-barrens.
4. **D. epilis** Scribn. In swamps: southern N. J. to Ga.
 A rare and local species confined to the pine-barrens, in our area.

49. *Capriola* Adans.

1. **C. Dactylon** (L.) Kuntze. In fields and waste places: Mass. and southern N. Y. to Mo., Fla. and Mex., W. I., and S. Am. Native of Europe.
 Rare as a weed.

50. *Spartina* Schreb.

- First scale awn-pointed, equalling the third; second long-awned. 1. *S. Michauxiana*
 First scale acute, shorter than the third; usually $\frac{1}{2}$ as long.
 First scale strongly scabrous-hispid on the keel.
 Leaves 1.25 cm. wide or more, flat. 2. *S. cynosuroides*.
 Leaves 6 mm. wide or less. 3. *S. patens*.
 First scale smooth on the keel or sometimes lightly scabrous. 4. *S. stricta*.
1. **S. Michauxiana** Hitch. (*S. cynosuroides* of many local floras, not of L.). In swamps or streams of fresh or brackish water, N. S. to Sask., south to N. J., Tex. and Colo.
 CONN. Common along the coast and at Glastonbury and Oxford, inland.
 N. Y. On L. I. and S. I.; near the northern end of Manhattan Is. (according to Bicknell).
 N. J. Rare in Bergen and Hudson counties; common along the coast, and inland at Hammonton; reported from Hunterdon Co.
 PA. Bucks, Philadelphia and Delaware counties (according to Porter).
 Almost wholly within the influence of salt water, with us.

2. **S. cynosuroides** (L.) Roth (*S. polystachya* Ell. and of many local floras). In salt and brackish marshes: Conn. to Fla. and Miss.

Common along the whole coast and almost wholly maritime, but at Yonkers-on-Hudson.

3. **S. patens** (Ait.) Muhl. On salt meadows, and on beaches: Newf. to Que., Fla. and Tex.

Common along the whole coast: wholly maritime.

4. **S. stricta** (Ait.) Roth. (*S. alternifolia* Loisel). Along the coast: Me. to Fla. and Tex.

Common along the whole coast in some of its forms and almost wholly maritime, but inland at White Plains, Westchester Co., N. Y.

51. **Gymnopogon** Beauv.

Spikes bearing spikelets their whole length; awn longer than flowering scale.

1. *G. ambiguus*.

Spikes bearing spikelets above the middle; awn shorter than flowering scale.

2. *G. brevifolius*.

1. **G. ambiguus** (Michx.) B. S. P. In dry sandy soil: southern N. J. to Kan., south to Fla. and Tex.

N. J. Not uncommon from Ocean Co. **southward**, along the Delaware to Cape May, rare or only introduced in the pine-barrens.

Tertiary, o, or only introduced: Cretaceous, scattered **southward**: Older Formations, o: 168-220 days. About sea level.

2. **G. brevifolius** Trin. In dry soil: N. J. to Fla., west to Miss.

Known only from near Swedesboro, Gloucester Co., and Bennett, Cape May Co., N. J.; very rare.

52. **Atheropogon** Muhl.

1. **A. curtispendus** (Michx.) Fourn. In dry soil: Conn. to N. Dak. and Wyoming, south to N. J., Tenn., Miss. and Mex. Conn. Rare in Fairfield and Litchfield counties, unknown elsewhere.

N. J. Warren and Sussex Co., not uncommon; also at Mickleton, Gloucester Co.

PA. Chester and Northampton Co.

Tertiary, o: Cretaceous, very rare: Older Formations, scattered, predominating on limestone. 138-207 days. Sea level-1,080 ft.

53. *Eleusine* Gaertn.

1. *E. indica* (L.) Gaertn. In waste places and fields: nearly throughout N. Am. Native of Europe, or Asia.

Common as a weed in most parts of our range.

54. *Dactyloctenium* Willd.

1. *D. aegypticum* (L.) Willd. In waste places and cultivated grounds: southern N. Y., Pa. and Va. to Ill., Cal., south to Fla. and Mex. Naturalized from Asia or Africa.

Rare as a weed in our area.

55. *Phragmites* Trin.

1. *P. Phragmites* (L.) Karst. In swamps and wet places: nearly throughout N. Am. Also in Eu. and Asia.

Throughout the range, except the pine-barrens.

56. *Tridens* R. & S.

1. *T. flava* (L.) Hitchc. In fields: Mass. and N. Y. to Kan., south to Fla. and Tex.

CONN. Rare in New London Co., along the coast and the valley of the Thames, increasing westward along the coast, and inland as at Kent and Southington.

N. Y. L. I., S. I. and up the Hudson to Westchester Co., unknown northward.

N. J. Rare and local in the north, increasing southward, but not in the pine-barrens.

PA. Luzerne, Northampton, Bucks, Philadelphia, Delaware and Chester counties.

Tertiary, wanting on Beacon Hill, scattered elsewhere: Cretaceous common: Older Formations, scattered, usually near the coast. 128-220 days. Sea level-1,000 ft.

57. *Triplasis* Beauv.

1. *T. purpurea* (Walt.) Chapm. In sand, especially on the sea beaches: Me. to Fla. and Tex. and along the Great Lakes.

Common along the sea beaches and inland at Lisbon, Conn., and throughout the coastal plain in N. J.: reported as formerly along the Harlem River.

58. *Diplachne* Beauv.

1. *D. maritima* Bicknell. Brackish marshes and shores: Mass. to S. Car., also on the shore of Onondaga Lake, N. Y.
Throughout the coastal part of our range; not common.

59. *Aira* L. [*Molina* Schrank.]

1. *A. coerulea* L. On ballast: Me. to N. Y. Native of Europe.
Rare as a weed.

60. *Eragrostis* Beauv.

Culms not creeping; plants with perfect flowers.

Annuals.

Spikelets 2-5 flowered, 2-3 mm. long.

Culms branched only at the base; pedicels and branches of panicle long and capillary.

1. *E. capillaris*.

Culms branched above the base; pedicels stout.

2. *E. Frankii*.

Spikelets 5-many flowered, 4-16 mm. long.

Spikelets 1.5 mm. wide or less.

Flowering scales thin, usually bright purplish, the lateral nerves faint or wanting.

3. *E. pilosa*.

Flowering scales firm, usually dull purplish or green, the lateral nerves very prominent.

4. *E. Purshii*.

Spikelets 2 mm. wide or more.

Lower flowering scales about 1.5 mm. long.

5. *E. Eragrostis*.

Lower flowering scales about 2-2.5 mm. long.

6. *E. megastachya*.

Perennial.

7. *E. pectinacea*.

Culms extensively creeping; plants dioecious.

8. *E. hypnoides*.

1. *E. capillaris* (L.) Nees. In dry places: N. H. to Kan., south to Ga. and Tex.

CONN. Scattered throughout the state, most common in the southwest.

N. Y. In Manhattan, the Bronx, and Westchester counties, and at Aqueduct, L. I.

N. J. Camden and Gloucester counties, increasing northward; not in the pine-barrens.

PA. Monroe, Northampton, Philadelphia, Delaware and Chester counties.

2. *E. Frankii* Steud. In moist places: Mass. to Minn., Miss., La. and Kan.

CONN. Rare and local.

N. J. Philipsburg.

PA. Monroe, Northampton, Bucks, Philadelphia and Chester counties.

3. **E. pilosa** (L.) Beauv. Waste places or cultivated ground: Mass. to Mich. and Kan., south to Fla. and Tex. Naturalized from Europe.

Common throughout the range, except the pine-barrens, there rare.

4. **E. Purshii** Schrad. In dry places: Me. to Ont. and N. Dak., south to Fla. and Tex.

Common throughout the area except the pine-barrens, there rare; apparently a weed.

5. **E. Eragrostis** (L.) Karst. In waste places or cultivated ground: Mass., N. Y. and Pa. Naturalized from Europe.

A rare and local weed.

6. **E. megastachya** (Koeler) Link. (*E. major* Host.) In waste and cultivated ground: nearly throughout N. Am. Native of Europe.

Common as a weed.

7. **E. pectinacea** (Michx.) Steud. In dry soil: Me. to S. Dak., south to Fla. and Tex.

Scattered throughout the range, except the pine-barrens, there rare; rare also in the north.

8. **E. hypnoides** (Lam.) B. S. P. On sandy or gravelly shores: Vt. and Ont. to Wash., south to Fla.

Rare, and local, not recorded from the pine-barrens, but common along the Delaware.

61. **Sphenopholis** Scribn. (*Eatonia* Endlich.)

Empty scales unequal, the first shorter and about one-sixth as wide as the second.

Second scale obovate, often almost truncate.

Second scale oblanceolate, obtuse or abruptly acute.

1. *S. obtusata*.

2. *S. pallens*.

Empty scales equal, the first not less than one-third as wide as the second.

3. *S. nitida*.

1. **S. obtusata** (Michx.) Scribn. (*Eatonia pubescens* Scribn. & Merr.). In dry soil: Me. to Sasks., Fla. and Ariz.

Throughout the range, except the pine-barrens, in some of its forms; locally rare.

2. **S. pallens** (Spreng.) Scribn. (*Eatonia pennsylvanica* (D. C.) A. Gray). In hilly woods or moist soil: Newf. to Br. Col., Ga. and Tex.

Common throughout the range except the pine-barrens and the region east and south of them, there not recorded, nor from the coastal plain of L. I.

3. **S. nitida** (Spreng.) Scribn. In dry woods: Vt. to Mich., Ga. and Miss.

CONN. Scattered throughout.

N. Y. Throughout, rare southward.

N. J. Rare and local in Gloucester, Camden, Burlington and Mercer counties, near the Delaware; thence increasing **northward**.

PA. Throughout.

Tertiary, 0: Cretaceous, rare and scattered: Older Formations increasing **northward**. 177-207 days. Sea level-3,200 ft.

62. **Koeleria** L.

1. **K. cristata** (L.) Pers. In dry sandy soil: Ont. to Br. Col., south to Pa., Tex. and Cal. Also in Europe.

Known definitely in our area only from Lackawanna Co., Pa., from an old specimen marked "Conn." and as reported from Jamaica South, L. I., by E. P. Bicknell.

63. **Uniola** L.

1. **U. laxa** (L.) B. S. P. Sandy soil: S. I. to Ky., south to Fla. and Tex.

N. Y. Rare on S. I.; occasional, perhaps frequent, on southwestern L. I. (Bicknell).

N. J. Common on the coastal plain, except the pine-barrens, there rare and perhaps only adventive.

- PA. Tinicum, Delaware Co.

Not very common in our area except in southern N. J.

64. **Distichlis** Raf.

1. **D. spicata** (L.) Greene. On salt meadows along the coast from N. S. to Tex. and locally in the interior.

Common throughout the coastal marshes.

65. *Briza* L.

1. *B. minor* L. In ballast and waste places: N. J. to Va. Native of Europe.

Rare as a weed.

B. media L. has been reported from Conn. as a waif. It is a native of Europe.

66. *Dactylis* L.

1. *D. glomerata* L. In fields and waste places: N. B. to Br. Col., south to Fla. and Cal.

Common everywhere.

67. *Cynosurus* L.

1. *C. cristatus* L. In fields and waste places: Newf. to Ont., southern N. Y. and N. J. Native of Europe.

Rare as a weed.

68. *Poa* L.

Annual.

Perennials.

Culms tufted, usually densely so.

Flowering scales not webby at base.

Flowering scales webby at base.

Flowering scales glabrous; culms obviously compressed.

Flowering scales somewhat pubescent; culms usually cylindrical.

Lateral nerves of the flowering scales glabrous.

Plant yellowish green; flowering scale 2.5 mm. long.

Plant green; flowering scale 3.5 mm. long.

Lateral nerves of the flowering scales pubescent.

Spikelets 4 mm. long or less; panicle-branches dividing and spikelet-bearing at or below the middle.

Intermediate nerves of the flowering scale obscure.

Intermediate nerves prominent.

Midnerve of flowering scale pubescent only below; spikelets crowded on the branches.

Midnerve pubescent its whole length; spikelets scattered on the spreading branches.

Spikelets 5 mm. long or more; panicle-branches usually dividing and spikelet-bearing only at the end.

Culms not tufted; rootstocks long, creeping.

1. *P. annua*.

2. *P. autumnalis*.

3. *P. debilis*.

4. *P. trivialis*.

5. *P. alsodes*.

6. *P. triflora*.

7. *P. pratensis*.

8. *P. sylvestris*.

9. *P. brachyphylla*.

10. *P. compressa*.

1. ***P. annua*** L. In waste and cultivated places: nearly throughout N. Am. Native of Eu. and Asia.
Common as a weed in most parts of our range.
2. ***P. autumnalis*** Muhl. In woods: N. J. to Mo., south to Fla. and Tex.
N. J. Rare and local near the Palisades, Bergen Co.
PA. Scattered in Monroe, Lackawanna, Bucks and Philadelphia counties.
Apparently increasing **westward** with us.
3. ***P. debilis*** Torr. In woods: Que. and Ont. to R. I., Pa., Ill. and Iowa.
CONN. Rare and scattered, increasing **northwestward**.
N. Y. Recorded from Westchester Co., increasing **northward**.
N. J. Sussex Co.
PA. Monroe and Luzerne counties.
Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Not south of the moraine. 117-189 days. Sea level-3,365 ft.
4. ***P. trivialis*** L. In meadows and waste places: Newf. to Ont., S. Car. and La. Naturalized from Europe.
Locally common as a weed.
5. ***P. alsodes*** A. Gray. In woods and thickets: Que. to Minn. south to N. Car. and Tenn.
CONN. Rare and local along the coast, increasing **northwestward**.
N. Y. Pine Plains, Dutchess Co. and in the Catskills; rare.
N. J. Warren, Morris and Sussex counties; reported from but doubtfully in Monmouth Co.
Tertiary, o: Cretaceous, o: Older Formations increasing **northward**. Not south of the moraine. 117-189 days. Sea level-3,980 ft.
6. ***P. triflora*** Gilib. (*P. serotina* Ehrh. *P. flava* of many Am. Auct. not of L.). In swampy places: Newf. to Vanc., south to N. J. and Colo. Also in Eu. and Asia.
CONN. Throughout, increasing **northward**.
N. Y. Hewlett and Woodmere, L. I., thence increasing **northward**.
N. J. Bergen and Essex counties, increasing **northward**; as a waif in Camden Co.
PA. Pike and Northampton counties.

Tertiary, o: Cretaceous, only adventive: Older Formations increasing northward. 117-189 days. Sea level-3,365 ft.

7. **P. pratensis** L. In woods, thickets, fields and waste places: nearly throughout N. Am. Also in Eu. and Asia.]
Common throughout the range.
8. **P. sylvestris** A. Gray. In thickets and meadows: N. Y. to Wisc., Neb., south to Fla. and Tex.
Rare and local as an apparent adventive, with us.
9. **P. brachyphylla** Schult. (*P. brevifolia* Muhl.). In rocky woods: southern N. Y. to Ill., Ga. and Tenn.
N. J. Rare in Warren and Hunterdon counties, near the Delaware; also in Burlington and Cape May counties (according to Stone).
PA. Northampton, Bucks, Philadelphia, Delaware and Chester counties.
Tertiary, o: Cretaceous, rare: Older Formations, rare and scattered. 148-207 days. Sea level-680 ft.
10. **P. compressa** L. Waste places and cultivated grounds: nearly throughout N. Am. Native of Europe.
Locally abundant as a weed, often in woods and thickets.
Poa crocata Michx. and *P. nemoralis* L. have both been recorded as waifs in our area.

69. *Panicularia* Fabr.

Spikelets ovate or oblong, 8 mm. long or less.

Flowering scales very broad, obscurely or at least not sharply nerved.

Panicle open, the branches ascending or spreading, often drooping.

Spikelets 3-5 flowered; lowest flowering scale about 2 mm. long.

Spikelets 5-12 flowered; lowest flowering scale about 3 mm. long.

Panicle contracted, the branches erect.

Flowering scales narrow, sharply and distinctly 7-nerved.

Panicle elongated, its branches erect or appressed.

Panicle not elongated, open, its branches spreading or drooping, rarely erect.

Scales about 2 mm. long, obtuse or rounded at the apex.

Spikelets 3 mm. long or less; panicle branches often drooping.

1. *P. laxa*.

2. *P. canadensis*.

3. *P. obtusa*.

4. *P. Torreyana*.

5. *P. nervata*.

- Spikelets 4-6 mm. long; panicle branches ascending or spreading. 6. *P. grandis*.
- Scales 2.5-4 mm. long, truncate and denticulate at the apex. 7. *P. pallida*.
- Spikelets linear, 12 mm. long or more.
- Flowering scales 3-5 mm. long, obtuse, equalling or exceeding the obtuse palet.
- Flowering scales firm, hispidulous all over, truncate. 8. *P. septentrionalis*.
- Flowering scales thin, hispidulous on the nerves only. 9. *P. borealis*.
- Flowering scales 6-8 mm. long, usually shorter than the acuminate palet.
- Flowering scales obtuse, about 6 mm. long, a little exceeded by the palet. 10. *P. fluitans*.
- Flowering scales acute, about 8 mm. long, much exceeded by the palet. 11. *P. acutiflora*.
1. ***P. laxa*** Scribn. In moist places: N. S. to Me., N. J. and Pa. N. Y. Rare on and near Hempstead Plains, and elsewhere in southwestern L. I., unknown elsewhere. N. J. Rare in Gloucester and Middlesex counties on the coastal plain, and at Lake Marcia, Sussex Co.; not in the pine-barrens. PA. Schuylkill and Monroe counties.
- Tertiary, 0: Cretaceous, rare: Older Formations scattered. 123-189 days. Sea level-2,500 ft.
2. ***P. canadensis*** (Michx.) Kuntze. In swamps and marshes: Newf. to Minn., south to N. J. and Kans.
- Throughout the range, rare and perhaps adventive in the pine-barrens, common **northward**.
3. ***P. obtusa*** (Muhl.) Kuntze. In swamps: N. S. and N. B. to N. Y. and central Pa., south to Md. and N. Car.
- CONN. Southeastern counties and along the coast.
- N. Y. L. I. and S. I.
- N. J. Bergen Co. southward.
- PA. Pocono Mts., Monroe Co.
4. ***P. Torreyana*** (Spreng.) Merr. In wet woods: Me. and Que. to Minn., south to N. Car. and Ky.
- CONN. Rare along the coast, increasing **northward**.
- N. Y. Local in the Bronx, and on L. I., increasing **northward**.
- N. J. Rare in Monmouth Co., thence increasing **northward**.
- PA. Bucks Co. increasing and common **northward**.
- Tertiary 0: Cretaceous, rare: Older Formations, increasing **northward**. 117-189 days. Sea level-4020 ft.

5. **P. nervata** (Willd.) Kuntze. In wet places: Newf. to Br. Col., south to Fla. and Mex.
Throughout the range, rare in the pine-barrens, increasing and common **northward**.
6. **P. grandis** (S. Wats.) Nash (*P. americana* MacM.). In wet soil: N. S. to Alask., south to Pa., Colo. and Nev.
CONN. Rare along the coast, increasing **northward**.
N. Y. Rare on L. I., not recorded from S. I., thence increasing and common **northward**.
N. J. Rare in Camden Co. (not recently collected): in Sussex and Essex counties.
PA. Monroe, Northampton, Bucks and Schuylkill counties.
Tertiary, o: Cretaceous, very rare and perhaps not now present: Older Formations, increasing **northward**.
7. **P. pallida** (Torr.) Kuntze. In shallow water: N. S. and N. B. to Minn., south to N. Car. and Tenn.
Common throughout the range.
8. **P. septentrionalis** (Hitche.) Bicknell. (*P. glutans* of some local floras, not of R. Br.). In water: Vt. and Que. to Br. Col., south to N. Car., La. and Tex.
CONN. Rare and local in New London, Windham, New Haven and Litchfield counties.
N. Y. In the Bronx and Westchester counties and on S. I.
N. J. Throughout the state north of the coastal plain; not in the pine-barrens, but at Cape May.*
PA. Chester Co. northward.
A scattered and rather local species.
9. **P. borealis** Nash. In shallow water: Newf. to Alask., south to N. Y. and Minn., Iowa, and Ore., and in the mountains to Colo.
CONN. In northern Windham, Hartford and Litchfield counties.
N. Y. Unknown on L. I., rare on S. I., thence increasing **northward**.
N. J. Sussex Co.
PA. Rare in Pike Co.
Tertiary, o: Cretaceous, o: Older Formations rare and scattered **northward**. Not south of the moraine. 117-179 days. Sea level-3,365 ft.

* See Introduction paragraph 32.

10. *P. fluitans* (L.) Kuntze. In shallow water: Gulf of St. Lawrence and near N. Y. City. Perhaps introduced. Common in Europe.

Rare in the Bronx and near Tappan, Rockland Co., unknown elsewhere in our range.

11. *P. acutiflora* (Torr.) Kuntze. In wet places: Me. to Del. and Ohio.

Scattered throughout the range, very rare in the pine-barrens.

70. *Puccinellia* Parl.

Panicle branches naked below; flowering scales 2 mm. long, or less, truncate at the apex.

1. *P. distans*.

Panicle branches spikelet-bearing to the base; flowering scales 2-2.5 mm. long, acutish or obtuse at apex.

2. *P. fasciculata*.

1. *P. distans* (L.) Parl. On salt meadows and sea beaches: N. S. to Del. Perhaps naturalized from Europe.

Scattered throughout the sea-beaches, and salt marshes.

2. *P. fasciculata* (Torr.) Bicknell. Salt marshes: Nantucket to N. J.

Scattered along the coast of Conn., N. Y. and N. J.; rare.

Puccinellia Borreri (Bab.) Hitchc. has been collected as a waif, especially in Conn. It is a native of Europe. *P. angustata* (R. Br.) Rand and Redfield has been collected at Old Lyme, Conn.

71. *Festuca* L.

Leaf-blades involute or folded, 2 mm. wide or less.

Annuals; stamens 1 or 2.

Awn not longer than flowering scale; spikelets 5-∞ flowered. 1. *F. octoflora*

Awn more than twice as long as flowering scale; spikelets 2-5 flowered.

2. *F. Myuros*.

Perennials; stamens 3.

Plants with rootstocks or stolons.

3. *F. rubra*.

Plants densely tufted, no rootstocks or stolons.

Flowering scales short awned; leaf-blades setaceous.

4. *F. ovina*.

Flowering scales awnless; leaf-blades capillary.

5. *F. capillata*.

Leaf-blades flat, 4 mm. wide or more.

Flowering scale awnless or short-awned.

Flowering scales 5-7 mm. long; spikelets 5-10 flowered.

6. *F. elatior*.

Flowering scales 4 mm. long or less; spikelets 3-6 flowered.

7. *F. nutans*.

Flowering scales with awns twice their length or more.

8. *F. gigantea*.

1. *F. octoflora* Walt. In dry sandy soil: Que. to Br. Col., south to Fla., Tex. and Cal.

Throughout the range, rare northward, common southward.

2. **F. Myuros** L. In waste places and fields: N. H. to N. J. and Ohio. Naturalized from Europe.
Local as a weed.
3. **F. rubra** L. In fields, etc.: Lab. to Alaska, south to Va. Also in Europe and Asia.
Scattered as a weed in most parts of our range, especially maritime N. J.
4. **F. ovina** L. In fields and waste places: N. H. to N. Dak., N. J., Ky. and Iowa. Native of Asia.
Locally abundant as a weed.
5. **F. capillata** Lam. In fields and along roadsides: Newf. to N. J. and Mich. Introduced from Europe.
Not uncommon, as a weed.
6. **F. elatior** L. In fields and waste places: throughout the U. S. Naturalized from Europe.
Common as a weed.
7. **F. nutans** Willd. In rocky woods: N. S. to Minn., south to Fla. and Tex.
CONN. Throughout.
N. Y. On L. I. south of the moraine, perhaps north of it, and on S. I. increasing and common **northward**.
N. J. Rare in Gloucester, Camden and Burlington counties, west of the pine-barrens, thence increasing **northward**.
PA. Throughout.
Tertiary, 0: Cretaceous, rare: Older Formations, common **northward**. 117-207 days. Sea level-3,980 ft.
8. **F. gigantea** (L.) Vill. In waste places: Me. to southern N. Y. Adventive from Europe.
Rare as a weed, often wanting.

Festuca bromoides L. has been recently collected at Hewlett, L. I.

72. **Bromus** L.

Lower empty scale 1-nerved, the upper 3-nerved.

Awns longer than the flowering scales; low annuals 5 dm. tall or less.

Flowering scales strigose, 8-12 mm. long.

Flowering scales sparsely hispidulous, 12 mm. long or more.

1. *B. tectorum*.

2. *B. sterilis*.

- Awns shorter than the flowering scales or wanting; perennials
5 dm. tall or more.
- Leaf-sheaths strongly retrorse-hispid. 3. *B. asper*.
- Leaf-sheaths glabrous or softly pubescent.
- Flowering scales pubescent on the margins only. 4. *B. ciliatus*.
- Flowering scales pubescent all over the back. 5. *B. purgans*.
- Lower empty scale 3-nerved, the second one 5-9 nerved.
- Perennials; flowering scales densely pubescent with silky hairs. 6. *B. Kalmii*.
- Annuals.
- Flowering scales awned.
- Flowering scales pubescent with soft appressed hairs. 7. *B. hordeaceus*.
- Flowering scales glabrous, or minutely roughened.
- Awns straight.
- Fruiting scales with strongly inrolled margins, the nerves obscure, leaf-sheaths glabrous. 8. *B. secalinus*.
- Fruiting scales with the margins not inrolled, the nerves prominent; leaf sheaths pubescent.
- Spikelets broadly lanceolate, usually over 6 mm. wide. 9. *B. racemosus*.
- Spikelets lanceolate, usually less than 6 mm. wide. 10. *B. arvensis*.
- Awns bent near the base, divergent. 11. *B. squarrosus*.
- Flowering scales awnless or awn-pointed, nearly as broad as long. 12. *B. brizaeformis*
1. *B. tectorum* L. In fields and waste places: Me. to Ont., Md., Ohio and Mo. Naturalized from Europe.
Abundant as a weed.
 2. *B. sterilis* L. In waste places and on ballast: eastern Mass. to D. C., Ohio, Ark. and Colo. Native of Eu. and Asia.
Rare as a weed in our area.
 3. *B. asper* Murr. In waste places: N. B. to Mich. and Ky. Naturalized from Europe.
Rare as a weed in our range.
 4. *B. ciliatus* L. In woods and thickets: Newf. to Man., N. Y., N. J., Minn. and Tex.
CONN. Rare along the coast, increasing northward.
N. Y. Throughout, rare or wanting on L I., and S. I., increasing northward.
N. J. Northern Ocean and Monmouth counties, increasing northward.
PA. Throughout.
Tertiary, o: Cretaceous, very rare: Older Formations, increasing northward. 117-207 days. Sea level-3,365 ft.

5. **B. purgans** L. Woods and banks: Vt. to Mont., south to Fla. and Tex.

CONN. Throughout.

N. Y. S. I.; Pine Plains, Dutchess Co., and in the Catskills.

N. J. Bergen, Essex, Hunterdon counties, increasing **northward**; and at Wildwood, Atlantic Co., along the coast (according to Stone).

PA. Northampton Co., apparently rare.

Tertiary, not on Beacon Hill, very rare off it: Cretaceous, 0: Older formations, increasing **northward**. 123-189 days. Sea level-3,365 ft.

6. **B. Kalmii** A. Gray. In woods and thickets: Que. to Man., N. J., Pa. and Mo.

CONN. Rare or wanting near the coast, increasing **northward**.

N. Y. Reported from Westchester Co. increasing **northward**.

N. J. Not uncommon in Warren and Sussex counties; also in meadows over limestone in Morris Co. (according to Mackenzie).

PA. Northampton and Bucks counties.

Tertiary, 0: Cretaceous, 0: Older Formations, increasing **northward**. South of the moraine only in Pa. 117-189 days. Sea level-4,020 ft.

7. **B. hordeaceus** L. In fields and waste places: N. S. to Br. Col., Cal. and N. Car. Adventive from Europe.

Not uncommon, as a weed, in our area.

8. **B. secalinus** L. In fields and waste places: nearly throughout N. Am. Native of Europe.

Locally common as a weed in most parts of our area.

9. **B. racemosus** L. In fields and waste places: nearly throughout U. S. and Can. Native of Europe and Asia.

Locally common as a weed.

10. **B. arvensis** L. In fields and waste places: N. Y. to Mich., Mo. and Fla. Adventive from Europe.

Not common in our area, always as a weed.

11. **B. squarrosus** L. In ballast and waste places: eastern sea-ports. Fugitive from Europe.

Rare as a weed.

12. **B. brizaeformis** Fisch. and Mey. In waste places: Mass. to Mich., Del. and Ind., also from Br. Col. to Cal. and Colo. Native of Europe.

Not common as a weed.

B. rubens L., *B. maximus* L. and *B. breviaristatus* (Hook.) Buckl. occur as occasional waifs. *B. erectus* Huds. and *B. inermis* Leyss. are sparingly introduced.

73. *Lolium* L.

Empty scale shorter than the spikelet.

Flowering scales awnless.

1. *L. perenne*.

Flowering scales awned.

2. *L. multiflorum*.

Empty scale equalling or extending beyond the flowering scale.

3. *L. temulentum*.

1. **L. perenne** L. In waste places or cultivated grounds: almost throughout N. Am. Naturalized from Europe.

Not uncommon as a weed.

2. **L. multiflorum** Lam. In fields and waste places: N. Y., N. J., Mo. and Iowa.

Locally common as a weed.

3. **L. temulentum** L. In waste places and cultivated grounds: N. B. to Mich., Ga. and Kan. Native of Europe.

Rare as a weed.

74. *Agropyron* J. Gaertn.

Culms not densely tufted; plants with creeping rootstocks or stolons. 1. *A. repens*.

Culms densely tufted; plants with no rootstocks or stolons.

Awn shorter than the flowering scale.

2. *A. biflorum*.

Awn much longer than the flowering scale.

3. *A. caninum*.

1. **A. repens** (L.) Beauv. In fields and waste places: almost throughout N. Am. except the extreme north. Native of Europe.

Common throughout the range.

2. **A. biflorum** (Brig.) R. & S. In fields, etc.: N. S. to Br. Col., south to the mountains of N. Eng., N. Y. and Pa., and in the Rocky Mts. to Colo. Also in northern Europe and Asia.

Known from near the summit of "Round Top," near Cairo, Greene Co., N. Y., a peak north of the moraine, with an elevation of about 3,500 ft., and a growing season of about 118 days; also at High Point, Sussex Co., N. J.

3. **A. caninum** (L.) R. & S. In fields, etc.: N. B. to the Yukon, south to N. Car., Tenn., Iowa and Colo. Also in Eu. and Asia.
 CONN. Occasional.
 N. Y. Cairo, Greene Co.
 N. J. Morris Co.
 PA. Pike and Monroe counties.

Agropyron tenerum Vasey has been collected as a waif in Conn.

75. **Hordeum** [Tourn.] L.

Flowering scales, exclusive of awns, 6-8 mm. long.

1. *H. jubatum*.

Flowering scales, exclusive of awns, about 12 mm. long.

2. *H. murinum*.

1. **H. jubatum** L. In dry soil: Ont. to Alaska, south to Ill., Tex. and Cal. Naturalized in the east from Lab. to N. J. and Pa.
 A rare and scattered weedy grass, with us.
2. **H. murinum** L. On ballast and in waste places: Mass. to D. C. Adventive from Europe.
 Rare as a ballast weed in most parts of the area.

The barley, *Hordeum vulgare* L. occasionally escapes in the range, and *H. nodosum* L. has been collected as a waif in Bucks Co., Pa. *H. pusillum* Nutt. is reported as introduced at Aqueduct, L. I., by E. P. Bicknell.

76. **Elymus** L.

Empty scales linear lanceolate to linear.

Empty scales manifestly indurated, usually curved or bowed at the white base.

Awn rarely exceeding $1\frac{1}{2}$ times length of flowering scale.

Flowering scales glabrous or hispidulous.

Spike long exserted.

1. *E. halophilus*.

Spike included in the broad, inflated upper sheath.

2. *E. virginicus*.

Flowering scales hirsute.

3. *E. hirsutiglumis*.

Awn exceeding twice length of flowering scale.

4. *E. glabriflorus*.

Empty scales not indurated, not white at the base, straight.

5. *E. canadensis*.

Empty scales narrowly subulate.

Spikelets hirsute.

6. *E. striatus*.

Spikelets glabrous or hispidulous.

7. *E. arkansanus*.

1. **E. halophilus** Bicknell. Salt marshes: Mass. to N. J.
 CONN. "Along the Sound" (E. P. Bicknell).
 N. Y. Common along the coast of L. I. and S. I., unknown elsewhere.
 N. J. Common from Sandy Hook to Cape May.
2. **E. virginicus** L. In moist soil, especially along streams: N. S. to Man., south to Fla. and Tex.

Throughout the range, except the pine-barrens, but rare inland.

3. **E. hirsutiglumis** Scribn. River banks: Me. to Tenn., and Neb.
 CONN. Along the coast and up the larger river valleys.
 N. Y. Lawrence and Hewlett, L. I. (according to Bicknell).
 N. J. Rare in Passaic and Morris counties.
 PA. Rare in Northampton Co.
4. **E. glabriflorus** (Vasey) Scribn. and Ball. Low places: S. N. Y. to Iowa, south to Fla., Tex. and N. Mex.,
 Columbia and Orange counties, N. Y. and Essex and Sussex counties, N. J. Reported from Easton, Pa.
5. **E. canadensis** L. (*E. canadensis glaucifolius* Torr.). On banks: N. S. to Alberta south to W. Va., and Ariz.
 Throughout the range, except the pine-barrens and the region east of them, there not recorded.
6. **E. striatus** Willd. In woods and on banks: Me. to N. Dak., N. Car. and Tex.
 Throughout the range, except the pine-barrens and the L. I. coastal plain; nowhere common.
7. **E. arkansanus** Scribn. and Ball. In woods and on banks: N. J. and N. Y. to Iowa and Ark.
 Near Egbertville, S. I., N. Y. and Wildwood, N. J.

Elymus australis Scribn. & Ball has been collected as a waif near New Haven, Conn. and *E. brachystachys* Scribn. & Ball near Naugatuck, Conn.

77. **Hystrix** Moench.

1. **H. Hystrix** (L.) Millsp. In rocky woods: N. B. Ga., Ill. and Neb.
 CONN. Throughout.
 N. Y. Rare southward, increasing and common **northward**.
 N. J. Burlington Co. west of the pine-barrens, increasing **northward**.
 PA. Throughout.

Tertiary, 0: Cretaceous, very rare: Older Formations, increasing **northward**. 117-207 days. Sea level-3,980 ft.

Rye, *Secale cereale* L., and wheat, *Triticum sativum* L., are frequent but doubtfully persistent escapes. The following have also been reported from the area: *Leptochloa fascicularis* (Lam.) Gray, *Melica mutica* Walt., *Melica striata* (Michx.) Hitchc. = *Avena Torreyi* Nash.

CYPERACEAE*

Fertile flowers perfect.

Basal empty scales of the spikelets none or not more than two (except in *Eriophorum*).

Scales of the spikelets 2-ranked; bristles none.

Scales of the spikelets spirally imbricated.

Base of the style persistent as a tubercle on the achene.

Spikelet 1; culm leafless; bristles usually present.

Spikelets several or numerous; culms leaf-bearing; bristles none.

Base of the style not persistent as a tubercle.

Flowers without any inner scales.

Base of the style swollen; bristles none.

Base of the style not swollen; bristles usually present.

Bristles 6-many, silky, much elongated.

Bristles short or little elongated, smooth or barbed.

Flowers with one or more inner scales.

Flowers with 3 broad, stalked scales alternating with barbed bristles.

Flowers with 1-2 hyaline scales; bristles none.

Flowers with 2 convolute inner scales.

Flowers with a single minute inner scale.

Basal empty scales of the spikelets 3 or more.

Style 2-cleft.

Spikelets breaking up into 1-fruited joints; bristles present; scales 2-ranked.

Rachis of the spikelets not jointed, persistent; scales spirally imbricated.

Spikelets few-flowered; bristles usually present.

Spikelets many-flowered; bristles none.

Style 3-cleft; bristles none.

All the flowers imperfect.

Pistillate flower subtended by a flat scale; achene long.

Pistillate flower enclosed in a perigynium.

1. CYPERUS.

2. ELEOCHARIS.

3. STENOPHYLLUS.

4. FIMBRISTYLIS.

5. ERIOPHORUM.

6. SCIRPUS.

7. FURENA.

8. LIPOCARPHA.

9. HEMICARPHA.

10. DULICHIMUM.

11. RYNCHOSPORA.

12. PSILOCARYA.

13. MARISCUS.

14. SCLERIA.

15. CAREX.

1. *Cyperus* L.

Style 2-cleft; achene lenticular, not 3-angled; scales falling from the rachis; spikelets flat.

Spikelets yellow; superficial cells of the achene oblong.

1. *C. flavescens*.

* Taxonomic treatment, except the genus *Carex*, contributed by Dr. N. L. Britton.

- Spikelets green or brown; superficial cells of the achene quadrate.
- Scales obtuse or obtusish, appressed.
- Scales membranous, dull; style much exerted.
- Scales subcoriaceous, shining, style scarcely exerted.
- Scales acute, somewhat spreading at maturity.
- Achene narrowly obovate; spikelets 1-3 cm. long.
- Achene linear-oblong; spikelets 0.5-2 cm. long.
- Style 3-cleft; achene 3-angled.
- Scales falling away from the persistent rachis of the flattened spikelets.
- Wings of the rachis, if present, permanently adnate to it.
- Scales tipped with recurved awns; low, annual, 2-15 cm. tall.
- Scales acute or obtuse, not awned.
- Wings of the rachis none or very narrow.
- Stamens 2 or 3; spikelets linear-oblong, 8-25 mm. long.
- Scales sharply acuminate.
- Scales blunt, mucronulate.
- Stamen 1; spikelets ovate, 4-8 mm. long.
- Wings of the rachis distinct.
- Low annual; adventive from Europe; scales brown.
- Tall indigenous perennials.
- Scales mucronate, reddish brown or green.
- Scales acute or obtuse, not mucronate.
- Scales wholly or partly purple-brown; achene linear.
- Scales straw-colored; achene obovoid.
- Wings of the rachis separating from it as interior scales; annual.
- Spikelets falling away from the axis of the spikes, the lower pair of scales commonly persistent.
- Annuals; spikelets elongated, nearly terete.
- Scales imbricated or but slightly distant; achene obovoid.
- Scales thin, dull brown; spikelets slender.
- Scales rigid, yellow-brown; spikelets stout.
- Scales very distant; achene linear-oblong; spikelets very slender.
- Perennial by hard, tuber-like basal corms; spikelets more or less flattened.
- Achene narrowly linear-oblong, 3-4 times as long as thick.
- Spikelets flat, several-many-flowered.

2. *C. diandrus*.
3. *C. rivularis*.
4. *C. filicinus*.
5. *C. microdontus*.
6. *C. inflexus*.
7. *C. compressus*.
8. *C. Iria*.
9. *C. pseudovegetus*.
10. *C. fuscus*.
11. *C. dentatus*.
12. *C. rotundus*.
13. *C. esculentus*.
14. *C. erythrorhizus*.
15. *C. speciosus*.
16. *C. ferax*.
17. *C. Engelmanni*.
18. *C. strigosus*.

- Spikelets subterete, few-flowered.
- Spikelets 12-25 mm. long, loosely spicate, the lower reflexed. 19. *C. refractus*.
 - Spikelets 3-10 mm. long, densely capitate or spicate.
 - Spikelets all reflexed; culms rough. 20. *C. retrofractus*.
 - Spikelets spreading or the lower reflexed; culms smooth.
 - Heads oblong or cylindrical.
 - Spikelets 4-10 mm. long, at least the lower reflexed.
 - Head oblong or short-cylindrical; lower spikelets reflexed. 21. *C. lancastriensis*.
 - Head obovoid; all but the upper spikelets reflexed. 22. *C. hystericinus*.
 - Spikelets 3-4 mm. long, the lower spreading. 23. *C. Torreyi*.
 - Heads globose. 24. *C. oocularis*.
- Achene oblong or obovoid, about twice as long as thick.
- Rachis wingless or very narrowly winged.
 - Heads globose. 25. *C. filiculmis*.
 - Heads oblong. 26. *C. cayennensis*.
 - Rachis-wings membranous, broad.
 - Scales firm, not appressed; spikelets loosely capitate. 27. *C. Grayi*.
 - Scales thin, closely appressed; spikelets densely capitate. 28. *C. globulosus*.

1. ***C. flavescens* L.** In marshy ground: N. Y. to Mich., Fla., Mex. and Costa Rica. Also in the Old World.

N. Y. In Bronx and Westchester counties, and on western L. I. and on S. I., unknown elsewhere.

N. J. Rare in Warren, Hunterdon, and Morris counties, increasing southward.

PA. Northampton, Bucks, Philadelphia, Delaware and Chester counties.

Tertiary, common: Cretaceous, common: Older Formations, rare and scattered. 138-220 days. Sea level 1,080 ft.

2. ***C. diandrus* Torrey.** In marshy places: N. B. to Minn., S. Car., and Kan.

Throughout the range except the pine-barrens, there not recorded; rare at Cape May.

3. *C. rivularis* Kunth. In moist places: Me. to Ont. and Mich., south to Mo., N. Car. and Mo.
 CONN. Throughout.
 N. Y. Throughout.
 N. J. Rare in Morris Co., wanting thence to the coastal plain, there increasing and common, but not recorded from the pine-barrens.
 PA. Northampton and Delaware counties.
4. *C. filicinus* Vahl. (*C. Nuttallii* Eddy.) In salt marshes: Me. to Miss.
 Common throughout our coastal marshes.
5. *C. microdontus* Torr. In wet soil; on or near the coast: N. J. to Fla. and Tex.
 Known only from Navesink Highlands and at Cape May, N. J., along the coast and at Pleasant Mills in the pine-barrens; rare.
6. *C. inflexus* Muhl. In wet sandy soil: N. B. to N. W. Terr. and Br. Col., south to Fla., Tex., Cal. and Mex.
 CONN. Throughout, but rare.
 N. Y. Rare in Columbia and Greene counties, and also at Van Courtlandt Park and Mt. Vernon.
 N. J. Rare in Hunterdon, Sussex, Warren and Morris counties; mostly along the Delaware River.
 PA. Northampton, Bucks and Chester counties.
 Tertiary, o: Cretaceous, o: Older Formations, scattered. 128-220 days. Sea level-1,900 ft.
7. *C. compressus* L. In fields and waste places: southern N. Y. to Mo. and Tex. Also in the Tropics.
 Rare in our area as a ballast weed.
8. *C. Iria* L. In cultivated ground: N. Y.; N. Car. to Fla. and Tex. Native of Asia.
 Localized, so far as known, at Hempstead, L. I.
9. *C. pseudovegetus* Steud. In marshes: N. J. to Fla., Ky., Mo., Kan. and Tex.
 Known in our area only from Riddleton, Salem Co., N. J., a region in the Cretaceous area, at about sea level and with a growing season of about 179 days; not recently collected.
10. *C. fuscus* L. On ballast: Mass. to N. J. and Md. Native of Europe.
 Rare as a weed.

11. **C. dentatus** Torr. In sandy swamps and on shores: Me. to northern N. Y., W. Va. and S. Car.
 CONN. Throughout, but not common.
 N. Y. Rare on L. I. as at Yaphank and Ronkonkoma, recorded from but not definitely known on S. I., thence scattered up the Hudson Valley to Columbia Co.; not known from the Catskills.
 N. J. Bergen, Essex and Warren counties, increasing **southward**.
 PA. Northampton and Bucks counties.
12. **C. rotundus** L. In fields: Va. to Fla., Mo., Kan. and Tex. Adventive in ballast near the eastern seaports.
 Rare as a ballast weed near Philadelphia and Bethlehem, Pa.
13. **C. esculentus** L. In moist fields: N. B. to Minn., Neb., Fla. and Tex. Also on the Pacific Coast, Trop. Am. and the Old World.
 Common throughout the range in some of its forms, but apparently only adventive and rare in the pine-barrens.
14. **C. erythrorhizos** Muhl. In wet soil: southern Ont. to Mass., Fla., Minn., Kan., Tex. and Cal.
 Throughout the range except in the pine-barrens and on S. I.; and not definitely known from the Catskills.
15. **C. speciosus** Vahl. In marshes: Mass. to Ohio and S. Dak., south to Fla., Kan., Tex. and Cal.
 CONN. Rare along the coast, decreasing and perhaps wanting inland.
 N. Y. Rare in Westchester Co., increasing **southward**.
 N. J. Rare in Bergen and Hudson Co., increasing **southward**, but not in the pine-barrens.
 PA. Northampton, Schuylkill, Bucks, Philadelphia, Delaware and Chester counties.
 Tertiary, not on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, rare, more common near the coast than elsewhere. 169-220 days. About sea-level.
16. **C. ferax** L. C. Rich. In wet soil: Mass. to Fla., Cal. and in Trop. Am.
 Known definitely only from near Secaucus, N. J.
17. **C. Engelmanni** Steud. In wet soil: Mass. to S. Ont. and Wisc., south to N. J. and Mo.

Known only from Kaign's Point, Camden Co., N. J., there probably adventive.

18. **C. strigosus** L. In meadows, swamps or streams: Me. and Ont. to Minn., Fla. and Tex.
Common throughout the range, except the pine-barrens, there unrecorded.
19. **C. refractus** Engelm. In dry fields: N. J. to Ga., Mo. and Tex.
Known in our area only from Delaware Co., Pa., and from near Trenton, N. J.
20. **C. retrofractus** (L.) Torr. (*C. dipsaciformis* Fernald). In dry sandy soil: N. J. to Fla., west to Ky., Mo. and Tex.
N. J. Camden, Atlantic and Salem counties; recorded as formerly growing about Hoboken.
PA. Philadelphia, Bucks and Chester counties, increasing southward.
A rare and local species.
21. **C. lancastricensis** Porter. In dry fields: N. J. and Pa. to Ga., Mo. and Ala.
N. J. Mercer, Camden and Salem counties along the Delaware and at Sea Bright, Monmouth Co.
PA. Tullytown, Bucks Co. and in Philadelphia and Delaware counties.
Tertiary, o: Cretaceous, rare: Older Formations, very local near the "fall line" in Pa., unknown elsewhere. 176-224 days. About sea level.
22. **C. hystricinus** Fernald. In dry sandy soil: N. J. and E. Pa. to Ga. and Tex.
N. J. Rare and local in Camden, Gloucester and Atlantic counties.
PA. Near Philadelphia.
A rare and local species whose distribution is not fully known.
23. **C. Torreyi** Britton. Sandy pine-barrens and on the seashore: southern N. Y. to Fla., west to Mo. and Tex.
N. Y. On the south side of L. I. and near Tottenville, S. I., unknown elsewhere.
N. J. Common throughout the coastal plain, except towards the "fall line"; unknown elsewhere. Most common on the Beacon Hill formation in our area.

24. **C. ovularis** (Michx.) Torr. In dry fields and on hills: southern N. Y. to Fla., west to Ill., Kan. and Tex.
 N. Y. Rare and local in Westchester Co. and the Bronx, increasing **southward** but not definitely known from L. I.
 N. J. Common throughout the coastal plain except the pine-barrens, there and elsewhere not recorded.
 PA. Bucks Co.
 Tertiary, wanting on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, rare and local. 176-220 days. About sea level.
25. **C. filiculmis** Vahl. (*C. filiculmis macilentus* Fernald). In dry fields and on hills: Me. to Ont., Minn., Fla., Kan., Tex. and Mex.
 Throughout the range except in the pine-barrens, there not recorded; more common northward and less common southward than elsewhere, but common on L. I.
26. **C. cayennensis** (Lam.) Britton. In waste grounds: N. J., Pa. and in the southern states. Native of Tropical America.
 Known only as a weed near Camden, N. J.
27. **C. Grayi** Torr. In sands of the sea shore and in pine-barrens: N. H. to Fla.
 CONN. Along the coast, decreasing and perhaps wanting inland.
 N. Y. Coasts of L. I. and S. I. and locally on sand in the interior of L. I.
 N. J. Rare in Monmouth and Middlesex counties, increasing and common **southward**, especially in the pine-barrens.
 Tertiary, common: Cretaceous, less common: Older Formations, confined to sea-beaches or near them. 176-220 days. About sea level.
28. **C. globulosus** Aubl. In dry soil, or a weed: Va. to Fla., west to Mo. and Tex. Also in Bermuda and Trop. Am.
 PA. A rare weed near Philadelphia.

2. *Eleocharis* R. Br.

Spikelet scarcely or not at all thicker than the culm; scales coriaceous.

Culm stout, spike many-flowered.

Culm terete, nodose.

Culm 3- or 4-angled, continuous.

Culm slender, triangular, continuous; spikelet few-flowered.

1. *E. interstincta*.

2. *E. mutata*.

3. *E. Robbinsii*.

Spikelet manifestly thicker than the culm.

Style mostly 2-cleft; achene lenticular or biconvex.

Upper sheath scarious, hyaline; plants perennial by slender rootstocks.

Scales pale green or nearly white.

4. *E. flaccida*.

Scales dark reddish-brown.

5. *E. olivacea*.

Upper sheath truncate, oblique or toothed, not scarious.

Annuals with fibrous roots.

Spikelet ovoid or oblong.

Tubercle narrower than the top of the achene.

6. *E. ovata*.

Tubercle about as broad as the top of the achene.

7. *E. obtusa*.

Spikelet oblong-cylindric; tubercle broad, low.

8. *E. Engelmanni*.

Perennial by horizontal rootstocks.

9. *E. palustris*.

Style 3-cleft; achene 3-angled or turgid.

Achene reticulated or cancellate.

Spikelet compressed; culm filiform.

10. *E. acicularis*.

Spikelet terete; culm slender.

Tubercle conic, smaller than the achene.

11. *E. simplex*.

Tubercle cap-like, as large as or larger than the achene.

12. *E. tuberculosa*.

Achene smooth or papillose.

Achene smooth, white; culms capillary.

13. *E. Torrejana*.

Achene papillose or smooth, brown, black or yellow.

Tubercle depressed short-conic.

14. *E. melanocarpa*.

Achene smooth.

Achene papillose.

Achene 3-ribbed on the angles.

15. *E. tricostrata*.

Achene obtuse-angled, not ribbed.

16. *E. tenuis*.

Tubercle subulate or narrowly pyramidal.

Culms filiform, wiry, densely tufted.

17. *E. intermedia*.

Culms flattened, slender, elongated.

18. *E. rostellata*.

1. ***E. interstincta*** (Vahl) R. & S. In water: Mass. to Wisc., Fla., the W. Ind. and Mex.

Known in our range only from Repaupo, Gloucester Co., N. J.

2. ***E. mutata*** (L.) R. & S. (*E. quadrangulata* R. & S.). In ponds, streams and swamps: Mass. to N. J., Ont., Mich., Ala., Mo., Tex. and Guatemala. Also in the W. I. and S. Am.

CONN. Guildford.

N. Y. North Pond, Westchester Co.

N. J. Rare in Sussex and Cape May counties, unknown elsewhere.

PA. Philadelphia Co.

A rare and scattered species.

3. ***E. Robbinsii*** Oakes. In shallow water: N. S. to Mich., south to Fla.

CONN. Rare along the coast and at Salisbury.

N. Y. Rare in Suffolk, Nassau and Dutchess counties, not reported elsewhere.

N. J. Rare and local in Burlington, Monmouth and Ocean counties, increasing **southward**, especially in the pine-barrens; also in Sussex Co.

A rare and scattered species, more common in the pine-barrens than elsewhere.

4. **E. flaccida** (Rchb.) Urban (*E. ochreatea* Steud.). In wet soil: N. J. and Del. to Fla. and Miss. Also in tropical America.

Known only from Cape May Co., N. J., a region at about sea-level, with underlying Tertiary sands and gravels and with a growing season of about 220 days.

5. **E. olivacea** Torr. In wet soil: Me. to S. Ont., Mich., Pa., S. Car. and Kan.

Throughout the range, more common along the coast and less common in the mountains than elsewhere.

6. **E. ovata** (Roth) R. & S. (*E. diandra* Wright). In wet soil: N. B. to Ont., Mich. and Conn.

CONN. Apparently confined to the valley of the Connecticut River.

N. Y. Westchester Co.

Tertiary, o: Cretaceous, o: Older Formations, rare and local. Not south of the moraine. 117-179 days. Sea level-3,800 ft.

7. **E. obtusa** (Willd.) Schultes. In wet places: Cape Breton to Minn., Br. Col., Fla. and Tex.

Throughout the range except the pine-barrens, there intrusive or following tidal streams.

8. **E. Engelmanni** Steud. In wet soil: Mass. to Ind., S. Dak., Wash., N. J., Tex. and Cal.

CONN. Wethersfield and West Hartford.

N. Y. Rare in the Bronx; Jamaica, Valley Stream and Rockville Centre, L. I.

N. J. Rare in Warren, Hunterdon and Camden counties, all near the Delaware River.

PA. Monroe, Bucks and Chester counties.

A rare and rather inexplicably scattered species.

9. **E. palustris** (L.) R. & S. (*E. glaucescens* (Willd.) Schultes). In ponds, swamps and streams: Lab. to Br. Col., Fla., Tex. and Cal.

Common, in some of its forms, throughout the range, except the pine-barrens.

10. **E. acicularis** (L.) R. & S. In wet soil: Newf. to Br. Col., N. J., Mo., Mex. and Cal. Also in Eu. and Asia.
Throughout the range, more common **northward** and less common southward than elsewhere. Rare or wanting in the pine-barrens.
11. **E. simplex** (Ell.) A. Dietr. (*E. tortilis* Schultes). In wet soil: N. Y. to Fla. and Tex., near the coast.
Known from near Gloucester and Cape May counties, N. J., and from Rockville Centre, L. I.
12. **E. tuberculosa** (Michx.) R. & S. In wet soil: Mass. to Pa., Fla. and Tex. near the coast.
CONN. Not uncommon along the coast in New London Co., decreasing inland and westward.
N. Y. On S. I. and L. I., and at West Mt. Vernon.
N. J. Monmouth and Middlesex counties, increasing **southward**, especially in the pine-barrens.
PA. Willow Gove, Montgomery Co.
Tertiary, common: Cretaceous, less common: Older Formations, rare and scattered near the coasts. 179-220 days. About sea level.
13. **E. Torreyana** Boeckl. (*E. microcarpa filiformis* Torr.). In wet sandy soil: Conn. to Fla. and Tex. mostly near the coast.
CONN. Rare near Voluntown.
N. J. In the pine-barrens and in Cape May Co.
Tertiary, common on Beacon Hill, rare elsewhere: Cretaceous, rare or wanting: Older Formations, very rare and perhaps only adventive. 179-220 days. About sea level.
14. **E. melanocarpa** Torr. In wet sandy soil: Mass. to Fla., near the coast.
N. Y. Rare at Wading River, L. I., and on S. I.
N. J. Rare in Burlington and Cape May counties; not in the pine-barrens.
A rare and local species in our range.
15. **E. tricostata** Torr. In wet soil: Mass. to southern N. Y. and Fla.
N. Y. Rare at Wading River and at Ronkonkoma, L. I., unknown elsewhere.

N. J. Ocean and Burlington counties, increasing **southward**, but rare west of the pine-barrens.

PA. Tinicum, Delaware Co.

Tertiary, not rare on Beacon Hill, scattered elsewhere: Cretaceous, very rare: Older Formations, scattered and local near the coast. 179-220 days. About sea level.

16. **E. tenuis** (Willd.) Schultes. In wet soil: Cape Breton to Ont. and Man., south to Fla. and Tex.

Throughout the range.

17. **E. intermedia** (Willd.) Schultes. In marshes: Que. to Minn., south to N. J., Ohio, Ill. and Iowa.

CONN. Rare in northern Hartford and Litchfield counties.

N. J. Lake Grinnell, Sussex Co. and at Succasunna, Morris Co.

PA. Philadelphia, increasing **northward**.

Rare and local species always increasing **northward**.

18. **E. rostellata** Torr. In marshes and wet meadows: N. J., Vt. and N. Y. to Br. Col., Fla., Tex., Mex. and Cal.

CONN. Rare and local in coastal marshes, decreasing inland and westward.

N. Y. Not uncommon on L. I., and in southern Westchester Co.; occasional in the Bronx.

N. J. In the Hackensack marshes and increasing in the coastal marshes **southward**: not in the pine-barrens.

More common in our area near the sea than elsewhere.

The reported occurrence at Sellersville, Bucks Co., Pa., of *E. acuminata* (Muhl.) Nees. was based on an incorrectly determined specimen of *E. tenuis* (Willd.) Schultes.

3. *Stenophyllus* Raf.

1. **S. capillaris** (L.) Britton. In dry or moist soil: Me. to southern Ont., Minn., Fla., Tex., Cal. and tropical Am.

Common throughout the range.

4. *Fimbristylis* Vahl.

Style 2-cleft; achene lenticular or biconvex.

Culms 0.2-0.9 m. tall.

Perennial; leaves involute.

Scales glabrous, shining, coriaceous.

1. *F. castanea*.

Scales, at least the lower, pubescent or puberulent.

2. *F. puberula*.

- Annual; roots fibrous; leaves flat.
 Culms 2-10 cm. tall.
 Style 3-cleft; achene 3-angled.
 Umbel mostly simple; spikelets ovoid to oval; achene reticulated.
 Umbel mostly compound; spikelets linear; achene smooth or nearly so.
3. *F. Baldwiniana*.
 4. *F. VahlII*.
 5. *F. geminata*.
 6. *F. autumnalis*.
1. **F. castanea** (Michx.) Vahl. (*F. spadicea castanea* A. Gray).
 In marshes and shallow water: N. Y. to Fla., along the coast.
 N. Y. Salt meadows, L. I. and S. I., rare.
 N. J. Common along the coasts and occasional in pine-barren swamps.
 2. **F. puberula** (Michx.) Vahl. Fields and meadows: N. Y. to Fla., La. Also from Ont., Mich. and Ill. to Kan. and Tex.
 N. Y. Rare on the Hempstead Plains on L. I.
 N. J. Common along the coast and locally in the pine-barrens, unknown elsewhere.
 A typically coastal plains species, with us.
 3. **F. Baldwiniana** Torr. (*F. laxa* of Britton's Manual). In moist soil: southern Pa. to Fla., west to Ill., Mo. and Tex.
 Known in our area only from Philadelphia, Delaware and Chester counties, Pa.
 4. **F. VahlII** (Lam.) Link. In moist soil: Mo. to Tex., east to N. Car. and Fla., Cal., Ont. and S. Am. In waste grounds about eastern seaports.
 N. J. Reported by Dr. Torrey, years ago, not recently verified.
 PA. Chester and Philadelphia counties.
 Almost certainly adventive with us.
 5. **F. geminata** (Nees.) Kunth. (*F. Frankii* Steud.). In moist soil: Me. to Ont., Tenn. and La.
 Known only from Connecticut, there recorded from throughout the state. To be looked for elsewhere in the northern part of our range.
 6. **F. autumnalis** (L.) R. & S. In moist soil: Conn. to Fla. and Tex. Also in tropical Am.
 Throughout the range.

5. *Eriophorum* L.

Spikelet solitary; involucre leaf short or none.

Bristles 6, simple, white, crisped.

1. *E. alpinum*.

Bristles 6, each 4-6 cleft, thus appearing numerous.

2. *E. callithrix*.

Spikelets several, involucre by 1-∞ leaves.

Leaves triangular-channelled throughout.

Blade of the upper stem-leaf not longer than the sheath.

3. *E. gracile*.

Blade of the upper stem-leaf much longer than the sheath.

4. *E. tenellum*.

Leaves flat, at least below the middle.

Scales with a prominent midvein; stamens 3.

5. *E. viridicarinatum*.

Scales striate-nerved; stamen 1.

6. *E. virginicum*.

1. ***E. alpinum*** L. (*Scirpus hudsonianus* (Michx.) Fernald). In bogs and on high mountains: Newf. to Hudson Bay and Br. Col. to Conn., northern N. Y. and Mich. Also in Europe and Asia.

Known in our area only from northern Tolland and Windham counties, Conn., perhaps elsewhere northward.

2. ***E. callithrix*** Cham. (*E. vaginatum* Torr. not L.). In bogs: Newf. to Alask., south to Mass., Pa., Wisc. and Manitoba. Also in Asia.

CONN. Rare in the northern tier of counties, not recorded elsewhere.

PA. Mountains of Monroe and Wayne counties.

Tertiary, 0: Cretaceous, 0: Older Formations, rare **northward**. 123-138 days. 780-2,900 ft.

3. ***E. gracile*** Koch. In bogs: Que. to Br. Col., N. Y., Pa., Iowa, Neb., Col. and Cal. Also in Eu. and Asia.

CONN. Throughout.

N. Y. Rare in the Bronx and Westchester Co., unknown elsewhere.

N. J. Rare in Gloucester Co., thence increasing **northward**; not in the pine-barrens.

4. ***E. tenellum*** Nutt. In bogs: Newf. to Hudson Bay, N. J., Pa., and Ill. Often confused in local catalogs with the similar *E. gracile* Koch.

Throughout most of the range, local southward, increasing **northward**; unknown from S. I.

5. ***E. viridicarinatum*** (Engelm.) Fernald. (*E. polystachyon latifolium* Gray). In wet meadows: Newf. to Br. Col., N. Y., Ga., Ohio and Mich.

CONN. Common in the north, rare or wanting southward.

N. Y. Westchester Co., increasing **northward**.

N. J. Bergen and Morris counties, increasing **northward**.

PA. Pocono Summit, Monroe Co.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Not south of the moraine. 117-153 days. Sea level-3,900 ft.

6. *E. virginicum* L. In bogs: Newf. to Man., south to Fla. and Neb.

Throughout the range, more common in the bogs of the pine-barrens and the mountains **northward** than in the intervening territory.

6. *Scirpus* L.

Spikelet solitary, terminal.

Involucral bract wanting.

Involucral bract present, erect.

Bract shorter than or but little exceeding the spikelet; plants not aquatic.

Bract at least twice as long as the spikelet; plant aquatic.

Spikelets normally more than one, usually several or numerous, often appearing lateral; involucral bract only one.

Spikelets few, 1-12, appearing lateral.

Culms not sharply 3-angled; achene plano-convex; annual.

Culms sharply 3-angled; perennials.

Achene plano-convex; bristles shorter than or equaling the achene.

Spikelets acute, overtopped by the involucral bract.

Spikelets obtuse; involucral bract short, stout.

Achene 3-angled, ridged on the back.

Bristles longer than the achene; involucral leaf erect.

Bristles as long as the achene; involucral leaf abruptly bent.

Spikelets several or numerous, umbelled; tall sedges.

Style 2-cleft; achene lenticular.

Style 3-cleft; achene trigonous.

Spikelets several, capitate or umbellate, large; involucral leaves 2 or more.

Achene lenticular or plano-convex.

Scales short-awned; achene lenticular.

Scales long-awned; achene plano-convex.

Achene trigonous.

Achene sharply and nearly exactly trigonous.

Achene with one face broader than the other two.

Spikelets very numerous in compound umbels or umbelled heads; involucral leaves several; tall sedges.

1. *S. nanus*.

2. *S. planifolius*.

3. *S. subterminalis*.

4. *S. debilis*.

5. *S. americanus*.

6. *S. Olneyi*.

7. *S. Torreyi*.

8. *S. mucronatus*.

9. *S. validus*.

10. *S. occidentalis*.

11. *S. paludosus*.

12. *S. robustus*.

13. *S. fluvialis*.

14. *S. novae-angliae*.

Bristles downwardly barbed; spikelets in umbelled heads.

Bristles equalling or slightly exceeding the achene.

Style 3-cleft; achene 3-angled; bristles 6.

Spikelets 3-8 in each head; bristles barbed throughout.

15. *S. sylvaticus*.

Spikelets 8-20 in each head; bristles not barbed below.

16. *S. atrovirens*.

Style 2-cleft; achene plano-convex; bristles 4.

17. *S. microcarpus*.

Bristles flexuous, twice as long as the achene.

18. *S. polyphyllus*.

Bristles smooth or slightly pubescent; umbel mostly decom-pound.

Bristles shorter than or scarcely exceeding the scales.

19. *S. lineatus*.

Bristles much exerted beyond the scales when mature.

20. *S. cyperinus*.

1. **S. nanus** Spreng. (*S. parvulus* R. & S. and *Eleocharis pygmaea* Torr.). Muddy places in salt marshes: Cape Breton Is. to Fla. and Tex. and about the salt springs in N. Y., Mich. and Minn. Also on the Pacific Coast; in Africa, Cuba and Mex. Throughout our coastal marshes, but not reported from Pa.
2. **S. planifolius** Muhl. In woods and thickets: Vt. and Mass. to Del., D. C., western N. Y. and Mo.
CONN. Throughout.
N. Y. Rare and local on L. I., frequent on S. I. and in the Bronx, thence increasing **northward**.
N. J. Rare in Gloucester Co., west of the pine-barrens; Mercer Co., thence increasing **northward**.
PA. Throughout, increasing **northward**.
Tertiary, 0: Cretaceous, rare: Older Formations, increasing **northward**. 117-220 days. Sea-level-3,800 ft.
3. **S. subterminalis** Torr. In ponds and streams or on their edges: Newf. to N. W. Terr. and Br. Col., S. Car., Pa., Mich. and Idaho.
Scattered throughout the range, and common in the pine-barren streams; unknown on S. I.
4. **S. debilis** Pursh (*S. Smithii* A. Gray and *S. Smithii setosus* Fernald). In wet soil: Me. to Ont., Minn., Ga., Ala. and Neb.
CONN. Throughout.
N. Y. Throughout, increasing **northward**.
N. J. Rare and local in Salem, Monmouth and Camden counties.

west and north of the pine-barrens and along the coast, thence increasing **northward**; not in the pine-barrens or at Cape May.

PA. Throughout, increasing **northward**.

Tertiary, unknown on Beacon Hill, rare elsewhere: Cretaceous, rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,980 ft.

5. **S. americanus** Pers. In fresh water and brackish marshes: North America, north to Newf. Also in S. Am. and Eu.
Throughout the range, more common near the coast than elsewhere.
6. **S. Olneyi** A. Gray (*S. Olneyi contortus* Eames). In salt marshes: N. H. to Fla., Tex., Mex. and Cal. and along the Pacific Coast to Oregon. Also in Mich., Ark. and the W. I.
Throughout the coastal marshes, but not reported up the Delaware in Pa.
7. **S. Torreyi** Olney. In swamps: Me. to R. I. and Pa., west to Minn. and Man.
CONN. In the Connecticut River at Lyme.
N. Y. Lynbrook, L. I.
N. J. Delanco, Burlington Co.
PA. Carbon and Pike counties.
A rare and very local species.
8. **S. mucronatus** L. Known in N. Am. only from a swamp in Delaware Co., Pa. and as reported also from Chester Co. Widely distributed in the Old World.
9. **S. validus** Vahl. In ponds and swamps: throughout N. Am. and in the W. I.
Throughout the range except in the pine-barrens.
10. **S. occidentalis** (S. Wats.) Chase. Borders of streams and lakes: Newf. to B. C., N. Y., Mo., Utah and Calif.
Known in our area only from Goshen, Conn.
11. **S. paludosus** A. Nelson (*S. campestris* Britton, not Roth). Salt marshes: Que. to N. J. about salt springs inland and on wet prairies and plains: Man. and Minn. to Ore., Neb., Kan., Nev. and Mex.
Nearly throughout the coastal marshes, but not definitely known on S. I. A possible hybrid between this and *S. americanus* has been collected at Long Beach, L. I.

12. **S. robustus** Pursh (*S. maritimus macrostachyus* Michx.). In salt marshes: N. S. to Tex.
Common throughout the coastal marshes.
13. **S. fluviatilis** (Torr.) A. Gray. In shallow water along lakes and streams: Que. to Minn., N. J., Neb. and Kan.
CONN. Rare along the lower part of the Connecticut River, unknown elsewhere.
N. Y. Known only from Pine Plains, Dutchess Co., and on an island in the Hudson River opposite New Baltimore, Greene Co.
N. J. Along the Delaware and its affluents in Camden, Gloucester and Salem counties.
PA. Tinicum, Chester Co., and Essington, Delaware Co.
14. **S. novae-angliae** Britton. In fresh and brackish marshes: Mass. to N. Y.
Known in our area only on the coast of Conn. from Milford westward, and near Spuyten Duyvil Creek, and at Smithtown, L. I.
15. **S. sylvaticus** L. In swamps: Me. to Ga. and Mich. Also in Eu. and Asia.
CONN. Throughout.
N. Y. S. I.
N. J. Essex and Hunterdon counties.
PA. Philadelphia Co., northward.
16. **S. atrovirens** Muhl. (*S. georgianus* Harper). In swamps: N. S. to Sask., south to Ga. and La.
Throughout the range, except in the pine-barrens and the region east of them, there rare and apparently adventive.
17. **S. microcarpus** Presl (*S. rubrotinctus* Fernald). In swamps and wet woods: Newf. to Alaska south to Conn., northern N. Y., Minn., Nev. and Cal.
CONN. Throughout.
N. Y. Near Riverdale, and at Smithtown, L. I.
PA. Reported from Bucks Co.
18. **S. polyphyllus** Vahl. In swamps, wet woods and meadows: Mass. to Minn., south to Ga., Tenn. and Ark.
CONN. Throughout, but not common.
N. Y. Rare on the north side of L. I. and reported from the south side; S. I., thence increasing northward.

- N. J. Rare in Mercer, Somerset and Union counties, increasing northward.
- PA. Throughout, increasing northward.
Tertiary, 0: Cretaceous, 0: Older Formations, increasing northward. 117-207 days. Sea level-3,980 ft.
19. **S. lineatus** Michx. In swamps and wet meadows: Ont. to N. H., Ore., Kan. and Tex.
CONN. Rare; New Haven, New Milford, Sharon and Salisbury.
N. Y. Woodlawn, N. Y. City.
N. J. Rare in Sussex, Bergen, Ocean and one station in the pine-barrens in Atlantic Co.
PA. Chester Co.
A rare and scattered plant, most common on limestone (according to K. K. Mackenzie).
20. **S. cyperinus** L. (*S. pedicellatus* Fernald. *S. Eriophorum* Michx. *Eriophorum cyperinum* L. *S. cyperinus pelius* Fernald).
In swamps: Newf. to Ont., Sask., Fla. and La.
Common in some of its forms throughout the range.

A form known as *S. atrocinctus* Fernald has been collected in several parts of our range, being replaced in the pine-barrens by the form known as *S. Longii* Fernald. *S. Hallii* A. Gray was admitted into the "Preliminary Catalogue" of 1888, but the record of the station has been lost. The nearest station is Winter Pond, Winchester, Mass. A plant recorded from Connecticut as *S. Peckii* Britton appears to be a race of *S. polyphyllus*.

7. *Fuirena* Rottb.

Annual; perianth-scales long-awned.

1. *F. squarrosa*.

Perennial; perianth-scales short-awned or awnless.

2. *F. hispida*.

1. **F. squarrosa** Michx. In wet meadows and marshes: Mass. to Fla. and La. . Also in Mich. and Ind.

In our coastal marshes, but not definitely known from Conn., S. I., or Pa.

2. **F. hispida** Ell. Wet grounds: New York (?), N. J. to Fla., Ky., Ind. Terr. and Tex.

Frequent from Long Branch southward, along the New Jersey coast but not certainly known elsewhere in our range.

8. *Lipocarpa* R. Br.

1. **L. maculata** (Michx.) Torr. In wet or moist soil: Va. to Fla., near Philadelphia, probably adventive.

Known in our area only from Petty's Island, Camden Co., N. J.; obviously introduced.

9. *Hemicarpa* Nees & Arn.

1. *H. micrantha* (Vahl) Pax. In moist sandy soil: N. H. to Ont., Wash., Fla., Tex., Mex. and S. Am.
 Conn. Rare, but scattered over most of the state, perhaps wanting northward.
 N. Y. Rare and local on L. I. and in West Chester Co.
 N. J. Rare in Hunterdon and Camden counties near the Delaware, unknown elsewhere.
 A rare and local species whose distribution is not yet understood.

10. *Dulichium* L. C. Rich.

1. *D. arundinaceum* (L.) Britton (*D. spathaceum* Pers.). In wet places: Newf. to Ont., Minn., Wash., Fla. and Tex. Also in Costa Rica.
 Common throughout the range.

11. *Rynchospora* Vahl.

- Style entire or 2-toothed, persistent as a long-exserted subulate beak.
 Style deeply 2-cleft, only its base persistent as a tubercle.
- | | |
|---|-----------------------------|
| Bristles minute or wanting. | 1. <i>R. corniculata</i> . |
| Bristles plumose. | 2. <i>R. pallida</i> . |
| Bristles downwardly barbed or rarely smooth. | 3. <i>R. oligantha</i> . |
| Scales white or nearly so; bristles 9-15. | 4. <i>R. alba</i> . |
| Scales brown; bristles 6. | 5. <i>R. capillacea</i> . |
| Leaves filiform; achene oblong. | 6. <i>R. Knieskernii</i> . |
| Leaves narrowly linear, flat; achene obovate. | |
| Bristles equalling the achene; tubercle $\frac{1}{2}$ as long or less. | 7. <i>R. glomerata</i> . |
| Bristles reaching or exceeding the end of the tubercle, which is as long as the achene. | 8. <i>R. axillaris</i> . |
| Spikelets few-several in numerous rather loose clusters. | 8. <i>R. axillaris</i> . |
| Spikelets very numerous in 2-6 very dense globose heads. | |
| Bristles upwardly barbed. | |
| Spikelets numerous in 2-6 very dense globose heads. | |
| Spikelets few-several in rather loose clusters. | |
| Achene smooth. | |
| Leaves setaceous; achene obovate shining. | 9. <i>R. fusca</i> . |
| Tubercle triangular-subulate. | 10. <i>R. filifolia</i> . |
| Tubercle flat, ciliate, triangular. | |
| Leaves narrowly linear. | |
| Achene broadly oval. | 11. <i>R. gracilentia</i> . |
| Achene narrowly obovate. | 12. <i>R. Smallii</i> . |

Achene transversely wrinkled.

Leaves flat; spikelets nearly or quite sessile.

Leaves involute; spikelets short pedicelled.

Leaves and stems filiform; spikelets distinctly pedicelled.

13. *R. cymosa*.

14. *R. Torreyana*.

15. *R. rariflora*.

1. **R. corniculata** (Lam.) A. Gray. (*R. macrostachya* Torr.) In swamps: Mass. to Fla., west to Ohio, Mo., Kan. and Tex.
CONN. Rare and scattered along the coast, decreasing and perhaps wanting inland.
N. Y. Known only from Wading River and Lynbrook, L. I.
N. J. Lakehurst Ocean Co., Camden Co., increasing **southward**, Tertiary, common: Cretaceous, less common: Older Formations, rare and scattered along the coast in Conn. 189–220 days. About sea level.
2. **R. pallida** M. A. Curtis (*R. Curtisii* Steud.). In bogs: N. J. to N. Car.
N. J. The coastal plain from Burlington and Ocean counties **southward**; common in the pine-barrens, local elsewhere.
Tertiary, common: Cretaceous, common: Older Formations, 0. 159–220 days. About sea level.
3. **R. oligantha** A. Gray. In wet soil: N. J. to Fla. and Texas.
Very rare in the pine-barrens near the west branch of Wading River, in Burlington Co., N. J.; unknown elsewhere.
4. **R. alba** (L.) Vahl. In bogs: Newf. to Alaska, south to Fla., Ky., Minn., Idaho and Cal. Also in northern Eu. and Asia.
Throughout the range; abundant in the pine-barrens.
5. **R. capillacea** Torr. In bogs: N. B. to Ont., Minn., N. J., Pa., Ind. and Mo.
Known in our range only from near White Pond, Warren Co., N. J.; from White Pond, Sussex Co., N. J., and Salisbury, Conn.
6. **R. Knieskernii** Carey. In pine-barrens: N. J. to Va.
Known only from the pine-barrens; on the Beacon Hill formation.
7. **R. glomerata** (L.) Vahl. (*R. glomerata leptocarpa* Chapm.). In moist soil: N. B. to Ont., Mich., Ark., Fla. and Tex.
Scattered throughout the range, more common in the south and less common in the north than elsewhere.
8. **R. axillaris** (Lam.) Britton (*R. axillaris microcephala* Britton). In swamps: L. I. to Fla. and La. near the coast; also in Cuba.

N. Y. Reported from Suffolk Co., unknown elsewhere.

N. J. Apparently confined to the pine-barrens; rare.

A rare and local species here, more common southward.

9. **R. fusca** (L.) Ait. In bogs: Newf. to Del. and Fla., west to Mich. Also in Eu.

CONN. Scattered and local over most of the state, increasing along the coast.

N. Y. Rare on L. I., unknown elsewhere.

N. J. Throughout the pine-barrens, rare at Cape May and New Egypt, unknown elsewhere.

Tertiary, common on Beacon Hill, rare and probably adventive elsewhere: Cretaceous, rare and adventive: Older Formations, scattered and local. 189-220 days. About sea level.

10. **R. filifolia** Torr. In pine-barren swamps: N. J. and N. C. to Fla. Rare.

Known only from Woodbine and Bennett, Cape May Co., N. J.

11. **R. gracilentia** A. Gray. In pine-barren swamps and bogs: southern N. Y. to Fla. and Tex. near the coast.

N. Y. Reported from L. I., but the record not verified.

N. J. Known only from the pine-barrens and from Cape May.

12. **R. Smallii** Britton. In bogs and on damp hillsides: N. J. and Pa. to N. Car.

N. J. Rare in Burlington and Camden counties.

PA. Marshalltown, Chester Co.

Tertiary, o: Cretaceous, rare: Older Formations, known, as yet, only on Azoic slates, in Pa. 179-207 days. About sea level.

13. **R. cymosa** Ell. In moist soil: N. J. to Ill., Ark., Fla. and Tex. Also in the W. I. and S. Am.

N. J. Rare in Warren, Hunterdon and Mercer counties, thence increasing **southward**, but not common.

PA. Bucks, Philadelphia, Delaware and Chester counties.

A rare and scattered species whose distribution is not understood.

14. **R. Torreyana** A. Gray. In wet pine-barrens: N. H. and Mass. to S. Car. and Ga.

N. J. Monmouth Co., increasing and common **southward**.

15. **R. rariflora** (Michx.) Ell. In grassy pine-lands: N. J. to N. C., Fla., Cuba and Jamaica.

Known only from near Bennett, Cape May, Co., N. J.

12. *Psilocarya* Torr.

1. *P. nitens* (Vahl) Wood. In wet soil: L. I., Cape May, and Del. to Fla. and Tex. Rare in our area.

Known only from near Wading River, L. I., and Cape May, N. J.

13. *Mariscus* (Hall.) Zinn. [*Cladium* P. Br.]

1. *M. mariscoides* (Muhl.) Kuntze. In marshes: N. S. to Ont. and Minn.

Common throughout in coastal marshes, decreasing inland, but at North Pond, Westchester Co., N. Y.

14. *Scleria* Berg.

Spikelets in terminal or terminal and lateral clusters.

Achene smooth.

Achene reticulated or regularly rugose.

Culms erect or ascending; achene not hairy.

Culms spreading; achene hairy.

Achene papillose.

Spikelets interruptedly glomerate-spicate.

1. *S. triglomerata*.

2. *S. reticularis*.

3. *S. setacea*.

4. *S. pauciflora*.

5. *S. verticillata*.

1. *S. triglomerata* Michx. (*S. triglomerata minor* Britton. *S. minor* Stone). In meadows and thickets: Vt. to Ont. and Wisc., south to Fla., Ark. and Tex.

Scattered throughout the range, more common southward and less common inland than elsewhere.

2. *S. reticularis* Michx. In moist meadows: eastern Mass. to Fla. and in northern Ind.

N. Y. Known only from Wading River and along the south side of L. I.

N. J. Rare in Ocean, Atlantic and Cape May counties, in or near the pine-barrens, unknown elsewhere.

PA. Tinicum, Delaware Co.

A scattered species, little known as to distribution features.

3. *S. setacea* Poir. (*S. Torreyana* Walp. *S. reticularis pubescens* Britton). In moist soil: Conn. (?), L. I. to Fla., Ind., Mo., Tex. and Mex. Also in Cuba and Porto Rico.

N. Y. Rare on the south side of L. I., and at Ronkonkoma.

N. J. Lakehurst, Ocean Co., increasing southward.

PA. Rare in Monroe Co., thence unrecorded to Bucks Co., thence increasing southward.

A rare plant in our area; Conn. record not verified.

4. **S. pauciflora** Muhl. In dry sandy soil: N. H. to Ohio, Mo., Kan., Fla. and Tex.

CONN. Columbia and Hartford; rare.

N. Y. Rare in Westchester Co.; on L. I., specially on the Hempstead Plains; unknown on S. I.

N. J. Mt. Tammany, Delaware Water Gap*, and Milburn, Essex Co.; Monmouth Co., increasing southward.

PA. Northampton Co., increasing southward.

5. **S. verticillata** Muhl. In moist meadows: eastern Mass. to Ont., Minn., Mo., Fla., Tex., Mex., Bahamas and Cuba.

CONN. Salisbury, rare.

N. Y. Woodside, L. I., rare.

N. J. White Pond, Warren Co.; White Pond, Sussex Co., (according to Mackenzie); the Hackensack meadows, thence increasing southward along the coast.

PA. Reported from Lehigh Co.; Mount Bethel, Northampton Co.

A rare and scattered species in our region, more common out of our area than in it.

15. **Carex** L.†

1. Achenes lenticular and stigmas 2; lateral spikes sessile; terminal spike partly pistillate, or if staminate, the lateral spikes short or heads dioecious.

Rootstock long creeping, the culms arising 1-few together. Culms caespitose, but plants sometimes stoloniferous, or with slender rootstocks.

Spikes always androgynous.

Perigynia strongly compressed, not whitish green.

Perigynia 2-5 mm. long, the beak not exceeding the body.

Spikes usually 10 or less, green or reddish brown tinged.

Spikes numerous, yellow or brown.

Perigynia plano-convex, yellowish.

Perigynia thick, much rounded on outer, somewhat on inner surface, brownish.

1. ARENARIAE.

2. MUILENBERGIANAE.

3. MULTIFLORAE.

4. PANICULATAE.

* See Introduction paragraph 50.

† Contributed by Mr. Kenneth K. Mackenzie.

- Perigynia 4–9 mm. long, spongy at base; beak longer than body.
- Perigynia scarcely compressed, nearly terete, whitish green.
- Spikes gynaeceandrous, rarely entirely staminate or pistillate.
- Perigynia ascending or appressed, the body not margined.
- Perigynia 4 mm. long or less, puncticulate.
- Perigynia longer, not puncticulate.
- Perigynia body with thin or winged margins.
- Perigynia spongy at base, usually spreading at maturity.
- Perigynia not spongy at base, not widely spreading at maturity.
2. Achenes triangular or lenticular; if lenticular the lower lateral spikes conspicuously peduncled, or with staminate terminal spike and elongated lateral spikes.
- Scales bract-like; achenes strongly constricted at the base.
- Scales not bract-like; achenes not strongly constricted at the base.
- Spike normally 1, the perigynia reflexed, or rounded and beakless at the apex.
- Perigynia rounded at the apex, beakless, glabrous.
- Perigynia beaked, strongly reflexed.
- Spikes 1–many, when one the perigynia neither reflexed nor rounded.
- Perigynia triangular, membranous, closely enveloping the achene, essentially nerveless, or 2 ribbed; bracts sheathless or nearly so.
- Perigynia obtusely triangular; foliage not pubescent.
- Young achenes mitrate at apex; lowest scales rough awned.
- Young achenes and lowest scales not as above.
- Perigynia acutely triangular; foliage usually pubescent.
- Perigynia not as above; or if so bracts strongly sheathing.
- A. Lowest bract strongly green-sheathing; perigynia beakless to beaked, entire, oblique or emarginate at apex; or long beaked and apex hyaline, becoming bidentate, teeth weak; achenes triangular, or, if (rarely) lenticular the perigynia dull and subterete.
- Bracts with obsolete or rudimentary blades.
- Lower spikes nearly radical; scales abruptly cuspidate.
5. STENORHYNCHAE.
6. TENELLAE.
7. CANESCENTES.
8. DEWEYANAE.
9. STELLULATAE.
10. OVALES.
11. PHYLLOSTACHYAE.
12. POLYTRICHOIDEAE.
13. PAUCIFLORAE.
14. MITRATAE.
15. MONTANAE.
16. TRIQUETRAE.
17. PEDUNCULATAE.

- Lower spikes not radical; scales not abruptly cuspidate.
- Bracts with well developed blades.
- Pistillate spikes short oblong to linear, erect, or if drooping the spikes short and the perigynia acutely triangular.
- Achenes lenticular; styles two. 18. ALBAE.
- Achenes triangular; styles three. 19. BICOLORES.
- Perigynia with few to many strong nerves or nerveless.
- Perigynia tapering at base, triangular, closely enveloping achene.
- Rootstocks long creeping. 20. PANICEAE.
- Rootstocks not long creeping. 21. LANIFLORAE.
- Perigynia rounded at base, suborbicular in cross section, loosely enveloping the achene. 22. GRANULARES.
- Perigynia finely many-striate.
- Perigynia tapering at base, constricted at apex. 23. OLIGOCARPAE.
- Perigynia rounded at both ends. 24. GRISEAE.
- Pistillate spikes elongated, linear to cylindric, slender-peduncled, the lower drooping.
- Perigynia beakless or short beaked; terminal spike gynaeandrous. 25. GRACILLIMAE.
- Perigynia conspicuously or strongly beaked.
- Culms strongly reddish tinged at base, aphyllopodic.
- Leaves glabrous; spikes very slender. 26. DEBILES.
- Leaves pubescent; spikes dense. 27. FLEXILES.
- Culms not reddish tinged at base, phyllopic. 28. LONGIROSTRES.
- B. Lowest bract sheathless to strongly green-sheathing; if green-sheathing achenes lenticular and perigynia not dull and subterete, or perigynia with strongly bidentate non-hyaline apex and stiff teeth.**
- Perigynia or foliage (at least the lower sheaths) pubescent; perigynia beakless or the beak not strongly bidentate; achenes triangular.
- Terminal spike gynaeandrous. 29. VIRESCENTES.

- Terminal spike staminate. 30. **PALLESCENTES.**
- Perigynia and foliage glabrous, or if pubescent the perigynia strongly bidentate; achenes triangular or lenticular.
- Perigynia rough papillose, conspicuously beaked. 31. **ANOMALAE.**
- Perigynia not rough papillose.
- Perigynia beakless or very short beaked; achenes triangular.
- Lateral spikes drooping on slender peduncles, at least at maturity.
- Perigynia glaucous, flattened. 32. **LIMOSAE.**
- Perigynia not glaucous, not flattened; spikes narrow. 33. **SCITAE.**
- Lateral spikes strictly erect. 34. **ATRATAE.**
- Perigynia with strongly bidentate beak, or if not, the achenes lenticular.
- Achenes lenticular; perigynia dull.
- Scales obtuse to acuminate, not long-aristate; achenes not constricted. 35. **RIGIDAE.**
- Scales broad, long-aristate; achenes strongly constricted at the middle. 36. **CRYPTOCARPAE.**
- Achenes triangular.
- Perigynia coriaceous, little if any inflated, often pubescent; bracts sheathless. 37. **HIRTAE.**
- Perigynia membranous or papery, from little to much inflated, never pubescent (rarely hispidulous); or if slightly coriaceous the lower bract long-sheathing.
- Perigynia little inflated, abruptly beaked; pistillate scales usually reddish or chestnut brown tinged; lower bracts strongly sheathing. 38. **FLAVAE.**
- Perigynia little to much inflated; pistillate scales not reddish brown or chestnut, or if somewhat so, lower bract not strongly sheathing.

Perigynia lanceolate or lance-subulate, tapering into the beak, many-nerved.

Perigynia-teeth reflexed; perigynia green, early deciduous.

39. COLLINSIAE.

Perigynia-teeth not reflexed; perigynia yellowish-green.

40. FOLLICULATAE.

Perigynia broader, abruptly contracted into beak, usually strongly ribbed.

Perigynia less than 10 mm. long.

Perigynium body ovoid or globose, not truncately contracted.

Perigynia coarsely ribbed.

41. PHYSOCARPAE.

Perigynia finely and closely ribbed.

42. PSEUDOCYPHEREAE.

Perigynia with an obovoid or obconic body truncately contracted into the prominent beak.

43. SQUARROSAE.

Perigynia 10 mm. long or longer.

44. LUPULINAE.

1. ARENARIAE, represented only by

1. *C. sicca*

2. MUHLENBERGIANAE.

Sheaths tight, often thickened at mouth; inconspicuously if at all septate-nodulose.

Perigynia corky-thickened at base, usually widely radiating or reflexed at maturity.

- Perigynia beak smooth; scales acuminate, deciduous. 2. *C. retroflexa*.
- Perigynia beak minutely roughened; scales obtuse or acutish, persistent. 3. *C. rosea*.
- Perigynia not corky thickened at base, spreading or ascending.
- Scales tinged with reddish-purple; perigynia more than 4 mm. long. 4. *C. muricata*.
- Scales not tinged with reddish purple; perigynia 4 mm. or less long.
- Head 15-30 mm. long, the lower spikes distinct. 5. *C. Muhlenbergii*.
- Head 8-20 mm. long, the spikes densely capitate.
- Perigynia elliptic-ovate or narrower; leaves 2.5-4 mm. wide. 6. *C. cephalophora*.
- Perigynia orbicular-ovate; leaves 1-2 mm. wide. 7. *C. Leavenworthii*.
- Sheaths loose and membranous, easily breaking, conspicuously septate-nodulose.
- Culms sharply triangular, not winged, or flattened; perigynia not ribbed dorsally.
- Perigynia flat on inner face; sheaths rarely transversely rugulose; spikes approximate.
- Scales less than half length of perigynia body; sheaths truncate at throat, not thickened, and not reddish brown tinged. 8. *C. cephaloidea*.
- Scales about length of perigynia body, strongly cuspidate; sheaths rounded at throat, thickened and reddish brown tinged. 9. *C. aggregata*.
- Perigynia with raised border on inner face; sheaths usually conspicuously transversely rugulose; lower spikes usually separate. 10. *C. sparganioides*.
- Culms narrowly-winged, triangular, much flattened in drying.
- Perigynia strongly nerved on outer face. 11. *C. conjuncta*.
- Perigynia faintly nerved on outer face. 12. *C. alopecoidea*.
3. MULTIFLORAE.
- Leaves exceeding culms; perigynia beak equalling body. 13. *C. vulpinoidea*.
- Culms exceeding leaves; perigynia beak shorter than body.
- Perigynia ovate to suborbicular. 14. *C. annectens*.
- Perigynia lanceolate to ovate lanceolate. 15. *C. setacea*.
4. PANICULATAE.
- Spikes approximate or little separate, the lower simple or nearly so; sheaths not copper color at mouth. 16. *C. diandra*.
- Spikes strongly separate, the lower compound; sheaths strongly copper color at mouth. 17. *C. prairea*.
5. STENORHYNCHAE.
- Sheaths transversely rugulose; not thickened at mouth. 18. *C. stipata*.
- Sheath not transversely rugulose; thickened at mouth. 19. *C. laevivaginata*.
6. TENELLAE, represented only by 20. *C. disperma*.
7. CANESCENTES.
- Lowest bract bristle-form, much prolonged, many times exceeding its 1-5-flowered spike; spikes widely separated. 21. *C. trisperma*.

- Lowest bract much shorter, or none; spikes several-many flowered.
- Glaucous; leaves 2-4 mm. wide; spikes many-flowered. 22. *C. canescens*.
- Not glaucous; leaves 1-2.5 mm. wide; spikes fewer-flowered. 23. *C. brunnescens*.
8. DEWEYANAE.
- Spikes oblong-ovoid; perigynia nerveless or nearly so, sharply margined above. 24. *C. Deweyana*.
- Spikes linear; perigynia noticeably or strongly nerved, little margined above. 25. *C. bromoides*.
9. STELLULATAE.
- Spike one (rarely with a small additional one). 26. *C. exilis*.
- Spike more than one.
- Perigynia broadest near the base, the beak serrulate.
- Perigynia beak $\frac{1}{4}$ - $\frac{1}{3}$ the length of body, the teeth very short; scales very obtuse to acutish.
- Leaves flat, 1-2 mm. wide, usually shorter than the culm; perigynia little nerved. 27. *C. interior*.
- Leaves usually involute, 0.5-1 mm. wide, usually exceeding the culm; perigynia strongly nerved. 28. *C. Howei*.
- Perigynia beak longer, strongly bi-dentate; scales sharper.
- Purely staminate spikes abundant; culms blackish at base, very rough; perigynia setulose-serrate. 29. *C. sterilis*.
- Spikes gynaeandrous or pistillate; culms not blackish at base; perigynia serrate.
- Perigynia body lanceolate to broadly ovate, usually inconspicuously nerved on inner face. 30. *C. cephalantha*.
- Perigynia body suborbicular, abruptly contracted into beak, conspicuously nerved on inner face.
- Perigynia lightly nerved on both faces; leaves usually less than 2 mm. wide; culms slender, sharply triangular. 31. *C. incompta*.
- Perigynia strongly nerved on both faces; scales acutish to acute; leaves 2-4 mm. wide, culm obtusely triangular. 32. *C. atlantica*.
- Perigynia broadest near the middle, the beak smooth. 33. *C. rosaeoides*.
10. OVALES.
- Perigynia subulate, at least 3 times as long as wide; the wing near base almost obsolete. 34. *C. Crawfordii*.
- Perigynia lanceolate to reniform; the wing always prominent.
- Perigynia narrowly to broadly lanceolate, at least $2\frac{1}{2}$ times as long as broad; tips of perigynia prominently exceeding scales.
- Leaves at most 3 mm. wide, those of sterile shoots, few, ascending. 35. *C. scoparia*.
- Leaves broader, those of sterile shoots numerous, spreading.

- Tips of perigynia appressed or ascending; spikes 7-10 mm. long. 36. *C. tribuloides*.
- Tips of perigynia widely spreading or recurved; spikes 4-8 mm. long.
- Inflorescence dense, oblong; culm stiff, stoutish. 37. *C. cristatella*.
- Inflorescence loose, elongate; culm weak, slender. 38. *C. projecta*.
- Perigynia ovate-lanceolate or broader, at most twice as long as broad.
- a. Perigynia strongly exceeding scales, or if nearly equalled by them much wider.
- Perigynia narrowly to broadly ovate, 3-4 mm. long, the tips not appressed.
- Perigynia brownish; spikes closely aggregated, rounded at base. 39. *C. Bebbii*.
- Perigynia green; spikes contiguous to widely separate, usually clavate at base.
- Leaves 2 mm. wide or less. 40. *C. straminea*.
- Leaves 2.5-6 mm. (averaging 4 mm.) wide. 41. *C. normalis*.
- Perigynia ovate to reniform, 4 mm. or more long, if shorter with closely appressed tips.
- Perigynia spreading-ascending; spikes green or brownish.
- Spikes approximate or scattered, the head stiff.
- Perigynia 4-4.7 mm. long, thickish, nerveless or obscurely nerved on inner surface. 42. *C. festucacea*.
- Perigynia 4.7-6.7 mm. long, very thin, prominently about 10-nerved on inner face. 43. *C. Bicknellii*.
- Spikes in moniliform flexuous head; scales long-pointed. 44. *C. hormathodes*.
- Perigynia closely appressed, or if somewhat spreading-ascending, the spikes whitish or silvery green.
- Spikes approximate, the head stiff.
- Scales long acuminate or aristate; achenes stipitate. 45. *C. alata*.
- Scales obtuse, or acutish; achenes nearly sessile. 46. *C. albolutescens*.
- Spikes in moniliform flexuous head. 47. *C. silicea*.
- b. Scales very slightly shorter or slightly longer than perigynia and concealing them.
- Perigynia nerveless on inner face or faintly nerved. 48. *C. aenea*.
- Perigynia strongly nerved on inner face. 49. *C. foenea*.
11. PHYLLOSTACHYAE.
- Body of perigynia oblong; pistillate flowers usually 3-10. 50. *C. Willdenovii*.

- Body of perigynia globose; pistillate flowers usually 2-3.
12. POLYTRICHOIDEAE, represented only by
13. PAUCIFLORAE, represented only by
14. MITRATAE, represented only by
15. MONTANAE.
- None of the culms short and hidden among the bases of the leaves.
- Aphyllopodic and not stoloniferous; lower sheaths little fibrillose.
- Phyllopodic and often long stoloniferous.
- Staminate spike stout; lower sheaths usually long fibrillose.
- Long stoloniferous; staminate spike 12-25 mm. long.
- Short stoloniferous; staminate spike 4-12 mm. long.
- Staminate spike not over 1 mm. thick; sheaths little fibrillose.
- Many of the culms short and hidden among the bases of the leaves.
- Pistillate and staminate spikes contiguous; culms aphyllopodic.
- Lower pistillate spikes widely separate; culms phyllopodic.
- Perigynia 4 mm. long or less, puberulent; leaves slender.
- Perigynia 2.5-3 mm. long, the beak less than half length of body; achenes brownish, shining, minutely pitted, orbicular obovoid.
- Perigynia longer, the beak more than half length of body; achenes grayish black, dull, roughened, oblong obovoid.
- Perigynia longer, glabrous, except the long beak; leaves stiff.
16. TRIQUETRAE, represented only by
17. PEDUNCULATAE, represented only by
18. ALBAE, represented only by
19. BICOLORES, represented only by
20. PANICEAE.
- Perigynia beak none or very short, often bent.
- Leaves 2 mm. wide or less, involute or folded.
- Leaves 2-6 mm. wide, flat.
- Perigynia turgid; peduncle of staminate spike smooth.
- Perigynia not turgid; peduncle of staminate spike rough.
- Fertile culm blades usually 6-10, 3-7 mm. wide; perigynia more than 3 mm. long.
- Fertile culm blades usually 3-5, 2-3 mm. wide; perigynia less than 3 mm. long.
- Perigynia beak straight, prominent, $\frac{1}{4}$ - $\frac{1}{2}$ length of body.
51. *C. Jamesii*.
52. *C. leptalea*.
53. *C. pauciflora*.
54. *C. caryophyllea*.
55. *C. communis*.
56. *C. pennsylvanica*.
57. *C. varia*.
58. *C. novae-angliae*.
59. *C. nigromarginata*.
60. *C. abdita*.
61. *C. umbellata*.
62. *C. tosa*.
63. *C. hirtifolia*.
64. *C. pedunculata*.
65. *C. eburnea*.
66. *C. aurea*.
67. *C. livida*.
68. *C. panicea*.
69. *C. Meadii*.
70. *C. tetanica*.
71. *C. polymorpha*.

21. LAXIFLORAE.

Sheaths and base of culm strongly purplish; staminate scales purplish.

72. *C. plantaginea.*

Sheaths not purplish tinged, the base of culms but rarely so; staminate scales never purplish.

Perigynia acutely triangular, short tapering at base.

Leaf-blades very smooth (except edges), the larger 12 mm. wide or more, those of fertile culm much smaller than those of sterile; perigynia smooth.

73. *C. platyphylla.*

Leaf-blades hispidulous on veins, 10 mm. wide or less; those of fertile culm moderately smaller than those of sterile; perigynia minutely roughened.

Staminate spike sessile or nearly so; peduncles short, erect.

74. *C. abscondita.*

Staminate spike usually strongly peduncled; lower peduncles capillary.

Perigynia short-beaked; second bract and leaves usually exceeding culm; blades 2.5-5 mm. wide, erect.

75. *C. digitalis.*

Perigynia beakless or nearly so; second bract and leaves usually exceeded by the culm; blades 4-8 mm. wide, spreading.

76. *C. laxiculmis.*

Perigynia obtusely triangular, long tapering at base, smooth.

Pistillate scales very truncate; blades 15-40 mm. wide; culms very strongly flattened and wing-margined.

77. *C. albursina.*

Pistillate scales acuminate to strongly cuspidate.

Culms strongly purplish tinged at base (sterile culms conspicuous; perigynia with abruptly bent beak).

78. *C. laxiflora.*

Culms not purplish tinged at base.

Perigynia with abruptly bent minute beak (sterile shoots developing conspicuous culms).

79. *C. blanda.*

Perigynia with straight prominent beak.

Perigynia fusiform; spikes 5-15-flowered; sterile shoots developing conspicuous culms.

80. *C. styloflexa.*

Perigynia obovoid; spikes many-flowered; sterile shoots reduced to tufts of leaves.

Perigynia appressed-ascending, 3.5 mm. long or less; fertile culms lateral; plant densely cespitose.

81. *C. anceps.*

Perigynia spreading-ascending, 3-4.5 mm. long; fertile culms lateral and central; plant loosely cespitose.

82. *C. striatula.*

22. GRANULARES.

Rootstocks not long creeping; staminate spike short-stalked; bracts overtopping spikes.

- Perigynia narrowly obovoid, ascending, nerved, about 2.5 mm. long.
- Perigynia broadly obovoid, soon squarrose, ribbed, about 3.5 mm. long.
- Rootstocks long-creeping; staminate spike long stalked; bracts rarely overtopping spikes.
23. OLIGOCARPAE.
Sheaths smooth; perigynia 2.5-4 mm. long.
Sheaths rough-pubescent; perigynia 4.5-5 mm. long.
24. GRISEAE.
Culms strongly purplish at base; perigynia triangular in cross-section.
Culms not purplish at base or but little so; perigynia circular in cross-section.
Perigynia 1.5 mm. wide; bract sheaths and pistillate peduncles rough.
Perigynia 2 mm. wide; bract sheaths smooth and pistillate peduncles nearly so.
Leaves not glaucous; perigynia 4.5-5 mm. long; spikes 5-15-flowered.
Leaves glaucous; perigynia 3-4.5 mm. long; spikes 10-40-flowered.
25. GRACILLIMAE.
Plants glabrous; perigynia 2.7 mm. long or less.
Perigynia rounded at apex, beakless.
Perigynia sharp pointed at apex, short-beaked.
Sheaths and often foliage pubescent.
Scales except lowest obtuse or acute; spikes all gynaecandrous.
Scales acuminate to cuspidate; lateral spikes pistillate.
Bracts strongly sheathing; leaves 3-4 mm. wide.
Lower bracts only strongly sheathing; leaves 2-4 mm. wide.
Perigynia nearly 2 mm. wide, slightly inflated, strongly nerved.
Perigynia about 1 mm. wide, obscurely nerved.
26. DEBILES.
Scales tinged with reddish-brown; perigynia firm, strongly many-nerved.
Scales hyaline with green midrib or somewhat reddish-brown tinged; perigynia membranous, lightly nerved.
Perigynia sessile or subsessile; scales obtuse or short cuspidate.
Perigynia 6-10 mm. long, the beak subulate; scales hyaline margined.
Perigynia 4.5-6.5 mm. long, the beak less subulate; scales tawny tinged.
Perigynia strongly stipitate; scales strongly cuspidate.
27. FLEXILES, represented only by
28. LONGIROSTRES, represented only by
83. *C. Shriveri*.
84. *C. granularis*.
85. *C. Crawei*.
86. *C. oligocarpa*.
87. *C. Hitchcockiana*.
88. *C. amphibola*.
89. *C. conoidea*.
90. *C. grisea*.
91. *C. glaucodea*.
92. *C. gracillima*.
93. *C. prasina*.
94. *C. formosa*.
95. *C. Davisii*.
96. *C. aestivaliformis*.
97. *C. aestivalis*.
98. *C. oblita*.
99. *C. debilis*.
100. *C. flexuosa*.
101. *C. arcata*.
102. *C. castanea*.
103. *C. Sprengelii*.

29. VIRESCENTES.

Perigynia densely pubescent.

Leaves exceeding culms; lowest bract setaceous, 0.5 mm. wide; pistillate spikes oblong-cylindric; perigynia obovoid.

104. *C. Swanii.*

Culms exceeding leaves; lowest bract leaflet-like, 0.5-3 mm. wide; pistillate spikes linear-cylindric; perigynia elliptic.

105. *C. virescens.*

Perigynia glabrous; at least at maturity.

Perigynia much flattened, rounded at apex, lightly nerved.

106. *C. complanata.*

Perigynia swollen, nearly orbicular in cross-section, pointed at apex, coarsely nerved.

Perigynia 2 mm. long, brownish-green; scales not rough-cuspidate.

107. *C. caroliniana.*

Perigynia longer, green; scales rough-cuspidate.

108. *C. Bushii.*

30. PALLESCENTES, represented only by

109. *C. pallescens.*

31. ANOMALAE, represented only by

110. *C. scabrata.*

32. LIMOSAE.

Strongly stoloniferous; leaves involute, glaucous, 3 mm. wide or less; scales little exceeding perigynia.

111. *C. limosa.*

Tufted; leaves flat, not glaucous, wider; scales much exceeding perigynia.

112. *C. paupercula.*

33. SCITAE, represented only by

113. *C. Barrattii.*

34. ATRATAE, represented only by

114. *C. Buxbaumii.*

35. RIGIDAE.

Fertile culms aphyllopodic.

Culms slender, very rough above; perigynium beak not twisted; spikes erect (except abnormally).

Perigynia plano-convex, elliptic.

Basal sheaths strongly filamentose.

115. *C. stricta.*

Basal sheaths not filamentose.

121. *C. Emoryi.*

Perigynia bi-convex, suborbicular.

116. *C. Haydeni.*

Culms stout at base, smooth above; beak of perigynium twisted when dry; lower spikes soon drooping.

117. *C. torta.*

Fertile culms phyllopodic.

Lowest bract at most slightly exceeding inflorescence; plants strongly stoloniferous.

118. *C. Goodenowii.*

Lowest bract much exceeding inflorescence; culms densely caespitose, the stolons absent or inconspicuous.

Leaf-blades 1-3 mm. wide; staminate spike solitary; perigynia glaucous-green.

119. *C. lenticularis.*

Leaf-blades wider; staminate spikes several; perigynia stramineous green.

120. *C. aquatilis.*

36. CRYPTOCARPAE.

Sheaths rough hispid; lower pistillate scales tapering into awn.

122. *C. gynandra.*

Sheaths smooth; lower pistillate scales abruptly contracted into awn.

123. *C. crinita.*

37. HIRTAE.

Staminate scales not ciliate.

Perigynia beak much shorter than the body, the teeth
1 mm. long or less.

Perigynia glabrous to sparsely pubescent.

Leaves 6-12 mm. wide, flat.

124. *C. lucustris*.

Leaves 2-4 mm. wide, becoming involute.

125. *C. Walleriana*.

Perigynia densely or strongly pubescent.

Perigynia beak with hyaline orifice at length
somewhat bidentate; staminate spike usually
one.126. *C. vestita*.Perigynia beak with non-hyaline, strongly biden-
tate orifice; staminate spikes more than one.

Leaves flat, more than 2 mm. wide.

127. *C. lanuginosa*.

Leaves involute, 2 mm. wide or less.

128. *C. lasiocarpa*.Perigynia beak, including teeth, nearly as long as body,
the teeth 1.7 mm. long or more.129. *C. trichocarpa*.

Staminate scales strongly ciliate.

130. *C. hirta*.

38. FLAVAE.

Leaves involute; perigynia ascending, not yellowish.

131. *C. extensa*.

Leaves not involute; perigynia squarrose, yellowish.

Perigynia 2-3 mm. long, the beak scarcely half the
length of the body.132. *C. Oederi*.Perigynia 4-6 mm. long, the beak about the length of
the body.

Scales hidden; perigynia 4 mm. long.

133. *C. cryptolepis*.

Scales conspicuous; perigynia 5-6 mm. long.

134. *C. flava*.

39. COLLINSIAE, represented only by

135. *C. Collinsii*.

40. FOLLICULATAE, represented only by

136. *C. folliculata*.

41. PHYSOCARPAE.

Pistillate scales, except rarely the lowest, not rough awned.

Pistillate spikes oblong to cylindric, 15-many-flowered.

Perigynia not reflexed; bracts not more than several
times exceeding spikes.

Achenes not excavated on one side or but little so.

Beak of perigynia smooth.

Culms sharply triangular, rough above,
scarcely spongy at base.137. *C. vesicaria*.Culms obtusely triangular, usually smooth
above, often thick and spongy at base.138. *C. rostrata*.

Beak of perigynia rough.

139. *C. bullata*.

Achenes deeply excavated on one side.

140. *C. Tuckermanni*.Lower perigynia reflexed; bracts many times ex-
ceeding spikes.

Pistillate spikes globose or short oblong, 5-15-flowered.

141. *C. retrorsa*.142. *C. oligosperma*.

Pistillate scales rough-awned.

Spikes cylindric, 14-19 mm. thick.

143. *C. lurida*.

Spikes narrow cylindric, 8-12 mm. thick.

144. *C. Baileyi*.

42. PSEUDO-CYPHEREAE.

Perigynia suborbicular in cross section, more or less inflated.

Spikes linear-cylindric; staminate scales scarcely awned.

145. *C. Schwemmleri*.

- Spikes oblong or oblong-cylindric; staminate scales with short rough awns. 146. *C. hystricina*.
- Perigynia obtusely triangular, scarcely inflated.
- Perigynia teeth erect, 1 mm. long; body of beak 1 mm. long. 147. *C. Pseudo-Cyperus*.
- Perigynia teeth recurved or spreading, 1.5-2 mm. long; body of beak 1.5-2 mm. long. 148. *C. comosa*.
43. SQUARROSAE.
- Scales exceeding perigynia; terminal spike small, normally staminate. 149. *C. Frankii*.
- Scales much shorter than perigynia; terminal spike gynaeandrous.
- Scales acuminate or awned; spikes oval. 150. *C. squarrosa*.
- Scales obtusish; spikes oblong-cylindric. 151. *C. typhina*.
44. LUPULINAE.
- Pistillate spikes globose or subglobose; style straight.
- Scales usually strongly awned; pistillate spikes 1-12-flowered. 152. *C. intumescens*.
- Scales usually obtuse, varying to slightly cuspidate; pistillate spikes 6-30-flowered. 153. *C. Asa-Grayi*.
- Pistillate spikes oblong or cylindric; style abruptly bent.
- Achenes longer than thick, the angles not prominently knobbed. 154. *C. lupulina*.
- Achenes not longer than thick, the angles prominently knobbed. 155. *C. lupuliformis*.
1. *C. siccata* Dewey. In dry fields and on hills: Me. to Alaska, south to R. I., N. J., Mich., Ariz. and Cal.
- CONN. Stratford and Southington; reported as occasional or local elsewhere.
- N. Y. Bank of Hudson, near Hastings, one colony.
- N. J. Succasunna, Morris Co. and Assinpink Creek, Mercer Co.
- PA. Reported from Northampton Co.
- A rare and local species with us.
2. *C. retroflexa* Muhl. In woods and thickets: Mass to Ont., Mich., Fla. and Tex.
- CONN. Pomfret; reported as scattered throughout except in Litchfield Co., increasing southwestward.
- N. Y. The Bronx, and scattered up the Hudson Valley; not reported from the Catskills. North of the moraine on Long Island and at Giffords, S. I.
- N. J. Bergen, Warren, Sussex and Passaic counties; reported also from Hunterdon and Monmouth counties (the latter very doubtful).
- PA. Bucks, Delaware and Montgomery counties. Reported from Wayne and Northampton counties.

3. **C. rosea** Schk. (*C. rosea radiata* Dewey). In woods and thickets: Newf. to Man., south to Ga., Neb. and Ark.
Throughout the range except the pine-barrens and Cape May district. Common north of the coastal plain, rare on it on Long Island.
4. **C. muricata** L. In meadows and fields: southern Me. to Ohio and Va. Locally naturalized from Europe.
Rare as a naturalized weed in the area. Specimens have been seen from Staten Island and New York City and Montgomery Co., Pa.
5. **C. Muhlenbergii** Schk. In dry fields and on hills: Me. to Ont. and Minn., south to Fla. and Tex.
Throughout the range, but rare in the pine-barrens.
6. **C. cephalophora** Muhl. In dry fields and on hills: Me. and Ont. to Man., south to Fla. and Tex.
Scattered and usually common throughout the range, except the pine-barrens of N. J., and east of them, there not recorded.
7. **C. Leavenworthii** Dewey. In meadows: Ont. and N. J. to Iowa and Texas.
Known in our area only from Cape May, New Jersey, where but recently found.
8. **C. cephaloidea** Dewey. In alluvial woods and thickets: N. B. to Wisc. and Pa.
CONN. "Rare or occasional." (Conn. Bot. Soc. Catalog.)
N. Y. Pine Plains, Dutchess Co.; reported from Westchester Co. and the Bronx.
N. J. Warren and Sussex counties.
PA. Northampton, Montgomery and Bucks counties; reported from Monroe Co.
9. **C. aggregata** Mackenzie. In dry woods: Pa. and D. C. to Mo.
Known in our area only from Philadelphia, Delaware and Chester counties, Pa.
10. **C. sparganioides** Muhl. In woods and thickets: N. H. to Ont. and Mich., south to Va., Ky. and Kan.
CONN. Southington and Fairfield; reported as rare in the east, increasing westward.
N. Y. Rare on L. I., frequent up the Hudson Valley to Pine Plains; not reported from the Catskills.

- N. J. Bergen, Warren and Passaic counties; reported from Hunterdon, Morris and Essex counties.
 PA. Northampton, Philadelphia and Bucks counties; reported also from Chester, Delaware and Montgomery counties.
11. **C. conjuncta** Boott. Moist meadows and thickets: N. Y. to D. C., west to Minn. and eastern Kan.
 N. J. Baptisttown, Hunterdon Co.
 PA. Philadelphia and Montgomery counties.
12. **C. alopecoidea** Tuckerm. Meadows: Me. to Pa. and Wisconsin.
 Known from our area only as reported from Shekomeko Creek, Dutchess Co., N. Y. (Hoysradt).
13. **C. vulpinoidea** Michx. In swamps and wet meadows: N. B. to Man., south to Fla., La., Neb. and Tex.
 Throughout the range, except in the pine-barrens where probably only introduced. Abundant northward.
14. **C. annectens** Bicknell. In fields: Me. to N. Y., Iowa, Md. and Mo.
 Scattered throughout the range. Local northward and not definitely known from the Catskills, often abundant at lower elevations.
15. **C. setacea** Dewey. Vt. to Ont., south to Md. and Ky.
 Riverdale, N. Y. City, reported also as occasional or frequent in Conn., and as occurring at Locust Valley, L. I.
16. **C. diandra** Schrank. In swamps and wet meadows: N. S. to Alaska, south to R. I., Pa., Neb. and B. Col. Also in Europe and Asia.
 CONN. Reported only from Salisbury and New Haven.
 N. Y. Pine Plains, Dutchess Co.
 N. J. Sussex Co.
 PA. Reported from Monroe Co.
 Not south of the moraine, in our area.
17. **C. prairea** Dewey. In wet meadows: Que. to B. Col., south to Conn., N. J., Ky. and Utah.
 CONN. Reported from Salisbury.
 N. Y. Pine Plains, Dutchess Co.
 N. J. Bergen, Morris, Sussex and Gloucester counties. Reported from Warren Co.
 PA. Northampton Co.

18. **C. stipata** Muhl. In swamps, wet woods and meadows: Newf. to B. Col., Fla., Tenn., Mo., N. Mex. and Cal.
Throughout the range except the pine-barrens and east and south of them, there not recorded.
19. **C. laevivaginata** (Küken.) Mackenzie. N. Y. to Md. and N. Car.
Known in our area only from Yonkers and Cold Spring Harbor, N. Y., and Morris, Warren and Sussex counties, N. J. and Delaware Co., Pa. Reported from Connecticut.
20. **C. disperma** Dewey. In larch and spruce bogs: Newf. to B. Col., N. J., Pa., Ind., Mich., Colo. and Cal. Also in Europe and Asia.
CONN. Reported as rare, Waterford, Stafford, Manchester, Norfolk, Barkhamstead and Cornwall.
N. Y. Pine Plains, Dutchess Co.
N. J. Morris, Warren and Sussex counties; reported also from Hudson and Bergen counties.
PA. Lehigh Co.
Known only north of the moraine, in our area.
21. **C. trisperma** Dewey. In swamps and wet woods: Newf. to Sask., south to Md., Ohio, Mich. and Neb.
CONN. Huntington; reported as occasional elsewhere.
N. Y. Dutchess and Greene counties; also formerly on S. I.
N. J. Not uncommon in the pine-barrens, not recorded thence to Bergen, Morris and Sussex counties.*
PA. Northampton, Lehigh, Pike, Monroe and Luzerne counties, reported also from Wayne Co.
22. **C. canescens** L. (*C. canescens disjuncta* Fernald). In swamps and bogs: Va. and Ohio north to the Arctic Circle, southward in the western mountains.
Scattered throughout the range. Rare or wanting south of the pine-barrens in New Jersey as also in southeastern Pennsylvania.
23. **C. brunnescens** (Pers.) Poir. In wet or even dry places: Lab. to B. C., N. Y. and N. Eng. and southward in the mountains. Also in Europe.
CONN. Reported from Wallingford, Winchester and Salisbury.
N. Y. Dutchess and Greene counties.
PA. Monroe Co.; reported also from Wayne Co.
N. J. Newton, Sussex Co.
Known, in our area, only north of the moraine.

* See Introduction paragraph 7.

24. **C. Deweyana** Schwein. In dry woods: N. S. to B. C. and Vancouver, south to Pa., Iowa, N. Mex. and Ariz.
 CONN. West Goshen and Brookfield; reported as scattered elsewhere in the northwestern part of the state.
 N. Y. Ulster Co.
 PA. Reported from Wayne Co.
25. **C. bromoides** Schk. In bogs and swamps: N. S. to Ont. and Mich., south to Fla. and La.
 CONN. Southington and Huntington; reported as increasing westward.
 N. Y. On S. I. and in Bronx, Westchester, Dutchess and Greene counties.
 N. J. Sussex, Bergen and Morris; reported also from Warren and Hunterdon counties.
 PA. Bucks Co.; reported from Monroe, Northampton and Chester counties.
26. **C. exilis** Dewey. In bogs: Lab. to southern N. J., mostly near the coast.
 A characteristic species of the pine-barrens of N. J., but unknown elsewhere in our range, except from Newton, Sussex Co., N. J., and Woodmere, Long Island.
27. **C. interior** Bailey. Wet soil: eastern Quebec to Hudson Bay, B. C., Fla. and Ariz.
 N. Y. Pine Plains, Dutchess Co.
 N. J. Morris, Warren and Sussex counties.
 PA. Lehigh and Chester counties, in the latter predominating on Serpentine barrens.
28. **C. Howei** Mackenzie. In wet soil: Mass. and N. H. to N. Y., N. J. and Pa.
 Scattered throughout the range, usually in white cedar, larch or spruce bogs. Abundant in the pine-barrens of New Jersey and on Long Island.
29. **C. sterilis** Willd. (*C. scirpoides* Schk. in part). Ont. and Ind. to N. Y. and N. J.
 N. Y. Greene Co.
 N. J. Sussex Co.
 PA. Monroe and Northampton counties.
30. **C. cephalantha** (Bailey) Bicknell. In moist soil: throughout the continent north of Mexico.
 Common throughout the range, except the pine-barrens. Var. *angustata* (Carey) Mackenzie is abundant northward.

31. **C. incomperta** Bicknell. In boggy places: Mass. to Mich., Pa. and Fla.
 CONN. Fairfield and Easton.
 N. Y. On L. I., in Westchester Co. and in the Highlands of the Hudson, unknown elsewhere. Reported from Lower Hudson region.
 N. J. Morris, Passaic and Union counties, also at Delanco, Burlington Co.
 PA. Lehigh, Northampton, Montgomery, Bucks and Chester counties; recorded also from Delaware Co.
32. **C. atlantica** Bailey. In swamps near the coast: Newf. to Fla. and Tex.; also rarely inland.
 CONN. Reported as not uncommon near the coast, decreasing inland. This report probably refers to the last.
 N. Y. Islip, L. I., and reported as frequent on the coastal plain of Long Island.
 N. J. Throughout the coastal plain region, especially in the pine-barrens, unknown elsewhere.
 PA. Delaware Co.
33. **C. rosaeoides** E. C. Howe (*C. seorsa* E. C. Howe). In swampy woodlands: Mass. to N. Y., south to Stone Mt., Ga.
 CONN. Reported as rare and local over most of the state.
 N. Y. L. I., S. I., the Bronx and in Westchester Co.
 N. J. Sussex, Morris, Bergen, Middlesex and Cape May counties; reported also from Burlington, Camden and Salem-counties; not in the pine-barrens.
 PA. Montgomery, Lehigh and Chester counties.
34. **C. Crawfordii** Fernald. In open places: Newf. to B. Col., Conn., Mich. and Wash.
 Known in our area only from Salisbury, Conn.
35. **C. scoparia** Schk. In moist or dry soil: Newf. to Wash., Fla. and Colo.
 Throughout the range, but less common in the pine-barrens and possibly not native there.
36. **C. tribuloides** Wahl. In meadows: N. B. to Sask., Fla. and Ariz.
 Scattered throughout the range except the pine-barrens of New Jersey and east and south of them, there not reported. Rare on Long Island.

37. **C. cristatella** Britton. In meadows and thickets: E. Mass. to B. Col., south to Va. and Mo.
 CONN. Reported as rare as Ledyard, Southington, Oxford, Huntington, Kent and Salisbury.
 N. Y. Rare in the Bronx, increasing northward to Greene Co., but not reported from the Catskills.
 N. J. Warren and Sussex counties; reported also from Bergen, Morris, Union and Hunterdon counties.
 PA. Lehigh and Chester counties; reported from Northampton Co.
38. **C. projecta** Mackenzie (*C. tribuloides reducta* Bailey). In damp soil: N. S. to N. Dak., south to D. C. and Ill.
 CONN. Reported from Woodstock, Franklin, Winchester, Litchfield, and Salisbury.
 N. Y. Van Cortlandt Park, N. Y. City, and at Glendale, L. I.
 N. J. Oak Ridge, Sussex Co.
39. **C. Bebbii** Olney. In low grounds: Newf. to B. C. and northward, southward to N. J., Ill. and Colo.
 CONN. Reported from Salisbury.
 N. Y. Pine Plains, Dutchess Co.; Westchester county.
 N. J. Morris and Sussex counties.
40. **C. straminea** Willd. In woods: N. B. to B. C., Ky., Ark. and Cal.
 CONN. Green's Farms; reported also from northern Hartford and Litchfield counties.
 N. Y. On S. I., in the Highlands near West Point, at Pine Plains, Dutchess Co., and in the Catskills; reported as occasional on L. I. and frequent in the Bronx.
 N. J. Camden, Ocean, Monmouth and Middlesex counties on the coastal plain, and in Essex, Hudson, and Morris counties, in the north; reported from Salem and Gloucester counties.
 PA. Bucks, Philadelphia and Chester counties; reported also from Northampton, Monroe and Delaware counties.
41. **C. normalis** Mackenzie (*C. mirabilis* Dewey). Woodlands: Que. to N. Car., Kan. and Man. and in the western mountains.
 Scattered and usually rather common throughout the range, except the coastal plain of N. J.; rare or occasional on L. I.
42. **C. festucacea** Schkuhr. In dry or moist soil: N. B. to B. C., south to Fla. and Ark.

- CONN. New Haven, Southington and Milford; reported as frequent or common elsewhere.
- N. Y. L. I., the Bronx, and in Westchester and Sullivan counties.
- N. J. Sussex and Hunterdon counties; reported from Cape May Co.
- PA. Philadelphia Co., reported also from Northampton, Bucks and Delaware counties.
43. **C. Bicknellii** Britton. In dry soil: Me. to Man., south to N. J., Ark. and Neb.
- CONN. Pomfret; reported as rare and scattered over the rest of the state.
- N. Y. Westchester and Dutchess counties. Bronx Co. (Bicknell).
- N. J. Morris, Bergen and Sussex counties.
- PA. Bucks and Delaware counties; reported also from Chester Co.
44. **C. hormathodes** Fernald (*C. tenera* of first edition of Illus. Flora). In wet soil, chiefly near the coast: Gulf of St. Lawrence to Va.
- CONN. Common along the coast, rare inland, as at Pomfret.
- N. Y. L. I., S. I. and in the Bronx, unknown elsewhere. Common along the coast.
- N. J. Rare in Morris, Bergen and Hudson counties, increasing southward, especially along the coast; absent from the pine-barrens.
- PA. Reported from Bucks, Chester and Delaware counties.
45. **C. alata** Torr. In moist soil: N. H. to Fla., inland to Mich.
- CONN. Reported from Hartford and Southington.
- N. Y. Rare on L. I.; reported from Bronx and Westchester counties.
- N. J. Hudson, Cape May, and Gloucester counties; reported also as scattered throughout the coastal plain except the pine-barrens; also near Newton, Sussex county.
- PA. Reported from Bucks and Montgomery counties.
46. **C. albolutescens** Schwein. In wet soil along the coast: N. B. to Venezuela, and locally in the interior.
- Usually common throughout the coastal part of our range; occurs also at Pine Plains, Dutchess Co., N. Y., Pocono Summit, Monroe Co., Pa., and reported near Union, Conn., in the interior.
47. **C. silicea** Olney. In sands of the sea coast: Newf. to Va.
- Common on the coastal sands.

48. **C. aenea** Fernald. In dry places: Lab. to Conn., west to Mich. and B. Col.
Known, in our area, only from Salisbury, Conn.
49. **C. foenea** Willd. In dry woods, often on rocks: Newf. to B. Col., south to Va. and Iowa.
CONN. Reported as occasional.
N. Y. Westchester, Rockland, Dutchess and Delaware counties.
N. J. Sussex, Warren and Passaic counties; reported from Hunterdon Co.
PA. Monroe, Northampton and Lehigh counties.
50. **C. Willdenovii** Schk. In dry woods and thickets: Mass. to Ohio, Mich. and Man., south to Fla., Ky. and Tex. Rare and local in our area.
CONN. Reported from East Haven and Hamden.
N. Y. Pine Plains, Dutchess Co. Bronx Park (Bicknell).
N. J. Passaic and Hunterdon counties; reported also from Bergen and Gloucester counties (the latter record doubtful).
PA. Northampton and Bucks counties.
51. **C. Jamesii** Schwein. In dry woods: southern Ont. and N. Y. to Mich. and Iowa, south to W. Va., Mo. and Kan.
N. J. Delaware, Warren Co.
PA. Betzwood, Montgomery Co.
52. **C. leptalea** Wahl. In bogs and swamps: Newf. to Alaska, Fla., La., Tex., Colo. and Ore.
CONN. Canaan and Bridgeport; reported as frequent elsewhere.
N. Y. Westchester, Dutchess and Sullivan counties; also on S. I.; reported from L. I. and the lower Hudson region.
N. J. Scattered throughout the state, except in the pine-barrens; more common northward.
PA. Northampton Co., reported also from Monroe, Bucks, Delaware and Chester counties.
53. **C. pauciflora** Lightf. In bogs: Newf. to Alaska south to Conn., Pa., Mich. and Wash.
Seen only from Norfolk, Conn., and Pike Co., Pa.; reported also from Wayne and Monroe counties in Pa.
54. **C. caryophyllea** Latourrette. Me. to D. C. Native of Europe.
Known only as established near Riverdale, N. Y. City.

55. **C. communis** Bailey. In dry soil: N. S. to B. Col., south to Ga., Ohio and Neb.
Common or frequent throughout the range, except on the coastal plain.
56. **C. pennsylvanica** Lam. In dry soil: N. B. to N. Dak., N. Car. and Tenn.
Abundant throughout the range in some of its forms.
57. **C. varia** Muhl. In dry soil: N. S. to western Ont. and Man., south to Ga. and Tex.
Scattered throughout the range. The records from within our range, in Pa., of *C. deflexa* Hornem. and *C. albicans* Willd. are based on specimens of this species.
58. **C. novae-angliae** Schwein. In wet shaded places: N. B. to Me., Mass. and N. Y.
East Windham in the Catskills. Reported from Norfolk, Conn. (*Rhodora* 15: 30), and Pine Plains, Dutchess Co., N. Y.
59. **C. nigro-marginata** Schwein. In dry soil: Conn. to Alabama and Louisiana.
CONN. Reported from near North Stonington.
N. Y. L. I. Yonkers (Bicknell).
N. J. Milford and Holland in the north, and scattered throughout the coastal plain except the pine-barrens; most abundant southward.
PA. Bucks Co.; reported also from Northampton and Montgomery counties.
60. **C. abdita** Bicknell. Que. to Vancouver, south to Delaware and Indiana.
CONN. Bridgeport, rare.
N. Y. L. I., Westchester, Sullivan and Dutchess counties.
N. J. Salem, Camden, Mercer and Sussex counties, all within the drainage of the Delaware, and near Hoboken.
PA. Chester, Delaware, and Montgomery counties.
61. **C. umbellata** Schk. In dry soil: N. S. to Mich. and Pa.
CONN. Reported as occasional near the coast, decreasing northward. These records probably refer largely to the last species.
N. Y. Yonkers and in the Highlands.
N. J. Scattered over most of the state, except the pine-barrens, there rare.
PA. Philadelphia Co., and reported from Northampton and Bucks counties.

62. **C. tonsa** (Fernald) Bicknell. In dry soil, chiefly near the coast: Me. to N. Y. and N. J.
 N. Y. L. I., the most common member of this group.
 N. J. Common on the coastal plain, except at Cape May.
 PA. Northampton, Bucks, Montgomery and Philadelphia counties.
63. **C. hirtifolia** Mackenzie. In woods and thickets: N. S. to N. Dak., N. J., Ky. and Kan.
 CONN. Southington; reported also as rare in New London Co., increasing northward and westward.
 N. Y. L. I.; Bronx, Westchester and Dutchess counties.
 N. J. Hunterdon, Somerset and Warren counties.
 PA. Northampton, Montgomery, Philadelphia and Delaware counties; reported from Bucks and Chester counties.
64. **C. pedunculata** Muhl. In dry woods: Anticosti to Sask., south to Va., Pa. and Iowa.
 CONN. Weston; reported as rare or occasional elsewhere.
 N. Y. Dutchess and Greene counties; reported also from Westchester Co.
 N. J. Union, Morris, and Sussex counties; reported also from Bergen Co. *Occurs locally at New Egypt, Ocean Co.
 PA. Bucks and Northampton counties; reported also from Lackawanna and Berks counties.
65. **C. eburnea** Boott. (*C. setifolia* (Dewey) Britton). In dry, sandy, or rocky soil; often on limestone: N. B. to Alberta, south to Va., Tenn., Mo. and Neb. Very local in our range.
 CONN. Litchfield Co.; reported also in Fairfield Co. and on the trap intrusions in the Connecticut Valley.
 N. Y. North end of Manhattan Island and at Pine Plains, Dutchess Co.
 N. J. Sussex Co., near Swartswood.
 PA. Northampton and Lehigh counties.
66. **C. aurea** Nutt. In wet places: Newf. to B. Col., south to Mass., Pa., Mich., Utah and Cal. Rare in our area.
 CONN. Kent; reported also from Salisbury.
 N. Y. Dutchess Co.

67. **C. livida** (Wahl.) Willd. In bogs: Lab. and Hudson Bay to Alaska, south to Conn., the pine-barrens of N. J., central N. Y., Mich. and Cal. Also in Europe.
CONN. New Haven, not recently collected.
N. J. Scattered through the pine-barrens, unknown elsewhere, except near Newton, Sussex Co.
68. **C. panicea** L. In fields and meadows: N. S. to Conn. Naturalized from Europe.
Known definitely only as a rare waif, in Conn.
69. **C. Meadii** Dewey. In swamps and wet meadows: N. J. and Pa. to Ga., Mich., Assinib., Neb. and Ark.
N. J. Hunterdon Co., in the drainage of the Delaware River.
PA. Bucks, Montgomery, Lehigh and Delaware counties, all in the drainage of the Delaware River.
70. **C. tetanica** Schk. In meadows and wet woods: Mass. to Man., south to D. C. and Mo.
CONN. Reported from Waterford, Sherman and Salisbury.
N. Y. In the Bronx, Westchester and Dutchess counties and reported from Long Island.
N. J. Morris and Sussex counties. Very locally in Camden and Cape May counties, and reported from Gloucester Co.
PA. Northampton and Bucks counties, and reported from Monroe Co.
71. **C. polymorpha** Muhl. In wet meadows and borders of woods: southern Me. to northern N. J. and S. C. Very local in our area.
CONN. Reported from East Lyme, Waterbury and New Haven.
N. Y. Hempstead, L. I.; also Rosedale.
N. J. Warren and Middlesex counties; also near Mickleton, Gloucester Co.; reported from Union, Ocean and Monmouth counties.
PA. Northampton Co., and reported from Monroe and Bucks counties.
72. **C. plantaginea** Lam. In woods: N. B. and Ont. to Man., south to N. Car. and Ill.
CONN. Sherman; reported also from North Branford, Colebrook, Norfolk, Torrington and Salisbury.

- N. Y. Westchester and Orange counties, increasing in the Catskills.
 PA. Bucks Co., reported also from Chester Co.
73. **C. platyphylla** Carey. In woods and thickets: Que. and Ont. to Mich., south to Va. and Ill.
 CONN. Brookfield, Canaan and Kent, reported also as occasional in the northwestern part of the state, especially on limestone.
 N. Y. Westchester, Ulster, Sullivan and Dutchess counties.
 N. Y. and Bronx counties.
 N. J. Bergen, Passaic, Morris, Warren, Hudson and Sussex counties; reported also from Essex, Hunterdon and Somerset counties. Increasing northward.
 PA. Bucks Co.; reported also from Monroe and Chester counties.
74. **C. abscondita** Mackenzie (*C. ptychocarpa* Steud.). In beech woods: Mass. and N. J. to Fla. and La.
 CONN. Reported from Waterford, unknown elsewhere.
 N. Y. Frequent on L. I., south of moraine, and reported as occasional north of it.
 N. J. Throughout the coastal plain, except the pine-barrens, there rare or wanting; increasing southward. Reported from Morris Co.
 PA. Bucks Co.; reported also from Delaware and Chester counties.
75. **C. digitalis** Willd. In woods and thickets: Me. to southern Ont., south to Fla. and Tex.
 Throughout the range except the pine-barrens of N. J. and the region east and south of them, there not reported. Abundant northward, rare and local in southwestern New Jersey.
76. **C. laxiculmis** Schwein. In woods and thickets: Me. to southern Ont., Mich., Va. and Mo.
 Throughout the range except the pine-barrens of N. J. and the region east and south of them, and the L. I. coastal plain, and S. I. there not recorded. Abundant northward, rare and local in southwestern New Jersey.
77. **C. albursina** Sheldon (*C. laxiflora latifolia* Boott.). In woods: Que. to Minn., south to Va., Tenn. and southern Mo. Very local in our area.
 CONN. Southington and Oxford; reported as rare and scattered elsewhere.

N. Y. Westchester Co.; reported also from Dutchess Co. and Forest Hills, L. I.

N. J. The reports from Bergen, Hunterdon and Gloucester counties are probably all erroneous.

78. **C. laxiflora** Lam. In meadows and thickets: eastern Que. and Ont. to Minn., south to Fla., Ala. and Tex.

Throughout the range north of the coastal plain but much less common than the next. The var. *leptonervia* Fernald is found in Warren and Sussex counties, N. J.

79. **C. blanda** Dewey. Me. and Ont. to Va., Ark. and Kan.
PA. Bucks Co.

Common throughout, except on the coastal plain of New Jersey, there wanting save casually on the northern borders.

80. **C. styloflexa** Buckley. In woods and thickets: Conn. to Fla. and Tex.

CONN. New Haven; reported also elsewhere along the coast.

N. Y. S. I.; Westchester and Orange counties. Long Island and also Bronx Co. (Bicknell).

N. J. Throughout, except the pine-barrens, increasing southward.

PA. Lehigh Co. and southward.

81. **C. anceps** Muhl. Woods: Newf. to Mich., N. Car. and Tenn.

Common throughout the range except on the coastal plain of New Jersey, there wanting save casually on the northern borders.

82. **C. striatula** Muhl. Conn. and Pa. to Fla., Tenn. and Tex.

CONN. Fairfield.

N. Y. S. I. and probably L. I.

N. J. Occasional on the coastal plain except the pine-barrens; also in Warren and Sussex counties in the drainage of the Delaware River.

PA. Philadelphia, Bucks, Northampton, Delaware, Chester, Montgomery and Lehigh counties.

83. **C. Shriveri** Britton. In moist meadows: Me. to N. Dak., Va. and Ind.

CONN. Reported only from Ridgefield and Salisbury.

N. Y. L. I. and in Westchester Co.

N. J. Sussex Co., and locally in Cape May Co.

PA. Pike and Northampton counties.

84. **C. granularis** Muhl. In moist meadows: N. B. to Man., south to Fla. and La.
 CONN. Ridgefield and Canaan; reported, also, as rare in the western part of the state.
 N. Y. L. I., S. I., and up the Hudson Valley to Dutchess Co.
 N. J. Throughout, except in the pine-barrens and the region east and south of them.
 PA. Northampton Co.; reported also from Bucks, Delaware, Philadelphia and Chester counties.
85. **C. Crawei** Dewey. Moist meadows: Cape Breton Island to Man., south to Conn., Pa. and Kan.
 Known in our area only as reported from Beaslick Pond, Salisbury, Conn.
86. **C. oligocarpa** Schk. In dry woods and thickets: Vt. and Ont. to Mich., south to W. Va., Ky. and Okla. Very local with us.
 CONN. Reported from Colebrook and Salisbury.
 N. Y. Pine Plains, Dutchess Co.
 N. J. Hunterdon Co., and reported from Bergen Co.
 PA. Bucks Co.; reported also from Northampton Co.
87. **C. Hitchcockiana** Dewey. In woods and thickets: Vt. and Ont. to Mich., south to W. Va., Ky. and western Mo.
 CONN. Reported from Middlefield, Southington, Plainville and Farmington.
 N. Y. Pine Plains, Dutchess Co.; reported from Tuckahoe, Westchester Co. and Spuyten Duyvil Creek, N. Y. Co. (Bicknell).
 N. J. Delaware, Warren Co. and Little Pond, Sussex Co.
 PA. Northampton Co.; reported also from Lackawanna and Bucks counties.
88. **C. amphibola** Steud. Florida to Texas, north to Pennsylvania and Missouri.
 PA. Bucks Co.
89. **C. conoidea** Schk. In meadows: N. S. to Ont., south to R. I., N. J., Ohio and Iowa, and in the mountains to N. Car.
 CONN. West Goshen, Southington and Fairfield; reported as common throughout the state.
 N. Y. Bronx Co., northward; reported from Woodmere, L. I., on the coastal plain.

N. J. Throughout, commencing in the northern borders of the coastal plain; reported from Swedesboro, Gloucester Co.; more common northward.

PA. Pike and Bucks counties; reported also from Monroe, Northampton, Berks and Delaware counties.

90. **C. grisea** Wahl. In woods and thickets: Me. to Ont. and Minn., south to N. Car. and Ark.

Throughout the range except the pine-barrens of N. J. and east and south of them, there not reported. Not common on the coastal plain.

91. **C. glaucodea** Tuckerm. In open fields and meadows: Mass. to Ont., Ill., Va. and Ark.

Throughout the range, except the pine-barrens and the coastal region near them, there not reported.

92. **C. gracillima** Schwein. In moist woods and meadows: Newf. to Man., N. Car., Ohio and Mich.

Throughout, except the coastal plain of New Jersey and Long Island. Rare on Long Island.

93. **C. prasina** Wahl. In meadows and moist thickets: Me. to Mich., D. C. and Ohio, south in the Alleghanies to Ga.

Throughout the range except the coastal plain of N. J., there reported only from Salem and Gloucester counties near the Delaware; also absent from Long Island except north of the moraine, where rare.

94. **C. formosa** Dewey. In dry woods and thickets: Mass. and Vt. to S. Ont., N. Y. and Mich.

CONN. Reported from Salisbury.

N. Y. Pine Plains, Dutchess Co. Reported from Columbia Co.

95. **C. Davisii** Schwein. & Torr. In moist thickets and meadows: Mass. to Minn., south to Ga., Ky. and Tex.

CONN. Reported from Windsor, East Hartford, Lyme and Chester.

N. Y. Pine Plains, Dutchess Co. A specimen from Aqueduct, L. I., may be incorrectly labeled.

N. J. Along the Delaware River from Mercer Co. northward.

PA. Northampton and Bucks counties; reported also from Pike, Philadelphia and Chester counties.

96. *C. aestivaliformis* Mackenzie. In mountain meadows: N. J., N. Y. and Pa. Rare in our area.
 N. Y. Known only at Yonkers.
 N. J. Near Greenwood Lake.
 PA. Wissahickon Ravine, Philadelphia Co.
97. *C. aestivalis* M. A. Curtis. In mountain woods: N. H., Mass., northern N. Y. to Ga.
 CONN. Reported from Salisbury, Colebrook and Norfolk.
 N. Y. Pine Plains, Dutchess Co. and in the Catskills.
 PA. Carbondale, Carbon Co.; reported also from Wayne, Lackawanna and Chester counties (the last very doubtful).
98. *C. oblita* Steud. In bogs: central N. Y., Pa. and N. J., to Ala. and La.
 N. Y. Known only from L. I., where rare.
 N. J. Scattered on the coastal plain, unknown elsewhere.
 PA. The reported occurrence of this species in Lackawanna Co. is open to doubt.
99. *C. debilis* Michx. Woods and open copses, N. J. to Tenn., south to Fla. and Tenn.
 N. J. Occasional throughout the coastal plain except the pine-barrens, as far north as Bergen Co.
 PA. Delaware Co.
100. *C. flexuosa* Muhl. In woods: Newf. to Wisc., Va., the mountains of N. Car. and Ky.
 Throughout the range, except the coastal plain of New Jersey, there not recorded.
101. *C. arctata* Boot. In dry woods and thickets: Newf. and Que. to Minn., Pa. and Mich.
 CONN. Reported from Bridgeport, Barkhamsted, Norfolk and Canaan.
 N. Y. Dutchess and Ulster counties.
 N. J. The reported occurrence of this species in Gloucester, Bergen and Essex counties is open to doubt.
 PA. Monroe Co.; reported also from Bucks Co. (which is doubtful).
102. *C. castanea* Wahl. In dry thickets and on banks: Newf. to Minn., south to Conn., N. Y. and the Great Lake region.
 Known in our area, only as reported from Salisbury, Conn. years ago; not recently collected.

103. **C. Sprengelii** Dewey (*C. longirostris* Torr.). On banks and in moist thickets: N. B. to Alberta, south to Mass., N. J., Pa. and Neb.
 CONN. Southington, reported as local from the Connecticut River westward except along the coast.
 N. Y. Pine Plains, Dutchess Co. A specimen labeled "Coney Island" has been seen.
 N. J. Bergen, Hunterdon and Warren counties.
 PA. Northampton and Bucks counties, reported also from Monroe Co.
104. **C. Swanii** (Fernald) Mackenzie (*C. virescens* of Britton's manual). Thickets and open grounds: N. S. to Mich., N. Tenn. Car., and Mo.
 Scattered throughout the range, less common in the pine-barrens than elsewhere.
105. **C. virescens** Muhl. In woods: Me. and Ont. to Ga. and Ky.
 Scattered throughout the range, except the coastal plain of New Jersey, there not recorded.
106. **C. complanata** Torr. In woods, fields and swamps: Me. to southern Ont. and Mich., south to Fla. and Tex.
 CONN. New Haven; reported also as infrequent in central and southwestern part of the state.
 N. Y. Occasional or common throughout, except on L. I., where rare, especially on the coastal plain.
 N. J. Occasional throughout the state, but rare in the pine-barrens. The smooth leaved plant occurs in Gloucester and Atlantic counties.
 PA. Montgomery, Philadelphia, Lehigh, Bucks, Delaware and Chester counties; reported also as throughout the range.
107. **C. caroliniana** Schwein. In meadows: (?) L. I. and N. J. to Pa., N. Car. and Tex.
 N. Y. Known only from a specimen very doubtfully collected at Aqueduct, L. I.
 N. J. Morris Co. southward, especially along the Delaware River. Not reported from the pine-barrens or south of them.
 PA. Delaware, Philadelphia and Chester counties.
108. **C. Bushii** Mackenzie. In meadows: R. I. and N. Y. to S. Car. and Okla.
 CONN. Reported as more frequent than *Carex complanata*.

- N. Y. Known only from near Yonkers.
 N. J. Milford, Hunterdon Co.
 PA. Lehigh, Bucks, Delaware, Philadelphia, Montgomery and Chester counties.
109. **C. pallescens** L. In fields and meadows: Newf. to N. J., Pa., Ill. and Wisc. Also in Europe and Asia.
 CONN. Canaan and Stratford; reported as common throughout.
 N. Y. Throughout, except not reported from S. I. Rare on L. I. Frequent northward.
 N. J. Sussex, Morris and Passaic counties; reported also from Union, Essex and Bergen counties; Ocean Co. record probably incorrect.
 PA. Monroe and Northampton counties; reported also from Wayne, Lackawanna, Lehigh, Luzerne and Bucks counties.
110. **C. scabrata** Schwein. Along woodland brooks: eastern Que. to Ont., Mich., S. Car. and Tenn.
 Occasional throughout our area, except the coastal plain of New Jersey and L. I.; not reported from Staten Island. Rare on L. I. north of the coastal plain.
111. **C. limosa** L. In bogs: Lab. to B. Col., south to Me., N. J., Ohio, Iowa and Colo. Also in Europe. Very local in our area.
 CONN. Reported from Burlington, Salisbury and Norfolk.
 N. Y. Pine Plains, Dutchess Co.
 N. J. Locally in Sussex, Morris and Gloucester counties.
 PA. Wayne and Bucks counties, reported also from Pike and Monroe counties.
112. **C. paupercula** Michx. In bogs: Newf. and Lab. to B. Col., Conn., Pa. and Utah. Also in Europe and Asia. Rare in our area.
 CONN. Reported from Norfolk, unknown elsewhere.
 N. Y. Reported from Pine Plains, Dutchess Co., but the specimen on which the report is based may be from outside N. Y.
 PA. Monroe Co.
113. **C. Barrattii** Schw. & Torr. In swamps: Conn. to Pa. and N. Car., mostly near the coast.
 CONN. Stratford and East Windsor; reported also from South Windsor and East Hartford.

- N. Y. Islip and Woodmere, L. I.
 N. J. Scattered throughout the coastal plain. Local and mostly in the pine barrens.
 PA. Delaware Co.
114. **C. Buxbaumii** Wahl. In bogs: Green. to Alaska, south to Ga., Ky., Mo., Utah and Cal. Also in Europe and Asia.
 CONN. New Haven and Milford; reported as rare and scattered over most of the state.
 N. Y. Pine Plains, Dutchess Co. and locally on L. I.
 N. J. Bergen, Morris and Sussex counties, and very locally in Cape May Co.
 PA. Bucks and Lehigh counties.
115. **C. stricta** Lam. (*C. salina* Kneiskern). In swamps: Newf. to Ont., Neb., Ga. and Tex.
 Common throughout the range, except the pine-barrens, there rare.
116. **C. Haydeni** Dewey. Swamps: N. B. to Minn., south to N. J. and Mo. Rare in our area.
 CONN. Reported from Franklin, Waterford, East Hartford, Glastonbury, and Southington.
 N. J. Lawrence, Mercer Co.; reported from Budd's Lake. The Camden Co. record is erroneous.
 PA. Pike and Bucks counties.
117. **C. torta** Boott. In rocky beds of streams: Que. to Minn., south to N. Car. and Mo.
 CONN. Beacon Falls and Pomfret; reported as rare near the coast and increasing northwestward.
 N. Y. Dutchess, Ulster and Greene counties.
 N. J. Sussex, Warren, Hunterdon and Passaic counties; reported also from Essex Co.
 PA. Pike, Lehigh and Bucks counties; reported also from Northampton, Chester and Delaware counties.
118. **C. Goodenowii** J. Gay. In wet grounds: Newf. to Mass., Pa. Also in Europe and Asia.
 CONN. Reported, but record is unverifiable.
 N. Y. Pine Plains, Dutchess Co., in cold wet places on Mt. Riga.
 PA. Erroneously reported from Monroe, Bucks and Delaware counties.

119. **C. lenticularis** Michx. On shores: Lab. to Sask., south to Mass., N. Y. and Minn.
 Known in our area only from Husted Meadow, Pine Plains, Dutchess Co., N. Y. Mounted on a sheet with *Carex stricta* Lam., to which only it is possible that the label refers.
120. **C. aquatilis** Wahl. In swamps and along streams: Newf. to Alaska, south to Conn. and Mich., and in the western mountains. Also in Eu. and Asia.
 CONN. Reported from Lyme, Oxford, and Salisbury.
 N. Y. Pine Plains, Dutchess Co.
 N. J. Erroneously reported from the shores of the Delaware in Camden Co.
121. **C. Emoryi** Dewey. N. Y. and Md. to N. Dak. and N. Mex.
 N. Y. Rare in Sullivan Co.
 N. J. Camden, Mercer, Hunterdon and Warren counties.
 PA. Lehigh, Bucks and Delaware counties.
 All of our stations in the drainage area of the Delaware.
122. **C. gynandra** Schw. In swamps: Newf. and Wisc., south to Ga.
 Scattered throughout the range except the pine-barrens, there not recorded; more common northward.
123. **C. crinita** Lam. In swamps and wet woods: Newf. to Minn., south to Fla. and Tex.
 Scattered throughout the range. Usually common except in the pine-barrens where rare and mostly wanting.
124. **C. lacustris** Willd. In swamps: Newf. to James Bay and Man., south to Delaware, Iowa and Idaho.
 CONN. Woodbury, Southington and Fairfield; reported as occasional.
 N. Y. L. I., and in Yonkers, Bronx Co.
 N. J. Frequent except in the pine-barrens and adjacent country, there very local.
 PA. Bucks and Philadelphia counties, and reported from Delaware Co.
125. **C. Walteriana** Bailey. In pine-barren bogs: southeastern Mass. to Fla. near the coast.
 N. Y. On L. I., on the coastal plain, unknown elsewhere.
 N. J. Abundant in the pine-barrens and rare in the regions adjacent to them.

126. **C. vestita** Willd. In sandy woods: southern Me. to eastern N. Y. and Pa., south to Ga.
 CONN. Southington, Easton and Bridgeport; reported as frequent or common throughout the state.
 N. Y. Westchester Co. southward; common on the coastal plain of Long Island and on S. I.
 N. J. Throughout the state except the northwestern part where rare or wanting. Rare in the pine-barrens.
 PA. Reported from Monroe, Northampton, Bucks and Delaware counties.
127. **C. lanuginosa** Michx. In swamps and wet meadows: N. S. to B. C., D. C., Mo., N. Mex. and Cal.
 Scattered and often common throughout the range, but absent from the pine-barrens of N. J., and very local in southwestern New Jersey.
128. **C. lasiocarpa** Ehrh. In wet meadows and swamps: Newf. to B. Col., south to N. J., Pa., Iowa and Minn. Also in Europe.
 CONN. Huntington; reported as local in the north and increasing southward.
 N. Y. Local on L. I., also Pine Plains, Dutchess Co. and reported from Dunwoodie; increasing northward.
 N. J. Scattered north of the coastal plain, unknown elsewhere.
 PA. Reported from Monroe, Bucks, Berks and Delaware counties.
129. **C. trichocarpa** Muhl. In marshes and wet meadows: Que. and Vt. to Ore., south to Ga., Mo. and Kan.
 CONN. Reported only from Thomaston.
 N. Y. Pine Plains, Dutchess Co. and reported southward to Bronx Co.
 N. J. Hunterdon and Sussex counties, and Mercer and Burlington counties, near the Delaware River; reported from Bergen Co.
 PA. Chester, Delaware and Bucks counties; reported also from Monroe and Northampton counties.
130. **C. hirta** L. In fields and waste places: Mass. and N. Y. to N. J. and Pa. Naturalized from Europe.
 Local as a naturalized weed in our area around New York and at Wharton, N. J.; also at Roslyn, L. I.
131. **C. extensa** Gooden. Borders of salt marshes: N. Y. and Va. Naturalized from Europe.
 Known, in our area, only from near Coney Island and Rockaway, L. I.

132. *C. Oederi* Retz. In bogs and on wet rocks: Newf. to Hudson Bay and the N. W. Terr., south to Me., Pa., Minn., Utah and Washington.
 CONN. Canaan and New Haven.
 N. Y. Dutchess and Greene counties.
 N. J. Sussex Co.; reported from Warren Co. The Camden Co. (Atco) record is undoubtedly erroneous.
133. *C. cryptolepis* Mackenzie. In wet meadows: Newf. to Mich., R. I. and N. J.
 CONN. Canaan; reported also from Ridgefield and Kent.
 N. Y. Lake Mohegan; unknown elsewhere.
 N. J. Sussex and Morris counties.
134. *C. flava* L. In swamps and wet meadows: Newf. to B. C., R. I., N. J., Pa., Ohio and Mont. Europe.
 CONN. Salisbury; reported at Berlin and Ridgefield and as frequent in Litchfield Co.
 N. Y. In the Bronx; Pine Plains, Dutchess Co. and at Long Beach, Long Island.
 N. J. Morris and Sussex counties; reported from Warren Co. Formerly found at Kaighn's Point, Camden Co.
 PA. Montgomery Co.
135. *C. Collinsii* Nutt. In bogs: R. I. to eastern Pa., south to S. Car. and Ga.
 CONN. Reported from Cromwell (*Rhodora* 13: 78).
 N. Y. L. I. and S. I., unknown elsewhere.
 N. J. Common on the coastal plain, usually in white cedar swamps.
 Locally at Round Pond, Sussex Co.,* unknown elsewhere.
 PA. Broad Mt., Schuylkill Co.; reported from Chester Co.
136. *C. folliculata* L. In swamps and wet woods: Newf. to Mich., south to N. Car.
 Throughout the range, especially common on the coastal plain. Often locally absent north of the coastal plain.
137. *C. vesicaria* L. (including *C. monile* Tuckerm.). Newf. to B. Col., south to N. J., Ohio and Mo. Also in Eu., Asia and north Africa.
 CONN. Middletown and East Windsor; reported as occasional.
 N. Y. Delaware, Dutchess and Greene counties; also Staten Island.

* See Introduction paragraph 7.

- N. J. Sussex, Bergen, Morris, Passaic and Mercer counties; reported from Hunterdon Co.
- PA. Delaware, Bucks and Northampton counties; reported from Pike, Monroe and Chester counties.
138. **C. rostrata** Stokes. Marshes: Lab. to B. Col., Del., Ohio and Cal. Also in Eu. and Asia. Rare in our area.
- CONN. Bridgeport and Thompson; reported as rare and occasional over most of the state.
- N. Y. Pine Plains, Dutchess Co. and Lake Ronkonkoma, L. I.; reported as formerly found in Bronx Co. and on S. I.
- N. J. Camden Co.; reported also in Bergen and Morris counties.
- PA. Pike, Monroe, Lehigh and Bucks counties; reported also in Wayne Co.
139. **C. bullata** Schk. In swamps: Me. to Ga.
- CONN. Reported only from Voluntown, Stonington, Colchester, Columbia and Ellington.
- N. Y. Frequent on L. I. coastal plain, unknown elsewhere.
- N. J. Common in the pine-barrens and occasional on the coastal plain elsewhere.
140. **C. Tuckermani** Dewey. In bogs and meadows: N. B. to Minn., south to N. J., Ind. and Iowa. Rare in our area.
- CONN. Reported from northern Hartford and Litchfield counties.
- N. Y. Westchester, Dutchess and Greene counties, reported from Bronx Co.
- N. J. Oradel (station now destroyed); reported also from English Neighborhood, Bergen Co.
- PA. Reported from Monroe Co.
141. **C. retrorsa** Schwein. In swamps and wet meadows: Newf. to B. C., south to Pa., Iowa and Ore.
- CONN. Canaan and Salisbury, reported also at Lyme and Huntington.
- N. Y. Dutchess and Greene counties.
- PA. Reported from Bucks Co.
142. **C. oligosperma** Michx. In bogs: Lab. and Newf. to N. W. Terr., south to Mass., Pa. and Mich. Very rare in our area.
- CONN. Reported from near Groton, unknown otherwise.
- PA. Long Pond, Monroe Co., reported also from Carbon Co.
143. **C. lurida** Wahl. In swamps and wet meadows: N. S. to Minn., Neb., Fla. and Tex.

Common in some of its many forms throughout the range, except the pine-barrens, there rare.

144. *C. Baileyi* Britton. Bogs: Me. and Vt. to Va. and Tenn.
 CONN. Reported from East Lyme.
 N. Y. Mountains of Greene Co.
 PA. Monroe Co.
 N. J. Austin's report from Closter, Bergen Co., is doubtless erroneous.
145. *C. Schweinitzii* Dewey. In swamps and bogs: Vt. to Ont., south to Conn., N. J. and Mo.
 CONN. Reported only from Salisbury.
 N. Y. Dutchess Co. Hoysradt considers this the most common of the section *VESICARIAE* near Pine Plains. Reported as very local at Riverdale, Bronx Co.
 N. J. Reported by Schweinitz from Hope, Warren Co., nearly a hundred years ago. Not found since.
 PA. Reported from Monroe Co.
146. *C. hystricina* Muhl. In swamps and low meadows: Newf. to Alberta, south to Ga., N. Mex. and Ariz.
 CONN. Canaan and Southington; reported as rare over the state.
 N. Y. Scattered, throughout, common northward. Local on Long Island.
 N. J. Throughout the state, except the pine-barrens and south of them. Increasing northward. Uncommon in the coastal plain.
 PA. Bucks and Lehigh counties, reported also from Monroe, Delaware and Chester counties.
147. *C. Pseudo-Cyperus* L. In bogs: N. S. to Sask., south to Conn., N. Y. and Mich. Also in Eu. and Asia.
 CONN. Reported from near Salisbury.
 N. Y. Pine Plains, Dutchess Co.
 N. J. Reported from near Closter, Bergen Co. Probably the next species.
148. *C. comosa* Boott. In swamps and along borders of ponds: N. S. to Wash., south to Fla., La. and Cal.
 CONN. Canaan and Southington; reported as occasional throughout the state.
 N. Y. L. I., in Westchester Co. and northward; reported from S. I.
 N. J. Throughout the state except the pine-barrens.
 PA. Luzerne Co.; reported from the other counties in the range.

149. **C. Frankii** Kunth. In swamps and wet meadows: eastern Pa. to eastern Va. and Ga., west to Ill., Mo., La. and Tex. Known in our area only as reported from Chester Co., Pa.
150. **C. squarrosa** L. In swamps and bogs: Ont. to Conn., Mich., Neb., Ga., La. and Ark.
Scattered throughout the range except the pine-barrens and the region east and south of them, there not reported. Rare on the coastal plain.
151. **C. typhina** Michx. In swamps: Que. to Va., La., Iowa and Mo. Local in our range.
CONN. Middletown; reported also from Guildford, East Haven, East Hartford and Hartford.
N. Y. L. I. and S. I. and up the Hudson Valley to the Highlands, not known northward.
N. J. Warren and Salem counties. Rare.
PA. Reported from Monroe and Pike counties.
152. **C. intumescens** Rudge. In swamps, bogs and wet woods: Newf. to Man., south to Fla. and La.
Throughout the range, but rare in the pine-barrens.
153. **C. Asa-Grayi** Bailey. In swamps and wet meadows: Vt. to Mich., south to Ga. and Mo. Local in our area.
CONN. Reported as local along the Connecticut River, rare elsewhere, as at Middletown, Westfield and Southington.
N. Y. In the Bronx, Westchester and Greene counties. Also on Staten Island.
N. J. Bergen, Hunterdon and Warren counties. The records from southern New Jersey are erroneous.
PA. Reported from Delaware Co.
154. **C. lupulina** Muhl. In swamps and ditches: N. B. to Hudson Bay, western Ont., Iowa, Fla. and Tex.
Throughout the range, in some of its forms, more common northward, than elsewhere. Rare or wanting in the pine-barrens.
155. **C. lupuliformis** Sartwell. In swamps: Vt. to Minn., south to Del. and La. Rare and local in our territory.
CONN. Reported from Southington, Huntington and Monroe counties.
N. Y. Westchester Co., reported at Pine Plains, Dutchess Co. and in Bronx Co.

N. J. Sussex and Salem counties; reported also from Bergen Co. PA. Montgomery Co.; reported from Bucks, Northampton and Delaware counties.

Dichromena colorata (L.) Hitchc., once supposed to grow in N. J., has not been collected from there recently, if at all. The original record from the state is apparently an error.

ARACEAE

Flowers without a perianth.

Flowers monoecious or dioecious.

Flowers borne at the base of the spadix.

1. ARISAEMA.

Flowers borne throughout the spadix.

2. PELTANDRA.

Flowers perfect.

3. CALLA.

Flowers with a perianth.

Spathe enclosing the spadix.

4. SPATHYEMA.

Spathe, when present, not enclosing the spadix.

Spadix naked terminating the scape; leaves oblong.

5. ORONTIUM.

Spadix borne at the base of a leaf-like spathe; leaves linear.

6. ACORUS.

1. *Arisaema* Mart.

Spathe hooded, open at the throat, enclosing the spadix; leaves tri-foliolate.

Leaves glaucous beneath; spadix stout, thickening upward.

1. *A. triphyllum*.

Leaves shiny throughout; spadix slender, cylindric.

Spathes light colored, distinctly fluted, flaring into a relatively broad hood.

2. *A. Stewardsonii*.

Spathes dark colored (except in rare albino forms) the tube not fluted and not much narrower than the hood.

3. *A. pusillum*.

Spathe convolute; summit of spadix exerted; leaves pedately 5-17 divided.

5. *A. Dracontium*.

1. *A. triphyllum* (L.) Torrey. In rich woods and moist thickets: Nov. Scot. to Fla., Ont., Minn., Kan. and La.

CONN. Common throughout.

N. Y. Common throughout, but rare south of the moraine on L. I.

N. J. Rare and local, or often wanting in the pine-barrens, common elsewhere.

PA. Common throughout.

Tertiary, rare on Beacon Hill, scattered elsewhere: Cretaceous, more common: Older formations, ubiquitous. 117-204 days. Sea level-3,365 ft.

2. *A. Stewardsonii* Britton. In wet woods, growing among sphagnum: N. J. and Pa.

N. J. Morris and Sussex counties.

PA. Wayne, Pike, Monroe and Luzerne counties.

Tertiary, O: Cretaceous, o: Older formations, increasing at

higher elevations. Rare or perhaps wanting south of the moraine. 118-164 days. 993-2,100 ft.

3. **A. pusillum** (Peck) Nash. In open sunny bogs, sometimes in deep woods: Southwestern Conn. to Ky. and Ga.
 CONN. Fairfield Co.
 N. Y. Westchester Co., increasing and common **southward**.
 N. J. Newton, Sussex Co. increasing and common **southward**, but rare or perhaps wanting in the pine-barrens.
 PA. Monroe, Lehigh, Montgomery and Chester counties, increasing **southward**.
 Tertiary, unknown on Beacon Hill, rare elsewhere; Cretaceous, common: Older formations, common. 166-204 days. **Sea level**-858 ft.
4. **A. Dracontium** (L.) Schott. In moist shady places: Me. to Ont. and Minn., south to Fla., Kan. and Tex.
 CONN. Rare and local, apparently increasing **westward**.
 N. Y. Bloodroot Valley, S. I., increasing northward to Columbia and Ulster counties. Not recorded from L. I.
 N. J. Sussex, Warren, Hunterdon, Bergen, Hudson, Middlesex, Monmouth, Burlington and Camden counties but unrecorded from the pine barrens.
 PA. Philadelphia, Chester and Delaware counties.
 Tertiary, 0: Cretaceous, scattered in shady places: Older formations, not very common. 154-204 days. **Sea level**-471 ft.

2. **Peltandra** Raf.*

1. **P. virginica** (L.) Kunth. In swamps and shallow water: Me. to Ont., south to Mich., Fla., La. and Mo.
 Common throughout the range in favorable situations.

3. **Calla** L.

1. **C. palustris** L. In bogs: N. S. to Hudson Bay, Minn., Wisc. and Iowa.
 CONN. Throughout, increasing **northward**.
 N. Y. Westchester and Orange counties, increasing **northward**, particularly up the Hudson Valley.
 N. J. Woodbridge, Middlesex Co., to Hudson and Bergen counties, thence increasing **northwestward**.
 PA. Monroe, Northampton and Pike counties.

* See footnote, page 76.

Tertiary o: Cretaceous, perhaps at Woodbridge, N. J., not otherwise known: Older formations, common, increasing **northward**. Not south of the moraine. 117-186 days. Sea level-1,933 ft.

4. *Spathyema* Raf.

1. *S. foetida* (L.) Raf. In swamps and wet soil: N. S. to Ont., Minn., N. Car. and Iowa.

Throughout the range except in the pine-barren region of N. J. and L. I. where it is rare and local or often wanting.

5. *Orontium* L.*

1. *O. aquaticum* L. In swamps and ponds: Mass. to Pa., Fla. and La., mostly near the coast.

CONN. Common in the coastal counties, decreasing northward.

N. Y. L. I. and up the Hudson Valley to Orange Co.

N. J. Nearly throughout, increasing **southward** and in the coastal counties.

PA. Pike, Monroe, Northampton, Lehigh, Delaware and Chester counties.

6. *Acorus* L.

1. *A. Calamus* L. In swamps and along streams: Nov. Scot. to Ont., Minn., La. and Kan. Also in Europe and Asia.

Common throughout the range, rare in the pine-barrens.

LEMNACEAE†

Thallus with 1-∞ roots.

Roots several.

Root solitary.

Thallus rootless.

1. *SPIRODELA*.

2. *LEMNA*.

3. *WOLFFIA*.

1. *Spirodela* Schleid.

1. *S. polyrhiza* (L.) Schleid. In still water: Nov. Scot. to Brit. Col., S. Car., Tex., northern Mex. and Nev.

Not uncommon as a ditch or pond plant in most parts of our range except the pine-barrens.

2. *Lemna* L.

Thalli long stipitate, 5 mm. long or more.

Thalli short stipitate or sessile, mostly less than 5 mm. long.

Spathe open.

Thalli 1-nerved or nerveless.

Thalli 3-nerved; root cap cylindric.

Spathe sac-like.

1. *L. trisulca*.

2. *L. cyclostasa*.

3. *L. perpusilla*.

4. *L. minor*.

* See footnote page 76.

† See footnote, page 76.

1. **L. trisulca** L. In water: N. S. to N. J., N. Mex., Brit. Col. and Cal. Also in Europe, Asia, Africa and Australia.
 CONN. Rare or wanting in the east, scattered along the coast, increasing **northward**.
 N. Y. Clove Lake, S. I., increasing **northward**.
 N. J. Hudson, Bergen, Essex, Passaic, Sussex and Morris counties, increasing **northward**.
 PA. Northampton, Lehigh, Monroe and Chester counties.
2. **L. cyclostasa** (Ell.) Chev. In ponds and rivers: Mass. to Fla., Ill., Wyo. and Cal. Also in South America.
 CONN. Along the coast, rare or wanting inland.
 N. Y. Reported from L. I; S. I.
 N. J. Bergen and Union counties.
3. **L. perpusilla** Torr. In ponds, springs, rivers and lakes: N. Y. to Fla., Minn., Neb. and Kan.
 CONN. Reported but not definitely known from the state.
 N. Y. Gardiner's I., L. I. and S. I.
 N. J. Bergen, Hudson and Atlantic counties, perhaps in the intervening territory.
 PA. Northampton Co. (Porter).
4. **L. minor** L. In ponds, lakes and stagnant pools, throughout North America except the extreme north. Also in Europe, Asia, Africa and Australia.
 Throughout the range, but apparently rare in southeastern Conn. and wanting in the pine-barrens.

3. **Wolffia** Horkel.

1. **W. columbiana** Karst. Floating as minute alga-like bodies just beneath the surface of the water: Mass. to Ont., N. J., S. Car., Minn., Mo. and La. Also in Mexico and South America.
 CONN. Fairfield and Litchfield counties, increasing **northward**.
 N. Y. Old Town Pond, S. I. and up the Hudson Valley to Greene and Delaware counties, increasing **northward**.
 N. J. Passaic, Bergen, Camden and Salem counties, apparently not in the pine-barrens.
 PA. Philadelphia and Bucks counties.

The reported occurrence of *W. punctata* Griseb. in Pa. has not been satisfactorily established.

XYRIDACEAE

1. *Xyris* L.

Lateral sepals as long as the bracts or shorter, usually concealed.

Lateral sepals ciliate, prominently fringed tipped.

1. *X. flexuosa*.

Lateral sepals not ciliate, but crose or laciniate, not fringed tipped.

Heads oblong or nearly cylindrical; bracts numerous, in many series.

2. *X. elata*.

Heads ovoid; bracts relatively few and in few series.

Sepals laciniate only near the apex (rarely entire).

3. *X. montana*.

Sepals laciniate at least half their length.

4. *X. caroliniana*.

Lateral sepals longer than the bracts.

Sepal tips not conspicuously fringed.

5. *X. Congdoni*.

Sepal tips conspicuously fringed.

Scapes not conspicuously bulbous thickened at the base; leaves not spirally twisted.

6. *X. fimbriata*.

Scapes conspicuously bulbous thickened at the base; leaves spirally twisted.

7. *X. arenicola*.

1. *X. flexuosa* Muhl. In bogs: Me. to Minn., Ga., Mo. and Tex.

CONN. Throughout but not common, decreasing southeastward.

N. Y. L. I. and S. I. decreasing and perhaps wanting northward.

N. J. Not recorded from Passaic, Sussex, Warren and Hunterdon counties, increasing and common southward.

PA. Lehigh, Montgomery, Berks and Delaware counties.

Tertiary common: Cretaceous, less common: Older Formations scattered. Predominating south of the moraine. 153-220 days.

Sea level-860 ft.

2. *X. elata* Chapm. In sandy swamps near the coast: N. J. to Fla. and La.

N. J. Bennett, Cape May Co.

3. *X. montana* H. Ries. In bogs: N. S. to Ont., Mich. and Pa.

Known definitely only from Tannersville and Tobyhanna, Monroe Co., Pa. Both places are in the region of Pocono and Catskill Red sandstones, on or very near the terminal moraine, have an elevation of 1,200-1,933 ft. and a growing season of 118 days. Reported also from Woodbury, Conn.

4. *X. caroliniana* Walt. In swamps and bogs: Me. and Mass. to Pa., Fla. and La., mostly near the coast.

CONN. Local in most of the state, decreasing northward.

N. Y. L. I. and S. I.

N. J. Middlesex, Monmouth and Ocean counties, increasing southward.

PA. Luzerne, Monroe and Carbon to Chester and Delaware counties.

Tertiary, common: Cretaceous, less common: Older Formations, more common in Pa. than elsewhere. 118-220 days. Sea level-600 ft.

5. **X. Congdoni** Small. Low grounds: Mass. to N. J., near the coast.

CONN. New Haven and New London counties, near the coast.

N. Y. Suffolk Co., L. I.

N. J. Common in the pine-barrens, rare along the edges and at Cape May, unknown elsewhere.

Tertiary, common on Beacon Hill, rare elsewhere: Cretaceous, o: Older Formations, confined to the glaciated region of Suffolk Co., L. I., and to Conn.* 168-187 days. About sea level.

6. **X. fimbriata** Ell. In wet pine-barrens: Southern N. J. to Fla. and Miss., mostly near the coast.

N. J. Ocean, Burlington, Atlantic and Gloucester counties, confined to the pine-barrens.

Tertiary, common on Beacon Hill, rare elsewhere: Cretaceous, o: Older Formations, o. Not north of the moraine. 168-182 days. About sea level.

7. **X. arenicola** Small. In dry pine-barrens: S. N. J. to Fla., west to Tex., mostly near the coast, extending north to Ark. N. J. Known only from Batsto and Atsion in the pine-barrens.

Tertiary, rare or local: Cretaceous, o: Older Formations, o. Not north of the moraine. 168 days. About sea level.

ERIOCAULACEAE

1. *Eriocaulon* L.

Leaves 14-30 mm. long, much surpassing the sheath of the scape. 1. *E. decangulare*.

Leaves usually 10 mm. long or less, as long as or much shorter than the sheath of the scape.

Leaves at least twice shorter than the sheath of the scape. 2. *E. compressum*.

Leaves about as long as the sheath of the scape, sometimes a little longer or shorter.

Heads 5-9 mm. in diameter; petals ciliate. 3. *E. septangulare*.

Heads 3-4 mm. in diameter; petals glabrous. 4. *E. Parkeri*.

1. **E. decangulare** L. In swamps: S. N. J. and Pa. to Fla. and Tex. Also in Cuba.

* See Introduction paragraph 7.

- N. J. Ocean and Burlington counties, increasing and common **southward**, predominating in the pine-barrens.
- PA. Reported from the state, but not definitely known from our area.
- Tertiary common: Cretaceous, scattered in edaphically favorable situations:* Older Formations, o. Not north of the moraine. 168–220 days. About sea level.
2. **E. compressum** Lam. In still shallow water and in swamps: S. N. J. to Fla. and Tex. Also in Cuba.
- N. J. Ocean and Burlington counties, increasing and common **southward**, predominating in the pine-barrens.
- Tertiary, common: Cretaceous, not definitely known; Older Formations, o. Not north of the moraine. 168–220 days. About sea level.
3. **E. septangulare** L. In still waters or on shores: Newf. to Ont., Minn., Fla. and Tex. Also in western Europe.
- CONN. Rare or local over most of the state, increasing south-eastward.
- N. Y. Dutchess and Putnam counties, increasing **southward** and common on L. I. Not recorded from S. I.
- N. J. Throughout, local in the north, increasing and common **southward**.
- PA. Pike, Luzerne, Lackawanna, Monroe, Carbon, Bucks and Philadelphia counties.
- Apparently indifferent as to geological formation. 117–220 days. Sea level–750 ft.
4. **E. Parkeri** B. L. Robinson. In tidal mud: southern N. J., adjacent Pa., and from near Washington, D. C.
- Burlington and Camden counties, N. J., and at Mullica River above Crowleytown along the coast.

COMMELINACEAE

Perfect stamens 3 or rarely 2; petals unequal; bracts spathe-like.

1. COMMELINA.

Perfect stamens 6 or rarely 5; petals all alike; bracts leaf-like.

2. TRADESCANTIA.

1. *Commelina* L.

Spathe not united at the base.

Spathe acuminate; capsules 3-celled, 5-seeded.

1. *C. nudiflora*.

Spathe acute; capsules 2-celled, 4-seeded.

2. *C. communis*.

* See Introduction paragraph 29.

Spathe with united base.

All the cavities of the ovary with 2 ovules.

Capsules 2-valved, dorsal cavities indehiscent.

3. *C. virginica*.

Capsules 3-valved, all cavities dehiscent.

4. *C. erecta*.

Ventral cavities of the ovary with 2 ovules, dorsal cavity with 1 ovule.

4. *C. hirtella*.

1. ***C. nudiflora*** L. Along streams and in waste places: N. J. to Ind. and Mo., south to Fla. and Tex.; and through tropical America to Paraguay. Also in Europe and Asia.
Rare as a weed.
2. ***C. communis*** L. In waste places: Conn. and eastern Pa. to Ga. and Ky. Adventive or naturalized from Asia.
Locally abundant as a weed.
3. ***C. virginica*** L. S. N. Y. to Ill. and Mich., south to Fla., Nev. and Tex.; and through tropical America to Paraguay.
N. Y. Near N. Y. City, and recorded from S. I.
N. J. Burlington Co.
4. ***C. erecta*** L. In moist soil: S. N. Y. to Fla., Tex. and tropical Am.
Known only from Camden, N. J., and from N. Y. City, probably adventive from the south.
5. ***C. hirtella*** Vahl. In moist soil: S. N. J. to Fla. and Tex.
Known definitely only from Kaighn's Point, Camden Co., N. J.
Not recently collected.

2. *Tradescantia* L.

1. ***T. virginiana*** L. S. N. Y. to Ohio and S. Dak., south to Va., Ky. and Ark. Escaped from cultivation in N. E.
Locally abundant as a weed; rare in our range as a wild plant, but wild in the valley of the Delaware from Trenton northward.

T. reflexa Raf., a southern species, has been collected as a waif in Conn.

PONTEDERIACEAE*

Flowers 2-lipped; stamens 6; fruit a 1-seeded utricle.

1. PONTEDERIA.

Flowers regular; stamens 3; fruit a many-seeded capsule.

2. HETERANTHERA.

1. *Pontederia* L.

1. ***P. cordata*** L. Ponds and streams: Nov. Scot. to Minn., Fla. and Tex.

* See footnote, page 76.

Common throughout the range. A narrow lanceolate-leaved form occurs sparingly with the typical plant, particularly in northern N. J.

2. *Heteranthera* R. & P.

Leaves mostly reniform, sometimes cordate-ovate.
Leaves narrowly linear, grass-like.

1. *H. reniformis*.
2. *H. dubia*.

1. **H. reniformis** R. & P. In mud or shallow water: Conn. to N. J., Neb. and Kan., south to La. Also in South and Central America.

CONN. The southeastern part of the state.

N. Y. In the Hudson from Dutchess Co. **northward**.

N. J. Bergen, Morris and Hunterdon counties southwestward to Salem Co., apparently not in the pine-barrens.

PA. Northampton, Berks, Bucks, Chester and Delaware counties.

2. **H. dubia** (Jacq.) MacM. In still water: Que. to Ore., Fla. and Mex. Also in Cuba.

CONN. Rare or local over most of the state.

N. Y. Westchester Co., increasing **northward**. Apparently wanting on L. I. and S. I.

N. J. Apparently throughout the state, except in the pine-barrens and east and south of them.

PA. Northampton, Bucks, Philadelphia, Chester and Delaware counties.

JUNCACEAE

Leaf sheaths open; capsule 1- or 3-celled, many-seeded; placenta parietal or axial.

1. **JUNCUS**.

Leaf sheaths closed; capsule 1-celled, 3-seeded, its placenta basal.

2. **JUNCOIDES**.

1. *Juncus* L.

Inflorescence lateral, the leaves above it terete.

Flowers prophyllate.

Perianth parts green or straw colored.

Perianth parts equalling the capsule, acute.

Stamens 3; leaf of inflorescence much shorter than the stem.

1. *J. effusus*.

Stamens 6; leaf of the inflorescence about equaling the stem or longer.

2. *J. filiformis*.

Perianth parts $\frac{1}{2}$ as long as the capsule, the inner obtuse.

3. *J. gymnocarphus*.

Perianth parts brown or with a brown band down each side of the midvein.

4. *J. balticus*.

Flowers eprophyllate.

5. *J. maritimus*.

Inflorescence terminal, or if lateral the leaves above it not terete.

Leaves not provided with septa.

Flowers prophyllate.

Inflorescence more than $\frac{1}{3}$ the height of the plant:

6. *J. bufonius*.

Inflorescence less than $\frac{1}{3}$ the height of the plant.

Inflorescence 1-3 flowered, usually 1-flowered.

7. *J. trifidus*.

Inflorescence more than 1-3 flowered, usually many flowered.

Brown and greenish sepals incurved and obtuse.

8. *J. Gerardi*.

Sepals acute or acuminate.

Capsule reddish or castaneous, exceeding the calyx.

9. *J. Greenei*.

Capsule exceeded by the calyx.

Leaves flat.

Inflorescence not conspicuously secund; bract exceeding the inflorescence.

Auricles of the sheath conspicuously extended beyond the point of insertion.

10. *J. tenuis*.

Auricles of the sheath not extending beyond the point of insertion.

11. *J. Dudleyi*.

Inflorescence conspicuously secund; inflorescence exceeding the bract.

12. *J. secundus*.

Leaves terete.

Capsules oblong; bract somewhat exceeding inflorescence.

13. *J. dichotomus*.

Capsule globose-ovoid; bract much exceeding inflorescence.

14. *J. setaceus*.

Flowers eprophyllate.

Heads 5-10 flowered; panicle of 2-20 heads.

15. *J. marginatus*.

Heads 2-5 flowered; panicle 20-100 heads.

16. *J. aristulatus*.

Leaves provided with septa.

Leaves tuberculate.

17. *J. caesariensis*.

Leaves not tuberculate.

Heads 1-flowered.

18. *J. pelocarpus*.

Heads more than 1-flowered.

Plants with 2 kinds of leaves, submerged and erect.

19. *J. militaris*.

Leaves all alike.

Capsule subulate beaked.

Leaf of inflorescence extending above the flower cluster.

Stamens 3.

20. *J. nodosus*.

Stamens 6.

21. *J. Torreya*.

- Leaf of inflorescence shorter than the flower cluster or wanting. 22. *J. scirpoides*.
- Capsule merely acute or with a short mucro, not subulate.
- Inner perianth parts much shorter than the outer. 23. *J. brachycarpus*.
- Inner perianth parts equalling the outer or exceeding them.
- Perianth parts about as long as the capsule rarely a little shorter.
- Seeds 0.7 mm. long or more, narrowed into tails at both ends.
- Perianth 3-4 mm. long. 24. *J. canadensis*.
- Perianth about 2 mm. long. 25. *J. brachycephalus*.
- Seeds 0.5 mm. long or less, merely apiculate at both ends.
- Perianth parts as long as or longer than the capsule; heads several to many-flowered. 26. *J. acuminatus*.
- Perianth parts shorter than the capsule; heads 2-3-flowered. 27. *J. debilis*.
- Perianth parts from $\frac{1}{2}$ - $\frac{1}{3}$ shorter than the capsules.
- Stamens 6; cymes spreading. 28. *J. articulatus*.
- Stamens 3; cymes contracted. 29. *J. brevicandatus*.
1. *J. effusus* L. In swamps and moist places: nearly throughout North America, except the extreme north and the high western portions. Also in Europe and Asia.
Throughout the range.
 2. *J. filiformis* L. Lab. to Brit. Col., Pa., Mich. and in the Rocky Mountains to Utah and Col. Also in Europe and Asia.
Known only from Naomi Pines and Long Pond, Monroe Co., Pa. Both places are on or very near the terminal moraine, have an elevation of 1,200-1,933 ft. and a growing season of 118 days.
 3. *J. gymnocarpus* Coville (*J. Smithii* Engelm.). In swamps: Mountains of Schuylkill and Lebanon counties, Pa., and in Walton Co., Fla.
The only known station in the range is at the summit of Broad

Mt., Schuylkill Co., Pa. It is at approximately 1,795 ft., has a growing season of 140 days and is underlaid by Pottsville conglomerate.

4. **J. balticus** Willd. On shores: Lab. to Alask., S. N. Y., Pa., Ohio, Neb. and far south in the western mountains. Also in Europe and Asia.
N. Y. Rare on L. I.; on S. I. and up the Hudson Valley to Windham, Greene Co.
5. **J. maritimus** Lam. Widely distributed in temperate regions. Confined in our area to Coney Island, L. I., N. Y. Reported but not definitely known from the coast of Monmouth and Ocean counties, N. J.
6. **J. bufonius** L. Throughout North America except the extreme north.
Common throughout our range except the pine-barrens.
7. **J. trifidus** L. Greenl. and Lab., south to the higher mountains of N. E. and N. Y., and in N. Car.
Localized in our range at Sam's Point, and Lake Mohonk, Ulster Co., N. Y., at about 2,300 ft. and having a growing season of about 120 days. Not south of the moraine.
8. **J. Gerardi** Lois. On salt meadows: Gulf of St. Lawrence to Fla., rare in W. N. Y. and the vicinity of the Great Lakes. On the northwest coast and in Europe.
CONN. Common in the coastal counties, decreasing or wanting inland.
N. Y. Common on L. I. and S. I. and about the City of N. Y., not recorded elsewhere.
N. J. Common in the coastal counties, decreasing or wanting inland.
Confined mostly to brackish meadows.
9. **J. Greenei** Oakes & Tuckerm. N. B. to N. J., near the coast. Mich., Wisc., Minn. and Ont.
CONN. Common along the coast, decreasing inland.
N. Y. Common on L. I. and S. I., decreasing and perhaps wanting northward; rare in Ulster Co.
N. J. Known definitely only from Monmouth, Burlington and Middlesex counties and from High Point, Sussex Co.; the latter station due to the locally favorable edaphic conditions.*

* See Introduction paragraph 50.

Tertiary, (?) o: Cretaceous, scattered: Older Formations, rare on silicious sandstones and grits at High Point, N. J., 138-190 days.
Sea level—1,800 ft.

10. *J. tenuis* Willd. In dry or moist soil: nearly throughout North America.

Throughout the range.

11. *J. Dudleyi* Wiegand. Me. and Ont., Sask., Wash., Conn., Tenn. and Mex.

CONN. Hartford and Litchfield counties, increasing **northwestward**.

N. Y. Perhaps, though doubtfully on L. I.; Clove Lake, S. I., probably increasing northward.

N. J. Sussex and Morris counties.

PA. Monroe Co.

Tertiary, o: Cretaceous, o: Older Formations, increasing northward. Not south of the moraine. 117-175 days. Sea level-1,827 ft.

12. *J. secundus* Beauv. In dry soil: Me. to N. Y. and N. Car. Occasional in the Miss. Valley.

CONN. Rare over most of the state, decreasing southwestward.

N. Y. Bronx and Westchester counties; also at Locust Valley, L. I.

N. J. Passaic and Warren counties, and south in the Delaware Valley to Camden Co.

PA. Northampton, Montgomery, Chester and Delaware counties.

Tertiary, o: Cretaceous, scattered along the Delaware River: Older Formations, not common. 153-176 days. Sea level-350 ft.

13. *J. dichotomus* Ell. (*J. dichotomus platyphyllus* Wiegand). In dry or moist soil: Conn. to Fla. and Tex. near the coast.

CONN. Coast of New Haven and New London counties.

N. Y. Suffolk and Nassau counties, L. I., south of the moraine; on S. I. at Tottenville (Legget) and at Mariner's Harbor; perhaps at Van Courtlandt Park.

N. J. Monmouth and Middlesex counties common and increasing **southward** in the coastal counties, decreasing up the Delaware River to Camden Co.

PA. Bucks, Montgomery and Delaware counties.

Tertiary, common: Cretaceous, confined mostly to its approach to brackish water in N. J., Pa., and S. I. Older Formations, scattered along the coast of Conn. and S. I. 190-220 days. About sea level.

14. **J. setaceus** Rostk. Marshes: S. N. J. to Fla., Tex. and up the Mississippi Valley to Mo.
N. J. Cape May Co.
15. **J. marginatus** Rostk. Grassy places: Me. and Ont. to Fla. and Neb.
CONN. Common.
N. Y. Common on L. I. and S. I. decreasing and perhaps wanting northward.
N. J. Common in the coastal region, decreasing inland.
PA. From Lackawanna and Monroe counties to Montgomery, Chester and Delaware counties.
16. **J. aristulatus** Michx. Wet sandy barrens: Mass. to Fla. and Mex., mostly near the coast. In the Miss. Valley to Kan. and Mich.
N. Y. L. I. and S. I. and near Van Courtlandt Park.
N. J. Hunterdon and Monmouth counties, increasing **southward** and toward the coast.
PA. Chester and Delaware counties.
Tertiary, common: Cretaceous, less common: Older Formations, very rare in Hunterdon Co., N. J. Not north of the moraine. 161-220 days. About sea level.
17. **J. caesariensis** Coville. Sandy swamps: S. N. J.
N. J. Northern Ocean Co., Burlington and Atlantic counties in the pine-barrens, and western Camden Co. (C. E. Smith).
Tertiary, common on Beacon Hill, rare elsewhere: Cretaceous, Rare in edaphically favorable situations:* Older Formations, o. 168-182 days. About sea level.
18. **J. pelocarpus** E. Meyer. Newf. to N. J., Ont. and Minn.
CONN. Rare or local over most of the state, decreasing south-westward.
N. Y. L. I. and up the Hudson Valley to Dutchess Co. (Hoysradt).
Not recorded from S. I.
N. J. Rare in the north, increasing and common **southward**, particularly in the pine-barrens.
PA. Apparently confined to Long Pond, Luzerne Co., and Tobyhanna Mills, Monroe Co.
Tertiary, common: Cretaceous, less common: Older Formations, scattered. 117-220 days. **Sea level**-1,933 ft.

* See Introduction paragraph 29.

19. *J. militaris* Bigel. Shallow margins of lakes, ponds or streams: N. S. to N. N. Y. and Md.
 CONN. Rare or local along the coast.
 N. Y. Lynbrook, L. I., otherwise known only from Sullivan Co.
 N. J. Common in the pine barrens, unknown elsewhere, save for a single station at Delaware Water Gap.
 PA. Pike and Carbon counties; rare.
 Tertiary, common: Cretaceous, less common: Older Formations, localized in edaphically favorable situations which are climatically extra-limital. 138-220 days. Sea level-1,800 ft.
20. *J. nodosus* L. In bogs: N. S. to Va., Neb. and Brit. Col.
 CONN. Rare and local in Middlesex and Hartford counties, increasing **northward** into Litchfield Co.
 N. Y. Dutchess Co.
 N. J. Warren and Sussex Counties, increasing **northward**.
 PA. Northampton and Bucks counties.
 Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 138-190 days. Sea level-683 ft.
21. *J. Torreyi* Coville. (*J. nodosus megacephalus* Torr.) Wet grounds: Mass. to Sask., Ala. and Ariz.
 Known in our area only from Long Beach, L. I., and as recorded from Petty's Island, Camden Co., N. J.
22. *J. scirpoides* Lam. Wet sandy soil: N. Y. to Fla. and La.
 N. Y. On the south side of L. I. and on S. I.
 N. J. In the coastal region from Middlesex Co. southward.
 PA. Montgomery, Bucks and Delaware counties.
 Tertiary, common: Cretaceous, scattered: Older Formations, confined to the Pa. counties. 175-220 days. About sea level.
23. *J. brachycarpus* Engelm. Damp light soil: Mass. to Ga., Ont. to Miss. and Tex.
 Known definitely in the range only from Ocean Beach, New London, Conn. (Graves); probably a fugitive species. Not known as a native plant in our area.
24. *J. canadensis* J. Gay. N. B. to Minn., Ga. and La.
 Common throughout the range in some of its forms.
25. *J. brachycephalus* (Engelm.) Buch. Bogs and meadows: Me. to Pa., Mo. and Wisc.
 Known only from Copake Falls, N. Y., and Sterling Hill, N. J.

26. **J. acuminatus** (Michx.) Engelm. Me. to S. Ont., Minn., Ga. and Mex. Also on the northwest coast.
Common throughout the range.
27. **J. debilis** A. Gray (*J. acuminatus debilis* A. Gray). In wet places and sandy shores: R. I. to Mo., Fla., Miss. and Ala.
CONN. Waterford and Ledyard.
N. Y. Belport, L. I.; recorded from S. I.
N. J. Essex and Morris counties, common on the coastal plain.
PA. Reported from Bucks Co.
28. **J. articulatus** L. (*J. articulatus obtusatus* Engelm.). Lab. to N. J., Ont. and Mich. Also in Europe and Asia.
Local in most parts of the range, wanting in the pine-barrens.
29. **J. brevicaudatus** (Engelm.) Fernald. Muddy and damp places: Newf. to Ont., W. Va. and Minn.
CONN. Canaan, Litchfield Co.
N. Y. Orange Co. increasing and common **northward**.
N. J. Bergen, Morris and Sussex counties, increasing **northward**.
PA. Monroe, Northampton, Lackawanna, Schuylkill and Carbon counties.
Tertiary, o: Cretaceous, o: Older formations, increasing **northward**. 117-171 days. Sea level-1,864 ft.

Juncus Roemerianus Scheele has been reported from N. J. but there seems to be no evidence that it grows there now.

2. *Juncoides* Adans.

- Inflorescence umbelloid, 1 or 2 flowers on each of its branches. 1. *J. pilosum*.
Inflorescence theoretically paniculate, the flowers often crowded in spike-like clusters.
Outer perianth parts shorter than the inner. 2. *J. nemorosum*.
Perianth parts equal or nearly so. 3. *J. campestre*.
1. **J. pilosum** (L.) Kuntze. Rocky woods, sometimes in moist places: N. B. to Alaska, N. Y., Mich. and Ore. and S. Ga.
CONN. Litchfield Co. Rare or wanting elsewhere.
N. Y. Woodland, Ulster Co.
N. J. Pascack, Bergen Co. (Austin). Not recently collected.
PA. Pike and Monroe counties.
Tertiary, o: Cretaceous, o: Older Formations, rare and local at high elevations. Not south of the moraine. 117-177 days. 106-2,253 ft.

2. *J. nemorosum* (Poll.) Kuntze. A European species known in North America only as a naturalized plant at Riverdale, N. Y. City; and at Niagara.
3. *J. campestre* (L.) Kuntze. In woodlands and meadows: throughout the U. S. and Canada. Also in Europe and Asia. Common throughout the range except the pine-barrens.

Juncoides bulbosum (Wood) Small has been collected on the serpentine barrens at Nottingham, Chester Co., Pa., according to Pennell.

MELANTHACEAE

Flowers numerous in terminal, erect, racemes or panicles.

Anthers oblong or ovate, 2-celled.

Anthers introrsely dehiscent.

Capsule septicial; flowers involucrate by 3 bractlets.

Capsule loculicidal; flowers not involucrate.

Anthers extrorsely dehiscent.

Flowers perfect.

Stem very leafy; leaves linear; seeds few.

Leaves basal; seeds numerous.

Flowers dioecious; stem leafy.

Anthers cordate or reniform, confluent 1-celled.

Plants glabrous.

Perianth segments not gland bearing.

Perianth segments bearing 1-2 glands.

Stem and inflorescence pubescent.

Perianth segments clawed, free from the ovary.

Perianth segments not clawed, adnate to the base of the ovary.

Flower solitary, terminal or opposite the leaves, usually drooping.

1. TOFIELDIA.

2. ABAMA.

3. XEROPHYLLUM.

4. HELONIAS.

5. CHAMAELIRIUM.

6. CHROSPHERMA.

7. OCEANORUS.

8. MELANTHIUM.

9. VERATRUM.

10. UVULARIA.

1. *Tofieldia* Huds.

1. *T. racemosa* (Walt.) B. S. P. In pine-barren swamps: N. J. to Fla. and Ala.

N. J. Rare, known only from Lakehurst, Ocean Co. and Chatsworth, Burlington Co.

Tertiary, Confined to Beacon Hill: Cretaceous, o: Older Formations, o: Not north of the moraine. 168-182 days. About sea level.

2. *Abama* Adans.

1. *A. americana* (Ker) Morong. In pine-barren swamps: N. J. and Del.

N. J. Throughout the pine-barrens in favorable situations.

Tertiary, confined to Beacon Hill: Cretaceous, o: Older Formations o. Not north of the moraine. 168-220 days. About sea level.

3. *Xerophyllum* Michx.

1. *X. asphodeloides* (L.) Nutt. In the pine-barrens: N. J. to E. Tenn. and Fla.
 N. J. Throughout the pine-barrens, and at Allaire, Monmouth Co. and near Milltown and Crane's Mill, Middlesex Co. and at Sewell, Gloucester Co.
 Tertiary, common on Beacon Hill, rare elsewhere: Cretaceous, scattered in edaphically favorable situations:* Older Formations, 0. Not north of the moraine. 168-220 days. About sea level.

4. *Helonias* L.

1. *H. bullata* L. In bogs: N. N. J. and S. N. Y. to N. Car. Local.
 N. Y. Southwestern S. I.
 N. J. Morris Co., on and near the moraine, local; Mercer, Middlesex and Monmouth counties, scattered; increasing and common southward.
 PA. Recorded from E. Pa., not recently collected.
 Tertiary, common: Cretaceous, less common: Older Formations, rare on and near the terminal moraine.† 164-220 days. Sea level-993 ft.

5. *Chamaelirium* Willd.

1. *C. luteum* (L.) A. Gray (*C. obovale* Small). In moist meadows and thickets: Mass. to Ont., Fla. and Ark.
 CONN. Rare or local in the eastern and northern part, increasing southwestward; Salisbury.
 N. Y. Dutchess Co. increasing southward to S. I. and western L. I.
 N. J. Rare and local in Sussex, Morris, Warren, Bergen, Middlesex, Burlington and Gloucester counties, not in the pine-barrens.
 PA. Northampton Co., increasing southward.
 Tertiary, 0: Cretaceous, rare: Older formations, scattered. 138-220 days. Sea level-708 ft.

6. *Chrosperma* Raf.

1. *C. muscaetoxicum* (Walt.) Kuntze. In dry sandy woods: L. I. to Fla., E. Pa., Tenn. and Ark.
 N. Y. On western L. I. exclusively south of the moraine; apparently wanting on S. I. and elsewhere.

* See Introduction paragraph 29.

† See Introduction paragraph 7.

N. J. Bergen Co., and exclusively west and north of the Tertiary sands and gravels from Mercer to Salem counties.

PA. Carbon and Northampton to Delaware and Chester counties.

Tertiary, rare along the edges, not on Beacon Hill: Cretaceous, common: Older Formations scattered, but more common in Pa. than elsewhere. Predominating south of the moraine. 152-204 days. Sea level-1,624 ft.

7. *Oceanorus* Small.

1. *O. leimanthoides* (A. Gray) Small (*Zygadenus leimanthoides* (A. Gray) Watson). In swamps and wet soil: Southern N. Y. to Ga. and Tenn. Not common in our range.

N. Y. Western L. I. exclusively south of the terminal moraine; apparently wanting on S. I. and elsewhere.

N. J. Princeton Junction, Mercer Co.; Milltown, Middlesex Co., and Monmouth, Ocean, Burlington and Camden counties.

Tertiary, scattered on Beacon Hill, rare elsewhere: Cretaceous, more common: Older Formations, o. Not north of the moraine. 175-182 days. About sea level.

8. *Melanthium* L.

Blade of the perianth segments oblong, entire; leaves linear.

1. *M. virginicum*.

Blade of the perianth segments nearly orbicular, undulate; leaves oblanceolate.

2. *M. latifolium*.

1. *M. virginicum* L. In meadows and wet woods: R. I. to Minn., Fla. and Tex.

N. Y. Reported from L. I.; on S. I.

N. J. Not recorded from the pine-barrens; rare and local in Gloucester, Camden, Burlington and Ocean counties, increasing but not common northward into Bergen Co.

PA. Lehigh Co. to Delaware and Chester counties.

Tertiary, rare; or perhaps wanting: Cretaceous, scattered: Older formation, not common. Predominating south of the moraine. 138-204 days. Sea level-860 ft.

2. *M. latifolium* Desr. In dry woods and on hills: Conn. to Pa. and S. Car.

CONN. Rare and local in southwestern Fairfield Co.

N. Y. Bronx, Westchester and Rockland counties.

N. J. Bergen to Morris counties, increasing northwestward; also at Swedesboro, Gloucester Co.

PA. Monroe and Northampton to Chester and Delaware counties.

Tertiary, o: Cretaceous, rare: Older Formations, not very common. South of the moraine only in Pa. 138-204 days. Sea level-1,050 ft.

9. *Veratrum* L.

1. **V. viride** Ait. In swamps and wet woods, or on dry hillsides in the Catskills: Quebec to Alask., Ga., Tenn., Minn. and Brit. Col.

CONN. Common throughout the state, increasing **northwestward**. N. Y. Throughout, increasing **northward**; rare south of the moraine on L. I.

N. J. Rare or wanting in the pine-barrens; local in Salem, Cumberland, Gloucester, Camden, Burlington and Ocean counties, increasing and common **northward**.

PA. Throughout, increasing **northward**.

Tertiary, rare or wanting: Cretaceous, scattered: Older Formations, common, increasing northward. 118-204 days. Sea level-2,865 ft.

10. *Uvularia* L.

Capsule obtusely 3-angled, truncate or rounded; leaves perfoliate. 1. *U. perfoliata*.

Capsule acutely 3-angled, acute at each end; leaves sessile.

Leaves thin, pale or glaucous beneath, narrowed at both ends. 2. *U. sessilifolia*.

Leaves firm, green both sides, sometimes subcordate. 3. *U. nitida*.

1. **U. perfoliata** L. In moist woods and thickets: Quebec and Ont. to Fla. and Miss.

Throughout the range except in the pine-barrens; but apparently not in Luzerne and Schuylkill counties, Pa.

2. **U. sessilifolia** L. In moist woods and thickets: N. B. and Ont. to Minn., Ga. and Ark.

Throughout the range except in the pine-barrens of L. I. and N. J.

3. **U. nitida** (Britton) Mackenzie (*U. sessilifolia nitida* (Britton) Morong). In sandy swamps: N. J.

N. J. Frequent in, and along the edges of the pine-barrens.

Tertiary, common on Beacon Hill, rare or unknown elsewhere: Cretaceous, rare or o: Older Formations, o. Not north of the moraine. 186-224 days. About sea level.

The reported occurrence of *U. grandiflora* J. E. Smith in the range has not been established. It may grow in the Catskills or in the mountains of Pa.

LILIACEAE

Ovary superior, not adnate to the perianth.

Roots fibrous or fleshy; scape tall; flowers orange or yellow.

Plants with bulbs or corms.

Flowers unbelloid.

Flowers solitary, racemes, corymbed or paniced.

Anthers not introrse.

Anthers versatile; tall herbs.

Anthers not versatile; low herbs.

Anthers introrse.

Perianth of 6 separate segments.

Corolla globose, oblong or urn-shaped.

Ovary half inferior; roots fibrous; flowers racemed.

1. **HEMEROCALLIS.**

2. **ALLIUM.**

3. **LILIUM.**

4. **ERYTHRONIUM.**

5. **ORNITHOGALUM.**

6. **MUSCARI.**

7. **ALETRIS.**

1. **Hemerocallis L.**

1. **H. fulva L.** Escaped from cultivation: N. B. and Ont. to Va. and Tenn.

Locally common as an escape from gardens, particularly in N. Y. and N. J., often wanting.

The yellow day lily, *H. flava L.*, has been reported as a rare escape from old gardens.

2. **Allium L.**

Leaves oblong lanceolate, absent at flowering time; ovules 1 in each cavity.

1. *A. tricoccum.*

Leaves linear, present at flowering time; ovules 2 in each cavity.

Bulb coats membranous, not fibrous reticulated.

Umbels capitate, shorter than the flowers.

2. *A. sibiricum.*

Umbels loose, pedicels much longer than the flowers.

Sepals not keeled; inner filaments toothed under the anthers.

3. *A. vineale.*

Sepals keeled; inner filaments not toothed.

4. *A. carinatum.*

Bulbs with fibrous outer coats.

5. *A. canadense.*

1. **A. tricoccum Ait.** In rich woods: N. B. to Minn., N. Car., Tenn. and Iowa.

CONN. Throughout.

N. Y. Throughout, but rare or wanting south of the moraine on L. I.; at Flushing.

N. J. Not reported from the pine-barrens; rare or local in Salem Co., increasing and local **northward**.

PA. Lehigh, Berks, Bucks and Philadelphia counties.

Tertiary rare or wanting: Cretaceous scattered: Older formations, common and increasing **northward**. 118-179 days. Sea level-2,820 ft.

2. **A. sibiricum** L. In moist soil: Newf. to Alask., Me., N. N. Y., Pa., Mich., Wyo. and Wash.

The Palisades of the Delaware River, Pike Co., Pa., a sandstone region north of the moraine, with a growing season of about 145 days and an elevation of 500 ft.

3. **A. vineale** L. In fields and meadows: Mass. to Ohio, Mo. and Va. Naturalized from Europe.

Locally abundant as a weed.

4. **A. carinatum** L. Fugitive from Europe and in North America known only from Bucks Co., Pa., where it is a rare escape; erroneously recorded from N. J.

5. **A. canadense** L. In meadows and thickets: N. B. to Minn., Fla., La. and Colo.

CONN. Throughout.

N. Y. Rare south of the moraine on L. I., frequent elsewhere and increasing **northward**, but apparently wanting in the Catskills.

N. J. Scattered from Gloucester to Middlesex counties, exclusively north and west of the pine-barrens, thence increasing and common **northward**.

PA. Bucks, Philadelphia, Delaware and Chester counties.

Tertiary, rare or perhaps wanting: Cretaceous scattered: Older Formations, increasing **northward** at moderate elevations. 142-204 days. Sea level-1,000 ft.

A. Schoenoprasum L. and *A. cernuum* Roth have both been reported as established escapes.

3. **Lilium** L.

Flower or flowers erect; perianth segments narrowed into long claws.

1. *L. philadelphicum*.

Flowers drooping or spreading.

Leaves finely roughened on the veins beneath.

2. *L. canadense*.

Leaves perfectly smooth.

3. *L. superbium*.

1. **L. philadelphicum** L. In dry woods and thickets: Me. to Ont., N. Car. and W. Va.

CONN. Throughout, increasing **northwestward**.

N. Y. Throughout increasing **northward**; rare south of the moraine on L. I.

N. J. Not definitely recorded from the pine-barrens; rare and local from Gloucester to Monmouth counties exclusively north and west of the pine-barrens, thence increasing and common **northward**.

PA. Throughout, increasing **northward**.

Tertiary, o: Cretaceous, scattered in locally favorable situations. Older Formations, increasing **northward**. 118-220 days. Sea level-4,000 ft.

2. **L. canadense** L. In swamps and meadows, sometimes in fields: N. S. to Ont., Minn., Ga., Ala., Mo. and Neb. CONN. Throughout. N. Y. Throughout, increasing **northward**; rare south of the moraine on L. I. N. J. Rare or wanting in the pine-barrens, except as an occasional escape; increasing and common **northward**. PA. Throughout, increasing **northward**. Tertiary, o: Cretaceous, scattered: Older Formations, common. 118-204 days. Sea level-1,800 ft.
3. **L. superbum** L. In meadows and marshes: N. B. and Ont. to Minn., N. Car. and Tenn. Throughout the range, always decreasing inland.

L. tigrinum Andr., the Asiatic tiger-lily, is a rare escape from gardens.

4. **Erythronium** L.

Flower yellow; stigmas very short.

1. *E. americanum*.

Flowers white; stigmas 2-3 mm. long, recurved.

2. *E. albidum*.

1. **E. americanum** Ker. In moist woods and thickets and along river banks: Nova Scot. to Ont., Minn., Fla., Mo. and Ark. Common throughout the range except in the pine-barrens and east and south of them, there wanting; always increasing **northward**; unknown on the south side of L. I.
2. **E. albidum** Nutt. Moist woods and thickets: Ont. to Ga., Minn. and Tex. N. J. Recorded from Oxford, Warren Co., Garfield, Bergen Co., and from near Mattewan, Monmouth Co., the latter locality long since destroyed.

5. **Ornithogalum** L.

1. **O. umbellatum** L. In fields and meadows: N. H. to Pa. and Va. Naturalized from Europe. Locally abundant as an introduced plant, often wanting.

In the neighborhood of Philadelphia *O. nutans* L. has been reported as an occasional escape.

6. **Muscari** Mill.

Perianth globose, 2-3 mm. in diameter; leaves erect.

1. *M. botryoides*.

Perianth oblong, 4-6 mm. long; leaves recurved.

2. *M. racemosum*.

1. **M. botryoides** (L.) Mill. In meadows and thickets, and along roadsides escaped from gardens: N. H. to O. and Va. Native of Europe and Asia.

Occasional as a garden escape in most parts of the range.

2. **M. racemosum** (L.) Mill. Escaped from gardens: Conn. and S. N. Y. to Pa. and Md. Native of Europe.

A very rare garden escape.

7. **Aletris** L.

1. **A. farinosa** L. In dry, mostly sandy soil, sometimes in bogs: Me. to Ont., Minn., Fla. and Ark.

CONN. Local throughout the state, decreasing inland.

N. Y. L. I., S. I., and in Bronx and Westchester counties, increasing southward.

N. J. Rare and local in Bergen, Morris, Passaic and Essex counties, increasing and common southward, particularly in the pine-barrens.

PA. Luzerne, Montgomery, Delaware and Chester counties.

Tertiary, common: Cretaceous, less common: Older Formations, not common and decreasing north of the moraine. 153-220 days.

Sea level-718 ft.

The reported occurrence of *A. aurea* Walt. in southern New Jersey is an error.

The European wild tulip *Tulipa sylvestris* L. is naturalized in Bucks Co., Pa. *Yucca filamentosa* L. is frequently spontaneous on L. I. and in Monmouth Co., N. J.

CONVALLARIACEAE

Leaves reduced to scales; leaf-like branches filiform.

1. ASPARAGUS.

Leaves broad; stem simple or somewhat branched.

Leaves alternate or basal.

Leaves basal; flowers umbelloid or solitary.

2. CLINTONIA.

Leaves alternate (solitary in flowerless plants of No. 4).

Perianth segments separate.

Flowers terminal, racemose, umbelloid, paniculate or solitary.

Perianth segments 6.

3. VAGNERA.

Perianth segments 4.

4. UNIFOLIUM.

Flowers axillary, solitary or two together.

5. STREPTOPUS.

Perianth cylindric or oblong, 6-toothed.

6. POLYGONATUM.

Leaves in 1 or 2 whorls below the flower.

Leaves in 2 whorls; flowers umbelloid.

7. MEDEOLA.

Leaves in 1 whorl; flower solitary.

8. TRILLIUM.

1. *Asparagus* L.

1. *A. officinalis* L. Escaped from cultivation and naturalized, especially along salt marshes: N. B. to Va.; and locally naturalized in waste places in the interior. Native of Europe.

Locally abundant as a naturalized escape.

2. *Clintonia* Raf.

Flowers greenish yellow, drooping, 1.6-2 cm. long; berry blue.

1. *C. borealis*.

Flowers white, not drooping, 0.8-1 cm. long; berry black.

2. *C. umbellulata*.

1. *C. borealis* (Ait.) Raf. In moist woods and thickets: Lab. to Man. and Minn., south to N. Car. and Wisc.

CONN. Rare and local in northern New London and Middlesex counties, and in Windham Co., increasing **northwestward** and common at higher elevations in Litchfield Co.

N. Y. In the higher hills of the Hudson Highlands, increasing and common **northward**, particularly in the Catskills.

N. J. Morris, Passaic, Warren and Sussex counties, increasing **northward**.

PA. Luzerne, Lackawanna, Pike, Monroe and Schuylkill counties.

Tertiary, o: Cretaceous, o: Older Formations, common at high elevations. Not south of the moraine, except in Pa. 117-160 days. 450-4,000 ft.

2. *C. umbellulata* (Michx.) Torr. In woods: N. Y. and N. J. to Ga. and Tenn.

An unquestionably authentic specimen in the Columbia University Herbarium from Short Hills, Essex Co., N. J., is the only recorded occurrence of this species in the range.

3. *Vagnera* Adans. (*Smilacina* Desf.)

Flowers numerous, paniced.

1. *V. racemosa*.

Flowers few-several, racemose.

Plant 2.5-4.5 dm. high; leaves numerous.

2. *V. stellata*.

Plant 0.5-4 dm. high; leaves 2-4.

3. *V. trifolia*.

1. *V. racemosa* (L.) Morong. In woods and thickets: N. S. to Brit. Col., Ga., Mo. and Ariz.

Common throughout the range except the pine-barrens.

2. *V. stellata* (L.) Morong. In moist soil: Newf. to B. C., Va., Ky., Kan. and Cal. Also in N. Europe.

Throughout the range, except in the pine-barrens and at Cape May, usually rare and local, decreasing inland in Conn. and N. Y.

3. **V. trifolia** (L.) Morong. In bogs and wet woods: Newf. to B. C., N. J., Pa. and Mich.

CONN. Rare and local in the northwestern part of the state, and in northern Middlesex Co.

N. Y. Pine Plains, Dutchess Co.

N. J. Morris and Sussex counties.

PA. Pike, Monroe, and Carbon counties.

Tertiary, o: Cretaceous, o: Older Formations, rare and local. Not south of the moraine. 118-153 days. 700-1,708 ft.

4. **Unifolium** Adans.

1. **U. canadense** (Desf.) Greene. In moist woods and thickets: Newf. to the N. W. Terr., N. Car., Tenn., Iowa and S. Dak. Common throughout the range except the pine-barrens.

5. **Streptopus** Michx.

Leaves glaucous beneath, clasping; flowers greenish white.

1. *S. amplexifolius*.

Leaves green both sides, sessile; flowers purple or rose.

2. *S. roseus*.

1. **S. amplexifolius** (L.) DC. In moist woods: Lab. to Alask., N. Car., O., Mich. and N. Mex.

CONN. Rare and local in northwestern Litchfield Co.

N. Y. Confined to the mountains of Greene and Ulster counties.

PA. Wayne, Pike and Carbon counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing at higher elevations. Not south of the moraine. 117-145 days. 640-3,500 ft.

2. **S. roseus** Michx. In moist woods: Lab. to Alask., Ga., Mich. and Ore.

CONN. Very rare and local in the south and east, increasing and common **northwestward**.

N. Y. Westchester Co., increasing and common **northward**.

N. J. Sussex Co. and Bearfort Mts., Passaic Co.

PA. Pike and Monroe counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing at higher elevations. Not south of the moraine. 118-187 days. Sea level-4,000 ft.

6. **Polygonatum** [Tourn.] Mill. (*Salomonina* Heist.)

Leaves pubescent beneath; filaments filiform, roughened.

1. *P. biflorum*.

Leaves glabrous; filaments somewhat flattened, smooth.

2. *P. commutatum*.

1. **P. biflorum** (Walt.) Ell. In woods and thickets: N. B. to Ont., Mich., Fla., W. Va. and Tenn.

CONN. Throughout.

N. Y. Throughout, but unknown south of the moraine on L. I.

N. J. Not definitely known from the coastal plain, thence increasing and common northward.

PA. Throughout.

Tertiary, 0: Cretaceous, 0: Older Formations, common. 118-204 days. Sea level-2,800 ft.

2. **P. commutatum** (R. & S.) Dietr. In woods and along streams, frequently in dry soil: Ont. to Manit., Utah, south to R. I., Ga., La., N. Mex. and Ariz. In our range not so common as the preceding.

Throughout the range.

7. **Medeola** L.

1. **M. virginiana** L. In moist woods and thickets: N. S. to Ont., Minn., Fla. and Tenn.

Throughout the range, apparently increasing in southwestern Conn. and decreasing in southern N. J., particularly in the pine-barrens.

8. **Trillium** L.

Leaves sessile or narrowed at the base and short petioled.

Petals obovate or oblanceolate, white or pink.

T. grandiflorum.*

Petals ovate or lanceolate, 1-3 cm. long.

Peduncles 3-10 cm. long, erect or declined; petals spreading.

1. *T. erectum*.

Peduncles 3 cm. long or less, recurved beneath the leaves; petals recurved.

2. *T. cernuum*.

Leaves distinctly petioled, obtuse or rounded at the base.

3. *T. undulatum*.

1. **T. erectum** L. In rich woods: N. S. to James' Bay, Manit., N. Car. and Tenn.

CONN. Throughout, more common westward and northward, rare southeastward.

N. Y. On L. I., north of the moraine, but rare; S. I., Westchester Co., increasing and common northward.

* This species is keyed in because, while it has never been authentically reported from the range, it is to be expected from the Catskills and from the mountains of Pa.

N. J. Not recorded from the pine-barrens, rare in Burlington Co. increasing and common **northward**.

PA. Luzerne, Monroe and Bucks Co.

Tertiary, o: Cretaceous, a single station at Bordentown, N. J.: Older Formations, common and increasing **northward**. 118-187 days. Sea level-3,365 ft.

2. **T. cernuum** L. In rich woods: Newf. to Ont. and Wisc., Ga. and Mo.

Conn. "Occasional in southeastern and southwestern Conn., apparently wanting elsewhere." (Conn. Bot. Club Cat.)

N. Y. L. I., S. I., increasing and common **northward**, rare south of the moraine on L. I.

N. J. Not recorded from the pine-barrens, rare from Salem and Camden to Middlesex and Mercer counties, thence increasing and frequent **northward**.

PA. Northampton, Lehigh, Montgomery, Philadelphia, Delaware and Chester counties.

Tertiary, rare or wanting: Cretaceous, rare and scattered in edaphically favorable situations: Older Formations, common. 117-204 days. Sea level-1,885 ft.

3. **T. undulatum** Willd. In woods: N. S. to Ont. and Wisc., south to Ga. and Mo.

CONN. Rare and local in New Haven, Middlesex and Tolland counties, increasing **northwestward**.

N. Y. Reported, but not definitely known from L. I. Northwestern Westchester Co., increasing and common **northward**, particularly in the Catskills.

N. J. Hudson Co. (not recently collected) Passaic and Sussex counties.

PA. Luzerne, Lackawanna, Carbon, Monroe, Lehigh, and Schuylkill counties.

Tertiary, o: Cretaceous, o: Older Formations increasing and common **northward**. South of the moraine only in Pa. 117-170 days. Sea level-2,800 ft.

The garden lily-of-the-valley, *Convallaria majalis* L., has been reported as an established escape.

SMILACEAE

1. *Smilax* L.

Stem annual, herbaceous, unarmed; ovules 2 in each cavity.

Leaves usually ovate, thin.

Leaves usually hastate, coriaceous.

1. *S. herbacea*.

2. *S. tannifolia*.

Stem perennial, woody, usually armed with prickles; ovules 1 in each cavity.

Berries black or bluish black.

Berries ripening the first year.

Leaves glaucous.

3. *S. glauca*.

Leaves green both sides.

Leaves ovate, 7-nerved.

4. *S. hispida*.

Leaves rounded or lanceolate, 5-nerved.

5. *S. rotundifolia*.

Berries ripening the second year; leaves elliptic or lanceolate.

6. *S. laurifolia*.

Berries red.

7. *S. Walteri*.

1. *S. herbacea* L. (*S. pulverulenta* Michx. *S. herbacea crispifolia* Pennell). In woods and thickets: N. B. to Ont., Dak., Fla., La., Neb. and Okla.

Common throughout the range except the pine-barrens and east of them.

2. *S. tannifolia* Michx. In dry soil: L. I. and N. J. to S. Pa., S. Car. and Tenn.

N. Y. South of the moraine on L. I.

N. J. Common on the coastal-plain, not recorded elsewhere.

PA. Delaware Co.

Tertiary, common: Cretaceous, common: Older Formations, o. Not north of the moraine. 168-220 days. About sea level.

3. *S. glauca* Walt. In dry sandy soil: E. Mass. to Fla., Kan. and Tex.

CONN. Throughout, decreasing inland.

N. Y. L. I., S. I. and Westchester Co.

N. J. Rare and local in Warren, Morris, Bergen and Hunterdon counties, increasing and common **southward**.

PA. Monroe, Northampton, Montgomery, Bucks, Schuylkill, Delaware and Chester counties, increasing **southward**.

Tertiary, common: Cretaceous, less common: Older Formations, about equalling in frequency the Tertiary. Predominating south of the moraine. 118-220 days. **Sea level-1,200 ft.**

4. *S. hispida* Mühl. In thickets: Ont. to Minn., Neb., N. Car. and Tex.

CONN. Fairfield Co., rare.

N. J. Sussex, Warren and Hunterdon counties.

PA. Northampton and Bucks counties.

Tertiary, o: Cretaceous, o: Older formations, not common.

Stations all near, or on the terminal moraine except in Pa. 138-185 days. **Sea level-640 ft.**

5. **S. rotundifolia** L. In woods and thickets: N. S. to Minn., Fla. and Tex.

Throughout the range, always decreasing in the mountains.

6. **S. laurifolia** L. In moist woods and thickets: S. N. J. to Fla. and Tex., north in the Miss. Valley to Ark.
N. J. The pine-barrens and at Cape May.

Tertiary, not very common on Beacon Hill, rare elsewhere: Cretaceous, o: Older Formations, o. Not north of the moraine. 168-220 days. About sea level.

7. **S. Walteri** Pursh. In wet soil in the pine-barrens: N. J. to Fla. and La.

N. J. The pine-barrens and Cape May.

Tertiary, not common on Beacon Hill, rare elsewhere: Cretaceous, o: Older Formations, o: not north of the moraine. 168-220 days. About sea level.

The reported occurrence in N. J. of *S. Bona-nox* L. and *S. Pseudo-China* L. seem to have been errors. There are no specimens or authentic records from this state, and the plants are otherwise definitely known only from Maryland southward. A single plant of *S. Bona-nox* L. (*S. tamnoides* A. Gray) not of L. has been recorded from S. I. The S. I. record of *S. Pseudo-China* L. is based on a short-petioled specimen of *S. herbacea* L.

HAEMODORACEAE

I. *Gyrotheca* Salisb.

1. **G. tinctoria** (Walt.) Salisb. Sandy swamps near the coast: Cape Cod to N. J. and Fla.

CONN. Coastal swamps of New Haven and New London counties.

N. Y. Lake Ronkonkoma, Suffolk Co., L. I.

N. J. The pine-barrens and Cape May, often a weed in cranberry bogs.

Tertiary, common: Cretaceous, o: Older Formations, limited to the Conn. and L. I. stations. North of the moraine only on L. I. and in Conn.* 187-220 days. About sea level.

AMARYLLIDACEAE

Bulbous herbs with a solitary flower on a scape.

Bulbous herbs with a rootstock or corm; flowers umbellate or cymose.

Perianth adnate to the whole surface of the ovary; leaves mostly basal.

Perianth adnate only to the lower part of the ovary; stem leafy; flowers woolly.

1. NARCISSUS.

2. HYPOXIS.

3. LOPHIOLA.

* See Introduction paragraph 7.

1. **Narcissus L.**

1. **N. Pseudo-Narcissus L.** Escaped from gardens: N. J. and Penn.

An occasional escape from gardens.

N. poeticus L. has been reported as a rare escape.

2. **Hypoxis L.**

1. **H. hirsuta (L.) Coville.** In dry soil or low damp ground: Me. and Ont. to Assin., Fla. and Tex.

Apparently throughout the range, except the region east and south of the pine-barrens, but always decreasing and perhaps wanting at elevations greater than 1,000 ft.

3. **Lophiola Ker.**

1. **L. aurea Ker.** (*L. americana* (Pursh) A. Wood). Pine-barren bogs: N. J. to Fla.

N. J. Common in the pine-barrens, rare along the edges, and wanting elsewhere in the state.

Tertiary, common on Beacon Hill, rare or wanting elsewhere: Cretaceous, rare or wanting: Older Formations, o. Not north of the moraine. 168-220 days. About sea level.

The summer snowflake, *Leucojum aestivum* L., has been reported as a rare escape.

DIOSCOREACEAE

1. **Dioscorea L.**

1. **D. villosa L.** In moist thickets: R. I. to Ont., Minn., Fla. and Tex.

CONN. "Frequent along and near the coast and in the valley of the Conn. River; occasional or rare elsewhere." (Conn. Bot. Club Cat.)

N. Y. Throughout, but rare and local in the north.

N. J. Common throughout, particularly **southward**.

PA. Throughout, increasing **southward**.

Apparently without special distributional features except that it is found more commonly in Conn. in the predominately Triassic valley of the Conn. River.

IRIDACEAE

Style branches opposite the anthers, very broad and petal like.

Style branches alternate with the anthers, slender or filiform.

1. **IRIS.**

Filaments all distinct; seeds fleshy.
 Filaments united; seeds dry.

2. GEMMINGIA.
 3. SISYRINCHIUM.

1. *Iris* [Tourn.] L.

Flowers blue, variegated with yellow, white or green (rarely all white).

Leaves 12–25 mm. broad, numerous.

Leaves 3–5 mm. broad, grass like; 2 or 3.

Flowers bright yellow; introduced species.

1. *I. versicolor*.
 2. *I. prismatica*.
 3. *I. Pseudacorus*.

1. ***I. versicolor*** L. In marshes, thickets and wet meadows:
 Newf. to Manit., Fla. and Ark.

Throughout the range, except the pine-barrens, usually decreasing northward.

2. ***I. prismatica*** Pursh. In wet grounds or rarely in dry sand:
 N. B. to Pa. and Ga.

CONN. Common in the coastal counties, decreasing and perhaps wanting in the interior.

N. Y. Common on L. I. and S. I.; Westchester Co., not recorded elsewhere.

N. J. Rare and local in Sussex, Hunterdon, Essex, Bergen and Union counties, increasing and common **southward**, particularly along the coast.

PA. Bucks, Delaware and Chester counties.

Tertiary, common: Cretaceous, common: Older Formations, decreasing and scanty northward. 138–220 days. **Sea level**–718 ft.

3. ***I. Pseudacorus*** L. In marshes: Mass. to N. Y. and N. J.
 Native of Europe.

Locally abundant as an escape from cultivation.

I. orientalis Mill. and *I. germanica* L. have both been reported as rare or occasional escapes.

2. *Gemmingia* Fabr.

1. ***G. chinensis*** (L.) Kuntze. On hillsides and along roadsides:
 Conn. to Ga., Ind. and Mo.

Locally abundant as an established escape.

3. *Sisyrinchium* L.

Spathes twin, sessile, terminating the winged stem.

Spathes single.

Stems mostly simple, with a sessile terminal spathe.

Capsule 4–6 mm. high; leaves 2–6 mm. wide.

Capsule 2–4 mm. high; leaves 0.8–2 mm. wide.

1. *S. albidum*.
 2. *S. angustifolium*.
 3. *S. mucronatum*.

Stems mostly branched above and bearing 2 or more pedunculate spathes.

Tufts fibrous coated at the base; plant turning dark when dry.

4. *S. arenicola*.

Tufts not fibrous coated at the base or but sparingly so.

Plant usually turning dark when dry; stem broadly winged; pedicels spreading or recurved.

5. *S. graminoides*.

Plant not turning dark when dry; pedicels not recurved.

6. *S. atlanticum*.

1. ***S. albidum*** Raf. Ont. to Wisc., La., Ala. and N. Car.; and in Conn. and N. Y. as an introduced plant.

Known in our range only from New London, Conn., and Morrisania, N. Y. City; obviously fugitive from the west.

2. ***S. angustifolium*** Mill. Fields and roadsides and on hills: Newf. to N. J. and in the mountains to Va., west to Sask. and Col.

CONN. Throughout, apparently decreasing southwestward.

N. Y. Not recorded from S. I., occasional on L. I.; rare and local in Westchester Co., increasing and common **northward**.

N. J. Herman and Tuckerton along the coast and near New Brunswick, Middlesex Co.; rare in Hunterdon, Somerset and Union counties, increasing **northward**.

PA. Luzerne, Monroe and Northampton counties.

Tertiary, o: Cretaceous, rare or perhaps wanting: Older Formations, increasing **northward**. 117-190 days. Sea-level-2,300 ft.

3. ***S. mucronatum*** Michx. In meadows and fields: Mass. and Mich. to N. J. and Va.

CONN. Rare in the south and east, increasing northwestward, nowhere common.

N. J. Morris, Passaic and Union counties; not common; reported from Burlington, Gloucester and Atlantic counties, outside the pine-barrens.

PA. Pike, Monroe, Northampton and Lehigh counties; reported also from Delaware and Chester counties.

Tertiary, not on Beacon Hill, rare elsewhere: Cretaceous, rare: Older Formations, not common. 149-189 days. 374-2,100 ft.

4. ***S. arenicola*** Bicknell. In sandy soil on or near the coast: Mass., N. J. and N. Car.

N. Y. Common on L. I. and S. I., not recorded elsewhere.

N. J. Common in Middlesex, Monmouth, Ocean and Burlington counties, near the coast and west of the pine-barrens, not recorded elsewhere.

Tertiary, common: Cretaceous, confined to northeastern Middlesex and northern Monmouth counties, N. J.: Older Formations, rare along and north of the moraine on L. I. 173-185 days. About sea level.

5. **S. graminoides** Bicknell (*S. gramineum* Curtis). In wet meadows and in damp woods: N. H. to Minn., Fla. and Tex., Santo Domingo.

CONN. Common throughout.

N. Y. Frequent on L. I.; S. I.; Westchester Co., increasing and common **northward**, but unknown in the Catskills.

N. J. The coastal plain except the pine-barrens and Cape May; Bergen Co., increasing **northwestward**.

PA. Pike, Monroe, Northampton, Lehigh, Chester and Delaware counties.

Tertiary, unknown on Beacon Hill, rare elsewhere: Cretaceous, rare: Older Formations, increasing **northward**. 153-204 days. Sea level-680 ft.

6. **S. atlanticum** Bicknell. In dry or moist soil: Me. and Vt. to Fla. and Miss.

Throughout the range, most abundant along the coast, and always decreasing inland and in the mountains.

A form described from southern N. J. as *S. intermedium* Bicknell seems doubtfully distinct from *S. mucronatum*.

ORCHIDACEAE

Anthers 2; lip a large inflated sac.

Plant acaulescent, scape 1-flowered.

1. FISSIPES.

Plant caulescent, scape 1-∞ flowered.

2. CYPRIPEDIUM.

Anther solitary.

Pollinia with a caudicle which is attached at the base to a viscid disk, or gland.

Glands enclosed in a pouch, sepals united above into a hood; lip entire.

3. GALEORCHIS.

Glands not enclosed in a pouch.

Lip not fringed or cut-toothed.

Stem leafy.

Valves of the anthers dilated at the base, enclosing the glands below.

4. PERULARIA.

Valves of the anthers not dilated at the base.

Glands surrounded by a thin membrane.

5. COELOGLOSSUM.

- Glands naked.
 Beak of the stigma with 2 or 3
 appendages.
 Beak of the stigma without
 appendages.
 Stem scapiform; leaves 1-2, basal; anther
 sacs divergent.
 Lip fringed or parted or cut-toothed.
 Pollinia not produced into a caudicle (except apparently in
 No. 23).
 Pollinia granulose or powdery.
 Flowers comparatively large, solitary or few;
 anthers incumbent on a long column.
 Leaves not grass-like; lip free.
 Flowers terminal, the lip crested.
 Leaves alternate.
 Stem leaves whorled.
 Flowers axillary, the lip not crested.
 Leaves grass-like.
 Flower solitary, terminal.
 Flowers racemose, lip free.
 Flowers small, numerous, in spikes or racemes.
 Anther operculate; leaves broad, alternate.
 Anther not operculate.
 Leaves green, borne on the stem.
 Leaves alternate; spike mostly
 twisted.
 Leaves 2, opposite; spike not
 twisted.
 Leaves white-reticulate, basal.
 Pollinia smooth or waxy.
 Plants with corms or bulbs; leaves basal or
 cauline.
 Leaves unfolding before or with the flowers.
 Leaf cauline; lip smooth or auricled at
 base.
 Leaf or leaves basal.
 Leaf 1, basal, unfolding before the flowers.
 Flowers long-spurred; lip 3-lobed.
 Flowers not spurred; lip 3-ridged.
 Plants with coralloid roots, bulbless, the leaves
 reduced to scales.
6. GYMNADENIOPSIS.
 7. LIMNORCHIS.
 8. LYSIAS.
 9. BLEPHARIGLOTTIS.
 10. POGONIA.
 11. ISOTRIA.
 12. TRIPHORA.
 13. ARETHUSA.
 14. LIMODORUM.
 15. SERAPIAS.
 16. IBIDIUM.
 17. OPHRYS.
 18. PERAMIUM.
 19. MALAXIS.
 20. LIPARIS.
 21. TIPULARIA.
 22. APLECTRUM.
 23. CORALLORHIZA.

1. *Fissipes* Small.

1. *F. acaulis* (Ait.) Small (*Cypripedium acaule* Ait.). In sandy or rocky woods: Newf. to Ont., N. Car., Tenn., Ky. and Minn.

Throughout the range, locally absent. Albino forms are not infrequent.

2. *Cypripedium* L.

Sepals and petals not longer than the lip.

1. *C. reginae*.

Sepals and petals longer than the lip.

Sterile stamen lanceolate; lip white.

2. *C. candidum*.

Sterile stamen triangular; lip yellow.

3. *C. parviflorum*.

1. **C. reginae** Walt. (*C. hirsutum* Mill.) In swamps and woods: Nov. Scot. to Ont. and Minn., south to Ga.

CONN. Not very common in the north and west, decreasing coastward.

N. Y. Dutchess Co., increasing **northward**. *S. I. record unverified*.

N. J. Hudson Co. (old record; not recently collected), otherwise recorded only from Sussex Co.

PA. Luzerne, Northampton and Berks counties.

Tertiary, o: Cretaceous, o: Older Formations, not common, increasing **northward**. Not south of the moraine. 117-153 days. 471-1,900 ft.

2. **C. candidum** Willd. In bogs and meadows: N. Y. and N. J. to Ky., Minn., Neb. and Mo. Rare.

Known definitely in the range only from Bergen and Warren counties, N. J.

3. **C. parviflorum** Salisb. (*C. hirsutum* of Britton's Manual, not of Miller (?) and *C. flavescens* Raf.). In woods and thickets: Newf. to Brit. Col. and Alaska, Ga. and Mo.

CONN. Throughout, rare in the south, increasing **northward**.

N. Y. Not recorded from L. I. and S. I.; rare and local in northern N. Y. City, increasing and common **northward**.

N. J. Very rare in Gloucester Co., apparently wanting between it and two known stations in Monmouth Co., thence increasing and common **northward**.

PA. Luzerne, Monroe, Northampton, Lehigh, Bucks, Delaware and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, common northward. 117-204 days. Sea level-2,300 ft.

3. *Galeorchis* Rydb.

1. **G. spectabilis** (L.) Rydb. (*Orchis spectabilis* L.). In rich woods: N. B. to Ont. and Minn., south to Ky., Ga. and Neb.

CONN. Rare near the coast, increasing **northwestward**.

N. Y. Rare and local on L. I., S. I., the Bronx and Westchester counties, increasing and common **northward**.

N. J. Rare in Salem, Gloucester and Burlington counties and in Monmouth and Mercer counties exclusively north and west of the pine-barrens, thence increasing and frequent **northward**.

PA. Monroe, Northampton, Berks, Chester and Delaware counties. Tertiary, o: Cretaceous, rare and local: Older Formations, increasing **northward**. 117-204 days. Sea level-1,900 ft.

The reported occurrence of *Orchis rotundifolia* Pursh has never been satisfactorily established.

4. *Perularia* Lind.

1. *P. flava* (L.) Farw. (*Habenaria flava* (L.) Gray). In moist soil: N. S. to Minn., south to Fla., La. and Mex.

CONN. Throughout, rare and local in the south, increasing **northwestward**.

N. Y. Rare and local on L. I.; common on S. I.; increasing **northward**.

N. J. Rare in Ocean, Monmouth and Middlesex counties, increasing **northward**.

PA. Pike, Monroe, Bucks, Delaware and Chester counties.

Tertiary, o: Cretaceous, rare: Older Formations, increasing and common **northward**. 118-204 days. Sea level-2,680 ft.

5. *Coeloglossum* Hartmann.

1. *C. bracteatum* (Willd.) Parl. (*Habenaria bracteata* (Willd.) R. Br.). In woods and meadows: N. S. to B. Col., south to N. Car. and Neb.

CONN. Rare in New Haven and Middlesex counties, more common in the northern tier of counties, increasing **northwestward**.

N. Y. Recorded from but not definitely known on L. I., unknown on S. I., rare in Westchester Co., increasing and common **northward**.

N. J. Bergen, Passaic, Morris, Sussex and Warren counties, increasing **northwestward**.

PA. Pike, Monroe and Northampton counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Not south of the moraine. 117-187 days. Sea level-2,500 ft.

6. *Gymnadeniopsis* Rydb.

Lip entire; stigma with 2 appendages; stem several-leaved.

Ovary not twisted; spur longer than the ovary; flowers white.

Ovary twisted; spur shorter than the ovary; flowers orange.

Lip 3-toothed; stigma with 3 appendages; leaves 1 or 2.

1. *G. nivea*.

2. *G. integra*.

3. *G. clavellata*.

1. **G. nivea** (Nutt.) Rydb. In pine-barren bogs: N. J. to Fla. and Ala.
N. J. Bennett, Cape May Co.
2. **G. integra** (Nutt.) Rydb. (*Habenaria integra* (Nutt.) Gray).
In wet pine-barrens: N. J. to Fla. and La.
N. J. Rare and local in the pine-barrens of Monmouth, Ocean, Atlantic and Burlington counties; reported also in Cape May Co.
Tertiary, not common: Cretaceous, o: Older Formations, o. Not north of the moraine. 168-182 days. About sea level.
3. **G. clavellata** (Michx.) Rydb. (*Habenaria clavellata* (Michx.) Spreng.). In wet or moist woods: Newf. to Minn., south to Fla. and La.
Throughout the range.

The European *Gymnadenia conopsea* R. Br. occurs in N. Am., so far as known, only at Litchfield, Conn., as an adventive plant.

7. **Limnorchis** Rydb.

Lip lanceolate, slightly, if at all dilated at the base; flowers greenish or purplish.

1. *L. hyperborea*.

Lip decidedly rhomboid-dilated at the base; flowers white.

2. *L. dilatata*.

1. **L. hyperborea** (L.) Rydb. (*L. huronensis* (Nutt.) Rydb.; *Orchis huronensis* Nutt.). In swamps: Greenland to Alaska, N. Y., Conn., N. J., Pa. and Ore.
CONN. Tolland, Hartford and Litchfield counties, increasing **northwestward**.
N. Y. Dutchess Co., increasing in the Catskills.
N. J. Northern Bergen and Sussex counties.
PA. Wayne Co.
Tertiary, o: Cretaceous, o: Older Formations, increasing at higher elevations. Not south of the moraine. 117-153 days. 618-1,900 ft.
2. **L. dilatata** (Pursh) Rydb. (*Habenaria dilatata* (Pursh) Hook.). In bogs and wet woods: N. S. to Sask., south to Me., N. Y. and Ore.
CONN. Eastern Hartford Co. and in Litchfield Co., increasing **northwestward**.
N. Y. The higher Catskills.
Tertiary, o: Cretaceous, o: Older Formations, increasing at higher elevations. Not south of the moraine. 117-153 days. 618-3,600 ft.

8. *Lysias* Salisb.

Scape bracted.
Scape naked.

1. *L. orbiculata*.
2. *L. Hookeriana*.

1. *L. orbiculata* (Pursh) Rydb. (*Habenaria orbiculata* (Pursh) Torr.; *H. macrophylla* Goldie). In rich woods: Newf. to B. C., N. Car. and Minn.

CONN. Rare in northwestern Litchfield Co.

N. Y. West Point, Orange Co., increasing and common **northward**.

N. J. Closter, Bergen Co. (old record; not recently collected).

Otherwise known only from Sussex Co.

PA. Monroe, Carbon, Berks and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. South of the moraine only in Pa. 117-204 days. Sea level-2,800 ft.

2. *L. Hookeriana* (A. Gray) Rydb. (*Habenaria Hookeriana* A. Gray). In woods: N. S. to Minn., N. J., Pa. and Iowa.

CONN. Rare in the coastal counties, increasing **northwestward**.

N. Y. Not recorded from L. I. or S. I., rare and local in Westchester Co., increasing and common **northward** at moderate elevations.

N. J. Sussex, Morris, Warren and Passaic counties.

PA. Water Gap, Monroe Co.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Not south of the moraine. 117-189 days. Sea level-1,000 ft.

9. *Blephariglottis* Raf.

Lip not 3-parted, pectinately fringed.

Spur half as long as the ovary; flowers yellow.

Spur longer than the ovary.

Flowers bright yellow.

Flowers white.

1. *B. cristata*.

2. *B. ciliaris*.

3. *B. Blephariglottis*.

Lip 3-parted.

Segments of the lip deeply fringed.

Segments narrow, fringe of a few threads.

Segments broadly fan-shaped, fringe copious.

Racemes 4-5 cm. thick; lip 1-2 cm. broad.

Racemes 1-3 cm. thick; lip 8-10 mm. broad.

Segments of the lip cuc toothed.

4. *B. lacera*.

5. *B. grandiflora*.

6. *B. psycodes*.

7. *B. peramoena*.

1. *B. cristata* (Michx.) Raf. (*Habenaria cristata* (Michx.) R. Br.). In bogs: N. J. to Fla., Ark. and La.

N. J. Very rare in the cedar swamp in Hudson Co. (old specimen; not recently collected), and throughout the coastal plain, predominating in the pine-barrens.

PA. Bucks and Montgomery counties.

Tertiary, common: Cretaceous, less common: Older Formations, scattered in edaphically favorable situations and rare. North of the moraine only in Hudson Co., N. J.* 162-204 days. About sea level.

2. **B. ciliaris** (L.) Rydb. (*Habenaria ciliaris* (L.) R. Br.). In meadows: Vt. and Ont. to Mich., south to Fla. and Tex.

CONN. Known only from the coastal counties, apparently increasing eastward.

N. Y. Common on L. I. and S. I.; Tappan, Rockland Co.

N. J. Rare in Bergen, Hudson and Essex counties, increasing **southward**.

PA. Northampton, Lehigh, Chester, Berks, Philadelphia and Delaware counties.

Tertiary, common: Cretaceous, less common: Older Formations, rare, but more common in Pa. than elsewhere. 162-220 days.

Sea level-891 ft.

3. **B. blephariglottis** (Willd.) Rydb. (*Habenaria blephariglottis* (Willd.) Torr.). In bogs and swamps: Newf. to Minn., Fla. and Miss.

CONN. Rare in northern Middlesex and northern and central New Haven counties, increasing but not common northwestward into Litchfield Co.

N. Y. L. I. and S. I.; Tuxedo Park, Rockland Co.

N. J. Rare and local in Bergen, Hudson, and Union counties, increasing and common **southward**, particularly in the pine-barrens.

PA. Wayne, Pike and Monroe Co.

Tertiary, common: Cretaceous, less common: Older Formations, rare. Unknown on the unglaciated portion of the Piedmont Plain.† 117-224 days. Sea level-1,829 ft.

4. **B. lacera** (Michx.) Farw. (*Habenaria lacera* (Michx.) R. Br.). In swamps, meadows and wet woods: N. S. to Minn., south to Ga. and Mo.

Throughout the range, except the pine-barrens, always decreasing up the mountains and perhaps wanting above 1,300 ft.

5. **B. grandiflora** (Bigel.) Rydb. (*Habenaria grandiflora* (Bigel.) Torr. *H. fimbriata* (Ait.) R. Br.). In rich woods and meadows: N. B. to Ont. and Mich., south to N. Car.

* See Introduction paragraph 7.

† See Introduction paragraph 7.

CONN. Northwestern Litchfield Co., and rare in northern Middlesex Co.

N. Y. Known only from the Catskills.

N. J. Rare and local in Gloucester, Camden, Mercer, Somerset and Union counties, increasing **northward**.

PA. Luzerne, Monroe, Northampton, Chester and Delaware counties, apparently not in the intervening territory.

Tertiary, o: Cretaceous, rare: Older Formations, common and increasing **northward**. 117-204 days. Sea level-2,900 ft.

6. **B. psycodes** (L.) Rydb. (*Habenaria psycodes* (L.) A. Gray). In meadows, swamps, and wet woods: Newf. to N. Car., Tenn. and Ind.

CONN. Throughout, increasing **northwestward**.

N. Y. Rare on L. I., elsewhere frequent, increasing **northward**.

N. J. Rare and local from Gloucester to Monmouth counties north and west of the pine-barrens; thence increasing and common **northward**.

PA. Luzerne, Monroe, Northampton, Lehigh, Berks, Bucks, Delaware and Chester counties.

Tertiary, o: Cretaceous, rare and local: Older Formations, common and increasing **northward**. 117-204 days. Sea-level-1,800 ft.

7. **B. peramoena** (A. Gray) Rydb. (*Habenaria peramoena* Gray). In moist meadows: N. J. to Ill., Va., Ala. and Tenn. Not common.

N. J. Rare and local in Mercer, Monmouth, and Camden counties; Cape May Co.

PA. Delaware and Chester counties.

Tertiary, known only from Cape May Court House:* Cretaceous, more common: Older Formations, limited to Delaware and Chester counties in Pa. Not north of the moraine. 176-220 days. About sea level.

10. *Pogonia* Juss.

Sepals and petals nearly-equal and alike; lip bearded.

1. *P. ophioglossoides*.

Sepals longer and narrower than the petals; lip not bearded.

2. *P. divaricata*.

1. **P. ophioglossoides** (L.) Ker. In meadows and swamps: Newf. to Ont., Fla., Kan. and Tex.

Throughout the range, apparently always decreasing inland and at higher elevations.

* See Introduction paragraph 33.

2. **P. divaricata** (L.) R. Br. In swamps: S. N. J. to Fla. and Ala. N. J. Batsto and Quaker Bridge, Burlington Co.; Bennett, Cape May Co.

Tertiary, very rare: Cretaceous, o: Older Formations, o. Not north of the moraine. 168 days. About sea level.

11. *Isotria* Raf.

Lip crested along a narrow line down the face; peduncle as long as the capsule or longer.

1. *I. verticillata*.

Lip crested over the whole face and lobes; peduncle shorter than the capsule.

2. *I. affinis*.

1. **I. verticillata** (Willd.) Raf. (*Pogonia verticillata* (Willd.) Nutt.).

In moist woods: E. Mass. to Ont., Wisc., Ind. and Fla.

CONN. Throughout, increasing southward.

N. Y. Common south of the moraine on L. I.; S. I., decreasing up the Hudson Valley to Dutchess Co., apparently wanting northward.

N. J. Scattered throughout, rare in the pine-barrens.

PA. Throughout.

Tertiary, rare and local: Cretaceous, scattered: Older Formations, not very common. 118-204 days. Sea level-1,800 ft.

2. **I. affinis** (Austin) Rydb. (*Pogonia affinis* Austin). In moist woods: Vt. to N. J. and Pa. Rare and local.

CONN. Rare and local near the coast in New Haven and Fairfield counties.

N. Y. Reported from southern N. Y. in Gray's Manual, ed. 5, 507. Otherwise unknown.

N. J. Closter (station destroyed) and near Trenton.

PA. Monroe, Berks, Chester (station not recently verified) and Philadelphia counties.

A rare and little-known species, whose distribution needs additional study.

12. *Triphora* Nutt.

1. **T. trianthophora** (Sw.) Rydb. (*Pogonia trianthophora* (Sw.) B. S. P.). In rich woods: Me. to Fla., Wisc. and Kan.

CONN. Rare and local in New London, Hartford and Litchfield counties.

N. Y. Reported from but not recently collected near the vicinity of N. Y. City. Otherwise unknown.

N. J. Along and near the Palisades; Mt. Tabor, Morris Co.

PA. Northampton, Lehigh, Bucks, Delaware and Chester counties.

Tertiary, o: Cretaceous, rare in Bucks Co., Pa.: Older Formations not common. 153-204 days. Sea level-500 ft.

13. *Arethusa* L.

1. *A. bulbosa* L. In bogs: Newf. to Ont. and Minn., south to N. Car. and Ind.

CONN. Rare and local.

N. Y. Rare and local in Dutchess Co., increasing and frequent southward, particularly on L. I. Not recorded from S. I.

N. J. Scattered north of the moraine in Sussex, Morris, Essex and Bergen counties, and common south of the "fall line"; apparently wanting in the Piedmont region in Hunterdon, Somerset and Mercer counties.

PA. Wayne, Northampton and Chester counties.

Tertiary, common: Cretaceous, less common: Older Formations, confined to the glaciated area except in Pa.* 144-204 days. Sea level-993 ft.

14. *Limodorum* L.

1. *L. tuberosum* L. In bogs and meadows: Newf. to Ont. and Minn., south to Fla. and Mo.

Throughout the range. Apparently wanting or at least very rare on the Piedmont Plateau in N. J.

15. *Serapias* L. (*Epipactis* R. Br.)

1. *Serapias Helleborine* L. (*E. viridiflora* (Hoffm.) Reichb.). Que. and Ont. to Mass., N. Y., N. J. and Pa.

Known only from a single station near Plainfield, Union Co., N. J., which has an elevation of about 100 ft., a growing season of 162 days, and is on or near the terminal moraine.

16. *Ibidium* Salisb. (*Gyrostachys* Pers. *Spiranthes* Rich.).

Flowers 3-ranked; stems not twisted or slightly so.

Sepals and petals more or less connivent into a hood.

1. *I. strictum*.

Lateral sepals separate, free.

Spike about 5 cm. long, 8-10 mm. thick; lip with a truncate base and 2 small spreading callosities.

2. *I. plantagineum*.

Spike 10-15 cm. long, 12-20 mm. thick; lip with a cuneate base and 2 stout reflexed callosities; flowers yellowish.

3. *I. cernuum*.

Flowers merely alternate, appearing secund from the spiral twisting of the stem.

* See Introduction paragraph 7.

Stem leafy; lower leaves elongated, mostly persistent through the flowering season.

Lip glabrous without, of an oblong type, the base not dilated.

4. *I. praecox*.

Lip pubescent without, of an ovate type, the base dilated.

5. *I. vernale*.

Stem a scaly scape; leaves basal, mostly withering before the flowering season.

Root a single tuber; spike about 2.5 cm. long.

6. *I. Beckii*.

Root a collection of tubers; spike 2-7 cm. long.

7. *I. gracile*.

1. ***I. strictum*** (Rydb.) House (*G. stricta* Rydb.). In bogs: Newf. to Alaska, south to Me., Pa., Minn. and Col.

Known only from a single station near Norfolk, Litchfield Co., Conn., a region at about 1,200 ft., with a growing season of 145 days, and underlaid by Becket Gneiss; and from Copake Falls, Columbia Co., N. Y.

2. ***I. plantagineum*** (Raf.) House (*G. plantaginea* (Raf.) Rydb.). Moist banks and woods: N. S. to Minn., south to Va. and Mich.

CONN. Rare and local in New London, Middlesex, Hartford, Fairfield and Litchfield counties, increasing northwestward.

N. Y. Woodmere, L. I.; Dutchess Co., perhaps increasing northward.

N. J. Rare and local in Sussex, Warren, Burlington and Cape May counties.

PA. Cedar Creek, Lehigh Co.

Tertiary, rare: Cretaceous, rare: Older Formations, increasing northward. 117-153 days. Sea level-650 ft.

3. ***I. cernuum*** (L.) House (*G. cernuua* (L.) Kuntze. *G. ochroleuca* Rydb.). In meadows and swamps: Newf. and Nov. Scot. to Ont. and Minn., south to Fla. and N. Mex.

Throughout the range.

4. ***I. praecox*** (Walt.) House (*G. praecox* (Walt.) Kuntze). In grassy places: S. N. J. to Fla. and Tex.

Apparently confined, in our region, to the coastal plain of N. J. Records of the species from further north mostly apply to the following.

5. ***I. vernale*** (Engelm. & Gray) House (*G. linearis* Rydb.). In meadows, sometimes in dry soil: Mass. to Fla. and N. Mex., northward through the Miss. Valley to Ill. and Kan.

CONN. In the coastal counties, decreasing inland; not common.
 N. Y. Near N. Y. City and on S. I.; and on L. I. south of the hills.
 N. J. Bergen, Union, Monmouth and Ocean counties, southward
 near the coast; rare in the pine-barrens.

PA. Delaware Co.

Tertiary, confined to the northern coastal region of N. J.: Cre-
 taceous, o: Older Formations, not very common. 160-182 days.
 About sea level.

6. **I. Beckii** (Lindl.) House (*G. Grayi* (Ames) Britton. *G. simplex*
 (Gray) Kuntze). In dry sandy soil: Mass. to Md., eastern
 Ky., Ark. and Tex.

CONN. Rare and local mostly near the coast.

N. Y. Common on L. I., rare and local on southern S. I., decreasing
 up the Hudson Valley to Yonkers; otherwise unknown.

N. J. A single station in Bergen Co.; Monmouth Co., increasing
 but not common southward.

PA. Bucks and Chester counties.

Tertiary and Cretaceous, not very common: Older Formations,
 mostly near the coastal region. 166-204 days. About sea level.

7. **I. gracile** (Bigel.) House (*G. gracilis* (Bigel.) Kuntze). In dry
 fields and open woods: N. S. to Minn., south to Fla., La. and
 Tex.

Throughout the range except the pine-barrens.

17. **Ophrys** [Tourn.] L. (*Listera* R. Br.)

Lip twice as long as the petals, with lateral teeth.

1. *O. cordata*.

Lip 4-8 times as long as the petals, with auricles at the base.

2. *O. australis*.

1. **O. cordata** L. (*L. cordata* (L.) R. Br.). In moist woods: Lab.
 to Alaska, N. J., Mich., Colo. and Ore.

N. Y. An old specimen from S. I., not recently collected and
 otherwise unknown.

N. J. "The cedar swamp," Bergen Co. (not recently collected).

PA. Wayne Co.

Tertiary, o: Cretaceous, o: Older Formations, very rare. Not
 south of the moraine. 144-177 days. 500-1,258 ft.

2. **O. australis** (Lindl.) House (*L. australis* Lindl.). In bogs:
 N. Y. and N. J. to Fla., La. and Ala.

N. J. Middlesex and Camden counties.

PA. Chester Co.

Tertiary, o: Cretaceous, not very common: Older Formations, o.
Not north of the moraine. 175-204 days. About sea level.

The reported occurrence of *O. convallarioides* (Sw.) House (*L. convallarioides* (Sw.) Torr.) is an error. The plant on which it was based is *O. cordata* L.

18. **Peramium** Salisb.

Spike loosely flowered; lip with recurved margins.

Spike 1-sided; beak shorter than the stigma proper; blotches of the leaf mostly white.

1. *P. ophioides*.

Spike spiral; beak as long as the stigma proper or longer; blotches of the leaf mostly dark green.

2. *P. tesellatum*.

Spike densely flowered, not 1-sided; margins of the lip not recurved.

3. *P. pubescens*.

1. **P. ophioides** (Fernald) Rydb. (*Epipactis repens ophioides* (Fernald) A. A. Eaton). In cold mossy woods: Prince Edward's Island to Man. and S. Car., Mich. and Colo.

CONN. Hartford and Litchfield counties, increasing **northwestward**.

N. Y. The higher Catskills of Greene Co.

PA. Mountains of Wayne and Monroe Co.

Tertiary, o: Cretaceous, o: Older Formations, increasing at higher elevations. Not south of the moraine. 117-145 days. 700-2,820 ft.

2. **P. tesellatum** (Lodd.) Rydb. (*Epipactis tesellata* (Lodd.) A. A. Eaton). In woods or bogs: Newf. to Lake Superior, south to Pa.

CONN. Northern Hartford and Litchfield counties, increasing **northwestward**.

N. Y. Ulster, Sullivan and Greene counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing at higher elevations. Not south of the moraine. 117-145 days. 500-2,575 ft.

3. **P. pubescens** (Willd.) MacM. (*Epipactis pubescens* (Willd.) A. A. Eaton). In dry woods: Newf. to Ont. and Minn., south to Fla. and Tenn.

CONN. Throughout.

N. Y. L. I.; S. I. and increasing up the Hudson Valley.

N. J. Throughout the state except the pine-barrens, there rare; not reported from the region east of the barrens.

PA. Luzerne, Monroe, Northampton, Montgomery, Chester and Delaware counties.

Tertiary, rare: Cretaceous, scattered: Older Formations, increasing at moderate elevations northward. 118-204 days. Sea level-1,950 ft.

19. **Malaxis Soland** (*Achroanthes* Raf. *Microstylis* (Nutt.) Eaton).

Leaf sheathing the base of the stem.

1. *M. monophylla*.

Leaf clasping the stem near the middle.

2. *M. unifolia*.

1. **M. monophylla** (L.) Sw. (*A. monophylla* (L.) Greene). In woods: Que. to Man., Pa. and Neb.

CONN. Northwestern Litchfield Co.

N. Y. Sam's Point, Ulster Co., and Pine Plains, Dutchess Co.

N. J. Reported from Andover Junction.

PA. Wayne Co.

Tertiary, o: Cretaceous, o: Older Formations, not common. Not south of the moraine. 120-149 days. 660-2,760 ft.

2. **M. unifolia** Michx. (*A. unifolia* (Michx.) Rydb.). In woods and thickets: Newf. to Ont. and Minn., south to Fla., Ala. and Mo.

CONN. Rare and local in northern New London, New Haven, Middlesex and Fairfield counties, increasing **northward** in Tolland, Hartford and Litchfield counties.

N. Y. L. I., mostly north of the moraine; S. I. and increasing **northward**.

N. J. A single station at Hammonton, Atlantic Co. (Bassett); rare and local in Gloucester, Middlesex, Monmouth, and Mercer counties, thence increasing **northward**, but not recorded from Hunterdon and Somerset counties.

PA. Wayne, Monroe, Lackawanna, Philadelphia, Delaware and Chester, presumably in the intervening territory.

Tertiary, very rare or wanting:* Cretaceous, scattered: Older Formations, increasing **northward**. 117-204 days. Sea level-2,300 ft.

20. **Liparis** L. C. Rich (*Leptorchis* Thouars)

Raceme many flowered; lip as long as the petals.

1. *L. liliifolia*.

Raceme few flowered; lip shorter than the petals.

2. *L. Loeselii*.

1. **L. liliifolia** (L.) Richard (*Leptorchis liliifolia* (L.) Kuntze). In moist woods and thickets: Me. to Minn., Ga. and Mo.

CONN. Throughout, but not common.

* See Introduction paragraph 36.

N. Y. Throughout, but rare at higher elevations in the Catskills.
 N. J. Rare and local in Cape May, Salem, Camden, Burlington and Mercer counties, north and west of the pine-barrens; a single station at Lakehurst, Ocean Co. (Kneiskern, not recently collected); thence increasing **northward**.

PA. Throughout.

Tertiary, rare or wanting: Cretaceous, scattered: Older Formations, increasing **northward**. 117-204 days. Sea level-2,400 ft.

2. **L. Loeselii** (L.) Richard (*Leptorchis Loeselii* (L.) MacM.). In wet woods and on springy banks: N. S. to N. W. Terr., south to Ala. and Mo.

CONN. Rare or occasional throughout.

N. Y. Rare on L. I. and S. I., increasing but not common northward.

N. J. Rare or occasional throughout the state.

PA. Monroe, Lehigh, Berks, Bucks, Chester and Delaware counties.

21. *Tipularia* Nutt.

1. **T. unifolia** (Muhl.) B. S. P. In woods: Mass. to Pa., Fla. and La.

N. Y. Near N. Y. City; on S. I. and at Greenport, L. I., rare; otherwise unknown.

N. J. Rare and local in Bergen, Morris, Warren, Hudson, Essex, Monmouth, Gloucester and Cape May counties.

PA. Delaware Co.

Tertiary, unknown on Beacon Hill, not common elsewhere: Cretaceous, more common: Older Formations, scattered. North of the moraine only near N. Y. City. 161-179 days. About sea level.

22. *Aplectrum* Nutt.

1. **A. hyemale** (Muhl.) Torr. In woods and swamps: Vt. and Ont. to N. W. Terr., south to Ga., Mo. and Cal.

CONN. Rare and local in New London, New Haven, Fairfield, Hartford and Litchfield counties.

N. Y. Bronx, Westchester and Dutchess counties.

N. J. Rare and local in Gloucester, Bergen, Passaic, Warren and Sussex counties.

PA. Monroe, Montgomery, Bucks, Berks, Delaware and Chester counties.

Tertiary, 0: Cretaceous, rare: Older Formations, not common and increasing northward. 117-204 days. Sea level-1,900 ft.

23. *Corallorhiza* [Haller] Chatelain

Lip not deeply 3-lobed.

Lip 2-lobed or 2-toothed above the base.

1. *C. Corallorhiza*.

Lip entire or merely denticulate.

Flowers about 6-8 mm. long; lip not notched; column narrowly winged.

2. *C. odontorhiza*.

Flowers 14 mm. long; lip notched; column manifestly winged.

3. *C. Wisteriana*.

Lip deeply 3-lobed; flowers 12-18 mm. long.

4. *C. maculata*.

4. *C. Corallorhiza* (L.) Karst. In cold wet woods: N. S. to Alaska, south to N. Y. and N. J. and in the mountains to Ga.; west to Neb. and Wash.

CONN. Rare and local in the northwestern part of the state, and in northern Middlesex Co.

N. Y. The higher Catskills.

N. J. Reported but not definitely known from Bergen and Warren counties; Stanhope, Morris Co. and at Avon on the coast.

PA. Wayne Co.

Tertiary, 0: Cretaceous, rare: Older Formations, increasing but not common northward. Not south of the moraine. 117-186 days. 500-2,800 ft.

2. *C. odontorhiza* (Willd.) Nutt. In woods: Me. to Mich., Fla. and Mo.

CONN. Not very common along the coast, decreasing northward.

N. Y. L. I. and S. I. and up the Hudson Valley to West Point.

N. J. Cape May, Gloucester, Camden and Mercer counties, thence increasing and common northward; not in the pine-barrens.

PA. Northampton, Montgomery, Bucks and Chester counties.

Tertiary, rare: Cretaceous, scattered: Older Formations, increasing northward at moderate elevations. 138-204 days. Sea level-1,243 ft.

3. *C. Wisteriana* Conrad. In woods: N. Eng. and Pa. to Fla. and Tex.

Known in our range only from Chester and Philadelphia counties, Pa., a region near the "fall line," with a growing season of about 204 days and at about sea level; and from Swedesboro, Gloucester Co.

4. *C. maculata* Raf. (*C. multiflora* Nutt.). In woods: N. S. to B. C., south to Fla., Mo. and Col.

Throughout the range except in the pine-barrens of N. J. and

L. I., there rare or wanting; always increasing northward and at higher elevations; rare on the coastal plain.

DICOTYLEDONES

SAURURACEAE

1. *Saururus* L.*

1. *S. cernuus* L. In swamps and shallow water: R. I. to Fla., S. Ont., Minn. to Tex.

CONN. Mostly in the coastal counties.

N. Y. L. I., S. I., Bronx and Westchester counties.

N. J. Throughout, except in the pine-barrens.

PA. Chester and Delaware counties.

SALICACEAE

Bracts of the flowers more or less cut and fringed; disk cup-shaped; winter buds with several scales.

1. *POPULUS*.

Bracts of the flowers entire; disk of 1 or 2 glands; winter buds with 1 scale.

2. *SALIX*.

1. *Populus* L.

Petioles round or channeled, scarcely or not at all flattened laterally.

Leaves densely white-tomentose beneath, lobed or coarsely toothed.

1. *P. alba*.

Leaves glabrous or nearly so when mature, crenate or crenulate.

Leaves densely tomentose when young; capsules long-pedicelled.

2. *P. heterophylla*.

Leaves not tomentose when young, capsules short-pedicelled.

3. *P. candidans*.

Petioles strongly flattened laterally.

Leaves broadly deltoid, abruptly acuminate; stigma lobes dilated.

Young leaves pubescent; capsules nearly sessile.

4. *P. nigra*.

Leaves glabrous; capsules pedicelled.

5. *P. deltoides*.

Leaves broadly ovate to suborbiculate; stigma lobes filiform.

Leaves coarsely sinuate-dentate.

6. *P. grandidentata*.

Leaves crenulate-denticulate to entire margined.

7. *P. tremuloides*.

1. *P. alba* L. In yards and along roadsides: N. B. to Ont. and Va. Introduced from Eur. and As.

Locally abundant as an escape.

2. *P. heterophylla* L. In rich wet soil: Conn. to N. J. and Ga., west to Mo., Ark. and La.

* See footnote page 76.

CONN. The southern half of the state, not common.

N. Y. Highlands of the Hudson, increasing southward.

N. J. Bergen, Hudson, Middlesex and Cumberland counties, not common; also at Cape May Court House.

PA. Chester and Delaware counties.

Tertiary, 0: Cretaceous, not very common: Older Formations, local. 160-204 days. About sea level.

3. *P. candicans* Ait. Newf. to N. J. and Va., westward to Mich., S. Dak., Alberta and Alaska. In the east mainly an escape from cultivation.

A rather uncommon escape in most parts of our range.

4. *P. nigra* L. As an escape from cultivation: in the Hudson and Delaware valleys. Native of Europe.

Rare and local in the Delaware Valley. Not recently collected from the lower Hudson Valley; otherwise unknown.

5. *P. deltoides* Marsh. In moist soil: Que. to Manitoba, Conn., Fla. and Tenn. Rare in our range.

CONN. In the valley of the Connecticut, Housatonic and Farmington rivers; rare elsewhere.

N. Y. Bronx Co.; Highlands of the Hudson, increasing northward.

N. J. Known only from islands in the Delaware River in Warren Co.

Tertiary, 0: Cretaceous, 0: Older Formations, not common. Rare or wanting south of the moraine. 161-187 days. Sea level-815 ft.

6. *P. grandidentata* Michx. In rich soil: N. S. to Del., along the mountains to N. Car., west to Ont., Minn., Ill. and Tenn.

CONN. Throughout.

N. Y. Frequent on L. I., and S. I., increasing and common northward.

N. J. Throughout the state, increasing and common northward; rare and perhaps only adventive in the pine-barrens.

PA. Throughout, more common northward.

7. *P. tremuloides* Michx. In sandy, gravelly, or rocky soil: Newf. to Alaska, south to N. Y., Pa., Ky., west to Mo. and Neb.; and Lower Calif.

Throughout the range, except the pine-barrens and south of them, apparently always increasing northward.

2. *Salix* [Tourn.] L.

Capsule glabrous.

Trees or larger shrubs; leaves acute or acuminate, serrate.

Stamens 3-7.

Pedicels slender, 3-5 times as long as the gland.

Peties and stipules without glands.

1. *S. nigra*.

Peties and stipules with prominent glands.

Leaves green on both sides; fruit ripening

May-July; rachis smooth.

Capsule conic-subulate; mature leaves short acuminate.

2. *S. pentandra*.

Capsule conic-ovoid; mature leaves with long acuminate curved tips.

3. *S. lucida*.

Leaves pale beneath, fruit ripening August-

October; rachis white-pilose.

4. *S. serrissima*.5. *S. fragilis*.

Pedicels about twice as long as the gland.

Stamens 2.

Filaments hairy at the base; bracts caducous, yellow.

Pedicels in fruit 1-3 mm. long.

5. *S. fragilis*.

Pedicels in fruit less than 1 mm. long; stigma sessile.

Branches not drooping.

6. *S. alba*.

Branches drooping (weeping willow).

7. *S. babylonica*.

Filaments glabrous; bracts persistent.

8. *S. cordata*.

Low shrub, leaves entire.

9. *S. pedicellaris*.

Capsule not glabrous, silky nor tomentose.

Filaments distinct.

Capsule distinctly pedicelled, rostrate

Mature leaves not densely hairy beneath.

Leaves linear or linear-lanceolate.

Filaments hairy, capsule glabrate in age.

10. *S. interior*.

Filaments glabrous, capsule permanently hairy.

11. *S. petiolaris*.

Mature leaves oblong, elliptic, or ovate-lanceolate.

Bracts brownish, dark, ovate or cuneate.

12. *S. discolor*.

Bracts yellow, light, linear-oblong or lanceolate.

Bracts longer than the pedicels.

13. *S. squamata*.

Bracts shorter than the pedicels.

14. *S. Bebbiana*.

Mature leaves densely hairy.

Leaves white tomentose beneath.

Style less than 1 mm. long.

Leaves ovate-lanceolate, slender-petioled.

14. *S. Bebbiana*.

Leaves oblanceolate.

Leaves 5-10 cm. long, aments 2-3 cm. long.

15. *S. humilis*

Leaves 2-5 cm. long, aments 1 cm. long.

16. *S. tristis*.

* Prepared with the assistance of Dr. P. A. Rydberg.

- Style more than 1 mm. long. 17. *S. candida*.
 Leaves silvery beneath. 18. *S. sericea*.
 Capsule subsessile, tree with silvery, acuminate leaves. 19. *S. viminalis*.
 Filaments united; pedicel and style none. 20. *S. purpurea*.
1. ***S. nigra*** Marsh. In wet soil: N. B. to western Ont. and N. Dak., south to Fla. and Tex.
 Throughout the range, apparently decreasing northward; rare and introduced in the pine-barrens.
 2. ***S. pentandra*** L. Cultivated and rarely escaped: New England to Ohio.
 Very rare as an escape in the range.
 3. ***S. lucida*** Muhl. In swamps and along riversides: Newf. to N. J. and Pa., westward to Athabasca, Ky. and Neb.
 CONN. "Occasional."
 N. Y. Rare on L. I.; on S. I., increasing and common **northward**.
 N. J. Sussex, Morris and Essex counties, increasing **northwestward**; also at Sandy Hook, Monmouth Co.
 PA. Northampton, Lehigh, Bucks, Philadelphia, Delaware and Chester counties.
 Tertiary, 0: Cretaceous, perhaps in Bucks Co., Pa.: Older Formations, not very common. 118-204 days. Sea level-1,000 ft.
 4. ***S. serissima*** (Bailey) Fernald. In bogs and wet meadows: Que. to Alberta, N. J. and Wisc.
 CONN. Northwestern Litchfield Co. and from Westville, New Haven Co.
 N. J. Sussex Co.
 Tertiary, 0: Cretaceous, 0: Older Formations, rare. Not south of the moraine. 138-145 days. Sea level-690 ft.
 5. ***S. fragilis*** L. Along streams: Newf. to Ky. Native of Europe.
 Frequent as an escape from cultivation in some parts of the range.
 6. ***S. alba*** L. On wet soil or on uplands: N. S. and Ont. to N. Car., westward to Idaho and Iowa. Native of Europe.
 Locally abundant as an escape from cultivation.
 7. ***S. babylonica*** L. Widely cultivated and sometimes spreading. Native of Asia.
 Not very common as an escaped plant.

8. **S. cordata** Muhl. (*S. acutidens* Rydb.). In wet soil: N. B. to Brit. Col., south to Va., Mo., Col. and Cal. Hybridizes with *S. sericea* and other species.

Throughout the range in some of its forms, except the pine-barrens and east and south of them.

9. **S. pedicellaris** Pursh (*S. myrtilloides* of Am. Authors; not of L.). In bogs: N. B. and Que. to B. C., south to N. J. and Iowa. Also in northern Europe.

CONN: Except for a single station at New Haven, known only from Litchfield Co.

N. Y. Near Pine Plains, Dutchess Co. Perhaps in the Catskills.
N. J. Morris and Sussex counties.

Tertiary, o: Cretaceous, o: Older Formations, not very common. Not south of the moraine. 138-170 days. Sea level-1,240 ft.

10. **S. interior** Rowlee (*S. longifolia* Muhl. *S. fluviatilis* Sargent, not of Nutt.). Wet sandy soil: Quebec to Athabasca, south to Va., Ky., Neb. and Tex.

CONN. The valley of the Connecticut River, from Hartford southward. Not common.

N. Y. The valley of the Hudson in Dutchess Co.

N. J. In the valley of the Delaware from Sussex to Gloucester counties, decreasing southward.

PA. Monroe and Northampton counties. More common on sandy banks along riversides than elsewhere.

11. **S. petiolaris** J. G. Smith. In swamps: N. B. to N. W. Terr., south to Tenn. and Wisc.

CONN. Known only from near Middletown.

N. Y. Dutchess and Orange counties, in the valley of the Hudson increasing southward.

N. J. Warren, Morris, Hudson, Camden, and Gloucester counties. Not common.

PA. Bucks, Delaware and Chester counties.

A rather rare species whose distribution needs additional study.

12. **S. discolor** Muhl. (*S. eriocephala* Michx. *S. prinoides* Pursh). In swamps or on moist hillsides: N. S. to Man., Del. and Mo.

Common throughout the range in some of its forms, except the pine-barrens, and east and south of them.

13. **S. squamata** Rydb. Conn. to N. J.

CONN. Known only from near Middletown.

N. Y. A single record from near New York City.

N. J. Sparta Junction, Sussex Co.

A rare plant whose distribution and specific status is not fully understood.

14. **S. Bebbiana** Sargent (*S. rostrata* Richards). In dry soil or along streams, sometimes in woods and thickets: Anticosti to Hudson Bay and Br. Col., south to N. J., Pa., Neb. and Utah.

CONN. Throughout, increasing **northwestward**.

N. Y. Occasional on L. I. and in Bronx Co., increasing **northward**; rare or perhaps adventive on S. I.

N. J. Rare in Ocean, Monmouth and Middlesex counties; Bergen and Essex counties, increasing **northward**.

PA. Monroe and Northampton counties.

Tertiary, o: Cretaceous, rare: Older Formations; increasing **northward**. South of the moraine only in Pa. 117-187 days. Sea level-2,800 ft.

15. **S. humilis** Marsh. In dry soil: N. S. to western Ont., south to N. Car. and Neb.

Throughout the range, apparently decreasing in the pine barrens of N. J. and L. I.

16. **S. tristis** Ait. In dry soil: N. E. to Minn., south to Fla. and Tenn.

CONN. Rare along the coast, scattered in the eastern and north central part of the state.

N. Y. On L. I. and on S. I.

N. J. Bergen and Hunterdon counties, common on the coastal plain.

PA. Luzerne, Monroe, Delaware and Chester counties, presumably in the intervening territory.

17. **S. candida** Fluegge. In bogs: Lab. to N. W. Terr., south to N. J., Iowa and Mont.

CONN. Northwestern Litchfield Co.

N. Y. Reported but not definitely known from Westchester Co.; Pine Plains, Dutchess Co. and northward.

N. J. Rare and local in Hudson and Bergen counties, increasing but local northwestward in Morris, Warren and Sussex counties.

PA. Luzerne, Monroe and Northampton counties; reported but not definitely known from Pike Co.

Tertiary, o: Cretaceous, o: Older Formations, increasing northward. Not south of the moraine. 118-153 days. 500-1,300 ft.

18. **S. sericea** Marsh. (*S. subsericea* (Anders.) Schneider.) In swamps: Me. to Mich. and Va.

Throughout the range, except the pine-barrens and east and south of them.

19. **S. viminalis** L. Cultivated and occasionally escaped in the eastern states. Native of Europe and Asia.

Not a very common escape in our range.

20. **S. purpurea** L. Sparingly escaped from cultivation in the eastern states. Native of Europe.

Locally abundant as a roadside plant.

The following hybrids have been described and are to be looked for in our range wherever both the supposed parents are known.

Salix nigra × *alba*.

Salix fragilis × *alba*.

Salix cordata × *sericea* and others.

Salix humilis × *discolor*.

Salix candida × *petiolaris*.

Salix candida × *cordata*.

Salix glaucophylla Bebb. has been reported as growing in Monroe Co., Pa., but it has not recently been collected. In Conn. the European *S. incana* Schrank occurs as a rare escape.

MYRICACEAE

Ovary subtended by 2-4 bractlets; leaves serrate or entire stipulate.

1. MYRICA.

Ovary subtended by 8 linear persistent bractlets; leaves pinnatifid, stipulate.

2. COMPTONIA

1. *Myrica* L.

Bractlets of pistillate aments persistent, clasping the drupes; low bog shrub.

1. *M. Gale*.

Bractlets of pistillate aments deciduous, the ripe drupes separated.

Slender tree; leaves mostly acute, narrow; drupes less than 2 mm. in diameter.

2. *M. cerifera*.

Shrub; leaves mostly obtuse. 3-4 mm. in diameter.

3. *M. carolinensis*.

1. **M. Gale** L. In wet places: Newf. to Alask., S. N. Y., Va., Mich. and Wash.

CONN. Rare or wanting in the littoral, increasing northward.

N. Y. L. I., not definitely known between it and Dutchess and Ulster counties, thence increasing northward.

N. J. Morris, Warren, Passaic and Sussex counties. Reported from, but not definitely known in Camden and Gloucester counties.

PA. Monroe and Schuylkill counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Predominating north of the moraine. 118-189 days. Sea level-2,764 ft.

2. **M. cerifera** L. In sandy swamps and wet woods: S. N. J. to Fla. and Tex., north to Ark.

N. J. Known only from Cape May Co., the southernmost part of our range, which is underlaid by Tertiary sands and gravels, has a growing season of 220 days, and is almost at sea level.

3. **M. carolinensis** Mill. In dry or moist sandy soil: N. S. to Fla. and Ala. and on the shores of Lake Erie. Occurs also in bogs in N. N. J. and Pa.

Throughout the range, more common in the pine-barrens of L. I. and N. J. than elsewhere, but abundant on coastal sands.

2. *Comptonia* Banks.

1. **C. peregrina** (L.) Coulter. In dry soil, especially on hillsides: N. S. to Man., N. Car., Ind. and Mich.

Throughout the range.

JUGLANDACEAE

Husk indehiscent; nut rugose or sculptured.

1. *JUGLANS*.

Husk at length splitting into segments; nut smooth or angled.

2. *HICORIA*.

1. *Juglans* L.

Fruit globose, not viscid; petioles puberulent.

1. *J. nigra*.

Fruit oblong, pointed, viscid; petioles pubescent.

2. *J. cinerea*.

1. **J. nigra** L. In rich soil: W. Mass. to S. Ont., Minn., south to Ga., Fla., Miss. and Tex. Its commercial value has resulted in the present scarcity of the tree.

CONN. Rare as a roadside escape over most of the state, perhaps native in northwestern Litchfield Co.

N. Y. Throughout.

N. J. Not recorded from the pine-barrens, elsewhere common and increasing **northward**.

PA. Monroe, Northampton, Chester and Delaware counties, presumably in the intervening territory.

Tertiary, rare or wanting: Cretaceous, not very common: Older Formations, increasing northward. 123-204 days. Sea level-1,800 ft.

2. *J. cinerea* L. Rich alluvial soil or on hillsides: N. B. to Ont. and N. Dak., south to Del. and in the mountains to Ga., and Ala.; also in Ark.

CONN. Throughout.

N. Y. Occasional on L. I. and S. I., increasing and common northward.

N. J. Reported but not definitely known from Ocean and Monmouth counties; rare in Burlington, Mercer and Middlesex counties, thence increasing and common northward.

PA. Luzerne, Monroe, Northampton, Bucks, Chester and Delaware counties.

Tertiary, 0: Cretaceous, scattered: Older Formations, increasing northward. 117-204 days. Sea level-1,700 ft.

2. *Hicoria* Raf. (*Carya* Nutt.)

Lateral leaflets falcate.

1. *H. cordiformis*

Lateral leaflets not falcate.

Bracts longer than the lobes of the staminate calyx; husk of fruit freely splitting.

Bark close, rough; foliage scurfy or pubescent.

2. *H. alba*.

Bark shaggy; foliage glabrous or pubescent.

Leaflets 7-9; nuts pointed at both ends.

3. *H. laciniosa*.

Leaflets 3-5; nuts rounded or notched at base.

4. *H. ovata*.

Bracts about as long as the lobes of the staminate calyx, except in some specimens of *H. glabra*: husk not freely splitting.

Bark shaggy; fruit subglobose to oblong.

5. *H. microcarpa*.

Bark not shaggy, close; fruit more or less obovoid.

6. *H. glabra*.

1. *H. cordiformis* (Wang.) Britton (*H. minima* Britton). In woods, swamps and on hillsides: Que to Minn., south to Fla. and Tex.

Throughout the range, except in the pine-barrens of N. J. and east and south of them; wanting in the pine-barrens of L. I.; increasing northward.

2. *H. alba* (L.) Britton. In rich woods: Mass. and Ont. to Neb., south to Fla. and Tex.

Throughout the range, except in the pine-barrens of N. J. and L. I.

3. *H. laciniosa* (F. A. Michx.) Sargent. In rich soil: central N. Y. to Iowa and Neb.
 N. J. Reported but not definitely known from Mercer Co.
 PA. Recorded from Montgomery, Bucks, Berks, Philadelphia and Delaware counties.
 Tertiary, o: Cretaceous, perhaps in Bucks Co., Pa.: Older Formations, confined to eastern Pa. 176-204 days. Sea level-624 ft.
4. *H. ovata* (Mill.) Britton. Rich moist soil in valleys or occasionally on hillsides: Que. to Minn. and Kan., south to Fla.
 Throughout the range, except in the pine-barrens of N. J. and east and south of them, and on the coastal plain of L. I.; apparently always increasing **northward**.
5. *H. microcarpa* (Nutt.) Britton. In rich woods: Mass. to Mich., south to Ga. and Mo.
 CONN. Occasional or frequent near the coast.
 N. Y. North shore of L. I.; S. I. increasing northward.
 N. J. Reported from Cumberland Co.; Bergen Co.
 PA. Monroe, Northampton, Chester and Delaware counties.
6. *H. glabra* (Mill.) Britton. Rocky woods and dry hillsides: Me. to Minn. and Kan., south to Fla. and Tex.
 CONN. Throughout.
 N. Y. Throughout, increasing **northward**.
 N. J. Throughout the state, except the coastal strip, increasing and common **northward**.
 PA. Monroe, Northampton, Bucks, Philadelphia, Delaware and Chester counties.
 Tertiary, rare: Cretaceous, scattered: Older Formations, increasing **northward**. 117-204 days. Sea level-1,000 ft.
- H. villosa* Ashe has been recorded from southern N. J.

BETULACEAE

Staminate flowers solitary in the axil of each bract, without a calyx;
 pistillate flowers with a calyx.

Staminate flowers with no bractlets; pistillate aments spike-like;
 nut small, subtended by or enclosed in a large bractlet.

Fruiting bract flat, 3-cleft and incised.

Fruiting bract bladder-like, closed, membranous.

Staminate flowers with 2 bractlets; pistillate flowers 2-4, capitate;
 nut large, enclosed by a leafy involucre.

1. CARPINUS.

2. OSTRYA.

3. CORYLUS.

Staminate flowers 3-6 together in the axil of each bract, with a calyx; pistillate flowers without a calyx.

Stamens 2, filaments 2-cleft, each fork bearing an anther-sac; fruiting bracts 3-lobed or entire, deciduous.

Stamens 4, anther-sacs adnate; fruiting bracts woody, crose or 5-toothed, persistent.

4. *BETULA*.5. *ALNUS*.

1. *Carpinus* [Tourn.] L.

1. *C. caroliniana* Walt. Moist woodlands: N. S. to Fla., west to Ont., Minn., Kan. and Tex.

Common throughout the range, except in the pine-barrens of N. J. and the coastal plain of L. I., there rare or wanting.

2. *Ostrya* [Mich.] Scop.

1. *O. virginiana* (Mill.) Willd. In dry woods: Cape Breton to N. Fla., west to Ont., Minn., S. Dak., Kan. and Tex.

CONN. Throughout.

N. Y. North of the moraine on L. I., thence increasing and common **northward**. Bloodroot Valley, S. I.

N. J. Burlington, Somerset and Hunterdon counties, increasing but not common **northward**; not in the pine-barrens.

PA. Pike, Northampton, Lehigh, Bucks, Philadelphia, Delaware and Chester counties.

Tertiary, o: Cretaceous, rare: Older Formations, increasing **northward**. 120-204 days. Sea level-2,900 ft.

3. *Corylus* [Tourn.] L.

Involucre of two broad lacinate bractlets.

1. *C. americana*.

Involucral bractlets united, prolonged into a tubular bristly beak.

2. *C. rostrata*.

1. *C. americana* Walt. In thickets: Me. and Ont. to Man., Fla. and Kan.

Throughout the range, except in the pine-barrens and east and south of them, and usually increasing **northward**.

2. *C. rostrata* Ait. In thickets: N. S. to B. Col. and Oreg., south to Ga., Tenn. and Kan.

CONN. Rare or wanting along the coast; increasing but not very common **northward**.

N. Y. In the Highlands of the Hudson, increasing but not very common **northward**. Reported but not definitely known from S. I.

N. J. Rare and local in Mercer, Union, Hunterdon and Somerset counties; increasing but not very common **northward**.

PA. Probably throughout, but not definitely known from Delaware or Luzerne counties.

Tertiary, o: Cretaceous, o, or perhaps in Bucks Co., Pa.: Older Formations, increasing northward. 117-189 days. Sea level-1,800 ft.

Corylus heterophylla Fisch. has been recorded from Conn. as an escape.

4. *Betula* [Tourn.] L.

Shrub.
Trees.

1. *B. pumila*.

Catkins slender stalked.

Bark chalky white (sometimes darker in *B. papyrifera*).

Leaves deltoid or rhombic.

Leaves ovate.

2. *B. populifolia*.

3. *B. papyrifera*.

Bark brown or red-brown or green-brown, not white.

4. *B. nigra*.

Catkins sessile or very nearly so.

Fruiting scales glabrous.

5. *B. lenta*.

Fruiting scales ciliate.

Scales 4-5 mm. long, the lateral wings almost basal; leaves cordate.

6. *B. alleghaniensis*.

Scales 8-10 mm. long, the lateral wings arising in the upper half of the scale, leaves rarely cordate.

7. *B. lutea*.

1. *B. pumila* L. In bogs or wet ground: Newf. to Ont. and the N. W. Terr., south to N. J., Ohio and Minn.

CONN. Northwestern Litchfield Co.

N. Y. Pine Plains, Dutchess Co., increasing **northward**.

N. J. Morris, Warren and Sussex Co.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Not south of the moraine. 117-153 days. 650-1,800 ft.

2. *B. populifolia* Marsh. Along streams or on hillsides: Prince Edward's Is. to Delaware, west to W. N. Y. and E. Pa.

Throughout the range except in southern Pa.

3. *B. papyrifera* Marsh. In forests: Newf. to Alask., south to N. J., Pa., Mich., Neb., Colorado and Wash.

CONN. Rare and local in the coastal counties, increasing **northwestward**.

N. Y. Dutchess Co., increasing but not very common **northward**.

N. J. Known only from two isolated stations in Union Co., both perhaps derivatives of cultivation.

PA. Luzerne, Lackawanna, Monroe and Northampton counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Not south of the moraine except in Pa. 117-185 days. Sea level-2,000 ft.

4. **B. nigra** L. In moist soil along river valleys and in swamps: northeastern Mass. to Fla., west through southern N. Y. to Ill., Minn., Neb., Kan., Tex. and Fla.

N. Y. Reported, but not recently collected from L. I.; S. I. and up the Hudson Valley to Dutchess Co., decreasing northward.

N. J. Throughout the state, except the pine-barrens, especially in the drainage area of the Delaware River.

PA. Monroe, Northampton and Chester counties, presumably in the intervening territory.

Tertiary, common: Cretaceous, o: Older Formations, decreasing northward. 135-204 days. Sea level-1,800 ft.

5. **B. lenta** L. Rocky woodlands: Newf. to Ga. and Ala., west to Ont., Ill. and Tenn.

Throughout the range, except in the pine-barrens, there wanting; rare on the coastal plain.

6. **B. alleghaniensis** Britton. In woodlands: Mass. to Quebec and N. Mich., south to N. Y. and Pa., and in the mountains to Ga.

CONN. Throughout, increasing **northward**.

N. Y. Bronx and Westchester counties; Highlands of the Hudson, increasing **northward** and westward; Copake Falls.

N. J. Essex, Passaic and Bergen counties, increasing **northward**.

PA. Luzerne, Monroe and Pike counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Not south of the moraine. 118-187 days. Sea level-2,200 ft.

7. **B. lutea** Michx. In deep forests: Newf. to Man., south to Mass., Pa. and Wisc.

Confined so far as now known to the high peaks of Greene and Ulster counties, N. Y., at elevations exceeding 2,800 ft.; a region with a growing season of 117-123 days; and to the north shore of L. I. Not south of the moraine.

5. *Alnus* [Tourn.] Hill

Leaves not glutinous when mature; native species.

Leaves prevailingly obovate; shrub or small tree.

1. *A. rugosa*

Leaves ovate, oval, or oblong, seldom obovate.

Leaves ovate or oval, glaucous or finely tomentose beneath.

2. *A. incana*.

Leaves oblong or slightly obovate, pale but not glaucous beneath; a tree.

3. *A. noveboracensis*.

Leaves glutinous when mature, introduced European species.

4. *A. Alnus*.

1. *A. rugosa* (Du Roi) K. Koch (*A. serrulata* Willd.). In wet soil or on hillsides: Me. to Ohio, Minn., Fla. and Tex.

Throughout the range.

2. *A. incana* (L.) Willd. In wet soil: Newf. to N. W. Terr., south to S. N. Y., Pa., and Neb. Also in Europe and Asia, but the Old World plant may be different from ours.

CONN. Rare in the southeastern part of the state and along the coast, increasing **northwestward**.

N. Y. Rare on L. I. north of the moraine; rare in Westchester Co., increasing and common **northward**.

N. J. Warren, Morris and Sussex counties.

PA. Luzerne, Lackawanna, Pike, Monroe, Northampton and Lehigh counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. South of the moraine only in Pa. 117-187 days. Sea level-2,800 ft.

3. *A. noveboracensis* Britton. Woods and thickets near the coast: Southeastern N. Y.; perhaps on Nantucket.

A rare and local plant known definitely only from its type locality. Grant City, S. I.; first recorded as *A. incana*.

4. *A. Alnus* (L.) Britton (*A. glutinosa* Gaertn.). In wet places: Mass. to southern N. Y. and N. J., west to Pa.; also near Chicago. Native of Europe.

An occasional escape in many parts of our range; often wanting.

FAGACEAE

Staminate catkins globose; nut triangular.

1. FAGUS.

Staminate catkins slender, elongate.

Nut enclosed in a prickly burr.

2. CASTANEA.

Nut seated in an open scaly cup.

3. QUERCUS.

1. *Fagus* [Tourn.] L.

1. *F. grandifolia* Ehrh. In rich soil: Nov. Scot. to Ont. and Wisc., south to Fla. and Tex.

Throughout the range always increasing **northward** and decreasing in size and number in the pine-barrens; wanting in the middle of them.

2. *Castanea* [Tourn.]Hill.

Leaves densely tomentose beneath; small tree or shrub.

1. *C. pumila*.

Leaves smooth on both sides; large forest tree.

2. *C. dentata*.

1. *C. pumila* (L.) Mill. In dry soil: N. J. to Ind., south to Fla., Mo. and Tex.

N. J. Mercer, Camden, Gloucester and Salem counties, exclusively north and west of the pine-barrens.

PA. Chester and Delaware counties.

Tertiary, o: Cretaceous, not very common: Older Formations, confined to Chester Co., Pa. Not north of the moraine. 176-204 days. About sea level.

2. *C. dentata* (Marsh) Borkh. Rich woods or in dry ground: Me. to Ont. and Mich., south to Del. and in the mountains to Ala. and Miss., west to Ind. and Ark.

Throughout the range except in southern N. J. and the pine-barrens, there rare and local or wanting. A burless variety has been collected in Greene Co., N. Y.

3. *Quercus* L.

Leaves or the lobes bristle-tipped; fruit maturing the second season.

Leaves pinnatifid or pinnately lobed.

Leaves pinnatifid or pinnately lobed, usually deeply so.

Leaves green on both sides.

Cup saucer-shaped, broader than deep.

Cup 16-30 mm. broad; leaves dull.

1. *Q. rubra*.

Cup 8-16 mm. broad; leaves shining above.

2. *Q. palustris*.

Cup top-shaped, to hemispheric or deeper.

Inner bark of tree bright orange, leaves hairy on the veins.

3. *Q. velutina*.

Inner bark yellow or reddish, not orange.

Leaves pale beneath (northern tree).

4. *Q. borealis*.

Leaves shining both sides.

5. *Q. coccinea*.

Leaves white or gray-tomentulose beneath.

Large trees; leaf-lobes long, lanceolate.

Leaves rounded or obtuse at base, 3-7 lobed.

6. *Q. triloba*.

Leaves cuneate, acute or truncate at base, 5-13 lobed.

7. *Q. pagodaefolia*.

Small tree or shrub; leaf lobes triangular, short.

8. *Q. ilicifolia*.

Leaves 3-5 lobed above the middle; obovate or spatulate.

- Leaves obovate-cuneate, brown-floccose beneath. 9. *Q. marilandica*.
 Leaves spatulate to obovate, glabrous both sides. 10. *Q. nigra*.
 Leaves entire, rarely with a very few teeth.
 Leaves smooth beneath except sometimes in the axils
 of veins. 11. *Q. Phellos*.
 Leaves pubescent beneath. 12. *Q. imbricaria*.
 Leaves or their lobes not bristle-tipped; fruit maturing the first
 season.
 Leaves crenate or shallowly lobed.
 Acorns sessile.
 Low tree, or usually a shrub; leaves obovate. 13. *Q. prinoides*.
 Tall trees; leaves oblong to lanceolate, rarely
 obovate; bark close. 14. *Q. Muhlenbergii*.
 Acorns stalked.
 Peduncles shorter than the petioles, rarely as long.
 Teeth of the leaves acute or mucronulate. 15. *Q. Michauxii*.
 Teeth of the leaves rounded. 16. *Q. Prinus*.
 Peduncles much longer than the petioles. 17. *Q. bicolor*.
 Leaves deeply lobed.
 Leaves hairy, at least on the veins beneath.
 Upper scales of the cup awned, forming a fringe. 18. *Q. macrocarpa*.
 Upper scales not awned.
 Acorn broader than high, nut immersed in cup. 19. *Q. lyrata*.
 Acorn longer than broad, nut only $\frac{1}{2}$ immersed
 in cup. 20. *Q. stellata*.
 Leaves smooth and pale beneath when old; cup shallow. 21. *Q. alba*.
1. ***Q. rubra* L.** In various situations: N. S. to Minn. and Kan.,
 south to Fla. and Tex.
 Throughout the range except in the pine-barrens, there wanting,
 always increasing **northward**.
 2. ***Q. palustris* Du Roi.** In moist places: Mass. to Mich. and
 Mo., south to Va., Tenn. and Ind. Terr.
 Throughout the range, except in the pine-barrens and east of
 them; increasing in the Connecticut Valley and southwestern
 Conn.
 3. ***Q. velutina* Lam.** In dry soil: Me. to W. Ont., south to Fla.
 and Tex.
 Throughout the range.
 4. ***Q. borealis* Michx. f.** Que. and Ont. to N. Y. and Pa. and
 perhaps in the mountains to N. Car.
 CONN: Litchfield Co.
 N. Y. Highlands of the Hudson, increasing but not common
northward.
 N. J. Passaic Co.
 PA. Northampton Co.

Tertiary, o: Cretaceous, o: Older Formations, rare and local.
117-153 days. 500-2,000 ft.

5. **Q. coccinea** Meunch. In dry sandy soil: Me. to Minn., N. Car. and Mo.
Throughout the range.
6. **Q. triloba** Michx. (*Q. digitata* Michx.). In gravelly or sandy soil: L. I., N. J. to Mo., Fla. and Tex.
N. Y. Recorded from L. I. but record not verified.
N. J. Common or frequent on the coastal plain from Monmouth Co. southward.
PA. Philadelphia, Delaware and Chester counties.
Tertiary, common on Beacon Hill, rare elsewhere: Cretaceous, less common: Older Formations, scattered. Not north of the moraine. 179-204 days. About sea level.
7. **Q. pagodaefolia** (Ell.) Ashe. Swamp, woodlands and along streams: L. I. to S. Ill. and Mo., south to Fla. and Ark.
Recorded so far as known only from near West Hempstead, L. I., an area on the coastal plain, with a growing season of about 190 days.
8. **Q. ilicifolia** Wang. (*Q. nana* Marsh). Usually in somewhat sterile soil: Me. to Ohio, south to N. Car. and Ky.
Throughout the range.
9. **Q. marilandica** Meunch. In dry, somewhat sterile soil: N. Y. to Pa., Ind. and eastern Neb., south to Fla. and Tex.
N. Y. L. I. and S. I.
N. J. South Amboy and Jamesburg, Middlesex Co., increasing and common **southward**.
PA. Northampton, Montgomery, Bucks, Berks, Chester and Delaware counties.
Tertiary, common: Cretaceous, less common: Older Formations, confined to eastern Pa. Not north of the moraine, but on it at Ft. Wadsworth, S. I. 169-220 days. About sea level.
10. **Q. nigra** L. Wet shores: S. N. J. to Ky., Mo., Fla. and Tex.
N. J. Near Bennett, Cape May Co.
11. **Q. Phellos** L. In wet sandy soil: L. I. to Fla., west to Ky., Mo. and Tex.
N. Y. Suffolk Co., L. I.; not recently collected; and on S. I. exclusively south of the moraine.

N. J. Southern Mercer and Middlesex counties, thence increasing and common **southward**.

PA. Bucks, Philadelphia, Delaware and Chester counties.

Tertiary, common: Cretaceous, less common: Older Formations, scattered. Not north of the moraine. 169-204 days. About sea level.

12. **Q. imbricaria** Michx. Rich woods: Pa. to Mich. and Neb., south to Ga. and Ark.

PA. Lehigh and Philadelphia counties.

Tertiary, o: Cretaceous, perhaps near Philadelphia: Older Formations, not common. Not north of the moraine. 179-204 days. Sea level-500 ft.

13. **Q. prinoides** Willd. In dry sandy or rocky soil: Me. to Minn., N. Car., Ala. and Tex.

Throughout the range, apparently decreasing in the Piedmont Plain of N. J.

14. **Q. Muhlenbergii** Engelm. (*Q. acuminata* Houba; *Q. Alexanderi* Britton). Usually in limestone soil: Ont. to Minn., Fla. and Tex.

CONN. In northwestern Litchfield Co. and on or near outcrops of Stockbridge Limestone in the valley of the Housatonic river.

N. Y. Peekskill, Westchester Co., and probably on the limestone outcrops in the rest of the upper Hudson Valley.

N. J. Bergen, Warren and Sussex counties.

PA. Northampton, Lehigh, Bucks and Chester counties.

Tertiary, o: Crétaceous, o: Older Formations, predominating on limestone, not common. 138-204 days. Sea level-1,000 ft.

15. **Q. Michauxii** Nutt. In moist soil: S. N. J. to Fla., Ind., Mo. and Tex.

N. J. Moorestown, Repaupo and Upper Pennsgrove.

16. **Q. Prinus** L. In sterile soil, usually on hillsides: Me. to Ont., south to N. J. and Va., south in the mountains to Ga., Ala. and Tenn.

Throughout the range.

17. **Q. bicolor** Willd. (*Q. platanooides* Sudw.). In rich wet soil: Me. and Que. to Mich., south to Ga. and Ark.

Throughout the range, except in the pine-barrens and east and south of them.

18. *Q. macrocarpa* Michx. In rich bottom lands: Nov. Scot. to Man., Wyo., Ga. and Tex.
 CONN. Northwestern Litchfield Co., not common.
 N. Y. Greene Co.
 PA. Northampton, Lehigh, Delaware and Philadelphia counties.
 Tertiary, o: Cretaceous, o: Older Formations, not common in our range, 153-179 days. Sea level-1,000 ft.
19. *Q. lyrata* Walt. In swamps or along streams: N. J. to Fla. and Mo.
 N. J. Near Riddleton, Salem Co., a region with a growing season of 179 days, at about sea level and near the line between the Tertiary and Cretaceous regions.
20. *Q. stellata* Wang. Rocky or dry soils: Mass. to Pa., Ohio, Mo. and Kan., south to Fla. and Tex.
 CONN. Along the coast, decreasing and perhaps wanting inland.
 N. Y. Common on L. I. and S. I., decreasing northward to Larchmont, Westchester Co.
 N. J. Rare and local in Bergen, Hudson and (?) Warren counties, increasing and common **southward**.
 PA. Northampton, Chester and Delaware counties.
 Tertiary, common: Cretaceous, common: Older Formations, scattered. Predominating south of the moraine. 160-204 days. **Sea level-350 ft.**
21. *Q. alba* L. Rich woods: southern Me. to Ont. and Minn., south to Fla. and Tex.
 Throughout the range.

The following hybrids have been described and are to be looked for in our range wherever both the supposed parents are known.

Quercus marilandica × *Phellos* = *Q. Rudkini* Britton.

Quercus marilandica × *illicifolia* = *Q. Brittonii* W. T. Davis.

Quercus Phellos × *rubra* = *Q. heterophylla* Michx.

Quercus Phellos × *ilicifolia*.

Quercus Phellos × *triloba*.

Quercus imbricaria × *marilandica* = *Q. tridentata* Engelm.

Quercus alba × *Prinus*.

ULMACEAE

Fruit a dry, winged samara.

Fruit a fleshy, juicy drupe, with a hard endocarp.

1. ULMUS.

2. CELTIS

1. *Ulmus* [Tourn.] L.

At least some of the branches corky winged; samara faces pubescent. 1. *U. Thomasi*.
None of the branches winged.

Leaves smooth or somewhat roughened above; samara faces
glabrous, the margins ciliate. 2. *U. americana*.

Leaves very rough above; samara faces pubescent over the seed,
the margins not ciliate. 3. *U. fulva*.

1. ***U. Thomasi*** Sargent (*U. racemosa* Thomas). On hillsides and slopes: Que. and Ont. to Mich. and Wisc., south to N. J., Ky., Ohio, Mo. and E. Neb.

Known in our range only from Woodruff's Gap, Sussex Co., N. J.

2. ***U. americana*** L. In various situations: Newf. to Fla., west to Sask., S. Dak., south to Kan. and Tex.

Throughout the range except in the pine-barrens of N. J. and east and south of them; not known as a wild tree on L. I.

3. ***U. fulva*** Michx. Rocky hillsides and banks of streams: Que. to Fla., west to N. Dak., Neb. and Tex.

CONN. Local over most of the state, increasing **northward**.

N. Y. Frequent north of the moraine on L. I.; S. I., thence increasing and common **northward**, particularly in the Catskills.

N. J. Burlington, Mercer and Monmouth counties, north and west of the pine-barrens, rare; thence increasing and common **northward**.

PA. Monroe, Northampton, Delaware and Chester counties, presumably in the intervening territory.

Tertiary, o: Cretaceous, rare and local. Older Formations, common northward. 117-204 days. Sea level-1,933 ft.

The English elm, *Ulmus campestris* L., and the wahoo, *U. alata* Michx., have both been reported as established escapes.

2. *Celtis* [Tourn.] L.

Pedicels long, mostly twice as long as the drupe or longer.

Leaves smooth or nearly so above.

Leaves acute or short acuminate.

Leaves long-acuminate.

Leaves rough above; drupe subglobose.

Pedicels short, less than twice as long as the drupe.

1. *C. occidentalis*.

2. *C. canina*.

3. *C. crassifolia*.

4. *C. georgiana*.

1. ***C. occidentalis*** L. In rocky places, often on hillsides; Que. to N. Car., westward to Man., Neb. and Okl.

Throughout the range but not very common, decreasing in the pine-barrens of L. I. and wanting in those of N. J.

2. **C. canina** Raf. In rich soil of fields and meadows: N. Y. to Ill. and S. Dak., south to Pa. and Mo.

Localized in our range, near Bushkill, Pike Co., Pa., a region north of the moraine with a growing season of 149 days, and underlain by Marcellus Shale.

3. **C. crassifolia** Lam. In rich soil: Mass.?, N. Y. and Pa. to S. Car., west to Ind., S. Dak., Tenn., Kan. and Col.

N. Y. Garrison-on-Hudson.

N. J. Sussex Co. to Mercer Co.

PA. Northampton and Bucks Co.

A localized species in our range.

4. **C. georgiana** Small. Rocky and gravelly soil: N. J. to Fla., Ky., Mo. and Ala.

Localized in our range, so far as known near Newton, Sussex Co., N. J., a region north of the moraine, and with a growing season of 138 days.

MORACEAE

Staminate and pistillate flowers spiked; leaves dentate or lobed.	1. MORUS.
Staminate flowers racemose or spiked; pistillate capitate.	
Pistillate perianth deeply 4-cleft; leaves entire.	2. TOXYLON.
Pistillate perianth 3-4 toothed; leaves various.	3. PAPYRIUS.

1. *Morus* [Tourn.] L.

Leaves rough above, pubescent beneath; fruit purple; spikes 2-6 cm. long.

1. *M. rubra*.

Leaves smooth and glabrous, or very nearly so, on both sides; fruit nearly white; spikes 1-1.5 cm. long.

2. *M. alba*.

1. **M. rubra** L. In river valleys or on moist hillsides: Mass. to Ont., Mich. and Neb., south to Fla. and Tex.

Throughout, except in the pine-barrens of L. I. and N. J.

2. **M. alba** L. Naturalized along riversides from N. Eng., southward. Native of Asia and Europe.

Occasional as an escape from cultivation.

2. *Toxylon* Raf.

1. **T. pomiferum** Raf. Mo. to Kan. and Tex., in the east naturalized in New Eng. and Middle States.

Rare as a naturalized escape in our range.

3. *Papyrius* Lam. (*Broussonetia* L'Her.)

1. *P. papyrifera* (L.) Kuntze. Along roadsides: N. Y. to Fla. and Mo. Native of Asia.
Rare in our range as a localized escape.

CANNABINACEAE

Twining vines.
Erect herbs.

1. *HUMULUS*.
2. *CANNABIS*.

4. *Humulus* L.

Bracts and achenes dotted with yellow, resinous grains.
Bracts and achenes not so dotted.

1. *H. Lupulus*.
2. *H. japonicus*.

1. *H. Lupulus* L. In thickets and on river banks: N. S. to Man., N. Y. and Pa., in the Alleghanies to Ga. and Kan., and in the Rocky Mts. to Ariz. and N. Mex. Also in Europe and Asia.
Throughout the range, except in southern N. J.; often an escape from cultivation.
2. *H. japonicus* Sieb. and Zucc. In waste ground: Conn. to Del. Native of Europe.
Rare in our range as an escape.

2. *Cannabis* [Tourn.] L.

1. *C. sativa* L. In waste places: N. B. to Ont., Minn., N. Car., Tenn. and Kan.
Rare as an escape on waste ground.

URTICACEAE

Herbs with stinging hairs.

Leaves opposite; both kinds of flowers 4-parted; achene straight.

1. *URTICA*.

Leaves alternate; staminate flowers 5 parted; achene oblique.

2. *URTICASTRUM*.

Herbs without stinging hairs.

Flower clusters paniced or spiked, not involucrate; leaves mostly opposite.

Pistillate calyx 3 parted or of 3 sepals.

3. *PILEA*.

Pistillate calyx, 2-4 toothed or entire.

4. *BOEHMERIA*.

Flowers clusters involucrate by leafy bracts, leaves alternate.

5. *PARIETARIA*.

1. *Urtica* [Tourn.] L.

Perennials, 0.6-2.2 m. tall; flower-clusters compound.

Leaves ovate, cordate at base.

1. *U. dioica*.

Leaves lanceolate, rarely cordate.

2. *U. gracilis*.

Annuals, 1.5-7 dm. tall; flower-clusters oblong, rather dense.

3. *U. urens*.

1. **U. dioica** L. In waste places: Newf. to Ont., Minn., S. Car., Mo. and Colo. Naturalized from Europe. Native also of Asia.

Casual in most parts of our range, except in the pine-barrens, there rare or wanting.

2. **U. gracilis** Ait. In dry soil: Newf. to B. Col., N. Car., La. and Colo.

CONN. Throughout the state, increasing **northward**.

N. Y. Not common on L. I. and S. I., becoming frequent in Westchester Co. thence increasing and common **northward**.

N. J. Unknown in the pine-barrens; rare and local in Burlington, Mercer and Middlesex counties, thence increasing and common **northward**.

PA. Northampton and Pike counties.

Tertiary, o: Cretaceous, rare and local: Older Formations, increasing **northward**. 120-210 days. Sea level-1,950 ft.

3. **U. urens** L. In waste places: Newf. to N. Y., N. J. and Fla. Also on the Pacific Coast. Naturalized from Europe.

A rare adventive.

U. Lyallii S. Wats., a species confused with *U. gracilis*, has been credited to our range, especially in Conn. and Pa.; it is omitted from the list because its specific and distributional status are open to question.

2. *Urticastrum* Fabr.

1. **U. divaricatum** (L.) Kuntze. In rich woods: N. S. to Ont., N. Dak., Minn., Fla. and Kan.

Throughout the range, except in the pine-barrens, always increasing **northward**.

3. *Pilea* Lind (*Adicea* Raf.)

1. **P. pumila** (L.) A. Gray. In swampy shaded situations, often on old logs: N. B. to Ont., Minn., Fla., La., Neb. and Kan. Also in Japan.

Throughout the range, except in the pine-barrens of N. J. and L. I., there rare or wanting.

4. *Boehmeria* Jacq.

Leaf-blades leathery, finely serrate; petioles much shorter than the blades.

1. *B. Drummondiana*.

Leaf-blades relatively thin, coarsely serrate, petioles as long as the blades or a little shorter.

2. *B. cylindrica*.

1. **B. Drummondiana** Weddell. (*B. scabra* (Porter) Small). In swamps: Conn. to Mich., Kan., Fla. and Texas.

CONN. Reported from Southington, Bridgeport and Fairfield.

N. Y. Occasional on L. I., rare on S. I.; Bronx and Westchester counties to the Highlands. Unknown elsewhere.

N. J. Throughout the state except the pine-barrens, there rare or wanting.

PA. Northampton Co.

A little known species, whose distribution is not yet elucidated; perhaps not specifically distinct from the following.

2. **B. cylindrica** (L.) Willd. In moist soil: Que. and Ont. to Minn., Fla., Kan. and Tex.

Common throughout the range except in the pine-barrens, there rare or wanting.

5. *Parietaria* L.

1. **P. pennsylvanica** Muhl. On dry rocks and banks: Me. and Ont. to B. Col., Fla., Colo. and Mex.

CONN. Throughout the state but rare and local.

N. Y. Manhasset Neck, L. I., unknown on S. I., South Yonkers, Westchester Co.

N. J. Known only from Sandy Hook, Monmouth Co. and rare and local in Mercer, Hunterdon, Warren, and Bergen counties.

PA. Chester and Bucks counties.

A rare and local species whose distribution is little understood.

Parietaria officinalis L., *P. debilis* Forst. and *P. diffusa* Mert. & Koch have been credited to the area as waifs. Not recently collected.

LORANTHACEAE

Leaves scale-like, united at the base; anthers 1-celled; berry peduncled.

1. RAZOUMOFSKYA.

Leaves thick, flat; anthers 2-celled; berry sessile.

2. PHORADENDRON.

1. *Razoumofskya* Hoffm.

1. **R. pusilla** (Peck) Kuntze. Parasitic on twigs of spruces and larch: Newf. to Conn., N. Y., Pa. and Mich.

CONN. Rare and local in Litchfield Co.

N. Y. Mountain summits in Greene Co.

PA. Mountain summits in Pike and Monroe counties.

So far as known not distributionally coextensive with our spruces and the larch. Its known localities are more restricted than theirs.

2. *Phoradendron* Nutt.

1. *P. flavescens* (Pursh) Nutt. Parasitic on deciduous leaved trees, notably on the Tupelo and Red Maple: N. J. to Ohio, Ind., Mo., Fla., Texas.
 N. J. Keyport, Monmouth Co. and Hightstown, Mercer Co. increasing **southward**.
 PA. Schuylkill, Delaware and Chester counties.

SANTALACEAE

1. *Comandra* Nutt.

1. *C. umbellata* (L.) Nutt. Dry fields and thickets: Cape Breton Is. to Ont., Br. Col., Ga., Ariz. and Cal.
 Throughout the range.

ARISTOLOCHIACEAE

Acaulescent herbs; perianth regular, persistent; filaments distinct. 1. ASARUM.
 Vines or erect leafy-stemmed herbs; perianth irregular, deciduous; anthers sessile. 2. ARISTOLOCHIA.

1. *Asarum* L.

- Calyx segments lanceolate acuminate, longer than the tube, not reflexed. 1. *A. canadense*.
 Calyx segments triangular, merely acute, about as long as the tube, reflexed; the tip obtuse. 2. *A. reflexum*.
1. *A. canadense* L. Rich woods: N. B. to Man., Ont., N. C., Mo. and Kan.
 CONN. Not common along the coast, increasing and common **northwestward**.
 N. Y. Reported, but not definitely known from L. I., perhaps at Newtown, increasing and common **northward** up the Hudson Valley.
 N. J. Rare in Gloucester, Camden, Burlington and Monmouth counties, thence increasing and common **northward**.
 PA. Northampton, Chester and Delaware counties.
 Tertiary, o: Cretaceous, not common: Older Formations, increasing and common **northward**. 117-190 days. Sea level-3,200 ft.
2. *A. reflexum* Bicknell. Rich or wet woods: Conn. to Iowa, N. C., Mo. and Kan.
 CONN. Fairfield and Litchfield counties.

N. Y. S. I., frequent in Bronx, Westchester and Rockland counties.

N. J. Morris and Sussex counties.

PA. Bucks, Northampton and Delaware counties.

Tertiary, o: Cretaceous, o; Older Formations not very common.
South of the moraine only in Pa. 138-186 days. **Sea level**-680 ft.

2. *Aristolochia* [Tourn.] L.

Calyx tube bent; flowers solitary.

1. *A. Serpentaria*.

Calyx tube straight; flowers clustered, axillary.

2. *A. Clematitis*.

1. **A. *Serpentaria*** L. In dry woods: Conn. and N. Y. to Mich., south to Fla. and La.

CONN. Rare over most of the state.

N. Y. Rare and local on L. I. and S. I., apparently wanting south of the moraine on L. I.; thence increasing, but not very common, northward to Putnam Co.; not known northward.

N. J. Very rare in Cape May Co., increasing but rare **northward**; rare or wanting in the pine-barrens.

PA. Northampton, Delaware, Berks and Chester counties.

Tertiary, o: Cretaceous, not common: Older Formations, more common. 162-210 days. Sea level-680 ft.

2. **A. *Clematitis*** L. Near Ithaca and Flushing, N. Y., and E. Pa. An escape from cultivation. Native of Europe.

A rare and perhaps doubtfully established escape.

A. macrophylla Lam., is an occasional escape.

POLYGONACEAE

Stigmas tufted; calyx 6-parted.

1. RUMEX.

Stigmas capitate.

Internodes not adnate; plants not heath-like.

Leaf-blades jointed at the base; ochreae 2-lobed; filaments dilated.

2. POLYGONUM.

Leaf-blades not jointed at the base; ochreae not 2-lobed; filaments slender.

Ochreae cylindric, truncate.

Sepals 4; calyx curved; stamens 4.

3. TOVARA.

Sepals mostly 5; calyx straight.

4. PERSICARIA.

Ochreae oblique, partly open on one side.

Sepals neither keeled nor winged.

Racemes corymbed; plants smooth.

5. FAGOPYRUM.

Racemes not corymbed; plants prickly.

6. TRACAULON.

Sepals, at least the outer, keeled or winged.

Stigmas capitate; styles erect or none.

7. TINIARIA.

Stigmas dilated, toothed; styles divaricate.

8. PLEUROPTERYS.

Internodes adnate; plants heath-like.

9. POLYGONELLA.

1. *Rumex* L.

- Leaves hastate; flowers dioecious; foliage acid; low species.
 Inner sepals not developing wings in fruit; achenes granular. 1. *R. Acetosella*.
 Fruiting inner sepals developing wings; achenes smooth. 2. *R. hastatulus*.
 Basal leaves numerous. 3. *R. Acetosa*.
 Basal leaves few.
- Leaves not hastate; flowers perfect or polygamo-dioecious; foliage scarcely or not at all acid; tall species.
- Leaves flat, bright or light green, or glaucescent.
 Tubercles usually 3; pedicel longer than the wing.
 Pedicels several times longer than the wing. 4. *R. verticillatus*.
 Pedicels little longer than the wing. 5. *R. mexicanus*.
 Tubercle usually 1; pedicels equalling the wing. 6. *R. altissimus*.
- Leaves wavy-margined or crisped, not glaucescent.
 Wings of the calyx entire, more or less undulate.
 Lower leaves narrowed or acuminate at the base.
 Tubercle 1. 7. *R. Patientia*.
 Tubercles 3. 8. *R. Britannica*.
- Lower leaves cordate or rounded at the base.
 Tubercles mostly 3; inflorescence not leafy, pedicels long. 9. *R. crispus*.
 Tubercle 1; inflorescence not leafy; pedicel short. 10. *R. sanguineus*.
- Wings of the calyx toothed or fringed.
 Lower leaves cordate.
 Wings ovate or oblong-ovate; tubercles mostly 2. 11. *R. pulcher*.
 Wings hastate or ovate-hastate; tubercle 1. 12. *R. obtusifolius*.
 Lower leaves mostly narrowed at the base; wings with 4 spreading, bristle-like teeth. 13. *R. persicarioides*.
1. **R. Acetosella** L. Dry fields and hillsides: throughout N. Am., except the extreme north. Naturalized from Europe.
 Abundant as a roadside and field weed.
2. **R. hastatulus** Muhl. On the seacoast: Mass. to Fla. and on the plains from Kan. to Tex.
 N. Y. Exclusively north of the moraine on eastern L. I.; not reported from S. I., elsewhere unknown.
 N. J. Longport, Atlantic Co.
 A localized species whose center of distribution is unknown.
3. **R. Acetosa** L. Lab. to Alaska. Naturalized from Eu. in Vt., N. Y. and Pa.
 Local as a weed.
4. **R. verticillatus** L. In swamps: Que. to Ont. and Iowa. south to Fla. and Tex.
 CONN. Known only in the area of the drainage of the Connecticut River.

- N. Y. Southern shore of L. I. and on S. I. Unknown elsewhere.
 N. J. Near Paterson, thence increasing southward, but not in the pine-barrens.
 Rare and local; its center of distribution uncertain.
5. **R. mexicanus** Meisn. Newf. to B. C., Me., Tex. and Mex., locally introduced eastward.
 Occasional in waste ground.
6. **R. altissimus** Wood. Along streams and in swamps: Conn. to Neb., Md. and Texas.
 CONN. Rare and local in waste places perhaps adventive from the West.
 N. Y. Not common; a weed in waste places.
 N. J. Locally as a weed near Hoboken, Jersey City and Newark.
 Rare or wanting elsewhere.
7. **R. Patientia** L. Waste places: Me. and Ont. to Wis., south to Conn., Pa. and Kan. Also in the far west. Naturalized from Europe.
 Locally as a weed.
8. **R. Britannica** L. In swamps and wet soil: N. B. and Ont. to Minn., N. J., Pa., Ill. and Neb.
 Throughout the range in ecologically favorable habitats; not reported from the pine-barrens of L. I. and N. J.
9. **R. crispus** L. In fields and waste places: nearly throughout N. Am. Naturalized from Eu. Native of Asia.
 Abundant as a troublesome weed in most parts of the range.
10. **R. sanguineus** L. In waste places and on ballast: S. N. Y. to Va. Naturalized from Europe.
 Uncommon and local weed. Not recently collected.
11. **R. pulcher** L. Waste places: Va. to Fla. and La. Also on the Pacific coast and in ballast about the eastern seaports.
 Locally rare as an occasional weed.
12. **R. obtusifolius** L. Waste places: N. S. to N. B. to Ore., south to Fla. and Tex. Naturalized from Eu. Native also in Asia.
 Locally abundant as a weed.

13. **R. persicarioides** L. On sea shores: N. B. to Va. and westward. Sometimes confused with the Old World *R. maritimus* L.

N. Y. Eastern L. I.

N. J. Middlesex Co.; reported from Monmouth and Ocean counties.

R. conglomeratus Murr., and *R. salicifolius* Weinm., have been reported, but it is doubtful if they are really established. *R. maritimus* L. has been collected as a waif. *R. elongatus* Guss. is recorded from Southington, Conn.

2. **Polygonum** [Tourn.] L.

Stems and branches terete and usually striate.

Achenes much exerted from the calyx.

Plant prostrate; achene broad.

1. *P. maritimum*.

Plant erect; achene narrow.

2. *P. exsertum*.

Achenes included within the calyx; or exposed at the tip.

Sepals with white or pink margins.

Pedicels not exerted from the ocreae.

Achenes with striate faces.

Mature sepals over 3.5 mm. long; achenes acute.

3. *P. aviculare*.

Mature sepals less than 3.3 mm. long; achenes acuminate.

4. *P. neglectum*.

Achenes with granular or nearly smooth faces.

Plant prostrate; leaves broad; mature sepals over 3.5 mm. long.

5. *P. buxiforme*.

Plant erect or nearly so; leaves narrow; mature sepals less than 3.3 mm. long.

6. *P. prolificum*.

Pedicels exerted.

7. *P. atlanticum*.

Sepals with yellowish or greenish margins.

8. *P. erectum*.

Stems and branches angled.

9. *P. tenue*.

1. **P. maritimum** L. In sands of the seashore: Mass. to Fla. Also on the coast of Europe.

CONN. Reported but not definitely known.

N. Y. Common along the south shore of L. I., less common on the north shore; rare along the coast on S. I.; unrecorded elsewhere.

N. J. Uncommon along the sea coast, not recorded elsewhere.

Apparently never found far from sandy sea beaches.

2. **P. exsertum** Small. Saskatchewan, south to Ill., Mo. and Neb.; and along the Atlantic coast in brackish marshes, from N. B. to N. J.

CONN. Rare along the coast in New Haven and Fairfield counties.

- N. Y. Not very common along the coast of L. I., and S. I., ascending the Hudson to the junction of the Harlem.
- N. J. Near Woodbridge, Middlesex Co. and Absecon, Atlantic Co.
Rare and local along our coastal marsh-lands; apparently reaching its southerly range with us.
3. **P. aviculare** L. (*P. monspeliense* Pers.). A weed in cultivated and waste grounds: nearly throughout N. Am.
Abundant as a weed throughout the area.
 4. **P. neglectum** Besser. A cosmopolitan weed found throughout the N. Temp. Regions.
Common everywhere.
 5. **P. buxiforme** Small (*P. littorale* Auct. not of Link). On shores and in waste places: N. B. to Minn. and Cal., south to Va., Ill. and Kan.
Occasional in our range, the known stations lying between Stonington, Conn. and Woodbridge, N. J. These and the intermediate stations are all near tidal marshes.
 6. **P. prolificum** (Small) Robinson. (*P. ramosissimum prolificum* Small). In saline soil: Minn. to the N. W. Terr., N. Mex. and Cal., and on the Atlantic Coast from Me. to N. J.
Common along our coasts, and reported from a roadside at Litchfield, Conn.
 7. **P. atlanticum** (Robinson) Bicknell. In salt marshes: Me. to N. J.
Scattered through the coastal marshes.
 8. **P. erectum** L. In moist or dry soil: Me. to Ont., the N. W. Terr., Tenn. and Ark.
Common throughout most of the range as a weed. Less common in the pine-barrens of L. I. and N. J. than elsewhere.
 9. **P. tenue** Michx. Dry soil: Me. and Ont. to Minn., Nebr., Ga. and Ark.
Frequent throughout the area, except in the pine-barrens of L. I. and N. J., there rare or wanting.

The reported occurrence of *P. Rayi* Babingt. in the range, is an error. *P. provinciale* C. Koch. has been found as a waif, and *P. ramosissimum* Michx. has been collected as a roadside waif in Conn.

3. *Tovara* Adans.

1. *T. virginiana* (L.) Raf. (*Polygonum virginianum* L.) In woods: N. S. to Minn., south to Fla. and Tex.

Common throughout the range except in the pine-barrens of N. J. and the coastal plain of L. I.

4. *Persicaria* [Tourn.] Mill.

Racemes solitary or 2; aquatic or swamp species; perennials.

Leaves oblong, elliptic or elliptic-lanceolate, not acuminate.

Leaves ovate or oblong lanceolate, usually acuminate.

Racemes several or numerous; annuals or perennials, mostly terrestrial.

Ocreae naked or ciliate, their limbs not spreading.

Racemes drooping.

Racemes erect.

Annual; achene concave-orbicular.

Perennial; achene biconvex, broadly oblong.

Ocreae fringed with bristles, their limbs not spreading.

Sepals not glandular punctate.

Racemes not interrupted.

Racemes erect.

Raceme drooping.

Raceme interrupted.

Ocreae strigose, fine bristly.

Calyx greenish-white; ocreae copiously long bristly.

Calyx white, pink or purplish-pink; ocreae sparingly fine-bristly.

Ocreae hirsute or appressed hirsute.

Sepals glandular punctate.

Achene granular and dull; racemes drooping.

Achene smooth, shining; racemes erect.

Ocreae fringed with bristles, their limbs normally spreading.

1. *P. amphibia*.

2. *P. Muhlenbergii*.

3. *P. lapathifolia*.

4. *P. pennsylvanica*.

5. *P. portoricensis*.

6. *P. Persicaria*.

7. *P. Careyi*.

8. *P. opelousana*.

9. *P. hydro Piperoides*.

10. *P. setacea*.

11. *P. Hydro Piper*.

12. *P. punctata*.

13. *P. orientalis*.

1. *P. amphibia* (L.) S. F. Gray (*Polygonum Hartwrightii* A. Gray*). In water or in swamps: Que. to Alaska, south to N. J., Pa., Kan. and S. Cal. Also in Eu.

CONN. Rare and local over most of the state, increasing north-westward.

N. Y. Rare and local on the north of L. I. and on S. I. increasing up the Hudson Valley, but nowhere very common.

N. J. Morris, Sussex and Hunterdon counties.

* See Coulter, Barnes and Cowles Textbook of Botany. 2. Ecology, 574. 1911.

PA. Northampton and Montgomery counties.

South of the moraine only in Pa. Nowhere very common, but always increasing **northward**.

2. **P. Muhlenbergii** (S. Wats) Small. In swamps and moist soil: Me. and Ont. to N. W. Terr. and B. C., south to Va., La. and Mo.

CONN. Common along the Connecticut River and its tributaries, elsewhere scarce.

N. Y. L. I. and on S. I., thence increasing up the Hudson Valley to Pine Plains, Dutchess Co. Nowhere common.

N. J. Rare and local in Cape May, Gloucester, Atlantic and Mercer counties, perhaps not wild in the pine-barrens, thence increasing and more common **northward**.

PA. Luzerne, Northampton, Bucks, Delaware and Chester counties.

Tertiary, rare or wanting: Cretaceous, more common: Older formations increasing and common **northward**. 123-220 days. Sea level-2,400 ft.

3. **P. lapathifolia** (L.) S. F. Gray (*Polygonum incarnatum* Ell. *P. tomentosum* Schrank). In waste places: nearly throughout N. Am. Naturalized from Eu. Native of Asia.

Locally common in some of its forms over most of our area.

4. **P. pennsylvanica** (L.) Small. In moist soil: N. S. to Ont., Minn., Fla. and Tex.

Common as a weed throughout the region.

5. **P. portoricensis** (Bertero) Small. In wet soil: S. N. J. and Mo. to Fla., Tex. and N. J.

N. J. Cape May Co.

6. **P. Persicaria** (L.) Small. In waste places: throughout N. Am., except the extreme north. Naturalized from Europe.

Frequent as a weed in most parts of the range.

7. **P. Careyi** (Olney) Greene. In wet soil: Me. and Ont. to Mich., south to R. I., N. J. and Pa.

CONN. Litchfield, Hartford, New Haven and Fairfield counties.

N. Y. The north side of L. I.; reported from Westchester Co., otherwise unknown.

N. J. Bergen, Essex, Morris and Hunterdon counties, increasing southward, but not common.

PA. Carbon and Monroe counties.

A rare and local species whose distributional tendencies are not satisfactorily known.

8. **P. opelousana** (Riddell) Small. In wet soil: Mass. and Mo. to La., Tex. and Mex.
N. Y. On L. I., S. I. and at Van Cortlandt Park.
N. J. Along the coast and at Delanco.
9. **P. hydropteroides** (Michx.) Small. In swamps and wet soil: N. B. to Minn. and Cal., south to Fla. and Mex.
Common throughout the range, except in the pine-barrens of L. I. and N. J. there rare and perhaps wanting as a wild plant.
10. **P. setacea** (Baldw.) Small. In swamps: Mass. and Mo., La. and Fla.
N. J. Cape May Co.
11. **P. Hydropiper** (L.) Opiz. In moist places: nearly throughout N. Am. Naturalized from Europe.
Throughout the range, often becoming a weed.
12. **P. punctata** (Ell.) Small (*P. punctatum robustior* Small, *P. robustior* (Small) Bicknell). In swamps and wet places: nearly throughout N. Am.
Common throughout the range in some of its forms.
13. **P. orientalis** (L.) Spach. In waste places, escaped from gardens: throughout eastern N. Am. Native of India.
Locally common near cities and gardens.

5. **Fagopyrum** Gaertn.

1. **F. Fagopyrum** (L.) Karst. Fields and roadsides: nearly throughout the northern U. S. and southern Canada. Native of Temperate Old World.
Not a very common escape in most parts of our range.

F. tataricum (L.) Gaertn. has been reported as an occasional waif.

6. **Tracaulon** Raf.

Leaves sagittate; achenes 3-angled.

1. *T. sagittatum*.

Leaves halberd-shaped; achene lenticular.

2. *T. arifolium*.

1. **T. sagittatum** (L.) Small (*Polygonum sagittatum* L.). In wet soil: Newf. and N. S. to the N. W. Terr., south to Fla. and Kan.
Common throughout our range, except the pine-barrens.

2. **T. arifolium** (L.) Raf. In moist or wet soil: N. B. and Ont. to Minn., south to Ga.

Throughout the range, except the pine-barrens.

7. **Tiniaria** Webb & Moq.

Outer segments of the calyx unchanged or keeled in fruit.

Achenes granular and dull, ocreae not bristly.

Achene smooth and shining; ocreae bristly.

1. *T. Convolvulus.*

2. *T. cilinodis.*

(Inner segments of the calyx conspicuously winged in fruit.

Calyx wings not incised.

Fruiting calyx 2.5-3 mm. long, the wings crisped.

3. *T. scandens.*

Fruiting calyx 1.5-2 mm. long, the wings rather flat.

4. *T. dumetorum.*

Calyx wings incised.

5. *T. cristata.*

1. **T. Convolvulus** (L.) Webb & Mag. In waste and cultivated grounds: nearly throughout N. Am. Naturalized from Europe. Native of Asia.

Locally abundant as a weed.

2. **T. cilinodis** (Michx.) Small. In rocky places: N. S. to Ont., Minn. and Pa., south in the Alleghanies to N. Car.

CONN. Rare along the coast, increasing but not very common northward.

N. Y. Forest Park, L. I.; not reported from S. I.; Westchester Co. and northern N. Y. City rare, thence increasing and common northward.

N. J. Warren, Hunterdon and Sussex counties.

PA. Monroe, Northampton, Lackawanna and Luzerne counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing and common northward. 117-189 days. Sea level-3,100 ft.

3. **T. scandens** (L.) Small. In woods and thickets: N. S. to Ont. and the Rocky Mts., south to Fla., Neb. and Tex.

Locally abundant sometimes as a troublesome weed; rare or wanting in the pine-barrens.

4. **T. dumetorum** (L.) Opiz. Thickets and woods: northeastern U. S. Also in Europe.

CONN. Scattered over the state.

N. Y. Coastal L. I., S. I. and in the Bronx.

5. **T. cristata** (Engelm. and Gray) Small. Sandy woods and rocky banks: Conn. to Ga., Ind. Terr. and Tex.

CONN. Milford and Huntington.

N. Y. On L. I. and near the northern edge of N. Y. City and in Westchester Co. Otherwise unknown.

N. J. Passaic and Sussex counties.

PA. Near Easton and from Delaware Co.

8. **Pleuropterys** Turcz.

1. **P. Zuccarinii** Small. (*Polygonum cuspidatum* Sieb. & Zucc., not Willd.) Escaped from cultivation in the Eastern States. Native of Japan.

Often common as a rather local escape.

Polygonum sachalinense Schmidt, referable to this genus, is reported from Tolland, Conn. Native of eastern Asia.

9. **Polygonella** Michx.

1. **P. articulata** (L.) Meisn. In sands of the seashore and in sandy soil near the coast: Me. and N. H. to Fla. and on the shores of the Great Lakes.

CONN. Common along the coast, decreasing inland.

N. Y. Common on L. I. and S. I.; known also from a single station in Ulster Co. in an edaphically favorable habitat.*

N. J. Common along the coast and in the pine barrens, rare or wanting north of Middlesex and Mercer counties.

Tertiary, common: Cretaceous, less common; Older Formations decreasing inland. 148-224 days. Sea level-1,800 ft.

Emex spinosa Camb. has been collected near New York as a waif.

CHENOPODIACEAE

Embryo annular or conduplicate, not spirally coiled; endosperm copious (except in *Salicornia*).

Leaty herbs; endosperm copious.

Flowers perfect or some of them pistillate; calyx herbaceous or fleshy.

Plants glabrous or scurfy.

Calyx herbaceous or but slightly fleshy in fruit; flowers in paniced spikes.

Fruiting calyx dry, strongly reticulated; leaves pinnatifid.

Calyx very fleshy and bright red in fruit; flowers densely capitate.

Plant pubescent.

Flowers monoecious or dioecious; calyx of pistillate flowers none; fruit enclosed by 2 bractlets.

Leafless fleshy herbs with opposite branches; endosperm none.

Embryo spirally coiled; endosperm little or none.

Fruiting calyx wingless; leaves fleshy, not spiny.

1. CHENOPODIUM.

2. ROUBIEVA.

3. BLITUM.

4. BASSIA.

5. ATRIPLEX.

6. SALICORNIA.

7. DONDIA.

* See Introduction paragraph 50.

Fruiting calyx bordered by a thin horizontal wing; leaves very spiny.

8. *SALSOLA*.

I. *Chenopodium* L.

Embryo a complete ring; plants not glandular

Leaves white-mealy on the lower surface, not glandular.

Leaves or some of them sinuate toothed or lobed.

Sepals strongly keeled in fruit; stem erect, tall.

Sepals not keeled in fruit; stem decumbent.

Leaves mostly entire, narrowly linear or oblong.

1. *C. album*.2. *C. glaucum*.3. *C. leptophyllum*.

Leaves green and glabrous or nearly so on both surfaces when mature.

Seeds all vertical; style filiform, one fourth to one half as long as the diameter of the utricle.

4. *C. Bonus-Henricus*.

Seeds vertical and horizontal in the same inflorescence, or all horizontal.

Leaves ovate-oblong, entire.

5. *C. polyspermum*.

Leaves very coarsely toothed, usually cordate at base.

6. *C. hybridum*.

Leaves merely sinuate or toothed.

Stamens 5; calyx not fleshy.

Pericarp readily separable from the seed.

7. *C. Boscianum*.

Pericarp firmly attached to the seed.

Flower clusters, at least the upper, longer than the leaves.

8. *C. urbicum*.

Spikes loosely paniced in the axils, the panicles shorter than the leaves.

9. *C. murale*.

Stamens only 1 or 2; calyx slightly fleshy, red.

10. *C. rubrum*.

Embryo an incomplete ring; plants glandular

Leaves ovate or oblong, pinnately lobed; flowers in long loose panicles.

11. *C. Botrys*.

Leaves lanceolate; flowers in continuous or interrupted spikes.

Spikes borne in the axils of the numerous small upper leaves.

12. *C. ambrosioides*.

Spikes in large, commonly leafless, terminal panicles.

13. *C. anthelminticum*.

1. *C. album* L. In waste places, a common weed: throughout N. Am. Naturalized from Eu. Also in Asia.

Common throughout the range, and with the form known as *C. viride* Auct. (*C. lanceolatum* Muhl.) often a troublesome weed.

2. *C. glaucum* L. A weed in the waste places: throughout N. Am. Naturalized from Europe.

Locally abundant as a roadside weed.

3. *C. leptophyllum* (Moq.) Nutt. In dry soil: Man. and N. W. Terr. to Mo., N. Mex. and Ariz. Also on the shores of Lake Erie, and on sands of the seashore, Conn. to N. J.

CONN. Known only from the sandy stretches along the coast.

N. Y. On L. I. and on S. I.; at a single station near the northern end of N. Y. City along the Harlem River.

N. J. More or less common along the coast from Monmouth Co. southward.

PA. Near Bristol, Bucks Co.

Usually confined to sandy stretches within the influence of the tides.

4. **C. Bonus-Henricus** L. In waste places: N. S. to Ont., Mass. and S. N. Y. Naturalized from Eu.

Not very common as a roadside weed.

5. **C. polyspermum** L. In waste places and on ballast: Mass. to N. J. Adventive from Europe.

Rare near the larger cities, as a weed.

6. **C. hybridum** L. In woods and thickets, sometimes in waste places: Que. to N. W. Terr., Br. Col., N. Y., Ky. and N. Mex. Also in Europe.

More common as a roadside weed than as a woodland plant, in our range. Common on ballast near New York. Not recorded from southern N. J.

7. **C. Boscianum** Moq. In woods and thickets: Conn., N. Y. and N. J. to Ind., Minn., N. Car. and Tex.

CONN. Rare, known definitely only from Southington and Meriden.

N. Y. Westchester and Bronx counties and on S. I.

N. J. Rare, known definitely only from Hunterdon Co. at Milford, and from Florence Heights, Burlington Co.

PA. Northampton, Bucks and Berks counties.

A rare species whose distribution is little known; apparently more common in the drainage area of the Delaware River than elsewhere.

8. **C. urbicum** L. In waste places: N. S. and Ont. to S. N. Y. Adventive from Europe.

Not very common, as a rather fugitive weed.

9. **C. murale** L. In waste places: Me. to Mich., Br. Col., Fla. and Mex.

Occasional as a roadside and ballast weed.

10. **C. rubrum** L. In salt marshes along the sea coast: Newf. to N. J. and B. C. Also in Europe and Asia.
Rare in salt marshes.
11. **C. Botrys** L. In waste places: N. S. to Minn., Ore., N. Y., Ky. and Mex. Naturalized from Europe. Native also of Asia.
Locally abundant as a weed.
12. **C. ambrosioides** L. In waste places: Me. and Ont. to Fla., west to Cal. Naturalized from Trop. Am.
Common as a roadside weed.
13. **C. anthelminticum** L. In waste places: Mass. to Ont., Mass., Fla. and Mex. Naturalized from Europe.
Not very common as a weed; doubtfully distinct, specifically, from *C. ambrosioides*.
- As waifs *C. obovatum* Moq. and *C. vulvaria* L. have been reported.

2. **Roubieva** Moq.

1. **R. multifida** (L.) Moq. In waste places and in ballast: S. N. Y. to Va. Naturalized or adventive from Trop. Am.
Not very common as an adventive weed.

3. **Blitum** L.

1. **B. capitatum** L. In dry soil: N. S. to Alaska, N. J., Ill., Minn., in the Rockies to Colo., Utah and Nev. Also in Europe.
Not common as a roadside weed in our range.

4. **Bassia** All.

1. **B. hirsuta** (L.) Asch. Borders of salt marshes: Mass. and N. J. Native of Europe.
N. J. Southern coastal region.

5. **Atriplex** [Tourn.] L.

- | | |
|---|-------------------------|
| Plant of the sea beaches; leaves oblong, densely silvery, entire. | 1. <i>A. arenaria</i> . |
| Plants of salt marshes and of waste places, leaves hastate, rhombic or linear-lanceolate. | |
| Plants green, glabrous or sparingly scurfy, not silvery. | |
| Leaves lanceolate, several times longer than wide. | 2. <i>A. patula</i> . |
| Leaves triangular hastate, the lower ones only 1-2 times as long as wide. | 3. <i>A. hastata</i> . |
| Plant very scurfy, leaves rhombic-ovate, short petioled. | 4. <i>A. rosea</i> . |

1. **A. arenaria** Nutt. On sandy sea-beaches: Mass. to Fla.
Common along the coast of New York, Conn. and N. J., decreasing up the rivers, unrecorded beyond the salt water influence.
2. **A. patula** L. In waste places and ballast: N. S. and Ont. to S. N. Y. and N. J. Naturalized from Europe. Native also of Asia.
Common locally as a weed, perhaps not specifically distinct from the following.
3. **A. hastata** L. In salt meadows and in waste places mostly near the coast: N. B. to S. C. and in saline soil. Man. to B. Col., Neb. and Utah. Also in Europe.
Common throughout the range but more frequent along the coast and up the river valleys than elsewhere.
4. **A. rosea** L. In waste places and ballast: N. S. to N. N. Y. and N. J. Adventive from Europe.
Rare as an occasional weed in our area.

Atriplex hortensis L. and *A. laciniata* L. have both been collected near our larger cities. They may both be established in some part of our range. *A. congesta* Moq. has been found near New York, but not recently.

6. *Salicornia* [Tourn.] L.

Annuals; stem erect.

Scales very short, acute or blunt; spikes 2-3 mm. in diameter.

Scales mucronate-tipped; spike 4-6 mm. in diameter.

Perennial by a woody rootstock; stems trailing or decumbent.

1. *S. europaea*.

2. *S. Bigelovii*.

3. *S. ambigua*.

1. **S. europaea** L. (*S. herbacea* L.). In salt marshes: Anticosti to Ga., about salt springs in Cent. N. Y. In saline soil from Manitoba to B. C., Kan. and Utah. Also in Europe and Asia.
Common throughout the tidal marshes of our range.
2. **S. Bigelovii** Torr. In salt marshes: N. S. to Fla. and Tex.
Common throughout the tidal marshes of our range, apparently more frequent on L. I. than elsewhere.
3. **S. ambigua** Michx. On sea beaches and on salt meadows: N. H. to Fla. and Tex. and on the Pacific Coast.
Throughout the tidal marshes of our range, more common than the preceding.

7. *Dondia* Adans

Not glaucous; sepals acutely keeled; seeds black.

Glaucous; sepals scarcely keeled; seeds dark red.

1. *D. linearis*.

2. *D. maritima*.

1. **D. linearis** (Ell.) Heller (*D. americana* (Pers.) Britton). On salt marshes, and along salt water ditches: N. S. to N. J. and Tex.

Throughout the coastal marshes within the influence of the tides.

2. **D. maritima** (L.) Druce. On sea beaches, stony and muddy shores, and in salt marshes: Me. to S. N. Y. and southward. Also on the coasts of Europe.

Common throughout the coastal marshes of our range. Less frequent in N. J. and apparently more frequent on L. I. than elsewhere.

8. **Salsola** L.

Calyx coriaceous, not conspicuously veined; plant maritime.

1. *S. Kali*.

Calyx membranous, very strongly veined; an inland weed.

2. *S. pestifer*.

1. **S. Kali** L. On sea beaches: Cape Breton Island to Fla. Also in Europe and Asia.

Common on sands of the sea-shore.

2. **S. pestifer** A. Nelson. In cultivated and waste places: N. J. to Ont., N. W. Terr. and Kan. Native of the Old World. Sometimes confused with *S. Tragus* L.

Occasional as a weed.

Among the waifs and adventives reported from the range the following deserve note: *Cyclotoma atriplicifolium* (Spreng.) Coult., reported from southern coastal N. J.; *Beta maritima* L., in ballast about the metropolis; *Spinacia oleracea* L., not infrequent about truck gardens and in ballast; *Kochia Scoparia* (L.) Roth has been collected at Hartford, Conn., and Orient, L. I.

AMARANTHACEAE

Calyx 2-5 parted or of 2-5 sepals.

1. AMARANTHUS.

Calyx of the pistillate flowers wanting.

2. ACNIDA.

1. **Amaranthus** [Tourn.] L.

Utricle circumscissile, the top falling away as a lid.

Flowers, at least the upper, in dense terminal spikes.

Axils not spine-bearing.

Spikes stout, 8-14 mm. thick.

1. *A. retroflexus*.

Spikes slender, 4-6 mm. thick.

2. *A. hybridus*.

Axils bearing a pair of stout spines.

3. *A. spinosus*.

Flowers all in small axillary clusters, mostly shorter than the leaves.

Plant prostrate; sepals 4 or 5.

4. *A. blitoides*.

Erect, bushy-branched; sepals 3.

5. *A. graecizans*.

Utricle indehiscent, membranous, coriaceous or fleshy.

Upper flowers in terminal, more or less elongated spikes.

6. *A. deflexus*.

Flowers all in small axillary clusters, shorter than the leaves.

Plant not fleshy; stem prostrate; leaves crisped.

7. *A. crispus*.

Seacoast, fleshy plant, erect; leaves not crisped.

8. *A. pumilus*.

1. **A. retroflexus** L. Throughout North America as a weed.
Common throughout the range, but often locally rare.
2. **A. hybridus** L. (*A. hybridus paniculatus* (L.) Uline and Bray).
Throughout North America as a weed.
More common than the preceding, throughout the range.
3. **A. spinosus** L. In waste and cultivated soil: Mass. to Pa.,
Ohio, Kan., Fla. and Mex. Naturalized from tropical
America.
Rather rare as a weed near the larger cities.
4. **A. blitoides** S. Wats. In ballast: along the Atlantic sea-
board. Naturalized from west of the Rocky Mountains.
Not very common as weed near our larger cities.
5. **A. graecizans** L. In waste and cultivated soil: throughout
North America. Naturalized from tropical America.
Common everywhere.
6. **A. deflexus** L. In waste places and in ballast along the coast:
Mass. to S. N. J. Also in Calif.
Rather rare in waste grounds near New York and Jersey City.
7. **A. crispus** (Lesp. and Thev.) Braun. In waste places:
southern N. Y. Also in France. Native region unknown.
Rare near N. Y. City and at Yonkers. A fugitive species.
8. **A. pumilus** Raf. On sea beaches: R. I. to N. Car.
Rare on the sea beaches of southern L. I. and of N. J.; not
reported from the beaches of S. I. bordering N. Y. Bay, nor from
Conn. nor from the north shore of L. I. bordering the Sound.

A. lividus L. has been collected as a waif at Forbell's Landing, L. I. and *A. Blitum*
L. is recorded as formerly found on S. I.

2. *Acnida* L.

Utricle fleshy, angled, indehiscent; salt marsh plant.

1. *A. cannabina*.

Utricle membranous, irregularly dehiscent.

2. *A. tuberculata*.

1. **A. cannabina** L. In salt and brackish marshes and up the
rivers to fresh water: N. H. to Fla.
Common throughout the range within the influence of the tides.

2. **A. tuberculata** Moq. Swamps and river shores, or in waste places: Que. to N. Dak., south to Ky., La. and Mo.

Occasional in waste grounds, not known to be native in the area.

Cladothrix lanuginosa Nutt., a plant of the Middle West, has been collected as a waif at Jersey City, *Gomphrena globosa* L. and *Celosia cristata* L. have been found near New York, and *C. argentea* L. has been found in Montgomery Co., Pa.

PHYTOLACCACEAE

I. *Phytolacca* L.

1. **P. decandra** L. In various situations: Me. and Ont. to Minn., Fla. and Tex. Naturalized in Europe.

Common throughout our range, nearly always as a weed.

NYCTAGINACEAE

Mirabilis jalapa L., *Allionia nyctaginea* Michx., *A. albida* Walt., *A. hirsuta* Pursh, *Abronia micrantha* (Torr.) Chois. and *A. linearis* Pursh have all been reported as rare adventives.

AIZOACEAE

Fleshy sea coast herbs; leaves opposite; capsule circumscissile.
Not fleshy; leaves in our species verticillate; capsule 3-valved.

1. **SESUVIUM.**
2. **MOLLUGO.**

I. *Sesuvium* L.

1. **S. maritimum** (Walt.) B. S. P. Sands of the seashore: Long Island to Fla.
N. Y. The south shore of L. I. near the eastern end. Not reported from S. I. nor from the environs of the metropolis.
N. J. Along the coast throughout. Not very common.

2. *Mollugo* L.

1. **M. verticillata** L. In waste and cultivated grounds: N. B. and Ont. to Minn., Fla., Tex. and Mex. Native of tropical or sub-tropical America.

Locally common as a weed throughout most parts of the range.

Trianthema portulacastrum L. and *Tetragonia expansa* Murr. have both been reported as adventives. *Mesembryanthemum nodosum* L. has been collected as a waif.

PORTULACACEAE

Calyx free from the ovary; capsule 3-valved.

Seeds numerous; stamens 5-∞.

Seeds not more than 6; stamens 2-5.

Calyx partly adnate to the ovary; capsule circumscissile.

1. **TALINUM.**
2. **CLAYTONIA.**
3. **PORTULACA.**

1. **Talinum** Adans.

1. **T. teretifolium** Pursh. On dry rocks: Pa. to Minn., Ga. and Tex.

PA. Known definitely only from Chester and Delaware Counties.

Growing in our range most plentifully upon hydromica-schists and azoic slates. Not north of the moraine.

2. **Claytonia** [Gron.] L.

Leaves linear-lanceolate, 8-17 cm. long.

1. *C. virginica*.

Leaves ovate-lanceolate or ovate, 5-8 cm. long.

2. *C. caroliniana*.

1. **C. virginica** L. In moist woods: N. S. to the N. W. Terr., Ga. and Texas.

Throughout the range except in the pine-barrens of N. J., there wanting; on L. I. only north of the moraine.

2. **C. caroliniana** Michx. In damp woods: N. S. to the N. W. Terr., Conn., N. Car., Ohio and Mo.

CONN. Middlesex, Hartford and Litchfield counties, increasing **northwestward**.

N. Y. Summits of the Catskills in Ulster, Delaware and Greene counties.

PA. Mountains of Luzerne Co.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward** and at higher elevations. Not south of the moraine. 117-164 days. 322-4,020 ft.

3. **Portulaca** [Tourn.] L.

1. **P. oleracea** L. In fields and waste places, common throughout North America. Native in the southwest, but naturalized northward.

A troublesome weed throughout our area. Often locally rare.

The sun plant, *Portulaca grandiflora* Hook., and *P. pilosa* L. are both occasional waifs in the range.

CORRIGIOLACEAE

Leaves stipulate; stamens borne on the base of the calyx.

Sepals awn-tipped.

1. PARONYCHIA.

Sepals awnless.

2. ANYCHIA.

Leaves not stipulate; stamens borne on the throat of the calyx.

3. SCLERANTHUS.

1. **Paronychia** Adans.

1. **P. argyrocoma** (Michx.) Nutt. In rocky places: Me. and N. H. to Tenn. and Ga.

Reported, so far as our range is concerned, only from Northampton, Delaware and Philadelphia counties, Pa. Apparently known mostly from regions of garnetiferous schists.

2. *Anychia* Michx.

Pubescent; flowers sessile; stems mostly prostrate or ascending. 1. *A. polygonoides*.
Glabrous or nearly so; flowers pedicelled; stem usually erect. 2. *A. canadensis*.

1. *A. polygonoides* Raf. In dry woods, thickets and open places: Me. to Minn., Fla., Ala. and Ark.

CONN. Near Norwalk.

N. Y. The north side of L. I. and on S. I.

N. J. Frequent or common throughout the northern counties, rare southward.

PA. Northampton, Berks, and Montgomery counties.

2. *A. canadensis* (L.) B. S. P. In dry woods: N. E. to Fla., west to Minn. and Ark.

Common throughout the range, except in the pine barrens of N. J. and L. I., there rare and local or wanting.

3. *Scleranthus* L.

1. *S. annuus* L. In fields and waste places, or on dry rocks: Quebec and Ont. to Pa. and Fla. Naturalized from Europe.

Locally abundant as a weed, often lacking.

Corrigiola littoralis L. has been collected near Jersey City. It is a mere waif.

ALSINACEAE

Styles separate to the base; stipules wanting.

Plants not fleshy; disc of the flower inconspicuous or none.

Petals deeply 2-cleft or 2-parted.

Capsule ovoid or oblong, dehiscent by valves.

1. ALSINE.

Capsule cylindric, commonly curved, dehiscent by teeth.

2. CERASTIUM.

Petals entire or emarginate, rarely none.

Styles as many as the sepals.

3. SAGINA.

Styles fewer than the sepals.

Seeds not appendaged.

4. ARENARIA.

Seeds appendaged.

5. MOEHRINGIA.

Plant fleshy, maritime; disc conspicuous, 8-10 lobed.

6. HONKENYA.

Styles separate to the base; stipules present, scarious.

Styles and capsule-valves 5.

7. SPERGULA.

Styles and capsule-valves 3.

8. TISSA.

1. **Alsine** [Tourn.] L.

Styles 5; leaves ovate, 2-5 cm. long.

1. *A. aquatica*.

Styles 3, rarely 4.

Leaves broad, ovate, ovate-oblong or oblong.

Plant glabrous or with a few scattered hairs.

2. *A. uliginosa*.

Stems with 1-2 pubescent lines, petioles often ciliate.

Petals shorter than the calyx; lower leaves petioled.

3. *A. media*.

Petals longer than the calyx; lower leaves rarely petioled.

4. *A. pubera*.

Leaves narrow, linear, oblong, oblanceolate or spatulate.

Flowers 14-20 mm. broad.

5. *A. Holostea*.

Flowers only 4-12 mm. broad.

Bracts of the cyme small, scarious.

Leaves linear, acute at each end; seeds smooth.

6. *A. longifolia*.

Leaves lanceolate, broadest below; seeds rough.

7. *A. graminea*.

Bracts of the cyme foliaceous, resembling the upper leaves; seeds smooth.

8. *A. borealis*.

1. **A. aquatica** (L.) Britton. In wet and waste places: Ont. to Pa. Also in Br. Col. Adventive from Europe.

A rare and local weed, known definitely only near Philadelphia and New York.

2. **A. uliginosa** (Murr.) Britton. In cool brooks and springs: Md. and Penn. to Newf. Also in Br. Col. and the N. W. Terr. Europe and Asia.

N. Y. Orange, Sullivan, and Delaware counties, within the drainage of the Delaware River and at Queens, L. I.

N. J. Burlington, Mercer, Hunterdon, Morris, Warren and Sussex counties all within the drainage of the Delaware River.

PA. Throughout the counties bordering the Delaware, and also in Luzerne county.

3. **A. media** L. In waste places: common throughout North America. Naturalized from Europe.

Common as a weed almost everywhere.

4. **A. pubera** (Michx.) Britton. In waste rocky places: N. J. and Pa. to Ind., Ky., Ga. and Ala.

N. J. Reported from Mercer Co. not recently collected.

PA. Bucks, Montgomery, Philadelphia, Delaware and Chester counties.

Tertiary, o: Cretaceous, rare in Bucks Co., Pa. Older Formations, not very common. Not north of the moraine. 176-224 days. About sea-level.

5. **A. Holostea** (L.) Britton. L. I., N. Y., and Poland, Me. Fugitive or adventive from Europe. Native also of Asia.

N. Y. Western L. I.

6. *A. longifolia* (Muhl.) Britton. In low meadows and swamps: Newf. to Alask., Ky. and La.; in the Rocky Mt. region, Br. Col. and northern Europe and Asia.
Common throughout the range, except in the pine-barrens of N. J. and east and south of them; rare on L. I.
7. *A. graminea* (L.) Britton. In fields and along roadsides: Newf. to Ont. and Md. Adventive from Europe.
Common throughout the range, except in southern N. J. and the pine-barrens of L. I.
8. *A. borealis* (Bigel.) Britton. In wet places: Lab. to R. I., northern N. J., Minn. and Br. Col., south in the Rocky Mts. to Colo. Also in northern Europe and Asia.
CONN. Not common along the coast, increasing and more common **northward** into Litchfield Co.
N. Y. Pine Plains, Dutchess Co., and from Ulster, Greene, Delaware and Sullivan counties.
N. J. Kittatiny Mts., Sussex Co.
PA. Wayne, Monroe and Montgomery counties, increasing **northward**.
Tertiary, o: Cretaceous, o: Older Formations; increasing but never very common **northward**. South of the moraine only in Pa. 117-187 days. Sea level-3,800 ft.

2. *Cerastium* L.

Petals equalling the sepals or shorter.

Pedicels not longer than the sepals; flowers glomerate. 1. *C. viscosum*.

Pedicels subsequently longer than the sepals; flowers cymose.

Leaves 4-8 mm. long; capsule nearly straight. 2. *C. semidecandrum*.

Leaves 8-25 mm. long; capsules curved upward. 3. *C. vulgatum*.

Petals longer than the sepals, rarely wanting.

Annuals, sticky pubescent; flowers 4-6 mm. broad. 4. *C. longipedunculatum*.

Perennials; flowers 10-20 mm. broad.

Leaves linear to linear-lanceolate; pod about half as long again as the calyx. 5. *C. arvense*.

Leaves lanceolate to oblong-lanceolate; pod twice as long as the calyx. 6. *C. velutinum*.

1. *C. viscosum* L. In waste places and meadows: N. B. and Ont. to Fla. and Mex. Naturalized from Europe. Naturalized also in the W. I., Cent. Am. and on the Pacific coast.

Throughout the range but frequently rare locally; rare or wanting in the pine-barrens of N. J. and L. I. Naturalized from Europe.

2. **C. semidecandrum** L. In dry sterile soil: Nantucket and Conn. to Va. Naturalized from Europe.
 CONN. Reported from East Lyme, otherwise unknown.
 N. J. Tuckerton, Forked River and Cedar Creek, Ocean Co., and May's Landing, Atlantic Co.
 PA. Reported from Lehigh Mt., Lehigh Co.; otherwise unknown.
3. **C. vulgatum** L. In fields and woods: common throughout our area. Naturalized from Europe.
 Locally abundant as a weed; rare in the pine-barrens.
4. **C. longipedunculatum** Muhl. In moist and shaded places: N. S. and Hudson Bay to N. Car., Br. Col., Nev. and northern Mex.
 CONN. Throughout the state except in Litchfield Co. from which it has never been reported. Not common.
 N. Y. Frequent on the north side of L. I., a single station on S. I.; and in Bronx and Westchester counties, thence increasing but not common **northward**.
 N. J. Rare in Monmouth, Mercer, Union and Camden counties. thence increasing but not common **northward**.
 PA. Northampton, Bucks, Delaware, Chester and Philadelphia counties.
 Tertiary, o: Cretaceous, not very common: Older Formations increasing but not common **northward**. 123-204 days. Sea level-1,950 ft.
5. **C. arvense** L. In dry rocky places: Lab. to Alaska, Ga., Mo., Nev. and Cal. Also in Europe and Asia.
 CONN. Throughout, but uncommon.
 N. Y. West Point.
 N. J. Gloucester, Monmouth and Middlesex counties, increasing **northward**.
 PA. Throughout.
6. **C. velutinum** Raf. (*C. oblongifolium* Torr.). Serpentine and limestone rocks: N. Y. to Md., Ont. and Colo.
 N. Y. Serpentine hills of Staten Island.
 N. J. Recorded from the Palisades of the Hudson, probably erroneously.
 PA. Bucks, Delaware and Chester counties.
- C. tetrandrum* Curtis has been reported as a waif near New York.

3. *Sagina* L.

Parts of the flower in 4's (or some flowers in 5's).

1. *S. procumbens*.

Parts of the flower in 5's, the petals equalling or shorter than the sepals.

2. *S. decumbens*.

1. *S. procumbens* L. In moist places: Newf. and Greenland to N. J., Pa., Kan. and Mich. Probably naturalized from Europe.

Rare or occasional throughout most parts of our range, except in the pine-barrens, there probably wanting.

2. *S. decumbens* (Ell.) T. & G. In dry soil: E. Mass. to Ill., Fla., Mo. and La.

CONN. Fairfield Co., near the coast.

N. Y. Recorded only from S. I., there rare and local; and at Hempstead, L. I.

N. J. Monmouth, Mercer and Atlantic counties, thence increasing and common **southward**, except in the pine-barrens, there rare or wanting.

PA. Near Philadelphia.

Tertiary, common except on Beacon Hill; Cretaceous, common: Older Formations, decreasing northward. Not north of the moraine, except in Conn. 160-224 days. About sea level.

Specimens have been mistaken for *S. apetala* Ard. of Europe.

Sagina subulata L. has been collected as a waif near Philadelphia.

From near Philadelphia, specimens were collected many years ago of *Moenchia crecta* (L.) Gaertn. It differs from *Sagina* in having the styles opposite the sepals. Not recently collected.

4. *Arenaria* L.

Valves of the capsule 2-cleft or 2-toothed, sometimes appearing as if double the number of the styles.

1. *A. serpyllifolia*.

Valves of the capsule entire.

Leaves subulate or setaceous, rigid.

Leaves densely imbricated; pine-barren species.

2. *A. caroliniana*.

Leaves fascicled in the axils.

3. *A. stricta*.

Leaves soft, herbaceous, narrowly linear or filiform.

4. *A. groenlandica*.

1. *A. serpyllifolia* L. In dry or rocky places: throughout eastern North America. Naturalized from Europe.

Common throughout our range, usually more plentiful in cultivated areas than elsewhere.

Arenaria leptoclados Guss., a European plant, more slender than *A. serpyllifolia* L., has been reported as growing in waste places

from Me. and Vt. to Va. I have seen no specimens from within our area.

2. **A. caroliniana** Walt. In dry sand: southeastern N. Y., the pine-barrens of N. J. and along the coast to Fla. and Ga.
N. Y. Known only from the south side of L. I. in Suffolk Co. and from near Tottenville, S. I.

N. J. Common throughout the pine-barrens, and in Middlesex Co., south of the Raritan River, otherwise unknown.

Tertiary, very common on Beacon Hill, decreasing elsewhere: Cretaceous, rare: Older Formations, o. Found only on the unglaciated portions of L. I., S. I., and N. J. 183-220 days. About sea-level.

3. **A. stricta** Michx. (*A. Michauxii* (Fenzl.) Hook. f.). In dry rocky places: Ont. and Vt. to Va., Minn., S. Dak. and Mo.
CONN. Brookfield, Fairfield Co. increasing but not common **northward** into Litchfield Co.

N. Y. Near New Baltimore, Greene Co.

N. J. Rare and local in Warren and Hunterdon counties.

PA. Northampton, Bucks, Montgomery, Chester and Delaware counties.

Tertiary, o: Cretaceous, perhaps in Bucks Co., Pa. Older Formations, so far as known most common on limestone and serpentine rocks. 153-204 days. Sea level-1,053 ft.

4. **A. groenlandica** (Retz.) Spreng. On dry rocks: Lab. and Greenland to N. Y., Conn. and Pa., and on the higher Alleghanies of Va. and N. Car.

CONN. Near Middletown and Durham, Middlesex Co.

N. Y. The higher peaks of the Catskills.

PA. The highest peaks of Monroe Co.

Tertiary, o: Cretaceous, o: Older Formations, increasing at higher elevations, particularly on limestone. Not south of the moraine. 117-170 days. 340-4,040 ft.

5. *Moehringia* L.

1. **M. lateriflora** (L.) Fenzl. In moist places and on shores: Newf. to N. J. and Pa., westward to the Rocky Mts. and Alaska. Also in Br. Col., Europe and Asia.

Not very common throughout most parts of our range, but rare or wanting in the pine-barrens of L. I. and N. J.

6. *Honkenya* Ehrh. (*Ammodenia* J. G. Gmel.)

1. *H. peploides* (L.) Ehrh. On sands of the seashore: Arctic Am. to Va. Also in Europe and Asia.

CONN. Not very common on the beaches in Fairfield Co., increasing eastward into New London Co.

N. Y. Common along the maritime beaches of L. I.; S. I.

N. J. Throughout maritime New Jersey.

7. *Spergula* L.

1. *S. arvensis* L. In fields and waste places: frequent as a weed throughout E. N. Am. Adventive from Europe.

Common as a weed throughout the cultivated areas in the range, locally wanting.

S. sativa Boenn. has recently been collected in Conn. as a weed. It is a native of Europe and perhaps not distinct from *S. arvensis*.

8. *Tissa* Adans.

Salt marsh species; leaves fleshy.

1. *T. marina*.

Dry soil species; leaves scarcely fleshy.

2. *T. rubra*.

1. *T. marina* (L.) Britton (*Spergularia leiosperma* (Thunb.) Smith. *S. salina* J. & C. Presl). In salt marshes: N. B. to Fla. Also in those at Salina, N. Y., the Pacific Coast, and of northern Europe and Asia.

Common throughout the range in salt marshes.

2. *T. rubra* (L.) Britton. In waste places and along roadsides or sometimes maritime: Newf. to Pa., W. N. Y., Ohio and Va. Apparently adventive from Europe. Also in Cal. and Ore.

Frequent, especially near the coasts, decreasing inland.

Tissa canadensis (Pers.) Britton has recently been reported from near the R. I. border in a Conn. coastal marsh.

CARYOPHYLLACEAE

Calyx-ribs at least twice as many as the teeth, running both into the teeth and into the sinuses.

Styles 5, alternate with the foliaceous calyx-teeth.

Styles 3-5, when 5 opposite the short calyx teeth.

Styles 3, rarely 4.

Styles 5; capsule 1-celled to the base.

Calyx 5-ribbed, 5-nerved, or nerveless or striate nerved.

Calyx conspicuously scarious between its green nerves.

1. AGROSTEMMA.

2. SILENE.

3. LYCHNIS.

- | | |
|--|------------------|
| Calyx not bracteolate at the base. | 4. GYPSOPHILA. |
| Calyx bracteolate at the base. | 5. PETRORRHAGIA. |
| Calyx not at all scarious. | |
| Petals appendaged at the base of the blade. | 6. SAPONARIA. |
| Petals not appendaged at the base of the blade. | |
| Calyx strongly 5-angled, not bracteolate. | 7. VACCARIA. |
| Calyx terete or nearly so, subtended by bractlets. | 8. DIANTHUS. |

1. *Agrostemma* L.

1. **A. Githago** L. In grain fields and waste places: throughout E. N. Am. Adventive from Eu. Also in Asia.
Throughout the range, nowhere common.

2. *Silene* L.

- | | |
|---|----------------------------|
| Leaves or some of them verticillate in 4's. | 1. <i>S. stellata</i> . |
| Leaves all opposite. | |
| Calyx much inflated and bladdery. | 2. <i>S. latifolia</i> . |
| Calyx merely expanded by the ripening pod. | |
| Flowers cymose or paniculate. | |
| Day-blooming; flowers rarely white, mostly red or pink. | |
| Perennials, more or less sticky pubescent. | |
| Petals 2-cleft or 4-cleft. | 3. <i>S. nutans</i> . |
| Petals emarginate or eroded. | 4. <i>S. caroliniana</i> . |
| Annuals, glutinous at or below the nodes. | |
| Calyx ovoid; flowers small, paniced. | 5. <i>S. antirrhina</i> . |
| Calyx club-shaped; flowers large, cymose. | 6. <i>S. Armeria</i> . |
| Night-blooming; flowers large, white. | 7. <i>S. noctiflora</i> . |
| Flowers spicate or racemose. | |
| Spike-like raceme simple; flowers small. | 8. <i>S. Anglica</i> . |
| Raceme forked; flowers 12-16 mm. broad. | 9. <i>S. dichotoma</i> . |

1. **S. stellata** (L.) Ait. In woods: Mass. to Minn., Ga., Neb. and Ark.

Common throughout the range except in the pine-barrens of L. I. and N. J., there rare or wanting.

2. **S. latifolia** (Mill.) Britten & Rendle (*S. vulgaris* (Moench) Garcke). In meadows and waste places: N. B. to Ont., N. J. and Ill. Naturalized from Europe.

Not very common along roadsides in most parts of the range; unknown in the pine-barrens.

3. **S. nutans** L. Waste grounds: Me. and N. Y. Native of Europe.

Known in our area only from Arrochar, S. I. Not recently collected.

4. *S. caroliniana* Walt. In dry, rocky or sandy soil: Me. to Ga., west to central N. Y., Pa. and Ky.

CONN. Not very common, decreasing inland.

N. Y. Locally common on L. I.; S. I. and in Westchester Co., decreasing up the Hudson Valley to Pine Plains, Dutchess Co.; not reported from the Catskills nor from Columbia Co.

N. J. Wanting in the pine barrens and apparently at Cape May, increasing in the Cretaceous area, but rare and local over the rest of the state, decreasing northward to Hamburg, Sussex Co.

PA. Lehigh and Northampton counties.

Tertiary, unknown on Beacon Hill, elsewhere rather common: Cretaceous, more common: Older Formations rare and local in rocky places, apparently more common along the moraine than elsewhere. 138-182 days. Sea level-580 ft.

5. *S. antirrhina* L. In waste places and woods: N. Eng. to S. Ont., Br. Col., Fla. and Mex.

Rare in our area as a woodland plant; common as a weed throughout the range, except in the pine-barrens, there rare and a probable adventive.

6. *S. Armeria* L. In waste places and spontaneous in gardens: N. B. and Ont. to Michigan, E. Mass., N. J. and Pa. Introduced from Europe.

A rather uncommon escape and occurring as a weed in most parts of the range.

7. *S. noctiflora* L. In waste places: N. S. and N. B. to Manitoba, Fla. and Mo. Adventive from Europe.

Rare and local as a weed, frequently rather common near old gardens and along roadsides.

8. *S. Anglica* L. In waste places: Me. to Ont., N. Y. and Pa. Also on the Pacific Coast. Native of Europe.

A rare and local weed near Jersey City and New York, not recently collected.

9. *S. dichotoma* Ehrh. In fields and waste places: Me. to N. J. and Penn. Also in Cal. Adventive from S. Europe.

Rare and local as a weed in most parts of our range, except in the pine-barrens.

The reported occurrence of *S. virginica* L., the fire pink, in S. N. J. has not been satisfactorily established.

Among the occasional waifs are *S. italica* Pers., *S. pendula* L. and *S. quinquevulnera* L.

3. *Lychnis* [Tourn.] L.

Calyx teeth not twisted; plants pubescent, glandular or glabrate.

Fruiting calyx much enlarged, ovoid, obovoid or globose.

Plants sticky pubescent; flowers usually dioecious.

Flowers white or pink, opening in the evening.

Flowers red, opening in the morning.

Plants roughish pubescent; flowers perfect, scarlet.

Fruiting calyx campanulate or tubular; petals lancinate.

Calyx teeth twisted; plant densely white-wooly all over.

1. *L. alba*.

2. *L. dioica*.

3. *L. chalcedonica*.

4. *L. Flos-cuculi*.

5. *L. coronaria*.

1. ***L. alba*** Mill. In fields and waste places: Eastern Canada, Ont., and Eastern and Middle States. Naturalized from Europe.

Not very common as a weed in most parts of our range, except the pine-barrens, there rare or wanting.

2. ***L. dioica*** L. In waste places and on ballast: N. S., Ont., N. Eng. and the Middle States. Adventive from Europe.

Rare as an escape from gardens, and as a weed.

3. ***L. chalcedonica*** L. Escaped from gardens to roadsides: Mass. to S. N. Y. Native of E. Eu. and W. Asia.

A rather rare escape on L. I., S. I. and the lower Hudson Valley, and in Conn.

4. ***L. Flos-cuculi*** L. In waste places: N. B. to N. J. and Pa. Fugitive from Europe.

Not uncommon near the larger cities as an escape from cultivation, rarely persisting.

5. ***L. coronaria*** (L.) Desr. Escaped from gardens to roadsides: Mass. to N. Y. Native of Europe.

Not common and often wanting, as a roadside escape from gardens.

L. sylvestris Schk. has been recorded as a waif near New York and Philadelphia.

4. *Gypsophila* L.

1. ***G. muralis*** L. In waste places: Me. and Ont. to Mich., Mass., N. Y. and N. J. Adventive or naturalized from Europe.

Rare as a weed.

G. elegans Bieb. has been reported from Conn. as a rare escape from gardens.

5. *Petrorhagia* (Ser.) Link (*Tunica* Adans.)

1. ***P. Saxifraga*** (L.) Ser. Roadside: Flushing, L. I., and London, Ont. Adventive from Europe.

Known only in our range from the L. I. locality; not recently collected.

6. *Saponaria* L.

1. *S. officinalis* L. Roadsides and waste places: common throughout E. N. Am. Naturalized from Europe.

Locally abundant as a weed.

S. ocymoides L. has been recorded as a waif.

7. *Vaccaria* Medic.

1. *V. Vaccaria* (L.) Britton. In waste places: Ont. to B. Col., Fla. and La. Also in the Rocky Mts. Naturalized from Europe.

Locally common as a weed.

8. *Dianthus* L.

Annuals; flowers clustered.

Bracts broad, ovate, scarious.

Bracts narrow, lanceolate-subulate, herbaceous.

1. *D. prolifer.*

2. *D. Armeria.*

Perennials.

Flowers solitary; leaves linear.

Flowers clustered; leaves lanceolate.

3. *D. deltoides.*

4. *D. barbatus.*

1. *D. prolifer* L. In waste places and on ballast: S. N. Y. to Del. and Ohio. Fugitive from Europe.

A rare and local escape, near N. Y., on L. I. and near Philadelphia. Not recently collected.

2. *D. Armeria* L. In fields and along roadsides: Me. to S. Ont., Mich. and Va. Naturalized from Eu.

Common or frequent throughout our area as a roadside weed.

3. *D. deltoides* L. In waste places: Conn. and E. Mass. to northern N. Y. and Mich. Adventive from Europe.

Rare and local as field weed in northern Conn. and in Delaware Co., N. Y.; also near Philadelphia.

4. *D. barbatus* L. In waste places: Eastern and Middle States. Native of Europe.

Rather rare as an occasional escape from gardens in most parts of our range.

NYMPHAEACEAE*

Sepals and petals 3; stamens 6.

Sepals 4-6; petals numerous.

Carpels numerous (8-30) united into a compound pistil; ovules numerous.

I. BRASENIA.

* See footnote, page 76.

Petals very small and stamen-like, the stamens inserted under the ovary.

Petals large, numerous; stamens epigynous.

Carpels few—several, separately immersed in the obconic receptacle; ovules solitary.

2. NYMPHAEA.

3. CASTALIA.

4. NELUMBO.

1. **Brasenia** Schreb.

1. **B. Schreberi** Gmel. (*B. purpurea* (Michx.) Casp.). In ponds and slow streams: N. S. to Fla., Man., Tex., Mex. and rarely on the Pacific coast from Cal. to Wash.

Throughout the range and in some localities exceedingly common, usually decreasing northward and at greater elevations.

2. **Nymphaea** [Tourn.] L.

Leaves 1–3 dm. long; stigma 12–24 rayed; petals truncate, fleshy.

1. *N. advena*.

Leaves 0.7–2.5 dm. long; stigma 9–12 rayed; petals spatulate, fleshy.

2. *N. rubrodisca*.

Leaves 0.5–1 dm. long; stigma 7–10 rayed; petals spatulate, thin.

3. *N. microphylla*.

1. **N. advena** Soland. In ponds and slow streams: Labrador to the Rocky Mts., Fla., Tex. and Utah.

Common throughout the range in some of its forms, the variety *variegata*, with floating leaves, being perhaps the commonest of all. It has been maintained by some as *N. variegata* (Engelm.) G. S. Miller. A plant confined to the pine-barrens, with smaller flowers and fruit than the type, has recently been described as *N. fraterna* Miller and Standley.

2. **N. rubrodisca** (Morong) Greene (*N. hybrida* Peck). In ponds and slow streams: Vt. to Ont., N. Y., Pa. and Mich.

Known in our range, only from ponds and lakes north of the terminal moraine; frequent in the Bronx River. Perhaps a hybrid between the preceding and the following.

3. **N. microphylla** Pers. (*N. Kalmiana* (Michx.) Sims.). In ponds and slow streams: Newf. to N. Y., Pa., Minn. and Saskatch.

Known in our range only from ponds and lakes north of the moraine.

3. **Castalia** Salisb.

Flowers 0.7–1.5 dm. broad, fragrant; leaves orbicular, purplish beneath.

1. *C. odorata*.

Flowers 1–2.5 dm. broad, not fragrant; leaves orbicular, green both sides.

2. *C. tuberosa*.

1. **C. odorata** (Dryand) Woodv. & Wood. In ponds and slow streams: Newf. to Manit., Fla. and Tex.

Common throughout the area either in its typical form or, in the south, replaced by the varieties *rosea* and *minor*.

2. **C. tuberosa** (Paine) Greene. Lake Champlain, west through the Great Lakes to Mich., south to Pa., Del. and Ark.

Known definitely only from Pocatquissing Creek and from near Trenton, both in Mercer Co. and from Cape May Co., N. J.

4. **Nelumbo** [Tourn.] Adans.

Flowers pale yellow; native plant.

1. *N. lutea*.

Flowers pink or white; introduced plant.

2. *N. Nelumbo*.

1. **N. lutea** (Willd.) Pers. In ponds and slow streams: Ont. to Mass., Fla., Minn. and Tex. Rare in our area.
CONN. Selden's Cove, Lyme.
N. J. Rare in Sussex, Salem, and Bergen counties, in the latter county introduced.
PA. Near Philadelphia and along the banks of the Delaware in Delaware Co.
2. **N. Nelumbo** (L.) Karst. Known in N. Am. only from a large pond-like swamp at Bordentown, N. J., within 1/8 mile of the Delaware River. Obviously introduced.

CERATOPHYLLACEAE

1. **Ceratophyllum** L.

1. **C. demersum** L. In ponds and streams: throughout N. Am. except the extreme north.

Throughout the range except in the pine-barrens. The variety *echinatum* with large fruit is said to be of similar range; it is known definitely only from Westchester Co., N. Y.

MAGNOLIACEAE

Anthers introrse; leaves entire or with 2 basal lobes.

1. **MAGNOLIA**.

Anthers extrorse; leaves lobed or truncate.

2. **LIRIODENDRON**.

1. **Magnolia** L.

Leaves 8-15 cm. long, glaucous beneath.

1. *M. virginiana*.

Leaves 20-40 cm. long, light green and somewhat pubescent beneath.

2. *M. tripetala*.

1. **M. virginiana** L. In swamps and swampy woods: Mass. to Pa., Fla. and Tex.
N. Y. On L. I. south of the moraine in Suffolk Co.; occasional on S. I.
N. J. Rare and local in Bergen, Essex, Hudson and northern Middlesex and Monmouth counties, increasing and common southward.

PA. Bucks, Montgomery, Delaware and Chester counties.

Tertiary, common: Cretaceous, scattered in edaphically favorable places: Older Formations, rare north of the moraine. 177-210 days. About sea level.

2. **M. tripetala** L. In woods: southeastern Pa. to Ga., Mo., Ark. and Miss.

PA. Near Oxford, Chester Co.

Reported also from southwestern N. J., but not certainly wild there.

2. **Liriodendron** L.

1. **L. Tulipifera** L. In woods: Vt. and R. I. to Fla., Mich. and Ark.

CONN. Throughout, decreasing northwestward.

N. Y. Common on the north side of L. I.; on S. I. and south of the Highlands in the Hudson Valley, thence decreasing northward; rare or wanting as a wild tree in Greene Co.; Copake Falls, Columbia Co.

N. J. Common throughout the state except in the pine-barrens, there wanting.

PA. Monroe and Bucks counties, increasing and common southward.

Tertiary, not uncommon, but wanting on Beacon Hill: Cretaceous common: Older Formations, decreasing northward. 145-224 days. Sea level-1,000 ft.

ANNONACEAE

1. **Asimina** Adans.

1. **A. triloba** (L.) Dunal. Along streams: Ont. to Mich., N. J., Pa. and Fla.; westward to Tex.

N. J. Recorded as rare along the drainage of the Delaware River in Mercer and Hunterdon counties and from May's Landing, Atlantic Co.

PA. Uncommon in Montgomery, Delaware and Chester counties.

A rare and local species in our region apparently localized in the drainage of the Delaware River.

RANUNCULACEAE

Carpels several ovuled, fruit a follicle or berry.

Flowers regular.

Leaves palmately nerved or palmately compound.

Petals wanting.

- | | |
|---|------------------|
| Carpels ripening into a head of red berries. | 1. HYDRASTIS. |
| Carpels ripening into a head of dry follicles. | 2. CALTHA. |
| Petals present. | |
| Petals linear, flat. | 3. TROLLIUS. |
| Petals tubular, at least at the base. | |
| Sepals persistent; stem tall, leafy. | 4. HELLEBORUS. |
| Sepals deciduous; stem scape-like, bearing
1 leaf. | 5. ERANTHIS. |
| Leaves ternately or pinnately compound or decompound. | |
| Petals not spurred. | |
| Flowers solitary or paniced. | 6. COPTIS. |
| Flowers racemose. | |
| Fruit berries. | 7. ACTAEA. |
| Fruit follicles. | 8. CIMICIFUGA. |
| Petals prolonged backward into hollow spurs. | 9. AQUILEGIA. |
| Flowers irregular. | |
| Posterior sepal spurred. | 10. DELPHINIUM. |
| Posterior sepal hooded, helmet-like. | 11. ACONITUM. |
| Carpels 1-ovuled; fruit an achene. | |
| Flowers subtended by involucre remote from the calyx or close
under it; sepals petal-like. | |
| Involucre remote from the calyx; styles short, subulate. | 12. ANEMONE. |
| Involucre of 3 simple sessile leaflets close under the flower. | 13. HEPATICA. |
| Involucre of 3 compound sessile leaves; leaflets stalked. | 14. SYNDESMON. |
| Flowers not subtended by involucre. | |
| Leaves opposite; sepals petal-like. | |
| Petals wanting. | |
| Sepals and stamens spreading; flowers paniced. | 15. CLEMATIS. |
| Sepals and stamens erect or ascending; flowers
mostly solitary. | 16. VIORNA. |
| Petals present, small, spatulate. | 17. ATRAGENE. |
| Leaves alternate or basal. | |
| Petals present. | |
| Mostly aquatic; petals white, only the claw
yellow. | 19. BATRACHIUM. |
| Mostly terrestrial; petals yellow. | |
| Achenes swollen; sepals 3. | 20. FICARIA. |
| Achenes compressed. | |
| Achenes longitudinally striate. | 21. HALERPESTES. |
| Achenes not longitudinally striate, but
smooth, papillose or spiny. | 18. RANUNCULUS. |
| Petals none; leaves ternately decompound. | 22. THALICTRUM. |

1. *Hydrastis* Ellis.

1. *H. canadensis* L. In woods: Conn. and S. N. Y. to Ont., Minn., Ga. and Ark. Very rare in our area.
- CONN. Southern part of Hartford Co.
- N. Y. Unknown on L. I. and on S. I. and up the Hudson Valley to the Highlands; reported but not definitely known from near West Point, thence scattering and rare **northward**.

N. J. Reported from Warren Co. in the valley of the Delaware River, and from Sussex Co.

PA. Bucks, Berks, Montgomery, Philadelphia, Delaware and Chester counties.

Tertiary, o: Cretaceous, perhaps, but doubtfully in Bucks Co., Pa. Older Formations, rare and local. 118-220 days. Sea level-2,000 ft.

2. *Caltha* [Rupp.] L.

Leaves cordate, generally with a narrow sinus; flowers 2.5-4 cm. wide. 1. *C. palustris*.
 Leaves flabelliform, with a broad sinus; flowers 1-2.5 cm. wide. 2. *C. flabellifolia*

1. *C. palustris* L. In swamps and meadows: Newf. to S. Car. and Neb.

Common throughout the range in favorable situations, except in the pine-barrens of L. I. and in those of N. J. and east and south of them.

2. *C. flabellifolia* Pursh. In cold mountain springs, sometimes in streams: Pa. and N. N. J. and N. Y. to Md.

N. Y. Cool streams and springs of Delaware Co.; at Woodlawn, N. Y. City and West Hampton, L. I.*

N. J. Sussex and Bergen counties.

PA. Monroe Co.

Tertiary, o: Cretaceous o. Older Formations increasing but not common northward. 117-183 days. Sea level-3,500 ft. South of the moraine only on L. I. at a single station.

The reported occurrence of *C. radicans* Forst. at Woodlawn, N. Y. City and West Hampton, L. I., is an error. The plants upon which the statement was based are *C. flabellifolia*. *C. radicans* is a circumboreal species known in America only from Alaska.

3. *Trollius* L.

1. *T. laxus* Salisb. In swamps: N. H. (?), Conn. to Del., west to Mich.

CONN. Near Cornwall and Falls Village, Canaan.

N. Y. Rare and local in Westchester and Rockland counties, formerly in Bronx Co., otherwise unknown, except for an unverified record from Queens Co., L. I.

N. J. Not very common in Sussex, Morris, Passaic, Warren, Bergen, and Hudson counties.

PA. Monroe, Northampton and Bucks counties.

Tertiary, o: Cretaceous, o: Older Formations not very common. South of the moraine only in Pa. 138-170 days. 413-1,800 ft.

* See Introduction paragraph 41.

4. *Helleborus* [Tourn.] L.

1. *H. viridis* L. In waste places: N. Y., N. J., Penn., N. Car. and W. Va. Adventive from Europe.

Rare and local as an occasional adventive in N. Y., N. J. and Pa.

5. *Eranthis* Salisb. (*Cammarum* Hill.).

1. *E. hymenalis* (L.) Salisb. Known in N. Am. only at Bartram's Garden, Philadelphia and at Media, Pa. Naturalized from Europe.

6. *Coptis* Salisb.

1. *C. trifolia* (L.) Salisb. In damp mossy woods and bogs: Newf. to Md., E. Tenn., Minn., Br. Col. and Alaska.

CONN. Rare and local along the coast, increasing northward and especially **northwestward**.

N. Y. Unknown on L. I., two records, not recently verified, from S. I., rare and local in the Hudson Valley below the Highlands, thence increasing and common **northward** into the Catskills.

N. J. Sussex, Warren, Morris, Passaic, Bergen, Hudson and Mercer counties, increasing **northward**.

PA. Pike, Monroe, Luzerne, Northampton, Lehigh, Berks and Schuylkill counties, increasing **northward**.

Tertiary, o: Cretaceous, o: Older Formations increasing and common **northward**. South of the moraine only in Pa. 117-187 days. Sea level-4,020 ft.

7. *Actaea* L.

Pedicels slender; berries red.

1. *A. rubra*

Pedicels stout; berries white.

2. *A. alba*.

1. *A. rubra* (Ait.) Willd. In woods: N. S. to N. J. and Pa., west to S. Dak. and Neb.

CONN. Rare near the coast, increasing **northwestward**.

N. Y. Very rare and local on the north side of L. I.; near Silver Lake, S. I., thence increasing but not common **northward**, becoming frequent above the Highlands.

N. J. Rare and local in Monmouth, Mercer, Essex and Passaic counties, increasing **northward**.

PA. Reported but not definitely known from Delaware and Chester counties, rare in Northampton Co.; otherwise unknown.

Tertiary, o: Cretaceous, perhaps in Monmouth Co., N. J.: Older Formations increasing but never very common **northward**. Predominating north of the moraine. 117-189 days. Sea level-3,860 ft.

2. **A. alba** (L.) Mill. In woods: N. S. and Anticosti to Ga., west to Minn. and La.

Throughout the range except in the pine-barrens of N. J., and east and south of them; on L. I., only north of the moraine; always increasing **northward**.

8. **Cimicifuga** L.

1. **C. racemosa** (L.) Nutt. In woods: Me. and Ont. to Wisc., south to Ga. and Mo.

CONN. Common in the southwestern part of the state, rare and local elsewhere.

N. Y. Common on the north shore of L. I., on S. I., and up the Hudson Valley to the Highlands, thence decreasing, and becoming rare in the Catskills.

N. J. Rare and local at Cape May; in the counties bordering the Delaware to Mercer; thence increasing and common **northward**.

PA. Northampton, Bucks, and Chester counties and in Delaware Co. so far as the form *dissecta* is concerned.

Tertiary, rare in the regions to the west and south of Beacon Hill, not recorded elsewhere: Cretaceous, rare and local: Older Formations increasing, but not very common **northward**. 118-220 days. Sea level-1,800 ft.

9. **Aquilegia** [Tourn.] L.

Spur of the petals nearly straight; flowers scarlet, rarely white or yellow.

1. *A. canadensis*.

Spur incurved; flowers blue, white or purple.

2. *A. vulgaris*.

1. **A. canadensis** L. In rocky woods: N. S. to the N. W. Terr., south to Fla. and Kan.

Common nearly throughout the range, except in the pine-barrens, there wanting; rare on L. I.

A form with yellow flowers, *A. canadensis flaviflora* (Tenney) Britton, has been found only at Sea Bright and Cold Spring, N. J., and at Congers and Poughkeepsie, N. Y., within our area.

2. **A. vulgaris** L. Escaped from gardens in the Eastern and Middle States, in N. S. and N. B. Adventive from Europe.

A rather rare escape from gardens in most parts of our range.

10. **Delphinium** L.

Follicles glabrous.

Follicles pubescent.

1. *D. Consolida*.

2. *D. Ajacis*.

1. **D. *Consolida*** L. In our area probably occurring only as a garden plant, though reported as escaped; probably mistaken for the following species.
2. **D. *Ajacis*** L. Escaping from gardens: Vt. to Va., Tenn. and Mo. Naturalized from Europe.

An escape from cultivation throughout the range.

D. divaricatum L. and *D. peregrinum* L. have been collected in waste places near New York.

11. **Aconitum** [Tourn.] L.

1. **A. *noveboracense*** A. Gray. Orange, Ulster and Chenango counties, N. Y. Reported from Ohio. Very rare.

Known from near Beaverville, Ulster Co. and from an unrecorded locality in Orange Co., otherwise unknown. Both these stations are north of the moraine, have an elevation of about 800 ft. and a growing season of about 147 days.

12. **Anemone** L.

Achenes densely woolly.

Beak of fruit 1 mm. long; divisions of the leaves wedge-shaped, narrow.

1. *A. cylindrica*.

Beak of fruit 2 mm. long; divisions of the leaves ovate, broad.

Flowers greenish white or white, 1.5-3 cm. wide; head of fruit oblong.

2. *A. virginiana*.

Flowers pure white, 3-5 cm. wide; head of fruit short cylindrical.

3. *A. riparia*.

Achenes pubescent or glabrous but never densely woolly.

Leaves of the involucre sessile.

4. *A. canadensis*.

Leaves of the involucre petioled.

5. *A. quinquefolia*.

1. **A. *cylindrica*** A. Gray. Open places: N. B. and Ont. to Conn., N. J., N. Mex. and in B. Col.

CONN. Rare and local along the coast, increasing **northward**.

N. Y. Unknown on L. I. and S. I.; rare and local in northern Westchester Co., thence increasing **northward**.

N. J. Near Franklin Furnace, and Ogdensburg, Sussex Co.; on limestone.

PA. Luzerne Co.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**, and most common on limestone. Not south of the moraine. 117-159 days. Sea level-3,800 ft.

2. **A. *virginiana*** L. In woods: N. S. to S. Car., Kan., Man. and the Canadian Rockies.

CONN. Common throughout the state.

N. Y. Rare and local on the south side of L. I., not uncommon on the north side and on S. I., thence increasing and common **northward**.

N. J. Rare and local in the south and unknown in the pine-barrens; thence increasing and common **northward**.

PA. Pike, Luzerne, Monroe, Northampton, Bucks and Chester counties, increasing **northward**.

Tertiary, unknown on Beacon Hill, rare and local elsewhere: Cretaceous, scattered: Older Formations, increasing **northward**. 117-220 days. Sea level-4,020 ft.

3. **A. riparia** Fernald. On river banks: Me. and Ont. to Va.

CONN. Apparently confined to the drainage of the Housatonic River, increasing **northward**.

N. Y. Pine Plains, Dutchess Co.

N. J. Sussex Co.

PA. Pike, Bucks, and Northampton counties, increasing **northward**.

Tertiary, o: Cretaceous, o: Older Formations, predominating on limestone. South of the moraine only in Pa. 127-153 days. 510-1,800 ft. Perhaps not specifically distinct from *A. virginiana*.

4. **A. canadensis** L. In low grounds: Lab. to N. W. Terr., E. Mass., Md., Ill. and Colo.

CONN. Rare and local along the coast, increasing **northwestward**.

N. Y. Unknown on L. I. and S. I.; rare and local in Westchester and Bronx counties, thence increasing but not very common **northward**.

N. J. A single station at Red Bank, Gloucester Co.; near Woodbridge and Carlstadt, thence increasing but rare **northward**.

PA. Northampton Co. Not recently collected.

Tertiary, o: Cretaceous, rare and very local:* Older Formations, increasing but not common **northward**. 138-220 days. Sea level-1,200 ft.

5. **A. quinquefolia** L. In low woods: N. S. to Ga., west to the Rocky Mountains.

Throughout the area, except in the pine-barrens, there rare or wanting.

13. **Hepatica** [Rupp.] Mill.

Lobes of the leaves rounded or obtuse.

Lobes of the leaves acute.

1. *H. Hepatica*.

2. *H. acutiloba*.

* See Introduction paragraph 36.

1. **H. Hepatica** (L.) Karst. In woods: N. S. to northern Fla., west to Manitoba, Iowa, and Mo. Also in Eu. and Asia.
Common throughout the range except in the pine-barrens and south of the moraine on L. I., there rare or wanting.
2. **H. acutiloba** DC. In woods: Quebec and throughout Ont., south to Ga., west to Iowa and Minn.
CONN. Litchfield Co.
N. Y. The Catskills.

14. **Syndesmon** Hoffmg.

1. **S. thalictroides** (L.) Hoffmg. In woods: throughout E. N. Am.
Common throughout the range, except in the pine-barrens, there wanting; rare south of the moraine on L. I.

15. **Clematis** L.

1. **C. virginiana** L. In low woodlands and along fences and water courses: N. S. to Manitoba, south to Ga. and Kan.
Common throughout the range, except in the pine-barrens, there wanting.

16. **Viorna** Reichb.

Climbing vines; leaves pinnate or 3-foliolate.
Erect or ascending herb; leaves entire.

1. *V. Viorna*.
2. *V. ochroleuca*.

1. **V. Viorna** (L.) Small (*Clematis Viorna* L.). In rich soil: S. Penn. to Ind., Mo., Ga. and Tenn.
Known in our area only from Chester Co., Pa.
2. **V. ochroleuca** (Ait.) Small. In woods: S. N. Y. and Pa. to Ga.
Known in our area only from the glaciated portion of S. I. and near London Grove, Chester Co., Pa. The stations on S. I. are many of them on serpentine hills, but the Chester Co. station is on (?) Potsdam Quartzite. Formerly found near Brooklyn, L. I. but the region in which the plant grew is wholly built over.

17. **Atragene** L.

1. **A. americana** Sims. In woods and thickets: Hudson Bay to Manitoba, Conn., Va. and Minn.
CONN. Not common, but found in most parts of the state.
N. Y. Not reported from L. I. nor S. I., rare and local in Westchester Co., thence increasing but not common **northward**.

N. J. Rare and local in Hunterdon, Somerset and Union counties, thence increasing but not common northward.

PA. Monroe, Northampton, Lehigh, Bucks, Montgomery, Berks and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing north of the moraine. 117-175 days. Sea level-3,800 ft.

18. *Ranunculus* [Tourn.] L.

Aquatic, or creeping mud plants, or plants of swamps or muddy shores.

Leaves orbicular, palmately divided.

1. *R. delphinifolius*.

Leaves entire or denticulate.

Annual; achene beakless, tipped with the persistent style-base.

2. *R. pusillus*.

Perennial; rooting from the nodes; achenes beaked.

Stems trailing; achenes minutely beaked.

3. *R. reptans*.

Stems ascending or erect; achenes subulate beaked.

4. *R. obtusiusculus*.

Terrestrial species with some or all of the leaves divided.

Achenes smooth, neither papillose nor spiny.

Basal leaves, some or all of them, merely crenate.

Styles very short, curved.

Basal leaves cordate; plant usually glabrous.

5. *R. abortivus*.

Basal leaves not cordate; plant villous.

6. *R. micranthus*.

Styles subulate, hooked, nearly $\frac{1}{2}$ as long as the achene.

7. *R. allegheniensis*.

Leaves all lobed or divided.

Plant glabrous; stem hollow; flower small.

8. *R. sceleratus*.

Plant more or less pubescent.

Beak of the achene strongly hooked.

9. *R. recurvatus*.

Beak not hooked.

Beak of the achene short.

Erect plants naturalized in fields.

Calyx spreading; roots fibrous.

10. *R. acris*.

Calyx reflexed; stem bulbous-thickened at the base.

11. *R. bulbosus*.

Erect or ascending plant of moist places; flower 6-12 mm. broad.

12. *R. pennsylvanicus*.

Prostrate or somewhat ascending; plant of fields; flowers about 25 mm. broad.

13. *R. repens*.

Beak of the achene long, stout or slender; flowers 12-36 mm. broad.

Beak stout, sword shaped; leaves cuneate at the base.

14. *R. septentrionalis*.

Beak slender, subulate.

Leaf segments broad, oblong.

15. *R. hispidus*.

Leaf segments narrow, linear-oblong.

16. *R. fascicularis*.

Achenes not smooth.

Achenes rough-papillose, the beak straight.

Achenes muricate, the beak recurved.

17. *R. parviflorus*.

18. *R. arvensis*.

1. ***R. delphinifolius*** Torr. In ponds: Me. and Ont. to Mich., south to N. Car., Mo. and Kan.
 CONN. Not common but found throughout the state.
 N. Y. Rare and local on L. I. and S. I., thence increasing but not very common **northward**.
 N. J. Rare and local in Monmouth and Middlesex counties, thence increasing and not uncommon **northward**.
 Distribution little understood; more common **northward** than elsewhere.
2. ***R. pusillus*** Poir. In marshes: S. N. Y. and N. J., Pa., south to Fla., west to Tex. and Mo.
 N. Y. Rare and local in Westchester Co., on L. I. and on S. I.
 N. J. Rare and local in Morris and Essex Counties, increasing **southward** but nowhere common, and not found in the pine-barrens or south of them.
 PA. Bucks and Chester counties.
 Tertiary, o: Cretaceous, common: Older Formations, decreasing northward. 137-220 days. **Sea level**-1,800 ft.
3. ***R. reptans*** L. On shores: Newf. and Arctic Am., south to N. J., Penn. and Mich. and in the Rocky Mts. to Col. Also in Eu. and Asia.
 CONN. Near the coast in New London Co. and along the drainage area of the Connecticut River in Hartford Co.
 N. Y. Reported from the north shore of L. I. near N. Y. City.
 N. J. Mercer, Warren and Sussex counties; in the drainage area of the Delaware River.
 PA. Bucks and Northampton counties near the Delaware.
 A rare and local species, the distribution of which is little known.
4. ***R. obtusiusculus*** Raf. In marshes: Me. and Ont. to Ga., west to Minn. and Mo.
 Throughout the range, except in the pine-barrens, there wanting; apparently rare on L. I. and S. I.
5. ***R. abortivus*** L. In moist ground, most common in woods: Newf., Lab. and N. S. to Manitoba, Fla., Ark. and Col.
 Common throughout the range, except in the pine-barrens, there wanting; doubtfully north of the moraine on L. I.

6. **R. micranthus** Nutt. In rocky woods: Newf., Lab. and N. S. to Manitoba, Fla., Ark. and Col.
 CONN. Throughout the state, more common along the Connecticut River than elsewhere.
 N. Y. Common along the Hudson to Putnam Co., thence apparently decreasing northward. Apparently unknown on L. I. and S. I.
 N. J. Not uncommon along the Palisades in Bergen and Hudson counties, also in Essex, Sussex and Hunterdon Counties; unknown elsewhere.
 PA. From Bucks Co.
 Apparently most common on trap rock in Conn. and N. J.; otherwise its distribution is little understood.
7. **R. allegheniensis** Britton. Mountains: Vt. and Mass. to Va. and N. Car.
 Known only from Litchfield Co., Conn., there very rare. Reported, but not definitely known from the Catskills.
8. **R. sceleratus** L. In swamps and ditches, and on shores: N. B. to Fla., Kan. and Minn. Also in Eu. and Asia.
 CONN. Not uncommon along the coast, decreasing inland.
 N. Y. Common on L. I. and S. I., decreasing up the Hudson Valley.
 N. J. Common along the coast, decreasing inland; not reported from the pine-barrens.
 PA. Chester and Delaware counties.
 More common near the junction of salt and fresh water than elsewhere.
9. **R. recurvatus** Poir. In woods: N. S. to Manitoba, south to Fla. and Mo.
 Throughout the range except in the pine-barrens, there wanting.
10. **R. acris** L. In fields and meadows: Northern States and Canada. Naturalized from Europe.
 Common throughout the range.
11. **R. bulbosus** L. In fields and along roadsides: Eastern States. Naturalized from Europe.
 Common everywhere.
12. **R. pennsylvanicus** L. f. In wet open places: N. S. to Ga. and west to the Rocky Mts. and B. Col.

CONN. Rare and local along the coast, increasing **northwestward**.
 N. Y. Unknown on the south side of L. I., rare and local north of the moraine, near the western end of the island; rare on S. I.; not common in Westchester Co., thence increasing and common **northward**.

N. J. Unknown in the pine-barrens, rare and local in the area surrounding them; from Monmouth and Middlesex counties, thence increasing and becoming common **northward**.

PA. Pike, Northampton and Delaware counties.

Tertiary, known only locally, exclusively outside of the Beacon Hill formation: Cretaceous, scattered: Older Formations, increasing and common **northward**. 127-220 days. Sea level-1,900 ft.

13. **R. repens** L. In fields and along roadsides: Newf. to Va. and locally in the interior. Mainly introduced from Europe.

Occasional as an adventive over most parts of our range, except in the pine-barrens, there unknown.

14. **R. septentrionalis** Poir. Mainly in swamps and low grounds: N. B. to Man., Ga., Ky. and Kan.

CONN. Not common in the southeastern part of the state, increasing and becoming common **northwestward**.

N. Y. Rare and local on L. I. and S. I., frequent in Westchester Co., thence increasing and becoming very common **northward**.

N. J. Rare and local at Cape May, becoming more frequent **northward**, but not found in the pine-barrens.

PA. Pike, Luzerne, Lehigh, Northampton, Bucks and Philadelphia counties.

Tertiary, not on Beacon Hill, rare and local elsewhere: Cretaceous, scattering: Older Formations, increasing and common **northward**. 127-220 days. Sea level-2,100 ft.

15. **R. hispidus** Michx. In dry woods and thickets: Ont. to the N. W. Terr., Ga. and Ark.

Throughout the range, except in the pine-barrens, there wanting.

16. **R. fascicularis** Muhl. In woods: Ont. and N. Eng. to N. Car., west to Man., Kan. and Tex.

CONN. Rare and local, increasing **northwestward**.

N. Y. Highlands of the Hudson.

N. J. Sussex Co.

Most of the older records of *R. fascicularis* in the local flora apply to the preceding.

17. **R. parviflorus** L. In waste places: about eastern seaports. Mass. to Va. Naturalized from Europe.

A rare and local adventive near the larger cities, frequently wanting.

18. **R. arvensis** L. In waste ground: Tom's River and Passaic, N. J., and in ballast near the northern seaports.

Rare at the New Jersey stations and near the outskirts of the City. Otherwise unknown.

Ranunculus parvulus L., *R. graecus* Griseb., *R. lanuginosus* L., and *R. villosus* DC. have all been reported on ballast near New York.

19. **Batrachium** S. F. Gray*

Segments of the leaves 10-15 mm. long, rather rigid, scarcely collapsing when withdrawn from the water.

1. *B. circinatum*.

Segments of the leaves 15-30 mm. long, flaccid, collapsing when withdrawn from the water.

2. *B. tricophyllum*.

1. **B. circinatum** (Sibth.) Rehb. In ponds and streams: N. S. to B. Col., south to Tenn. and Cal. Also in Europe and Asia. CONN. Lakeville and Salisbury.

N. Y. Hyde Park, Dutchess Co. and Bedford, Westchester Co.

N. J. Bergen, Morris, Passaic and Sussex Cos. Recorded from Monmouth Co.

2. **B. tricophyllum** (Chaix.) F. Schulz. In streams: Mass. to Wash., south to N. Car. and Lower Cal. Also in Europe, Asia and S. Africa.

Throughout the range, except in the pine-barrens and south of them in N. J.

B. longirostres (Godr.) F. Schultz has been reported from Litchfield Co., Conn.

20. **Ficaria** Huds.

1. **F. Ficaria** (L.) Karst. Known in our range only from Flushing and College Point, L. I., S. I., and Delaware and Philadelphia counties, Pa. Fugitive from Europe.

21. **Halerpestes** Greene.

1. **H. Cymbalaria** (Pursh) Greene (*Oxygraphis Cymbalaria* (Pursh) Prantl.). On sandy shores and on salt meadows: Lab. to N. J., west to Alask., Cal., Mex. and Kan. Also in Asia and S. Am.

* See footnote, page 76.

CONN. Rare along the coast and up the Thames.

N. Y. Rare on L. I.

N. J. Local along the coast from Cape May to Monmouth counties.

Apparently more common near the sea-coast than elsewhere.

22. *Thalictrum* [Tourn.] L.

Filaments filiform or slender, not wider than the anthers.

Flowers strictly dioecious; lower stem leaves distinctly petioled. 1. *T. dioicum*.

Flowers polygamous; stem leaves almost sessile.

Leaves pubescent, but not glandular.

2. *T. dasycarpum*.

Leaves glandular pubescent.

3. *T. revolutum*.

Filaments spatulate, often wider than the anthers; plant not glandular.

4. *T. polygamum*.

1. *T. dioicum* L. In woods: Lab. and Anticosti to Ala., west to Sask. and Mo.

Throughout the area except the pine-barrens and the coastal plain of L. I. there wanting, and rare in the region surrounding the N. J. pine-barrens; always increasing **northward**.

2. *T. dasycarpum* Fisch. & Lall. (*T. purpurascens* of Britton's Manual, in part). Alluvial soil: Conn. to Sask. and southwestward.

CONN. Franklin and Southington.

N. J. Clifton, Bergen Co.

3. *T. revolutum* DC. (*T. purpurascens* of Am. Auth. not of L.). Rocky upland woods, and on river banks: E. Mass. to N. J., southwestern Ont., Ind. and N. C.

CONN. Common near the coast, decreasing inland.

N. Y. Not very common on L. I. and S. I., increasing **northward** but not known from the Catskills.

N. J. Unknown in the pine-barrens; rare and local in the region surrounding them, thence increasing but not common **northward**.

PA. Northampton, Delaware and Chester counties.

4. *T. polygamum* Muhl. In fields and meadows: Lab. and Que. to Fla., west to Ohio.

Common throughout the area, except in the pine-barrens, there wanting.

The following, heretofore credited to the area, are to be excluded: *Isopyrum alternatum* (Raf.) T. & G., *Xanthorrhiza apiifolia* L'Her., and *Adonis annua* L. I can find no evidence that any of these are established within the range. *Nigella damascena* L. has been reported from Conn. as an escape.

BERBERIDACEAE

Shrubs; fruit baccate.

Herbs.

1. BERBERIS.

Anthers opening by valves.

Pericarp early bursting, leaving 2 large, naked, stalked seeds, resembling berries.

Fruit capsular, half circumscissile.

2. CAULOPHYLLUM.

3. JEFFERSONIA.

Anthers longitudinally dehiscent; fruit baccate, stamens 6-18.

4. PODOPHYLLUM.

1. *Berberis* [Tourn] L.

1. *B. vulgaris* L. In thickets: naturalized from Eu. in the Eastern and Middle States, adventive in Canada and the West.

A rare escape in our area, commonly cultivated. The reported occurrence of *B. canadensis* in Conn. was based on a specimen of *B. vulgaris*.

2. *Caulophyllum* Michx.

1. *C. thalictroides* (L.) Michx. In woods: N. B. to S. Car., Minn., Neb. and Mo.

CONN. Rare near the coast; increasing **northwestward**.

N. Y. Unknown on L. I.; rare and local on S. I. and in Bronx and Westchester counties, thence increasing and common **northward**.

N. J. Essex, Bergen and Union counties, increasing **northward**.

PA. Pike, Monroe, Northampton, Lehigh, Bucks, Berks, Philadelphia, Delaware and Chester counties, increasing **northward**.

Tertiary, o: Cretaceous, o: Older Formations, increasing and usually common **northward**. 117-210 days. Sea level-3,365 ft.

3. *Jeffersonia* Bart.

1. *J. diphylla* (L.) Pers. In woods: Ont. to Wisc., Va. and Tenn. A rare species.

Known definitely in our area only from Bucks Co., Pa.

4. *Podophyllum* L.

1. *P. peltatum* L. In low woods: Que. and Ont. to Minn., Fla., La. and Tex.

CONN. Throughout the state, nowhere common.

N. Y. Unknown on L. I., rare and local on S. I., and in the Bronx, increasing and common **northward**.

N. J. Rare at Cape May and the area to the north and west of the pine-barrens, thence increasing **northward**.

PA. Monroe, Northampton, Lehigh, Bucks, Delaware and Chester counties.

Tertiary, unknown on Beacon Hill, rare elsewhere: Cretaceous, scattered: Older Formations, increasing **northward**. 123-220 days. Sea level-1,950 ft.

MENISPERMACEAE

1. *Menispermum* [Tourn.] L.

1. *M. canadense* L. In woods: Que. to Man., Ga. and Ark.
 CONN. Rare over most of the state, especially in the west.
 N. Y. Rare on L. I., S. I., and becoming frequent in Westchester Co., thence increasing and common **northward**.
 N. J. Cape May and in the area north and west of the pine-barrens, thence increasing and common **northward**.
 PA. Pike, Northampton, Bucks, Delaware and Chester counties.
 Tertiary, unknown on Beacon Hill, rare elsewhere: Cretaceous, scattered; Older Formations, increasing and common **northward**, especially on the trap intrusions of the Palisades, and in the Connecticut Valley. 128-220 days. Sea level-1,950 ft.

LAURACEAE

- Anthers 4-celled; leaves or some of them lobed; usually a small tree. 1. SASSAFRAS.
 Anthers 2-celled; leaves entire; always a shrub. 2. BENZOIN.

1. *Sassafras* (Nees.) Eberm.

1. *S. sassafras* (L.) Karst. In dry soil: Me. to Ont., Mich., Fla. and Tex.
 Common throughout the range.

2. *Benzoin* Fabric.

1. *B. aestivale* (L.) Nees. (*B. Benzoin* (L.) Coulter). In moist thickets, woods, and along streams: Me. to Ont., Mich., N. Car., Tenn. and Kan.
 Throughout the area except in the pine-barrens, there wanting.

PAPAVERACEAE

- Pod dehiscent at the top or only to the middle. 1. PAPAVER.
 Pod dehiscent to the base. 2. SANGUINARIA.
 Flowers white; juice red. 3. GLAUCIUM.
 Flowers and juice yellow or orange.
 Capsule long-linear, rough, tipped with a dilated stigma.

Capsule linear, smooth, tipped with a subulate style and minute stigma.

4. CHELIDONIUM.

1. *Papaver* [Tourn.] L.

Glabrate and glaucous; leaves lobed, clasping; capsule subglobose. 1. *P. somniferum*.
Green, hirsute; leaves pinnately divided.

Capsule glabrous.

Capsule sub-globose or top-shaped.

2. *P. Rhoëas*.

Capsule oblong, narrowed below.

3. *P. dubium*.

Capsule hispid, with a few erect hairs; oblong.

4. *P. Argemone*.

1. ***P. somniferum* L.** Occasional in waste ground and on ballast: Eastern States. Fugitive from Europe.

Rare as a fugitive species; sometimes escaping from gardens.

2. ***P. Rhoëas* L.** In waste places and on ballast: Me. to Va. Fugitive from Europe.

Rare and local as a fugitive species.

3. ***P. dubium* L.** In waste and cultivated ground: Conn. to Va. and southward. Adventive from Europe.

Occasional near the larger cities.

4. ***P. Argemone* L.** Waste ground: Eastern seaports. Fugitive from Europe.

Rare in waste places, especially near Philadelphia and New York.

P. hybridum L. has been recorded as on ballast near New York.

2. *Sanguinaria* [Dill.] L.

1. ***S. canadensis* L.** In rich woods: N. S. to Man., Neb., Fla. and Ark.

Common throughout the area, except the pine-barrens and the coastal plain of L. I., there wanting; always increasing **northward**.

3. *Glaucium* Juss.

1. ***G. Glaucium* (L.) Karst.** In waste places: R. I. to Va. Adventive from Europe.

Rare in our area as an adventive, more common along the sea beaches than elsewhere.

4. *Chelidonium* [Tourn.] L.

1. ***C. majus* L.** Waste places, roadsides and in woods: common in the East. Naturalized from Europe.

Common in most parts of our range, except the pine-barrens.

Argemone mexicana L. has been reported from the area as an established escape; not common. *Stylophorum diphyllum* Nutt. has been reported from Northampton Co., Pa., as escape from gardens. *Eschscholtzia californica* Cham. has been recorded as a waif near New York.

FUMARIACEAE

Each of the 2 outer petals spurred at the base.

Corolla deeply cordate at the base; petals slightly coherent.

1. BICUCULLA.

Corolla rounded or slightly cordate; petals permanently coherent and persistent.

2. ADLUMIA.

One of the outer petals spurred at the base.

Capsule 2-valved, few-several-seeded.

3. CAPNOIDES.

Fruit globose, indehiscent, 1-seeded.

4. FUMARIA.

I. *Bicuculla* Adans.

Spurs divergent; inner petals minutely crested.

1. *B. Cucullaria*.

Spurs short, rounded; inner petals conspicuously crested.

2. *B. canadensis*.

1. **B. Cucullaria** (L.) Millsp. In woods: N. to Minn., Wash., N. Car., Neb. and Mo.

CONN. Not common in New London Co., increasing and common elsewhere, especially **northwestward**.

N. Y. Unknown on L. I., rare on S. I., increasing and common **northward**.

N. J. A single station in Salem Co., rare and local in Middlesex and Mercer counties, thence increasing and common **northward**; not in the pine-barrens.

PA. Northampton, Lehigh, Bucks and Delaware counties.

Tertiary, o: Cretaceous, very rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,365 ft.

2. **B. canadensis** (Goldie) Millsp. In rich woods: N. S. to Minn., Tenn., Neb. and Mo.

CONN. Rare and local in northern New London Co., increasing **northwestward** into Hartford and Litchfield counties, but nowhere common.

N. Y. Unknown on L.I., and in the Bronx, formerly collected on S. I.; Slide Mt., Ulster Co.

N. J. Reported but not definitely known from Sussex Co.

PA. Reported from Montgomery, Philadelphia, Bucks and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing but never common **northward**. 117-210 days. Sea level-4,020 ft.

2. *Adlumia* Raf.

1. *A. fungosa* (Ait.) Greene. In moist woods and thickets: N. B. to Ont., N. Car. and Tenn.

CONN. Rare in the east, and along the coast, increasing **northward**.

N. Y. Very rare on the north shore of L. I., unknown on S. I., rare in northern Westchester Co., thence increasing **northward**.

N. J. Bergen, Passaic and Morris counties, increasing **northward**.

PA. Lehigh, Bucks, Lackawanna and Chester counties.

Tertiary, o: Cretaceous, perhaps in Bucks Co., Pa.: Older Formations, not common and increasing **northward**. 117-220 days. Sea level-3,365 ft.

3. *Capnoides* [Tourn.] Adans.

Stems tall; flowers pink with yellow tips.

1. *C. sempervirens*.

Stems low, diffuse or ascending; flowers yellow.

2. *C. flavulum*.

1. *C. sempervirens* (L.) Borck. In rocky places: N. S. to Alaska, N. Car. and Minn.

CONN. Not very common, but found throughout the state.

N. Y. Unknown on L. I. and S. I., rare and local in Westchester Co. and the Bronx, thence increasing and becoming common **northward**.

N. J. From Somerset Co. **northward**.

PA. Pike, Monroe and Luzerne counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Predominating north of the moraine. 117-189 days. Sea level-3,200 ft.

2. *C. flavulum* (Raf.) Kuntze. In rocky woods: S. N. Y. to S. W. Ont., Minn., Va., Kan. and La.

N. Y. Ulster, Dutchess, Orange, Rockland, Putnam and Westchester counties and on Manhasset Neck, L. I.; otherwise unknown.

N. J. Rare and local at Cape May and in Gloucester Co., thence increasing and becoming frequent **northward**.

PA. Philadelphia and Chester counties.

An uncommon species whose distribution is little understood.

The reported occurrence of *C. aureum* (Willd.) Raf. in the range is an error.

4. *Fumaria* L.

- I. *F. officinalis* L. In waste places and on ballast: N. S. to Fla. and the Gulf States; locally in the interior. Adventive from Europe.

An uncommon adventive near the towns and cities.

F. capreolata L. and *F. parviflora* Lam. have been recorded as ballast weeds near New York.

CRUCIFERAE

- A. Pod a silique or silicle, dehiscent into 2 valves to the base.
- I. Pod an elongated linear silique, at least twice as long as wide.
- Silique tipped with a short slender style, or without a style.
- Seeds globose or oblong, wingless.
- Seeds in 2 rows in each cell.
- Pubescence, if any, of simple hairs.
- Flowers yellow. 13. RADICULA.
- Flowers white. 14. SISYMBRIUM.
- Pubescence of forked hairs. 24. SOPHIA.
- Seeds in only 1 row in each cell.
- Leaves reniform or cordate; flowers white. 4. ALLIARIA.
- Leaves not reniform or cordate; flowers yellow (except in No. 28).
- Leaves dentate, dissected, or pinnatifid.
- Hairs simple.
- Pods narrowly conic, ribbed. 5. ERYSIMUM.
- Pods linear-cylindric. 6. NORTA.
- Hairs forked. 24. SOPHIA.
- Leaves entire or slightly toothed.
- Flowers white or pink.
- Valves of the silique nerved. 32. CONRINGIA.
- Valves of the silique nerveless. 25. STENOPHRAGMA.
- Flowers yellow. 27. CHEIRINIA
- Flowers large, purple or purplish-white. 31. HESPERIS.
- Seed flat, wingless or winged.
- Siliques 4-angled, the valves keeled; flowers yellow. 12. BARBAREA
- Siliques flat or flattish.
- Valves of the silique nerveless.
- Stem leafy below or throughout. 17. CARDAMINE.
- Stem leafless below, 2-4 leaved above. 18. DENTARIA.
- Valves of the silique 1-nerved or veiny. 26. ARABIS.
- Silique produced into a beak beyond the valves.
- Beak conic, very short in No. 8.

- Siliqua terete; seeds in 1 row. 9. BRASSICA.
- Siliqua flat; seeds in 2 rows. 10. DIPLTAXIS.
- Beak flat, sword-shaped. 8. SINAPIS.
- Siliqua elliptic or oblong, very flat, 2-3 times as long as broad, clearly stipitate; flowers violet. 19. LUNARIA.
- II. Pod an orbicular, globose or oblong silicle, or but little more than twice as long as wide.
- Silicle globose, or flattened parallel with the septum.
- Silicle not compressed.
- Silicle pear shaped, or obovoid, many-seeded. 21. CAMELINA.
- Silicle globose or terete oblong.
- Petals 2-cleft. 30. BERTEROA.
- Petals not 2-cleft.
- Flowers yellow. 13. RADICULA.
- Flowers white.
- Terrestrial; tall; style very short. 15. ARMORACIA.
- Aquatic, with dissected leaves; style slender. 16. NEOBECKIA.
- Silicle compressed or flat.
- Silicle many seeded. 23. DRABA.
- Silicle 2-8 seeded.
- Flowers yellow. 28. ALYSSUM.
- Flowers white. 29. KONIGA.
- Silicle flattened at right angles to the septum.
- Seeds several in each cell of the silicle.
- Silicle triangular, obtuse.
- Silicle oblong or orbicular, winged all around. 20. BURSA.
- Seeds* solitary in each cell, compressed. 3. THLASPI.
- I. LEPIDIUM.
- B. Pod indehiscent, short or elongated.
- Pod broader than long. 2. CARARA.
- Pod globose, reticulated. 22. NESLIA.
- Pod elongated.
- Pod of 2 joints, separating at maturity; plants maritime. 7. CAKILE.
- Pod not jointed, but constricted between the seeds; plants not maritime. 11. RAPHANUS.

1. Lepidium [Tourn.] L.

- Stem leaves clasping by an auriculate base.
- Pods broadly ovate, winged. 1. *L. campestre*.
- Pods wingless, broader than long. 2. *L. Draba*.
- Stem leaves petioled or sessile, not clasping.
- Petals relatively conspicuous, almost always as long as the calyx. 3. *L. virginicum*.
- Petals rudimentary or 0, scarcely as long as the calyx in rare cases.
- Pods ovate, 1.5 mm. long, 2 mm. broad, angled on the edges and with very small wings. 4. *L. ruderale*.
- Pods orbicular, seldom broadly ovate, mostly 3 mm. long and broad. 5. *L. densiflorum*.

1. *L. campestre* (L.) R. Brown. In fields and waste places: N. S. and Ont. to Va., Kan. and on the Pacific Coast. Naturalized from Europe.
A troublesome weed in many parts of our range.
2. *L. Draba* L. On ballast: near Astoria, L. I., and Syracuse, N. Y., also near the seaports. Fugitive from Europe.
A rare adventive near New York and at Swartzwood Lake, N. J.
3. *L. virginicum* L. In fields and along roadsides: Quebec to Minn., Colo., Fla., Tex. and Mex. Also in the W. I.
Common throughout the area.
4. *L. ruderale* L. In waste places, on ballast and along roadsides: N. S. to Tex.
Rare as an occasional adventive near New York and Philadelphia. Reported from near Bridgeport, Conn.
5. *L. densiflorum* Schrad. On ballast: near the eastern seaports.
Common throughout the area as a weed. Previously confused with the Asiatic *L. apetalum* Willd.

L. neglectum Thell, also found in waste places, with characters apparently intermediate between those of *L. virginicum* and *L. densiflorum*, may be a hybrid between these species.

The garden cress, *L. sativum* L., is frequently a short-lived escape from cultivation. Other species which are sometimes found as waifs are *L. graminifolium* L. and *L. Smithii* Hook.

2. Carara Medic (*Coronopus* Gaertn.)

Pod rugose, not crested.

1. *C. didyma*.

Pod coarsely wrinkled, crested.

2. *C. Coronopus*.

1. *C. didyma* (L.) Britton. In waste places: Newf. to Fla., Mo. and Tex., west to Cal. Naturalized from the South.
A rather common weed near Philadelphia, Jersey City and about the Metropolitan Area.
2. *C. Coronopus* (L.) Medic. In waste places and on ballast: N. B. to Fla. and Tex., and on the Pacific Coast. Fugitive or adventive from Europe.
Not uncommon near the edges of N. Y. City.

3. *Thlaspi* [Tourn.] L.

1. *T. arvense* L. In waste places and on ballast: Que. to Man., the N. W. Terr., N. Y. and Kan.
Not uncommon near the larger cities in the area.

4. *Alliaria* Adans.

1. *A. Alliaria* (L.) Britton. Waste places, woods and along roadsides: Ont., N. Y., N. J. and Va. Adventive from Europe.

Becoming frequent near the larger cities in the range, and along the Hudson River Railroad above Yonkers and near Roslyn, L. I.

5. *Erysimum* [Tourn.] L.

1. *E. officinale* L. (*Sisymbrium officinale* Sap.). In waste places: throughout Eastern N. America. Naturalized from Europe. Common everywhere.

6. *Norta* Adans.

1. *N. altissima* (L.) Britton (*Sisymbrium altissimum* L.). In waste places: Quebec and Ont. to Alberta, D. C. and Mo. Adventive from Europe.

Common throughout the range, except in the pine-barrens, there rare or wanting.

Sisymbrium Irio L., *S. Loesellii* L., and *S. pannonicum* Jacq., referable to this genus, have been reported as occasional waifs.

7. *Cakile* [Tourn.] Mill.

1. *C. edentula* (Bigel) Hook. In sands of the seashore: Newf. to Fla. and along the Great Lakes, N. Y. to Minn. Also on the California coast.

Along the sea-coast throughout the range, also along the shores of L. I. Sound and N. Y. Bay; always in sandy places.

In 1874 at Brooklyn, N. Y., and at Communipaw Ferry, N. J., *C. maritima* Scop. was collected. It has not been recorded since.

8. *Sinapis* L.

Leaves lyrate-pinnatifid; fruiting pedicels 8-10 mm. long.

1. *S. alba*.

Leaves dentate or lobed; fruiting pedicels 4-6 mm. long.

2. *S. arvensis*.

1. *S. alba* L. In waste places and fields, mostly escaped from cultivation: Eastern North America. Adventive from Europe. Native also of western Asia.

Not a very common adventive near the larger cities.

2. *S. arvensis* L. (*Brassica arvensis* (L.) B.S.P.). In fields and waste places: E. N. Am. Adventive from Europe.

Frequent as a weed.

9. *Brassica* [Tourn.] L.

None of the leaves clasping the stem, the upper sessile.

Pods slender, 1-2.5 cm. long, appressed.

Pods rather slender, 2-5 cm. long, not appressed.

Leaves merely toothed or lyrate-pinnatifid.

Leaves laciniate, at least marginally.

Upper leaves clasping by an auricled base.

1. *B. nigra*

2. *B. juncea*.

3. *B. japonica*.

4. *B. campestris*.

1. *B. nigra* (L.) Koch. In fields and waste places: common throughout N. Am. Naturalized from Europe.

Throughout the range, except in the pine-barrens, there rare or wanting.

2. *B. juncea* (L.) Cosson. In waste places: N. H. to Pa., Mich., Va. and Kan. Adventive from Asia.

Not uncommon near the larger cities in the range, often wanting.

3. *B. japonica* Siebold. In waste places: Me. to Ga. Adventive from Asia.

Known definitely only as a rare adventive in Conn.

4. *B. campestris* L. In cultivated grounds, sometimes persisting for a year or two: E. N. Am. Fugitive from Europe.

Not uncommon near the larger cities and along the edges of cultivated fields.

The rape, *B. napus* L., and the cabbage and its horticultural allies, *B. oleracea* L. are sometimes found as weeds in the area. Among other fugitive species are *B. monensis* Huds., and *B. Rapa* L.

10. *Diplotaxis* DC.

Perennial; stem leafy nearly to the inflorescence.

Annual; leaves mostly basal, oblanceolate.

1. *D. tenuifolia*.

2. *D. muralis*.

1. *D. tenuifolia* (L.) DC. In waste places and on ballast: N. S. to N. J. and Pa. Adventive from Europe.

Near New York and Philadelphia, and from a few stations in Connecticut.

2. *D. muralis* (L.) DC. In waste places and on ballast: N. S. to N. J. and Pa. Adventive from Europe.

Not a very common adventive near the larger cities of the area.

Diplotaxis eruroides DC. and *D. virgata* DC. have been reported from, but are very doubtfully established within our area.

11. *Raphanus* [Tourn.] L.

Flowers yellow, sometimes white; pod longitudinally grooved, 4-10 seeded.

Flowers pink or white; pod not longitudinally grooved, 2-3 seeded.

1. *R. Raphanistrum*.

2. *R. sativus*.

1. **R. Raphanistrum** L. In fields and waste places: Ont. and N. B. to Pa.; also in B. Col. Naturalized from Europe.
Common throughout the area, except in the pine-barrens, there rare or wanting.
2. **R. sativus** L. Cultivated and occasionally spontaneous for a year or two: E. N. Am. Native of Asia.
A rather uncommon and fleeting escape.

12. **Barbarea** R. Br.

Pods obtusely 4-angled, slender-pedicelled; leaf-segments 1-4 pairs.

Pods divergent or ascending.

1. *B. Barbarea*.

Pods erect, appressed.

2. *B. stricta*.

Pods sharply 4-angled, stout-pedicelled; leaf-segments 4-8 pairs.

3. *B. verna*.

1. **B. Barbarea** (L.) MacM. In fields and waste places: Lab. to Va. and locally in the interior. Also on the Pacific Coast. Naturalized from Europe.
Common as a weed throughout the area.
2. **B. stricta** Andrz. In fields and waste places: Que. to Minn., the N. W. Terr., Fla., Neb. Naturalized from Europe.
Not so common as the preceding, with a similar range in our area.
3. **B. verna** (Mill.) Aschers. (*B. praecox* (J. E. Smith) R. Br.). In waste places: Conn. to Fla. Adventive from Europe.
Rare in most parts of our area, except the pine-barrens, there perhaps wanting; not definitely known from the Catskills.

13. **Radicula** Hill (*Roripa* Scop.).

Plant perennial by creeping or subterranean branches

1. *R. sylvestris*.

Plant annual or perennial, with fibrous roots.

Stem nearly or quite glabrous; pods linear or linear-oblong.

2. *R. palustris*.

Stem hispid-pubescent; pods globose or oval.

3. *R. hispida*.

1. **R. sylvestris** (L.) Druce. In low grounds and waste places: Newf. to Mass., Va. and Mich. Adventive or naturalized from Europe.
Throughout the range, except in the pine-barrens, there rare or wanting.
2. **R. palustris** (L.) Bess. In wet places: nearly throughout N. Am., except the extreme north. Apparently naturalized from Europe.

Throughout the area except in the pine-barrens of New Jersey, there rare or wanting; rare in the region surrounding the pine-barrens, always increasing **northward**.

3. **R. hispida** (Desv.) Britton. In wet places: N. B. to B. Col., Fla. and N. Mex.

With a similar distribution to that of the preceding.

14. **Sisymbrium** [Tourn.] L.

1. **S. Nasturtium-aquaticum** L. (*Roripa Nasturtium* Rusby.) In brooks and streams: N. S. to Man., Ore., Va. and Neb., also in Arizona. Naturalized from Europe.

Common as an escape from cultivation in most parts of the range.

15. **Armoracia** Gaertn.

1. **A. Armoracia** (L.) Cockerell. (*Roripa Armoracia* (L.) A. S. Hitchcock). Escaped from gardens, especially along streams: E. N. Am. Adventive from Europe.

Not a very common escape from cultivation in most parts of our range.

16. **Neobeckia** Greene.

1. **N. aquatica** (Eaton) Britton. (*Roripa americana* Britton.) In lakes and slow streams: Vt. and Que. to Ont., Minn., Fla., La. and Ark.

Known definitely only from near Philadelphia, and from Swartzwood Lake, Sussex Co., N. J.

17. **Cardamine** [Tourn.] L.

Leaves pinnately divided, or some of them of but a single terminal segment.

Flowers 10-20 mm. broad, white or purplish.

1. *C. pratensis*.

Flowers 2-8 mm. broad, white.

2. *C. hirsuta*.

Leaves nearly all basal, pubescent.

Stem leafy; leaves glabrous or nearly so.

Flowers 4-5 mm. wide; plants of wet or dry sandy places.

Segments of basal leaves 4-12 mm. wide; plant 2-10 dm. high; of wet places.

3. *C. pennsylvanica*.

Segments of basal leaves 1-3 mm. wide; plant 1-4 dm. high; of dry sand.

4. *C. arenicola*.

Flowers 2-3 mm. wide, plants of dry rocky places.

5. *C. parviflora*.

Leaves entire, toothed, or rarely with 1-2 lateral segments.

Flowers purple; stem erect.

6. *C. purpurea*.

Flowers white.

Stem erect from a tuberous base.

7. *C. bulbosa*.

Stem decumbent, stoloniferous; roots fibrous.

8. *C. rotundifolia*.

1. **C. pratensis** L. In wet meadows and in swamps: Lab. to N. J., B. Col. and Minn. Also in Europe and Northern Asia.
CONN. Rare and local in northern Hartford and Litchfield counties, otherwise unknown.
N. Y. Pine Plains, Dutchess Co.; also on lawns at Riverdale and at Garden City.
N. J. Collected years ago in a swamp in Bergen Co., and Succasunna, Morris Co.
A rare and local plant in our area, becoming frequent in the far north.
2. **C. hirsuta** L. In moist places and waste ground: Mass. to Pa. and Mich. Neb. and N. Dak.
Occasional on lawns.
3. **C. pennsylvanica** Muhl. (*C. flexuosa* Auct. not With.). In swamps and wet places: Newf. to Minn., Mont., Fla., Tenn. and Kan.
Common throughout the area, except in the pine-barrens, there rare or wanting.
4. **C. arenicola** Britton. In sandy soil: Conn. to Fla., Ky. and Tenn.
CONN. Middletown.
N. Y. Occasional on the coastal plain of L. I.; Westchester Co.
N. J. Coastal plain from Ocean Co. **southward**.
Perhaps not specifically distinct from *C. parviflora*.
5. **C. parviflora** L. On rocks: Que. to W. Ont., Ore., south to Mass. and Ga. Also in northern Europe and Asia.
CONN. Throughout the state, nowhere common.
N. Y. Occasional in the Bronx and Westchester Co., thence increasing **northward**; Roslyn, L. I.
N. J. Rare and local in Bergen Co., thence increasing **westward**.
PA. Monroe, Northampton, Luzerne, Philadelphia and Bucks counties.
Tertiary, o: Cretaceous, o: Older Formations increasing **northward**. Predominating north of the moraine. 123-179 days. Sea level-2,100 ft.
6. **C. purpurea** (Torr.) Britton. In cold springy places: Que. and Arctic Am. to the Canadian Rockies, Md. and Wisc.
CONN. Rare and local in Litchfield and Fairfield counties.

N. Y. Rare and local in the Hudson Valley from Westchester Co. **northward**, but not reported from the region of the Catskills.

N. J. Morris and Sussex counties.

Tertiary, o: Cretaceous, o: Older Formations not common, and throughout the area most plentiful on soils derived from limestone. Not south of the moraine. Sea level-1,000 ft. 138-168 days.

7. *C. bulbosa* (Schreb.) B. S. P. In wet meadows and thickets: N. S. to Ont. and Minn., Fla. and Tex.

Throughout the area except in the pine-barrens of N. J. and south of them, there rare or wanting; unknown on L. I.

8. *C. rotundifolia* Michx. In cold springs: N. J. to Ohio, N. Car. and Ky.

N. J. Three miles above Delaware Water Gap, in Warren Co. very rare. Its reported occurrence in Monmouth Co. is unlikely and has not been unverified.

PA. Delaware Co.

A rare and extremely local species whose distribution is little known.

18. *Dentaria* [Tourn.] L.

Stem glabrous.

Rootstock continuous, prominently toothed.

1. *D. diphylla*.

Rootstock interrupted by distinct constrictions.

Rootstock elongate, composed of several fusiform or sub-cylindric, distinctly toothed segments.

Cauline leaves with ovate or obovate petiolulate leaflets.

2. *D. maxima*.

Cauline leaves with lanceolate, sessile leaflets.

3. *D. incisifolia*.

Rootstock of readily separable, obscurely toothed fusiform tubers.

4. *D. heterophylla*.

Stem pubescent, at least above.

Rootstocks of readily separable fusiform tubers; sepals 6-9 mm. long.

Leaves 3-parted, with linear to oblong segments.

5. *D. laciniata*.

Basal leaves with ovate or rhombic leaflets.

4. *D. heterophylla*.

Rootstock elongate, interrupted by constrictions; sepals 3-4 mm. long.

6. *D. anomala*.

1. *D. diphylla* Michx. In rich woods and thickets: Eastern Que. to southern Ont. and Minn., south to S. C. and Ky.

Throughout the area except in the pine-barrens of L. I. and central and southern N. J., there rare or wanting; always increasing **northward**; formerly on S. I.

2. **D. maxima** Nutt. By streams in rich woods: southern Me. to Mich. and Pa.
Near Windsor, Conn.
3. **D. incisifolia** Eames. Rich hillside woods: Sherman, Conn.
Known only from the original locality.
4. **D. heterophylla** Nutt. In rich woods: N. J. and Pa. to Ky. and westward.
Near Stockton, Hunterdon Co., and Far Hills, Somerset Co., N. J., and from Philadelphia and Chester counties in Pa.
5. **D. laciniata** Muhl. (*D. laciniata integra* (Schulz.) Fernald). In rich damp woods: Que. and Vt. to Minn. and southward.
Throughout the range, except in the pine-barrens and south of them, there rare or wanting.
6. **D. anomala** Eames. Rich moist woods: Plainville, Conn.
Collected only at original locality, and at Orange, Conn.

19. **Lunaria** [Tourn.] L.

1. **L. annua** L. Escaped from gardens: southwestern Conn.
Known only from near Westport, Conn. Not recently collected.

20. **Bursa** Weber

1. **B. Bursa-pastoris** (L.) Britton. In fields and waste places: throughout N. Am., except the tropics. Naturalized from Europe.
Common everywhere.

21. **Camelina** Crantz.

Glabrous or nearly so; pods 6-8 mm. long.

1. *C. sativa*.

Pubescent, at least below; pod 4-6 mm. long.

2. *C. microcarpa*.

1. **C. sativa** (L.) Crantz. In fields and waste places: throughout E. N. Am. Naturalized from Europe.
Not very common but in most parts of our range.
2. **C. microcarpa** Andrz. In waste places: R. I. to W. Va., Idaho, Br. Col. and Kan. Naturalized from Europe.
Not common as a weed in most parts of our range.

22. **Neslia** Desv.

1. **N. paniculata** (L.) Desv. In waste places: Ont., Man. and B. Col., and in ballast about the eastern seaports.
Rare near the larger cities and towns.

23. *Draba* [Dill.] L.

Petals deeply 2-cleft.

1. *D. verna*.

Petals entire, toothed or emarginate.

2. *D. caroliniana*.

1. *D. verna* L. In fields: common throughout U. S. and Canada, except in the extreme north. Naturalized from Europe.

Common in the south, decreasing northward.

2. *D. caroliniana* Walt. In sandy fields: Mass. to Ont., Minn., Neb., Ga. and Ark.

CONN. Rare along the coast, decreasing inland, and wanting in the north.

N. Y. Reported from near Ridgewood, L. I. and Rossville, S. I. and from Westchester Co. Not recently collected.

N. J. Rare and local in Hunterdon and Middlesex counties, increasing but not common **southward**, but not in the pine-barrens or east of them.

PA. Bucks Co.

A rare and local plant, apparently most common on Cretaceous sands and gravels.

24. *Sophia* Adans.

1. *S. Sophia* (L.) Britton. In waste places: N. B. to Ont., N. Y. Ill. and Neb. Naturalized from Europe.

Occasional as a weed in most parts of our range, except in the pine-barrens.

S. pinnata (Walt.) Howell has been reported as a waif from N. J., near Philadelphia and in Delaware Co., Pa.

25. *Stenophragma* Celak.

1. *S. Thaliana* (L.) Celak. In sandy fields and rocky places: Mass. and S. Ont. to Minn., Ga. and Mo. Naturalized from Europe.

Common throughout the area.

26. *Arabis* L.

Seeds in 1 row or in 2 incomplete rows in each cavity of the pod.

Basal leaves pinnatifid; pods ascending.

1. *A. lyrata*.

Basal leaves merely dentate or lyrate.

Seeds minute, oblong, wingless.

2. *A. dentata*.

Seeds larger, oblong, winged or wing-margined.

Pods nearly erect, 1 mm. broad.

Flowers white, 8 mm. broad; pods not appressed; style 1 mm. long.

3. *A. patens*.

Flowers white or greenish-white, 4-6 mm. broad;
pods appressed; style none.

Plant not glaucous.

4. *A. hirsuta*.

Plant glaucous.

5. *A. glabra*.

Pods recurved-spreading.

Plant glabrous throughout except the earliest
basal leaves.

Pedicels divergent in flower; petals not
much longer than the sepals.

6. *A. laevigata*.

Pedicels erect in flower; petals much longer
than the sepals.

7. *A. viridis*.

Leaves and lower part of stem hairy.

8. *A. canadensis*.

Seeds in 2 distinct rows in each cavity of the pod.

9. *A. Drummondii*.

1. **A. lyrata** L. Rocky and sandy places: Ont. to Va., Tenn.,
Man. and Mo.

Throughout the area, except in the pine-barrens, there rare or
wanting, most abundant northward.

2. **A. dentata** T. & G. Western N. Y. and Pa. to Minn., south
to Tenn. Mo. and Va.

PA. Luzerne Co.

3. **A. patens** Sullivant. In woods: E. Pa. to Minn., Ala. and Mo.
PA. Luzerne, Montgomery, Berks, Philadelphia and Chester
counties.

A rare and local species whose distribution is little known; in the
southern part of the area more common on garnetiferous schists
than elsewhere.

4. **A. hirsuta** (L.) Scop. In rocky places: N. B. to Br. Col., Ga.,
Ariz. and Cal. Also in Europe and Asia.

CONN. Rare and local in New London and New Haven counties,
increasing but never common **northwestward**.

N. Y. The limestone regions of Columbia and Dutchess counties,
and at Riverdale.

N. J. Sussex, Warren, Morris, Passaic and Mercer counties.

PA. Pike, Northampton and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **north-
ward** and most common on limestone. 138-220 days. Sea level-
1,400 ft.

5. **A. glabra** (L.) Bernh. In fields and rocky places: Que. to
S. N. Y., Pa., west to the Pacific Coast. Also in Europe and
Asia.

CONN. Rare in Hartford, Fairfield, and New Haven counties, otherwise unknown.

N. Y. Reported from L. I., apparently not recorded from S. I.; rare and local on the upper end of Manhattan, thence increasing but not common **northward**.

N. J. Reported, but probably incorrectly, from Cape May; known otherwise only from Sussex, Morris, and Passaic counties.

PA. Pike, Monroe, Wayne and Northampton counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**, specially on limestone. Not south of the moraine, except in Pa. 123-189 days. Sea level-2,180 ft.

6. *A. laevigata* (Muhl.) Poir. In rocky woods: Que. to Minn., Kan., Ga. and Ark.

Throughout the range except in the pine-barrens, wanting in them and rare in the surrounding area; common **northward**.

7. *A. viridis* Harger. Rocky places: Me. to Conn.

CONN. Reported from several stations, often on trap rock.

8. *A. canadensis* L. In woods: Ont. to N. Hamp., Ga., Minn., Kan. and Tex.

CONN. Throughout the state, but not common.

N. Y. Not very common on L. I. and S. I., increasing **northward** and becoming common in the Highlands. Not reported from the Catskills.

N. J. Gloucester Co., increasing and common **northward**. Not in the pine-barrens.

PA. Pike, Monroe, Luzerne, Northampton, Bucks, Delaware and Chester counties, increasing **northward**.

Tertiary, o: Cretaceous, very rare: Older Formations, increasing **northward**. 138-220 days. Sea level-1,800 ft.

9. *A. Drummondii* A. Gray. Cliffs and rocky soil: Que. to Conn., Ont., Ohio, Ill., Mich., B. C., Ore., south in the Rocky Mts. to Colo. and Utah.

CONN. Rare and scattered over most of the state.

A. brachycarpa (T. & G.) Britton has been reported from Conn. I have seen no specimens from our area.

27. *Cheirinia* Link

1. *C. cheiranthoides* (L.) Link. (*Erysimum cheiranthoides* L.). Along streams and in fields: Newf. to Br. Col., N. J. and Tenn. Also in northern Europe.

Occasional throughout our range, except in the pine-barrens, nearly always as a weed.

Erysimum repandum L. and *E. orientale* L., referable to this genus, have been collected near New York and Jersey City as waifs.

28. **Alyssum** [Tourn.] L.

1. **A. alyssoides** L. In fields: Ont. to N. Hamp., N. Y., N. J. and Iowa, and in ballast about the seaports. Naturalized from Europe.

. Occasional as a weed in most parts of our area.

29. **Koniga** Adans.

1. **K. maritima** (L.) R. Br. In waste places occasional: throughout E. U. S. Escaped from gardens. Native of Europe.

A rather rare escape in our region.

30. **Berteroa** DC.

1. **B. incana** (L.) DC. In waste places: Me. to Ont., Minn., N. J. and Mo. Adventive from Europe.

Not uncommon as a weed near the larger towns and cities.

31. **Hesperis** [Tourn.] L.

1. **H. matronalis** L. In fields and along roadsides: Me. to Pa. and Iowa. Native of Europe and Asia.

Occasional throughout our area, except in the pine-barrens.

32. **Conringia** Link.

1. **C. orientalis** (L.) Dumort. In waste places: N. B. to N. W. Terr. to N. Y. and Pa.

Locally common near the City of New York, at Kutztown, Pa. and at Fairfield and New Milford, Conn.

The following cruciferous waifs have been collected in the area: *Rapistrum rugosum* (L.) All., *Iberis amara* L., *I. umbellata* L., *Eruca Eruca* (L.) Britton, and *Bunias orientalis* L. *Teesdalia nudicaulis* (L.) R. Br., has been collected at Rosedale and Springfield, L. I., where it is becoming established.

CAPPARIDACEAE

Pod long stipitate on its pedicel.
Pod nearly or quite sessile on its pedicel.

1. CLEOME.
2. POLANISIA.

1. **Cleome** L.

1. **C. spinosa** L. In waste places: N. E. to Fla., Ill. and La.
Adventive from Tropical America.

Not very common as an adventive near the larger cities.

Cleome gynandra L. (*Pedicellaria pentaphylla* (L.) Schrank) has been collected near Philadelphia and on S. I., as a waif.

2. **Polanisia** Raf.

1. **P. graveolens** Raf. Sandy and gravelly shores: Que. to Man.,
the N. W. Terr., N. Y., Pa., Kan., and Colo.
CONN. Near East Hartford and Hartford.
N. Y. Near Gravesend L. I., and in the Hudson Valley.
N. J. Bergen and Monmouth counties, not recently collected.
PA. Luzerne Co.

P. trachysperma T. & G. and *P. viscosa* DC. have been collected as waifs in Connecticut and New York respectively.

RESEDACEAE

1. **Reseda** [Tourn.] L.

Leaves entire; upper petals lobed, the lower entire.

1. *R. Luteola*.

Leaves lobed or pinnatifid.

Petals greenish-yellow, 3 or 4 of them divided.

2. *R. lutea*:

Petals white, all of them cleft or divided.

3. *R. alba*.

1. **R. Luteola** L. In waste places: N. Y. and about the eastern
seaports in ballast. Adventive from Europe.

Common as a waif, perhaps naturalized near the metropolis;
also near the city of Philadelphia, and in Conn.

2. **R. lutea** L. In waste places: Mass. to N. J. and Mich. and in
ballast about the eastern seaports.

Occasional in waste places in parts of our range.

3. **R. alba** L. In waste places: Conn., N. Y., Ohio and in ballast
about the eastern seaports. Adventive from S. Europe.

Rare as a weed in parts of our area.

The common garden Mignonette, *Reseda odorata* L., has been reported as an established escape in Conn. It is a native of Africa. *R. Phyteuma* L. has been collected near New York as a waif.

SARRACENIACEAE

1. *Sarracenia* [Tourn.] L.

1. *S. purpurea* L. In peat bogs, particularly in sphagnum: Lab. to the Canadian Rockies, south to Fla., Ky. and Minn.

Common throughout the area in edaphically favorable situations except on the unglaciated portion of the Piedmont Plateau, there rare or wanting.*

S. purpurea heterophylla (Eaton) Torr. has so far been collected only in New Jersey, one station near Forked River and the other at "Cedar Swamp," a locality long since destroyed; otherwise unknown from the range and perhaps a mere form.

DROSERACEAE

1. *Drosera* L.

Blade of the leaf orbicular, or wider than long; petals white.

1. *D. rotundifolia*.

Blade of the leaf linear, or longer than wide.

Leaves linear or spatulate, with a distinct petiole; petals white. 2. *D. intermedia*.

Leaves filiform, much elongated, with no distinct petiole; petals purple.

3. *D. filiformis*.

1. *D. rotundifolia* L. In bogs or wet sand: Lab. to Alask., Fla. and Ala., and in the Sierra Nevada to Cal.

Throughout the range in edaphically favorable places.

2. *D. intermedia* Hayne (*D. longifolia* of Auct. not of L.). In bogs: Newf. to Arctic Am. to Br. Col. and Sask., south to Fla. and Cal.

Throughout our area, in edaphically favorable places, except on the unglaciated part of the Piedmont Plateau, there rare or wanting.*

3. *D. filiformis* Raf. In wet sand: Cape Cod to Fla.

N. Y. Not uncommon on eastern L. I.

N. J. Confined to the coastal plain and predominately a pine-barren species, rare in the region surrounding the barrens.

Tertiary, common: Cretaceous, rare: Older Formations, not known, except on the north of side L. I. Not north of the moraine, except perhaps on the north shore of L. I. and then very near it.

* See Introduction paragraph 7.

PODOSTEMACEAE

1. *Podostemon* Michx.*

1. *P. ceratophyllum* Michx. In shallow streams: Mass. to N. Y., Ont., Minn., Ga., Ala. and Ky.
 CONN. Rare or occasional.
 N. Y. Near Newburgh, not recently collected.
 N. J. Mercer, Passaic, and Warren counties.
 PA. Pike, Monroe, Northampton, Chester and Delaware counties.

CRASSULACEAE

- | | |
|---|------------------|
| Stamens as many as the calyx lobes. | 1. TILLAEASTRUM. |
| Stamens twice as many as the calyx lobes. | 2. SEMPERVIVUM. |
| Petals 6-20. | 3. SEDUM. |
| Petals 5 or fewer. | 4. RHODIOLA. |
| Carpels spreading; flowers perfect. | |
| Carpels erect; flowers polygamous. | |

1. *Tillaeastrum* Britton *

1. *T. aquaticum* (L.) Britton (*Tillaea aquatica* L.). Muddy banks of streams: N. S. to Md., La. and Tex., Wash. to Iowa, Calif. and Colo., Europe to N. Africa.
 Rare and local, apparently more common near Philadelphia, and coastal Conn. than elsewhere, not reported from near N. Y.

2. *Sempervivum* [Rupp.] L.

1. *S. tectorum* L. Escaped from cultivation: Mass. to N. J. Native of continental Europe.
 A very rare escape in our range; commonly cultivated.

3. *Sedum* [Tourn.] L.

- | | |
|---|---------------------------|
| Flowers not corymbose. | 1. <i>S. acre</i> . |
| Leaves densely imbricated, short. | 2. <i>S. ternatum</i> . |
| Leaves oblong or lanceolate, more or less flattened, not imbricate. | 3. <i>S. triphyllum</i> . |
| Flowers corymbose, petals purple, twice as long as the sepals. | |
1. *S. acre* L. On rocks and along roadsides: N. B. to Ont. and N. Y. and Pa. Adventive from Europe.
 Occasional in most parts of our range except in the pine-barrens, there rare or wanting.

* See footnote, page 76.

2. **S. ternatum** Michx. On rocks and in woodlands: Conn. and N. J. to Ind., Mich. and Tenn.

Rare and sporadic in most parts of our area, except the pine-barrens, there rare or wanting; not certainly native in the area.

3. **S. triphyllum** (Haw.) S. F. Gray (*S. Fabaria* Koch.). In fields and along roads: Quebec and Ont. to Md. and Mich. Naturalized from Europe.

A not uncommon adventive in most parts of our range, except in the pine-barrens, there wanting.

S. telephioides Michx. has been reported from Northampton Co., Pa.

4. **Rhodiola** L.

1. **Rhodiola rosea** L. (*S. roseum* (L.) Scop.). Newfoundland to Alaska, south to Maine and Pa. Also in Europe.

Known in our range only from Pike and Bucks Co., Pa., both near the Delaware River.

PENTHORACEAE

1. **Penthorum** L.

1. **P. sedoides** L. In ditches and swamps: N. B. to Fla., Minn., Neb. and Tex.

Throughout the area, except the pine-barrens, and east and south of them, there rare or wanting.

PARNASSIACEAE

1. **Parnassia** [Tourn.] L.

1. **P. caroliniana** Michx. In swamps and low meadows: N. B. to Man., S. Dak., Ill., Va. and Carolina (?).

CONN. Rare along the coast, especially westward, increasing **northward**.

N. Y. Not uncommon on L. I. and on S. I., thence increasing **northward**.

N. J. Unknown in the pine-barrens, reported but not definitely known from New Egypt, Ocean Co.; Hudson and Warren counties, thence increasing **northward**.

PA. Northampton, Lehigh and Bucks counties.

Tertiary, o: Cretaceous, only a doubtful record from Ocean Co., N. J.: Older Formations, increasing, but never common, **northward**.

117-189 days. Sea level-2,800 ft.

SAXIFRAGACEAE

Placentae parietal, sometimes nearly basal.

Flowers solitary and axillary, or in small corymbs.

Flowers in more or less elongated racemes or panicles.

Gynoeceum of 2-3 equal or essentially equal carpels.

Inflorescence racemose.

Inflorescence paniculate.

Gynoeceum of 2 very unequal carpels.

Placentae axial.

1. CHRYSOSPENIUM.

2. MITELLA.

3. HEUCHERA.

4. TIARELLA.

5. MICRANTHES.

I. *Chrysosplenium* [Tourn.] L. (see *pl.* 8)

I. *C. americanum* Schwein. In wet shaded places: N. S. to Sask., south to Ga. and Minn.

CONN. Throughout the state.

N. Y. Not rare on the south side of L. I., not common on the north side and on S. I., thence increasing and common **northward**.

N. J. Unknown in the pine-barrens, very rare in the region west of them, thence increasing and common **northward**.

PA. Throughout the area, very common **northward**.

Tertiary, not on Beacon Hill, rare elsewhere: Cretaceous, scattered: Older Formations, increasing **northward**. 117-207 days. Sea level-3,970 ft.

2. *Mitella* [Tourn.] L.

Stem leaves opposite.

Stem leaves usually wanting, if present, alternate.

1. *M. diphylla*.

2. *M. nuda*.

I. *M. diphylla* L. In rich woods: Que. to Minn., south to N. C. and Mo.

CONN. Throughout, but not reported from New London Co., increasing **northwestward**.

N. Y. Reported from but doubtfully on L. I., rare on S. I. and in Bronx and Westchester counties, thence increasing and becoming common **northward**.

N. J. New Egypt, Ocean Co.,* unknown between this locality and Hunterdon, Union and Somerset counties, thence increasing and common **northward**.

PA. Throughout the area, increasing **northward**.

Tertiary, a single, remarkable station just on the edge of Beacon Hill: Cretaceous, o: Older Formations, increasing **northward**. Predominating north of the moraine. 117-220 days. Sea level-4,020 ft.

* See Introduction paragraph 36.

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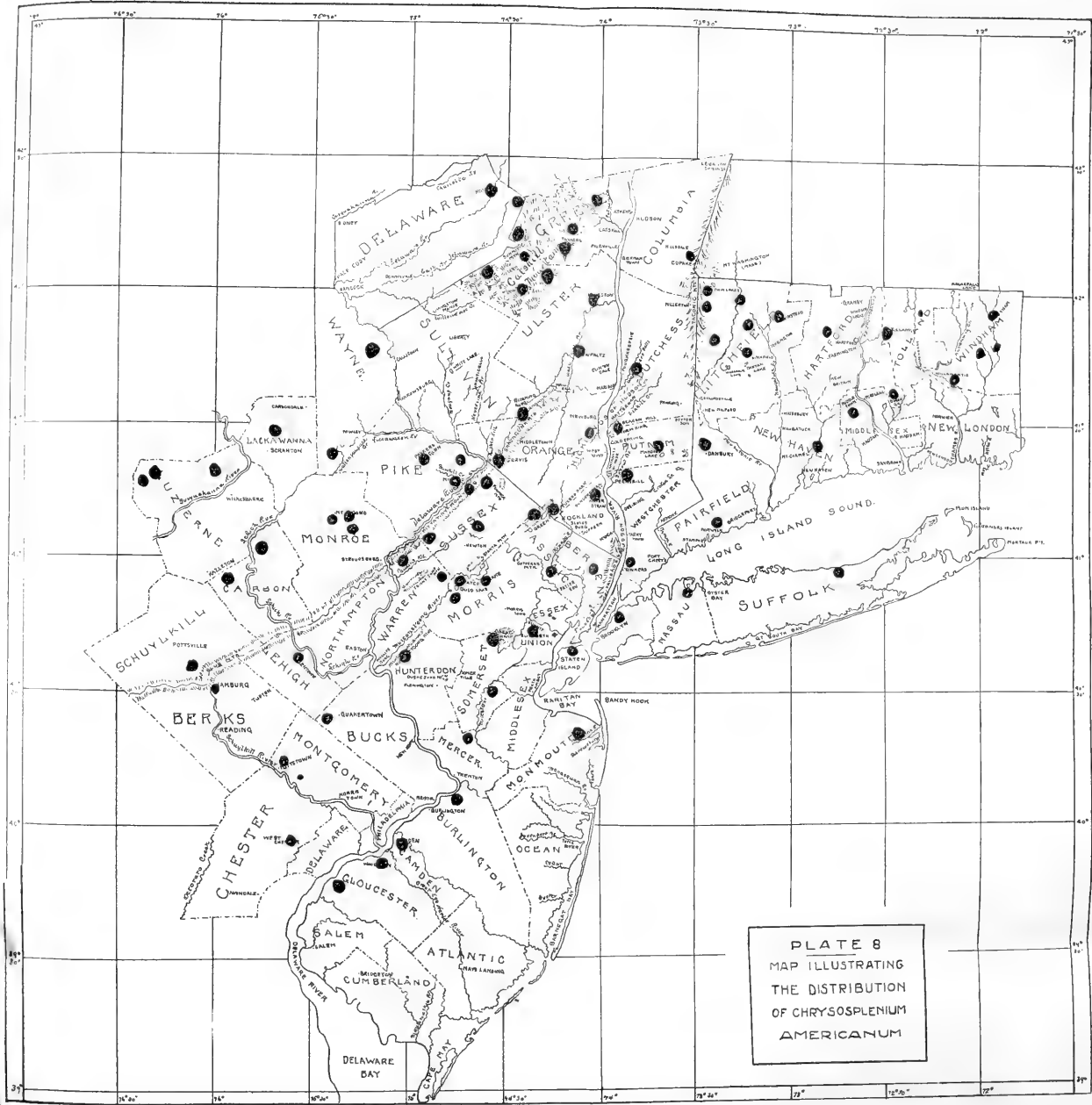


PLATE 8
 MAP ILLUSTRATING
 THE DISTRIBUTION
 OF CHRYSOSPENIUM
 AMERICANUM

2. **M. nuda** L. In cold woods and peat bogs: Labrador to Newf. and Br. Col., south to Pa. and Mont.; also in eastern Asia.
 CONN. The higher elevations of northwestern Litchfield Co.
 PA. The mountains of Wayne and Monroe counties.

Tertiary, 0: Cretaceous, 0: Older Formations, rare and local at high elevations. Not south of the moraine. 117-138 days. 1,070-4,000 ft.

The reported occurrence of *M. prostrata* Michx., at New Milford, Conn., is doubtful. The report is probably referable to a mere form of *M. nuda* or of *M. diphylla*.

3. *Heuchera* L.

1. **H. americana** L. In dry and rocky woods: Conn. to Ont. and Minn., south to Ala. and La.

Throughout the area except the pine-barrens of N. J. and L. I., there rare or wanting; rare in the area surrounding the pine-barrens, always increasing **northward**.

4. *Tiarella* L.

1. **T. cordifolia** L. In rich moist woods: N. S. to Minn., south to Ga. and Ala.

CONN. Rare and local in most parts of the state, especially near the coast; increasing and becoming common **northwestward**.

N. Y. Reported but not definitely known from Westchester Co., thence increasing and common **northward**.

N. J. Passaic, Morris, and Sussex counties, increasing **northward**.

PA. Pike, Wayne, Monroe, Luzerne, Lehigh and Delaware counties.

Tertiary, 0: Cretaceous, 0: Older Formations, increasing **northward**. South of the moraine only in Pa. 117-220 days. Sea level -3,800 ft.

5. *Micranthes* Haw.

Filaments subulate or filiform-subulate.

Cymules compact or closely corymb-like at maturity.

1. *M. pennsylvanica*.

Cymules open and often raceme-like at maturity.

2. *M. virginensis*.

Filaments clavate or spatulate.

3. *M. micranthidifolia*.

1. **M. pennsylvanica** (L.) Haw. (*Saxifraga pennsylvanica* L.).
 In swamps and on wet banks: Me. and Ont. to Minn., Va. and Mo.

Throughout the range, except in the pine-barrens of N. J. and L. I., there rare or wanting.

2. *M. virginiensis* (Michx.) Small (*Saxifraga virginiensis* Michx.)
In dry or rocky woodlands: N. B. to Minn., Ga. and Tenn.
Throughout the range, except in the pine-barrens of L. I. and N. J., there rare or wanting.
3. *M. micranthidifolia* (Haw.) Small (*Saxifraga erosa* Pursh, *S. micranthidifolia* (Haw.) Small). In cold brooks: Pa. to N. C. and Tenn.
PA. Northampton and Lehigh Co.
A rare and local plant in our range, most common on limestone.

HYDRANGEACEAE

Stamens 8-10, corolla relatively small.
Stamens 12-20, corolla relatively large.

1. HYDRANGEA.
2. PHILADELPHUS.

1. *Hydrangea* [Gron.] L.

1. *H. arborescens* L. On rocky stream or river banks: N. Y. to Iowa, Fla. and La.
N. Y. The Highlands of the Hudson.
N. J. From Kinkora, Burlington Co., **northward** in the counties bordering the Delaware; otherwise unknown.
PA. Pike, Luzerne, Northampton, Bucks, Philadelphia, Delaware and Chester counties, more common along the Delaware than elsewhere.
Tertiary, o: Cretaceous, scattered in Burlington Co., N. J. and Bucks Co., Pa.: Older Formations, apparently more common on the Piedmont Plateau than elsewhere. 138-220 days. Sea level-1,000 ft.

2. *Philadelphus* L.

1. *P. coronarius* L. Escaped from gardens: middle and eastern states. Native of Europe.
Rather a rare escape in most parts of our range.

Other cultivated shrubs sometimes recorded as being escapes are *Philadelphus inodorus* L., *P. pubescens* Koch. and *Deutzia scabra* Sieb. & Zucc. None are to be considered as part of our flora.

ITEACEAE

1. *Itea* L.

1. *I. virginica* L. In wet places or pine-barren swamps: N. J. and E. Pa. to Fla. and La.

N. J. Common throughout the pine-barrens, decreasing in the area surrounding them, unknown elsewhere in the state; more common southward than elsewhere.

PA. "Near Philadelphia," probably as an introduced plant, otherwise unknown.

Tertiary, common on Beacon Hill, decreasing outside it: Cretaceous, scattered: Older Formations, 0: 168-220 days. About sea level.

HAMAMELIDACEAE

I. *Hamamelis* L.

- I. *H. virginiana* L. In low woods: N. S. to Ont., Wisc., Neb., Fla. and Tex.

Common throughout the range, except in the pine-barrens, there wanting; rare on the coastal plain of L. I.

ALTINGIACEAE

I. *Liquidambar* L.

- I. *L. styraciflua* L. In woods: Conn. to Mo., Fla. and Tex., southward to Mex. and Guatemala.

CONN. Fairfield Co., near the coast.

N. Y. Common on L. I. and S. I.; frequent in the Bronx, and up the Hudson Valley to the southern end of the Highlands, unrecorded northward.

N. J. Local north of the coastal plains, increasing and common southward, but wanting in the pine-barrens.

PA. Bucks, Delaware and Chester counties.

Tertiary, common, except on Beacon Hill, there wanting: Cretaceous, common: Older Formations, scattered. Predominating south of the moraine. 143-220 days. Sea level-870 ft.

GROSSULARIACEAE

Plants without nodal spines, fruit disarticulating from the pedicel (currants).

1. RIBES.

Plants with nodal spines; fruit not disarticulating from the pedicel (gooseberries).

2. GROSSULARIA.

I. *Ribes* L.

Plants with spines or prickles.

1. *R. lacustre*.

Plants without spines or prickles.

2. *R. nigrum*.

Ovary with sessile glands.

Ovary without glands or the glands stalked.

Sepals slightly united at the base, the hypanthium obsolete.

Ovary without hairs of any kind.

Pedicels usually glandless, petals yellow.

3. *R. vulgare*.

Pedicels usually bearing a few glands; petals red.

4. *R. triste*.

Ovary with gland-tipped hairs.

5. *R. glandulosum*.

Hypanthium evident, though short.

6. *R. americanum*.

1. **R. lacustre** (Pers.) Poir. In swamps and wet woods: Newf. to Alask., Mass., Pa. and Mich., also in Colo., Utah and Cal. CONN. Near Meriden and Salisbury. N. Y. The summits of the Catskills. PA. Schuylkill Co.
Tertiary, o: Cretaceous, o: Older Formations, rare at higher elevations. South of the moraine only in Pa. 117-138 days. 735-4,020 ft.
2. **R. nigrum** L. Locally escaped from cultivation in the middle states. Native of Europe.
Rare as an escape in our area.
3. **R. vulgare** Lam. Escaped from cultivation: Mass. to Ont. and Wisc., south to Va. and Cal.
Not uncommon as an escape in our area.
4. **R. triste** Pall. (*R. rubrum subglandulosum* Maxim). In cold woods: Newf. to Alaska, south to N. J., Mich., S. Dak. and Ore., also in northern Asia.
Known only, in our area, from Onteora, Greene Co., and Bergen Co., N. J. The reference to *R. rubrum* as native in Warren Co., N. J., may apply to this species.
5. **R. glandulosum** Grauer. (*R. prostratum* L'Her.). In cold wet places: Newf. to Mackenzie, Br. Col., Athabasca, Sask., Man., Wisc. and N. Car.
CONN. Northwestern part of Litchfield Co.
N. Y. The Catskills.
N. J. Reported but not recently collected from Bergen Co. otherwise unknown.
PA. Monroe Co.
Tertiary, o: Cretaceous, o: Older Formations, increasing northward. Not south of the moraine. 117-138 ft. 1,000-4,020 ft.
6. **R. americanum** Mill. (*R. floridum* L'Her.). In woods: N. S. to Va., west to Alberta; also in New Mex.

CONN. Throughout most of the state but not common as a wild plant.

N. Y. Rare south of the moraine on L. I., increasing north of the moraine and on S. I., thence becoming common **northward**.

N. J. Mercer, Somerset and Hudson counties, increasing **northward**.

PA. Pike, Luzerne, Northampton, Bucks and Chester counties.

Tertiary, o: Cretaceous, rare or wanting, perhaps in Bucks Co., Pa.: Older Formations, increasing northward. 138-220 days. Sea level-1,800 ft.

R. odoratum Wendl., has been collected in many places in Conn. and New York. It is an escape from gardens.

2. *Grossularia* [Tourn.] Mill.

Ovary bristly, the larger bristles not gland-tipped.

1. *G. Cynosbati*.

Ovary smooth or pubescent, not bristly.

Ovary villous.

2. *G. reclinata*.

Ovary glabrous.

Sepals mostly greenish-purple, 1-2 times the length of the hypanthium.

3. *G. hirtella*.

Sepals mostly purplish green, 2-4 times the length of the hypanthium.

4. *G. rotundifolia*.

1. **G. Cynosbati** (L.) Mill. (*Ribes Cynosbati* L.). In rocky woods: N. B. to N. Car., Ala., Mo. and Man.

CONN. Hartford, Tolland, New Haven, Fairfield and Litchfield counties, increasing **northwestward**.

N. Y. North of the moraine on L. I.; on S. I., unknown in the Bronx, thence increasing and common **northward**.

N. J. Bergen and Hudson counties, increasing but not common **northward**.

PA. Pike, Monroe, Luzerne and Lehigh counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing and not uncommon **northward**. South of the moraine only in Pa. 117-169 days. Sea level-4,000 ft.

2. **G. reclinata** (L.) Mill. (*Ribes Uva-crispa* L.; *R. Grossularia* L.). Escaped from gardens: N. Y. and N. J.

A rather rare escape in our area, and probably not persisting.

3. **G. hirtella** (Michx.) Spach. (*Ribes huronense* Rydb. *R. oxyacanthoides* of Gray's Manual, 7th edition, and of Britton's Manual, in part. Not of L.). In wet woods and low grounds: Newf. to N. J., Pa., W. Va., S. Dak. and Man.

Nearly throughout the area, except in the pine-barrens and the area immediately surrounding them, there rare or wanting; not on known L. I. or S. I.

4. **G. rotundifolia** (Michx.) Coville & Britton (*Ribes rotundifolium* Michx.). In rocky woods: Mass. to N. Y. and N. Car.

CONN. Meriden, Southington and Salisbury.

N. Y. Formerly on L. I., reported from S. I.; unknown in the Bronx; Westchester Co., increasing northward.

N. J. Monmouth Co., rare; frequent north of the coastal plain.

PA. Wayne, Bucks and Schuylkill counties.

G. missouriensis (Nutt.) Coville & Britton (*Ribes gracile* Pursh) has been reported from a roadside in Conn. I have seen no specimens.

PLATANACEAE

1. **Platanus** [Tourn.] L.

1. **P. occidentalis** L. Along streams and in wet woods: N. Hamp. to Ont. and Neb., south to Fla. and Tex.
Throughout the area, except in the pine-barrens.

ROSACEAE

Fruit consisting of 1-5 dehiscent follicles.

Carpels alternate with the sepals, or less in number; stipules none or deciduous.

Carpels 1-5, if more than one united below; seeds shining.

1. OPULASTER.

Carpels 5, distinct; seeds dull.

Stamens inserted on the margin of the hypanthium; flowers perfect; shrubs with simple leaves.

2. SPIRAEA.

Stamens inserted on the inside of the hypanthium; flowers dioecious; herbs with compound leaves.

3. ARUNCUS.

Carpels opposite the sepals; stipules present, persistent.

Petals obovate or spatulate; leaves pinnately compound.

4. SCHIZONOTUS.

Petals strap shaped; leaves ternately compound.

5. PORTERANTHUS.

Fruit consisting of indehiscent achenes or drupelets.

Carpels not enclosed in a fleshy hypanthium.

Fruits consisting of dry achenes.

Ovules 2, one above the other; perennial herbs with pinnately dissected leaves.

6. FILIPENDULA.

Ovules and seeds solitary.

Seeds inserted at the point where the style arises.

Style articulated to the ovary; flowers cymose or solitary.

Style terminal or nearly so, ovules pendulous.

7. POTENTILLA.

Style lateral, ovules ascending.

- Achenes glabrous; herbs
 - Leaves odd-pinnate.
 - Petals yellow; leaves interruptedly pinnate. 8. ARGENTINA.
 - Petals red; leaves regularly pinnate. 9. COMARUM.
 - Leaves trifoliolate.
 - Petals yellow, receptacle not pulpy. 10. DUCHESNEA.
 - Petals white or cream, receptacle fleshy. 11. FRAGARIA.
- Achenes hairy; shrubs or undershrubs.
 - Leaves trifoliolate; petals white. 12. SIBBALDIOPSIS.
 - Leaves pinnate; petals yellow. 13. DASIPHORA.
- Style nearly basal, ovules ascending or nearly erect; leaves pinnate. 14. DRYMOCALLIS.
- Style not articulated to the ovary; flowers racemose or spicate.
 - Hypanthium not prickly; petals lacking.
 - Stamens 2-4; pistil 1. 15. SANGUISORBA.
 - Stamens in the staminate flowers numerous; pistils 2. 16. POTERIUM.
 - Hypanthium prickly, the prickles hooked. 17. AGRIMONIA.
- Seeds inserted at the proximal end of the ovary, perfectly basal.
 - Style persistent on the achene; leaves interruptedly pinnate. 18. GEUM.
 - Style deciduous; leaves trifoliolate. 19. WALDSTEINIA.
- Fruits of more or less fleshy drupelets.
 - Drupelets very pulpy; upright or prostrate partly woody vines or shrubs. 20. RUBUS.
 - Drupelets nearly dry, enclosed by the calyx; low tufted herb. 21. DALIBARDA.
- Carpels enclosed in the hypanthium which becomes fleshy in fruit. 22. ROSA.

I. *Opulaster* Medic.

1. *O. opulifolius* (L.) Kuntze. Rocky river banks: Que. to Tenn. and Mich.

CONN. Rare and local in New London Co., otherwise unknown.
 N. Y. Unknown on L. I., rare and local on S. I., thence scattering up the Hudson Valley to the Highlands. Not reported from the Catskills. Perhaps not a wild plant in the area.

N. J. Rare and local in Camden, Burlington, Middlesex and Mercer counties, thence increasing but not common northward.
 Unknown in the pine-barrens.

PA. Northampton, Lehigh, Bucks, Chester and Delaware counties.

Tertiary, o: Cretaceous, scattering: Older Formations, not common. 138-220 days. Sea level-1,000 ft.

2. *Spiraea* [Tourn.] L.

Inflorescence simple.

1. *S. ulmifolia*.

Inflorescence compound, flowers paniculate.

Sepals merely spreading; disk obsolete; leaves not tomentose beneath.

Inflorescence glabrous; leaf-blades broadly oblanceolate to obovate.

2. *S. latifolia*.

Inflorescence pubescent.

Leaves elliptic-lanceolate.

3. *S. salicifolia*.

Leaves narrowly oblanceolate.

4. *S. alba*.

Sepals soon reflexed; leaves tomentose beneath.

5. *S. tomentosa*.

1. ***S. ulmifolia*** Scop. Cultivated and sometimes escaping in the eastern states. Native of southern Europe.

Not uncommon as an escape, especially in Conn. Rare in N. Y.

2. ***S. latifolia*** (Ait.) Borkh. In meadows: Newf. to N. Car., W. Pa. and Sask.

Throughout the range except the region east and south of the pine-barrens in N. J.

3. ***S. salicifolia*** L. Sometimes escaping from cultivation: Eastern and Middle States. Native of Siberia.

Occasional as an escape in most parts of our range.

4. ***S. alba*** Du Roi. Wet soil: Ont. to N. Y., N. C., Sask. and Mo.

Known, in our area, only from the Fishkill Mts., N. Y.

5. ***S. tomentosa*** L. In swampy and wet places, sometimes in fields: N. S. to Ga., Ark., Kan. and Man.

Throughout the range in favorable localities, usually very common.

Among the Japanese garden forms commonly cultivated, but rarely escaping are *S. chamaedrifolia* L., *S. japonica* L. f. and *S. prunifolia* Sieb. & Zucc. None are to be considered as part of our wild flora.

S. corymbosa Raf. recorded from Morris Co., N. J., has not been subsequently collected within the range.

3. *Aruncus* [L.] Adans.

1. ***A. Aruncus*** (L.) Karst. Commonly cultivated but not escaping very freely in the Eastern United States. Native of Europe.

A rare escape, perhaps nowhere established within our area.

4. *Schizonotus* Lindl.

1. *S. sorbifolius* (L.) Lindl. Cultivated in Eastern U. S. and Canada, sometimes escaping. Native of N. Asia.

A rare escape known definitely only from Conn. and N. Y. in our area.

5. *Porteranthus* Britton

1. *P. trifoliatius* (L.) Britton. Woodlands: Ont. and N. Y. to Mich., Mo. and Ga.

N. Y. Rare in the Highlands of the Hudson.

N. J. Sussex, Warren, Hunterdon, Morris, Passaic and Bergen counties, increasing **northward**; locally at Prospertown, Ocean Co. PA. Monroe; Northampton, Bucks, Montgomery, Philadelphia, Delaware and Chester counties.

Tertiary, o: Cretaceous, rare: Older Formations, scattered and local, most common on limestone. 138-224 days. Sea level-1,000 ft.

6. *Filipendula* [Tourn.] Mill.

1. *F. rubra* (Hill) B. L. Robinson. In moist ground: Vt. to Pa., Iowa, Ky. and Ga.

Reported only from Hancock, Delaware Co., N. Y., Andover, Sussex Co., N. J., and locally in Conn., perhaps nowhere as a wild plant.

Filipendula Ulmaria (L.) Maxim. and *F. Filipendula* (L.) Voss, both commonly cultivated, are rare escapes in our area. Neither is established.

7. *Potentilla* L.

Flowers axillary, solitary, on long pedicels.

Pubescence of stem, petioles and peduncles appressed.

Leaflets sparingly silky or strigose, toothed except at the very base.

1. *P. simplex*.

Leaflets densely silky beneath; toothed only from the middle upwards.

2. *P. pumila*.

Pubescence of the stem, petioles and peduncles spreading.

3. *P. canadensis*.

Flowers cymose.

Cymes very leafy, many-flowered.

Annuals or biennials; styles glandular at the base; scarcely exceeding the calyx.

4. *P. monspeliensis*.

Perennials; styles not glandular; petals slightly exceeding the calyx.

Leaves white tomentose beneath.

5. *P. argentea*.

Leaves not white tomentose beneath.

6. *P. intermedia*.

Cymes not very leafy, generally rather few flowered.

Petals deep yellow, scarcely longer than the sepals.

7. *P. recta*.

Petals sulphur yellow, half longer than the sepals.

8. *P. sulphurea*.

1. **P. simplex** Michx. Moist shaded places: N. S. to Minn., Mo. and the mountains of Ala. and N. Car.

Common throughout the area except in the pine-barrens, there rare and local and probably adventive; always increasing **northward**.

2. **P. pumila** Poir. Sandy or dry soil: Me. to Ga., Ohio and Ont.

Throughout the area except in the pine-barrens, always decreasing inland, and frequently replacing *P. canadensis* along the coast.

3. **P. canadensis** L. Dry ground: N. B. to Wisc., eastern Texas, Ala. and N. Car.

Throughout the area, except in the pine-barrens, there rare and local, and probably adventive; always increasing **northward**.

4. **P. monspeliensis** L. Rich soil and waste places: Lab. to D. C., Kan., Mex., Calif. and Alask.; also in Europe and Asia.

Throughout the area except in the pine-barrens, becoming very common **northward**.

5. **P. argentea** L. In waste places and in fields: N. S. to the Dakotas, Kan. and D. C. Native of Europe.

Common as a weed throughout the area, probably introduced into the pine-barrens.

6. **P. intermedia** L. Fields and roadsides and waste places: E. U. S. Native of Europe.

Rare as a ballast plant near the larger cities.

7. **P. recta** L. Roadsides and waste places: E. U. S. Native of Europe.

A rare adventive in Conn. and N. Y., hardly persisting.

8. **P. sulphurea** Lam. Fields and waste places: Vt. to D. C., Ill. and Mich. Native of Europe and Asia.

A rather rare adventive near most of our larger towns and cities.

P. paradoxa Nutt. has been found as a waif.

8. **Argentina** Lam.

Leaf rachis densely pubescent; achenes corky.

1. *A. Anserina*.

Leaf rachis glabrate; achenes not corky.

2. *A. littoralis*.

1. **A. Anserina** (L.) Rydb. Roadsides and fields: E. N. S. Naturalized from Europe and Asia.

A rare or occasional adventive.

2. **A. littoralis** Rydb. Along the coast and in salt marshes: Lab., Newf. and Que. to S. I.

Known definitely in our range only from Sands Point and Southampton, L. I., and from the coast of Conn. and S. I. It has been referred to *Potentilla pacifica* Howell.

9. **Comarum** L.

1. **C. palustre** L. In bogs and moist places: Greenland to Alaska, south to Conn., N. J. and Wyoming.

CONN. Rare and local in New Haven Co., increasing **northward** into Litchfield Co.

N. J. Budd's Lake, Morris Co.

PA. Wayne and Monroe counties.

Tertiary, 0: Cretaceous, 0: Older Formations, rare and local **northward**. Not south of the moraine. 138-152 days. 715-1,800 ft.

10. **Duchesnea** J. E. Smith

1. **D. indica** (Andr.) Focke. In fields and waste places: N. Y. and Pa., westward to Mo. and southward. Native of Asia

A rare adventive, sometimes established.

11. **Fragaria** [Tourn.] L.

Pubescence of scape and petioles divaricate, generally spreading at right angles or somewhat reflexed.

Leaflets subsessile; achenes superficial.

Fruit hemispheric.

Fruit ovoid or subconic.

1. *F. vesca*.

2. *F. americana*.

Leaflets usually petiolulate; achenes set in deep pits.

Fruit subglobose.

3. *F. virginiana*.

Fruit oblong-conic.

4. *F. canadensis*.

Pubescence of the scape and petioles appressed or ascending; achenes in pits.

5. *F. terrac-novae*.

1. **F. vesca** L. Cultivated and sometimes escaping: Eastern and Middle States. Native of Europe.

Rather a rare escape in most parts of our range. The white-fruited form is rarer than the type, but is found in parts of the area and is apparently native northward.

2. **F. americana** (Porter) Britton. In woods: Newf. to Man., New Mex. and Va.

CONN. Rare near the coast, increasing but not common **northward**.

N. Y. From the Highlands of the Hudson **northward**, becoming common in the Catskills; unknown elsewhere.

N. J. Sussex and Morris counties.

PA. Pike, Luzerne, Monroe, Northampton and Bucks counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Predominating north of the moraine. 117-176 days. Sea level-3,365 ft.

3. **F. virginiana** Duchesne. In fields: P. E. I. to Minn. and Ind. Terr., south to Ga.

Common throughout the range except in the pine-barrens, there rare and probably introduced.

4. **F. canadensis** Michx. In woods: Newf. to Hudson Bay, N. Y. and Mich.

Known definitely in our area only from the mountain tops in Greene Co., N. Y.

5. **F. terrae-novae** Rydb. In woods and fields: Labrador and Newf. to Ont. and New York.

N. Y. The tops of the Catskills in Greene, Ulster and Delaware counties.

Tertiary, o: Cretaceous, o: Older Formations, exclusively north of the moraine. 117-138 days. 1,000-4,020 ft.

F. Grayana Vilm. (*F. virginiana illinoensis* (Prince) Gray) has been collected as a waif in Conn.

12. **Sibbaldiopsis** Rydb.

1. **S. tridentata** (Soland.) Rydb. Bare exposed places: Greenland to N. J., Ga., Minn., Man.; also in Great Britain.

CONN. The northwestern part of Litchfield Co.

N. Y. Dutchess Co., increasing **northward**.

N. J. The summit of High Point, Sussex Co.

PA. The summits of the mountains in Luzerne and Lackawanna counties.

Tertiary, o: Cretaceous, o: Older Formations, exclusively north of the moraine. 117-138 days. 1,000-4,020 ft.

13. **Dasiphora** Raf.

1. **D. fruticosa** (L.) Rydb. In woods or pastures: Lab. to Alask., Cal., N. Mex. and N. J.; also in Siberia and Western Europe.

CONN. Rare near the coast, increasing **northwestward**.

N. Y. Pine Plains, Dutchess Co., and Copake Falls, Columbia Co.

N. J. Hudson, Warren, Bergen, Passaic, Morris and Sussex counties, increasing **northward**.

PA. Pike and Monroe counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Not south of the moraine. 123-168 days. 800-3,365 ft.

14. *Drymocallis* Fourr.

1. *D. agrimonioides* (Pursh) Rydb. (*D. arguta* Rydb.). Meadows and rocky places: N. B. to D. C., Colo. and the Mackenzie.

CONN. Not common, but found throughout the state.

N. Y. Unknown on S. I., very rare on L. I. near Springfield; rare and local in Westchester and Rockland counties, thence increasing **northward** but not definitely known from the Catskills.

N. J. Abundant but local at Winslow Junction, Lakewood and Riverton, in and near the pine-barrens; thence unknown except at the north in Hunterdon, Warren, Morris, Passaic and Sussex counties. Probably introduced at all the southern stations.

PA. Delaware, Northampton and Luzerne counties.

Tertiary, not known as a wild plant, sparingly introduced: Cretaceous, scattered, doubtfully indigenous: Older Formations, increasing **northward**. 138-189 days. Sea level-2,100 ft.

15. *Sanguisorba* [Rupp.] L.

1. *S. canadensis* L. In swamps and meadows: Lab. and Newf. to Ga. and Mich.

CONN. Common along the coast, decreasing inland and perhaps wanting northward.

N. Y. Common on L. I. and S. I., decreasing up the Hudson to Peekskill, otherwise unknown.

N. J. Common throughout the state, except the pine-barrens.

PA. Monroe, Northampton, Delaware and Chester counties, perhaps not indigenous.

Distribution little understood, but apparently more common near the coasts and less common inland than elsewhere.

16. *Poterium* L.

1. *P. Sanguisorba* L. Often cultivated and frequently escaping: Eastern and Middle States.

Not a very common escape in most parts of our range.

17. *Agrimonia* [Tourn.] L.*

Fruiting hypanthium with several series of bristles, the lower bristles reflexed.

1. *A. gryposepala*.

Fruiting hypanthium with 2-4 series of bristles, the latter erect, ascending or merely spreading.

Racemes and leaves glabrous or nearly so.

2. *A. rostellata*.

Racemes and lower surface of the leaves decidedly hairy.

Roots tuberous and thickened.

Leaflets 5-7, rarely 9, obovate or oval or rarely elliptic.

3. *A. pubescens*.

Leaflets 7-13, lanceolate or narrowly elliptic.

4. *A. Bicknellii*.

Roots not tuberous.

Leaflets 5-9, broadly lanceolate, oblanceolate or elliptic, with rather few teeth.

5. *A. striata*.

Leaflets 9-25, narrowly lanceolate, with numerous teeth.

6. *A. parviflora*.

1. *A. gryposepala* Wallr. (*A. hirsuta* (Muhl.) Bicknell). Borders of woods and thickets: N. S. to N. Car., Neb. and N. D. and in Cal., N. Mex. and Mex.

Common throughout the range except in the pine-barrens and the region immediately surrounding them, there wanting; always increasing northward.

2. *A. rostellata* Wallr. (*A. striata* of Britton's Manual. Not of Michx.). Hilly woodsides: Conn. to Ga., Ala. and Kan. Conn. Not very common along the coast, decreasing inland, and wanting northward.

N. Y. On L. I., frequent north of the moraine; Bronx and Westchester counties.

N. J. Throughout the region north of the coastal plain, southward to Gloucester and Camden counties.

PA. Bucks Co.

3. *A. pubescens* Wallr. (*A. mollis* (T. & G.) Britton). In dry, open woods: N. Y. and Ont. to Ga., Ark., Kan. and Minn.

Scattered over most of our area, except the pine-barrens, there rare or wanting; rare in the region surrounding the pine-barrens.

4. *A. Bicknellii* (Kearney) Rydb. In woods: S. Mass. to Pa., Ga. and Tenn.

N. Y. Common on L. I., not reported from S. I.; in N. Y., Bronx, Westchester, and Putnam counties, otherwise unknown.

* The taxonomic treatment here presented is adapted from Dr. P. A. Rydberg's monograph in *North American Flora*. I have also followed Dr. Rydberg's treatment of *Geon.*, *Betula*, and *Rosa* in the same work, and here gratefully express my indebtedness to him for much help in these difficult genera.

N. J. Near Highlands, Monmouth Co.; Verona, Essex Co.
 PA. Rare in Northampton Co.

Rare and local species with inexplicably scattered distribution.

5. **A. striata** Michx. (*A. Brittoniana* Bicknell). Roadsides, open woods and copses: N. S. to W. Va., N. Mex. and B. Col.

CONN. Rare near the coast and in the southwestern part of the state, frequent elsewhere.

N. Y. Glen Cove, L. I., White Plains, Westchester Co., and in Greene Co.

PA. Northampton, Pike and Monroe counties.

6. **A. parviflora** Ait. In damp ground: Conn. to Fla., Minn. and Neb.; also in Santo Domingo.

CONN. Reported only from Fairfield Co. and from Salisbury.

N. Y. On L. I., S. I. and in Bronx and Westchester counties, otherwise unknown.

N. J. Throughout the state, except the pine-barrens; rare in the area surrounding them.

PA. Bucks, Berks and Delaware counties.

Agrimonia platycarpa Wallr. has been collected only once within our area, at Van Courtlandt Park, N. Y. City. It is a southern species, perhaps only a fugitive in the range.

18. **Geum** L.*

Sepals reflexed.

Receptacle stalked; bractlets none or rudimentary.

1. *G. vernum*.

Receptacle sessile.

Receptacle glabrous.

2. *G. virginianum*.

Receptacle hairy.

Petals white or ochroleucous; receptacle long-hairy.

Petals white or cream-colored, equalling the sepals.

Basal and lower stem-leaves simple or ternate.

3. *G. canadense*.

Basal and lower stem-leaves pinnate.

4. *G. Meyerianum*.

Petals cream yellow, and shorter than the sepals.

5. *G. hirsutum*.

Petals golden yellow; receptacle short hairy.

6. *G. strictum*.

Sepals ascending or merely spreading.

7. *G. rivale*.

1. **G. vernum** Raf. Meadows and borders of woods: Ont. to N. J., Tenn., Tex. and Kan.

N. Y. Near Brooklyn, N. Y., probably there adventive; Kingsbridge, N. Y. City.

* Prepared with the assistance of Dr. P. A. Rydberg and adapted from his treatment of the genus in *North American Flora*.

N. J. Known only from near Princeton; not recently collected.
PA. Bucks, Philadelphia and Delaware counties.

A rare and highly localized species.

2. *G. virginianum* L. Thickets and wet places: N. B. to N. Car., Mo. and Minn.

Throughout the range except in the pine-barrens, and the coastal plain of L. I., there wanting; rare and local in the area immediately surrounding the pine-barrens.

3. *G. canadense* Jacq. Banks and among bushes: N. S. to Ga., Tex., Kan. and the Black Hills of S. Dak.

Very common throughout the range, except in the pine-barrens, there rare or wanting.

4. *G. Meyerianum* Rydb. Que. to N. Y. and Pa.

Known in our area only from Tuxedo Park, N. Y. and from Bangor and Easton, Pa.

5. *G. hirsutum* Muhl. (*G. flavum* (Porter) Bicknell). Woods and banks: Conn., N. Y. and Ohio to Ga. and Tenn.

CONN. Throughout the state, but not very common.

N. Y. On L. I. and S. I. and near the city of New York; in Westchester Co., apparently wanting elsewhere.

N. J. Throughout the state, except the pine-barrens and east and south of them.

PA. Luzerne, Northampton, Bucks and Chester counties.

Distribution not as yet understood.

6. *G. strictum* Soland. Low meadows: Newf. to Pa., Mo., Mex. and B. Col.

CONN. Rare and local over most of the state.

N. Y. Rare on L. I. and S. I., and in the Bronx, thence increasing and common **northward**.

N. J. Freehold, Monmouth Co. and New Egypt, Ocean Co., rare; becoming more frequent in Somerset and Union counties, thence increasing **northward**.

PA. Pike, Monroe, Northampton and Bucks counties.

Tertiary, not on Beacon Hill, rare elsewhere: Cretaceous, 0: Older Formations, increasing **northward**. 118-189 days. Sea level-2,800 ft.

This species is supposed to hybridize with *G. rivale* and the hybrid is to be looked for wherever both the supposed parents occur.

7. *G. rivale* L. In swamps and low grounds: Lab. and Newf. to N. J., Mo., N. Mex. and B. Col. Also in Europe and Asia. CONN. Rare near the coast, increasing and becoming common **northward**.

N. Y. Unknown south of the Highlands of the Hudson, thence increasing **northward**.

N. J. Bergen, Passaic, Morris and Warren counties, increasing **northward**.

PA. Wayne, Monroe, Northampton and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Predominating north of the moraine. 118-220 days. Sea level-3,365 ft.

This species is supposed to hybridize with *G. strictum* and the hybrid is to be looked for wherever both the supposed parents occur.

G. macrophyllum Welld. a far northern species, has been erroneously reported from Bucks Co., Pa. The specimen on which the report was based is *G. virginianum*.

19. *Waldsteinia* Willd.

I. *W. fragarioides* (Michx.) Tratt. Woods and shaded hillsides: N. Eng. and Ont. to Minn., Mich., Ind. and along the Alleghanies to Ga.

CONN. Northern Litchfield Co.

N. Y. Ulster, Sullivan, Dutchess, Delaware and Greene counties.

N. J. Sussex Co.

PA. Bucks, Monroe, Northampton and Schuylkill counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 117-158 days. 800-4,020 ft.

20. *Rubus* [Tourn.] L.*

I. Leaves simple, crenate or palmately lobed.

Shrubby; flowers corymbose, purple.

Herbaceous; flower solitary, white.

1. *R. odoratus*.

2. *R. Chamaemorus*.

II. Leaves 3-7 foliolate.

Stem herbaceous, never prickly, rarely bristly.

Stems more or less woody, biennial or perennial, usually prickly.

3. *R. pubescens*.

Carpels united into a thimble-shaped aggregate fruit, falling off from the dry receptacle.

* Adapted, with the aid of Dr. P. A. Rydberg, from his treatment in *North American Flora*. Because of the uncertainty of specific limitations, the many hybrids, and the writer's lack of familiarity with the group, it has seemed wise to omit phytogeographical and ecological data.

- Petals rose or purple; stem densely hispid but not glandular.
- Petals white.
- Inflorescence corymbiform; fruit black or purple; stem prickly.
- Inflorescence racemose; fruit red.
- Plant not at all glandular hispid; young branches and inflorescence finely tomentose.
- Plant more or less glandular hispid, especially in the inflorescence.
- Carpels remaining on the fleshy receptacle, or falling off together with the same, or falling off separately.
- A. Stems prickly or rarely unarmed; prickles comparatively few, usually stout, confined to the angles of the stem.
- I. Suckers erect; stems in age erect, arching or recurved (prostrate in No. 21).
- Leaflets laciniate.
- Leaflets not laciniate.
- Leaves white-tomentose beneath.
- Leaves not white-tomentose beneath.
- Inflorescence densely glandular; with long stipitate hairs.
- Sepals ovate, abruptly acuminate; stem strongly angled.
- Inflorescence corymbose; terminal leaflet of the sucker broadly cordate.
- Inflorescence usually elongate racemiform; terminal leaflet of the suckers elongate-cordate or ovate.
- Sepals lanceolate, long acuminate.
- Inflorescence not at all glandular or only slightly so; glands sessile or short stipitate.
- Leaves densely pubescent beneath.
- Inflorescence elongated racemose; young branches angled; terminal leaflets of the suckers not broadly cordate.
- Stem very prickly, much branched; prickles of the stem long.
- Stem sparingly prickly; prickles of the stem short.
- Inflorescence short, corymbiform; young branches terete; terminal leaflets of the suckers broadly cordate.
4. *R. phoenicolasius*.
5. *R. occidentalis*.
6. *R. Idaeus*.
7. *R. strigosus*.
8. *R. laciniatus*.
9. *R. cuneifolius*.
10. *R. sativus*.
11. *R. nigrobaccus*.
12. *R. allegheniensis*.
13. *R. argutus*.
14. *R. pergratus*.

- Stem often recurved and rooting at the tip; leaflets on floral branches usually acuminate, incised toothed. 15. *R. recurvans*.
- Stem rarely recurved and rooting; leaflets on floral branches merely acute, with short broad teeth. 16. *R. frondosus*.
- Leaves essentially glabrous beneath or hairy only on the veins.
- Stem erect or arching, but not rooting at the tip.
- Stem slender, less than 1 m. high, almost herbaceous, unarmed or with a few bristle-like retrorse prickles.
- Flowers racemose, though few. 17. *R. Randii*.
- Flowers solitary or 2 or 3, leafy bracted (erect forms of). 25. *R. Enslenii*.
- Stem stout usually 1.5 m. high, angled, unarmed or with a few short stout prickles. 18. *R. canadensis*.
- Stems recurved and often rooting at the tips (hybrids of Nos. 10, 12, 13, 14, 15, 16, 17 and 18 with Nos. 20, 21, 22, 23, 24 and 25).
2. Suckers and stems prostrate, only the floral branches erect.
- Leaves decidedly pubescent beneath.
- Inflorescence conspicuously leafy-bracted with unifoliolate broadly ovate or cordate leaves.
- Leaflets firm and light green, shining above, regularly toothed. 19. *R. invisus*.
- Leaflets thin, dark green above, irregularly toothed. 20. *R. Baileyanus*.
- Inflorescence not conspicuously leafy-bracted; unifoliolate leaves rare, if any cuneate at base. 21. *R. plicatifolius*.
- Leaves glabrous or nearly so beneath, except on the veins beneath.
- Leaflets, at least those of the suckers coarsely and incisedly dentate or lobed. 22. *R. heterophyllus*.
- Leaflets more regularly serrate.
- Leaflets of floral branches sharply serrate, with lanceolate teeth, firm at least in age.

- Leaflets thick, dark green, dull;
leaves of inflorescence often uni-
foliolate. 23. *R. flagellaris*.
- Leaflets light green, shining above;
leaves of the inflorescence rarely
unifoliolate. 24. *R. procumbens*.
- Leaflets of floral branches crenate-ser-
rate, with ovate teeth. 25. *R. Enslenii*.
- B. Stem with usually numerous bristles, not confined
to the angles.
- Stem at first erect or ascending; leaflets of
suckers acute or acuminate at the apex,
not evergreen.
- Inflorescence corymbiform, short and
broad. 26. *R. nigricans*.
- Inflorescence racemiform, simple. 27. *R. setosus*.
- Stem prostrate from the beginning; leaflets of
suckers obtuse or rounded at apex, half-
evergreen. 28. *R. hispidus*.
1. **R. odoratus** L. (*Rubacer odoratum* (L.) Rydb.). In rocky
woods: N. S. to Ont., Mich., Ga. and Tenn.
CONN. Rare or wanting near the coast, increasing **northwestward**.
N. Y. Roslyn, L. I. Unknown on S. I.; rare and local in Bronx
and Westchester counties, thence increasing **northward**.
N. J. Rare in Union, Essex, and Hudson counties, increasing
northward.
PA. Throughout the area.
2. **R. Chamaemorus** L. Arctic Am. and Greenland to N. Hamp.
and N. Y., west to Alask., B. Col. Also in Eu. and Asia.
Localized in our area at Montauk Point, L. I., there presumably
introduced by birds.
3. **R. pubescens** Raf. (*R. americanus* Britton). Swamps and
damp woods: Newf. to N. J., Iowa, Mont., B. Col., also in
Colo.
CONN. Rare near the east coast, increasing **northward**.
N. Y. Unknown on L. I. or S. I.; rare in Westchester and Bronx
counties, thence increasing **northward**.
N. J. Hudson, Essex, and Hunterdon counties, increasing **north-**
ward.
PA. Pike, Monroe, Luzerne, Northampton and Bucks counties.
4. **R. phoenicolasius** Maxim. Escaped from cultivation in E.
U. S. Native of Japan and China.
A rare garden escape, occasionally persistent in our area.

5. **R. occidentalis** L. N. B. and Que. to Ga., Col. and Minn.

Throughout the range, except in the pine-barrens.

This species is supposed to hybridize with *R. strigosus*, and the hybrid (sometimes called *R. neglectus* Peck) is to be looked for wherever both the supposed parents occur together.

6. **R. Idaeus** L. Escaped from gardens: E. N. S. Native of Europe and Asia.

A very rare garden escape in our area, hardly persisting.

7. **R. strigosus** Michx. In thickets: Newf. to Va., Neb. and N. Dak.

CONN. Rare along the coast, increasing **northward**.

N. Y. From the Highlands of the Hudson, **northward**.

N. J. From Hunterdon and Essex counties **northward**.

PA. Pike, Lackawanna, Monroe, Northampton and Schuylkill counties.

Hybridizes with *R. occidentalis*.

8. **R. laciniatus** Willd. Escaped from cultivation: E. U. S. and in Canada.

A rare, hardly persisting escape, in our range.

9. **R. cuneifolius** Pursh. Dry fields: Conn. and N. J. to Fla. and La.

CONN. Not uncommon along the coast, decreasing and perhaps wanting northward.

N. Y. Rare on L. I. and S. I., apparently unknown elsewhere.

N. J. Rare in Hunterdon and Sussex counties, unknown between this and the pine-barrens, there common, and in the region surrounding the barrens.

PA. Bucks, Delaware and Chester counties.

Hybridizes with *R. argutus*.

10. **R. sativus** (Bailey) Brainerd. Open fields: Que. and Ont. to Conn. and Pa.

Known, in our area, only from Morris Co. and Forked River, N. J., from Meriden and Southington, Conn., and from Easton, Pa.

Hybridizes with *R. nigricans*.

11. **R. nigrobaccus** Bailey. Open woods: N. S. to N. Car., Ark. and Ill.

Common everywhere, except the coastal plain of N. J.

Hybridizes with *R. argutus*, *frondosus*, *canadensis*, *Randii*, *pergratus*, *Baileyanus*, *plicatiformis*, *procumbens*, *nigricans* and *hispidus*.

12. **R. alleghaniensis** Porter. In thickets: N. S. to Ont., N. Y., Va. and N. Car.

Known definitely only from Monroe, Carbon and Schuylkill counties in Pa. and Union and Morris counties in N. J.

13. **R. argutus** Link. (*R. andrewisanus* Blanch.). In fields: N. S. to mountains of N. Car., Kan. and Iowa.

Common nearly throughout the area, less common in the pine-barrens than elsewhere; not recorded from S. I.

Hybridizes with *R. frondosus*, *recurvans*, *Baileyanus*, *nigrobaccus*, *nigricans*, *canadensis*, *procumbens*, *flagellaris*, *Ensenii* and *cuneifolius*.

14. **R. pergratus** Blanchard. In mountains: Me. and Ont. to N. Y. and Iowa.

Known in our range only from the Catskills in Greene and Delaware Co., N. Y. and from Pike Co., Pa.

Hybridizes with *R. canadensis*, *procumbens*, *nigricans* and *nigrobaccus*.

15. **R. recurvans** Blanchard. In thickets: Me. to Conn. and N. N. Y.

Apparently rather common in Conn., but not definitely reported from any other part of our range.

Hybridizes with *R. argutus*, *procumbens*, *geophilus*, *canadensis* and *nigricans*.

16. **R. frondosus** Bigel. N. E. to Va. and Ohio.

Throughout the range, except in the pine-barrens, there wanting; very rare in the region immediately surrounding the pine-barrens.

Hybridizes with *R. nigrobaccus*, *argutus*, *procumbens*, *Baileyanus*, *flagellaris*, *nigricans*, *hispidus* and *Ensenii*.

17. **R. Randii** (Bailey) Rydb. Woods: N. S. and Mass. to N. Y. and Pa.

Known definitely only from Greene Co. in N. Y. and Pike, Monroe and Northampton counties in Pa.; rare.

Hybridizes with *R. nigricans* and *nigrobaccus*.

18. **R. canadensis** L. Woods: Newf. to N. Car. and Mich.
 Confined so far as now known to the mountains of Ulster, Greene, Columbia, Sullivan and Delaware counties, N. Y. and Monroe and Luzerne counties in Pa. Locally very common.
 Hybridizes with *R. sativus*, *nigrobaccus*, *argutus*, *recurvans*, *Randii*, *pergratus*, *Baileyanus*, *procumbens*, *geophilus*, *plicatifolius*, *nigricans* and *hispidus*.
19. **R. invisus** (Bailey) Britton. Conn. to Ont. and Va.
 Credited to Conn. but not definitely known from the state, otherwise unknown from the range.
20. **R. Baileyanus** Britton. Mass. and Ont. to Va., Okl. and Kan.
 Common throughout the range, except in and near the pine-barrens, there rare or wanting.
 Hybridizes with *R. nigrobaccus*, *frondosus*, *procumbens*, *hispidus*, *argutus*, *Enslonii*, *flagellaris*, *nigricans* and *canadensis*.
21. **R. plicatifolius** Blanchard. Me. and Ont. to the Catskills and Pa., also in Wisc. and Minn.
 Known definitely only from the mountains in Greene Co., N. Y. and Luzerne Co., Pa.
 Hybridizes with *R. nigrobaccus*, *nigricans*, *canadensis* and *hispidus*.
22. **R. heterophyllus** Willd. (*R. geophilus* Blanchard). On open ground: Me. to Mich., Conn. and N. J.
 Apparently not known on L. I. and S. I.; otherwise scattered, but rare, over most of the range.
 Hybridizes with *R. recurvans* and *canadensis*.
23. **R. flagellaris** Willd. Sandy plains: L. I. to Nantucket Island.
 Apparently localized on the coastal plain of L. I.
 Hybridizes with *R. argutus*, *frondosus*, *procumbens*, *Baileyanus*, *hispidus* and *Enslonii*.
24. **R. procumbens** Muhl. In dry soil: Newf. and Ont. to Lake Superior, Va., La. and the Ind. Terr.
 Common everywhere.
 Hybridizes with *R. nigrobaccus*, *argutus*, *recurvans*, *pergratus*, *frondosus*, *canadensis*, *hispidus*, *Enslonii*, *nigricans*, *Baileyanus* and *flagellaris*.

25. **R. Enslenii** Tratt. Mass. to Mo., Tex. and southeastward.
So far as now known, on L. I., the Bronx and Westchester County, N. Y.; reported also from the coastal plain of N. J.

Hybridizes with *R. Baileyanus*, *procumbens*, *flagellaris*, *frondosus*, *argutus* and *hispidus*.

26. **R. nigricans** Rydb. In low ground: Newf. to R. I., Pa. and Wisc.

Nearly throughout the range, except in the pine-barrens; there rare or wanting; rare in the region immediately surrounding the pine-barrens; not known on S. I.

Hybridizes with *R. frondosus*, *sativus*, *nigrobaccus*, *recurvans*, *pergratus*, *canadensis*, *Randii*, *plicatifolius*, *Baileyanus*, *procumbens* and *hispidus*.

27. **R. setosus** Bigel. Mass. to Conn. and N. Y.

Known in our area only from a doubtful specimen from Southington, Conn.

28. **R. hispidus** L. Low grounds and wet meadows: N. S. to Ga., Mich. and Minn.

Common throughout the range.

Hybridizes with *R. canadensis*, *nigrobaccus*, *frondosus*, *Baileyanus*, *plicatifolius*, *flagellaris*, *Enslenii* and *nigricans*.

R. Linkianus Ser., a European species has been collected, but not recently, near Camden, N. J.

21. **Dalibarda** L.

1. **D. repens** L. On dry or rocky hills: N. B. to the Rocky Mts., south to Tenn. and Kan.

CONN. Northwestern Litchfield Co.

N. Y. The Mountains of Ulster, Sullivan, Greene and Delaware counties.

N. J. Reported from Swedesboro, Gloucester Co.; otherwise unknown.*

PA. Monroe; Luzerne, Carbon, Lackawanna and Schuylkill counties.

Tertiary, o: Cretaceous, a single extra-limital station.* Older Formations: increasing **northward**. 117-189 days. Sea level-4,050 ft.

Alchemilla arvensis Scop. has been reported from the area as a waif.

* See Introduction, paragraph 36.

22. *Rosa* [Tourn.] L.*

Styles much exerted, about equalling the stamens.

Leaflets glabrous or slightly pubescent on the veins beneath, dark green and shining above.

Leaflets velutinous-pubescent, beneath, rather dull above.

Styles not exerted or only slightly so.

Sepals reflexed after flowering and early deciduous.

Achenes inserted both on the inner walls of the hypanthium and in the bottom; prickles rarely infrastipular.

Leaflets 3-5, rarely 7; stem with prickles and bristles.

Leaflets 7; stem with strong prickles but rarely with bristles.

Leaflets glandular-pruinose beneath, double-serrated.

Leaflets sub-orbicular or oval, usually blunt.

Leaflets ovate, mostly acute.

Leaflets not glandular-pruinose beneath; only rarely double-toothed.

Achenes inserted only in the bottom of the bristly hypanthium.

Infrastipular prickles decidedly curved.

Leaflets finely serrulate.

Leaflets coarsely serrate.

Leaflets not glaucous.

Leaflets glaucous.

Infrastipular prickles straight or slightly curved.

Leaflets 9-10; stems densely bristly.

Leaflets 5-7; old stems sparsely bristly.

Leaflets shining above.

Leaflets not shining above.

Leaves decidedly pubescent beneath.

Leaves glabrous or pubescent only on the veins beneath.

Leaflets not glandular-dentate.

Leaflets glandular-dentate.

Sepals erect after flowering, long-persistent on the fruit.

Flowers bracted.

Infrastipular prickles present.

Stems not pubescent; leaves not rugose.

Stems pubescent; leaves rugose.

Infrastipular prickles not present.

Flowers bractless.

1. *R. setigera*.

2. *R. rubifolia*.

3. *R. gallica*.

4. *R. rubiginosa*.

5. *R. micrantha*.

6. *R. canina*.

7. *R. palustris*.

8. *R. gemella*.

9. *R. virginiana*.

10. *R. nitida*.

9. *R. virginiana*.

11. *R. Lyoni*.

12. *R. carolina*.

13. *R. serrulata*.

14. *R. spinosissima*.

15. *R. rugosa*.

16. *R. Solanderi*.

17. *R. pimpinellifolia*.

* Prepared with the assistance of Dr. P. A. Rydberg. Because of scarcity of material and the many doubtful and hybrid specimens it seems wiser to omit phytogeographical and ecological data.

1. **R. setigera** Michx. N. Y. to N. Car. and Ky. to Fla., also in Ark. and Kan.
Rare and local as an escape from cultivation; not known as a wild plant from the range.
2. **R. rubifolia** R. Br. Ont. and N. Y. to Ga., Ala., Tex. and Wisc.
Known in our area only as a rare escape from cultivation.
3. **R. gallica** L. Escaped from gardens: Mass. and N. Y. to Mo. and Ohio. Introduced from Europe.
A rare escape from cultivation near the larger cities or about abandoned cottages.
4. **R. rubiginosa** L. Roadsides: N. S. to Ga., Miss. and Kan. Native of Europe.
Common as an escape from cultivation in our area.
5. **R. micrantha** J. E. Smith. Roadsides: Mass. and N. Y. to S. Car. and westward. Native of Europe.
Very rare as an occasional escape from gardens.
6. **R. canina** L. Roadsides: Mass. and D. C. to Tenn. Native of Europe.
Rare as an occasional escape from gardens naturalized in valley of the upper Delaware River.
7. **R. palustris** Marsh (*R. carolina* of Am. Auth.). Swamps and low places: N. S. to Minn., Miss. and Fla.
Common throughout the range except in the pine-barrens, there wanting.
Hybridizes with *Rosa carolina* and *Rosa virginiana*.
8. **R. gemella** Willd. Mass. to southern N. Y.
Known definitely only from the bay side of Staten Island, N. Y.
9. **R. virginiana** Mill. (*R. lucida* Ait.). Newf. to Ont., Va. and W. Va., Ark. and Mo.
Common throughout the range, except in the pine-barrens, there only sparingly introduced; more common **northward** than elsewhere.
Hybridizes with *R. palustris*, *carolina* and *Lyonii*.
10. **R. nitida** Willd. Low grounds: Conn. and Mass. to Newf.
Known, in our area, only from Thompson, Stafford and Plainfield, Conn.

11. **R. Lyoni** Pursh (*R. humilis villosa* Best.). Central N. Y. and N. J. to Ark. and Kan.
N. Y. Rare and local on L. I. and S. I., increasing **northward**.
N. J. Hunterdon, Warren, Morris, Passaic and Sussex counties.
PA. Bucks and Northampton counties.
12. **R. carolina** L. (*R. humilis* Marsh.). Me. to Ga., Kan. and Wisc.
Throughout the range, except in the pine-barrens, there rare or wanting.
Hybridizes with *R. virginiana* and *palustris*
13. **R. serrulata** Raf. Mass. and Ont. to Iowa, south to Fla. and Tex.
Throughout the range, except in the pine-barrens, there wanting; scattered and local in its distribution.
14. **R. spinosissima** L. (*R. cinnamomea* L.). Escaped from gardens: E. U. S. Native of Europe and Asia.
A rare escape from gardens in the northern part of the area; perhaps not persisting.
15. **R. rugosa** Thunb. Escaping from gardens. Native of E. Asia.
Established as an escape in Conn. and L. I.
16. **R. Solanderi** Tratt. (*R. blanda* Lindl. not Ait.). Anticosti to Conn., Pa., Ill., N. Dak. and Man.
Known definitely only from Litchfield Co., Conn. and Bucks and Delaware counties, Pa.; perhaps not as a wild plant in the area. Reported from Hunterdon and Sussex counties, N. J.
17. **R. pimpinellifolia** L. As an escape: E. U. S. Native of Eu. and Asia.
A rare escape from cultivation in some parts of our range; hardly persisting.

Among the numerous waifs and adventives perhaps the most persistent is *Kerria japonica* (Thunb.) DC. which is widely cultivated and often escapes.

MALACEAE

Ripe carpels papery or leathery.

Leaves pinnate.

1. SORBUS

Leaves simple, entire, toothed or lobed.

Cavities of the ovary as many as the styles.

Flesh of the pome with grit cells.

2. PYRUS

Flesh of the pome without grit cells.

Cymes simple; trees.

Cymes compound; shrubs.

Cavities of the ovary becoming twice as many as the styles.

Ripe carpels bony.

Ovule 1 in each carpel, or if 2, dissimilar.

Ovules 2 in each carpel, alike.

3. MALUS.

4. ARONIA.

5. AMELANCHIER.

6. CRATAEGUS.

7. COTONEASTER.

1. *Sorbus* [Tourn.] L.

Leaflets long-acuminate; fruit 4-6 mm. thick.

1. *S. americana*.

Leaflets obtuse or short pointed; fruit about 8 mm. thick.

2. *S. scopulina*.

1. ***S. americana*** Marsh. In moist ground: Newf., Man., N. C., and Mich.

CONN. Rare near the coast, increasing **northwestward**.

N. Y. Unknown on L. I. and S. I., rare and local in northern Westchester Co., thence increasing and becoming common **northward**.

N. J. Sussex, Morris, Warren and Hunterdon counties.

PA. Wayne, Monroe, Carbon, Luzerne and Lehigh counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. South of the moraine only in Pa. 127-189 days. 800-3,365 ft.

2. ***S. scopulina*** Greene. In moist ground: Lab. to Alberta, N. Eng., Pa. and Mich. Also in the Rockies to N. Mex. and Utah.

N. Y. The highest mountains in Sullivan and Greene counties.

PA. Luzerne Co.

Tertiary, o: Cretaceous, o: Older Formations, rare and local **northward**. 117-123 days. Not south of the moraine. 1,800-4,020 ft.

Sorbus Aucuparia (L.) Ehrh. is recorded as an established escape in Conn. and New York. I have seen no specimens of actually naturalized trees.

2. *Pyrus* [Tourn.] L.

1. ***P. communis*** L. In thickets and woods, escaped from cultivation: Me. to N. J. and Pa.

A rare escape locally established.

3. *Malus* Mill.

Leaves glabrous, at least when mature.

Leaves oblong, lanceolate or oval, narrowed at the base.

Leaves ovate, cordate or rounded at the base.

Leaves persistently pubescent or tomentose beneath.

1. *M. coronaria*.

2. *M. glaucescens*.

3. *M. Malus*.

1. **M. coronaria** (L.) Mill. (*M. angustifolia* Michx.) In thickets: N. J. to Ill., Kan., Fla. and La.

N. J. Found only at Cape May and near Landisville, Atlantic Co.

2. **M. glaucescens** Rehder (*M. coronaria* of Amer. auth., not of L.). In thickets: Ont. to Mich. and S. Car. Very rare in our range.

Known definitely only from Mercer Co. northward in N. J., and from Bucks, Delaware, and Chester counties in Pa.

3. **M. Malus** (L.) Britton. In woods and thickets, escaped from cultivation: Eastern U. S.

A common escape in our area, hardly persisting.

A supposed hybrid between *M. Malus* and *M. baccata* has been recorded from Conn. as *Pyrus prunifolia* Willd.

Malus baccata (L.) Borck. Britton has been reported from Conn. as an escape.

4. **Aronia** Medic.

Cymes and lower surfaces of the leaves woolly.

Fruit pyriform, bright red.

1. *A. arbutifolia*.

Fruit oval or globose, purple-black.

2. *A. atropurpurea*.

Cymes and leaves glabrous or nearly so; fruit blackish.

3. *A. melanocarpa*.

1. **A. arbutifolia** (L.) Medic. In swamps and wet woods: Conn. to Fla.

CONN. Not uncommon near the coast **southwestward**, unknown elsewhere.

N. Y. Occasional on L. I. and on S. I.

N. J. Throughout the state, rare in the north, increasing **southward**.

PA. Known definitely only from Lehigh, Northampton and Montgomery counties.

Tertiary, common: Cretaceous, decreasing: Older Formations, scattered in N. J. and Conn. and on the glaciated part of S. I. 189-224 days. About sea level.

2. **A. atropurpurea** Britton. Mostly in wet soil: N. S. to Fla.

Throughout the area, more common southward than elsewhere; perhaps wanting in the pine-barrens.

3. **A. melanocarpa** (Willd.) Britton. (*A. nigra* Britton). In swamps or low woods, sometimes in drier situations: N. S. to Ont., Fla. and Mich.

Common throughout the area.

5. *Amelanchier* Medic.*

Low shrub; petals 4-8 mm. long.

Trees, when mature; petals usually 10-16 mm. long.

Flowers racemose.

Top of the ovary smooth or nearly so.

Young leaves and inflorescence smooth or slightly hairy; leaves mostly cordate at base.

Young leaves and inflorescence white woolly; leaves rarely sub-cordate.

Petals 10-14 mm. long.

Petals 3-4 mm. long or less.

Top of ovary woolly; leaves rounded.

Flowers solitary or 1-3, not racemose.

1. *A. spicata*.

2. *A. canadensis*.

3. *A. intermedia*.

4. *A. nantucketensis*.

5. *A. sanguinea*.

6. *A. Bartramiana*.

1. *A. spicata* (Lam.) Dec. (*A. stolonifera* Wiegand). On dry rocks: Ont. to Mich. and N. Car.

CONN. Reported from several stations.

N. Y. Highlands of the Hudson; Sam's Point, Ulster Co.; Inwood, N. Y. City.

N. J. Bergen, Passaic and Sussex counties.

PA. Monroe, Northampton and Bucks counties.

Most common on limestone.

2. *A. canadensis* (L.) Medic. (*A. Botryapium* (L.f.) DC.; *A. laevis* Wiegand?). In woods: N. B. to Man., Fla. and La.

Throughout the range, except the coastal plain of N. J., commoner inland than near the coast.

3. *A. intermedia* Spach. (*A. oblongifolia* (T. & G.) Roemer). In moist soil: N. B. to Man., south to Fla. and La.

Common throughout especially on the coastal plain.

4. *A. nantucketensis* Bicknell. Sandy soil; E. Mass. to N. J.

N. Y. L. I. and S. I.

N. J. From Middlesex Co. southward.

5. *A. sanguinea* (Pursh) DC. (*A. rotundifolia* (Michx.) Roemer).

In woods: N. B. to N. Y. and Mich., south along the mountains to N. Car.

Confined as far as now known to the vicinity of Tannersville, Monroe, Co., Pa., and Saw Kill, Pike Co., Pa., a region underlaid by Clinton Red Shale, having a growing season of about 118 days and an elevation of 2,150 ft.

* A very complete account of *Amelanchier* in eastern North America appeared in *Rhodora* 14: 117-161. 1912. Students of this genus should refer to that paper for a more comprehensive study of the genus than is possible here.

6. **A. Bartramiana** (Pursh) Roem. (*A. oligocarpa* (Michx.) Roem.)
In cold swamps or wet rocky places: Lab. and Ont. to Pa.
and Mich.

Confined in our area to peaks of the Catskills and in Monroe and Schuylkill counties in Pa., all above 1,500 ft., usually up to 4,020 ft.

A. humilis Wiegand (Rhodora 14: 141. 1912) a plant reported to be related to *A. spicata* (Lam.) Dec. has been collected at West Point, N. Y., according to Professor Wiegand.

6. **Crataegus** L.*

- Leaves conspicuously deltoid-cordate, glabrous. 1. *C. Phaenopyrum.*
Leaves not deltoid-cordate; glabrous or pubescent.
Petioles 2 mm. long; shrubs 1-2.5 mm. high, with slender straight spines. 2. *C. uniflora.*
Petioles more than 4 mm. long.
Leaves deeply cut, the lobes sometimes as many as 15; thorns about 6 mm. long. 3. *C. monogyna.*
Leaves not deeply cut.
A. Leaves cuneate, mostly broadest at the middle or the apex.
Leaves broadest towards the apex.
Leaves not impressed veined above, shining. 4. *C. Crus-galli.*
Leaves serrate but not lobed. 5. *C. Canbyi.*
Leaves somewhat irregularly lobed.
Leaves impressed veined above. 6. *C. cuneiformis.*
Fruit ellipsoidal; leaves bright yellow-green. 7. *C. punctata.*
Fruit short; leaves dull gray-green.
Leaves broadest at the middle.
Leaves impressed veined.
Calyx lobes usually deeply cut; nutlets pitted on their ventral faces. 8. *C. succulenta.*
Leaves dark green, glabrous and shining above, coriaceous. 9. *C. neofluvialis.*
Fruit about 2 cm. in diameter; stamens 10. 10. *C. Calpodendron.*
Fruit about 1.2 cm. in diameter; stamens 15-20. 11. *C. Brainerdi.*
Leaves gray green, pubescent, or dull above.
Calyx lobes scarcely cut; nutlets with shallow pits on their ventral faces.

* Prepared with the assistance of Mr. W. W. Eggleston. The unsettled state of our knowledge of the thorns and the comparatively scanty material of many of the species, makes it advisable to omit the usual phytogeographical and ecological data in this genus. The synonymy of the species here treated may be found in Britton and Brown's Illustrated Flora, ed. 2, Vol. 2, page 294.

- Leaves not impressed veined.
- Petiole usually glandless; fruit red, soft. 12. *C. chrysocarpa*.
- Petiole always glandular; fruit greenish-yellow to reddish-brown, hard.
- Foliage and fruit pubescent.
- Fruit globose, greenish to reddish-brown. 13. *C. intricata*.
- Fruit ellipsoid to pyriform, yellow. 14. *C. Stonei*.
- Foliage, corymbs and fruit glabrous.
- Leaves elliptic-ovate; fruit pyriform. 15. *C. straminea*.
- Leaves ovate to ovoid; fruit globose. 16. *C. Boyntoni*.
- B. Leaves mostly broadest at the base.
- Calyx lobes usually entire.
- Leaves yellow-green, often pubescent; fruit soft at maturity.
- Fruit ellipsoidal, ovoid or pyriform.
- Fruit 6-8 mm. thick; leaves conspicuously lobed. 17. *C. roanensis*.
- Fruit 11-19 mm. thick; leaves not conspicuously lobed. 18. *C. macrosperma*.
- Fruit compressed globose or subglobose.
- Lobes of the leaves reflexed. 19. *C. Grayana*.
- Lobes of the leaves ascending. 20. *C. populnea*.
- Leaves blue-green; fruit hard at maturity.
- Leaves elliptic ovate. 21. *C. Jesupi*.
- Leaves ovate.
- Leaves usually cordate.
- Fruit conspicuously angled. 22. *C. rugosa*.
- Fruit not conspicuously angled. 23. *C. filipes*.
- Leaves usually cuneate; fruit pruinose. 24. *C. pruinosa*.
- Calyx lobes serrate.
- Mature leaves usually glabrous above; anthers pink.
- Leaves oblong-ovate; corymbs nearly glabrous. 25. *C. villipes*.
- Leaves broadly ovate.
- Leaves on vegetative shoots cuneate.

Leaves concave 3-7.5 cm.
long.

26. *C. Pringlei*.

Leaves flat, 3-10 cm. long.

27. *C. coccinea*.

Leaves on vegetative shoots
cordate.

28. *C. albicans*.

Mature leaves tomentose above.

29. *C. Arnoldiana*.

1. **C. Phaenopyrum** (L.) Medic. Along streams: Va. to Ga. and Ala., north in the Miss. Valley to S. Ill., Mo. Naturalized in S. N. J. and Pa. Not common.
Rare as an escaped plant in our area; commonly cultivated.
2. **C. uniflora** Moench. In sandy soil: L. I. to Fla., west to W. Va., Mo. and Tex.
N. Y. Common along the south side of L. I.; on S. I.; otherwise unknown.
N. J. Rare in Warren, Hunterdon, Somerset and Bergen counties, increasing and common **southward**, particularly in the pine-barrens.
PA. Northampton, Montgomery, Berks, Bucks, Philadelphia, Delaware and Chester counties.
3. **C. monogyna** Jacq. (*C. oxyacantha* of Am. Auct). Sparingly escaped to roadsides and thickets from cultivation. Native of Europe and Asia.
Not very common as an escaped plant in our area.
4. **C. Crus-galli** L. In sandy soil: Saratoga, N. Y., west through Ont. to E. Kan., south to W. Conn. and Ga.
CONN. Not very common along the coast and up the valley of the Connecticut River, rare elsewhere.
N. Y. Throughout but rare on L. I.; S. I. and the lower Hudson Valley.
N. J. Not common in and near the pine-barrens, increasing **northward**.
PA. Bucks, Montgomery, Berks, Philadelphia, Delaware and Chester counties.
5. **C. Canbyi** Sargent. Occasional in E. Pa. and Md.
PA. Philadelphia, Delaware and Chester counties.
6. **C. cuneiformis** (Marsh.) Eggleston (*C. pausiaca* Ashe). Western N. Y., Pa. and N. J. to S. W. Va., west to Central Ill.
N. J. Red Bank, Gloucester Co.
PA. Bucks, Delaware and Chester counties.

7. **C. punctata** Jacq. Que. to Pa., Minn., Iowa and Ky.
Throughout the range, except in the pine-barrens of N. J. and L. I., there rare or wanting, but locally unrecorded.
8. **C. succulenta** Schrader (*C. macracantha* of Britton's Manual).
N. S. to Minn., N. Car. and Neb., and in the Rocky Mts. to southern Col.
Throughout the range, except on L. I. and the coastal plain of N. J., most common on limestone.
9. **C. neofluvialis** Ashe. Western Vt. to E. Wisc. N. Car. and Iowa.
Known definitely in our range only from Montgomery, Bucks and Delaware counties, Pa.
10. **C. Calpodendron** (Ehrh.) Medic. (*C. tomentosa* of the manuals, not of L.). Central N. Y., northeastern N. J. and Pa. to Minn. and Mo., south in the mts. to northern Georgia.
N. J. Local from Mercer Co. northward,
Pa. Northampton, Bucks, and Montgomery counties.
11. **C. Brainerdi** Sargent. N. Eng. to N. E. Iowa, south to Pa.
CONN. Litchfield Co. and a single station in New London Co.
N. Y. Near Stamford, Delaware Co.
12. **C. chrysocarpa** Ashe. N. S. and N. B. to Sask., south to N. C. Mts. and in the Rocky Mts. to N. Mex.
CONN. Scattered over the state.
N. Y. Dutchess, Columbia, Delaware and Greene counties.
Pa. Reported from Pike, Monroe, Northampton and Bucks counties.
13. **C. intricata** Lange. Open rocky woods: N. Eng. and N. Y. to S. Car. and Mo.
CONN. Throughout.
N. Y. Bronx and Dutchess counties.
N. J. Bergen and Morris counties.
14. **C. Stonei** Sargent. Rocky places: Mass., Conn. and E. N. Y.
Known definitely only from near Southington, Conn.
15. **C. straminea** Beadle. Rocky hills: western Vt. to S. Mich., south through Conn. and Del. to N. Ala. and S. Mo.
Throughout our range, except on L. I. and S. I. and the coastal plain of N. J.

16. **C. Boyntoni** Beadle. Shaly soils: eastern Mass. to central Md., S. C. and central Tenn.
Known definitely only from Hartford Co., Conn., Dutchess Co., N. Y.; and Berks Co., Pa.
17. **C. roanensis** Ashe. Quebec to Wisc., N. C. and Tenn.
Known definitely in our range, only from Northampton and Bucks counties, Pa.
18. **C. macrosperma** Ashe. (*C. coccinea* of Ill. Flora, ed. 1). N. S. and Me. to SE. Minn., N. Car. and Tenn.
Common throughout the range, except on the coastal plain of N. J.
19. **C. Grayana** Eggleston. Montmorency Falls, west to Ottawa, Ontario, south to W. N. E. and NE. N. Y.
Known only from Wethersfield, Hartford Co. and East Lyme, New London Co., Conn.
20. **C. populnea** Ashe. Low grounds: S. Ont. to Pa. and Del.
Known only from Montgomery, Bucks, Delaware and Chester counties, Pa.
21. **C. Jesupi** Sargent. W. Vt. to S.W. Wisc., south to Pa.
Known only from near Sellersville, Bucks Co., Pa.
22. **C. rugosa** Ashe. S. W. N. E. and through Pa. to the Mts. of N. C.
Known only from Wethersfield, Hartford Co., Conn., Dutchess Co., N. Y. and Bucks Co., Pa.
23. **C. filipes** Ashe. W. N. E. to central Mich. and south to Pa.
Known definitely only from Berks and Chester counties, Pa.
24. **C. pruinosa** (Wendl.) K. Koch. Rocky open woods: W. N. E. to Mich., N. C. and Mo.
CONN. Scattered over the state.
N. Y. Bronx Co. northward.
N. J. Bergen and Morris counties.
PA. Bucks Co. northward.

25. *C. villipes* Ashe. Me. and Que. to cent. Mich., south in the mts. to N. Car.
 CONN. Rare in Fairfield and Litchfield Counties.
 N. Y. Near N. Y. City, increasing **northward** and common in the Catskills.
 PA. Bucks and Berks counties.
26. *C. Pringlei* Sargent. W. N. E., west to N. Ill., south to Pa.
 CONN. Cornwall and Lynne.
 N. Y. L. I.; Greene and Dutchess counties.
 PA. Bucks Co.
27. *C. coccinea* L. Conn. to Cent. Ill., Pa. and Del.
 CONN. Reported from the state.
 N. Y. Greene and Dutchess counties.
 PA. Reported from Pike, Northampton, Bucks, Delaware and Chester counties.
28. *C. albicans* Ashe. W. N. E. to S. Mich., south to Del. and in the mountains to northeastern Tenn.
 CONN. Known only from near East Lyme, New London Co. and Cornwall, Litchfield Co.
 N. Y. Dutchess Co., and near N. Y. City.
 PA. Berks, Chester and Delaware counties.
29. *C. Arnoldiana* Sargent. Rare: E. Mass. and Conn.
 Known only from near East Lyme, Conn.

Besides the above, more than 150 species have been credited to the area. As to the specific status of these or their distribution too little is known to warrant their inclusion here.

7. *Cotoneaster* Medic.

1. *C. Pyracantha* (L.) Spach. In thickets, escaped from cultivation: S. Pa., to Ala. and Tenn.
 Reported as an established escape at Doylestown, Bucks Co., and near Philadelphia, Pa.

AMYGDALACEAE

Flowers racemose, appearing after the leaves.

Flowers umbellate or corymbed, appearing before or with the leaves.

1. PADUS.

2. PRUNUS.

1. *Padus* Mill.

Leaves obovate or oval, sepals deciduous.

1. *P. nana*.

Leaves ovate-lanceolate or oval, sepals persistent.

2. *P. virginiana*.

1. **P. nana** (Du Roi) Roem. (*Padus virginiana* Roem.). Along river banks and in rocky situations: Newf. to Man., Br. Col., Ga., Neb., Tex. and Colo.

CONN. Rare near the coast, increasing **northward**.

N. Y. Occasional on L. I.; very rare and local on S. I., unknown in the Bronx, rare in Westchester Co., thence increasing and becoming very common **northward**.

N. J. Somerset, Hunterdon and Hudson counties, increasing **northward**.

PA. Throughout the area.

Tertiary, o: Cretaceous, rare or wanting, perhaps in Bucks Co., Pa.: Older Formations, increasing **northward**. 117-220 days. Sea level-4,020 ft.

2. **P. virginiana** Mill. (*Prunus serotina* Ehrh.). In woods and open places, S. Ont. to Fla., Dak., Kan. and Tex.

Common throughout the range, except in the pine-barrens, there rare or wanting.

2. *Prunus* [Tourn.] L.

Plums; fruit usually with a ventral groove and a flattened stone.

Drupe purple, with a bloom, less than 15 mm. thick.

Leaves glabrous when mature, ovate; tree.

1. *P. alleghaniensis*.

Leaves pubescent on the lower surface, when mature; shrubs.

Stone pointed at both ends; leaves acute.

2. *P. maritima*.

Stone pointed at base; leaves obtuse.

3. *P. Gravesii*.

Drupe red or orange, without a bloom, mostly more than 20 mm. thick.

Calyx lobes neither ciliate nor glandular.

4. *P. americana*.

Calyx lobes ciliate and often glandular.

5. *P. angustifolia*.

Cherries; fruit without a ventral groove; stone globose or subglobose.

Shrubs; flowers 6-12 mm. broad.

Leaves oblanceolate or spatulate.

6. *P. pumila*.

Leaves oval, or oblong.

7. *P. cuneata*.

Trees; flowers 15-30 mm. broad, slightly less in No. 12.

Flowers appearing with or before the leaves.

Introduced European trees; flowers not corymbose.

Leaves glabrous; pedicels short; fruit sour.

8. *P. Cerasus*.

Leaves pubescent, at least on the veins; pedicels long; fruit sweet.

9. *P. Avium*.

Native tree; flowers corymbose; leaves acute.

10. *P. pennsylvanica*.

Flowers appearing after the leaves.

11. *P. Mahaleb*.

1. ***P. alleghaniensis*** Porter. In woods: E. Conn., and eastern Pa. Rare in our range.
Known definitely in our area only from a few stations in southern Conn.
2. ***P. maritima*** Wang. On sea-beaches and in sandy soil near the coast: N. B. to Va.
Common throughout our sea beaches and along the shores of L. I. Sound and N. Y. Bay. Also on the coastal plain of N. J. and L. I.
3. ***P. Gravesii*** Small. On a gravelly ridge: Eastern Conn.
Known only from its original locality at Groton, Conn.
4. ***P. americana*** Marsh. (*P. americana mollis* T. & G.). In woods: N. Eng. to Mont., Fla. and Colo.
CONN. Rare over most of the state.
N. Y. Rare on L. I. and S. I. and up the Hudson Valley to the Highlands, not reported northward.
N. J. Unknown in the pine-barrens, rare in the region surrounding them, increasing **northward**.
PA. Luzerne, Northampton, Bucks, Delaware and Chester counties.
Tertiary, not on Beacon Hill, rare elsewhere: Cretaceous, scattered: Older Formations, increasing northward. 138-220 days. Sea level-1,800 ft.
5. ***P. angustifolia*** Marsh. In dry soil: N. J. to Fla., west to the Rocky Mts.
Known definitely only from Salem Co., N. J., a region on the Cretaceous sands and gravels, with a growing season of 179 days and about at sea-level; perhaps not native.
6. ***P. pumila*** L. On sandy or gravelly shores or in sandy woods: N. B. to Man., N. J. and Mich.
CONN. Rare and local in the northwestern part of the state.
N. Y. Unknown on L. I. or S. I., rare in Westchester Co., thence increasing and common **northward**.

N. J. Sussex, Warren and Hunterdon counties along the Delaware, increasing **northward**.

PA. Pike, Northampton and Bucks Co.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 117-189 days. Sea level-4,020 ft.

7. **P. cuneata** Raf. In wet soil or among rocks: N. H. to Minn., N. Car. and Wisc.

CONN. Rare near the coast, increasing **northwestward**.

N. Y. From the Highlands of the Hudson **northward**, not common.

N. J. Sussex, Morris, Passaic and Warren counties.

PA. Monroe, Northampton and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward** especially on limestone. 127-220 days. Sea level-2,100 ft.

8. **P. Cerasus** L. In woods, escaped from cultivation: N. H. and Mass. to N. Y. and Pa. Native of Europe and Asia.

Common as an established escape in our area.

9. **P. Avium** L. In thickets and woodlands, escaped from cultivation: Ont. to Mass. and Va. Native of Europe and Asia.

Occasional as an established escape in most parts of our range.

10. **P. pennsylvanica** L. f. In rocky woods: Newf. to Ga., west to the Rockies.

CONN. Throughout the state, more common **northward** than elsewhere.

N. Y. At Hewlett and north of the moraine on L. I.; rare on S. I., thence increasing up the Hudson Valley and becoming very common **northward**.

N. J. Throughout the region north of the coastal plain.

PA. Throughout the range, except in Chester and Delaware counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 117-189 days. Sea level-4,020 ft.

11. **P. Mahaleb** L. Roadsides and waste places: Conn. to Ont., N. J., E. Pa. and Kansas. Native of Europe.

Occasional as an escape from cultivation.

The following are sometimes to be found as adventives: *Prunus institi* L., *P. domestica* L. and *P. nigra* Ait. None are common.

The peach *Amygdalus persica* L., is an escape in many parts of our range.

CAESALPINIACEAE

Leaves unifoliolate; shrub with flowers appearing before the leaves. 1. **CERCIS**.
 Leaves pinnate; trees or herbs with flowers appearing after the leaves.

Herbs; flowers perfect; corolla nearly regular.

Pods elastically dehiscent; leaves sensitive to shock. 2. **CHAMAECRISTA**.

Pods not elastically dehiscent; leaves not sensitive. 3. **CASSIA**.

Trees; flowers polygamous. 4. **GLEDITSIA**.

1. **Cercis** L.

1. **C. canadensis** L. In rich soil: S. Ont. to Minn., Neb., N. J., Fla. and Tex.

CONN. Doubtfully as a wild plant in the state; commonly cultivated and sometimes escaping.

N. Y. Unknown as a wild plant in our area; frequently escaping.

N. J. Rare as an escaped plant in the north, wild only in the drainage of the Delaware from Hunterdon Co. southward.

PA. Delaware and Chester counties.

Tertiary, 0: Cretaceous, not very common near old glacial terraces:* Older Formations, confined to the Pa. localities as a wild plant. Not north of the moraine. 168-204 days. About sea level.

2. **Chamaecrista** Moench

Flowers 4-8 mm. broad, short pedicelled; anthers 5.

1. *C. nictitans*.

Flowers 2.5-4 cm. broad; anthers 10.

2. *C. fasciculata*.

1. **C. nictitans** Moench. (*Cassia nictitans* L.). In dry soil: Me. to Ga., Ind., Kan. and Tex.

Common nearly throughout our area except in the pine-barrens of N. J.; more common near the coast and less common inland, than elsewhere.

2. **C. fasciculata** (Michx.) Greene. (*Cassia Chamaecrista* L.).

In dry soil: Mass. to Minn., Fla., Miss. and Tex.

The distribution of the preceding, but not definitely known north of Westchester Co., N. Y.

3. **Cassia** [Tourn.] L.

1. **C. marylandica** L. In swamps and wet soil: N. E. to Fla., Mich., Neb. and La.

CONN. Not very common over most of the state.

N. Y. Rare on L. I. and S. I., decreasing up the Hudson Valley to Dutchess Co., unknown northward.

* See Introduction paragraph 34.

N. J. Throughout the state except in the pine-barrens, increasing southward.

PA. Northampton, Bucks, Lehigh, Delaware and Chester counties.

Cassia Tora L. has been collected as an adventive in Delaware Co., Pa. and near the City of New York.

4. **Gleditsia** L.

1. **G. triacanthos** L. In woods: W. N. Y. and Ont. to S. Dak., Ga., Kan. and Tex. Naturalized and extensively planted further east.

Doubtfully wild in any part of our area; all the numerous trees in the area are probably derivatives of cultivated specimens.

FABACEAE

The 10 stamens distinct.

The stamens monadelphous or diadelphous.

Leaves not tendril-bearing.

Pod not a loment, 2 valved or indehiscent.

Foliage not glandular dotted.

Stamens monadelphous, anthers of 2 kinds.

Herbs, with simple or 5-11 foliolate leaves.

Leaves simple; pod inflated.

Leaves 5-11 foliolate; pod flattened.

Shrubs with 1-3 foliolate leaves.

Stamens diadelphous; anthers all alike.

Leaves 3-foliolate, rarely unifoliolate.

Leaflets denticulate.

Flowers racemose.

Flowers spicate, umbelled or capitate.

Pods curved or coiled.

Pods straight.

Leaflets entire.

Leaves pinnately several-foliolate.

Herbs; leaves odd-pinnate.

Standard very broad.

Standard narrow.

Trees or shrubs.

Foliage glandular dotted.

Pod a loment; herbs.

Leaves odd-pinnate.

Flowers purplish.

Flowers yellow.

Leaves 3-foliolate, the terminal leaflet stalked.

Flowers yellow.

Flowers purple, blue or white.

Pod of several joints; leaflets stipellate.

Pod of 1 or 2 joints; leaflets not stipellate.

1. BAPTISIA.

2. CROTALARIA.

3. LUPINUS.

4. CYTISUS.

5. MELILOTUS.

6. MEDICAGO.

7. TRIFOLIUM.

8. LOTUS.

9. CRACCA.

10. ASTRAGALUS.

11. ROBINIA.

12. AMORPHA.

13. CORONILLA.

14. AESCHYNOMENE.

15. STYLOSANTHES.

16. MEIBOMIA.

17. LESPEDEZA.

Leaves tendril-bearing or if not, odd pinnate.

Leaves tendril-bearing, even pinnate.

Style slender, with a tuft of hairs at the summit. 18. *VICIA*.

Style flattened, bearded along the inner side. 19. *LATHYRUS*.

Leaves not tendril-bearing, odd-pinnate; herbaceous vines.

Style bearded along the inner side.

Rachis not thickened at the insertion of the flowers.

20. *CLITORIA*.

Rachis thickened at the insertion of the flowers.

Flowers purple, capitate.

21. *STROPHOSTYLES*.

Flowers racemose.

22. *PHASEOLUS*.

Style glabrous or slightly pubescent below.

Standard spurred at the base, flowers violet.

23. *BRADBURYA*.

Standard not spurred.

Leaves odd-pinnate; leaflets 5-7.

24. *GLYCINE*.

Leaves 3-foliolate, rarely 1-foliolate.

Calyx short, bracteolate.

25. *GALACTIA*.

Calyx tubular, not bracteolate.

26. *FALCATA*.

1. *Baptisia* Vent.

1. *B. tinctoria* (L.) R. Br. In dry soil: Me. to S. Ont., Minn., Fla. and La.

Common throughout the coastal part of the range, always decreasing inland, but locally common in sandy places northward.

2. *Crotolaria* L.

1. *C. sagittalis* L. In dry open places: northern N. Eng. to Fla., S. Dak., Ark. and Mex.

Throughout the range, local northward.

3. *Lupinus* [Tourn.] L.

1. *L. perennis* L. In dry sandy soil: Me. and Ont. to Minn., Fla., Mo. and La.

Throughout the range in edaphically favorable places, local northward, common on the coastal plain.*

4. *Cytisus* [Tourn.] L.

1. *C. scoparius* (L.) Link. In waste places: N. S. to Va. Naturalized from Europe.

Rather rare as a naturalized plant.

* See Introduction paragraph 50.

5. **Melilotus** [Tourn.] Mill.

Flowers white.

Flowers yellow.

Pod reticulate or alveolate, 2 mm. long.

Pods glabrous or pubescent, 3-5 mm. long.

Pods glabrous; leaves closely serrate.

Pods pubescent; leaves remotely toothed.

1. *M. alba*.2. *M. indica*.3. *M. officinalis*.4. *M. altissima*.

1. **M. alba** Desv. In waste places: E. N. Am. Naturalized from Europe.

Common as a weed nearly throughout our area.

2. **M. indica** (L.) All. In waste ground: eastern seaports. Naturalized from Asia and Europe.

Not very common as a weed.

3. **M. officinalis** (L.) Lam. In waste places: E. N. Am. Naturalized from Europe.

Common throughout our area, but not so common as *M. alba*.

4. **M. altissima** Thuill. In ballast: Atlantic seaports. Adventive from Europe.

Rare as a weed near the larger cities.

M. occidentalis Nutt. has been collected as a waif near New York.

6. **Medicago** [Tourn.] L.

Perennial; flowers violet, conspicuous.

Annual; flowers bright yellow, small.

Pod 1 seeded, curved, not spiny.

Pod several seeded, spiny on the edge, spirally twisted.

Pod loosely coiled.

Pod closely coiled.

1. *M. sativa*.2. *M. lupulina*.3. *M. denticulata*.4. *M. arabica*.

1. **M. sativa** L. In fields and waste places: N. Eng. and Ont. to Minn., Va. and Kan. Introduced from Europe.

Frequent in fields and waste places in most parts of our area.

2. **M. lupulina** L. In waste places and fields: E. N. Am. Native of Europe and Asia.

Common everywhere as a weed.

3. **M. denticulata** Willd. In waste places and in ballast: N. S. to Pa. Fugitive from Europe.

Rare as a more or less fugitive weed near the larger cities.

4. **M. arabica** All. In waste places and ballast: N. B. to Pa. Adventive from Europe.

Very rare as a fugitive weed near Brooklyn, N. Y., and perhaps elsewhere.

M. muricata All., *M. minima* L., and *M. pubescens* DC. have been collected as waifs near the larger cities.

7. *Trifolium* [Tourn.] L.

Flowers yellow.

Head 12-18 mm. long; stipules linear; leaflets all sessile.

1. *T. agrarium*.

Head 8-12 mm. in diameter, nearly globose; terminal leaflet stalked.

Heads 20-40-flowered.

2. *T. procumbens*.

Heads 3-20-flowered.

3. *T. dubium*.

Flowers red, purple, pink or white.

Inflorescence longer than thick.

Corolla crimson, equalling or exceeding the calyx teeth.

4. *T. incarnatum*.

Corolla whitish, shorter than the calyx teeth.

5. *T. arvense*.

Inflorescence not longer than thick; globose, ovoid or oval.

Flowers sessile or nearly so; heads dense.

6. *T. pratense*.

Flowers pedicelled; heads umbel like, loose.

Heads 2.5 cm. in diameter or more; pubescent.

7. *T. reflexum*.

Heads 12-18 mm. in diameter.

Ascending or procumbent; flowers pink, pinkish or purple.

Ascending; calyx shorter than the corolla.

8. *T. hybridum*.

Procumbent; calyx nearly equalling the corolla.

9. *T. carolinianum*.

Creeping; flowers white or pinkish.

10. *T. repens*.

1. ***T. agrarium*** L. (*T. aureum* Poll.). Along roadsides and in waste places: U. S. to Va., Ont. and Iowa. Naturalized from Europe.

Common as a weed throughout our area.

2. ***T. procumbens*** L. In fields and along roadsides: E. N. Am. Naturalized from Europe.

Throughout the range, not very common.

3. ***T. dubium*** Sibth. In fields and waste places: N. Eng., N. J. and in the Southern States. Naturalized from Europe.

Rare as a weed.

4. ***T. incarnatum*** L. In fields and waste places and on ballast: Me. to N. Y., N. J. and Pa. Naturalized from Europe.

Not common near the larger cities as a weed.

5. ***T. arvense*** L. In fields and waste places: Throughout E. N. Am. Naturalized from Europe.

Common everywhere, especially in fields.

6. **T. pratense** L. In fields and meadows: throughout E. N. Am. Naturalized from Europe.
Common throughout the area.
7. **T. reflexum** L. In meadows: Ont., western N. Y. and Pa. to Iowa, Neb., Fla. and Tex.
Recorded from Montgomery Co., Pa. and Trenton, N. J., otherwise unknown in the range; probably adventive from the west.
8. **T. hybridum** L. In meadows and waste places: N. S. to Idaho, Ga. and Kan. Naturalized from Europe.
Common in most parts of our range as a weed, often locally wanting.
9. **T. carolinianum** Michx. In waste places near Philadelphia and further southward.
Known definitely only on ballast near Philadelphia; not recently collected.
10. **T. repens** L. In fields and waste places: throughout N. Am. Also in Europe and Asia.
Common throughout our range as a weed.

The reported occurrence of *T. medium* L. in the range, cannot be verified. *T. maritimum* Huds. has been reported from near Bethlehem, Pa. *T. scabrum* L., *T. striatum* L. and *T. tomentosum* L. have been recorded as waifs.

8. **Lotus** [Tourn.] L.

- i. **L. corniculatus** L. In waste places and on ballast: N. B. and about the eastern seaports.
Not very common as an adventive.
L. americanus (Nutt.) Bischoff. has been reported as an established plant at Bridgeport, Conn.

9. **Cracca** L.

- i. **C. virginiana** L. In dry sandy soil, Me. to Minn., Fla., La. and Mex.
CONN. Rare and local, decreasing inland.
N. Y. Common on L. I. and S. I., unknown in the Bronx, decreasing up the Hudson Valley to Dutchess Co.; not known from the Catskills.
N. J. Rare and local in sandy or rocky places in Sussex, Morris, Warren, Passaic and Hunterdon counties, thence increasing and common southward.

PA. Pike, Northampton, Bucks, Delaware and Chester counties.

Tertiary, common; Cretaceous, less common; Older Formations, scattered in edaphically favorable places*. 138-224 days. Sea level-1,080 ft.

10. *Astragalus* [Tourn.] L.

1. *A. carolinianus* L. Along streams; Que. to Man., N. J., B. C., Kan., Colo. and Nev.
N. J. Near Andover, Sussex Co.
Reported, but not definitely known from Westchester Co., N. Y.

11. *Robinia* L.

Twigs, petioles and pods glabrous; flowers white.

1. *R. Pseudacacia*.

Twigs and petioles glandular; pods hispid, flowers pink.

2. *R. viscosa*.

Twigs and petioles bristly; pods hispid; flowers pink or purple; a shrub.

3. *R. hispida*.

1. *R. Pseudacacia* L. In woods: Pa. to Ga. and Iowa. Extensively naturalized in Eastern N. Am.
Doubtfully indigenous in any part of our area, common as an escape from cultivation.
2. *R. viscosa* Vent. In woods: Va. to Ga., sometimes escaping in Eastern N. Am.
Not uncommon as an escape in most parts of our range.
3. *R. hispida* L. Often cultivated, and sometimes escaping. Native from Va. to Ga. and Tenn.
Locally common as an escape.

12. *Amorpha* L.

1. *A. fruticosa* L. Along streams: Ohio to Minn., also escaped from cultivation in eastern U. S.
Not very common as an established escape.

13. *Coronilla* [Tourn.] L.

1. *C. varia* L. Roadsides and waste places: Mass. to N. Y. and N. J. Adventive from Europe.
Uncommon as a roadside weed throughout the area except in Pa., there only reported from Chester Co.

C. Emerus L. has been found as a waif near N. Y.

* See Introduction paragraph 50.

14. *Aeschynomene* L.

1. *A. virginica* (L.) B. S. P. River banks: Pa. and N. J. to Fla., west to La.

Confined to the region in the Delaware River Valley from Camden and Philadelphia southward.

15. *Stylosanthes* Sw.

1. *S. biflora* (L.) B. S. P. In dry soil: N. Y. to Fla., Ind., Kan. and La.

N. Y. Occasional south of the moraine on eastern L. I., rare north of it; occasional on S. I., rare at Inwood, N. Y. City, otherwise unknown.

N. J. Rare in Warren, Hunterdon, and Essex counties, increasing and common **southward**.

PA. Monroe and Northampton counties, increasing and becoming common **southward**.

16. *Meibomia* Heist.

Loment not constricted above, deeply constricted below, long stalked; leaflets broad.

Panicle arising from the base of the plant; peduncle usually leafless.

Panicle terminal.

Leaves crowded at its base.

Leaves scattered along the stem.

Loment constricted on both margins, more deeply above than below.

Stems trailing or reclining.

Leaflets orbicular or nearly so.

Leaflets ovate or oval.

Corolla whitish; leaves yellowish-green.

Corolla purple; leaves dull green.

Stems erect or ascending.

Leaves sessile or nearly so; leaflets linear or lanceolate.

Leaves petioled.

Leaflets narrowly linear; joints of the loment usually concave on the back.

Leaflets broad.

Joints of the loment notably longer than broad.

Leaflets obtuse, rough-pubescent.

Leaflets long-acuminate, glabrous.

Joints of the loment little longer than broad.

Loment distinctly long stalked in the calyx.

Plants glabrous.

Leaflets lanceolate or oblong.

Leaflets broadly ovate or oval.

1. *M. nudiflora*.
2. *M. grandiflora*.
3. *M. pauciflora*.
4. *M. Michauxii*.
5. *M. ochroleuca*.
6. *M. glabella*.
7. *M. sessilifolia*.
8. *M. stricta*.
9. *M. canescens*.
10. *M. bracteosa*.
11. *M. paniculata*.
12. *M. laevigata*.

Plants pubescent or scabrous.

Leaflets thick, coriaceous, velvety
pubescent beneath.

13. *M. viridiflora*.

Leaflets scarcely coriaceous, ap-
pressed pubescent or villous
beneath.

14. *M. Dillenii*.

Loment sessile in the calyx or nearly so.

Loment joints 4-7; flowers numerous,
showy.

15. *M. canadensis*.

Loment joints 1-3.

Leaflets scabrous 2-5 cm. long.

16. *M. rigida*.

Leaflets not scabrous 1-2 cm. long.

Plant nearly glabrous
throughout.

17. *M. marylandica*.

Stem pubescent, leaflets and
petioles ciliate.

18. *M. obtusa*.

1. *M. nudiflora* (L.) Kuntze. In dry woods: Que. to Minn., Fla. and La.

Throughout the area except in the pine-barrens of N. J., there wanting.

2. *M. grandiflora* (Walt.) Kuntze. In dry rocky woods: Que. to S. Dak., Fla., Neb. and Ind. Terr.

CONN. Throughout the state, not very common.

N. Y. Exclusively north of the moraine on L. I.; unknown on S. I., thence scattered up the Hudson Valley to the Highlands; thence increasing **northward**.

N. J. Gloucester, Ocean and Monmouth counties, north and west of the pine-barrens, increasing northward.

PA. Northampton, Bucks, Montgomery, Delaware, Philadelphia and Chester counties.

Tertiary, o: Cretaceous, a single station in Monmouth Co., N. J. and perhaps in Bucks Co., Pa.: Older Formations, increasing **northward**. 138-220 days. Sea level-1,900 ft.

3. *M. pauciflora* (Nutt.) Kuntze. In woods: Ont. to western N. Y., southern Pa. and N. J. to Fla., Ohio, Ark. and La.

N. J. New Egypt, Ocean Co.

PA. Chester Co.

4. *M. Michauxii* Vail. Dry woods: Me. (?) and Ont. to Minn., Fla. and La.

CONN. Throughout the state, decreasing northward.

N. Y. Uncommon on L. I. and S. I., decreasing northward to the Highlands of the Hudson, unknown elsewhere.

N. J. Frequent throughout the state.

PA. Northampton, Bucks, Philadelphia, Delaware and Chester counties.

A rare and very local species about whose distribution little is known.

5. **M. ochroleuca** (M. A. Curtis) Kuntze. In woodlands: N. J. and Pa. to Ga. and Mo.

Known only from Salem Co., N. J. and Northampton Co., Pa. and with distributional features not easy of explanation.

6. **M. glabella** (Michx.) Kuntze. In dry sandy woods: E. Mass. to N. Y., Pa. and S. Car. Very rare.

CONN. Known definitely only from Waterford.

N. Y. Known only from near Yonkers on the Hudson.

N. J. Hunterdon and Morris counties, rare; not collected since 1887.

PA. Bucks Co.

Distributional features unknown.

7. **M. sessilifolia** (Torr.) Kuntze. In dry soil: Mass., R. I. and Conn. to Mich., Ky., Ark. and Tex.

CONN. Rare and local in New London Co., near the drainage area of the Thames.

N. J. Known only from Hammonton, Atlantic Co.

A very rare and local species whose distribution is little known.

8. **M. stricta** (Pursh) Kuntze. Pine-barrens: N. J. to Fla., west to La.

N. J. Frequent in the pine-barrens, decreasing in the area surrounding them, unknown elsewhere.

Tertiary, common on Beacon Hill, decreasing elsewhere: Cretaceous, scattered: Older Formations, o: Not north of the moraine. 170-220 days. About sea level.

9. **M. canescens** (L.) Kuntze. In rich soil: Ont. to Mass., Fla., Minn. and Tex.

CONN. Common along the coast, decreasing inland, except in the Connecticut River Valley.

N. Y. Throughout the area, decreasing northward.

N. J. Throughout the state, except in the pine-barrens, there wanting; common in the valley of the Delaware.

PA. Northampton, Montgomery, Philadelphia, Bucks, Delaware and Chester counties.

Tertiary, not on Beacon Hill, scattered elsewhere: Cretaceous, common: Older Formations, scattered. Predominating south of the moraine. 170-224 days. Sea level-1,750 ft.

10. **M. bracteosa** (Michx.) Kuntze. In thickets: Me. to Ont., Fla., Mo. and Tex.
 CONN. Not uncommon in Fairfield Co. and along the coast and up the Connecticut Valley, rare or wanting elsewhere.
 N. Y. On L. I. and S. I., unknown in the Bronx, decreasing up the Hudson Valley to Dutchess Co. Not known from the Catskills.
 N. J. Rare in Gloucester Co. near the Delaware, thence wanting northward to Middlesex Co., thence increasing but not common northward.
 PA. Monroe, Northampton, Montgomery, Bucks, Philadelphia, Delaware and Chester counties.
 Tertiary, 0: Cretaceous, very rare: Older Formations, not very common. 138-220 days. Sea level-2,100 ft.
11. **M. paniculata** (L.) Kuntze. In dry soil: Ont. to Minn., Mass., Fla. and Tex.
 Common throughout the range, except in the pine-barrens of N. J., there rare or wanting; not abundant on the coastal plain of L. I.
12. **M. laevigata** (Nutt.) Kuntze. In dry woods: S. N. Y. to Fla., Mo. and Tex.
 N. Y. Common on L. I., particularly eastward and south of the moraine, and on S. I.; formerly local in the Bronx Valley.
 N. J. Very rare in the pine-barrens at Winslow Junction; increasing in the region surrounding the pine-barrens; reported from Morris Co.; scattered in Mercer and Hudson counties north of the coastal plain.
 PA. Known only from Northampton (?), Montgomery, Philadelphia and Delaware counties.
 Tertiary, very rare on Beacon Hill, increasing elsewhere, but nowhere common: Cretaceous, more common: Older Formations, rare and scattered exclusively south of the moraine, except for a few records on L. I. 189-220 days. About sea level.
13. **M. viridiflora** (L.) Kuntze. In dry woods: E. Pa. and S. N. Y. to Fla., Mich., Mo. and Tex.
 N. Y. Reported but not definitely known from L. I., rare on S. I. and at Woodlawn, N. Y. City; formerly at Inwood; unknown elsewhere.

N. J. Rare in the pine-barrens at Winslow Junction and at Landisville, common in the region north and west of the barrens; Morris and Hunterdon counties.

PA. Northampton, Bucks, Philadelphia, Delaware and Chester counties.

Tertiary, rare on Beacon Hill, increasing elsewhere: Cretaceous, common: Older Formations, scattered and rare. 189-220 days. About sea level.

14. **M. Dillenii** (Darl.) Kuntze. Woods: Me. and Ont. to Minn., Va., Ky., Mo. and Tex.

Throughout the range except in the pine-barrens, there rare and local and probably introduced.

15. **M. canadensis** (L.) Kuntze. Thickets and river banks: N. B. to Man., N. Car., Mo. and Ind. Terr.

Throughout the range, except in the pine-barrens, there rare and local and probably introduced, always increasing **northward**.

16. **M. rigida** (L.) Kuntze. In dry soil: N. H. to Fla., Mich., Kan. and La.

Throughout the range, more common southward and less common northward than elsewhere.

17. **M. marylandica** (L.) Kuntze. In dry soil: Ont. to Mass., Fla., Mich. and La.

Throughout the range, but nowhere common, decreasing northward.

18. **M. obtusa** (Muhl.) Vail. Dry soil: Ont. to Mass., Fla., Mich. and Tex.

Common throughout the range, but rare or perhaps wanting from the Catskills and the mountains of Pa.

17. *Lespedeza* Michx.

1. Perennial; native species; stipules and calyx-lobes narrow.

Flowers of 2 kinds, the larger perfect but seldom fruitful, the smaller, usually apetalous, pistillate and fertile.

Petaliferous flowers 1-6.

Stems soft downy, with short spreading hairs.

1. *L. procumbens*.

Stems glabrate or sparingly pubescent.

Stems prostrate or trailing; stipules 2-4 cm. long.

2. *L. repens*.

Stems upright; stipules 5-8 mm. long.

3. *L. violacea*.

Petaliferous flowers few-many.

Many of the peduncles elongate and exceeding their subtending leaves.

Leaves densely velvety beneath.

4. *L. Brittonii*.

- Leaves appressed pubescent or sparingly villous beneath. 5. *L. Nuttallii*.
- Few, if any, of the peduncles exceeding the leaves.
- Calyx of petaliferous flowers 3-5 mm. long.
- Leaflets densely woolly beneath. 6. *L. Stuevei*.
- Leaflets glabrate or appressed pubescent beneath.
- Leaflets linear to linear-oblong. 7. *L. virginica*.
- Leaflets oval to oval-oblong. 8. *L. frutescens*.
- Calyx of petaliferous flowers 6-8 mm. long. 9. *L. simulata*.
- Flowers all alike and perfect.
- Peduncles shorter than the dense globose heads.
- Stem loosely pubescent; calyx 8-12 mm. long. 10. *L. capitata*.
- Stem appressed pubescent; calyx 5-7 mm. long. 11. *L. angustifolia*.
- Peduncles chiefly longer than the subcylindric heads.
- Stem with appressed pubescence. 11. *L. angustifolia*.
- Stem with long, spreading or loosely spreading hairs.
- Leaflets oval to sub-orbicular. 12. *L. hirta*.
- Leaflets narrowly oblong. 13. *L. oblongifolia*.
2. Annual; naturalized species; stipules and calyx-lobes broad. 14. *L. striata*.

1. ***L. procumbens*** Michx. In dry soil: N. H. to Fla., the Ind. Terr. and La.

CONN. Throughout, but not very common.

N. Y. Common on L. I. and S. I., decreasing up the Hudson Valley to Dutchess and Ulster counties, but not reported from the Catskills.

N. J. Wanting in the pine-barrens, exceedingly rare in the region surrounding the barrens, becoming common in Mercer and Middlesex counties, thence increasing **northward**.

PA. Monroe, Northampton, Bucks, Philadelphia, Delaware and Chester counties.

Tertiary, unknown on Beacon Hill, very rare in the rest of the area; Cretaceous, rare and scattered: Older Formations, not very common. 138-224 days. Sea level-1,000 ft.

2. ***L. repens*** (L.) Bart. In dry or sandy soil: Conn. to Fla., Minn., Kan. and Tex.

CONN. Reported from near New Haven, otherwise unknown.

N. Y. Common south of the moraine on L. I. and on S. I., local north of the moraine at Jamaica, L. I., and in the Bronx.

N. J. Throughout the state, except the pine-barrens, there rare.

PA. Northampton, Bucks, Philadelphia and Delaware counties.

Tertiary, common, but less common on Beacon Hill than elsewhere; Cretaceous, common: Older Formations, scattered. 180-224 days. About sea level.

3. *L. violacea* (L.) Pers. In dry soil: N. Eng. to Fla., Miss., Kan. and La. and northern Mex.
 CONN. Throughout the state except New London Co.
 N. Y. Rare on L. I. and S. I., increasing northward up the Hudson Valley to Dutchess and Ulster counties, but not reported from the higher peaks of the Catskills.
 N. J. North of the coastal plain.
 PA. Northampton, Montgomery, Bucks and Delaware counties.
 Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 138-220 days. Sea level-1,300 ft.
4. *L. Brittonii* Bicknell. In dry soil: Mass. to N. J. and Md.
 Known only from its type locality, Bronxville, N. Y., from the coastal-plain of L. I. and from Quaker Bridge, N. J.
5. *L. Nuttallii* Darl. Dry soil: S. N. Eng. and N. Y. to Fla., Mich. and Kans.
 CONN. Rare and local in the southern part of the state.
 N. Y. Frequent on L. I., not reported from S. I.; common in the Bronx; increasing up the Hudson Valley to the Highlands but not reported north of them.
 N. J. Hunterdon, Mercer and Middlesex counties, rare; thence increasing southward, but not in the pine-barrens.
 PA. Northampton, Montgomery, Bucks, Delaware and Chester counties.
 Tertiary, not on Beacon Hill, rare elsewhere: Cretaceous, common: Older Formations, scattered. 158-224 days. Sea level-1,100 ft.
6. *L. Stuvei* Nutt. Dry soil: Vt. to Va., Mich. and the Ind. Terr.
 CONN. Not uncommon along the coast, decreasing inland and wanting in the north.
 N. Y. On L. I., not reported from but probably to be found on S. I., thence decreasing northward to Westchester Co.
 N. J. Rare in Bergen, Hunterdon, Mercer and Middlesex counties. thence increasing **southward**, but less common in the pine-barrens than elsewhere.
 PA. Near Philadelphia.
 Tertiary, more rare on Beacon Hill than elsewhere: Cretaceous, common: Older Formations, scattered. 168-220 days. Sea level-900 ft.

L. neglecta (Britton) Meck & Bush, of southern N. I., may be a hybrid between this species and *L. virginica*.

7. *L. virginica* (L.) Britton. In dry soil: Mass. to Fla., Ont., Minn., Tex. and Kans.
Throughout the range except in the pine-barrens, there rare and local and perhaps adventive.
8. *L. frutescens* (L.) Britton. In dry soil: Me. to Ont., Mich., Fla., Ill. and Tex.
Common throughout the range, more so in the pine-barrens than elsewhere.
9. *L. simulata* Mackenzie & Bush. In dry soil: Conn. and Pa. to Mo. and Ind. Terr.
Known in our area only from Groton and Southington, Conn., and from Haworth, Bergen Co., N. J.
10. *L. capitata* Michx. (*L. velutina* Bicknell.). In dry fields: Ont. and Me. to Fla., S. Dak., Kan. and La.
Common throughout the area.
11. *L. angustifolia* (Pursh) Ell. In dry sandy soil: E. Mass. to Fla., Mich. and La.
N. Y. Known only from the Hempstead Plains, Nassau Co., L. I.
N. J. Common in the pine-barrens, less so in the region surrounding them, unknown elsewhere.
PA. Known only from Delaware County.
A plant mostly localized in and near the pine-barrens in our area but of wide distribution outside the range.
12. *L. hirta* (L.) Ell. Dry soil: Me. and Ont. to Fla., Ill., Minn. and La.
Common throughout the area.
13. *L. oblongifolia* (Britton) Stone. Sandy soil: Conn.; N. J. and southward.
CONN. Reported from Glastonbury.
N. J. Rare in the pine-barrens.
14. *L. striata* (Thunb.) Hook & Arn. Fields: N. J. to Mo., Fla. and Tex. Naturalized from eastern Asia.
N. J. South Amboy and Wildwood.
PA. Delaware and Chester counties.

18. *Vicia* [Tourn.] L.

Flowers racemose or spicate; peduncles elongate.

Indigenous perennials.

Spike-like raceme 1-sided, 15-40 flowered.

1. *V. Cracca*.

Racemes loose flowered, 1-20 flowered.

Flowers 1.5-2 cm. long.

Flowers 4-10 mm. long.

Introduced annuals.

Pods glabrous, 3-6-seeded.

Pods pubescent, 2-seeded.

Flowers sessile or nearly so, few, axillary.

Leaflets oblong, oval or obovate.

Leaflets, except those of the lower leaves, linear-oblong.

2. *V. americana*.

3. *V. caroliniana*.

4. *V. tetrasperma*.

5. *V. hirsuta*.

6. *V. sativa*.

7. *V. angustifolia*.

1. **V. Cracca** L. In dry soil: Newf. to B. Col., N. J., Ky. and Kan. Also in Europe and Asia.

Rather common as a weed throughout the range, except the coastal plain of N. J.

2. **V. americana** Muhl. In moist ground: N. B. to Man., Br. Col., Va., Ky. and Nev. Rare.

Apparently confined in our area to the drainage of the Delaware and Lehigh rivers, in Warren, Hunterdon, and Mercer counties in N. J. and Northampton, Monroe, Lehigh, Bucks and Chester counties in Pa., otherwise unknown.

3. **V. caroliniana** Walt. Banks and cliffs: Ont. to Minn., Ga., Ky., and Kans.

Apparently confined to the limestone areas in Warren, Sussex and Hunterdon counties in N. J. and to Northampton and Bucks counties in Pa., otherwise unknown.

4. **V. tetrasperma** (L.) Moench. In meadows and waste places: N. S. and Ont. to Va. Naturalized from Europe.

Not uncommon as a weed near the larger cities and towns.

5. **V. hirsuta** (L.) Koch. In waste places: N. B. to Ohio and Va. and Alberta. Naturalized from Europe.

Frequent locally as a weed, in most parts of our range.

6. **V. sativa** L. In fields and waste places: throughout E. N. Am. Adventive from Europe.

Common locally as a weed.

7. **V. angustifolia** Roth. In fields and waste places: N. S. to Fla. Naturalized from Europe.

Occasional as a weed.

Among the waifs, from time to time collected on ballast and in waste places, are: *V. Sepium* L., *V. villosa* Roth., *V. narbonensis* L. and *V. Faba* L. It is doubtful if any are thoroughly established.

19. **Lathyrus** L.

Leaflets 1 pair; stipules foliaceous; stems winged.

1. *L. pratensis*.

Leaflets 3-7 pairs.

Flowers purple.

Stipules foliaceous; maritime.

2. *L. maritimus*.

Stipules half-sagittate or small; inland species (except *L. palustris* which usually inhabits salt marshes).

Leaflets ovate or oval, large; flowers 10-20.

3. *L. venosus*.

Leaflets linear, oblong or oval; flowers 2-6.

Leaflets linear, or linear oblong; stem winged.

4. *L. palustris*.

Leaflets oblong or oval; stem wingless.

5. *L. myrtifolius*.

Flowers yellowish-white.

6. *L. ochroleucus*.

1. **L. pratensis** L. In waste places: Me., N. H., Mass., Conn. and Ont. Naturalized from Europe.
Rare as a weed in N. Y. and Conn.
2. **L. maritimus** (L.) Bigelow. On sea beaches: Arctic Am. to N. J., the Great Lakes, and on the Pacific coast. Also in Europe and Asia.
Very common along all the sea beaches and along N. Y. Bay and L. I. Sound; decreasing in southern N. J. and not known south of Atlantic Co.
3. **L. venosus** Muhl. River shores and banks: N. J. and Pa. to Ind., Ga., La. and Kan.
Known only from the drainage of the Delaware and Lehigh Rivers in Hunterdon and Warren counties, N. J. and Lehigh and Northampton counties, Pa.
4. **L. palustris** L. In moist or wet places: Lab. to Alask., Mass., N. Y., S. Dak. and B. Col. Also in Europe and Asia.
Apparently confined to the salt marshes on S. I. and L. I. and coastal Conn., especially as to the form *linearifolius*.
5. **L. myrtifolius** Muhl. In moist or wet grounds: N. B. to Man., N. Car. and Tenn.
N. Y. Common on L. I. and S. I. and up the Hudson Valley to West Point, unknown northward.
N. J. From Bergen, Sussex, Union, Middlesex and Mercer counties, southward along the Delaware to Gloucester Co.; not in the pine-barrens.
PA. Monroe, Luzerne, Northampton, Lehigh, Berks and Delaware counties.
Tertiary, 0: Cretaceous, scattered: Older Formations, increasing northward. 149-204 days. Sea level-1,200 ft.

6. **L. ochroleucus** Hook. (*L. glaucifolius* Beck.). On river banks and hillsides: N. J. to Que. and Arctic Am., Iowa, Wyo. and B. Col. Very rare in our area.

Known only from an old collection from New Brunswick, N. J.

Lathyrus latifolius L. has been collected in Conn. as a waif, and *L. aphaca* L. has been found as a waif near the seaports.

20. *Clitoria* L.

1. **C. mariana** L. In dry soil: N. J. to Fla., Mo. and Tex.
 N. Y. Formerly at Brooklyn.
 N. J. A single station in Hudson Co., thence wanting to the pine-barrens; at Cape May; wanting in the counties bordering the Delaware.
 PA. Philadelphia Co.
 Rare and local.

21. *Strophostyles* Ell.

Leaflets mainly lobed, 2-5 cm. long; pod 5-8 cm. long.

1. *S. helvola*.

Leaflets mainly entire, 1-4 cm. long; pod 2-5 cm. long.

2. *S. umbellata*.

1. **S. helvola** (L.) Britton. In sandy soil: Que. to Fla., S. Dak., Neb. and Tex.
 CONN. Common along the coast decreasing and perhaps wanting northward.
 N. Y. Common on L. I. and S. I. and up the Hudson Valley to Putnam Co., unknown northward.
 N. J. Rare in Bergen, Hudson, Middlesex and Mercer counties, increasing and common southward, but not in the pine-barrens, or if so only locally adventive.
 PA. Northampton, Bucks, Philadelphia and Chester counties.
 Tertiary, not on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, scattered. Predominating south of the moraine. 159-220 days. Sea level-900 ft.
2. **S. umbellata** (Muhl.) Britton. In sandy soil: L. I. to Fla., Ind. and La.
 N. Y. Common south of the moraine on L. I. and on S. I., unknown elsewhere.
 N. J. Rare in Bergen, Hudson and Middlesex counties, thence increasing but not very common southward; unknown in the pine-barrens, except as a rare intruder.
 PA. Bucks, Delaware and Chester counties.

Tertiary, not on Beacon Hill, common elsewhere: Cretaceous: common: Older Formations, scattered. Predominating south of the moraine. 179-224 days. About sea level.

22. *Phaseolus* [Tourn.] L.

1. *P. polystachyus* (L.) B. S. P. In thickets; Can. (?), Conn. to Fla., Minn., Neb. and La.

CONN. Rare in New London, New Haven, and Fairfield counties near the coast, unknown elsewhere.

N. Y. Manhasset Neck, L. I., unknown on S. I., rare and local in the Bronx and in Westchester Co., otherwise unknown.

N. J. Rare and very local over most of the state except in the pine-barrens, there wanting.

PA. Northampton, Bucks, Delaware and Chester counties.

A rare and local species whose distribution is little understood.

The common kidney bean, *P. vulgaris* L., sometimes escapes from gardens but it is scarcely established.

23. *Bradburya* Raf.

1. *B. virginiana* (L.) Kuntze. In dry sandy soil: N. J. to Fla., Ark., Tex. and Trop. Am.

Known definitely in our area only from Angelsea, Cape May Co. and Swedesboro, Gloucester Co., N. J. The first station is on Cretaceous sands and gravel, the second on Tertiary sand, but not on the Beacon Hill Formation (pine-barrens).

24. *Glycine* L. (*Apios* Moench.)

1. *G. Apios* L. In moist ground: N. B. to Fla., Ont., Minn., Kan. and La.

Common throughout the range.

25. *Galactia* R. Br.

Nearly glabrous throughout; pods slightly pubescent.

Finely downy-pubescent; pods very downy.

1. *G. regularis*.

2. *G. volubilis*.

1. *G. regularis* (L.) B. S. P. In dry sandy soil: N. Y. and Pa. to Fla., Kan. and Miss.

N. Y. Known only from S. I. Not recently collected.

N. J. Middlesex and Burlington counties, increasing **southward**.

PA. Apparently confined to Berks and Philadelphia counties.

A coastal plain plant of curious distribution.

2. **G. volubilis** (L.) Britton. In dry sandy soil: N. Y. to Fla., Pa., Ky., Kans. and Tex.

N. Y. Rare on L. I., and the upper end of Manhattan (not recently collected), otherwise unknown.

N. J. The southern part of Cape May Co.

PA. Berks Co.

A rare and highly local species whose distribution is little understood.

26. **Falcata** Gmel.

Leaves thin; bracts small; plant pubescent or glabrate.

1. *F. comosa*.

Leaves firm; bracts large; plant villous-brown-pubescent.

2. *F. Pitcheri*.

1. **F. comosa** (L.) Kuntze. Moist thickets: N. B. to Fla., Man., Neb. and La.

Common throughout the range except in the pine-barrens of N. J., there rare or wanting; always decreasing southward.

2. **F. Pitcheri** (T. & G.) Kuntze. In moist thickets: Mass. to W. N. Y., S. Dak., Neb., Kan. and Tex.

CONN. Rare near the coast, especially westward, decreasing and perhaps wanting northward.

N. Y. Frequent on the L. I. coastal plain; occasional on S. I.; rare in the Bronx, increasing but not common northward.

N. J. Middlesex and Mercer counties, increasing southward but not in the pine-barrens; nowhere common.

Among the introduced plants credited to the range perhaps the following are here worthy of record: *Ervum Lens* L. the lentil, *Ononis arcensis* L., *Sesban macrocarpa* Muhl., *Genista tinctoria* L., *Ulex europaeus* L., *Pueraria Thunbergiana* Seib. and Zucc., *Vigna repens* (L.) Kuntze, *Anthyllis vulneraria* DC., *Ornithopus sativus* Brot., *Onobrychis sativa* Lam., *Pisum sativum* L., *Cicer arietinum* L., *Arachis hypogaea* Willd., *Trigonella Besseriana* Ser. and *Glycyrrhiza lepidota* (Nutt.) Pursh. They have all been found but none are to be considered as part of our wild flora. There are a score or so of mere waifs besides the above. *Acuan virgatus* (L.) Medic. of the Mimosaceae has been found as a waif near Communipaw, N. J.

GERANIACEAE

Anthers 10, rarely 5; carpel-tails not hairy inside.

Carpel-bodies deciduous from the styles, appendaged.

1. ROBERTIELLA.

Carpel-bodies not deciduous from the styles, not appendaged.

2. GERANIUM.

Anthers 5; carpel-tails bearded inside.

3. ERODIUM.

1. **Robertiella** Hanks

1. **Robertiella Robertiana** (L.) Hanks. (*Geranium Robertianum* L.). In rich woods: N. S. to Man., N. J., and Mo. Also in Europe, Asia and Africa.

CONN. Throughout the state, rare eastward, increasing westward and **northward**.

N. Y. Rare on L. I. and S. I., locally increasing **northward** particularly in the Catskills.

N. J. Rare along the coast in Cape May, Atlantic and Ocean counties, not inland in either county; rare and local throughout Monmouth and Middlesex counties, thence increasing and locally common **northward**.

PA. Throughout the area.

Tertiary, rare near the coast of N. J. and not on Beacon Hill: Cretaceous, scattered: Older Formations, increasing **northward**. 123-220 days. Sea level-2,800 ft.

2. *Geranium* [Tourn.] L.

Plants annual or biennial.

Peduncle terminated by a single pedicel.

1. *G. sibiricum*.

Peduncle terminated by a pair of pedicels.

Seeds smooth; sepals without subulate tips.

Carpels bodies wrinkled.

2. *G. molle*.

Carpel bodies pubescent.

3. *G. pusillum*.

Seeds reticulated or pitted; sepals subulate-tipped.

Sepal-tips less than 1 mm. long.

4. *G. rotundifolium*.

Sepal-tips 1-2 mm. long.

Style-beak and branches less than 3 mm. long.

Seeds pitted.

5. *G. dissectum*.

Seeds reticulated.

6. *G. carolinianum*.

Style-beak and branches more than 4 mm. long.

Peduncles appressed pubescent.

7. *G. columbinum*.

Peduncles glandular villous.

8. *G. Bicknellii*.

Plant perennial.

9. *G. maculatum*.

1. *G. sibiricum* L. In waste places: N. Y., Ill., Pa. and Cal. Naturalized from Asia.

Rare as an adventive weed near New York City, and reported from Delaware Co., Pa.

2. *G. molle* L. In waste places: Me. to B. Col., N. Car. and Ohio. Naturalized from Europe.

Rare as a roadside weed.

3. *G. pusillum* Burm. f. In waste places and along roadsides: Ont. to B. Col., south to Va., Neb. and Utah. Naturalized from Europe.

Local as a weed in most parts of our range, except the pine-barrens.

4. **G. rotundifolium** L. In waste places: N. Y. and Mich. Adventive from Europe.
Known only as a rare weed near the metropolis; not recently collected.
 5. **G. dissectum** L. In waste places: E. N. Am. Naturalized from Europe.
Rare as a weed near N. Y. City, perhaps elsewhere.
 6. **G. carolinianum** L. In barren soil: E. N. Am., Mex., Bermuda and Jamaica.
Throughout the range except in the pine-barrens, there rare and probably introduced.
 7. **G. columbinum** L. In fields and waste places: N. J. to Va. and S. Dak. Native of Europe.
Rare as an adventive weed in N. J. and Pa.
 8. **G. Bicknellii** Britton. In woods: N. S. to B. Col., N. Y., Mont. and Wash.
Known definitely only from near Woodmere and Aqueduct, L. I., Van Cortlandt Park, N. Y. City, and from Canaan Mt., Conn. A rare species.
 9. **G. maculatum** L. In woods: Newf. to Man., Ga. and Kan.
Common throughout the range except in the pine-barrens; there rare or wanting.
- G. pyrenaicum* L. has been collected at Bethlehem, Pa., presumably as a waif.

3. **Erodium** L'Her.

Sepal-tips not bearing bristle-like appendages.

1. *B. moschatum*.

Sepal-tips bearing 1 or 2 bristle-like appendages.

2. *E. cicutarium*.

1. **E. moschatum** (Burm. f.) L'Her. In waste places: E. N. S. and the Pacific Coast. Naturalized from Europe.
Rare on waste ground near our larger cities.
2. **E. cicutarium** (L.) L'Her. In fields and waste places: S. Canada, N. S. Mex., and Cent. Am. Introduced from Europe.
Locally common as a weed.

E. malachoides Willd. has been collected near the larger cities, scarcely persistent.

OXALIDACEAE

Acaulescent; rootstocks bulb-like or scaly; flowers white, pink or purple.

Sepals without tubercles; rootstocks elongated.

Sepals with apical tubercles; rootstocks bulb-like.

Caulescent; flowers yellow.

1. OXALIS.

2. IONOXALIS.

3. XANTHOXALIS.

1. *Oxalis* L.

1. **O. Acetosella** L. In woods: N. S. to Man. and southward on or near the mountains to N. Car. and Tenn. Also in Europe and Asia.

CONN. Recorded only from northern Hartford and Litchfield counties.

N. Y. The mountains of Ulster, Delaware and Greene counties.

PA. Wayne, Luzerne, Carbon, Lackawanna and Monroe counties.

Tertiary, o: Cretaceous, o: Older Formations, rare except northward. South of the moraine only in Pa. 117-158 days. 800-4,000 ft.

2. *Ionoxalis* Small

1. **I. violacea** (L.) Small (*O. violacea* L.). In woods: Me. to the Rocky Mountain Region, Fla. and Tex.

Throughout the range, except in the pine-barrens, there wanting.

3. *Xanthoxalis* Small

Pedicels appressed-pubescent; cymes typically umbel-like.

Longer filaments glabrous; stems not woolly.

Stem appressed-pubescent, not creeping; capsules pubescent.

1. *X. stricta*.

Stem loosely pubescent; capsules glabrous at maturity, except in *X. corniculata*, an introduced creeping plant.

Plants spreading and creeping; capsules pubescent.

2. *X. corniculata*.

Plants erect; capsules glabrous.

Cymes open at maturity, usually 1-3-flowered; capsules slender, gradually pointed.

3. *X. Bushii*.

Cymes cluster-like at maturity, usually 4-6-flowered; capsules stout, abruptly pointed.

4. *X. rufa*.

Longer filaments-pubescent; stems mostly woolly.

Leaves numerous; cymes mostly 1-flowered; capsules less than thrice as long as the calyx.

5. *X. filipes*.

Leaves few; cymes mostly several-flowered; capsules over thrice as long as the calyx.

6. *X. Brittoniae*.

Pedicels loosely pubescent, usually villous; cymes dichotomous.

7. *X. cymosa*.

1. **X. stricta** (L.) Small (*Oxalis stricta* L.). In fields and along roadsides: N. S. to Wyo., Fla., N. Mex. and Mex.

Not uncommon as a weed in most parts of our area.

2. **X. corniculata** (L.) Small (*Oxalis repens* Thunb.; *O. corniculata* L.). In ballast about seaports. Also in Trop. Am. and Europe.
Occasional as a weed.
3. **X. Bushii** Small (*Oxalis Bushii* Small). Dry soil, N. S. to S. Dak., Col. and Ga.
N. Y. Valley Stream, L. I.
PA. Luzerne Co.
4. **X. rufa** Small (*Oxalis rufa* Small). Woods and moist soil, Mass. to Ga. and Minn.
Known, in our area, only from Stroudsburg, Pa.
5. **X. filipes** Small. (*Oxalis filipes* Small). In woods along streams. N. Y. to Tenn. and Ga.
N. Y. Copake Falls, Columbia Co.
6. **X. Brittoniae** Small (*Oxalis Brittoniae* Small). In woods: Mass. to Mo. and Fla.
CONN. New Haven, Hartford and Litchfield counties.
N. Y. Common on L. I. and S. I., local northward, but not definitely known from the Catskills.
N. J. Rare in Monmouth, Ocean and Mercer counties, local northward; not in the pine-barrens.
PA. In Monroe Co., unknown elsewhere.
7. **X. cymosa** Small (*Oxalis cymosa* Small). Woods and fields, Ont. to Mich., Fla. and Tex.
Common throughout the range, except in the pine-barrens.

LINACEAE

- Stigmas introrse and more or less elongate; sepals glandless. 1. LINUM.
Stigmas terminal and capitate; sepals, at least the inner ones, with marginal glands. 2. CATHARTOLINUM.

1. **Linum** [Tourn.] L.

1. **L. usitatissimum** L. In waste places and in fields: throughout cultivated America. Native of Europe.

Common as a weedy escape in most parts of our area.

Linum angustifolium Huds. has been collected as a waif near New York.

2. **Cathartolinum** Reichb.

Styles distinct.

Sepals entire at maturity.

Outer sepals 2-2.5 mm. long at maturity; stems paniculately branched.

1. *C. striatum*.

- Outer sepals 3-3.5 mm. long at maturity, stems . . .
 corymbosely branched. 2. *C. virginianum*.
 Sepals, or some of them, glandular toothed.
 Capsule spheroidal. 3. *C. medium*.
 Capsule ovoid. 4. *C. intercursum*.
 Styles more or less united. 5. *C. sulcatum*.

1. ***C. striatum*** (Walt.) Small (*Linum striatum* Walt.). In moist sandy places: Ont. to Fla. and Tex.
 CONN. Not uncommon near the coast, decreasing and perhaps wanting northward.
 N. Y. Common on L. I.; on S. I., decreasing up the Hudson Valley to the Highlands; unknown northward.
 N. J. Rare in the north, increasing and common throughout the southern part of the state.
 PA. From Northampton Co. southward.
 Tertiary, common throughout: Cretaceous, common: Older Formations, apparently decreasing northward. 164-220 days. Sea level-800 ft.
2. ***C. virginianum*** (L.) Reich. (*L. virginianum* L.). In dry sandy woods: Me. and Ont. to Ga. and Ala.
 Throughout the range except the pine-barrens, there rare and probably introduced; not specifically known from the upper elevations of the Catskills.
3. ***C. medium*** (Planch.) Small (*L. medium* (Planch.) Britton). In sandy places and wet meadows: Ont. to Fla. and Tex.
 CONN. Not very common near the coast, decreasing and perhaps unknown northward.
 N. Y. Rare on S. I. and L. I.; unknown elsewhere.
 N. J. Common throughout the coastal plain especially near the sea; unknown elsewhere.
 PA. Delaware and Chester counties, according to Pennell.
 Tertiary, common throughout: Cretaceous, common: Older Formations, rare and local on overwash morainal material on L. I. and scattered along coastal Conn. 168-220 days. About sea level.
4. ***C. intercursum*** Bicknell (*Linum floridanum* of the Manuals). In dry places: E. Mass. to Fla.
 N. Y. The coastal plain of L. I.
 N. J. From Monmouth County southward, along the coast and in the southeastern part of the pine-barrens.
 PA. Delaware and Chester counties.

Tertiary, common on Beacon Hill and near the sea: Cretaceous, doubtfully, in northern Monmouth Co.: Older Formations, rare. 168-220 days. About sea level.

5. **C. sulcatum** (Riddell) Small (*L. sulcatum* Riddell). In dry soil: Ont. to Man., Ga. and Tex.
 CONN. Rare in New Haven, Hartford and Litchfield counties, increasing **northwestward**.
 N. Y. Occasional in the Bronx; reported but not definitely known from near the Highlands of the Hudson; otherwise unknown.
 N. J. Known only from a very old specimen collected in Bergen Co., and from Sussex Co.
 PA. Lackawanna Co.

ZYGOPHYLLACEAE

Tribulus terrestris L. and *Zygophyllum Fabago* L. have both been collected near the metropolis. They are very doubtfully established.

RUTACEAE

Pistils 2-5, distinct; fruit fleshy, capsular.
 Pistil 1, 2-celled; fruit a samara.

1. ZANTHOXYLUM.
 2. PTELEA.

1. *Zanthoxylum* L.

1. **Z. americanum** Mill. In woods: Que. and Ont. to Minn., Ga., Ala. and Oklahoma.
 CONN. Rare in the south and probably mostly as an escape from cultivation, increasing **northwestward** into Litchfield Co. as a wild plant.
 N. Y. Westchester Co., increasing **northward**. (L. I. records probably based on cultivated specimens.)
 N. J. Bergen and Hunterdon Co., rare, increasing **northward** and becoming common in Sussex Co. (Monmouth Co. record probably based on cultivated specimens).
 PA. Lackawanna, Northampton, Bucks and Berks counties.
 Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 117-166 days. Sea level-4,000 ft.

2. *Ptelea* L.

1. **P. trifoliata** L. In woods: Conn. to Minn., south to Fla. and northern Mex.
 CONN. Not uncommon as an escape from cultivation, unknown as a plant wild from the state.

N. Y. Known definitely only from Wading River, Suffolk Co., L. I.; S. I.; otherwise unknown. Doubtfully wild anywhere in the range.

N. J. Rare in Burlington, Mercer and Hunterdon counties in the drainage of the Delaware River; spontaneous elsewhere.

PA. Northampton, Berks and Philadelphia counties.

Tertiary, o: Cretaceous, rare or perhaps wanting; Older Formations, apparently scattered on various formations but probably not wild. 168-220 days. About sea level.

Ruta graveolens L. has been collected from various parts of the range as an escaped plant.

SIMAROUBACEAE

I. *Ailanthus* Desf.

1. *A. glandulosa* Desf. In fields and along roadsides: Ont. to Mass., N. Car., Ala. and Tex. Native of China.

Common as an escape from cultivation throughout the range.

POLYGALACEAE

I. *Polygala* [Tourn.] L.

Flowers in solitary spikes or spike-like racemes, terminating the stem and branches.

Basal leaves spatulate or obovate; flowers orange-yellow.

1. *P. lutea.*

Basal leaves inconspicuous or wanting; flowers not yellow.

Leaves, at least the lower, verticillate; spikes 8-18 mm. thick, blunt; flowers purple to greenish white.

Spikes sessile, or nearly so; wings deltoid.

2. *P. cruciata.*

Spikes peduncled; wings lanceolate-ovate.

3. *P. brevifolia.*

Leaves verticillate and alternate; spikes 4-6 mm. thick, acute.

Verticillate leaves predominating; spikes dense; flowers green to purplish.

4. *P. verticillata.*

Alternate leaves predominating; spikes loose; flowers more purple.

5. *P. ambigua.*

Leaves all alternate.

Petals united into a cleft tube, 6-8 mm. long, pink.

6. *P. incarnata.*

Petals not conspicuously united into a tube.

Spikes ovoid to globose.

Bracts persistent; flowers rose purple to white.

7. *P. viridescens.*

Bracts deciduous; flowers rose purple.

8. *P. mariana.*

Spikes cylindric.

Leaves 4-12 mm. long; flowers greenish to purplish.

9. *P. Nuttallii.*

Leaves 2.5-5 cm. long; flowers white or greenish.

10. *P. Senega.*

Flowers distinctly racemose, rose or purple.

11. *P. polygama*.

Flowers 1-4, axillary, but apparently terminal rose purple or white.

12. *P. paucifolia*.

1. ***P. lutea*** L. In pine-barren bogs: L. I. to Fla., Pa. and La.
 N. Y. Rare on the south side of Long Island in Nassau and Suffolk Co., and on S. I., unknown elsewhere.
 N. J. Common on the coastal plain; unknown elsewhere.
 PA. Known only from Bristol, Bucks Co.
 Tertiary, common: Cretaceous, common; Rare and local on the overwash plain on L. I. 168-224 days. About sea level.
2. ***P. cruciata*** L. In sandy swamps: Me. to Fla., Minn. and La. CONN. Common near the coast, decreasing and perhaps wanting northward.
 N. Y. Common on L. I. and S. I.; unknown elsewhere.
 N. J. Very rare in Bergen and Hudson counties, increasing southward and common on the coastal plain.
 PA. Bucks, Montgomery, Delaware and Chester counties.
 Tertiary, common throughout; Cretaceous, common: Older Formations, scattered and relatively rare north of the moraine. 170-224 days. About sea level.
3. ***P. brevifolia*** Nutt. In sandy swamps: R. I. to N. J., Fla. and Miss.
 N. J. Known only from the pine-barrens, except at New Egypt, Ocean Co., and Ashland, Camden Co. The reported occurrence of this plant at Secaucus, Hudson Co., not unverified and rather doubtful.
 Tertiary, common on Beacon Hill, wanting or very rare elsewhere: Cretaceous, rare and scattered: Older Formations, o. 168-220 days. About sea level.
4. ***P. verticillata*** L. In dry or moist soil: Que. and Ont. to Minn., Sask., Fla., Colo. and Mex.
 Common throughout the area, except in the pine-barrens and the higher elevations of the Catskills, there rare or wanting.
5. ***P. ambigua*** Nutt. In dry soil: Me. to Ga., Mo. and La.
 Perhaps a mere form of the preceding and generally distributed with it, but usually not nearly so common.
6. ***P. incarnata*** L. In dry soil: Ont. to Wisc., N. Y., N. J., Fla., Kans. and Mex.
 N. Y. Known only from near Southampton, L. I.

- N. J. Known only from Camden, Gloucester, Cumberland, and Salem counties, not in the pine-barrens.
 PA. Chester Co.
 Tertiary, o: Cretaceous, more common than elsewhere: Older Formations, very rare: Exclusively south of the moraine. 170-220 days. About sea level.
7. **P. viridescens** L. In fields and meadows: N. S. to N. Car., Minn., Kan. and La.
 Common throughout the range except in the pine-barrens, there rare and perhaps only introduced.
8. **P. mariana** Mill. In dry soil: S. N. J. to Fla., Ky. and La.
 N. J. Known only from a few stations in the pine-barrens and in the region of Cape May. Rare and local.
9. **P. Nuttallii** T. & G. In dry sandy soil: E. Mass. to N. Car., Mo. and Ala.
 CONN. Rare and local along the coast, decreasing and perhaps wanting inland.
 N. Y. Locally common on L. I. and S. I.
 N. J. Rare in Bergen, Somerset and Mercer counties, increasing and becoming common throughout the southern counties.
 PA. Pike, Lehigh, Bucks, Delaware and Chester counties.
 Tertiary, very common throughout: Cretaceous, common: Older Formations, rare and scattered, more common in the Pa. drainage of the Delaware River than elsewhere. 149-224 days. **Sea level-1,000 ft.**
10. **P. Senega** L. (*P. Senega latifolia* T. & G.). In rocky woods: N. B. to Minn. and the Canadian Rockies, N. Car. and Ark.
 CONN. Kent, and New Milford, both in the valley of the Housatonic; and in Litchfield Co.
 N. Y. Pine Plains, Dutchess Co.
 N. J. Reported from but very doubtfully occurring now near Jersey City and in Camden Co. No. N. J. specimens are extant.
 PA. Bucks, Philadelphia and Chester counties.
 Tertiary, o: Cretaceous, very doubtfully. Older Formations, restricted to Stockbridge limestone in the northern and to limestone and serpentine in the southern part of the local range. 142-220 days. Sea level-500 ft.
11. **P. polygama** Walt. In dry soil: N. S. to Man., south to Fla. and Tex.

CONN. Throughout the state, nowhere common.

N. Y. Common on L. I. and S. I., unknown elsewhere.

N. J. Rare in Bergen, Morris, and Sussex counties; Monmouth and Middlesex counties, thence increasing and common **southward**, except in the pine-barrens, there rather rare.

PA. Philadelphia.

Tertiary less common on Beacon Hill than elsewhere; Cretaceous, common; Older Formations, scattered. 142-220 days. Sea level-1,000 ft.

12. **P. paucifolia** Willd. In moist rich woods: N. B. to Anticosti and Sask., south to Ga. and Ill.

CONN. Rare in New London Co., increasing and becoming common **northwestward**.

N. Y. Very rare north of the moraine on L. I., unknown on S. I. rare and local in northern Westchester Co., increasing **northward**.

N. J. Reported from, but very doubtfully in Monmouth Co.; not very common in Hunterdon, Essex and Hudson counties, increasing **northward**; unknown elsewhere.

PA. Throughout the state, always increasing **northward**.

Tertiary, 0; Cretaceous, 0; Older Formations, increasing **northward**. 117-220 days. Sea level-4,020 ft.

EUPHORBIACEAE

Flowers not in an involucre, with a true calyx.

Ovules 1 in each cavity of the ovary.

Ovules 2 in each cavity of the ovary.

Plants clothed with stellate pubescence or scales.

Plants variously pubescent, with simple hairs.

Plants glabrous or nearly so.

Flowers in an involucre, the calyx represented by a minute scale at the base of the filament-like pedicel.

Glands of the involucre with petal-like appendages.

Leaves all opposite.

Leaves, at least the lower, alternate.

Annual or biennial; bracts petal-like.

Perennial; bracts not petal-like.

Glands of the involucre without petal-like appendages.

1. PHYLLANTHUS.

2. CROTONOPSIS.

3. ACALYPHA.

4. RICINUS.

5. CHAMAESYCE.

6. DICHROPHYLLUM.

7. TITHYMALOPSIS.

8. TITHYMALUS.

I. *Phyllanthus* L.

I. **P. carolinensis** Walt. In sandy or gravelly soil: E. Pa. to Ill., Kan., Fla., Tex. and Cent. Am.

Known only from Chester Co., Pa.

2. **Crotonopsis** Michx.

1. **C. linearis** Michx. In dry sandy soil: Conn. and N. J., to Kan., south to Fla. and Tex.

CONN. Milford.

N. J. Not uncommon in the pine-barrens, decreasing in the region north and west of them; unknown elsewhere.

PA. Near Bristol, Bucks Co. Not recently collected.

Tertiary, more common on Beacon Hill than elsewhere. Creaceous, decreasing: Older Formations, unknown except for its probably adventive occurrence in Conn. 179-220 days. About sea level.

3. **Acalypha** L.

Staminate and pistillate flowers in separate spikes or racemes; capsule spiny.

1. *A. ostryaefolia*.

Staminate and pistillate flowers in the same spike or raceme; capsule smooth.

Plant not glandular; bract palmately many lobed.

2. *A. virginica*.

Plant glandular; bract many-cleft.

3. *A. gracilens*.

1. **A. ostryaefolia** Ridd. In fields and waste places: N. J. to Kan., Fla. and Mex. Rare in our area.

Known only from near Lawrenceville, Princeton, Trenton and Closter, N. J. and Morrisville, Bucks Co., Pa. Not recently collected.

2. **A. virginica** L. In woods and thickets: N. S. to Minn., Kan., Fla. and Tex.

Common, in most parts of our range, except in the pine-barrens, there rare or wanting; often a weed.

3. **A. gracilens** A. Gray. In dry woods and thickets: Mass. to Kan., Fla. and Tex.

Occasional throughout the area, frequently wanting; less common in the pine-barrens than elsewhere.

4. **Ricinus** [Tourn.] L.

1. **R. communis** L. In waste places: E. N. Am. Native of Africa and Asia.

A rare escape from gardens in most parts of our range.

5. **Chamaesyce** S. F. Gray.

Leaves entire, seeds smooth or roughened.

1. *C. polygonifolia*.

Leaves serrate or dentate; plants prostrate.

Herbage glabrous.

2. *C. glyptosperma*.

Herbage pubescent or puberulent.

Capsules glabrous.

3. *C. Rafinesqui*.

Capsules pubescent.

4. *C. maculata*.

Leaves serrate or dentate; plant erect.

5. *C. Preslii*.

1. **C. polygonifolia** (L.) Small (*Euphorbia polygonifolia* L.). In sand, along Atlantic coast: N. S. to Fla. and on the shores of the Great Lakes.

Common on beaches throughout our range, not reported elsewhere.

2. **C. glyptosperma** (Engelm.) Small. In sandy soil: Ont. to B. Col., N. Y., Tex. and Mex.

Known in our area only as a weed, collected many years ago on Fisher's Island in L. I. Sound, and more recently at Hewlett, L. I.

3. **C. Rafinesqui** (Greene) Small (*E. hirsuta* (Torr.) Wiegand). In sandy or gravelly soil: Que. and Ont. to Conn., N. Y. and Pa.

Common, throughout the area, except on the coastal plain.

4. **C. maculata** (L.) Small. Fields and roadsides: throughout N. Am.

Common, often as a troublesome weed, nearly everywhere.

5. **C. Preslii** (Guss.) Arthur (*E. nutans* of American authors. Not of Lag.). In fields and thickets: E. N. Am.

Common throughout the area as a weed except in and near the pine barrens, there rare or wanting.

Chamaesyce humistrata (Engelm.) Small is erroneously recorded as found many years ago at Brigantine Beach, Atlantic Co., N. J.

C. serpens (H. B. K.) Small has been found as a waif about cities, as also *C. hirta* (L.) Millsp. (*Euphorbia pilulifera* L.), on Staten Island.

6. *Dichrophyllum* Kl. & Garcke

1. **D. marginatum** (Pursh) Kl. & Garcke. (*Euphorbia marginata* Pursh). In waste places: Central and Atlantic States. Introduced from the West.

Very rare as an escape.

7. *Tithymalopsis* Kl. & Garcke

Involucres with conspicuous white petaloid appendages.

1. *T. corollata*.

Involucres with inconspicuous green appendages.

2. *T. Ipecacuanhae*.

1. **T. corollata** (L.) Kl. & Garcke (*Euphorbia corollata* L.). In dry soil: Mass. and Ont. to Minn. and Kan., south to Fla. and Tex.

CONN. Rare, and only as an adventive weed.

N. Y. Unknown on L. I.; reported but not definitely known now on S. I., otherwise unknown.

N. J. Rare and local in Hunterdon, Somerset and Mercer counties, increasing and common southward, but not in the pine-barrens.

PA. Northampton, Bucks, Delaware and Chester counties.

Tertiary, unknown on Beacon Hill, rare elsewhere: Cretaceous, common: Older Formations, rare and scattered in locally sandy places. 158-220 days. About sea level.

2. **T. Ipecacuanhae** (L.) Small (*Euphorbia Ipecacuanhae* L.). In dry sandy soil, mostly near the coast: Conn. to Fla., also in southern Ind.

Common throughout most of the coastal part of our range, especially in the pine-barrens. Always in sand, but not collected from the sea-beaches, and known in Conn. only from an old specimen reported to be collected at East Windsor.

T. arundelana (Bartlett) Small has been reported from Swedesboro, Gloucester Co., N. J.

8. **Tithymalus** [Tourn.] Adans.

Leaves mainly opposite; capsules 10 mm. wide or more.

Leaves alternate; capsules less than 10 mm. wide.

Leaves serrulate.

Leaves entire.

Annual or biennial; seeds pitted.

Perennial; seeds smooth.

Glands reniform, not horned.

Glands crescent-shaped, horned.

Stem-leaves 4-12 mm. wide.

Stem-leaves 0.5-3 mm. wide.

1. *T. Lathyris*.

2. *T. Helioscopia*.

3. *T. Peplus*.

4. *T. Darlingtonii*.

5. *T. Esula*.

6. *T. Cyparissias*.

1. **T. Lathyris** (L.) Hill (*Euphorbia Lathyris* L.). In waste places: Conn. to N. Car. Also in Cal. Native of Europe.

Rare as an adventive weed.

2. **T. Helioscopia** (L.) Hill (*E. Helioscopia* L.). In waste places: Ont. to N. H., N. Y. and Ohio. Native of Europe.

In waste places near the City of New York and at Camden, N. J.

3. **T. Peplus** (L.) Hill. (*E. Peplus* L.). In waste places: N. Y. to N. J. and Pa. Native of Europe.

Rare as a weed near the larger cities.

4. **T. Darlingtonii** (A. Gray) Small (*E. Darlingtonii* A. Gray). N. Y., Pa. and N. J. to N. Car.

Known in our area only from Gloucester Co., N. J. and Chester Co., Pa., there very rare. Distribution insufficiently understood.

5. **T. Esula** (L.) Hill (*E. Esula* L.). In waste places: Mass. to N. Y. and Mich. Naturalized from Europe.

Very rare in our area as a weed. Collected at Redding, Conn., in 1902.

6. **T. Cyparissias** (L.) Hill (*E. Cyparissias* L.). Escaped from gardens to waste places: N. Eng. to Kan. Naturalized from Europe.

Common throughout the region except in the pine-barrens, there rare or wanting.

Tithymalus segetalis (L.) Lam. has been collected as a waif.

Mercurialis annua L. has also been collected on ballast, but is apparently fugitive.

Croton capitatus Michx. was reported from Monmouth Co., N. J. many years ago. There are no specimens extant and the record is doubtful. It has recently been collected as a waif on S. I.

CALLITRICHACEAE

I. *Callitriche* L.*

Fruit short peduncled; bracts wanting; terrestrial.

1. *C. Austini*.

Fruit sessile; aquatic or mud inhabiting herbs.

Fruit oval, longer than the styles.

2. *C. palustris*.

Fruit obovate, shorter than the styles.

3. *C. heterophylla*.

1. **C. Austini** Engelm. In damp shaded places: Conn. to N. J., Ohio, Mo., Tenn., Tex. and Mex.

CONN. Not common but generally distributed except in coastal New London Co., there not reported.

N. Y. Reported from S. I. but not otherwise known from the area.

N. J. Rare and local in Passaic, Bergen, Mercer, Middlesex and Salem counties.

PA. Bucks and Monroe counties.

A rare and local plant whose scattered distribution is little understood.

2. **C. palustris** L. Mostly in cold or running water: throughout Can. and U. S.

CONN. Not uncommon westward along the coast; rare or wanting elsewhere.

* See footnote, page 76.

N. Y. Rare and local on L. I. and S. I., increasing up the Hudson Valley.

N. J. Known only from Bergen, Passaic, Warren and Hunterdon counties.

PA. Pike, Northampton, Lehigh, Bucks, Philadelphia, Delaware and Chester counties.

3. **C. heterophylla** Pursh. In ponds and slow streams: N. Eng. to Fla., N. W. Terr., Colo. and La.

Throughout the range, except in the pine-barren streams and ponds, there rare or wanting.

According to Porter's Flora of Pennsylvania, p. 201, *C. autumnalis* L. (*C. bifida* (L.) Morong.) has been collected at Sellersville, Bucks Co. I have seen no specimens. The species is otherwise known only from Quebec westward, and in Europe and Asia.

EMPETRACEAE

1. **Corema** Don.

1. **C. Conradii** Torr. In rocky or sandy soil: Newf. to N. J., mostly near the coast, but occurring in one station on the Shawangunk mountains in Ulster Co., N. Y.

N. Y. Formerly collected on L. I., unrecorded from S. I.; known otherwise only from the summit of the Shawangunk Mountains, Ulster Co.

N. J. Known only from the pine-barrens.

Tertiary, common on Beacon Hill, unknown elsewhere: Cretaceous, o: Older Formations, in edaphically favorable places, but very rare.*

Pachysandra procumbens Michx. of the Buxaceae has been collected in Delaware Co., Pa., as an escape from cultivation; not otherwise known from the range.

LIMNANTHACEAE

1. **Floerkea** Willd.†

1. **F. proserpinacoides** Willd. In marshes and along rivers: Que. to Ont., Del., Tenn. and Mo.

CONN. New Haven Co.

N. Y. Unknown on L. I. and S. I., rare in Westchester and Bronx counties, otherwise unknown.

N. J. Locally common from Burlington and Middlesex counties northward.

* For an account of the factors governing the distribution of this plant see *Torreya* 12: 241, 242. 1912.

† See footnote, page 76.

PA. Northampton, Lehigh, Bucks and Delaware counties.
Distribution scattered and little understood.

ANACARDIACEAE

Fruit densely pubescent, its stone smooth.

Flowers in dense terminal panicles appearing after the leaves. 1. RHUS.

Flowers in clustered spikes, appearing before the leaves. 2. SCHMALTZIA.

Fruit glabrous, or sparingly pubescent, its stone striate. 3. TOXICODENDRON.

1. *Rhus* [Tourn.] L.

Rachis of the leaf wing-margined.

1. *R. copallina*.

Rachis of the leaf not wing-margined.

Foliage and twigs velvety pubescent.

2. *R. hirta*.

Foliage and twigs mostly glabrous and glaucous.

3. *R. glabra*.

1. ***R. copallina*** L. In dry soil: Me. and Ont. to Fla., Minn., Neb. and Tex.

Common throughout the range except in the pine-barrens, there wanting.

2. ***R. hirta*** (L.) Sudw. In dry rocky soil: N. S. to Ga., Ont., S. Dak., Mo. and Miss.

CONN. Throughout the state.

N. Y. Very rare on the north shore of L. I. and on S. I., thence increasing but not very common **northward**.

N. J. Very rare along the Delaware in Gloucester, Camden, Burlington, and Mercer counties, thence increasing and not common **northward**.

PA. Throughout the area.

Tertiary, o: Cretaceous, very rare, and practically confined to the glacial terraces of the lower Delaware. Older Formations, increasing **northward**. 117-220 days. Sea level-3,680 ft.

3. ***R. glabra*** L. (*R. pyramidalis* Greene, *R. bipinnata* Greene). In dry soil: N. S. to B. Col., Fla., Miss. and Ariz.

Common throughout the area except in the pine-barrens, there wanting, and rather rare in the region surrounding the barrens.

2. *Schmaltzia* Desv.

1. ***S. crenata*** (Mill.) Greene (*Rhus aromatica* Ait.). In rocky woods: Ont. and Vt. to Fla., Minn., Kan. and La.

In our area reported only from "Guildford, Conn. on a small rock outcrop in a salt marsh." Not seen by me.

3. **Toxicodendron** [Tourn.] Mill.

- Leaflets 7-13, glabrous; shrub with reddish twigs. 1. *T. Vernix*.
 Leaflets 3, more or less pubescent.
 Vine climbing by aerial rootlets; sometimes erect. 2. *T. radicans*.
 Low shrubs; leaflets crenately lobed. 3. *T. Toxicodendron*.
1. **T. Vernix** (L.) Kuntze (*Rhus Vernix* L.). In swamps: southern Ont. to R. I., Fla., Minn., Mo. and La.
 Throughout the range always decreasing inland, common in the pine-barrens.
2. **T. radicans** (L.) Kuntze (*R. radicans* L.) Thickets and along fences: N. S. to Fla., Minn., Neb. and Ark.
 Common throughout the range, except the pine-barrens, there rare and probably adventive.
3. **T. Toxicodendron** (L.) Cockerell (*R. Toxicodendron* L.). In dry soil: S. N. J. to Ga. and western N. Car.
 Rare and local in Camden, Gloucester, Atlantic, Salem, Cumberland and Cape May counties, perhaps only adventive in the pine-barrens. Otherwise unknown in the range. A recently discovered plant in N. J., apparently spreading northward, more readily along the western edge of the pine-barrens than through them.

AQUIFOLIACEAE

- Petals oblong or obovate, slightly united. 1. ILEX.
 Petals linear, distinct. 2. NEMOPANTHES.
1. **Ilex** L.
- Leaves thick, evergreen, persistent.
 Leaves spiny-toothed. 1. *I. opaca*.
 Leaves toothed or entire, not spiny. 2. *I. glabra*.
- Leaves thin; deciduous.
 Nutlets ribbed; peduncles 1-flowered. 3. *I. monticola*.
 Nutlets not ribbed.
 Flowers all short-pedicelled.
 Leaves oblong to oval.
 Branching not fastigiate; leaves 2.5 cm. wide or less. 4. *I. verticillata*.
 Branching fastigiate; leaves mostly less than 12 mm. wide. 5. *I. fastigiata*.
 Leaves obovate. 6. *I. bronxensis*.
 Staminate flowers on long and slender pedicels. 7. *I. laevigata*.
1. **I. opaca** Ait. In moist woods: S. Me. to Fla., Pa., Mo. and Tex.
 CONN. Doubtfully as a wild plant, frequently escaping from cultivation, especially near the coast.

- N. Y. Common south of the moraine on L. I.; on S. I., unknown elsewhere.
- N. J. Doubtfully as a wild plant in Warren and Mercer counties; thence increasing and becoming very common **southward**, except in the pine-barrens, there only an intruder, and rare.
- PA. Bucks, Delaware and Chester counties.
Tertiary, not indigenous on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, rare and confined as a wild plant to the coastal plain. 189-220 days. About sea level.
2. **I. glabra** (L.) Gray. In sandy soil, mainly near the coast: N. S., eastern Mass. to Fla., west to La.
CONN. Rare and local along the coast, rare or wanting inland, except as to derivatives of cultivated specimens.
N. Y. Rare on the south side of L. I. and on S. I., unknown elsewhere.
N. J. A single isolated station in Hudson Co.; Middlesex, and Monmouth counties, thence increasing and becoming very common **southward** especially in the pine-barrens.
PA. Bristol, Bucks Co.
Tertiary, common on Beacon Hill, decreasing elsewhere: Cretaceous, rare: Elsewhere, scattered exclusively on the coastal plain, except in Conn. 189-220 days. About sea level.
3. **I. monticola** A. Gray (*I. mollis* Gray). In mountain woods: N. Y. and Pa. to N. Car. and Ala.
CONN. Torrington.
N. Y. Rare in the Catskills, not recently collected.
N. J. Northwestern Sussex Co. and in Morris Co.
PA. Pike, Wayne, Monroe, Lackawanna and Lehigh Cos.
A rare and scattered shrub, mostly growing north of the moraine, and more common in Pa. than elsewhere especially as to the form *I. monticola mollis* (A. Gray) Britton.
4. **I. verticillata** (L.) A. Gray. In swamps: Conn. to Fla., Ont., Wisc. and Mo.
Common throughout the range except in the pine-barrens, there scattered near the edges.
5. **I. fastigiata** Bicknell. Swamps and hillsides: E. Mass. to N. J.
N. J. New Durham, Bergen Co.; Newton, Sussex Co.
6. **I. bronxensis** Britton. Swamps: N. S. to Ont., N. J. and Mich.

N. Y. Frequent on L. I. and S. I., increasing **northward**.

N. J. Middlesex Co., increasing northward.

PA. Luzerne Co.

Perhaps not specifically distinct from *I. verticillata*.

7. *I. laevigata* (Pursh) Gray. In swamps: Me. to Pa. and Ga.
Common throughout the range, most abundant southward;
locally wanting.

2. *Nemopanthes* Raf. (*Ilicioides* Dumont.)

1. *N. mucronata* (L.) Trelease. In swamps: N. S. to Ont., Wisc.,
Ind. and Va.

CONN. Rare along the coast, increasing **northwestward**.

N. Y. On L. I. and S. I., unknown in Bronx and Westchester
counties, thence increasing and becoming common **northward**.

N. J. Very rare and local in the pine-barrens and the region
surrounding them, thence increasing **northward**.

PA. Pike, Wayne, Monroe, Carbon and Lackawanna counties.

Tertiary, rare on Beacon Hill, scattered elsewhere: Cretaceous,
scattered.* Older Formations, increasing **northward**. 117-189
days. Sea level-4,020 ft.

CELASTRACEAE

Leaves opposite.

Leaves alternate, woody vine.

1. EUONYMUS.

2. CELASTRUS.

1. *Euonymus* [Tourn.] L.

Pods tuberculate; low shrubs; flowers greenish pink.

Erect or ascending; leaves ovate-lanceolate, acuminate.

Decumbent, rooting at the nodes; leaves obovate, obtuse.

Pods smooth; high shrubs or small trees.

Flowers purple; cymes 6-15-flowered.

Flowers greenish yellow; cymes 3-7-flowered.

1. *E. americanus*.

2. *E. obovatus*.

3. *E. atropurpureus*.

4. *E. europaeus*.

1. *E. americanus* L. In low woods: southern N. Y. to Fla., Neb.
and Tex.

N. Y. Not uncommon on L. I., S. I. and in the Bronx.

N. J. Rare in Passaic, Bergen, Essex and Hunterdon counties,
thence increasing and becoming common **southward**, but not in
the pine-barrens.

PA. Montgomery, Bucks, Berks, Delaware and Chester counties,
Tertiary, unknown on Beacon Hill, rare elsewhere: Cretaceous,
common: Older Formations, rather scattered. 176-220 days.
Sea level.

* See Introduction paragraph 36.

2. **E. obovatus** Nutt. In low woods: S. Ont. to Pa., Ind. and Ky.
Recorded, perhaps erroneously, in our area only, from several counties in N. J. and from Bucks Co., Pa. Not recently collected.
3. **E. atropurpureus** Jacq. In woods: Ont. to Fla., Mont. and Ind. Terr.
Not uncommon in most parts of our range, except in the pine-barrens; doubtfully indigenous in Conn. and N. Y.; commonly cultivated.
4. **E. europaeus** L. Escaped from cultivation: N. H., N. Y., and N. J. Native of Europe.
Rather rare as an escape from gardens.

E. alatus (Thunb.) Rupr. & Maxim. has been collected as an escape in Conn.

2. *Celastrus* L.

1. **C. scandens** L. In rich soil: Que. to N. Car., Man., Kan., Ind. Terr. and N. Mex.
CONN. Throughout the state.
N. Y. Frequent on L. I.; S. I., thence increasing and becoming common **northward**.
N. J. Rare along the coast from Cape May Co. northward and in the drainage of the Delaware from Camden Co. **northward**, thence increasing and becoming common in the northern counties; not in the pine-barrens.
PA. Throughout the state.
Tertiary, unknown on Beacon Hill, rare elsewhere: Cretaceous, scattered along the Delaware in N. J. and Bucks Co., Pa: Older Formations, increasing **northward**. 117-220 days. Sea level-4,000 ft.

STAPHYLEACEAE

1. *Staphylea* L.

1. **S. trifolia** L. In moist woods and thickets; Que. and Ont. to Minn., S. Car. and Kan.
CONN. Throughout the state, increasing **northwestward**.
N. Y. Unknown as a wild plant on L. I., reported only from New Springville on S. I., thence increasing **northward**.
N. J. Salem, Gloucester, Camden, Burlington and Mercer counties, near the Delaware, thence increasing **northward**; not in the pine-barrens.

PA. Northampton, Bucks, Lehigh, Delaware and Chester Co.

Tertiary, o: Cretaceous, scattered, mostly near glacial terraces along the Delaware: Older Formations, increasing **northward**. 117-220 days. Sea level-3,090 ft.

ACERACEAE

1. *Acer* [Tourn.] L.

Leaves simple, palmately lobed.

Flowers in dense sessile lateral clusters, unfolding before the leaves.

Petals none; ovary tomentose; samaras divergent.

Petals present; ovary glabrous; samaras incurved.

Leaves not conspicuously paler beneath than above, northern.

Leaves conspicuously paler beneath than above.

Flowers corymbose, unfolding with the leaves.

Leaves pale and nearly glabrous beneath.

Leaves green and pubescent, at least on the veins, beneath.

Flowers racemose, terminal, unfolding after the leaves.

Racemes drooping; leaves finely serrate.

Racemes erect; leaves coarsely serrate.

Leaves pinnate.

1. *A. saccharinum*.

2. *A. rubrum*.

3. *A. carolinianum*.

4. *A. Saccharum*.

5. *A. nigrum*.

6. *A. pennsylvanicum*.

7. *A. spicatum*.

8. *A. Negundo*.

1. *A. saccharinum* L. Along streams: N. B. to Fla., S. Ont., Dak., Neb. and Ind. Terr.

CONN. Unknown along the Sound as a wild plant, increasing **northward** especially up river valleys.

N. Y. Very rare, if at all as a wild tree on L. I. and S. I.; rare in the Bronx; unknown up the Hudson Valley to the Highlands, thence increasing but not common **northward**; common everywhere as an escape.

N. J. Known only in the drainage of the Delaware in Sussex, Warren, Hunterdon and Camden counties, and in the drainage of the Pasaic and upper Raritan rivers so far as wild trees are concerned. Perhaps all others are derivatives of cultivated specimens; found as an escape in most parts of the state, except the pine-barrens.

PA. Monroe, Northampton, Bucks, Delaware and Chester counties.

A rare and highly localized plant in our area. Except for its greater profusion in river-valleys, apparently without significant distributional features.

2. *A. rubrum* L. In swamps and low grounds: N. B. to Man. and southward.

Common throughout the range except in and near the pine-barrens, there replaced by *A. carolinianum*; increasing **northward**.

3. **A. carolinianum** Walt. In moist soil: E. Mass. to N. J., Fla. and Tex.
 N. Y. Rare on L. I. and S. I.
 N. J. Middlesex and Monmouth counties, increasing and becoming common **southward**, especially in the pine-barrens.
 PA. Bucks Co.
4. **A. Saccharum** Marsh. In rich woods: Newf. to Man., south to Fla. and Tex.
 CONN. Rare as a wild plant near the coast, increasing **northward**.
 N. Y. Rare on L. I., unknown on S. I. as a wild plant; commonly planted. Rare in the lower Hudson Valley, increasing and becoming common **northward**.
 N. J. Hudson, Mercer and Essex counties, increasing and common **northward**
 PA. Throughout the state.
 Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 117-220 days. Sea level-4,000 ft.
5. **A. nigrum** Michx. In woods: Ont. and Vt. to Ga., Minn., La. and Ark.
 Known only from Salisbury, Conn., Hyde Park, N. Y., Locktown, Far-Hills, Little Falls and Newton, N. J., and from Bucks Co., Pa. Very rare and rather inexplicably scattered.
6. **A. pennsylvanicum** L. In rocky woods: N. S. to Lake Superior and along the mountains to Ga. and Tenn.
 CONN. Not uncommon in northwestern Litchfield Co., rare and perhaps wanting elsewhere.
 N. Y. From the southern end of the Highlands of the Hudson **northward**, there common, unknown elsewhere.
 N. J. Rare in Somerset Co., thence increasing **northward**.
 PA. Luzerne, Lehigh, Carbon, Monroe and Bucks counties.
 Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 117-159 days. Sea level-4,020 ft.
7. **A. spicatum** Lam. Damp rocky woods: Newf. and James Bay to Man., south along the mountains to N. Car., Tenn. and Minn.
 CONN. Very rare along the coast, increasing **northwestward**.
 N. Y. Reported from but doubtfully in Westchester Co., rare at

the northern end of the Highlands, thence increasing **northward**. The L. I. record was apparently based on *Viburnum acerifolium*. N. J. Union, Somerset and Essex counties, thence increasing **northward**.

PA. Throughout the area except in Delaware and Chester counties. Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 117-168 days. Sea level-4,020 ft.

8. **A. Negundo** L. Along streams: Vt. and Ont. to Man., Fla. and N. Mex.

CONN. Reported as apparently native in the Housatonic valley; scattered elsewhere.

N. Y. An escape from cultivation.

N. J. Frequent or common in the drainage of the Delaware from Hunterdon to Gloucester counties. Also in Bergen and Passaic counties, perhaps elsewhere an escape.

PA. Northampton Co., southward.

Acer platanoides L. and *A. pseudoplatanus* L. both commonly planted are both occasionally collected as escapes.

HIPPOCASTANACEAE

1. *Aesculus* L.

1. **Æ. Hippocastanum** L. Escaped from cultivation: E. N. Am. Native of Asia.

A rather rare escape from cultivation in most parts of our range, commonly cultivated.

SAPINDACEAE

1. *Cardiospermum* L.

1. **C. Halicacabum** L. In waste places: N. J., D. C. and in ballast about the eastern seaports. Native of Tropical America.

Rare in our area as an occasional adventive near the larger settlements.

BALSAMINACEAE

1. *Impatiens* [Rivin.] L.

Flowers orange or orange-yellow, mottled; spur incurved.

1. *I. biflora*.

Flowers pale yellow; spur short, spreading.

2. *I. pallida*.

1. **I. biflora** Walt. In moist ground: N. S. to Ore., Alask., Fla., and Kans.

Common throughout the range except in the pine-barrens, there rare or wanting.

2. **I. pallida** Nutt. (*I. aurea* of S. Wats., not of Muhl.).

In moist shaded places: Que. to Ore., Ga. and Kan.

CONN. Rare and local over most of the state, increasing **northwestward**.

N. Y. Very rare on the north shore of L. I., unknown south of the moraine and on S. I.; rare and local in Westchester Co., thence increasing **northward**.

N. J. Very rare and local in Burlington Co., thence unknown to Hudson and Hunterdon counties, except up the drainage of the Delaware, thence increasing but not common **northward**.

PA. Monroe, Northampton, Bucks, Delaware and Chester counties.

Tertiary, o: Cretaceous, very rare near the glacial terraces along the lower Delaware. Older Formations, increasing **northward**. 117-220 days. Sea level-4,020 ft.

RHAMNACEAE

Ovary free from the disk; fruit a drupe.

1. RHAMNUS.

Ovary adnate to the disk at its base; fruit dry.

2. CEANOTHUS.

1. **Rhamnus** [Tourn.] L.

Flowers dioecious or polygamous; nutlets grooved.

Petals present; flowers mainly 4-merous.

1. *R. cathartica*.

Petals none; flowers 5-merous.

2. *R. alnifolia*.

Flowers perfect; nutlets smooth.

3. *R. Frangula*.

1. **R. cathartica** L. Escaped from hedges: E. N. Am. Introduced from Europe.

Not very common as an escape.

2. **R. alnifolia** L'Her. In swamps: N. B. to B. Col., N. J., Ill., Neb. and Cal.

CONN. Northwestern Litchfield Co.

N. Y. Near Pine Plains, Dutchess Co., Copake Falls, Columbia Co.

N. J. Hudson, Morris, Sussex and Warren counties, unknown elsewhere.

PA. Northampton Co.

Tertiary, o: Cretaceous, o: Older Formations, apparently most common on limestone. Not south of the moraine. 123-259 days. 500-1,500 ft.

3. **R. Frangula** L. In bogs: L. I. and N. J. Naturalized from Europe.

Occasional as an escape on L. I. and in northern N. J.; near the City of New York.

The reported occurrence of *R. caroliniana* Walt. in Hudson Co., N. J., is an error based on a misdetermination of a specimen of *R. Frangula* L.

2. *Ceanothus* L.

1. *C. americanus* L. In dry open woods: Me. and Ont. to Man., Kans., Fla. and Tex.

Common throughout our area except in the pine-barrens, there wanting; always increasing **northward**.

VITACEAE

Hypogynous disk present, annular or cup-shaped; leaves not digitately compound in our species.

1. VITIS.

Hypogynous disk obsolete or wanting; leaves digitately compound, the leaflets 5-7.

2. PARTHENOCISSUS.

1. *Vitis* [Tourn.] L.

Leaves woolly beneath.

Pubescence rusty-brown; berries large, musky.

1. *V. Labrusca*.

Pubescence at length whitish; berries small, black, not musky.

2. *V. aestivalis*.

Leaves glabrous or sometimes slightly pubescent when young.

Leaves bluish-white, glaucous beneath.

3. *V. bicolor*.

Leaves not glaucous beneath.

Leaves 3-7 lobed; lobes acute or acuminate.

4. *V. vulpina*.

Leaves sharply dentate; scarcely lobed.

5. *V. cordifolia*.

1. *V. Labrusca* L. In thickets: N. Eng. to Ind., Ga. and Tenn.

Common throughout the region except in the pine-barrens, there wanting; always increasing **northward**.

2. *V. aestivalis* Michx. In thickets: southern N. Eng. to Fla., southern Ont., Wisc. and La.

Common throughout the area, less common in the pine-barrens than elsewhere and perhaps there introduced.

3. *V. bicolor* LeConte. In woods: N. N. Y. to Mich. and N. Car.

CONN. Colebrook, Litchfield Co. and Southington, Hartford Co.

N. Y. Spring Valley, Rockland Co.

N. J. Sussex Co., very rare.

PA. Monroe, Northampton and Bucks counties.

Tertiary, o: Cretaceous, o: Older Formations, scattered indiscriminately on limestone and crystalline rock-soils. 128-159 days.

Sea level-1,900 ft.

4. **V. vulpina** L. Along rocky river banks: N. S. to Man., Md., and Ark.

CONN. Throughout the state, rare except along rivers and streams.
N. Y. Rare on L. I., S. I. and the Bronx; upper end of the Hudson Highlands **northward**, rare.

N. J. In the drainage of the Delaware, from Camden Co., to Sussex, Warren and Morris counties.

PA. Monroe, Northampton and Bucks counties.

A rare and scattered plant the distribution of which is not sufficiently understood.

5. **V. cordifolia** Michx. In moist thickets and along streams: N. Y. to Neb., Fla. and Tex.

N. Y. S. I. and L. I.; recorded from Dutchess Co.

N. J. Throughout the state except in the pine-barrens, there wanting; very rare in the region surrounding them.

PA. Luzerne, Northampton, Bucks, Delaware and Chester counties.

2. **Parthenocissus** Planch.

1. **P. quinquefolia** (L.) Planch. In woods and thickets: Que. to Man., Cuba, Tex. and Mex.

Common throughout the range except in the pine-barrens, there apparently sparingly introduced.

TILIACEAE

1. **Tilia** [Tourn.] L.

Leaves glabrous or nearly so on both surfaces.

1. *T. americana*.

Leaves glabrous above, pubescent beneath.

2. *T. Michauxii*.

Leaves glabrous above, silvery-white beneath.

3. *T. heterophylla*.

1. **T. americana** L. In rich woods and along river-bottoms: N. B. to Ga., Man., Neb. and Tex.

Throughout the range, except in the pine-barrens, there wanting; occasional in the region just west and north of the barrens, otherwise increasing **northward**.

2. **T. Michauxii** Nutt. (*T. pubescens* of the manuals, not of Ait.). In moist woods: Conn. to Fla. and Tex., mostly along the coast.

CONN. Rare near the coast, unknown elsewhere.

N. Y. Near College Point, L. I.

N. J. Rare; Hudson, Bergen, Hunterdon and Middlesex counties, unknown elsewhere.

A highly localized species whose distribution is little understood.

3. **T. heterophylla** Vent. In woods: N. Y. to Fla., Ala., Ky., Ill. and Tenn.

Known only from the region near Slatington and Lehigh Gap, Lehigh Co., Pa., an area with an elevation of about 800 ft., a growing season of about 165 days and underlaid by Hudson River and Utica shales.

The common European linden, *Tilia europaea* L. is often planted and is a not infrequent escape, but is scarcely persistent.

Corchorus tridens L. and *C. trilocularis* L. are rare waifs near New York and Philadelphia.

MALVACEAE

Stamen-column anther-bearing at the summit.

Carpels 1-seeded.

Involucels of 6-9 bractlets.

1. ALTHAEA.

Involucels of 1-3 bractlets, or none.

Stigmas linear, on the inner side of the style-branches.

2. MALVA.

Stigmas capitate, terminal.

3. SIDA.

Carpels 2-several-seeded.

4. ABUTILON.

Stamen-column anther-bearing below the entire or 5-toothed summit.

Carpels 1-seeded.

5. KOSTELETZKYA.

Carpels several-seeded.

6. HIBISCUS.

1. *Althaea* L.

1. **A. officinalis** L. In salt marshes: Mass. and N. Y. to Pa. Naturalized from Europe.

Occasional as naturalized plant in some of our salt-marshes.

A. rosea Car., the Hollyhock, is not infrequent as an escape in some parts of our range, hardly ever becoming established.

2. *Malva* [Tourn.] L.

Leaves with 5-9 shallow, angular lobes.

Petals 2-4 times the length of the calyx.

1. *M. sylvestris*.

Petals 1-2 times the length of the calyx.

Procumbent, low.

2. *M. rotundifolia*.

Erect, tall; leaf-margins crisped.

3. *M. crispa*.

Leaves deeply 5-7-lobed or pinnatifid.

Stem leaves 1-3 pinnatifid; carpels downy.

4. *M. moschata*.

Stems leaves deeply lobed; carpels glabrous.

5. *M. Alcea*.

1. **M. sylvestris** L. In waste places and along roadsides: throughout N. Am. Adventive from Europe.

Rare as an adventive weed.

2. **M. rotundifolia** L. In waste places: throughout E. N. Am. Naturalized from Europe.

A common weed throughout the range, except in the pine-barrens, there rare or wanting.

3. **M. crispa** L. In waste places sparingly escaped from gardens: N. S. to S. Dak. and Pa. Introduced from Europe and Asia.
An occasional escape, especially in N. J., often wanting and hardly persistent.
4. **M. moschata** L. In waste places: E. N. Am. Adventive from Europe.
Occasional as a weed, except in the pine-barrens.
5. **M. Alcea** L. In waste places occasionally escaped from gardens: E. N. Am. Introduced from Europe.
An occasional escape from gardens, especially near the City of New York.

M. arvensis Presl. and *M. borealis* Wallr. have been collected as waifs near New York.

3. **Sida** L.

1. **S. spinosa** L. In waste places: Me. to N. J., Mich., Kan., Fla., and Tex. and in Trop. Am.
Not uncommon as a weed especially in southern N. J. where perhaps native; not definitely known from L. I.

S. rhombifolia L., *S. angustifolia* Juss., *S. carpinifolia* L. f. and *S. linifolia* Cav. have been collected near some of our larger cities.

4. **Abutilon** Gaertn.

1. **A. Abutilon** (L.) Rusby. In waste places: common throughout N. Am. Native of southern Asia.
Common as a weed throughout most of the area, except the pine-barrens, there rare or wanting.

5. **Kosteletzkya** Presl.

1. **K. virginica** (L.) A. Gray. In salt or brackish marshes: N. Y. to Fla. and La.
N. Y. The marshes along the north shore of L. I., near the western end; unknown elsewhere.
N. J. Hudson Co., increasing and common **southward** in coastal marshes.
PA. Philadelphia Co., on the Delaware.
Apparently confined to salt marshes, more common **southward** than elsewhere.

6. **Hibiscus** L.

Tall perennial herbs.

Calyx segments triangular-lanceolate; capsule ovoid-conic,
long pointed.

Calyx segments triangular-ovate; capsule globose-ovoid.

Low hairy annual of waste places.

Tall woody shrub, escaped from gardens.

1. *H. oculiroseus*.
2. *H. Moscheutos*.
3. *H. Trionum*.
4. *H. Syriacus*.

1. **H. oculiroseus** Britton. In salt marshes: N. Y. and N. J.
N. Y. Frequent on L. I. and S. I.
N. J. Near Absecon, Atlantic Co., Island Heights, Ocean Co.,
South River, Middlesex Co.
A rare and highly local species to be looked for elsewhere, as it
becomes better known, and studied in relation to the following
species.
2. **H. Moscheutos** L. In brackish marshes: Mass. to Fla. and
La., locally in saline situations in the interior.
Common throughout the salt marshes of our area, and along the
edges and scattered through the center of Pensauken Sound;*
ascending the river valleys.
3. **H. Trionum** L. In waste places: N. S. to Fla., S. Dak. and
Kan. Adventive from southern Europe.
Locally common as a weed in most parts of our range.
4. **H. Syriacus** L. Escaped from cultivation: Conn. to Ga.
Rare as an occasional escape from gardens.

Malvastrum spicatum (L.) A. Gray, *M. coromandelianum* (L.) Garcke, *Sphaeralcea
miniata* Cav., *Modiola caroliniana* (L.) G. Don., *Pavonia hastata* Cav. *Urena lobata* L.
and *Gossypium barbadense* L. have all been collected near the larger cities as waifs.

HYPERICACEAE

Sepals 4, in unequal pairs; petals 4.

Sepals and petals 5.

Petals yellow.

Leaves normal, not reduced to scales.

Leaves reduced to minute, appressed scales.

Petals pink or greenish-purple.

1. ASCYRUM.

2. HYPERICUM.

3. SAROTHTA.

4. TRIADENUM.

1. **Ascyrum** L.

Erect, 3-6 dm. high; leaves clasping; styles 3 or 4.

Diffusely branched, 1-2.5 dm. high; leaves sessile; styles 2.

1. *A. stans*.

2. *A. hypericoides*.

* See Introduction paragraph 21 and *pl. 9*.

1123

42°
30'

42°

41°
30'

41°

40°
30'

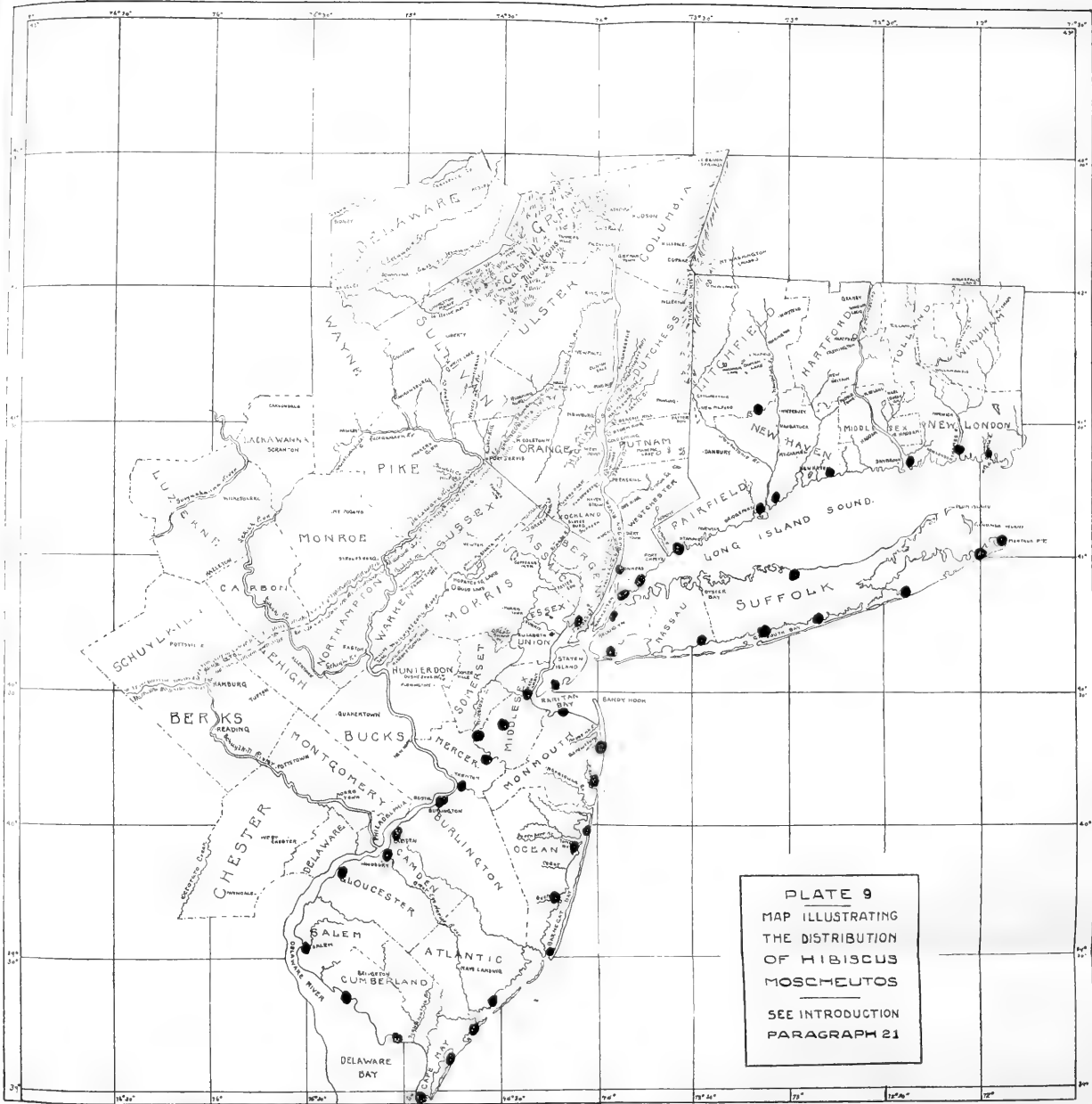


PLATE 9
 MAP ILLUSTRATING
 THE DISTRIBUTION
 OF *HIBISCUS*
MOSCHEOTOS
 —
 SEE INTRODUCTION
 PARAGRAPH 21

1. **A. stans** Michx.* In dry sandy soil: N. J. to Fla., Tenn. and Tex.
 N. J. Common in the pine-barrens, rare in the area surrounding them; unknown elsewhere.
 PA. Near Bristol, Bucks Co.
 Tertiary, common on Beacon Hill, rare elsewhere: Cretaceous, rare and scattered: Older Formations, o. 179-220 days. About sea level.
2. **A. hypericoides** L. In dry sandy soil: Mass. to Fla., Ill., Kan. and Tex.
 N. Y. Rare and local on L. I. and S. I., unknown elsewhere.
 N. J. Rare and local in Hudson, Mercer and Middlesex counties, thence increasing and becoming common **southward**, especially in the pine-barrens.
 PA. Bucks, Delaware and Chester counties.
 Tertiary, common: Cretaceous, less common: Older Formations, usually on or near the edge of the coastal plain. 179-220 days. About sea level.

2. *Hypericum* [Tourn.] L.

- Styles 5; large perennial; pods 5-celled.
 Styles 3 (rarely 4).
 Tall leafy shrub; pods 3-celled.
 Herbaceous, sometimes woody at the base.
 Stamens numerous, 15-40; flowers 6-25 mm. broad.
 Capsules 1-celled, or incompletely 3-5-celled.
 Capsules incompletely 3-4-celled.
 Capsules strictly 1-celled.
 Styles united into a beak, separate above;
 stigmas entire.
 Leaves oblong or linear-oblong; capsule 7 mm. long.
 Leaves elliptic; capsule about 4 mm. long.
 Styles separate; stigmas capitate.
 Capsules completely 3-celled; styles separate.
 Leaves linear to linear-oblong; sepals lanceolate.
 Leaves broadly oblong, ovate or ovate-lanceolate.
 Stamens few, 5-12; flowers 1-6 mm. broad.
 Cyme leafy-bracted.
1. *H. Ascyron*.
 2. *H. densiflorum*.
 3. *H. adpressum*.
 4. *H. Bissellii*.
 5. *H. ellipticum*.
 6. *H. virgatum*.
 7. *H. perforatum*.
 8. *H. punctatum*.
 9. *H. boreale*.

* The specimen of Miller and Young, upon which they incorrectly based the record of this plant's occurrence in Suffolk Co., L. I., was collected by H. W. Howland, in August, 1871, in the pine-barrens of Ocean County, N. J.

Cymes subulate bracted.

Leaves 5-7 nerved, not linear.

Leaves ovate, oval or oblong; capsule
2-5 mm. long.

Leaves obtuse; sepals linear-oblong. 10. *H. mutilum*.

Leaves acute, or only the lower
obtuse; sepals long acuminate. 11. *H. gymnanthum*.

Leaves lanceolate or oblong-lanceolate;
capsule 8-10 mm. long. 12. *H. majus*.

Leaves 3-5-nerved, linear or linear-oblong,
obtuse.

Leaves narrowed at the base. 13. *H. canadense*.

Leaves rounded or clasping at the base. 14. *H. dissimulatum*.

1. **H. Ascyron** L. Banks of streams: Que. and Vt. to Man., Conn., N. J., Ill. and Kan. Also in Europe and Asia.
CONN. Not very common in New Haven, Fairfield, Hartford, and Litchfield counties, increasing **northwestward**.
N. Y. The Catskills in Sullivan and Ulster counties.
N. J. Rare in Burlington Co., increasing **northward**, on the bank of the Delaware River.
PA. Pike, Northampton and Bucks counties, all the stations near or on the Delaware.
Tertiary, o: Cretaceous, very rare: Older Formations, increasing **northward**, especially in the valley of the Delaware. 127-183 days. Sea level-1,900 ft.
2. **H. densiflorum** Pursh. Pine-barrens: N. J., Ark. and Tex.
N. J. Common throughout the pine-barrens, decreasing in the region immediately surrounding the barrens; wanting elsewhere.
Tertiary, common on Beacon Hill, decreasing elsewhere: Cretaceous, scattered in Middlesex and the counties southwest of it: Older Formations, o. 179-220 days. About sea level.
- 2A. **H. prolificum** L. Sandy soil: Ont. and N. Y., Minn. and Ga.
PA. Philadelphia Co.
Records of this species from the coastal plain of N. J. refer to *H. densiflorum*.
3. **H. adpressum** Bart. Low grounds: Mass. to Ga., La., Mo. and Ark.
CONN. Very rare along the coast east of the Connecticut River.
N. Y. Local on L. I.
N. J. Rare in Bergen Co., not known between it and Monmouth Co., thence local along the edges of the pine-barrens, wanting in the pine-barrens.

PA. Bucks, Delaware and Philadelphia counties.

Tertiary, wanting on Beacon Hill, rare elsewhere: Cretaceous, rare: Older Formations, rare and scattered. 179-220 days. About sea level.

4. **H. Bissellii** Robinson. Known only from its original locality at Southington, Conn.
5. **H. ellipticum** Hook. In swamps and along streams: N. S. to Man., Conn., N. J., Pa., Md. and Minn.
CONN. Throughout the state.
N. Y. Unknown on L. I. and S. I.; rare and local in northern Westchester Co., thence increasing **northward**.
N. J. Very rare along the Delaware in Camden and Burlington counties; Hunterdon and Morris counties, increasing **northward**.
PA. Pike, Monroe, Northampton, Schuylkill, Bucks and Montgomery counties.
Tertiary, o: Cretaceous, very rare in the drainage of the Delaware: Older Formations, increasing **northward**. 117-183 days. Sea level-4,020 ft.
6. **H. virgatum** Lam. (*H. virgatum ovalifolium* Britton). Moist grounds: pine-barrens of N. J. to Florida and Tennessee.
N. J. Common in the pine-barrens, decreasing just outside the barrens and unknown elsewhere; formerly reported from Hudson Co.
PA. Bristol, Bucks Co.
Tertiary, common on Beacon Hill, decreasing outside it: Cretaceous, rare and scattered: Older Formations, o. 160-220 days. About sea level.
7. **H. perforatum** L. In fields and waste places; throughout eastern N. Am. Naturalized from Europe.
Common throughout the range as a weed; perhaps wanting in the middle of the pine-barrens of N. J.
8. **H. punctatum** Lam. (*H. subpetiolatum* Bicknell, *H. maculatum* Walt.). In moist soil: Me. and Ont. to Minn., Fla., Kan. and Tex.
Common throughout the range, except in the pine-barrens, there rare; occasional in the region immediately surrounding the barrens.
9. **H. boreale** (Britton) Bicknell. Wet soil: Newf. to Vt., N. J. and Va.

CONN. Not definitely reported, perhaps occurring in most parts of the state.

N. Y. Common on the L. I. coastal plain.

N. J. Locally common throughout, especially along the coast.

PA. Luzerne Co.

Distribution scattered and little understood.

10. *H. mutilum* L. In low grounds: N. S. to Man., Fla., Kan. and Tex.

Common everywhere except in the pine-barrens, there unknown.

11. *H. gymnanthum* Engelm & Gray. In low grounds: N. J. and Del. to Minn., La. and Tex.

Known in our range from two stations in Gloucester and Burlington counties, N. J. Both are on the edge of the pine-barrens, and are underlaid by Cretaceous sands and gravels. Reported also from Bucks and Delaware counties, Pa.

12. *H. majus* (Gray) Britton. In moist soil: Me. to Mich., N. J. and Neb.

CONN. Rare and local over most of the state, increasing northward.
N. Y. Rare on L. I., a single station on S. I., thence increasing **northward**.

N. J. A single station in Camden Co., near the Delaware, not recently collected; local in Hudson, Morris and Sussex counties, thence increasing **northward**.

Tertiary, o: Cretaceous, known only from a single station on a glacial terrace along the lower Delaware: Older Formations, increasing **northward**, 117-176 days. Sea level-3,365 ft.

13. *H. canadense* L. In wet sandy soil: Newf. to Man., Ga., Ky. and Wisc.

Common throughout the range.

14. *H. dissimulatum* Bicknell. Damp or wet sandy soil: Me. to N. C.

N. Y. Springfield and Rosedale, L. I., and on S. I.

H. humifusum L. has been recorded as a waif near New York and Philadelphia.

3. *Sarothra* L.

1. *S. gentianoides* L. In sandy soil: Me. to Fla., Ont., Minn., Mo. and Tex.

Common throughout the range, nearly always as a weed.

4. **Triadenum** Raf.

1. **T. virginicum** (L.) Raf. In swamps: Lab. to Fla., Man., Neb. and La.

Common throughout the range.

The reported occurrence of *T. petiolatum* (Walt.) Britton, in N. J., rests on a specimen collected "near Camden" many years ago. It has never been seen since.

ELATINACEAE

1. **Elatine** L.*

1. **E. americana** (Pursh) Arn. Margins of pools and in slow streams: Me. and Ont. to Va., Mo. and Tex. Also in Colo. and Oregon.

Scattered and local in most parts of the area.

CISTACEAE

Petals 5, yellow, fugacious or wanting.

Leaves broad, lanceolate or oblong.

1. **CROCANTHEMUM.**

Leaves subulate or scale-like, imbricated; style long.

2. **HUDSONIA.**

Petals 3, not yellow, persistent; flowers minute; style none.

3. **LECHEA.**

1. **Crocanthemum** Spach. [*Helianthemum* of Amer. Auth.].

Petaliferous flowers 5-12, in a short, terminal, cymose raceme, their capsules 3-4 mm. long.

Petaliferous flowers short-pedicelled, their pods thicker than long. 1. *C. majus.*

Petaliferous flowers long-pedicelled, their pods longer than thick. 2. *C. propinquum.*

Petaliferous flowers solitary, rarely 2, their capsules 6-8 mm. long.

Leaves oblong, acute; branches erect.

3. *C. canadense.*

Leaves oval or elliptic; branches spreading.

4. *C. dumosum.*

1. **C. majus** (L.) Britton (*Helianthemum majus* (L.) B. S. P.).

In dry soil: N. S. to S. Dak., Neb., N. Car. and Tex.

CONN. Not very common throughout the state, decreasing inland.

N. Y. Common on L. I. and S. I., decreasing up the Hudson

Valley to Pine Plains, Dutchess Co., unknown northward.

N. J. Common throughout the state, except in the pine-barrens.

PA. Montgomery, Bucks, Delaware and Chester counties.

Tertiary, common: Cretaceous, less common: Older Formations, scattered. Predominating south of the moraine. 143-220 days. Sea level-900 ft.

2. **C. propinquum** Bicknell. Dry soil: E. Mass. to N. J.

N. Y. Not uncommon on L. I.

N. J. Landisville.

* See footnote, page 76.

- 3: **C. canadense** (L.) Britton. In dry rocky or sandy soil: Me. to Ont., Wisc., N. Car. and Ky.

Common throughout the range, but not specifically known from the mountains of the Catskills and of Pa.

4. **C. dumosum** Bicknell. Dry soil: E. Mass. and L. I.

Known, in our area, only from the Hempstead Plains of L. I.

The reported occurrence of *C. corymbosum* (Michx.) Britton, in N. J. is based on a very old specimen collected in "N. Jersey." The specimen may be from further south, as the species has never since been collected in the state.

2. **Hudsonia** L.

Flowers slender-pedicelled; leaves subulate.

1. *H. ericoides*.

Flowers nearly sessile; leaves scale-like.

2. *H. tomentosa*.

1. **H. ericoides** L. In dry sandy soil: N. S. to Vt. and Va.

N. Y. Rare on L. I. and S. I., unknown elsewhere.

N. J. Common in the pine-barrens, rare in Middlesex Co., north of the barrens, and at Atlantic City, unknown elsewhere.

Tertiary, common on Beacon Hill, wanting or rare elsewhere; Cretaceous, scattered: Rare on the overwash plain on L. I. About sea-level.

2. **H. tomentosa** Nutt. Mostly in sands of the seashore and in pine-barrens: N. B. and N. H., southward to Va.

CONN. Mostly near the coast, but found also at Ledyard.

N. Y. Common on L. I. and S. I., unknown elsewhere.

N. J. From Middlesex Co., southward, especially abundant along the coast, occasional in the pine-barrens.

Tertiary, common: Cretaceous, scattered: practically confined to modern coastal sands. 166-220 days. About sea-level.

3. **Lechea** Kalm

Leaves of the basal shoots oblong to ovate, not more than 3 times as long as broad.

Outer sepals longer than the inner; panicle very leafy.

1. *L. minor*.

Outer sepals equalling or shorter than the inner.

Pod oblong; pedicels slender, 2-4 mm. long.

2. *L. racemulosa*.

Pod globose; pedicels about 1 mm. long.

Erect, villous-pubescent.

3. *L. villosa*.

Ascending, bushy-branched, tomentose-canescens.

4. *L. maritima*.

Leaves of the basal shoots lanceolate or linear, usually more than 3 times as long as broad.

Stem leaves narrowly linear; inner sepals 1-nerved.

5. *L. tenuifolia*.

Stem leaves oblong linear; inner sepals 3-nerved.

Pod obovoid, 1 mm. in diameter.

Pod globose, 2 mm. in diameter.

6. *L. Leggettii*.

7. *L. intermedia*.

1. ***L. minor*** L. In dry open grounds: E. Mass. to Mich., Fla. and La.
 CONN. Very rare and local over most of the state, more common near the coast than elsewhere.
 N. Y. Common on L. I. and S. I. and in the southern parts of Westchester County, unknown elsewhere.
 N. J. Throughout the state, more common in the pine-barrens and less common in the north than elsewhere.
 PA. Bucks and Chester counties.
 Tertiary, common on Beacon Hill, scattered elsewhere: Cretaceous, scattered: Older Formations, rare in locally sandy places. 153-220 days. Sea level-900 ft.
2. ***L. racemulosa*** Michx. In dry sandy soil: N. Y. to Ind., south to Fla. and Tenn.
 N. Y. Common on the south side of L. I. and up the Hudson Valley to West Point, unknown northward.
 N. J. Throughout the state, increasing **southward**, especially in the pine-barrens.
 PA. Carbon, Luzerne, Northampton, Bucks and Chester counties. Distribution scattered and not easy of explanation.
3. ***L. villosa*** Ell. In dry soil: Mass. and Vt. to S. Ont., south to Neb., Fla. and Tex.
 Throughout the area, but decreasing west of the N. J. pine-barrens.
4. ***L. maritima*** Leggett. Sands of the sea-shore and in sandy barrens: Me. to Ga. Also at Crawford Notch, N. H.
 Common throughout the coastal, sandy places and in the pine-barrens of N. J.; unknown elsewhere in our area.
5. ***L. tenuifolia*** Michx. In dry open places: E. Mass. to Wisc., Neb., Fla. and Tex.
 CONN. Throughout the state.
 N. Y. Not very common on the north shore of L. I. and up the Hudson Valley to Westchester Co.
 N. J. Known only from an old record at Phalanx, Monmouth Co.
 A rather rare and local species whose distribution is not as yet understood.

6. **L. Leggettii** Britton and Hollick. In open places: Mass. to Ind. and N. Car.

Throughout the range, more common near the coast and in the pine-barrens than elsewhere; rare or wanting at higher elevations.

7. **L. intermedia** Leggett. In open places: Conn., N. J. and Pa. to N. B. and northern N. Y. and Ont.

CONN. Litchfield Co.

N. Y. Unknown on L. I. or S. I., rare and local from Bronx and Westchester counties **northward**.

N. J. A single station near South Amboy, Middlesex Co., thence unknown except in Morris, Passaic, Sussex and Warren counties, increasing and common northwestward.

PA. Monroe, Northampton, Lehigh, Carbon, and Philadelphia counties.

VIOLACEAE*

Sepals not auricled; petals equal in length; stamens united into a sheath. 1. **CUBELIUM**.
 Sepals auricled; lower petal spurred; stamens distinct, the 2 lower spurred. 2. **VIOLA**.

1. **Cubelium** Raf.

1. **C. concolor** (Forst.) Raf. In moist woods: Ont. to Mich., N. Car. and Kan.

N. J. Local in Hunterdon Co.

PA. Northampton, Lehigh, Bucks, Berks, Philadelphia, Delaware and Chester counties.

2. **Viola** L.†

- I. Plant stemless, arising directly from a rootstock or from runners.

Style ending in a small hook pointing downward, flowers very fragrant; producing leafy runners.

1. *V. odorata*.

Style not ending in a downward pointing hook.

Style beakless.

Leaves pedatifid; flowers violet or purple.

2. *V. pedata*.

Leaves repand crenulate, not divided; flowers yellow.

3. *V. rotundifolia*.

Style dilated upward in a vertical plane, capitate, with a conical beak on the lower side.

Rootstock fleshy and thickened, without under-

* Ecological data are omitted in many species of this family as, owing to the scarcity of material, the recent instability of the specific status of many of them and the numerous hybrids, such data must, as yet, be of doubtful value.

† My thanks are due Dr. Ezra Brainerd for much help and criticism in the preparation of the treatment of this genus.

- ground runners; petals violet-blue to purple, the lateral bearded.
- Leaves heart-shaped, the margins merely crenate-serrate, or in nos. 9, 10 and 11, some leaves lobed but the cleistogamous flowers on prostrate peduncles.
- Plants glabrous or nearly so.
- Beard of the lateral petals strongly knobbed; cleistogamous flowers long and slender.
- Beard of the lateral petals not strongly knobbed; cleistogamous flowers ovoid or ovoid-acuminate.
- Cleistogamous flowers mostly on ascending peduncles; capsules 5-10 mm. long.
- Leaves and sepals obtuse; capsules green.
- Leaves and sepals acute; cleistogamous capsules usually purplish.
- Cleistogamous flowers mostly on short prostrate peduncles; capsules 10-15 mm. long.
- Leaves all undivided.
- Early leaves purplish beneath; plants of sandy or dry soil.
- Early leaves green; moist soil.
- Leaves palmately lobed or parted.
- Plants more or less pubescent.
- Leaves all palmately 5-11-lobed or parted, or rarely the first leaf of spring uncut; seeds brown.
- Earliest and latest leaves uncut, others pedately 3-7-lobed, parted or divided; seeds usually buff.
- Leaves all uncut.
- Spurred petal glabrous, or bearing only scattered hairs; capsules 8-10 mm. long.
- Spurred petal villous; capsules 5-8 mm. long.
- Pubescent only on the upper surface of the leaf.
- Pubescent on petioles and lower surface of the leaf; sepals ciliolate.
4. *V. cucullata.*
5. *V. nephrophylla.*
6. *V. obliqua.*
7. *V. latiuscula.*
8. *V. papilionacea.*
9. *V. Stoneana.*
10. *V. palmata.*
11. *V. triloba.*
12. *V. sororia.*
13. *V. hirsutula.*
14. *V. septentrionalis.*

- Leaves not heart-shaped, usually sharply dentate toward the base or lobed; cleistogamous flowers sagittate, on erect peduncles; capsules green.
- Leaves pedately divided into linear lobes. 15. *V. Brittoniana*.
- Leaves not divided but usually sharply toothed toward the base.
- Scapes usually exceeding the leaves, the latter ovate-oblong, pubescent. 16. *V. fimbriatula*.
- Scapes as long as the leaves or shorter.
- Leaves lanceolate, glabrous; basal lobes often dilated and incised. 17. *V. sagittata*.
- Leaves ovate-deltoid or deltoid.
- Margins coarsely toothed near the base; blades sometimes lobes. 18. *V. emarginata*.
- Margins sharply toothed towards the base or pectinately incised. 19. *V. pectinata*.
- Rootstock long and filiform, producing slender underground runners, except in *V. renifolia*.
- Petals lilac or pale violet. 20. *V. Selkirkii*.
- Petals white with purple lines on the 3 lower ones.
- Leaves glabrous on both sides, rarely pubescent in nos. 20 and 21.
- Leaves lanceolate or linear-lanceolate. 21. *V. lanceolata*.
- Leaves heart-shaped or ovate.
- Leaves ovate, acute, the base subcordate obtuse or almost decurrent. 22. *V. primulifolia*.
- Leaves heart-shaped, usually obtuse. 23. *V. pallens*.
- Leaves pubescent on one or both sides.
- Leaves reniform, pubescent; runners almost always small or wanting. 24. *V. renifolia*.
- Leaves heart-shaped.
- Lateral petals beardless; leaves minutely hairy above, especially on the basal lobes; plant elsewhere glabrous. 25. *V. blanda*.
- Lateral petals bearded; plant pubescent. 26. *V. incognita*.

II. Plants with leafy stems.

Stipules entire, the lower more or less scarious.

Petals yellow.

- Softly pubescent; root leaves often wanting; stem leaves broad, often 7 cm. wide or wider.
- Sparingly pubescent, root leaves usually 1-2; stem leaves rarely over 7 cm. wide.
- Petals white inside, tinged with violet outside.
- Stipules fringed toothed or lyrate-pinnatifid, herbaceous or leaf-like.
- Style slender, not much enlarged upward; stipules somewhat herbaceous, fringe toothed.
- Tip of the style bent downward, slightly pubescent near the apex.
- Petals white or cream colored.
- Petals pale violet or violet purple.
- Style straight and glabrous; petals lilac with violet spot near the center.
- Style much enlarged upward; stipules large, leaf-like and lyrate-pinnatifid.
- Stipules pinnatisect at the base; upper leaves crenately serrate.
- Stipules palmately pectinate at the base; upper leaves entire or nearly so.
27. *V. pubescens*.
28. *V. eriocarpa*.
29. *V. canadensis*.
30. *V. striata*.
31. *V. conspersa*.
32. *V. rostrata*.
33. *V. arvensis*.
34. *V. Rafinesquii*.
1. **V. odorata** L. Escaped from gardens: Nov. Scot. to southern N. Y. and N. J. Also in the south and on the Pacific coast. Native of Europe.
Rare as an occasional escape from gardens.
 2. **V. pedata** L. (*V. pedata lineariloba* DC.). In open sandy places: Me. and Ont. to Minn., Mo. and Fla.
Common over most of our range, always decreasing inland and increasing in the sandy regions of the coastal plain except in the pine-barrens, there rare.
 3. **V. rotundifolia** Michx. Rocky woods and hillsides: Lab. and Ont. to Minn., south in the mountains to N. Car.
CONN. Rare and local in the coastal part of New London Co., increasing and common **northwestward**.
N. Y. A single station on L. I. On S. I. near Bull's Head, rare and local in Bronx and Westchester counties, increasing and common **northward**.
N. J. Kinkora, Burlington Co.; reported but not definitely known from near Keyport, Monmouth Co., increasing **northward**.
PA. Throughout, increasing at higher elevations.
Tertiary, o: Cretaceous, very rare: Older Formations, increasing **northward**. Predominating north of the moraine. 117-220 days. Sea level-2,800 ft.

4. **V. cucullata** Ait. In wet places: Me. and Ont. to Ga. and Mo.
Common throughout the range in favorable situations except the pine-barrens.

The following species have been reported as hybridizing with *V. cucullata* and the various hybrids are to be looked for wherever both the supposed parents occur: *cucullata* × *emarginata*, *cucullata* × *palmata*, *cucullata* × *papilionacea*, *cucullata* × *primulifolia*, and *cucullata* × *sagittata*.

5. **V. nephrophylla** Greene. Cold mossy bogs and along streams: E. Que. to B. C., south to central Me., northwestern Conn., Wisc., Col. and Wash.

Known in our range only from Litchfield Co., Conn., there rare and local. The region is north of the moraine, with a growing season of about 145 days and the stations are at 1,400–1,860 ft.

6. **V. obliqua** Hill (*V. affinis* Le Conte). Moist thickets and boggy meadows: western N. E. to Wisconsin and southward.
Common throughout the range, except the pine-barrens and east and south of them, apparently always increasing **northward**.

The following hybrids have been recorded: *V. affinis* × *Brittoniana*, *affinis* × *fimbriatula*, *affinis* × *hirsutula*, *affinis* × *palmata*, and *affinis* × *sagittata*. Mr. Bicknell is of the opinion that the older name *V. obliqua* Hill. belongs to this species (Bull. Torr. Club, 40: 261–270). See this paper also for a discussion of the application of the names *V. cucullata* Ait. and *V. papilionacea* Pursh.

7. **V. latiuscula** Greene. In dry light soil: Vt. to N. J. (?)
Known in our area only from Southington and Cornwall, Conn. A rare and little known plant.

8. **V. papilionacea** Pursh. In moist meadows and groves: Mass. to Minn. and southward.
Throughout the range except the pine-barrens and east and south of them.

The following hybrids have been described: *V. papilionacea* × *sagittata*, *papilionacea* × *sororia*.

9. **V. Stoneana** House. In moist woodlands: N. J., e. Pa. and Md.
N. J. Known only from Middlesex Co., but probably southwestward through the Cretaceous region.
PA. Chester Co.
Tertiary, o: Cretaceous, rare and local: Older Formations, o: not north of the moraine. 175–204 days. About sea level.

10. **V. palmata** L. Dry rich woodlands: Mass. to Minn. and south to Ga. and Ark.

Common throughout the range, except in the pine-barrens and east and south of them.

The following hybrids have been described: *V. palmata* × *papilionacea*, and *palmata* × *sagittata*.

11. **V. triloba** Schwein. In dry woods: S. N. E. and S. N. Y. southward.

Common throughout the range except the pine-barrens.

12. **V. sororia** Willd. In various situations: Quebec to Minn. and southward.

Common throughout the range, except in the pine-barrens of L. I. and N. J., there rare and local or perhaps wanting.

The following hybrid is known: *V. sororia* × *cucullata*.

13. **V. hirsutula** Brainerd. Dry rich woods: S. N. Y. to Ky. and Ga.

N. Y. Reported but not definitely known, except on S. I.

N. J. Green Pond, Warren Co., increasing and common southward.

PA. Northampton Co., increasing southward.

The following hybrid is known: *V. hirsutula* × *sororia*.

14. **V. septentrionalis** Greene. Moist open woodlands, especially under conifers: Prince Ed. Is., Que. and Ont. to Conn. and N. Y.

CONN. Recorded as rare. Roadsides and shaded banks: Union, East Windsor, Plainville, New Hartford, and Winchester.

N. Y. Mt. Utsayantha, Stamford, Delaware Co., at an elevation of 3,000 ft.

N. J. Bearfort Mt., Passaic Co.

15. **V. Brittoniana** Pollard. In moist, sandy or peaty soil, or in meadows near the coast: S. Me. to N. Car.

CONN. Common along the coasts, decreasing inland.

N. Y. Common on L. I. and S. I.; Rockland Co.

N. J. Common along the coast, decreasing inland, and apparently wanting in Somerset, Hunterdon, Warren, Sussex and Passaic counties.

PA. Bucks and Philadelphia counties.

Most common in the coastal region.

Hybrids: *Brittoniana* × *cucullata*, *emarginata*, *fimbriatula*, *papilionacea*, *sagittata* and *sororia*.

16. **V. fimbriatula** Sm. Sandy hillsides and fields: N. S. to Wisc. and south to Mo. and La.

Throughout the range except the pine-barrens, there rare and perhaps intrusive.

The following hybrids are found. *V. fimbriatula* × *hirsutula*, *fimbriatula* × *palmata*, *fimbriatula* × *sagittata*.

17. **V. sagittata** Ait. Moist banks and fields: Mass. to Minn., south to Ga. and Tex.

CONN. Not very common along the coast, decreasing northward. N. Y. Rare on L. I.; common on S. I., decreasing up the Hudson Valley to Dutchess Co.

N. J. Throughout, more common southward except the pine-barrens, there rare.

PA. Northampton and Bucks Co., increasing southward.

V. sagittata × *Brittoniana*, has been reported as a hybrid.

18. **V. emarginata** Le Conte. Dry woods and hillsides: N. Y. to Va.

N. Y. Known only from S. I., L. I. and Rockland Co.

N. J. Morris Co., increasing and common **southward**, but rare in the pine-barrens.

PA. Bucks, Montgomery, Philadelphia, Delaware and Chester Co.

Tertiary, not very common: Cretaceous, common: Older Formations, scattered. Very rare north of the moraine. 164–204 days. About sea level.

Hybridizes with *V. sagittata* and *sororia*.

19. **V. pectinata** Bicknell. Low meadows: E. Mass. to Md.

CONN. Stratford.

N. Y. L. I. and S. I.

N. J. Cape May.

20. **V. Selkirkii** Pursh. Shaded ravines and cold woods: N. B. to Mass., W. Pa., L. Superior and northward.

N. Y. Reported but not definitely known from Dutchess Co., rare on the highest mountains in Ulster and Greene counties.

PA. Monroe Co.

Tertiary, o: Cretaceous, o: Older Formations, increasing at high elevations. Not south of the moraine. 117–123 days. 1,850–4,000 ft.

21. **V. lanceolata** L. In wet places: N. S. to Minn., south to Fla. and Tex.

Common throughout the range especially on the coastal plain.

V. lanceolata × *primulifolia* has been reported as a hybrid.

22. **V. primulifolia** L. In moist or dry soil: N. B. and south along the coast to Fla. and La.

CONN. Throughout, except in Litchfield Co., increasing coastward.
N. Y. Common on L. I. and S. I., decreasing up the Hudson Valley and perhaps not north of the Highlands.

N. J. Rare and local in Bergen, Union and Hudson counties, increasing and common **southward**.

PA. Northampton, Lehigh, Montgomery, Bucks, Berks, Philadelphia, Delaware and Chester counties.

Tertiary, common: Cretaceous, common: Older Formations, decreasing northward. 164–220 days. **Sea level**–900 ft.

23. **V. pallens** (Banks) Brainerd. In moist places: Lab. to B. C., south to the Mountains of S. C. and Tenn., Mich. and Wyoming.

Throughout the range, except in the pine-barrens and east and south of them.

V. pallens × *primulifolia* has been reported as a hybrid.

24. **V. renifolia** Gray. In swamps and cold woods: Newf. to B. C., south to N. E. Pa., Mich. and Minn.

Known in our range only from the highest peaks of Greene Co., N. Y. at elevations of 2,000 ft. or greater and having a growing season of about 123 days.

25. **V. blanda** Willd. Moist rich woodlands: N. Que. to Minn. and south to Ga and La.

Throughout the range except on the coastal plain, there rare near the edges.

26. **V. incognita** Brainerd. Mountain slopes and low moist woodlands: Newf. and E. Que., south to Pa. and westward.

CONN. Litchfield Co.

N. Y. In the highest peaks of the Catskills; doubtfully reported from S. I.

PA. In the mountains of Luzerne Co.

Tertiary, 0: Cretaceous, 0: Older Formations, increasing at higher elevations. Not south of the moraine. 117–153 days. 680–3,305 ft.

27. *V. pubescens* Ait. Dry rich woods: S. Me. to Ont., Kan. and Md.
Throughout the range except on the coastal plain.
28. *V. eriocarpa* Schwein. (*V. scabriuscula* (T. & G.) Schwein.).
In moist thickets: E. Que. to Lake Winnipeg, south to Ga. and Tex.
Throughout the range except the pine-barrens and east and south of them, and on L. I., there not known.
29. *V. canadensis* L. In woods: Newf. to N. Vt., south to N. Car., Neb., New Mex. and Ariz.
CONN. Rare and local along the coast in New Haven Co., increasing **northwestward**.
N. Y. Delaware, Greene, Sullivan and Ulster counties; formerly at Damascus, L. I.
N. J. Recorded as formerly in Warren and Bergen counties.
PA. Bucks and Monroe counties.
Tertiary, o: Cretaceous, o: Older Formations, increasing northward. South of the moraine only in Bucks Co., Pa. 117-189 days. Sea level-3,900 ft.
30. *V. striata* Ait. Low or shady ground: Conn. (?) to Minn. and south to Ga. and Mo.
N. J. Warren, Hunterdon, Essex, Bergen, Union, Somerset and Mercer counties.
PA. Northampton, Bucks, Philadelphia, Delaware and Chester counties.
Reported but not definitely known from Conn. and N. Y.
31. *V. conspersa* Reichenb. (*V. labradorica* of Britton's Manual).
In low or shaded ground: E. Que. to Minn., south to N. Car. and Ky.
Throughout the range, but rare and local in the region surrounding the pine-barrens and unknown in them; found only on the north side of L. I.
32. *V. rostrata* Pursh. Shaded hillsides: W. Que. to Mich., south in the mountains to Ga.
CONN. Rare and local in the coastal part of New Haven Co., increasing **northwestward**.
N. Y. Highlands of the Hudson, increasing and common **northward**. Unknown elsewhere.

N. J. Rare and local in Mercer, Hunterdon, Union and Somerset counties, increasing **northward**, not in the south.

PA. Northampton, Lehigh, Bucks and Montgomery counties.

Tertiary, o: Cretaceous, not very common: Older Formations, increasing **northward**. 117-220 days. Sea level-3,365 ft.

33. **V. arvensis** Murr. In fields and along roadsides: Newf. to Mass. and Pa. Adventive from Europe.

Rare as an occasional escape, often wanting.

34. **V. Rafinesquii** Greene: In woods and open places: N. Y. to Mich., Tex. and La.

N. Y. The Highlands of the Hudson.

N. J. Rare and local over most of the state, except in Morris, Sussex and Passaic counties and the pine-barrens, from which it is not reported.

PA. Luzerne, Northampton, Lehigh and Bucks counties.

Viola tricolor L., the progenitor of the garden pansy, is often common as an escape.

CACTACEAE

1. *Opuntia* Mill.

1. **O. Opuntia** (L.) Coult. In dry sandy soil or on rocks: E. Mass. to Pa. and Fla.

CONN. Not uncommon along the coast, rare inland.

N. Y. Frequent on L. I; S. I., decreasing up the Hudson Valley to Saugerties, Ulster Co., and Pine Plains, Dutchess Co., but not known from the Catskills.

N. J. Rare and scattered in Morris, Hunterdon, Passiac and Bergen counties, increasing and becoming common **southward**, but unknown in the pine-barrens.

PA. Philadelphia and Monroe counties.

Tertiary, unknown on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, decreasing northward. 149-220 days. Sea level-900 ft.

THYMELEACEAE

1. *Dirca* L.

1. **D. palustris** L. In woods and thickets: N. B. to Minn., Va., Tenn., Mo. and Fla.

CONN. Rare along the coast, increasing **northwestward**.

N. Y. Unknown on L. I. and in the Bronx, rare on S. I. and in Westchester Co.; increasing **northward**.

N. J. Along the Delaware in Salem, Gloucester and Camden counties, a single station in Mercer Co., thence scattered northward; not in the pine-barrens.

PA. Northampton, Bucks, Berks and Chester counties.

Tertiary, o: Cretaceous, rare in the drainage of the Delaware. Older Formations, increasing northward, but nowhere common. 117-220 days. Sea level-2,900 ft.

The Lady Laurel, *Daphne Mezereum* L. is known in our area only as a very rare escape from gardens.

ELAEAGNACEAE

1. *Elaeagnus* [Tourn.] L.

1. *E. argentea* Pursh. James Bay to the N. W. Terr., Que., Minn., S. Dak. and Utah.

Nowhere as a wild plant in our area, sometimes escaping from gardens.

Elaeagnus angustifolia L. has been collected in Chester Co., Pa., as an escape from cultivation. It is scarcely persistent.

LYTHRACEAE

Calyx-tube campanulate or hemispheric; flowers regular.

Flowers small, axillary, solitary or few; low herbs.

Capsule bursting irregularly.

Capsule septicidally dehiscent.

Flowers large, in axillary cymes; large aquatic shrub.

Calyx-tube cylindric; flowers regular.

Calyx-tube tubular, oblique; flowers irregular.

1. AMMANNIA.

2. ROTALA.

3. DECODON.

4. LYTHRUM.

5. PARSONSIA.

1. *Ammannia* [Houst.] L.

1. *A. Koehnei* Britton. In swamps: N. J. to Fla.

Known in our area only from specimens collected in the Hackensack Marshes, N. J. Not seen there since 1868.

The reported occurrence in N. J. of *A. coccinea* Rottb. appears to be an error.

2. *Rotala* L.

1. *R. ramosior* (L.) Koehne. In swamps: Mass. to Fla., Ill., Neb., Tex. and Ky.

CONN. Rare and local near the coast, unknown elsewhere.

N. Y. On L. I. and S. I.; reported but not definitely known from Pine Plains, Dutchess Co.

N. J. Rare and local throughout the state.

PA. Delaware and Chester counties.

A rare and local plant, confined for the most part to the coastal plain.

3. **Decodon** J. F. Gmel.

1. **D. verticillatus** (L.) Ell. In swamps: Me. to Fla., Ont., Minn., Ky. and La.

CONN. Not very common but found over most of the state.

N. Y. Common on L. I. and S. I., decreasing up the Hudson Valley, to Pine Plains, Dutchess Co., unknown northward.

N. J. Common throughout the state, decreasing northward.

PA. Pike, Carbon, Luzerne, Northampton, Berks and Delaware counties.

Distribution apparently more restricted in N. Y. than elsewhere, otherwise rather scattered.

4. **Lythrum** L.

Flowers axillary, solitary; stamens not more numerous than the petals.

Leaves mostly alternate.

Leaves obtuse, stamens all included; annual.

1. *L. Hyssopifolia*.

Leaves acute, stamens of short-styled flowers exerted; perennial.

2. *L. alatum*.

3. *L. lineare*.

Leaves mostly opposite.

Flowers in paniced spikes, terminal; stamens twice as many as the petals.

4. *L. Salicaria*.

1. **L. Hyssopifolia** L. Borders of salt marshes: Me. to N. J. Also in Cal. and S. Am. Also in Europe.

Known, in our area, only from borders of salt marshes on S. I. and at Girard's Point, Camden, N. J.; recorded from coastal marshes in N. J.

2. **L. alatum** Pursh. In low grounds: S. Ont. to Mass., Ky., S. Dak. and Kan.

CONN. Rare and scattered over most of the state, but unknown northeastward.

N. Y. Unknown on L. I. and S. I., formerly near Fordham, very rare northward.

N. J. Known only from Monroe Corner, Sussex Co., Pennington, Mercer Co., Monmouth Junction, New Egypt, Williamstown Junction, Beach Haven, and Cape May; perhaps introduced at all these stations.

PA. Delaware Co.

Rather inexplicably scattered in its distribution.

3. **L. lineare** L. Borders of salt marshes: N. J. to Fla. and Tex.

Rare and local in the salt marshes from the Hackensack Meadows to Cape May, N. J., not otherwise known.

4. **L. Salicaria** L. In swamps and wet meadows: Cape Breton Island to Ont. and Del. Native of Europe.

Becoming common throughout many parts of our range, especially in the Hudson and Delaware Valleys.

5. **Parsonsia** P. Br.

1. **P. petiolata** (L.) Rusby. In dry soil: R. I. to Ill., Kan., Ga. and La. Introduced into S. Ont.

Nearly throughout our range, but not known from the pine-barrens, and east and south of them.

MELASTOMACEAE

1. **Rhexia** L.

Stem cylindric, very pubescent.

1. *R. mariana*.

Stem square or angled, pubescent or glabrous.

Stem more or less pubescent; leaves ovate.

2. *R. virginica*.

Stem glabrous; leaves lanceolate oblong.

3. *R. aristosa*.

1. **R. mariana** L. In pine-barren swamps: L. I. to Fla., Ky., Mo. and Tex.

N. Y. Not very common on the east end of L. I., not reported from S. I., otherwise unknown.

N. J. Common throughout the coastal plain portion of the state, increasing southward.

PA. Near Bristol, Bucks Co.

Tertiary, common: Cretaceous, decreasing: Older Formations, perhaps wanting. 179-220 days. About sea level.

2. **R. virginica** L. In sandy swamps: Me. to Fla., Ill., Mo. and La.

CONN. Common along the coast, decreasing inland, and unknown in Litchfield Co.

N. Y. Common on L. I. and S. I.; rare up the Hudson Valley to Westchester Co.; unknown northward.

N. J. Morris, Passaic, Bergen, Hudson, Essex, Union and Hunterdon counties, thence increasing and common **southward**, especially in the pine-barrens.

PA. Monroe, Carbon, Lehigh, Bucks, Delaware and Chester counties.

Tertiary, common: Cretaceous, common: Older Formations, decreasing and becoming scattered. Predominating south of the moraine. 162-220 days. **Sea level**-1,000 ft.

3. **R. aristosa** Britton. In sandy pine-barren swamps: N. J., Del. and S. Car.
 N. J. Egg Harbor City, and Cologne, both in the pine-barrens.
 Isolated very locally on the Beacon Hill Formation in the Tertiary region.

ONAGRACEAE

Floral whorls of 4 parts or more.

Fruit a many-seeded capsule, opening by valves or by a pore.

Calyx-tube not prolonged beyond the ovary.

Seeds naked.

Leaves opposite; stems creeping or floating.

Flowers sessile; petals none or very small.

Flowers long-stalked; petals conspicuous.

Leaves alternate; stem erect or ascending.

Seeds furnished with a tuft of silky hairs.

Calyx-tube prolonged beyond the ovary.

Seeds furnished with a tuft of silky hairs.

Seeds naked or sometimes tuberculate.

Stamens equal in length.

Ovules and seeds horizontal, prismatic, angled.

Ovules and seeds ascending, not angled.

Stamens unequal in length, the alternate ones longer.

Fruit indehiscent, nut-like.

Floral whorls of 2 parts.

1. ISNARDIA.
2. LUDWIGIANTHA.
3. LUDWIGIA.
4. CHAMAENERION.
5. EPILOBIUM.
6. OENOTHERA.
7. RAIMANNIA.
8. KNEIFFIA.
9. GAURA.
10. CIRCAEA.

1. **Isnardia** L.*

1. **I. palustris** L. In muddy ditches and swamps: N. S. to Man., Ore., Fla., Col. and Mex. Widely distributed in the Old World.

Scattered throughout the range, but rare in the pine-barrens and perhaps introduced.

2. **Ludwigiantha** Small.*

1. **L. brevipes** Long. Moist sand: St. Albans, Long Beach Island, Ocean Co., N. J.

3. **Ludwigia** L.*

Flowers inconspicuous; petals none or small, yellowish or greenish.

Capsules sub-globose or top-shaped.

Bractlets at base of calyx minute, or none; capsule finely hairy.

Bractlets at base of calyx linear, about equalling the glabrous capsule.

Capsules cylindric or obpyramidal.

1. *L. sphaerocarpa*.
2. *L. polycarpa*.
3. *L. linearis*.

* See footnote, page 76.

Flowers showy, peduncled; petals large, bright yellow.

Plants hirsute; capsules bristly-pubescent.

Plants usually glabrous; capsules glabrous.

4. *L. hirtella*.

5. *L. alternifolia*.

1. ***L. sphaerocarpa*** Ell. In swamps: E. Mass. and N. Y. to Fla. west to La.

CONN. Known only from Guildford.

N. Y. Lake Mohegan, Westchester Co.; L. I. and S. I.

N. J. Rare in Bergen and Morris Cos., increasing and frequent southward.

PA. Bristol, Bucks Co.

2. ***L. polycarpa*** Short & Peter. In swamps: Ont. to Minn. and Mass., south to Ky., Neb. and Kan.

Known in our area only from near Hartford, plentiful about shallow ponds in meadows along the Connecticut River.

3. ***L. linearis*** Walt. In swamps: N. J. to Fla., west to La.

N. J. Known only from the southern pine-barrens, there very rare and local.

4. ***L. hirtella*** Raf. In pine-barren swamps: N. J. to Fla., west to Tex.

N. J. Known only from the southern pine-barrens, and at Cape May; very rare.

5. ***L. alternifolia*** L. In swamps: N. H. to N. N. Y., Ont., Mich., Fla., and Tex.

Common throughout the range; less common in the pine-barrens than elsewhere.

4. ***Chamaenerion*** [Tourn.] Adans.

1. ***C. angustifolium*** (L.) Scop. In dry soil: Lab. to Alask., N. Car., Kan., Ariz. and Cal. Also in Europe and Asia.

Common throughout the range but often scattered locally; very frequently following fires in the pine-barrens, and in the Catskills.

5. ***Epilobium*** L.

Stigmas deeply 4-lobed; flowers 2.5 cm. broad.

Stigmas entire or merely notched.

Leaves linear or lanceolate, entire or nearly so.

Plant crisp-pubescent, or canescent.

Plant glandular throughout; leaves sessile.

Leaves lanceolate or ovate, serrate.

Seeds obconic, beakless; coma reddish.

Seeds ellipsoid, short beaked; coma white.

1. *E. hirsutum*.

2. *E. lineare*.

3. *E. strictum*.

4. *E. coloratum*.

5. *E. adenocaulon*.

1. ***E. hirsutum*** L. In waste places: E. N. Eng., N. J., Ont. and in ballast near the eastern seaports. Native of Europe.
Rare as a weed.
2. ***E. lineare*** Muhl. In swamps: N. B. to Del., W. Va., Br. Col., the Ind. Terr. and Wyo.
CONN. Throughout the state, but not very common.
N. Y. Rare on the north side of L. I. and on S. I., increasing **northward**; not definitely known on the south shore of L. I.
N. J. Essex and Bergen counties, increasing **northward**.
PA. Lackawanna, Monroe, Schuylkill and Bucks counties.
Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 117-190 days. Sea level-3,800 ft.
3. ***E. strictum*** Muhl. In bogs: Me. to W. Ont. and Minn., south to Va. and Ill.
CONN. Rare in southern Hartford and Fairfield counties, increasing **northwestward**.
N. Y. Woodlawn, Bronx Co.; Dutchess, Ulster, Greene and Delaware counties, increasing **northward**. The L. I. record is an error.
N. J. Morris, Warren and Sussex counties. Pemberton, Burlington Co. record probably incorrect and not verified.
PA. Reported from Delaware Co., perhaps not reliably.
Tertiary, o: Cretaceous, o: Older Formations, not very common northward. Not south of the moraine, except the single doubtful record from Delaware Co., Pa. 117-189 days. Sea level-3,800 ft.
4. ***E. coloratum*** Muhl. In low grounds: Me. to Ont., Wisc., S. Dak., S. Car. and Kan.
Common throughout the area.
5. ***E. adenocaulon*** Haussk. In moist grounds; N. B. to Ore., south to Mass., Penn., Iowa, Utah and Cal.
CONN. Rare and scattered over most of the state, increasing **northwestward**.
N. Y. Occasional on the coastal plain of L. I., Unknown on S. I.: up the Hudson Valley to Orange Co., thence increasing but never very common **northward**.
N. J. Middlesex Co., increasing **northward**.
PA. Luzerne, Monroe, Schuylkill, and Delaware counties.
Tertiary, o: Cretaceous, rare: Older Formations, increasing **northward**. 117-210 days. Sea level-4,020 ft.

E. parviflorum Schreb. has been reported from the area as a weed and *E. tetragonum* L. was collected at Junction Station, Hunterdon Co., N. J., in 1885; not since collected.

6. *Oenothera* L. (*Onagra* Adans.)

Flowers small; petals linear, 2-4 mm. broad.

1. *O. cruciata*.

Flowers large; petals 1-3 cm. broad.

Upper bracts shorter than the pods, deciduous.

2. *O. biennis*.

Upper bracts as long as or shorter than the pods, persistent.

Puberulent and with long thick-based hairs.

3. *O. muricata*.

Densely velvety pubescent.

4. *O. Oakesiana*.

1. *O. cruciata* Nutt. Sandy soil: Me. and Mass. to N. Y.
Known only as reported from waste land near Hartford and Salisbury, Conn.
2. *O. biennis* L. In dry soil: Lab. to Fla., west to the Mississippi Valley.
Common in most parts of the range, usually as a weed.
3. *O. muricata* L. Sandy and gravelly soil, Newf. to N. Y. and N. J.
N. J. All along the coastal sands.
N. Y. Frequent on L. I. and S. I.
4. *O. Oakesiana* (A. Gray) Robbins. Sandy soil, Massachusetts to N. Y.
CONN. Sandy soil near the coast.
N. Y. Cold Spring Harbor and Floral Park, L. I.; frequent on the Hempstead Plains; Fort Schuyler, L. I. Sound; S. I.

O. grandiflora Ait. is known in our range only from an old specimen collected at Vineland, N. J. and there adventive.

7. *Raimannia* Rose.

Silvery pubescent with appressed or ascending hairs; seeds striate.

1. *R. humifusa*.

Glabrous or sparingly hirsute-pubescent; seeds pitted.

2. *R. laciniata*.

1. *R. humifusa* (Nutt.) Rose. On sea-beaches: N. J. to Fla.
Known in our area only from the sea-beach from Atlantic Co., to Cape May Point, N. J.
2. *R. laciniata* (Hill) Rose. In dry sandy soil: S. N. Y. to Pa., Ill. and Neb., south to Fla., Tex. and Mex.; locally adventive northward.
N. Y. Valley Stream, L. I., and in cultivated soil on S. I., introduced from the south.
N. J. Exclusively south of the "fall-line," almost always as a weed; probably in the pine-barrens only as an adventive.
PA. Bucks and Philadelphia counties.

Tertiary, not very common on Beacon Hill, common elsewhere;
Cretaceous, common: Older Formations, rare and scattered:
175-220 days. About sea-level.

Raimannia rhombipetala (Nutt) Rose has been found at Green Bank, near Batsto, N. J., presumably a waif from the west.

8. *Kneiffia* Spach.

Capsules club-shaped.

Pedicels and capsules pubescent.

Stem decumbent, spreading; body of the capsule becoming globose.

1. *K. Allenii*.

Stem erect or nearly so; body of the capsule more or less elongated.

Capsule stalked.

Pedicels longer than the body of the capsule, the wings thick and pubescent.

2. *K. longipedicellata*.

Pedicel shorter than the body of the capsule, the wings thin and glabrous.

3. *K. linearis*.

Capsule sessile.

4. *K. pratensis*.

Pedicels and capsules glabrous or glabrate.

5. *K. pumila*.

Capsules oblong or nearly so.

6. *K. fruticosa*.

1. ***K. Allenii*** (Britton) Small. In sand: eastern L. I. and perhaps coastal Conn. and N. J.

Montauk Point, Patchogue, and Easthampton, L. I., and reported from near Stratford, Conn.; recorded from Ocean Grove, N. J.

Localized in sandy places, but not confined to the region south of the moraine on L. I.

2. ***K. longipedicellata*** Small. In moist soil: Conn. to W. Va. and Fla.

CONN. Along the coast and at Southburg and Woodbury, according to Conn. Catalog.

N. Y. South of the moraine on L. I.; on S. I., Van Courtlandt Park: otherwise unknown in the area.

N. J. Very rare in the pine-barrens, perhaps there adventive, not uncommon along the coast in Monmouth, Ocean and Atlantic counties, but known only from Swedesboro, Gloucester Co., west of the pine-barrens; unknown elsewhere in the state.

PA. Known only from near Tullytown, Bucks Co., and from Darby and Tinicum, Delaware Co.

Tertiary, rare and perhaps adventive on Beacon Hill, increasing along the coast off this formation: Cretaceous, rare: Older Formations, rare and scattered near the coastal plain. 175-220 days. About sea level.

3. ***K. linearis*** (Michx.) Spach. In dry places: Conn. to Tenn. and Ga.

- CONN. New Haven and Fairfield counties, near the coast, decreasing and rare inland; otherwise unknown.
 N. Y. Not uncommon on the south shore of L. I.
 N. J. Union, Mercer, Middlesex and Monmouth counties, increasing **southward**.
 PA. Montgomery, Delaware and Chester counties.
4. **K. pratensis** Small. Low grounds: Ohio to Iowa, Mo. and Ark. Also in N. Eng. and N. Y.
 Known in our area only from near White Plains, N. Y.
5. **K. pumila** (L.) Spach. Mostly in dry soil: N. S. to Man., N. J., Ga., and Kan.
 Common throughout the range, except in the pine-barrens and Cape May, N. J., and the coastal plain of L. I., there rare.
6. **K. fruticosa** (L.) Raimann. In meadows: N. S. to La., Minn.
 CONN. Very rare in New Haven and Fairfield counties, near the coast; otherwise unknown.
 N. Y. Throughout, increasing **northward**.
 N. J. Unknown in the pine-barrens, and in the region east and south of them; rare in the region west of the barrens in Gloucester, Camden, Burlington and Ocean counties, thence increasing and common **northward**.
 PA. Monroe, Northampton, Bucks, Montgomery, Delaware and Chester counties.
 Tertiary, o: Cretaceous, very rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,365 ft.

Specimens approximating *Kneiffia riparia* (Nutt.) Small have been collected on the Hempstead Plains, L. I., and from East Rockaway, L. I.; the species is otherwise known only from N. Car. to Ga. Perhaps not separable from *K. linearis*.

9. **Gaura** L.

1. **G. 'biennis** L. In dry soil: Que. and Ont. to Minn., Ga., Tenn. and Miss.
 CONN. Occasional, perhaps in part adventive.
 N. Y. West Park, Ulster Co., and at Sag Harbor, L. I.
 N. J. Along the Delaware from Camden to Warren Co. and at Princeton and near New Brunswick.
 PA. Northampton Co. southward.

G. sinuata Nutt. has been collected as a waif near New York.

10. *Circaea* [Tourn.] L.

Fruit 2-celled; leaves mainly of an ovate type.

1. *C. lutetiana*.

Fruit 1-celled; leaves mainly of a cordate type.

2. *C. alpina*.

1. **C. lutetiana** L. In woods: N. S. to western Ont., S. Dak., Ga., Neb. and Kan. Also in Europe and Asia.

Throughout the range, except in the pine-barrens, and east and south of them, there apparently wanting, always increasing **northward**.

2. **C. alpina** L. In cold moist woods: Lab. to Alask., Ga., Ind., Mich. and S. Dak. Also in Europe and Asia.

CONN. Rare along the coast, increasing **northwestward**.

N. Y. Westchester, Dutchess, Columbia and Ulster counties, increasing **northward**.

N. J. Warren and Sussex counties.

PA. Pike, Carbon, Monroe, Lackawanna, and Northampton counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. South of the moraine only in Pa. 117-189 days. Sea level-3,365 ft.

Circaea intermedia Ehrh., a plant with the aspect of large *C. alpina*, has been found in Montague Township, Sussex Co., N. J.

HALORAGIDACEAE*

Fruit 3 angled or 4 angled.

1. PROSERPINACA.

Fruit of 4 carpels.

2. MYRIOPHYLLUM.

1. *Proserpinaca* L.

Emerald leaves linear-lanceolate to oblong, serrate; fruit sharp angled.

1. *P. palustris*.

Leaves all pectinate-pinnatifid; fruit obtusely angled.

2. *P. pectinata*.

1. **P. palustris** L. In swamps: N. B. to Lake Huron, Fla., Iowa, and Cent. Am. Also in Cuba.

Rather scattered over most of our area except in the pine-barrens, there apparently wanting.

2. **P. pectinata** Lam. In sandy swamps near the coast: Me. to Fla. and La.

N. Y. Lake Ronkonkoma and Manorville, L. I.; formerly on S. I.

N. J. Monmouth Co. southward.

A plant intermediate in character between these two species has been described as *P. intermedia* Mackenzie (Torrey's 10: 249. 1910). It has been found only in N. J., near Island Heights, Atsion and near Bennett, Cape May Co.

* See footnote, page 76.

2. *Myriophyllum* [Vaill.] L.

Carpels smooth.

Flowers on emersed spikes.

Floral leaves shorter than the spikes.

Floral leaves longer than the spikes.

Floral leaves reduced to minute bracts.

Flowers on both emersed and submersed stems.

Flowers only on submersed stems.

Carpels rough or tuberculate.

Floral leaves ovate or lanceolate, serrate.

Floral leaves linear, pectinate.

1. *M. spicatum*.2. *M. verticillatum*.3. *M. tenellum*.4. *M. humile*.7. *M. proserpinacoides*.5. *M. heterophyllum*.6. *M. pinnatum*.

1. *M. spicatum* L. In deep water: Newf. to the N. W. Terr., Md., Iowa, Kan. and Col. Also in Europe and Asia.
CONN. Litchfield Co.
N. Y. Known only from Dutchess Co. northward.
N. J. Doubtfully reported from Passaic Co., otherwise unknown.
2. *M. verticillatum* L. In pools, etc.: Que. and Ont. to N. J. and Pa., Minn. and Cal. Also in Europe and Asia.
CONN. Scattered over most of the state, but rare.
N. Y. Dutchess Co., **northward**.
PA. Bucks Co.
3. *M. tenellum* Bigel. Sandy bottoms of ponds and streams: Newf. to N. J., Pa. and Mich.
CONN. Rare in New London and Litchfield counties, doubtless in the intervening territory, but not reported.
N. Y. Known only from L. I., S. I., and the Hudson Valley below the Highlands.
N. J. Known only along the Delaware in Gloucester and Camden counties and along the coast in Monmouth and Ocean counties, not in the pine-barrens.
PA. Near Twelve Mile Pond, Pike Co.
4. *M. humile* (Raf). Morong. In ponds: Me., R. I. to Md. and Ill.
Rather common near the coast and in the pine-barrens, decreasing and very local northward.
5. *M. heterophyllum* Michx. In ponds: Ont. and N. Y. to Fla., S. Dak., Tex. and Mex. Very rare.
N. J. Near Hammonton, Atlantic Co.
PA. Bucks Co.
6. *M. pinnatum* (Walt.) B. S. P. In ponds: R. I. to Fla., Kan., La., Tex. and Panama.

CONN. Rare along the coast in New London Co.

N. Y. Rosedale, L. I.

N. J. Known from the region surrounding the pine-barrens, but not in them, otherwise unknown.

7. **M. proserpinacoides** Gill. Localized in our area at Haddonfield, N. J. Perhaps not persistent. Native of Chili, and frequently cultivated.

ARALIACEAE

Herbs, shrubs or trees; leaves alternate, decompose; styles 5.

1. ARALIA.

Herbs; leaves verticillate, digitately compound; styles 2 or 3.

2. PANAX.

1. *Aralia* [Tourn.] L.

Umbels numerous, paniced or racemose.

Spiny shrub or tree; leaflets thick, ovate.

1. *A. spinosa*.

Branching unarmed herb; leaflets thin; large, cordate.

2. *A. racemosa*.

Umbels 2-several, sometimes numerous, terminal or corymbose.

Plant glabrate; leaf and peduncle arising from the rootstock.

3. *A. nudicaulis*.

Plant bristly or hispid; stem leafy or erect.

4. *A. hispida*.

1. **A. spinosa** L. In low grounds, and along streams: Conn. to Fla., Ind., Mo. and Tex. Adventive from the South.

Not known as a wild plant in our area; rarely escaping from cultivation in southern N. J. and N. Y.; perhaps wild near Upper Darby, Pa.

2. **A. racemosa** L. In rich woods: N. B. to Ga., S. Dak. and Kan.

CONN. Throughout, increasing **northward**.

N. Y. L. I. and on S. I., increasing and becoming common **northward**.

N. J. Rare and local in Camden, Burlington and Monmouth counties, not in the pine-barrens, thence increasing and common **northward**.

PA. Pike, Luzerne, Monroe, Northampton, Bucks, Delaware and Chester counties.

Tertiary, o: Cretaceous, very rare: Older Formations, increasing **northward**. 117-220 days. Sea level-4,020 ft.

3. **A. nudicaulis** L. In woods: Newf. to Man., N. Car., Neb. and Mo.

Common throughout the range, more rare in the pine-barrens, and more common **northward** than elsewhere.

The variety *prolifera* A. C. Apgar has been collected only at Lambertville, Hunterdon Co., N. J.

The variety *elongata* Nash, is known only from Greene Co., N. Y. in the Catskills.

4. **A. hispida** Vent. In rocky or sandy woods and clearings: Newf. to N. Car., Ont., Minn. and Ind.
 CONN. Throughout the state, not common along the coast, increasing but not very common **northwestward**.
 N. Y. Rare on the north side of L. I. near the western end, and on the south side coastal strip, and at Hewlett; formerly on S. I., unknown in the Bronx, thence increasing and becoming common **northward**.
 N. J. Rare and local in northern Ocean and Monmouth counties, near the coast, thence increasing **northward**; not in the pine-barrens.
 PA. Wayne, Lackawanna, Luzerne, Monroe, Northampton, Lehigh and Chester counties.
 Tertiary, o: Cretaceous, very rare: Older Formations, increasing **northward**: 117-220 days. Sea level-4,050 ft.

2. **Panax** L.

Leaflets 5, ovate or obovate, stalked, acuminate.
 Leaflets 3-5, oval or oblanceolate, sessile, obtuse.

1. *P. quinquefolium*.
 2. *P. trifolium*.

1. **P. quinquefolium** L. In rich woods: Que. to Ala., Minn., Neb. and Mo.
 CONN. Scattered and rare over most of the state, increasing **northwestward**.
 N. Y. Recorded from Rockland Co., but rare, thence increasing but never common **northward**, particularly in the Catskills; otherwise unknown.
 N. J. In Sussex and Warren counties, rare; reported from but not recently collected at Plainfield, Union Co., otherwise unknown.
 PA. Luzerne, Northampton, Schuylkill, Berks and Bucks counties.
 Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 117-190 days. Sea level-4,050 ft.
2. **P. trifolium** L. In moist woods and thickets: N. S. to Ga., Ont., Minn., Iowa, and Ill.
 Throughout the range except in the pine-barrens, and the coastal plain of L. I., there apparently wanting; rare on the coastal strip of southern N. J.

The cultivated shrub *Acanthopanax pentaphyllum* (Thunb.) March. has been collected as a garden escape near Hartford; hardly an element of our wild flora.

AMMIACEAE

- Fruit with obscure or obsolete oil tubes.**
Fruit strongly flattened laterally.
Fruit not strongly flattened, sometimes turgid.
Fruit bristly, elongated.
Fruit smooth, of almost distinct globular carpels.
- Fruit with distinct oil tubes.**
Inflorescence glomerate, the inflorescence aggregated into dense heads.
Inflorescence manifestly umbellate.
Fruit flattened dorsally, the lateral ribs of the carpels more or less prominently winged.
Oil tubes solitary in the intervals.
Stylopodium conic.
Fruit not notched at the apex.
Fruit notched at the apex.
Stylopodium obsolete or flat.
Flowers white.
Fruit armed with barbed spines.
Fruit spineless.
Flowers yellow.
Oil tubes more than 1 in the intervals.
Leaf blades 1-2 ternately divided.
Leaves much more divided.
- Fruit more or less flattened laterally or sometimes slightly dorsally flattened.**
Oil tubes solitary in the intervals.
Stylopodium conic.
Upper leaves with narrow linear segments.
Upper leaves with relatively broad segments.
Seed-face concave.
Fruit glabrous or merely pubescent.
Fruit spiny.
Seed-face flat.
Fruit nearly as broad as long.
Fruit linear-oblong.
Stylopodium obsolete or flat.
Flowers white.
Dorsal ribs filiform; plant aquatic.
Dorsal and lateral ribs prominent and corky.
Stylopodium flat or flattish.
Stylopodium obsolete.
Flowers yellow.
Fruit with winged ribs.
Fruit with merely filiform ribs.
- Oil tubes more than one in the intervals.**
Stylopodium conic.
1. HYDROCOTYLE.
5. WASHINGTONIA.
7. BUPLEURUM.
3. ERYNGIUM.
20. OXYPOLIS.
22. HERACLEUM.
23. DAUCUS.
19. ANGELICA.
21. PASTINACA.
19. ANGELICA.
18. CONIOSELINUM.
14. PTHILMIUM.
4. CHAEROPHYLLUM.
6. TORILIS.
10. CICUTA.
11. DERINGA.
15. LILAEOPSIS.
8. CELERI.
13. SIUM.
17. THASPIUM.
9. ZIZIA.
16. LIGUSTICUM.

- Stylopodium flat or obsolete.
 Fruit without ribs, spiny. 2. *SANICULA*.
 Fruit ribbed, spineless.
 Ribs filiform. 12. *TAENIDIA*.
 Ribs corky, at least the lateral ones.
 Oil tubes continuous around the
 seed cavity. 7. *BUPLEURUM*.
 Oil tubes 2-3 in the intervals. 13. *SIUM*.

1. *Hydrocotyle* L.

Leaves nearly orbicular, peltate.

Umbels simple, rarely slightly proliferous; pedicels slender. 1. *H. umbellata*.

Umbels, at least some of them proliferous; pedicels or some
 of them short.

Fruit notched at each end. 2. *H. Canbyi*.

Fruit not notched at either end. 3. *H. verticillata*.

Leaves nearly orbicular, cordate or reniform, not peltate.

Leaves 5-13 lobed; umbels nearly sessile. 4. *H. americana*.

Leaves 3-7 cleft; umbels long-peduncled. 5. *H. ranunculoides*.

1. ***H. umbellata* L.** In swamps and low grounds: E. Mass. to Fla. and the W. I., Minn., Tex. and Mex. Also in S. Am. CONN. Rare and local along the coast, decreasing inland into Litchfield Co., unknown elsewhere. N. Y. Local on L. I. and S. I. and in Westchester Co., unknown northward. N. J. Rare in Passaic Co., thence wanting to Middlesex and Monmouth counties, thence increasing southward, but unknown in the pine-barrens. PA. Bucks, Philadelphia and Delaware counties. Tertiary, not on Beacon Hill, common elsewhere; Cretaceous, common: Older Formations, scattered and rare. 153-220 days. Sea level-850 ft.
2. ***H. Canbyi* C. & R.** In moist ground: N. J. to Md. Known in our range only from along the coast in Cape May Co.; and in Bucks Co., Pa.
3. ***H. verticillata* Thunb.** In moist soil: Mass. to Fla., west to southern Cal., and in Central and South America. Known in our area, only from the coastal part of N. J. from Monmouth to Cape May counties; not in the pine-barrens nor apparently in N. Y. or Conn.
4. ***H. americana* L.** In wet places: N. S. to Minn., Pa. and N. Car.

Throughout the range, except in the pine-barrens, and east and south of them, there wanting.

5. **H. ranunculoides** L. f. In ponds and swamps: Pa. to Fla., near the coast, west to Tex., Ore. to L. Cal. Also in Central and South America, Abyssinia and Italy.

Known only from Chester and Delaware counties, Pa., in our range, regions near sea level with a growing season of 179 days.

Hydrocotyle rotundifolia Roxb., a native of tropical Africa and Asia, is reported as becoming naturalized in lawns near Philadelphia.

2. *Sanicula* L.

Perennial; styles longer than the bristles; some staminate flowers in separate heads.

Petals and anthers greenish white; calyx segments cuspidate; fruit 6 mm. long.

1. *S. marylandica*.

Petals and anthers yellow; calyx segments obtuse; fruit about 3 mm. long.

2. *S. gregaria*.

Biennial; styles shorter than the bristles; staminate flowers never in separate heads.

Leaves 3-5 divided; pedicels of staminate flowers 2 mm. long; fruit less than 4 mm. long.

3. *S. canadensis*.

Leaves 3-foliolate; pedicels of staminate flowers 4 mm. long; fruit 6 mm. long or more.

4. *S. trifoliata*.

1. **S. marylandica** L. In rich woods: Newf. to Alberta, Ga. and Colo.

Throughout the area, except in the pine-barrens, but becoming rare southward.

2. **S. gregaria** Bicknell. In woods and thickets: B. N. and Ont. to Minn., Ga., Kan. and Neb.

CONN. Rare and scattered over most of the state, increasing **northwestward**.

N. Y. Frequent on L. I., north of the moraine; on S. I.; abundant in the Bronx, thence increasing **northward**.

N. J. Not known from the pine-barrens, reported from Swedesboro, Gloucester Co., thence increasing but scattered **northward**.

PA. Chester, Delaware, Monroe, Bucks and Northampton counties.

Tertiary, o: Cretaceous, very rare in Gloucester Co., N. J.: Older Formations, increasing but not common **northward**. 117-189 days. Sea level-3,365 ft.

3. **S. canadensis** L. In woodlands: Me. to Fla., S. Dak., and Tex.

Throughout the range, except in the pine-barrens, there not reported.

4. **S. trifoliata** Bicknell. In hilly woods: Vt. to Ont., N. Y. and Ind.

Known in our area only from Canaan, Conn., near Yonkers and Onteora, N. Y., Water Gap and Pt. Pleasant, Pa. Distribution not understood.

3. **Eryngium** [Tourn.] L.

Leaves parallel-veined.

1. *E. aquaticum*.

Leaves reticulate-veined.

2. *E. virginianum*.

1. **E. aquaticum** L. In wet soil or upland: Conn. to S. Dak., Fla., Kan. and Tex.

Known in our range only from near Bridgeport, Conn., Atsion in the pine-barrens of N. J. and at Pestletown, Camden, Co., N. J.

2. **E. virginianum** Lam. In marshes near the coast: N. J. to Fla., west to Tex.

N. J. Very common in the coastal salt marshes from Middlesex Co., southward, also in Camden, Gloucester and Cumberland counties, near the Delaware; not in the pine-barrens; formerly as far north as Hudson Co.

PA Bucks and Delaware counties.

Tertiary, not on Beacon Hill, common east of it: Cretaceous, scattered and rare: Older Formations, rare on gravel in Pa. 179-220 days. About sea level.

4. **Chaerophyllum** [Tourn.] L.

1. **C. procumbens** (L.) Crantz. In moist ground: N. Y. (?) and Ont. to Mich., N. Car. and Kan.

N. Y. Reported but not definitely known from L. I.; otherwise unknown.

N. J. Reported in 1819 from Hudson Co., not since collected; scattered in Warren, Middlesex, Mercer, Burlington, Camden, Gloucester and Salem counties, especially along the Delaware; not in the pine-barrens.

PA. Luzerne, Northampton, Bucks and Delaware counties.

Tertiary, o: Cretaceous, scattered: Older Formations, not very common in Pa., unknown elsewhere in our range. 152-220 days. Sea level-1,000 ft.

C. temulum L. has been collected as a waif in N. J.

5. *Washingtonia* Raf.

Style and stylopodium 1 mm. long or less.

1. *W. Claytoni*.

Style and stylopodium 2 mm. long.

2. *W. longistylis*.

1. **W. Claytoni** (Michx.) Britton. In woods: N. S. to S. Dak., Minn., Ala., Ill. and Kan.

CONN. Throughout the state, apparently not very common in New London Co.

N. Y. On the side north of L. I., and on S. I., thence increasing and becoming common **northward**.

N. J. Reported from but doubtfully in Camden and Monmouth Counties; rare and local in Middlesex and Mercer counties, increasing **northward**.

PA. Throughout the area, increasing **northward**.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 117-220 days. Sea level-3,365 ft.

2. **W. longistylis** (Torrey) Britton. In woods: N. S. to the N. W. Terr., Ala., Tenn. and Kan.

Throughout the range except in the pine-barrens, there wanting; very rare in the region just west of the barrens and on the coastal plain of L. I.

6. *Torilis* Adans.

Umbels sessile or short-stalked, capitate, opposite the leaves.

1. *T. nodosa*.

Umbels compound, peduncled; rays slender.

2. *T. Anthriscus*.

1. **T. nodosa** (L.) Gaertn. In waste places: Pa., Md. and Iowa. Adventive from Europe.

Not common as an established adventive in Pa., otherwise unknown.

2. **T. Anthriscus** (L.) Gmel. In waste places: N. J. to D. C. and Ohio. Adventive from Europe.

Not common as an established adventive.

7. *Bupleurum* [Tourn.] L.

1. **B. rotundifolium** L. In fields: N. H. to N. Car., S. Dak., Kan. and Ark. Also in the Southwest. Naturalized from Europe.

Rare as a weed near the larger cities.

8. *Celeri* Adans.

1. **C. graveolens** (L.) Britton. (*Apium graveolens* L.). In waste places, escaped from cultivation: E. U. S. Native of Europe.

A rare escape, from market gardens, sometimes persisting.

9. *Zizia* Koch.

Basal leaves 2-3-ternately compound.

1. *Z. aurea*.

Basal leaves cordate, undivided.

2. *Z. cordata*.

1. *Z. aurea* (L.) Koch. In fields and swamps: N. B. to Ont., S. Dak., Fla. and Tex.

CONN. Common throughout the state.

N. Y. Very rare on L. I. except in and near the Hempstead Plains; on S. I., thence increasing **northward**.

N. J. Farmingdale, Monmouth Co., and Cold Spring, Cape May Co., and north of the coastal plain.

PA. Monroe, Northampton, Bucks and Chester counties.

Tertiary, a single station, not on Beacon Hill:* Cretaceous, rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,365 ft.

2. *Z. cordata* (Walt.) DC. In woods: R. I. to Minn., the N. W. Terr., Ga., Mo., Wyo. and Ore.

CONN. The coastal region, except in Fairfield Co., there scattered.

N. Y. On L. I. and S. I., decreasing northward to Columbia and Ulster counties.

N. J. A single station in Gloucester Co., near the Delaware, thence unknown to Middlesex Co., thence increasing **northward**; not in the pine-barrens.

PA. Monroe, Northampton, Bucks, Delaware and Chester counties.

Tertiary, 0: Cretaceous, very rare in the region of the glacial terraces along the Delaware: Older Formations, not very common and apparently increasing **northward**. 153-220 days. Sea level-1,200 ft.

10. *Cicuta* L.

Leaf-segments lanceolate.

1. *C. maculata*.

Leaf-segments narrowly linear.

2. *C. bulbifera*.

1. *C. maculata* L. In swamps: N. B. to Man., Fla. and N. Mex.

Common throughout the range except in the pine-barrens, there wanting.

2. *C. bulbifera* L. In swamps: N. S. to Del., Man., Ind. and Neb.

CONN. Throughout the state.

N. Y. On L. I. and S. I. and in the Bronx, increasing and becoming common **northward**.

N. J. Rare in Camden and Gloucester counties, near the Delaware,

* See Introduction paragraph 36.

thence unrecorded to Mercer and Middlesex counties, thence increasing **northward**; not in the pine-barrens.

PA. Luzerne, Monroe, Northampton, Bucks and Philadelphia counties.

Tertiary, o: Cretaceous, very rare in the region of glacial terraces: Older Formations, increasing **northward**. 117-204 days. Sea level-3,365 ft.

11. *Deringa* Adans.

1. **D. canadensis** (L.) Kuntze. In woods: N. B. to S. Dak., Ga. and Tex.

Common throughout the range except in the pine-barrens, and in the region just east of them, there unrecorded; rare in the region west of the pine-barrens from Camden, Co., N. J. southward; and on the coastal plain of L. I.

12. *Taenidia* Drude.

1. **T. integerrima** (L.) Drude. In rocky or sandy soil: Que. to N. Car., Ont., Minn., Kan. and Miss.

CONN. New Haven and Fairfield counties near the coast.

N. Y. Hempstead Plains and at Flushing, L. I.; unknown on S. I.; rare in the Bronx, thence increasing **northward**.

N. J. Reported but not definitely known from northern Ocean and Monmouth counties; rare in Middlesex Co., thence increasing **northward**.

PA. Northampton, Bucks, Montgomery and Chester counties.

Tertiary, o: Cretaceous, very rare or wanting: Older Formations increasing but never very common **northward**. 117-220 days. Sea level-3,365 ft.

13. *Sium* [Tourn.] L.

1. **S. cicutaefolium** Gmel. In swamps: N. S. to B. Col., Fla., La. and Cal.

Throughout the range except in the pine-barrens, there unrecorded.

A weak, usually aquatic, form of this species has been described as *S. Carsoni* Durand. I am unable to maintain it as a species, at least so far as local plants are concerned.

14. *Ptilimnium* Raf.

1. **P. capillaceum** (Michx.) Raf. In wet soil, especially in brackish marshes: Mass. to Fla., west to Tex.

So far as our range is concerned, known only from the region within the influence of the tide, and at New Egypt, Ocean Co., N. J. inland.*

15. *Lilaeopsis* Greene.

1. *L. lineata* (Michx.) Greene. In salt and brackish marshes and on river shores: N. H. to Fla., west to Miss.

CONN. Rare along the coast in New London Co., increasing but never common in the coastal marshes westward.

N. J. At the foot of the Palisades in Bergen Co., a little south of a point directly opposite Hastings-on-Hudson and opposite Mt. St. Vincent; also very rare in the coastal marshes of Ocean and Atlantic counties; and in Cape May Co.

N. Y. Fort Washington Point, and Spuyten Duvil Creek, N. Y. City, and Smithtown, L. I.

A very rare and local plant whose distribution is not understood.

16. *Ligusticum* L.

1. *L. scoticum* L. Along salt marshes: Conn. to Lab., also on the Pacific Coast and in northern Europe and Asia.

Known only from East Lyme, eastward in Conn. and from Fisher's Island in L. I. Sound, and in N. Y.

17. *Thaspium* Nutt.

Leaves mostly ternate; segments crenate, thickish.

1. *T. trifoliatum*.

Leaves mostly biternate; segments incised or lobed, rather thin.

2. *T. barbinode*.

1. *T. trifoliatum* (L.) Britton (*T. trifoliatum aureum* Britton).
In woods: N. J. to Tenn. and Mo.

N. J. Union, Mercer and Middlesex counties, southwestward, but not in the pine-barrens.

PA. Northampton, Bucks, Delaware and Chester counties.

Distribution not fully understood.

2. *T. barbinode* (Michx.) Nutt. Along streams: Ont. to Minn., Kan., Fla., Ky. and Ark.

CONN. Near Canaan, Litchfield Co.

N. J. Known only from Hunterdon Co.

PA. From Northampton and Montgomery counties southward.

Tertiary, o: Cretaceous, perhaps rare, but probably not in the region: Older Formations, increasing **northward**. 117-220 days.

Sea level-3,200 ft.

* See Introduction paragraph 21.

18. *Conioselinum* Hoffm.

1. **C. chinense** (L.) B. S. P. In cold swamps: Lab. to Mass., N. Y., N. Car., Minn., Wisc. and Ind. Not Chinese.
 CONN. Northern part of Litchfield Co.
 N. Y. Rare in northern Westchester Co., increasing **northward**.
 N. J. Bergen and Sussex counties.
 PA. Northampton Co.
 Tertiary, o: Cretaceous, o: Older Formations, rare and local in the north. 117-153 days. 500-3,365 ft.

19. *Angelica* L.

- Umbels glabrous or nearly so; leaf-segments acute or acutish. 1. *A. atropurpurea*.
 Umbels densely tomentose; leaf segments tomentose. 2. *A. villosa*.
1. **A. atropurpurea** L. In swamps and moist ground: Lab. to Minn., Del. and Ill.
 Rare and scattered over all the range, but not in the pine-barrens, nor in the region immediately surrounding them.
2. **A. villosa** (Walt.) B. S. P. In dry soil: Conn. to Fla., Minn., Tenn. and Mo.
 Throughout the range, except in the pine-barrens, there unknown; nowhere common.

20. *Oxypolis* Raf.

1. **O. rigidior** (L.) Raf. (*O. longifolia* Britton). In swamps: N. Y. to Fla., Minn., Mo. and La.
 N. Y. Common on L. I. and S. I.; Piermont, Rockland Co.; unknown elsewhere.
 N. J. Bergen, Middlesex and Mercer counties, increasing southward, but rare or wanting in the pine-barrens.
 PA. From Northampton and Bucks counties, **southward**.
 Tertiary, common on Beacon Hill: Cretaceous, common: Older Formations, decreasing northward. 169-220 days. About sea-level.

21. *Pastinaca* L.

1. **P. sativa** L. Roadsides and waste places: E. N. Am. Naturalized from Europe.
 A common adventive in most parts of our range.

22. *Heracleum* L.

1. **H. lanatum** Michx. In moist ground: Newf. to Alask., N. Car., Mo., Utah and Cal.

CONN. Throughout the state, but not very common.

N. Y. Rare on L. I. and S. I., increasing **northward**, but not definitely known from the Catskills.

N. J. Local in Camden and Burlington counties, along the Delaware; increasing **northward**; not in the pine-barrens.

PA. Luzerne, Northampton, Bucks, Delaware and Chester counties.

Tertiary, o: Cretaceous, occasional along the Delaware in and near the region of glacial terraces: Older Formations, increasing **northward**. 128-220 days. Sea level-2,100 ft.

23. *Daucus* L.

1. *D. Carota* L. In fields and waste places: throughout N. Am. Native of Europe.

Common everywhere as a weed, less common in the pine-barrens than elsewhere.

Among the occasional waifs and introduced plants are the following: The garden chervil, *Anthriscus crefolium* (L.) Hoffm., and a wild form *A. sylvestris* (L.) Hoffm., known only on S. I.; the Shepherd's-needle, *Scandix Pecten-veneris* L.; the Poison Hemlock, *Conium maculatum* L.; the Parsley, *Apium Petroselinum* L.; The Caraway, *Carum Carui* L.; The Pimpernel, *Pimpenella Saxifraga* L.; The Goutweed, *Aegopodium Podagraria* L.; The Fool's Parsley, *Aethusa Cynapium* L., The Lovage, *Hipposelinum Levisticum* (L.) Britton; The Fennel, *Foeniculum Foeniculum* (L.) Karst.; The Dillweed, *Anethum graveolens* L.; The Coriander, *Coriandrum sativum* L.; The Masterwort, *Imperatoria Ostruthium* L., known only from Long Pond, Monroe Co., Pa.; and *Spermolepis divaricatus* (Walt.) Raf., known only from near Philadelphia. All of these have been collected from time to time, but it is doubtful if any are permanently established in the range. They are natives of Europe and Asia.

CORNACEAE

Flowers perfect, 4-parted; ovary 2-celled.

Flowers cymose, not involucrate.

Flowers capitate, involucrate by 4 large white bracts.

Trees or shrubs.

Undershrubs with creeping rootstocks.

Flowers polygamous or dioecious; petals minute or none; ovary 2-celled.

1. CORNUS.

2. CYNOSYLVON.

3. CHAMAEPERICLYMENUM.

4. NYSSA.

1. *Cornus* [Tourn.] L.

Leaves opposite.

Leaves downy pubescent beneath, at least when young.

Leaves broadly ovate or orbicular.

Leaves ovate or ovate-lanceolate.

Leaves glabrate or minutely pubescent beneath.

Leaves ovate, short-pointed; twigs purple.

Leaves ovate-lanceolate, acuminate; twigs grey.

Leaves alternate, clustered at the ends of the flowering branches.

1. *C. rugosa*.

2. *C. Amomum*.

3. *C. stolonifera*.

4. *C. femina*.

5. *C. alternifolia*.

1. **C. rugosa** Lam. (*C. circinata* L'Her.). In shady often rocky situations: N. S. to Man., Va., Ill. and Iowa.
 CONN. Rare in New London Co., increasing **northwestward** and becoming common in Litchfield Co.
 N. Y. Unknown on L. I. and S. I., rare and local in Bronx, Westchester and Rockland counties, thence increasing **northward**.
 N. J. Rare in Union and Hunterdon counties, increasing **northward**, unknown southward.
 PA. Pike, Luzerne, Monroe, Lehigh, Bucks and Schuylkill counties.
 Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**, south of the moraine only in Pa. and N. J. 118-187 days. Sea level-4,050 ft.
2. **C. Amomum** Mill. In wet soil: N. B. to Ont., Fla., S. Dak. and Tex.
 Common throughout the range, except in the pine-barrens, there wanting and rare on the L. I. coastal plain.
3. **C. stolonifera** Michx. In moist soil: N. S. to the Yukon Terr., Va., Ky., Neb., Ariz. and Cal.
 CONN. Hartford and Fairfield counties, rare; increasing and common **northwestward** into Litchfield Co.
 N. Y. Reported but not definitely known from the north side of L. I., unknown on the south side; rare on S. I., thence increasing **northward**.
 N. J. Reported but not definitely known from Ocean and Monmouth counties; rare and local in northern Middlesex Co., thence increasing **northward**.
 PA. Northampton Co.
 Tertiary, o: Cretaceous, rare or wanting; Older Formations, increasing **northward**. 117-189 days. Sea level-3,800 ft.
4. **C. femina** Mill. (*C. candidissima* Marsh., not Mill.) In rich soil: Me. to N. Car., Minn., and Neb.
 Throughout the range, except in the pine-barrens and Cape May, there wanting; rare or wanting in the region surrounding the barrens, except that it is found along the Delaware River in N. J. near the glacial terraces in Salem, Camden and Gloucester counties; rare on the L. I. coastal plain.
5. **C. alternifolia** L. f. In woods: N. S. to Ga., Ont., Minn., W. Va. and Ala.
 Common throughout the range except in the pine-barrens and

the region just east of them, there wanting; occasional on the L. I. coastal plain.

2. *Cynoxylon* Raf.

1. *C. floridum* (L.) Raf. (*Cornus florida* L.). In woods: Me. and Ont. to Fla., Ky., Mo. and Tex.

Common throughout the range except in the pine-barrens, there wanting.

3. *Chamaepericlymenum* Graebn.

1. *C. canadense* (L.) Asch. & Graebn. (*Cornus canadensis* L.). In low woods: Newf. to Alask., N. J., Ind. Minn., Colo. and Cal.

CONN. Very rare in the southern part of the state, increasing **northwestward**.

N. Y. Known on L. I. only from an old specimen collected at Dutch Kills, in Queens; unknown elsewhere except in Dutchess, Columbia, Ulster, Delaware and Greene counties.

N. J. Very rare in and not recently collected from Hudson and Mercer counties, unknown elsewhere except in northern Sussex Co.

PA. Pike, Monroe, Carbon, Luzerne and Schuylkill counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 118-158 days. Sea level-4,050 ft.

4. *Nyssa* L.

1. *N. sylvatica* Marsh. In rich moist soil: Me. and Ont. to Fla., Mich. and Tex.

Throughout the range, more common southward than in the mountains northward.

The reported occurrence of *Nyssa biflora* Walt. in N. J. has not been verified.

GAMOPETALAE

CLETHRACEAE

Clethra L.

1. *C. alnifolia* L. In wet soil: Ont. to northern N. J. and Fla., mostly near the coast.

Common throughout the range.

PYROLACEAE

Flowers racemose; leaves basal.

Flowers solitary or corymbose; leaves opposite or whorled.

Stem leafy at the base; flower solitary; style long.

Stem horizontal; branches erect, leafy; style very short.

1. PYROLA.

2. MONESES.

3. CHIMAPHILA.

I. *Pyrola* [Tourn.] L.

Style and stamens declined (slightly so in No. 4).

Petals very obtuse; leaves rounded at the apex.

Calyx lobes oblong or lanceolate; leaves shining.

Calyx lobes ovate or triangular, short; leaves dull.

Blades orbicular, coriaceous, mostly shorter than the petioles.

Blades oval, membranous, longer than the petioles.

Petals and leaves acute, the latter small.

Style straight; stamens connivent.

1. *P. americana*.

2. *P. chlorantha*.

3. *P. elliptica*.

4. *P. oxypetala*.

5. *P. secunda*.

1. ***P. americana*** Sweet. (*P. rotundifolia* of Amer. authors, not of L.). In dry woods: N. S. to S. Dak., Ga. and Ohio. Also in Europe.

Frequent throughout the range, less so in the region of the N. J. pine-barrens than elsewhere.

2. ***P. chlorantha*** Sweet. In dry woods: Lab. to Brit. Col., D. C., Ill., Neb. and Col. Also in Europe.

CONN. Rare near the coast, increasing **northward**.

N. Y. Near Riverhead, L. I.,* otherwise not known from the island, or from S. I. Rare and local from the Highlands of the Hudson **northward**.

N. J. Rare and local in Monmouth, Burlington and Camden counties, thence increasing **northward** up the Delaware Valley; at Closter, Bergen Co.; not in the pine-barrens.

PA. Pike, Luzerne, Monroe, Bucks, Berks, and Delaware counties.

Tertiary, o: Cretaceous, rare: Older Formations, increasing **northward**. 118-189 days. Sea level-4,050 ft.

3. ***P. elliptica*** Nutt. In rich, mostly dry woods: N. S. to B. Col., D. C., Ill., Mich., and in the Rocky Mts. to N. Mex.

Throughout the range except in the pine-barrens of N. J., there rare or wanting, not very common on the region surrounding the barrens.

4. ***P. oxypetala*** Austin. Hills: Deposit, Delaware Co., N. Y. Known only from its original collection and not recently seen.

5. ***P. secunda*** L. (*P. secunda pumila* Payne). In woods and thickets: Lab. to Alask., D. C., Neb., along the Rocky Mts. to Mex. and Cal. Also in Europe and Asia.

* See Introduction paragraph 39.

CONN. Very rare near the coast, increasing **northwestward**.

N. Y. Reported but not definitely known from L. I., rare on S. I., thence increasing and becoming common **northward**.

N. J. Very rare in Monmouth, Burlington and Camden counties, mostly near the Delaware River, thence increasing **northward**; not in the pine-barrens.

PA. Pike, Luzerne, Monroe, Philadelphia, Delaware and Chester counties.

Tertiary, 0: Cretaceous, rare: Older Formations, increasing **northward**. 118-204 days. Sea level-4,020 ft.

2. *Moneses* Salisb.

1. *M. uniflora* (L.) A. Gray. In woods: Lab. to Alask., Conn., Pa., Mich. in the Rocky Mts. to Col. and to Ore. Also in Europe and Asia.

CONN. Northern Windham, Tolland, Hartford and Litchfield counties.

N. Y. The mountains of Greene and Delaware counties.

PA. Reported from the "northern tier of counties"; not seen by me.

Tertiary, 0: Cretaceous, 0: Older Formations, confined to the northern part of the range. Not south of the moraine. 118-153 days. 1,200-4,050 ft.

3. *Chimaphila* Pursh.

Leaves lanceolate, mottled with white.

1. *C. maculata*.

Leaves spatulate or cuneate-ob lanceolate, bright green.

2. *C. corymbosa*.

1. *C. maculata* (L.) Pursh. In dry woods: Me. and Ont. to Minn., Ga. and Miss.

Throughout the range, more common in the pine-barrens and less common in the mountains than elsewhere.

2. *C. corymbosa* Pursh. (*C. umbellata* of Amer. authors). In dry woods: N. S. to Mich. and Ga.

Throughout the range, but rare in the pine-barrens and always increasing **northward**; less common than the last.

MONOTROPACEAE

Flowers solitary.

Flowers racemose.

1. MONOTROPA.

2. HYPOPITYS.

1. *Monotropa* L.

1. *M. uniflora* L. In moist rich woods: Anticosti to Fla., B. Col. and Cal. Also in Japan and the Himalayas.

Scattered throughout the range but rare or perhaps wanting in the interior of the pine-barrens.

2. *Hypopitys* Hill.

- Stigma retrorsely bearded; sepals and petals long-ciliate. 1. *H. lanuginosa*.
Stigma not retrorsely bearded; sepals and petals short-ciliate. 2. *H. americana*.

1. *H. lanuginosa* (Michx.) Nutt. Woods: Newf. to Ont., Tenn. and Fla.

Throughout the range, but rare in the pine-barrens.

2. *H. americana* (DC.) Small. Woods: Ont. and N. Y. to N. C. CONN. West Goshen.
N. Y. S. I.
N. J. Cranberry Lake, Sussex Co.

ERICACEAE

Fruit a septical capsule; corolla deciduous; anthers unappendaged.

Corolla of separate petals.

1. LEDUM.

Corolla gamopetalous (polypetalous in No. 5).

Corolla somewhat irregular.

Corolla funnelform, slightly 2-lipped; leaves deciduous.

2. AZALEA.

Corolla 2-lipped, lower lip divided to the base; leaves deciduous.

3. RHODORA.

Corolla campanulate; leaves evergreen.

4. RHODODENDRON.

Corolla regular; seeds angled or rounded.

Corolla polypetalous; low pine-barren plant.

5. DENDRUM.

Corolla gamopetalous.

6. KALMIA.

Fruit a loculicidal capsule, berry or drupe; corolla deciduous; anthers often awned.

Fruit a dry capsule; calyx not accrescent, mostly small.

Anther-sacs opening by a terminal pore or chink.

Sepals or calyx-lobes imbricated, at least in the bud.

Capsule dehiscent into a single layer of 5 valves.

7. EUBOTRYS.

Capsule dehiscent into 2 layers, the outer 5-valved, the inner 10-valved.

8. CHAMAEDAPHNE.

Sepals or calyx-lobes valvate or separate in the bud.

Anthers 2-awned on the back.

Corolla urn-shaped or cylindrical; leaves not glaucous.

9. NEOPIERIS.

- Corolla globose; leaves narrow, glaucous beneath.
 Anthers awnless.
 Anther-sacs longitudinally dehiscent; low trailing woody herb.
 Fruit a drupe or a capsule enclosed by the fleshy acrescent calyx.
 Fruit consisting of the fleshy calyx surrounding the capsule.
 Fruit a drupe with 4 or 5 nutlets.
 Fruit a septical capsule; corolla withering-persistent.
10. ANDROMEDA.
 11. XOLISMA.
 12. EPIGAEA.
 13. GAULTHERIA.
 14. UVA-URSI.
 15. CALLUNA.

1. *Ledum* L.

1. *L. groenlandicum* Oeder. In bogs and swamps: Greenland to B. Col., Mass., N. J. (?) and Wash.

CONN. Northeastern Litchfield Co.

N. Y. Pine Plains, Dutchess Co. and in the higher Catskills, otherwise unknown.

N. J. Credited to Sussex Co. but not definitely known from the state.

PA. Luzerne and Monroe counties.

Tertiary, o: Cretaceous, o: Older Formations, rare, increasing **northward**. Not south of the moraine. 118-153 days. 1,100-4,020 ft.

2. *Azalea* L.

Flowers expanding before or with the leaves.

Flowers pink or white.

Leaves strigose on the midrib beneath; corolla-tube hirsute. 1. *A. nudiflora*.

Leaves canescent beneath; corolla-tube glandular. 2. *A. prinophylla*.

Flowers orange or yellow.

3. *A. lutea*.

Flowers expanding later than the leaves.

4. *A. viscosa*.

1. *A. nudiflora* L. In dry woods and thickets: Me. to Ill., Fla. and Tex. Reported from Canada.

Throughout the range except in the pine-barrens, there rare; always increasing **northward**; uncommon on the L. I. coastal plain.

2. *A. prinophylla* Small. In woods: Mass. and N. Y. to Va. and Tenn. Has been included in *A. canescens* Michx.

CONN. Very rare in northern New London Co., otherwise known only from northwestern Litchfield Co.

N. Y. Known only from Greene, Ulster and Delaware counties, but not always at great elevations.

N. J. The northern corner of Sussex Co.

PA. Luzerne, Pike, Monroe and Lackawanna counties.

Tertiary, o: Cretaceous, o: Older Formations, rare and local.
Not south of the moraine. 117-168 days. Sea level-4,020 ft.

3. **A. lutea** L. In dry woods: N. Y. and Pa. to Ga. and Tenn.

This, the most widely cultivated of American azaleas, has never been collected from the range as a wild plant since its original discovery in Ulster Co., N. Y. In view of the fact that its extreme northern limit as a wild plant now appears to be in Franklin and Somerset counties in Pa., its original collection within our range may have been from a cultivated specimen.

4. **A. viscosa** L. In swamps: Me. to Ohio, Fla. and Tex.

Common throughout the range as to the type, and scarcely less so as to the forms *hispidula*, *glauca*, and *nitida*.

3. **Rhodora** L.

I. **R. canadensis** L. In bogs and on wet hillsides: Newf. to N. J., Que., central N. Y. and Pa.

CONN. Very rare near the coast, increasing **northward**.

N. Y. Reported from Westchester Co., otherwise unknown.

N. J. Morris and Sussex counties.

PA. Monroe and Lackawanna counties.

Tertiary, o: Cretaceous, o: Older Formations, rare and local.
Not south of the moraine. 117-160 days. 500-4,040 ft.

4. **Rhododendron** L.

I. **R. maximum** L. In woods and along streams: N. S. to Ont., Ohio and Ga.

CONN. Litchfield, Tolland and New London counties, increasing **northwestward**.

N. Y. Known only from the Highlands of the Hudson **northward**; formerly on S. I. and reported as formerly at Inwood.

N. J. Very rare in the region of glacial terraces along the Delaware in Camden and Burlington Co., thence increasing **northward**, especially in the valley of the Delaware.

PA. Throughout the range, increasing **northward**.

Tertiary, o: Cretaceous, very rare along the drainage of the Delaware River: Older Formations, increasing **northward**. 117-220 days. Sea level-4,020 ft.

5. **Dendrium** Desv.

I. **D. buxifolium** (Berg.) Desv. In damp sandy pine-barrens: N. J.

Common throughout the New Jersey pine-barrens, very rare in Monmouth Co., just north of the barrens.

Tertiary, confined to the Beacon Hill formation: Cretaceous, very rare at or near Freehold, Monmouth Co., N. J.: Older Formations, o. 169-182 days. About sea-level.

6. *Kalmia* L.

Flowers in mostly compound umbels or corymbs; twigs terete.

Leaves oblong, mostly obtuse; flowers 6-10 mm. broad.

Leaves elliptic or oval, acute; flowers 16-25 mm. broad.

Flowers in simple terminal umbels; twigs 2-edged.

1. *K. angustifolia*.

2. *K. latifolia*.

3. *K. polifolia*.

1. *K. angustifolia* L. In moist soil: Newf. to Hudson Bay, south to Ga. and Mich.

Common throughout the range, except that it is apparently wanting on the southern end of Cape May and not known from the Bronx.

2. *K. latifolia* L. In woods: N. B. to Ont., Ohio, Fla. and La.

Common throughout the range except at the southern end of Cape May, there unknown.

3. *K. polifolia* Wang. (*K. glauca* Ait.) In bogs: Newf. to Alaska, Conn., N. J., Pa., Mich. and Cal.

CONN. Very rare in Fairfield Co., increasing **northward** into Litchfield Co., unknown elsewhere.

N. Y. Dutchess Co., increasing but rare **northwestward** in the Catskills.

N. J. Near Budd's Lake, Morris Co. Round Pond, Sussex Co. PA. Pike, Wayne, and Monroe counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Not south of the moraine. 117-166 days. 680-4,050 ft.

7. *Eubotrys* Nutt.

1. *E. racemosa* (L.) Nutt. (*Leucothoë racemosa* (L.) A. Gray). In swamps and moist thickets: Mass. to Pa., Fla. and La.

CONN. Rare and local near the coast, decreasing and perhaps wanting northward.

N. Y. Common on L. I. and S. I., decreasing up the Hudson Valley to Westchester Co.; unknown northward.

N. J. Rare and local in Morris, Bergen, Hunterdon and Union counties, thence increasing and becoming common **southward**, especially in the pine-barrens.

PA. Bucks, Delaware and Chester counties.

Tertiary, common: Cretaceous, less common: Older Formations, scattered and apparently wanting northward. 159-220 days. Sea level-993 ft.

8. *Chamaedaphne* Moench.

1. *C. calyculata* (L.) Moench. In bogs and swamps: Newf. to Alask., N. J., Ga., Ill., Mich. and B. Col. Also in Europe and Asia.

Common throughout the range, except on S. I. and in the Bronx, there unknown.

9. *Neopieris* Britton.

1. *N. mariana* (L.) Britton (*Andromeda mariana* L.). In sandy soil: R. I. to Fla., Tenn. and Ark.

CONN. The coastal region in Fairfield Co.,

N. Y. Common on L. I. and S. I., rare along the coast of Long Island Sound in Westchester Co.; near Spuyten Duyvil Creek; otherwise unknown.

N. J. Rare and local in Bergen, Essex, Hudson and Passaic counties, thence increasing and common **southward**, especially in the pine-barrens, unknown in southern Cape May Co.

PA. Bucks, Montgomery, Delaware and Chester counties.

Tertiary, common throughout: Cretaceous, less common: Older Formations, rare and scattered. 164-220 days. About sea level.

10. *Andromeda* L.

1. *A. canescens* Small. In bogs: Newf. and Lab. to Man. and N. J., Pa. and Ind.

CONN. Rare in Fairfield Co., increasing **northward** into Litchfield Co.

N. Y. Orange and Putnam counties, increasing **northward**.

N. J. Morris and Sussex counties.

PA. Pike, Wayne and Monroe counties.

Tertiary, 0: Cretaceous, 0: Older Formations, rare and local **northward**. Not south of the moraine. 117-158 days. 500-4,050 ft. Formerly included in *A. polifolia* L.

11. *Xolisma* Raf.

1. *X. ligustrina* (L.) Britton. In swamps and wet soil: Me. to N. Y., Fla., Tenn. and Ark.

Common throughout the range but always increasing **southward**.

12. *Epigaea* L.

1. *E. repens* L. In sandy or rocky woods: Newf. to the N. W. Terr., Fla., Ky. and Mich.

Throughout the range in favorable places, but much diminished by recent collection.

13. *Gaultheria* Kalm.

1. *G. procumbens* L. In woods: Newf. to Man., Ga. and Mich. Common throughout the range.

14. *Uva-ursi* Mill. (*Arctostaphylos* Adans.)

1. *U. Uva-ursi* (L.) Cockerell. Dry, rocky or sandy soil: Lab. to Alask., N. J., Va., Ill., Neb., Colo., Cal. Also in Europe and Asia.

CONN. Rare and local in the north, increasing **southward**, especially along the coast.

N. Y. Common on eastern L. I.; S. I.; unknown in Bronx and Westchester counties, thence decreasing up the Hudson Valley to Greene Co., but not known from the higher Catskills.

N. J. Rare and local in Bergen and Passaic counties, thence unrecorded to Middlesex Co., thence increasing and common **southward**, in the pine-barrens.

PA. Bucks Co.

Tertiary, common: Cretaceous, less common: Older Formations, rare and scattered. 169-220 days. **Sea level**-590 ft.

15. *Calluna* Salisb.

1. *C. vulgaris* (L.) Salisb. Sandy or rocky soil: Newf. to N. J. Naturalized from Europe.

N. J. Very rare as an escape along the coast. Not recently collected.

VACCINIACEAE

Ovary 10-celled; fruit a berry-like drupe.

1. GAYLUSSACIA.

Ovary 4-5-celled; fruit a many seeded berry.

Corolla open, campanulate, 4-5 lobed.

2. POLYCODIUM.

Corolla cylindrical, sub-globose or urceolate.

Erect shrubs; ovary entirely inferior; berries normally not white.

3. VACCINIUM.

Low trailing woody plant with snow-white berries.

4. CHIOGENES.

Corolla deeply 4-cleft or 4-divided, the lobes reflexed.

5. OXYCOCCUS.

I. *Gaylussacia* H. B. K.

- Leaves pale and glaucous beneath, resinous; fruit with a bloom. 1. *G. frondosa*.
 Leaves green both sides, resinous; fruit mostly black.
 Bracts small, deciduous, mostly shorter than the pedicels. 2. *G. baccata*.
 Bracts oval, large, persistent, longer than the pedicels. 3. *G. dumosa*.
1. ***G. frondosa*** (L.) T. & G. In woods and thickets: N. H. to Fla., Ohio and La.
 Common throughout most of the range, less common northward and more abundant in the pine-barrens than elsewhere.
2. ***G. baccata*** (Wang.) C. Koch. (*G. resinosa* (Ait.) T. & G.).
 In woods and thickets: Newf. to Ga., Man., Wisc. and Ky.
 Common throughout the range, especially in the pine-barrens.
3. ***G. dumosa*** (Andr.) T. & G. In sandy swamps: Newf. to N. Y., Fla. and La.
 CONN. Very rare but scattered over most of the state; not definitely known from New London Co.
 N. Y. Not very common on L. I. and S. I., unknown in the Bronx, decreasing up the Hudson Valley to Westchester Co., apparently wanting elsewhere.
 N. J. The coastal plain, more common in the pine-barrens than elsewhere.
 PA. Montgomery and Chester counties.
 Tertiary, common: Cretaceous, less common: Older Formations, scattered and rare. 166-220 days. About sea level.
- A form with permanently glandular leaves has been described as var. *Bigeloviana* Fernald from Conn. I have seen no specimens.*

2. *Polycodium* Raf.

1. ***P. stamineum*** (L.) Greene. In dry woods and thickets: Me. to Ont., Minn., Ark., Ky. and Ala.
 Throughout the range, except in the pine-barrens, there unrecorded, very rare in the region surrounding the barrens.

3. *Vaccinium* L.

- Tall shrubs, mostly 1 m. high or higher.
 Corolla cylindric or nearly so, 2-3 times as long as thick.
 Glabrous or nearly so. 1. *V. corymbosum*.
 Twigs and leaves densely pubescent. 2. *V. vicinum*.
 Corolla urn-shaped to oblong-cylindric, 1-2 times as long as thick.
 Glabrous from the first. 3. *V. caesariense*.

* *Rhodora* 13: 99. 1911.

- Leaves pubescent beneath at least when young.
 Leaves entire-margined. 4. *V. atrococcum*.
 Leaves spinulose-ciliate. 5. *V. atlanticum*.
- Low shrubs, mostly less than 6 dm. high.
 Leaves green on both sides.
 Leaves densely pubescent beneath. 6. *V. canadense*.
 Leaves glabrous, or sparingly pubescent on the veins
 beneath. 7. *V. angustifolium*.
 Leaves pale and glaucous, at least beneath.
 Leaves pale on both sides; mature fruit black. 8. *V. Brittonii*.
 Leaves pale beneath; mature fruit blue. 9. *V. vacillans*.
1. ***V. corymbosum*** L. In swamps and wet woods: Newf. to Va.,
 Minn. and La.
 Common throughout the range.
 2. ***V. vicinum*** Bicknell. E. Mass. to N. J.
 Known only from the coastal plain of L. I. and N. J.
 3. ***V. caesariense*** Mackenzie. Bogs: L. I. (?) and N. J. to Fla.
 N. Y. Apparently on L. I.
 N. J. Rare in the pine-barrens in Ocean, Burlington and Atlantic
 counties; a single station at Five-Mile Beach along the coast, and
 one station near Woodbury, Camden Co.; otherwise unknown
 from the area.
 PA. Reported from Chester Co.
 4. ***V. atrococcum*** (A. Gray) Heller. In swamps and wet woods:
 N. B. and Ont., to N. J., Pa. and Ala.
 Throughout the range, decreasing northward, and more common
 southward than elsewhere.
 5. ***V. atlanticum*** Bicknell (? *V. amoenum* Ait.). In swamps: E.
 Mass. to N. Y. and N. J.
 CONN. Presumably recorded as *V. corymbosum amoenum*.
 N. Y. Coastal plain of L. I., S. I., and near West Point.
 N. J. Coastal plain, and in Union Co.
 Has been referred to *V. virgatum* Ait.
 6. ***V. canadense*** Richards. In moist places: Lab. to the N. W.
 Terr., Va., Ill. and Mich.
 CONN. Near Salisbury, Litchfield Co.
 N. Y. The mountains of Ulster, Delaware, Greene and Sullivan
 counties.
 PA. Monroe and Northampton counties.

Tertiary, 0: Cretaceous, 0: Older Formations, rare and local **northward**. Not south of the moraine. 117-152 days. 1,400-4,020 ft.

7. **V. angustifolium** Ait. (*V. pennsylvanicum* Lam., not Mill.). In dry rocky or sandy soil: Newf. to the N. W. Terr., N. J., Va., Ill. and Mich.

CONN. Throughout the state.

N. Y. Frequent on L. I., rare on S. I., unknown in the Bronx, increasing **northward**.

N. J. Not very common in Cumberland, Salem, Gloucester, Camden, Burlington, and Monmouth counties, north and west of the pine-barrens, thence increasing and common **northward**, especially on rocky ridges; rare in the pine-barrens.

PA. Pike, Monroe, Luzerne, Northampton, Lehigh, Bucks, Delaware and Schuylkill counties.

Tertiary, rare or wanting on Beacon Hill, increasing elsewhere: Cretaceous, more common: Older Formations, increasing and common **northward**. 117-220 days. Sea level-4,020 ft.

8. **V. Brittonii** Porter (*V. nigrum* Britton not *V. pennsylvanicum nigrum* Wood). In dry rocky soil: Me. to N. J., Pa. and Mich.

Confined, so far as present records show, to Litchfield Co., Conn., Sussex Co., N. J. and Monroe Co., Pa., at elevations in excess of 1,000 ft. All these stations are north of the moraine, and have a growing season of 118-153 days. Not reported from, but doubtless in, the Catskills.

9. **V. vacillans** Kalm. In dry soil: Me. and N. H. to Ont., Mich., N. Car. and Mo.

Common throughout the range.

V. Dobbini Burnham (*V. angustifolium* × *vacillans*) is to be looked for in our area wherever both the parents are found. *V. australe* Small has been recorded along the coast north to eastern Mass.

4. **Chiogenes** Salisb.

1. **C. hispidula** (L.) T. & G. In cold wet woods and bogs: Newf. to B. Col., N. Car. and Mich.

CONN. Northern New London and New Haven counties, increasing **northward** into Tolland and Litchfield counties.

N. Y. Reported from but doubtfully on L. I., a single station near Clove Lake, S. I., thence increasing but rare **northward** except in the higher elevations of the Catskills.

N. J. Known only from the old Cedar Swamp in Hudson Co., a station long since destroyed.

PA. Wayne, Northampton and Monroe counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Not south of the moraine. 117-189 days. Sea level-4,040 ft.

5. *Oxycoccus* [Tourn.] Hill.

Leaves oval, acute, 4-8 mm. long; berry globose.

1. *O. Oxycoccus*.

Leaves oval or oblong, obtuse, 6-14 mm. long; berry ovoid or oblong.

2. *O. macrocarpus*.

1. *O. Oxycoccus* (L.) MacM. In cold bogs: Lab. to Alask., N. J., N. Car., Mich. and B. Col. Also in Europe and Asia. CONN. Rare and local over most of the state, increasing **northwestward**.

N. Y. From West Point **northward**.

N. J. Reported, but not definitely known from Monmouth and Ocean counties; recorded from Hudson, Bergen, Morris and Sussex counties.

PA. Pike, Wayne, Monroe, and Luzerne counties.

Tertiary, o: Cretaceous, o: Older Formations, rare **northward**. Not south of the moraine. 117-189 days. Sea level-4,040 ft.

2. *O. macrocarpus* (Ait.) Pers. In bogs: Newf. to the N. W. Terr., N. Car., W. Va., Mich. and Minn.

Throughout the range in locally favorable places, more common southward, and less common northward than elsewhere. Apparently wanting in the unglaciated portion of the Piedmont Plateau.*

DIAPENSIACEAE

1. *Pyxidantha* Michx.

1. *P. barbulata* Michx. In dry sandy pine-barrens: N. J. and N. Car.

N. J. Rare and local in Middlesex, Monmouth and Camden counties, outside the pine-barrens; increasing and becoming common in the barrens.

Tertiary, common on Beacon Hill, decreasing elsewhere: Cretaceous, less common and scattered: Older Formations, unknown. 179-182 days. About sea level.

* See Introduction paragraph 7.

PRIMULACEAE

Lobes or segments of the corolla erect or spreading, not reflexed.

Lobes of the corolla imbricated, at least in the bud.

Ovary wholly superior.

Ovary adnate to the calyx; marsh herbs.

1. *HOTTONIA*.

2. *SAMOLUS*.

Lobes of the corolla convolute or valvate.

Capsule longitudinally dehiscent.

Corolla rotate or rarely short-funnelform.

Stem leafy throughout; flowers yellow.

Staminoidia 5; each corolla-lobe curved around its stamen.

3. *STEIRONEMA*.

Staminoidia none; corolla lobes convolute.

4. *LYSIMACHIA*.

Staminoidia 5, tooth-like; flowers in axillary spike-like racemes or heads.

5. *NAUMBURGIA*.

Leaves whorled at the top of the stem; flowers white.

6. *TRIENTALIS*.

Corolla none; flowers minute, solitary in the axils.

7. *GLAUX*.

Capsule circumscissile; flowers axillary.

8. *ANAGALLIS*.

Segments of the corolla reflexed; plants scapose.

9. *DODECATHEON*.

1. *Hottonia* Boerh.

1. *H. inflata* Ell. ? In shallow stagnant ponds: N. H. and Mass. to Cent. N. Y., Fla. and La.

Local in the coastal region of our area, and in Bergen and Hudson counties, N. J.

2. *Samolus* [Tourn.] L.

1. *S. floribundus* H. B. K. In swamps and brooks: N. B. to Fla., B. Col., Tex. and Cal.

Throughout the coastal part of our range, rare or wanting inland except along the river valleys.

3. *Steironema* Raf.

Leaves ovate to lanceolate; capsule longer than the calyx.

1. *S. ciliatum*.

Leaves lanceolate, oblong or linear; capsule nearly as long as the calyx.

2. *S. lanceolatum*.

1. *S. ciliatum* (L.) Raf. In moist thickets: N. S. to B. Col., Ga., Ala., Kan. and Ariz.

Throughout the region except in the pine-barrens, there wanting, and rare in the region to the east and south of the barrens.

2. *S. lanceolatum* (Walt.) A. Gray. (*S. hybridum* (Michx.) Raf.) In moist soil: Me. to Minn., Fla., La. and Ariz.

Distribution similar to the preceding but unknown in the Bronx.

4. *Lysimachia* [Tourn.] L.

Leaves verticillate in 3's-7's, or some of them opposite.

Corolla rotate-campanulate, pure-yellow, 1-2.5 cm. broad.

Flowers in terminal panicles; corolla-lobes glabrous.

Flowers axillary; corolla-lobes glandular ciliate.

Corolla rotate, 0.8-1.6 cm. broad, its lobes dark-streaked.

Leaves opposite or some of them rarely alternate, sometimes verticillate in No. 5.

Flowers in a terminal virgate raceme; stem erect.

Raceme leafy only at the base.

Raceme leafy to the middle or beyond.

Flowers axillary, solitary; stem creeping.

1. *L. vulgaris*.

2. *L. punctata*.

3. *L. quadrifolia*.

4. *L. terrestris*.

5. *L. producta*.

6. *L. Nummularia*.

1. *L. vulgaris* L. In fields and along roadsides: Me. to N. Y. and Penn. Naturalized from Europe.

A rare and scarcely established adventive in parts of our range.

2. *L. punctata* L. In waste places: N. S. to N. J. Adventive from Europe.

A rare and infrequent adventive in parts of our range.

3. *L. quadrifolia* L. In thickets: N. B. to Minn., Ga. and Wisc. Throughout the range, but rare and perhaps only intrusive in the pine-barrens, increasing northward.

4. *L. terrestris* (L.) B. S. P. In swamps and moist thickets, sometimes on gravelly shores: Newf., Man., Ga. and Ark.

Common throughout the range.

5. *L. producta* (A. Gray) Fernald. In swamps and along roadsides: Me. to N. Y., Mass. and Mich.

CONN. Rare and local near the coast, unknown elsewhere.

N. Y. On L. I. and S. I. and up the Hudson Valley to Putnam Co., unknown northward; nowhere common.

N. J. Passaic, Essex and Union counties, not very common; decreasing and scattered in Middlesex, Monmouth and Burlington counties; unknown in the pine-barrens.

A rare and local species whose distribution is little understood. Supposed by some to be a hybrid between *quadrifolia* and *terrestris*.

6. *L. Nummularia* L. In moist places: Newf. to N. J., Pa. and Ind. Naturalized from Europe.

Locally abundant as a naturalized weed, often wanting.

5. *Naumburgia* Moench.

1. *N. thyrsoflora* (L.) Duby. In swamps: N. S. to Alask., N. Y., Pa., Mo. and Ore. Also in Europe and Asia.

CONN. Throughout the state but much scattered and rare.

N. Y. Rare on the north shore of L. I. and on S. I., thence increasing but always scattered **northward**.

N. J. Rare and local in Bergen, Hudson, Morris, Sussex and Hunterdon counties.

PA. Pike and Wayne Co.

Tertiary, o: Cretaceous, o: Older Formations, rare and scattered, exclusively north of the moraine. 117-220 days. Sea level-4,000 ft.

6. *Trientalis* L.

1. *T. borealis* Raf. (*T. americana* (Pers.) Pursh.) In damp woods and thickets: Lab. to the N. W. Terr., Va., Ill. and Mich.

Throughout the range, common both in the south and in the highest elevations of the Catskills.

7. *Glaux* L.

1. *G. maritima* L. In salt marshes and on sea beaches: N. J. to Newf. and locally in the interior. Also in Europe and Asia.

Known so far as our area is concerned only at Deal on the coast of New Jersey; Montauk, L. I.

8. *Anagallis* [Tourn.] L.

1. *A. arvensis* L. In waste places: Newf. to Fla., Minn. and Mex., and on the Pacific Coast. Naturalized from Europe.

Locally common as a weed, often wanting.

The blue-flowered form *A. arvensis coerulea* (Lam.) Ledeb., has been collected in the range, but it is a rare and hardly persistent adventive.

9. *Dodecatheon* L.

1. *D. Meadia* L. On moist cliffs and prairies: Pa. to Man., Ga. and Tex.

Localized, and reaching its most northerly distribution point, in our area in southwestern Montgomery Co., Pa. This region is south of the moraine, is underlaid by syenite and granite, and has a growing season of about 174 days.

PLUMBAGINACEAE

1. *Limonium* Adans.

1. *L. carolinianum* (Walt.) Britton. On salt meadows: Lab. to Fla. and Tex.

Throughout the region of salt meadows in all our area, but not known from Pa.

EBENACEAE

I. *Diospyros* L.

I. *D. virginiana* L. In fields and woods: R. I. to Kan., Fla. and Tex.

CONN. Localized near New Haven in a good sized grove, perhaps not native there.

N. Y. L. I. and S. I., the northern end of Manhattan; found also on the Sound shore of Westchester Co.; unknown elsewhere.

N. J. Scattered in all the northern counties, increasing **southward**, but unknown in the pine-barrens; more common in the drainage of the Delaware River than elsewhere.

PA. Northampton, Bucks, Schuylkill, Delaware and Chester counties.

Tertiary, unknown on Beacon Hill, not uncommon elsewhere: Cretaceous, common: Older Formations, rare and scattered. 164-220 days. Sea level-625 ft.

OLEACEAE

Fruit a samara; leaves pinnate; flowers mostly dioecious; corolla wanting.

1. *FRAXINUS*.

Fruit a drupe; leaves simple; flowers perfect and complete.

2. *CHIONANTHUS*.

I. *Fraxinus* [Tourn.] L.

Lateral leaflets sessile or short stalked.

1. *F. nigra*.

Lateral leaflets distinctly stalked.

Wing decurrent on the samara to the middle or below.

Wing of the samara long-linear.

2. *F. Darlingtonii*.

Wing of the samara spatulate or oblong-spatulate.

Samara-body broadly spatulate; leaves thick, entire.

3. *F. Michauxii*.

Samara-body narrowly spatulate; leaves thin, serrate or entire.

4. *F. pennsylvanica*.

Wing of the samara terminal, scarcely decurrent on the seed-body.

Twigs and leaves glabrous.

5. *F. americana*.

Twigs and leaves densely pubescent.

6. *F. biltmoreana*.

I. *F. nigra* Marsh. Swamps and river shores: Newf. to Man., south to Va., Ill., Mo. and Ark.

CONN. Throughout the state but rare.

N. Y. Reported but not definitely known from the north shore of L. I., but south of Jamaica and north of Queens; rare on S. I.;

rare and local in the Bronx, and in Rockland Co., thence increasing but never common **northward**.

N. J. Rare and local in Bergen, Morris, Sussex, Hunterdon, Essex, Mercer, and Monmouth counties; not in the pine-barrens.

PA. Northampton, Bucks, Lehigh, Montgomery, Delaware and Chester counties.

Species scattered and the distribution not understood.

2. **F. Darlingtonii** Britton. In woods: Mass. to central N. Y., south to Ala. and La.

Known in our range only from near Southington, Conn. and West Chester, Chester Co., Pa. The Conn. station is in the region of Triassic sandstone and the Pa. record is on Azoic slates.

3. **F. Michauxii** Britton. In wet places: southern N. Y. to N. Car. and Ind.

Known definitely only from Swedesboro and Mickleton, Gloucester Co., N. J., and from the New York Botanical Garden; doubtless in the region between these geologically unrelated stations.

4. **F. pennsylvanica** Marsh. (*F. lanceolata* Borkh. *F. viridis* Michx.). In woods: Vt. to Minn., south to Fla. and Tex.

Common throughout the range except in the pine-barrens, there wanting.

5. **F. americana** L. In rich soil, usually on hillsides: N. S. to Minn., south to Fla., Kan. and Tex.

CONN. Throughout the state.

N. Y. Frequent along the north shore of L. I. and on S. I., thence increasing and becoming common **northward**.

N. J. Occasional in Salem, Gloucester, Camden and Burlington counties in the drainage of the Delaware, thence increasing and becoming common **northward**.

PA. Carbon, Northampton, Bucks, Delaware and Chester counties.

Tertiary, o: Cretaceous, rare along the Delaware: Older Formations, increasing **northward**. 117-220 days. Sea level-3,800 ft.

6. **F. biltmoreana** Beadle. Southern Pa. to Ga.

Known in our area only at or near Woodbourne, Bucks Co., Pa. This region is on the red and yellow gravels and clays that predominate in the southeastern part of the country.

F. excelsior L. planted for shade, is occasionally spontaneous.

2. **Chionanthus** L.

1. **C. virginica** L. In moist thickets: N. J. and southern Pa. to Fla. and Tex.

N. J. Local in Salem, Gloucester, Atlantic and Cumberland counties, especially along Maurice River and Cohausey Creek, also sporadically introduced along the edges of the pine-barrens in the same counties, otherwise unknown in the state.

PA. Chester Co.

Tertiary, o: Cretaceous, rare near the region of glacial terraces: Older Formations, not very common in the extreme southern part of our range. 168–204 days. About sea level.

The privet, *Ligustrum vulgare* L. and the lilac, *Syringa vulgaris* L. are both largely planted and both are established escapes, usually near gardens.

LOGANIACEAE

1. **Polypremum** L.

1. **P. procumbens** L. In dry sandy soil: N. J. and Pa. to Fla., Ky. and Ind. Terr. and Mex. Also in the W. I.

Found, in our area, only near the city of Philadelphia, as a weed; undoubtedly adventive from further south.

There seems to be no evidence that *Spigelia marylandica* L., once thought to grow in New Jersey, has ever been collected in that state.

GENTIANACEAE

Leaves normal; corolla-lobes convolute in the bud.

Style filiform; anthers usually twisting or recurving when old.

Corolla salverform.

1. CENTAURIUM.

Corolla rotate.

2. SABBATIA.

Style short, stout or none; anthers remaining straight.

Corolla without nectiferous pits, glands or scales.

Corolla without plaits in the sinuses.

3. GENTIANA.

Corolla with plaits in the sinuses.

4. DASYPSTEPHANA.

Corolla with one or two nectiferous pits, glands or scales at the base of each lobe.

5. HALENIA.

Leaves, at least those of the stem, reduced to scales; corolla lobes imbricated in the bud.

Calyx of 2 foliaceous spatulate sepals; upper leaves normal.

6. OBOLARIA.

Calyx of 4 lanceolate sepals; leaves all reduced to scales.

7. BARTONIA.

1. **Centaurium** Hill (*Erythraea* Neck.)

1. **C. pulchellum** (Sw.) Druce. In fields and waste places: N. J. to Pa. and Md. Also in the W. Ind. Naturalized from Europe.

Introduced locally as a weed in N. J., apparently not elsewhere.

C. Centaurium (L.) W. F. Wight, has been reported from the range as a very rare waif.

2. *Sabbatia* Adans.

Flowers normally 4-5-parted, sometimes 6-7 parted.

Branches opposite.

Style 2-parted to below the middle; flowers white. 1. *S. lanceolata*.

Style 2-cleft to about the middle; flowers normally pink. 2. *S. angularis*.

Branches alternate.

Calyx shorter than the corolla; leaves narrowed at the base. 3. *S. stellaris*.

Calyx-segments filiform, as long as the corolla; leaves broad at the base. 4. *S. campanulata*.

5. *S. dodecandra*.

Flowers normally 8-12 parted, 3.5-6 cm. broad.

1. *S. lanceolata* (Walt.) T. & G. In pine-barren swamps: N. J. to Fla.

Common throughout the pine-barrens and locally in Cape May Co., N. J.

Tertiary, common on Beacon Hill, rare elsewhere: Cretaceous, o: Older Formations, o. 168-220 days. About sea-level.

2. *S. angularis* (L.) Pursh. In rich soil: N. Y. and Pa. to Ont. and Mich., south to Fla., Ind. Terr. and La.

N. Y. On L. I. and S. I. and up the Hudson Valley to Westchester Co., unknown northward.

N. J. Bergen, Hudson, Morris, Essex, Somerset and Mercer counties, decreasing southward, but unknown in the pine-barrens.

PA. Northampton, Bucks, Montgomery, Delaware and Chester counties.

Tertiary, unknown on Beacon Hill, rare elsewhere: Cretaceous, common: Older Formations, scattered. 169-220 days. About sea level.

3. *S. stellaris* Pursh. In salt meadows: Me. to Fla.

Very common in all our salt marshes within the influence of the tides. A white-flowered form is sometimes found.

4. *S. campanulata* (L.) Torrey. In salt marshes and along brackish rivers, rarely in fresh-water swamps: Mass. to Fla. and La. Also in Cuba.

N. Y. Common along the south side of L. I.; along the bay side of S. I.; apparently unknown elsewhere.

N. J. Common along the coast; also at Burlington on the Delaware River; unknown elsewhere.

PA. Known only from Tullytown, Bucks Co. on the Delaware River.

All the stations maritime except two on the Delaware River just below the "fall line."

5. *S. dodecandra* (L.) B. S. P. Borders of ponds and along salt marshes: Mass. to Fla. and Ala.

In tidal marshes throughout the range; so far not reported inland, nor up the tidal rivers, except in Cape May; sometimes white flowered.

3. *Gentiana* [Tourn.] L.

Corolla-lobes fringed all around their summits.

1. *G. crinita*.

Corolla-lobes naked, not fringed.

2. *G. quinquefolia*.

1. *G. crinita* Froel. In moist woods and meadows: Que. to Minn., Ga. and Iowa.

CONN. Throughout the state; but not common.

N. Y. On the north side of L. I., there rare, and at Woodmere; on S. I., thence increasing but not common **northward**. Reported from Easthampton, L. I., but the report not unverified.

N. J. Occasional in Camden and Burlington counties in the drainage of the Delaware, and at Ocean View, Cape May Co., reported from Monmouth Co., thence increasing **northward**; not in the pine-barrens.

PA. Throughout the state, increasing northward.

Tertiary, not on Beacon Hill, very rare elsewhere*: Cretaceous, rare: Older Formations, increasing **northward**. 117-220 days. Sea level-4,000 ft.

2. *G. quinquefolia* L. In dry or moist soil: Me. and Ont. to Mich. and Mo.

CONN. Litchfield Co., increasing **northward**.

N. Y. Unknown on L. I. and S. I., rare and local in Orange and northern Westchester counties, thence increasing **northward**.

N. J. Reported but not definitely known from Monmouth and Mercer counties; rare and local in Union and Somerset counties, thence increasing **northward**.

PA. Monroe, Luzerne, Northampton and Bucks counties.

Tertiary, o: Cretaceous, very doubtful: Older Formations, increasing **northward**. 117-178 days. Sea level-3,860 ft.

4. *Dasystephana* [Reneal.] Adans. (*Gentiana*, in part).

Margins of leaves and calyx-lobes scabrous or ciliate.

Corolla-lobes distinct, longer than or equalling the plaits. 1. *D. Saponaria*.

* See Introduction paragraph 36.

Corolla-lobes none or minute, the plaits very broad.

2. *D. Andrewsii*.

Margins of leaves and calyx-lobes smooth or nearly so.

Flowers clustered, sessile, 2 bracteolate under the calyx.

Seeds winged.

Corolla-lobes twice as long as the plaits; leaves broad, acuminate; flowers yellowish.

3. *D. flavida*.

Corolla-lobes only a little longer than the plaits; leaves narrow; flowers blue.

4. *D. linearis*.

Seeds completely marginless; corolla-lobes much longer than the plaits, greenish white.

5. *D. villosa*.

Flowers solitary, peduncled, not bracteolate; leaves linear.

6. *D. Porphyrio*.

I. **D. Saponaria** (L.) Small (*Gentiana Saponaria* L.) In wet soil: Ont. to Minn., Conn., Fla. and La.

CONN. Not definitely known from the state; reported but probably erroneously.

N. Y. Common on the south side of L. I., and at Queens; common on S. I.; unknown elsewhere.

N. J. Rare and local in Bergen, Essex, Morris and Hunterdon counties, thence increasing and becoming common **southward**, but wanting in the pine-barrens.

PA. Montgomery, Bucks, Delaware and Chester counties, all the stations near the "fall line."

Tertiary, unknown on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, rare and scattered. 162-220 days. About sea level.

2. **D. Andrewsii** (Griseb.) Small. (*G. Andrewsii* Griseb.). In moist soil: Que. to the N. W. Terr., Ga. and Mo.

CONN. Throughout the state.

N. Y. Not rare along the north side of L. I. and on S. I., thence increasing **northward**; rare on the coastal plain region of L. I.

N. J. Throughout the state, decreasing southward and wanting in the pine-barrens, but found, rather rarely, near Cape May.

PA. Throughout, increasing **northward**.

Tertiary, wanting on Beacon Hill, rare elsewhere: Cretaceous, rare and scattered: Older Formations, increasing **northward**. 117-220 days. Sea level-3,980 ft.

3. **D. flavida** (A. Gray) Britton. In moist soil: Ont. to Va., Minn. and Ky.

Known in our area only as reported in Porter's Flora of Pa. from Bucks and Lehigh counties, Pa.; not seen by me.

4. **D. linearis** (Froel.) Britton. In bogs and on mountains: N. B. and Ont. to Md.

N. Y. The Catskills of Ulster and Greene counties.

N. J. Gathered at Budd's Lake, Morris Co., many years ago, not recently collected.

PA. Monroe and Lehigh counties.

Tertiary, o: Cretaceous, o: Older Formations, rare and local **northward**. South of the moraine only in Pa. 117-179 days. 800-4,020 ft.

5. **D. villosa** (L.) Small. In shaded places: N. J. and Pa. to Fla. and La.

Known definitely only from Bridgeton, Cumberland Co., N. J., and from Berks and Chester counties in Pa. Very local and the distribution not understood.

6. **D. Porphyrio** (J. F. Gmel.) Small. In moist pine-barrens: S. N. J. to Fla.

The pine-barrens, but found also at Cape May, N. J.

Tertiary, common on Beacon Hill, rare elsewhere: Cretaceous, o: Older Formations, o. 179-220 days. About sea level.

5. **Halenia** Borck (*Tetragonanthus* S. G. Gmel.).

1. **H. deflexa** (J. E. Smith) Griseb. In moist woods and thickets: Lab. to Mass., N. Y., Mich. and Ind. Terr.

Known in our area only from Cohecton, Sullivan Co., N. Y., which is north of the moraine, has a growing season of 147 days and is within the drainage area of the Delaware River. It is at about 900 ft.

5. **Obolaria** L.

1. **O. virginica** L. In rich woods and thickets: N. J. and Pa. to Ga., Ill. and Tex.

N. J. In Hunterdon, Essex, Somerset and Mercer counties, increasing southward along the Delaware, to Salem Co. Unknown elsewhere.

PA. Rather common in Northampton, Bucks, Berks, Philadelphia, Delaware and Chester counties.

Tertiary, o: Cretaceous, rare along the Delaware: Older Formations, confined exclusively to the unglaciated portion of the Piedmont Plateau. 159-220 days. **Sea level**-600 ft.

6. **Bartonia** Muhl.

Corolla lobes oblong, abruptly tipped, erose.

Corolla lobes lanceolate, acute or acuminate, entire.

1. *B. virginica*.

2. *B. paniculata*.

1. **B. virginica** (L.) B. S. P. In moist soil: Newf. to Fla., Mich. and La.
Throughout the range, less conspicuous than uncommon.
2. **B. paniculata** (Michx.) Robinson. (*B. iodandra* of Britton's Manual, in part, not of Robinson; *B. lanceolata* Small.) In wet sandy woods and swamps: Eastern Mass. to Fla. and La.
CONN. Rare and local over the southern part of the state.
N. Y. Rare on the L. I. coastal plain and at Smithtown.
N. J. The coastal plain, there rare and local near the edges, most common near the coast; unknown elsewhere.
A rare and local species whose distribution is not well understood.

MENYANTHACEAE

Leaves 3-foliolate; swamp plant.

1. MENYANTHES.

Leaves simple, entire, cordate; floating.

2. NYMPHOIDES.

1. **Menyanthes** [Tourn.] L.

1. **M. trifoliata** L. In bogs: Greenl. to Alask., L. I., Pa., W. Va., Neb. and Cal. Also in Europe and Asia.
CONN. Throughout the state, increasing **northward**.
N. Y. On L. I. and S. I., unknown in the Bronx, increasing **northward**.
N. J. Very rare in Cape May and Gloucester counties,* formerly in Camden Co., apparently wanting between these stations and Hudson and Bergen counties, thence increasing and locally common **northward**.
PA. Apparently confined to Monroe, Berks and Bucks counties.
Tertiary, unknown on Beacon Hill, rare elsewhere:* Cretaceous, very rare: Older Formations, increasing **northward**, especially in the glaciated area. 117-220 days. Sea level-3,980 ft.

2. **Nymphoides** Hill (*Limnanthemum* S. G. Gmel.).†

Floating leaves 2-5 cm. long; flowers 6-12 mm. broad, yellow; seeds smooth.

1. *N. lacunosum*.

Floating leaves 5-15 cm. long; flowers 12-20 mm. broad, white; seeds rough.

2. *N. aquaticum*.

1. **N. lacunosum** (Vent.) Kuntze. In ponds: N. S. to Fla., Ont., Minn. and L.

Throughout the area, nowhere very common and locally wanting; more frequent in the pine-barrens than elsewhere.

* See Introduction paragraph 33. The Cape May Co. records are the most southerly in the east except for one in W. Va. See *Rhodora* 12: 11. 1910.

† See footnote, page 76.

2. **N. aquaticum** (Walt.) Kuntze. In ponds: N. J. and Del. to Fla and Tex.

Known only from Bridgeton, Cumberland Co., N. J. Not recently collected.

APOCYNACEAE

Flowers large, solitary; vines.

1. VINCA.

Flowers small, cymose; erect or diffuse herbs.

2. APOCYNUM.

1. Vinca L.

1. **V. minor** L. Escaped from gardens: E. N. Am. Native of Europe.

Fairly common as an escape from cultivation in most parts of our range, frequently wanting.

2. Apocynum L.

Corolla 5-9 mm. long, its lobes spreading or recurved.

Corolla 8-9 mm. long, pink, its tube narrowed in the throat.

1. *A. androsaemifolium*.

Corolla 5-7 mm. long, white or pink; its tube not narrowed in the throat.

Corolla-lobes more than half as long as the tube.

2. *A. medium*.

Corolla-lobes much shorter than the tube.

3. *A. Milleri*.

Corolla 3-4.5 mm. long, its lobes erect or nearly so.

Leaves and cymes glabrous, or somewhat pubescent.

Leaves petioled, mostly narrowed at the base; flowers greenish.

4. *A. cannabinum*.

Larger leaves sessile or nearly so, mostly cordate-clasping at the base; flowers white.

5. *A. sibiricum*.

Whole plant, including the cymes densely soft-pubescent.

6. *A. pubescens*.

1. **A. androsaemifolium** L. (*A. divergens* Greene). In fields and thickets: Anticosti to Br. Col., Ga., Neb. and Ariz.

Throughout the range, including the pine-barrens, but there probably introduced; unknown at Cape May.

2. **A. medium** Greene. (*A. urceolifer* G. S. Miller). In fields and waste places: Que. to D. C. and Iowa.

Throughout the range.

3. **A. Milleri** Britton (*A. speciosum* G. S. Mill.). Dry soil, N. Y. to D.C.

N. J. Farmingdale, Monmouth Co.

PA. Recorded from Delaware Co.

4. **A. cannabinum** L. In fields and thickets: Anticosti to B. Col., Fla. and Lower Calif.

Common throughout the range, except in the pine-barrens, there rare or wanting; nearly always as a weed.

5. **A. sibiricum** Ait. (*A. album* Greene; *A. hypericifolium* Ait.). In dry soil or along streams: Ont. to B. Col., L. I., and N. Mex.

Rare and local over most of our range, but not in the pine-barrens.

6. **A. pubescens** R. Br. In moist soil; sometimes in fields: Ont. to R. I. and Ala., Ill., Iowa and Mo.

Local throughout most of the area, most common on the coastal plain; not definitely recorded from Pa.

The recently published revision of this genus by A. Béguinot and N. Beloserky records several other species within the range.

Amsonia Amsonia (L.) Britton was found in a field at Ridgewood, Bergen Co., N. J. in 1901, also collected at Lawrence, L. I.

ASCLEPIADACEAE

Erect or decumbent herbs.

Corona-hoods each with an incurved horn within; leaves mostly opposite. 1. ASCLEPIAS.

Corona-hoods unappendaged, or with a thickened, erect-like keel; leaves opposite or alternate. 2. ACERATES.

Twining vines.

Anthers tipped with a scarios membrane; pollen masses pendulous. 3. CYNANCHUM.

Anthers merely tipped; pollen-masses horizontal. 4. VINCETOXICUM.

I. *Asclepias* L.

Flowers yellow or orange; leaves alternate or opposite. 1. *A. tuberosa*.

Flowers not yellow nor orange.

Corolla bright red or purple; leaves opposite.

Flowers 8-12 mm. broad; corona-hoods 4-6 mm. high. 2. *A. lanceolata*.

Leaves lanceolate or linear; hoods oblong, obtuse. 3. *A. rubra*.

Leaves ovate or ovate-lanceolate; hoods lanceolate. 4. *A. purpurascens*.

Leaves oblong, ovate or ovate-oblong; hoods oblong, acutish. 5. *A. incarnata*.

Flowers 4-6 mm. broad; corona-hoods 2-3 mm. high. 6. *A. pulchra*.

Essentially glabrous; leaves lanceolate.

Pubescent; leaves oblong.

Corolla greenish, purplish, yellowish or white.

Leaves not narrowly linear.

Plants glabrous throughout.

Leaves sessile, clasping or very short petioled. 7. *A. amplexicaulis*.

Leaves cordate-clasping. 8. *A. intermedia*.

Leaves rounded at the base, short-petioled.

Leaves manifestly petioled. 9. *A. exaltata*.

Corolla greenish; umbels loose.

Corolla white; umbels dense.

10. *A. variegata*.

Corolla pink; some of the leaves in 4's.

11. *A. quadrifolia*.

Under surface of leaves hairy.

12. *A. syriaca*.

Leaves narrowly linear, all verticillate.

13. *A. verticillata*.

1. *A. tuberosa* L. In dry fields: Me. and Ont. to Minn., Fla., Tex. and Ariz.

Throughout the range, but not very common. Broad-leaved races have been referred to *A. decumbens* L.

2. *A. lanceolata* Walt. In swamps: N. J. to Fla. and Tex., mostly near the coast.

N. J. The region of coastal salt marshes and swamps from Point Pleasant to Cape May, N. J.; apparently not in the pine-barrens.

3. *A. rubra* L. In moist soil: N. Y. and Pa. to Fla., La. and Tex. N. Y. The south side of L. I.

N. J. Throughout the coastal plain, especially in the pine-barrens; unknown elsewhere.

PA. Bucks, Montgomery, Delaware and Chester counties.

Tertiary, common throughout: Cretaceous, common: Older Formations, decreasing and becoming scattered: 168-220 days. About sea level.

4. *A. purpurascens* L. In dry fields and thickets: Mass. to Va., Ont., Minn. and Kan.

Common throughout Conn., N. Y. and Pa.

N. J. Frequent north of the coastal plain, thence decreasing southward through Monmouth, Burlington, Camden, Atlantic and Gloucester counties; not in the pine-barrens, nor along the coast.

Tertiary, apparently wanting: Cretaceous, rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,980 ft.

5. *A. incarnata* L. In swamps: N. B. to the N. W. Terr., Tenn., La. and Kan.

CONN. Not uncommon throughout the state, apparently more frequent in the northwest than elsewhere.

N. Y. Very rare on L. I. near N. Y. on the north shore, and at Bull's Head, S. I., rare and local in Rockland Co., increasing **northward**.

N. J. Passaic, Sussex, Morris and Hunterdon counties.

PA. Northampton, Bucks, Delaware and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Doubtfully, if at all, on the coastal plain. 117-220 days. Sea level-3,900 ft.

6. **A. pulchra** Ehrh. In moist fields and swamps: Me. to Minn. and Ga.
 CONN. Common along the coast, decreasing northwestward.
 N. Y. Common throughout L. I. and S. I., decreasing up the Hudson Valley to Putnam and Orange counties, not definitely known northward.
 N. J. Throughout the state except the pine-barrens, increasing southward.
 PA. Northampton and Chester counties.
 Tertiary, unknown on Beacon Hill; common elsewhere: Cretaceous, common: Older Formations, decreasing northward. Predominating on the coastal plain. 159-220 days. **Sea level**-900 ft.
7. **A. amplexicaulis** J. E. Smith. In dry fields, mostly in sandy soil: Me. to Fla., Minn., Kan. and Tex.
 CONN. Rare over most of the state, more common along the coast, except in Fairfield Co., than elsewhere.
 N. Y. Common on L. I. and S. I. and up the Hudson Valley to northern Westchester Co., reported but not definitely known northward from Dutchess Co.
 N. J. Very rare and local in Sussex, Morris, Passaic, Bergen and Hunterdon counties, thence increasing **southward** and becoming common in the pine-barrens.
 PA. Monroe, Luzerne, Bucks, Delaware and Chester counties.
 Tertiary, common: Cretaceous, less common: Older Formations, decreasing northward. 141-220 days. **Sea level**-1,100 ft.
8. **A. intermedia** Vail. Known only from Rosedale, L. I.; originally cited as from Lawrence, L. I., but this was an error.
9. **A. exaltata** (L.) Muhl. In thickets and woods: Me. to Minn., Ga. and Mo.
 CONN. Throughout the state, but not very common.
 N. Y. Rare on the north side of L. I., occasional on the south side; on S. I., thence increasing and becoming common **northward**.
 N. J. Recorded in Burlington and Monmouth counties north and west of the pine-barrens, thence increasing, but not very common, **northward**.
 PA. Monroe, Lackawanna, Luzerne, Bucks, Delaware and Chester counties.
 Tertiary, o: Cretaceous, very rare: Older Formations, increasing **northward**. 117-220 days. **Sea level**-3,980 ft.

10. *A. variegata* L. In dry woods and thickets: Conn. to Ill., Fla., Ark. and La.

CONN. Rare along the coast, apparently wanting elsewhere.

N. Y. On L. I. and S. I. and up the Hudson Valley to northern Westchester Co., unknown northward.

N. J. Rare in Sussex, Passaic, Bergen, Somerset and Mercer counties, thence increasing **southward**, but rare in the pine-barrens.

PA. Northampton, Bucks, Delaware and Chester counties.

Tertiary, wanting as a wild plant on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, decreasing and becoming scattered northward. 138-220 days. Sea level-1,100 ft.

11. *A. quadrifolia* Jacq. Woods and thickets: Me. and Ont. to Minn., N. Car. and Ark.

CONN. Throughout the state, nowhere common.

N. Y. On the north side of L. I. and on S. I., thence increasing and common **northward**; apparently wanting from the south side of L. I.

N. J. Occasional in Camden and Gloucester counties, near the Delaware; wanting thence to Middlesex Co., thence increasing and common **northward**; wanting in the pine-barrens and south of them.

PA. Throughout the state, increasing **northward**.

Tertiary, 0: Cretaceous, very rare: Older Formations, increasing **northward**. 117-220 days. Sea level-4,020 ft.

12. *A. syriaca* L. In fields and waste places: N. B. to the N. W. Terr., N. Car. and Kan.

Throughout the range, nearly always as a weed, rather rare in the pine-barrens.

13. *A. verticillata* L. In dry fields and on hillsides: Me. and Ont. to N. W. Terr., Fla., Mex. and N. Mex.

Throughout the range, but always rather scattered; rare in the pine-barrens.

A. Bicknellii Vail. Known only from Van Cortlandt Park, N. Y., is perhaps a hybrid between *A. exaltata* and *A. amplexicaulis*.

2. *Acerates* Ell.

1. *A. viridiflora* (Raf.) Eaton. (*A. viridiflora Ivesii* Britton). In dry sandy or rocky soil: Mass. to Ont., the N. W. Terr., Fla. and Tex.

CONN. Rare and apparently confined to the coastal part of the state.

N. Y. Common on L. I. and S. I., unknown in the Bronx, decreasing up the Hudson Valley to Ulster Co., there rare at the lower elevations, unknown northward.

N. J. Rare and local in Bergen, Passaic, Warren, Morris, Hunterdon, Somerset, Mercer, Middlesex and Monmouth counties; not known in the pine-barrens; at Cape May as a weed.

PA. Pike, Northampton, Montgomery, Delaware and Chester counties.

Distribution very curious. Above the fall line apparently most common on limestone and serpentine, but common also on the coastal plain on L.I.

3. *Cynanchum* L.

I. *C. nigrum* (L.) Pers. Escaped from gardens: Mass. to Pa. and Ohio. Introduced from Europe.

Rare as a garden escape in our range, often locally wanting.

C. Vincetoxicum (L.) Pers. has been collected at Queens, L. I., and *C. acutum* L. on ballast near Communipaw, N. J.

4. *Vincetoxicum* Walt.

I. *V. obliquum* (Jacq.) Britton. In thickets: Pa. to Ohio, Va. and Ky.

Known in our area only from Montgomery, Philadelphia, Delaware and Chester counties in Pa.

I can find no evidence that the reported occurrence of *V. Shortii* (A. Gray) Britton, in Pa. is supported by specimens.

The reported occurrence of *Gonolobus laevis* Michx. in Pa., cannot be verified so far as our area is concerned. *Periploca graeca* L., a European weed, has been collected near Philadelphia; it is otherwise unknown in our area. *Philibertia gracilis* D. Don. has been collected as a waif near New York.

CONVOLVULACEAE

Style 2-cleft or 2-parted.

Style entire up to the stigma.

Stigmas capitate or globose.

Corolla salveriform; stamens and style exerted.

Corolla funnellform or campanulate; stamens and style included.

Stigmas 2, filiform or oblong.

1. STYLISMA.

2. QUAMOCLIT.

3. IPOMOEA.

4. CONVULVULUS.

1. *Stylisma* Raf.

1. *S. Pickeringii* (M. A. Curtis) A. Gray. In dry pine-barrens: N. J. to N. Car., Ill. to La. and Tex.
N. J. Localized in the heart of the pine-barrens in Atlantic and Burlington counties,—otherwise unknown.

2. *Quamoclit* [Tourn.] Moench.

1. *Q. coccinea* (L.) Moench. Along river banks and in waste places: R. I. to Fla., Ohio, Kan., Tex. and Ariz. Adventive from further south. Very rare.
Very rare as a scarcely persistent adventive.

Quamoclit Quamoclit (L.) Britton has been reported as an adventive.

3. *Ipomoea* L.

Ovary 2-celled; stigma entire or 2-lobed.

Perennial from an enormous root; corolla 5–8 cm. long.

Annual; roots fibrous; corolla 8–20 mm. long.

Ovary 3-celled; stigmas 3; leaves cordate.

Leaves entire; corolla 5–7 cm. long.

Leaves deeply 3-lobed; corolla 2.5–4 cm. long.

1. *I. pandurata*.

2. *I. lacunosa*.

3. *I. purpurea*.

4. *I. hederacea*.

1. *I. pandurata* (L.) Meyer. In dry soil: Ont. to Conn., Fla., Mich., Kan. and Tex.

CONN. Known only from western Litchfield Co., but not at great elevations.

N. Y. On L. I. and on S. I., Manhattan and the Bronx; reported also from Westchester Co., unknown northward.

N. J. Throughout the state, nowhere common, increasing westward.

PA. Northampton, Bucks, Delaware and Chester counties.

A local species whose distribution is little understood.

2. *I. lacunosa* L. In moist soil: N. J. to S. Car., Ill., Kan. and Tex.

N. J. Rare in Monmouth, Camden and Gloucester counties, otherwise unknown.

Perhaps nowhere native in the local flora range.

3. *I. purpurea* (L.) Roth. In waste places, usually escaping from gardens: N. S. to Fla., Ont., Neb. and Tex. Adventive from Trop. Am.

Occasional as an established escape from gardens.

4. **I. hederacea** Jacq. In fields and waste places: L. I. to Fla., Pa., S. Dak., Neb. and Mex. Adventive from Trop. America. Rare or occasional on cultivated areas or waste grounds, often wanting.

I. hirsutula Jacq. has been found as a waif on S. I.

4. **Convolvulus** L.

Calyx with 2 large bracts at the base which enclose it.

Stems trailing or climbing.

Glabrate; leaves hastate.

1. *C. sepium*.

Pubescent; leaves sagittate.

Flowers double, in our representative.

2. *C. japonicus*.

Flowers single.

3. *C. repens*.

Stems erect or ascending.

4. *C. spithameus*.

Calyx not bracted; peduncle bracted at the summit; leaves entire, auriculate.

5. *C. arvensis*.

1. **C. sepium** L. In fields and thickets: Newf. to N. Car., Br. Col. and N. Mex. Also in Europe and Asia.

Common in most parts of our range, except in the pine-barrens, there rare.

2. **C. japonicus** Thunb. In fields and waste places; Conn. to Mo. Locally established as a weed, mostly in a doubled-flowered form with us.

3. **C. repens** L. Moist and dry soil, Que. to Fla. and La.

Frequent along the coast throughout our area; occasionally introduced elsewhere.

4. **C. spithameus** L. In dry, sandy, or rocky fields, or on banks: N. S. to the N. W. Terr., Fla. and Ky.

Rare in our area, sometimes as a weed; not reported from the pine-barrens nor from S. I.

5. **C. arvensis** L. In fields and waste places: N. S. to Ont., N. J., Neb. and Kan. Naturalized from Europe.

Locally common as a weed, often wanting.

Dichondra repens Forst. has been collected as a waif, but is very doubtfully persistent.

CUSCUTACEAE

1. **Cuscuta** [Tourn.] L.

Corolla-scales crenulate; stigmas slender; capsule circumscissile.

Scales crenulate above, not incurved.

1. *C. Epilinum*.

Scales crenulate all round, strongly incurved.

2. *C. Epithymum*.

Corolla scales fringed; stigmas capitate; capsule indehiscent.

Sepals united below into a gamosepalous calyx.

Flowers very nearly sessile; corolla persistent at the base of the capsule.

Corolla scales ovate, fringed all around.

3. *C. arvensis*.

Corolla scales abortive, or of a few processes.

4. *C. Polygonarum*.

Flowers distinctly pedicelled; corolla enclosing or capping the capsules.

Tips of the corolla lobes incurved.

5. *C. Coryli*.

Corolla lobes spreading or recurved.

Scales small, irregularly fringed; capsule depressed globose.

6. *C. Cephalanthi*.

Scales long, fringed mainly above; capsule pointed.

7. *C. Gronovii*.

8. *C. compacta*.

Sepals separate, subtended by similar bracts.

1. **C. Epilinum** Weihe. On flax: N. S. to N. J. and Pa. Introduced from Europe.
Very rare in our area, and not recently collected.
2. **C. Epithymum** Murr. Usually on clover: Me. and Ont. to Conn., N. Y., Pa. and S. Dak. Introduced from Europe.
Rare in our area as an adventive, usually not persistent.
3. **C. arvensis** Beyrich. On various herbs and low shrubs: Mass. to the N. W. Terr., Fla., Tex., Mex. and Calif.
Throughout the range, nowhere common, and often locally wanting.
4. **C. Polygonorum** Engelm. On *Polygonum* and other herbs: Pa. and Del., also westward.
Confined in our area to Luzerne Co., Pa.; not recently collected.
5. **C. Coryli** Engelm. On hazels and other shrubs and on herbs: Conn. to Va., S. Dak. and Ark.
Known definitely, in our area, only from Norwich, Conn.
6. **C. Cephalanthi** Engelm. On shrubs and tall herbs: Pa. to Minn., the N. W. Terr., Tex. and Ariz.
Known only from Quaker Bridge, Tom's River and Swedesboro, all in or near the pine-barrens of N. J., and from Northampton Co., Pa.
7. **C. Gronovii** Willd. On herbs and low shrubs: N. S. to Man., Fla. and Tex.
Common throughout our area except in the pine-barrens, there not recorded; always increasing **northward**.

8. **C. compacta** Juss. On shrubs: Ont. to N. Y., Ala., Kan. and Tex.

Throughout the range, except in the coastal strip of N. J., there apparently wanting; common in the pine-barrens.

POLEMONIACEAE

Calyx distended and at length ruptured by the ripening capsule; leaves opposite.

1. PHLOX.

Corolla not distended or ruptured by the capsule; leaves alternate.

2. POLEMONIUM.

I. **Phlox** L.

Leaves flat, ovate, oblong, lanceolate or linear.

Cymes paniced; flowers short pedicelled or sessile.

Calyx-teeth subulate.

1. *P. paniculata*.

Calyx-teeth lanceolate, acute.

2. *P. maculata*.

Cymes corymbose, simple, or flowers scattered.

Stem erect or ascending; no prostrate, sterile shoots.

3. *P. pilosa*.

Stem ascending or reclining; sterile shoots prostrate.

4. *P. divaricata*.

Leaves subulate, fascicled or crowded.

5. *P. subulata*.

1. **P. paniculata** L. In woods and thickets: Pa. to Fla., Ill., Kan. and Ia. Freely escaped from gardens in the north and east.

Not uncommon as an escape in most parts of our range, perhaps native only in Luzerne and Northampton counties in Pa.

2. **P. maculata** L. In moist woods and along streams: Conn. to Fla., Minn. and Tenn.

CONN. and N. Y., escaped from cultivation.

N. J. On the drainage of the Delaware from Hunterdon to Salem counties, and in Cape May; elsewhere probably not native but frequently escaping.

PA. Luzerne, Bucks, Delaware and Chester counties.

3. **P. pilosa** L. In various situations: Ont. to Man., N. J., Fla., Kan., Ark. and Tex.

CONN. Very rare at Southbury, the only reported station for the species in New England.

N. J. Rare along the drainage of the Delaware in Gloucester,

Camden and Burlington counties; rare and local in Monmouth and Middlesex counties, thence increasing but scattered northward; not in the pine-barrens.

PA. Northampton, Bucks, Lehigh, Delaware and Chester counties.

Tertiary, o: Cretaceous, rare: Older Formations, not common. 141-220 days. Sea level-890 ft.

4. **P. divaricata** L. In moist woods: Ont. to Minn., Pa., Fla. and Ark.

Nowhere as a wild plant in our area; reported as an adventive in Conn., N. J. and Luzerne and Northampton counties, Pa.

5. **P. subulata** L. In dry sandy or rocky soil: N. Y. to Fla., Mich. and Ky. Escaped from cultivation in New England, and perhaps in N. J. and N. Y.

CONN. Not uncommon as an adventive.

N. Y. Occasional on the south side of L. I.; S. I.; wanting elsewhere.

N. J. Scattered throughout the north, but perhaps sometimes adventive there, increasing and becoming common southward, but not in the pine-barrens.

PA. Throughout the state, most common in Delaware and Chester counties, especially in the serpentine barrens in Chester Co.

Tertiary, unknown on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, rare and scattered, perhaps nearly always adventive in our area. 141-220 days. Sea level-980 ft.

A white flowered form has been collected.

2. **Polemonium** [Tourn.] L.

Anthers exserted; flowers 16-20 mm. broad; stem erect.

1. *P. Van-Bruntiae*.

Anthers included; flowers 10-12 mm. broad; stem reclining.

2. *P. reptans*.

1. **P. Van-Bruntiae** Britton. In swamps and along streams: Vt. and northern N. Y. to Md.

CONN. Known only from near Salisbury, Litchfield Co.

N. Y. Rare in the mountains of Ulster, Greene and Delaware counties; otherwise unknown.

N. J. Near Washington, Warren Co.

Tertiary, o: Cretaceous, o: Older Formations, rare in the north. Not south of the moraine. 850-3,900 ft. 117-145 days.

2. **P. reptans** L. In woods: N. Y. to Minn., Ga. and Kan.

N. J. Rather uncommon in the drainage of the Delaware River in Warren, Hunterdon, Mercer, Camden and Salem counties, unknown elsewhere.

PA. Bucks, Philadelphia, Delaware and Chester counties.

A rare and local plant in our area.

Gilia rubra L. has been reported from southern New Jersey and Westchester Co., N. Y. as an escape from cultivation. *G. achilleaefolia* Benth. and *G. capitata* Dougl. have been collected as waifs in New York and Pennsylvania.

HYDROPHYLLACEAE

Corolla lobes convolute in the bud; placentae dilated.

Stamens exserted, calyx not much enlarged in fruit.

Stamens not exserted; calyx much enlarged in fruit.

Corolla lobes imbricated in the bud; placentae narrow.

1. HYDROPHYLLUM.

2. NYCTELEA.

3. PHACELIA.

1. *Hydrophyllum* [Tourn.] L.

Leaves, at least the lower, pinnatifid or pinnately divided.

Leaves palmately 5-9 lobed.

1. *H. virginianum*.

2. *H. canadense*.

1. **H. virginianum** L. In woods: Que. to Alaska, south to S. Car., Kan. and Wash.

CONN. Rare, in Fairfield, New Haven, Hartford and Litchfield counties, increasing **northwestward**.

N. Y. Very doubtfully on L. I., except as a rare adventive; rare on S. I., thence increasing but not common **northward**.

N. J. Rare in Monmouth and Ocean counties, thence increasing but scattered **northward**; not in the pine-barrens, or south of them.

PA. Pike, Monroe, Northampton, Bucks, Delaware and Chester counties.

Tertiary, o: Cretaceous, very rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,365 ft.

2. **H. canadense** Michx. In woods: Mass. to N. Car., Ill. and Ky.

Known in our range only from near Nockamixon Rocks, Bucks Co., Pa., a region south of the moraine, having a growing season of about 176 days, and underlaid by Mesozoic formations; and along the Delaware in Warren Co., N. J.; formerly reported from S. I.

2. *Nyctelea* Scop. (*Ellisia* L. *Macrocalyx* True).

1. **N. Nyctelea** (L.) Britton. In moist soil: N. J. to Minn., the N. W. Terr., Va., Neb. and Kan.

N. Y. Port Washington, N. Y. City.

N. J. Very rare in Mercer and Hunterdon counties, near the Delaware River; unknown elsewhere.

PA. Bucks and Philadelphia counties.

3. *Phacelia* Juss.

Corolla-lobes entire.

Corolla-lobes nearly rotate, its lobes fimbriate.

1. *P. dubia*.

2. *P. Purshii*.

1. **P. dubia** (L.) Small. In moist soil: N. Y. and Pa. to Ga., Mo., Kan. and Tex.
PA. Telford, Bucks Co.
2. **P. Purshii** Buckl. In moist woods or thickets: Pa. to Minn., N. Car., Ala. and Miss.
PA. Walnut Hill, Montgomery Co.
Also as a waif in Conn.

Phacelia viscida (Benth.) Torrey has been collected in Conn. as an occasional waif; doubtfully persistent.

Marilaunidium jamaicense (L.) Kuntze has also been found as a waif near New York.

BORAGINACEAE

- | | |
|---|------------------|
| Ovary entire or 2-4 grooved; style terminal. | 1. HELIOTROPIUM. |
| Ovary 4-divided or deeply 4-lobed, the style arising from the center. | |
| Flowers regular. | |
| Nutlets armed with barbed prickles. | |
| Nutlets spreading or divergent, covered by the prickles. | 2. CYNOGLOSSUM. |
| Nutlets erect or incurved, the prickles on the back or margin. | 3. LAPPULA. |
| Nutlets unarmed. | |
| Nutlets attached laterally to the receptacle, sometimes just above their bases. | |
| Fruiting calyx not greatly enlarged nor membranous. | |
| Corolla blue, rarely white. | 4. MERTENSIA. |
| Corolla yellow. | 5. AMSINCKIA. |
| Fruiting calyx much enlarged; veiny and membranous. | 6. ASPERUGO. |
| Nutlets attached to the receptacle by their bases. | |
| Scar of the attachment small and flat. | |
| Corolla salverform or funnellform, its lobes rounded. | |
| Racemes not bracted; corolla-tube short. | 7. MYOSOTIS. |
| Racemes bracted; corolla-tube 4-12 mm. long. | 8. LITHOSPERMUM. |
| Corolla tubular, its lobes erect, acute. | 9. ONOSMODIUM. |
| Scar of attachment large, concave. | |
| Corolla tubular, 5-toothed. | 10. SYMPHYTUM. |
| Corolla rotate; anthers erect. | 11. BORAGO. |
| Flowers irregular. | |
| Stamens included; throat of corolla closed by scales. | 12. LYCOPSIS. |
| Stamens exserted; throat of corolla dilated, open. | 13. ECHIUM. |

1. *Heliotropium* [Tourn.] L.

1. *H. europaeum* L. In waste places: N. Y. and Pa. to Fla. Adventive from Europe.

Rare or occasional as a weed, particularly near New York and Philadelphia.

H. indicum L. and *H. peruvianum* Don. have been collected as waifs near New York; they are hardly persistent. *H. curassavicum* L. has also been found as a waif in some parts of the range.

2. *Cynoglossum* [Tourn.] L.

Stem leafy to the top; flowers reddish, purple, or white.

1. *C. officinale*.

Stem leafless above; flowers blue.

Flowers about 10 mm. broad; nutlets about 8 mm. long.

2. *C. virginianum*.

Flowers about 7 mm. broad; nutlets about 5 mm. long.

3. *C. boreale*.

1. *C. officinale* L. In fields and waste places: Que. and Ont. to Minn., Man., N. Car. and Kan. Naturalized from Europe.

Not uncommon as a weed in most parts of our range, often locally wanting.

2. *C. virginianum* L. In woods: Conn. to Fla., La., Mo. and Kan.

CONN. Reported from the southwestern part of the state.

N. Y. Reported from but doubtfully on L. I.

N. J. Bergen, Union, Somerset and Hunterdon counties.

PA. Bucks, Delaware and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing westward. 117-220 days. Sea level-3,900 ft.

3. *C. boreale* Fernald. Woods and banks: Que. and Ont. to Conn. and Minn.

CONN. Rare, in rocky woods.

N. Y. Catskill Mountains.

3. *Lappula* [Rivin.] Moench.

Racemes bracted; fruiting pedicels not reflexed.

1. *L. Lappula*.

Racemes bracted only at the base; fruiting pedicels reflexed.

2. *L. virginiana*.

1. *L. Lappula* (L.) Karst. In waste places: N. S. to B. Col., N. J. and Kan. Naturalized from Europe.

Occasional as a weed, often wanting locally.

2. *L. virginiana* (L.) Greene. In dry woods and thickets: N. B. to Ont. and Minn., Ala., La. and Kan.

CONN. Throughout the state.

N. Y. Frequent on the north side of L. I., apparently unknown from the south side; S. I.; rare and local in Bronx and Westchester counties, increasing **northward**.

N. J. Infrequent in Gloucester, Camden, Burlington, Ocean and Monmouth counties near the Delaware and north and west of the pine-barrens, thence increasing **northward**.

PA. Northampton, Bucks, Delaware and Chester counties.

Tertiary, 0: Cretaceous, rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,200 ft.

4. *Mertensia* Roth.

1. *M. virginica* (L.) DC. In low meadows and along streams: Ont. to N. J., S. Car., Minn., Neb. and Kan. Rare.

N. Y. Known only from Tuxedo Park, Rockland Co.

N. J. Not uncommon in Burlington, Monmouth, Middlesex, Mercer and Somerset counties, especially along the Raritan River, neither in the pine-barrens, nor elsewhere.

PA. Northampton, Bucks, Delaware and Chester counties.

Tertiary, 0: Cretaceous, more common: Older Formations, scattered. 175-220 days. About sea level.

5. *Amsinckia* Lehm.

1. *Amsinckia lycopsioides* Lehm. Waste and cultivated grounds. Locally introduced in Conn. from the Pacific Coast.

A. intermedia F. & M. has been found on eastern L. I., presumably as a waif.

6. *Asperugo* [Tourn.] L.

1. *A. procumbens* L. In waste places and on ballast: N. Y. to D. C. and Minn. Adventive from Europe.

Not uncommon as a weed near the larger cities, often wanting.

7. *Myosotis* [Dill.] L.

Hairs of the calyx all straight; perennial swamp or brook plants.

Calyx-lobes shorter than the tube; corolla 6-8 mm. broad.

1. *M. scorpioides*.

Calyx-lobes as long as the tube; corolla 4-6 mm. broad.

2. *M. laxa*.

Hairs of the calyx, or some of them with hooked tips; annuals or biennials.

Fruiting pedicels longer than the calyx.

3. *M. arvensis*.

Fruiting pedicels not longer than the calyx.

Calyx lobes equal.

4. *M. versicolor*.

Calyx lobes unequal; corolla white.

5. *M. virginica*.

1. **M. scorpioides** L. (*M. palustris* (L.) Lam.) In brooks and marshes, escaped from cultivation: N. S. to N. Y. and Tenn. Native of Europe.
Not uncommon as an escape in most parts of our range, apparently wanting in the pine-barrens.
2. **M. laxa** Lehm. In wet muddy places: Newf. to Ont., Va. and Tenn. Native of Europe.
Frequent throughout the range, less common in the pine-barrens than elsewhere.
3. **M. arvensis** (L.) Hill. In fields: N. B. to Ont. and Minn., south to W. Va. Also in Europe.
Very rare, always as a weed, near the City of New York and locally elsewhere.
4. **M. versicolor** (Pers.) Reichenb. In fields and along roadsides: southern N. Y. to Del. Naturalized from Europe.
Locally rare as a weed.
5. **M. virginica** (L.) B. S. P. On dry hills and banks: Me. to Ont., Minn., Ga. and Tex.
CONN. Not very common over most of the state.
N. Y. On the north shore of L. I. and on S. I., not reported from the south shore of L. I., thence increasing **northward**.
N. J. Throughout the state except in the pine-barrens.
PA. Northampton, Bucks and Philadelphia counties.
Tertiary, unknown on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, increasing **northward**. 117-220 days. Sea level-3,080 ft.

Myosotis micrantha Pall. has been collected as a waif and recorded as *M. collina* Hoffm.

8. **Lithospermum** [Tourn.] L.

Corolla white or yellowish, its tube shorter than or equalling the calyx;

flowers distant.

Nutlets brown, wrinkled and pitted; annual or biennial.

1. *L. arvense*.

Nutlets white, smooth and shining; perennial.

Leaves lanceolate, acute; nutlets ovoid.

2. *L. officinale*.

Leaves ovate, acuminate; nutlets globose-ovoid.

3. *L. latifolium*.

Corolla bright yellow, its tube much longer than the calyx; flowers dense.

4. *L. canescens*.

1. **L. arvense** L. In waste places and fields: Que. to Ont., Mich., Ga. and Kan. Naturalized from Europe.

Common as a weed in most parts of our range.

2. **L. officinale** L. In fields and waste places: Ont. to N. Y., west to Minn. Naturalized from Europe.
Locally rare as a weed.
3. **L. latifolium** Michx. In dry thickets and fields: Ont. and western N. Y. to Minn., Va., Kan. and Ark.
Known in our range only as reported from Berks Co., Pa.
4. **L. canescens** (Michx.) Lehm. In dry soil: Ont. to N. J., Ala., the N. W. Terr., Kan. and Ariz. Very rare.
Known in our area only from a limestone bluff above Phillipsburg, N. J. and in Chester Co., Pa.

9. **Onosmodium** Michx.

1. **O. virginianum** (L.) DC. In thickets and sandy soil: N. Eng. to Fla., Kan. and Tex.
CONN. Rare and scattered at a few stations throughout the state. N. Y. On the north side of L. I., near Jamaica, and in Westchester Co.; formerly on Manhattan Island.
N. J. Rare and local in Gloucester, Burlington, Atlantic, Middlesex, Monmouth, Sussex and Hunterdon counties, not in the pine-barrens.
PA. Bucks, Delaware and Chester counties.
Rather inexplicably scattered and its distribution little understood.
O. occidentale Mackenzie has been collected as a waif in Conn.

10. **Symphytum** [Tourn.] L.

Leaf-bases decurrent.

1. *S. officinale*.

Leaf-bases not decurrent.

2. *S. asperrimum*.

1. **S. officinale** L. In waste places: Newf. to Minn., south to Md. Adventive from Europe.
Not uncommon as a weed.
2. **S. asperrimum** Donn. Waste grounds, Mass. to Md. Adventive from Europe.
Occasional in waste grounds.

11. **Borago** [Tourn.] L.

1. **B. officinalis** L. In waste places: escaped from gardens: N. S. to Ont. and Pa. Native of Europe.
Very rare as an escape.

12. **Lycopsis** L.

1. **L. arvensis** L. In fields and waste places: N. S. to Ont., Pa. and Va. Adventive from Europe.

Not common as a weed near the larger cities.

13. **Echium** [Tourn.] L.

1. **E. vulgare** L. In fields and waste places: N. B. to Va., Ont. and Neb. Naturalized from Europe.

Locally abundant as a weed.

E. pustulatum Sibth. and *E. violaceum* have been collected as waifs near New York. *Nonnea nigricans* DC., *Anchusa officinalis* L., and *A. leptophylla* Roem & Schult. have been collected as waifs in the area.

Cochranea anchusaefolia (Poir.) Gürke has been collected as a waif.

The reported occurrence of *Pneumaria maritima* (L.) Hill on L. 1. has not been verified. No specimens are forthcoming.

VERBENACEAE

Corolla-limb 5-lobed, regular or nearly so; nutlets 4.

1. VERBENA.

Corolla-limb 4-lobed, 2-lipped; nutlets 2.

2. LIPPIA.

1. **Verbena** [Tourn.] L.

Spikes filiform; fruit scattered; corolla usually white.

Leaves incised or pinnatifid; diffuse annual.

1. *V. officinalis*.

Leaves serrate, rarely incised; erect perennial.

2. *V. urticifolia*.

Spikes slender; fruits densely imbricated; corolla blue.

Leaves lanceolate, acuminate, petioled.

3. *V. hastata*.

Leaves linear to spatulate-lanceolate, mostly obtuse and sessile.

4. *V. angustifolia*.

1. **V. officinalis** L. In waste or cultivated ground: Me. to Fla. and Tex. Also on the Pacific Coast. Naturalized from the Old World.

Locally rare as a weed.

2. **V. urticifolia** L. (*V. riparia* Raf.) In waste places, and in fields: N. B. to S. Dak., Kan., Fla. and Tex.

Common throughout the area, often as a weed.

Hybrids of this species with *V. hastata* have been reported and are to be looked for in the area.

3. **V. hastata** L. In moist fields and waste places: N. S. to B. Col., Fla., Neb. and N. Mex.

Common as a weed in most parts of our range except the pine-barrens.

4. *V. angustifolia* Michx. In dry fields: Mass. to Fla., west to Minn., Kan. and Ark.

Rare and local in most parts of our range except the pine-barrens.

V. stricta Vent. and *V. bracteosa* Michx. have both been collected as waifs, scarcely persistent; *V. bonariensis* L. has been recorded as a waif near New York, but not recently.

2. *Lippia* Houst.

1. *L. lanceolata* Michx. In moist soil: Ont. to Minn., N. J., Ill., Kan., Fla., Tex. and Mex. Also in California.

Known in our area only from the coastal region in Cape May Co., N. J., there very local.

LAMIACEAE

- Ovary 4-lobed, the style not basal; nutlets laterally attached.
- Corolla limb very irregular, apparently 1-lipped or the other lip very short.
- Upper lip of the corolla short, truncate. 1. AJUGA.
- Upper lip of the corolla 2-lobed, or all the lobes united into the lower lip. 2. TEUCRIUM.
- Corolla-limb nearly equally 5-lobed.
- Corolla-lobes spreading; stamens short exerted. 3. ISANTHUS.
- Corolla-lobes declined; stamens long exerted. 4. TRICHOSTEMA.
- Ovary 4-parted, the style basal; nutlets basally attached.
- Calyx with a protuberance on the upper side. 5. SCUTELLARIA.
- Calyx not gibbous on the upper side.
- Stamens and style very short, included in the corolla tube. 6. MARRUBIUM.
- Stamens longer, not included in the corolla tube.
- Corolla strongly 2-lipped; lips unlike, the upper concave.
- Anther-bearing stamens 4.
- Upper pair of stamens longer than the lower.
- Anther-sacs parallel or nearly so. 7. AGASTACHE.
- Anther-sacs divergent.
- Calyx tubular; plant erect. 8. NEPETA.
- Calyx unequally 5-toothed. 9. GLECOMA.
- Upper pair of stamens shorter than the lower.
- Calyx distinctly 2-lipped, closed in fruit. 10. PRUNELLA.
- Calyx 3-10 toothed, not 2-lipped.
- Calyx membranous, inflated in fruit, faintly nerved. 11. DRACOCEPHALUM.
- Calyx neither membranous nor inflated, distinctly 5-10 nerved.
- Anther-sacs transversely 2-valved. 12. GALEOPSIS.
- Anther-sacs not transversely 2-valved, parallel or divergent.

- Nutlets 3-sided, truncate.
 Calyx-teeth *n o t*
 spiny-tipped. 13. LAMIUM.
 Calyx-teeth spiny-
 tipped. 14. LEONURUS.
 Nutlets ovoid, rounded
 above.
 Calyx with a spread-
 ing 5-toothed limb. 15. BALLOTA.
 Calyx limb not
 spreading. 16. STACHYS.
- Anther-bearing stamens 2.
 Connective of anther very long, bearing a
 perfect sac only at one end. 17. SALVIA.
 Connective of anther very short, the sacs
 confluent.
 Calyx tubular, 15-nerved. 18. MONARDA.
 Calyx ovoid-tubular, 13-nerved, 2-
 lipped. 19. BLEPHILIA.
- Corolla 2-lipped or regular; upper lip when present
 mostly flat, scarcely concave.
 Flowers in axillary whorls or clusters or these
 forming terminal spikes.
- Corolla 2-lipped.
 Stamens curved, often converging.
 Anther-bearing stamens 2. 20. HEDEOMA.
 Anther-bearing stamens 4.
 Corolla-tube upwardly curved,
 exerted. 21. MELISSA.
 Corolla-tube straight.
 Calyx 10-nerved, about
 equally 5-toothed. 22. SATUREIA.
 Calyx mostly 13-nerved,
 2-lipped. 23. CLINPODIUM.
- Stamens straight, often diverging.
 Calyx 15-nerved. 24. HYSSOPUS.
 Calyx 10-13 nerved.
 Anther-bearing stamens 4.
 Anther-sacs divergent.
 Calyx equally 5-
 toothed; *e r e c t*
 herbs. 25. ORIGANUM.
 Calyx 2-lipped; creep-
 ing herbs. 26. THYMUS.
 Anther-sacs parallel. 27. KOELLIA.
 Anther-bearing stamens 2. 28. CUNILA.
- Corolla regular, 4-5 lobed.
 Anther-bearing stamens 2; plants not
 aromatic. 29. LYCOPUS.
 Anther-bearing stamens 4; aromatic,
 fragrant herbs. 30. MENTHA.

Flowers in terminal paniced racemes or spikes;
 corolla 2-lipped.

Anther-bearing stamens 2; lower lip of
 corolla fimbriate.

31. COLLINSONIA.

Anther-bearing stamens 4; lower lip of
 corolla not fimbriate.

32. PERILLA.

1. *Ajuga* L.

Glabrous; producing stolons.

1. *A. reptans*.

Pubescent; destitute of stolons.

2. *A. genevensis*.

1. *A. reptans* L. In fields: Que. and Me. to southern N. Y.
 Naturalized from Europe.

Locally rare as a roadside weed.

2. *A. genevensis* L. In fields and waste places: Me. and Conn.
 to N. Y. and Pa. Native of Europe.

Rare as a local and perhaps fugitive weed.

2. *Teucrium* L.

Calyx canescent, its upper teeth obtuse.

Leaves usually green and glabrous above, scarcely papillose.

1. *T. canadense*.

Leaves densely appressed-pubescent and papillose above.

2. *T. littorale*.

Calyx villous, its upper teeth acutish.

3. *T. occidentale*.

1. *T. canadense* L. In moist thickets: N. E. to Man., Fla.,
 Kan., Tex. and Mex.

CONN. Not very common over most of the state.

N. Y. Occasional on S. I. Most old records apply to *T. littorale*.

N. J. Rare in Bergen, Passaic and Morris counties, increasing
 westward; unknown in the pine-barrens; most common in
 the Delaware drainage.

PA. Throughout, but rare.

Tertiary, unknown on Beacon Hill, not common elsewhere: Cre-
 taceous, scattered: Older Formations, scattered. Predominating
 south of the terminal moraine. 153-220 days. Sea level-940 ft.

2. *T. littorale* Bicknell. On or near the coast: Me. to Fla.

Common along the coast of Conn., L. I., S. I., N. J., and up the
 Hudson as far as Yonkers. Not definitely reported up the Dela-
 ware in Pa.

3. *T. occidentale* A. Gray. In moist soil: Ont. to Pa., Br. Col.,
 Kan., N. Mex. and Cal.

Known in our range only from near Philadelphia, probably there
 adventive.

A plant approximating *T. boreale* Bicknell, has been collected at West Point, N. Y.
 This northern species is not otherwise known from our range.

3. *Isanthus* Michx.

1. **I. brachiatus** (L.) B. S. P. In sandy soil: especially along streams: Que. and Ont. to Minn., Kan., Ga. and Tex.
 CONN. Recorded but no definite station known.
 N. Y. Catskill Mts.
 N. J. Monmouth, Mercer, Hunterdon, Warren and Bergen counties.
 PA. Philadelphia and Bucks counties.

4. *Trichostema* [Gronov.] L.

Leaves oblong or lanceolate; minutely sticky-pubescent. 1. *T. dichotomum*.
 Leaves linear, plant puberulent or glabrous. 2. *T. lineare*.

1. **T. dichotomum** L. In dry fields: Me. to Fla., Pa., Ky. and Tex.
 Common throughout the range.
2. **T. lineare** Nutt. In sandy fields and dry barrens: R. I. to Ga. and La.
 CONN. Collected at Milford in 1829; not since recorded.
 N. Y. Occasional on L. I., S. I., apparently wanting elsewhere.
 N. J. Not rare in the pine-barrens and the region just west and north of them, unknown elsewhere.
 PA. Philadelphia Co.

Tertiary, not very common: Cretaceous, scattered: Older Formations, decreasing and becoming scattered northward. 168-220 days. About sea level.

5. *Scutellaria* [Rivin.] L.

Nutlets wingless, very slightly elevated on the short gynobase.

Flowers 6-10 mm. long, in axillary and sometimes terminal racemes.

Flowers 12-30 mm. long, in terminal, often paniced racemes.

Plant glabrous or very nearly so; leaves broad.

Plants pubescent, puberulent or pilose.

All except the floral leaves crenate or dentate.

Canescent, not glandular; corolla canescent.

Pubescent below, glandular above; corolla nearly glabrous.

All except the lowest leaves entire.

Flowers solitary in the axils.

Flowers 4-8 mm. long.

Flowers 16-26 mm. long.

Nutlets membranous-winged, elevated on the slender gynobase; flowers axillary.

1. *S. lateriflora*.

2. *S. serrata*.

3. *S. incana*.

4. *S. pilosa*.

5. *S. integrifolia*.

6. *S. parvula*.

7. *S. galericulata*.

8. *S. nervosa*.

1. *S. lateriflora* L. In wet places: Newf. to Ont., B. Col., Fla., N. Mex. and Wash.
Common throughout the range except in the pine-barrens.
2. *S. serrata* Andr. In woods: N. Y. and Pa. to N. Car., Ill. and Ky. Rare.
Known in our range only from near Woodlawn, N. Y. City and Montgomery and Delaware counties, Pa.
Distribution sporadic and little understood.
3. *S. incana* Muhl. In moist woods and thickets: Ont. to Mich., Kan., Ga. and Fla.
PA. Montgomery and Delaware counties.
4. *S. pilosa* Michx. In dry sandy woods and thickets: N. Y. and Pa. to Mich., Mo., Fla. and Tex.
N. Y. Occasional on L. I. and S. I.; in Westchester and Bronx counties; and at Inwood, on Manhattan.
N. J. Rare and local in Sussex and Passaic counties, increasing **southward**, but unknown in the pine-barrens.
PA. Northampton, Bucks, Chester and Delaware counties.
Tertiary, unknown on Beacon Hill, rare elsewhere: Cretaceous, more common: Older Formations, scattered and local. Predominating south of the moraine. 138-220 days. **Sea level**-1,000 ft.
5. *S. integrifolia* L. In fields, woods and thickets: Conn. and R. I. to W. Va., Fla., La. and Tex.
CONN. Apparently confined to New London, Middlesex and Hartford counties especially in the predominately Triassic valley of the Connecticut River.
N. Y. Occasional on L. I., on S. I. and in Westchester Co., not definitely known elsewhere.
N. J. Throughout the state but only occasional in the pine-barrens.
PA. Berks, Montgomery, Bucks, Delaware and Chester counties.
Tertiary, rare and perhaps only adventive on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, becoming scattered: 138-220 days. **Sea level**-1,200 ft.
6. *S. parvula* Michx. In moist sandy soil: Que. to Ont., S. Pa., N. J., Fla., Neb. and Tex.
CONN. Very rare and scattered and known only as to the form *ambigua* Fernald.
N. J. Known only from bluffs of the Raritan River, New Brunswick, Middlesex Co.

PA. Northampton, Bucks, Delaware and Chester counties.

Distribution scattered and little understood.

7. **S. galericulata** L. In swamps and along streams: Newf. to Alask., N. Car., Ohio, Neb., Ariz. and Wash. Also in Europe and Asia.

Frequent throughout most of the range except in the pine-barrens, there rare or wanting.

8. **S. nervosa** Pursh. In moist woods and thickets: N. Y. and N. J. to Ill., N. Car., Tenn. and Mo.

N. J. Hunterdon Co., near the Delaware: not recently collected.

PA. Bucks, Philadelphia, Delaware and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, rare and scattered near the "fall line," along the Delaware River. 175-220 days. About sea level.

6. **Marrubium** [Tourn.] L.

1. **M. vulgare** L. In waste places: Me. and Ont. to Minn., B. Col., Tex. and Mex. Naturalized from Europe.

Local as a weed in most parts of the range.

7. **Agastache** Clayt.

Glabrous or very nearly so, stout; corolla greenish yellow.

1. *A. nepetoides*.

Pubescent; corolla purplish.

2. *A. scrophulariaefolia*.

1. **A. nepetoides** (L.) Kuntze. In woods and thickets: Vt. and Ont. to S. Dak., Kan., Ga. and Ark.

CONN. Rare in Hartford, New Haven and Fairfield counties, unknown elsewhere.

N. Y. Rare on the north side of L. I., unknown from the south side; rare on S. I., thence increasing but not very common **northward**.

N. J. Rare and scattered in Gloucester, Camden and Monmouth counties, especially along the Delaware, thence increasing **northward**; not in the pine-barrens or south of them.

PA. Northampton, Bucks, Delaware, Chester and Philadelphia counties.

Tertiary, o: Cretaceous, rare in the region of glacial terraces, still less common elsewhere: Older Formations, increasing but scattered **northward**. 117-220 days. Sea level-2,800 ft.

2. *A. scrophulariaefolia* (Willd.) Kuntze. In woods and thickets: Mass. to Wisc., Kan., N. Car. and Ky.

CONN. Rare throughout most of the state. The variety *mollis* (Fernald) Heller has been collected at Fairfield, otherwise unknown in the local flora range.

N. Y. On the north shore of L. I. and formerly on S. I., thence increasing, but never common **northward**.

N. J. Camden and Monmouth counties, increasing **northward**; not in the pine-barrens.

PA. Northampton, Bucks, Delaware and Chester counties.

Tertiary, 0: Cretaceous, very rare: Older Formations, increasing **northward**. 117-220 days. Sea level-2,950 ft.

A. Foeniculum (Pursh) Kuntze has been reported from Portland, Conn. as a rare waif; doubtfully established.

8. *Nepeta* [Rivin.] L.

1. *N. Cataria* L. In waste places: N. B. and Que. to S. Dak., Va. and Kan. Naturalized from Europe.

Common as a weed in most parts of our range.

9. *Glechoma* L.

1. *G. hederacea* L. In waste places and in thickets: Newf. to Minn., Ga. and Kan. Naturalized from Europe.

Common, nearly always as a weed, in most parts of our range.

10. *Prunella* L.

1. *P. vulgaris* L. In fields, woods and waste places: throughout N. Am. Naturalized from Europe.

Common throughout the range.

P. laciniata L. has been collected as a waif near New York, but not recently.

11. *Dracocephalum* [Tourn.] L. (*Physostegia* Benth.)

1. *D. virginianum* L. In moist soil: Que. to the N. W. Terr., Fla., La. and Tex.

Occasional in most parts of our range, but always as an escape from cultivation. Perhaps, though doubtfully, wild in Luzerne Co., Pa. In its wild state, ranging west of our area.

12. *Galeopsis* L.

Plant puberulent; leaves linear to lanceolate.

Plant hispid; leaves ovate.

1. *G. Ladanum*.

2. *G. Tetrahit*.

1. **G. Ladanum** L. In waste places: N. B. to Mich. and N. J. Adventive from Europe.

Very rare as a weed, perhaps not persistent.

2. **G. Tetrahit** L. In waste places: Newf. to Alask., N. Car. and Mich. Naturalized from Europe.

Occasional as a weed, especially northward. Not reported from the region of the pine-barrens.

Galeopsis versicolor Curtis and *G. villosa* Huds. have been collected as waifs near New York and Philadelphia.

13. **Lamium** [Tourn.] L.

Upper leaves sessile or clasping.

1. *L. amplexicaule*.

Leaves all petioled.

Flowers red or purple.

Corolla 12-18 mm. long; leaves not blotched.

2. *L. purpureum*.

Corolla 20-25 mm. long; leaves usually blotched.

3. *L. maculatum*.

Flowers white.

4. *L. album*.

1. **L. amplexicaule** L. In waste and cultivated ground: N. B. to Ont., B. Col., Fla. and Ark. Naturalized from Europe.

Locally common as a weed, especially near the larger cities.

2. **L. purpureum** L. In waste and cultivated soil: R. I. to D. C. Native of Europe.

Rare as a weed, near the City of New York, and on L. I.

3. **L. maculatum** L. Along roadsides, escaped from gardens: Me. to Va. Native of Europe and Asia.

Rare as an established escape, frequently cultivated.

4. **L. album** L. In waste places: Ont. to Va. Adventive from Europe.

Rare as a weed.

L. hybridum Vill. has been reported as a waif, in Conn.

14. **Leonurus** L.

Lower leaves palmately 2-5 cleft, the upper 3-cleft.

1. *L. Cardiaca*.

Leaves deeply 3-parted, the segments cleft and incised.

2. *L. sibiricus*.

Leaves coarsely dentate or incised-dentate.

3. *L. Marrubiastrum*.

1. **L. Cardiaca** L. In waste places: N. S. to N. Car., S. Dak. and Kan. Naturalized from Europe.

Rather common as a roadside weed in most parts of our range.

2. **L. sibiricus** L. In waste and cultivated soil: Pa. and Del. Naturalized from eastern Asia.
Known in our area only near Philadelphia.
3. **L. Marrubiastrum** L. In waste places: Pa. and Del. Native of Europe.
Known in our area only in Philadelphia, Delaware and Chester counties, Pa. The reported occurrence of this plant in New Jersey is unsupported by specimens.

Leonurus glaucescens Bunge has been found as a waif near New York.

15. **Ballota** L.

1. **B. nigra** L. In waste places: Mass. to Pa. Naturalized from Europe.
Rare as a weed in our area.

16. **Stachys** [Tourn.] L.

Leaves narrowed at the base, linear to linear-lanceolate or oblong.

Stem glabrous; leaves entire or nearly so.

Leaves linear, 2-5 mm. wide.

Leaves oblong to linear-oblong, 4-10 mm. wide.

Stem retrorsely hirsute; leaves serrate.

Leaves slightly pubescent; calyx-teeth lanceolate.

Whole plant densely clothed with stiff appressed hairs.

Leaves cordate or truncate at the base, lanceolate to ovate.

Stem glabrous or nearly so.

Stem hirsute.

Leaves all very short-petioled, lanceolate to oblong.

Leaves, at least the lower, slender-petioled.

Leaves lanceolate or ovate, not obtuse.

Leaves ovate, obtuse; a diffuse annual.

1. *S. hyssopifolia*.

2. *S. atlantica*.

3. *S. ambigua*.

4. *S. arenicola*.

5. *S. tenuifolia*.

6. *S. palustris*.

7. *S. aspera*.

8. *S. arvensis*.

1. **S. hyssopifolia** Michx. In fields and thickets: Mass. to Fla., Mich. and Va.
CONN. Very rare and local in Windham, Hartford and New Haven counties.
N. Y. Not uncommon on L. I. and S. I., but not otherwise reported.
N. J. Along the Delaware in Camden, Burlington and Mercer counties; Atlantic Co.; thence scattered north of the coastal plain.
PA. Bucks Co.

Tertiary, o: Cretaceous, very rare in the region of glacial terraces: Older Formations, scattered. 138-220 days. Sea level-1,000 ft.

2. **S. atlantica** Britton. In meadows and marshes: L. I. to eastern Pa.
 N. Y. Common along the south side of L. I., very rare on the north shore and on S. I.; unknown elsewhere.
 N. J. Jamesburg, Middlesex Co.
 PA. Bristol, Bucks Co.
3. **S. ambigua** (A. Gray) Britton. In moist soil: Mass. to Pa. and Ga., Ill. and Ky.
 Known in our area only from Bristol, Bucks Co., Pa., a region on the Trenton gravels, with a growing season of about 176 days, and at about sea level.
4. **S. arenicola** Britton. In sandy soil: N. Y. to Ill. and Mich.
 Known in our area only from its original collection at New Dorp, S. I., near the beach, fronting on the Lower Bay.
5. **S. tenuifolia** Willd. In moist fields and thickets: N. Y. to Ill., Kan., N. Car. and La. Rare.
 Known only from Staten Island and West Point, N. Y., New Brunswick, N. J., and Bristol, Bucks Co., Pa. Distribution sporadic and not as yet understood.
6. **S. palustris** L. (*S. palustris homotricha* Fernald). In moist soil: Newf. to the N. W. Terr., Mass., N. J., N. Y., Wisc. and Minn. Also in Europe and Asia.
 CONN. Rare and local in Fairfield and Litchfield counties, perhaps sometimes adventive in the state.
 N. Y. Rare on L. I. and S. I., and up the Hudson to Rockland Co.
 N. J. Scattered throughout the north, decreasing southward to Spray Beach, Burlington Co., on the coast; not in the pine-barrens.
 PA. Northampton, Bucks, Delaware, and Philadelphia counties.
7. **S. aspera** Michx. In moist soil: Ont. to N. E. Fla., Minn. and La.
 CONN. The valleys of the Housatonic and Connecticut Rivers, there rare.
 N. Y. Known only from S. I. and in Westchester and Rockland counties.
 N. J. Throughout the state, except in the pine-barrens, and south of them, there not recorded.
 PA. Bucks and Delaware counties.

Tertiary, unknown on Beacon Hill, rare elsewhere: Cretaceous, not common: Older Formations, rare and scattered. 138-220 days.
Sea level-1,300 ft.

8. **S. arvensis** L. In waste places: Me. and Mass., and in ballast about the eastern seaports. Naturalized from Europe.

Rare as a weed; not recently collected.

S. annua L., *S. hirta* L., *S. sylvatica* L. and *S. recta* L. have been collected as weeds near New York, perhaps not persistent. *S. germanica* L. has been collected near Budd's Lake, N. J., in a field, probably escaped from cultivation. Records of *S. cordata* Riddell from the region apply to either *S. aspera* or *S. palustris*.

17. *Salvia* [Tourn.] L.

Leaves mostly basal, only 1-3 small pairs on the stem.

Leaves lyrate-pinnatifid or repand.

Leaves crenulate.

Stem leafy, bearing several pairs of leaves.

1. *S. lyrata*.
2. *S. pratensis*.
3. *S. Sclarea*.

1. **S. lyrata** L. In dry, mostly sandy woods: Conn. to Fla., Ill., Ark. and Tex.

CONN. Known only from near New Haven.

N. Y. Known only from near Yonkers.

N. J. Middlesex and Mercer counties, increasing and common southward, but not in the pine-barrens.

PA. Northampton, Bucks, Delaware and Chester counties.

Tertiary, unknown on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, rare and scattered and apparently adventive.

2. **S. pratensis** L. Atlantic Co., N. J. Fugitive from Europe. Collected years ago at May's Landing, N. J., as a weed; not otherwise known from our area.

3. **S. Sclarea** L. In fields and escaped from gardens: Pa. to S. Car. Native of Europe.

Rare as an escaped plant.

The scarlet sage, *Salvia splendens* Ker-Gawl, the garden sage, *S. officinalis* L., *S. Verbenaca* L., *S. sylvestris* L. and *S. verticillata* L. have all been collected as waifs.

18. *Monarda* L.

Flower-clusters solitary, terminal (rarely in upper axils).

Corolla scarlet.

Corolla white, pink or purple.

Leaves membranous; corolla slightly pubescent.

Leaves thin or firm; corolla pubescent.

1. *M. didyma*.
2. *M. clinopodia*.

Corolla cream-color, pink or purplish.

Pubescence spreading; leaves thin.

Pubescence short, canescent; leaves firm.

Corolla and bracts deep purple or purplish red.

Flower-clusters both axillary and terminal.

3. *M. fistulosa*.

4. *M. mollis*.

5. *M. media*.

6. *M. punctata*.

1. ***M. didyma* L.** In moist soil, especially along streams: N. B. to Ont., Mich. and Ga.

CONN. Scattered as an adventive.

N. Y. Catskill Mountains, escaped from cultivation elsewhere.

N. J. Bergen, Warren and Hunterdon counties: escaped from cultivation elsewhere.

PA. Pike, Monroe, Northampton and Bucks counties.

2. ***M. clinopodia* L.** In woods and thickets: Ont. to Ga. and Ky.
Known in our range only from Northampton, Bucks, Philadelphia and Delaware counties, Pa., and as introduced in Conn.

3. ***M. fistulosa* L.** On dry hills and in thickets: Me. and Ont. to Minn., Kan., Fla. and La.

CONN. Common along the coast, decreasing inland.

N. Y. Occasional on L. I. and S. I., decreasing up the Hudson Valley to northern Westchester Co., unknown elsewhere.

N. J. Rare and local in Ocean, Monmouth and Middlesex counties, thence increasing but scattered northward; not in the pine-barrens.

PA. Throughout the area.

Tertiary, o: Cretaceous, rare: Older Formations, increasing westward, as a wild plant. 138-220 days. Sea level-1,080 ft.

4. ***M. mollis* L.** Dry soil, Me. to Br. Col., Ala. and Texas.

CONN. Frequent throughout the state.

N. Y. Bedford, Westchester Co., and Copake Falls, Columbia Co.

N. J. Passaic, Sussex and Bergen counties.

5. ***M. media* Willd.** In moist thickets: Me. to Ont., Pa. and Va.

CONN. Escaped from gardens.

N. Y. Formerly near Fordham, N. Y. City, as an escape.

N. J. Hunterdon Co.

PENN. Bucks and Northampton counties.

6. ***M. punctata* L.** In dry fields: S. N. Y. to Fla., Wisc., Kan. and Tex.

N. Y. Rare on southern S. I., unknown elsewhere.

N. J. Middlesex and Monmouth counties, increasing **southward**, especially in the pine-barrens, where it is often weedy.

PA. Bristol, Bucks Co.

Tertiary, common: Cretaceous, less common: Older Formations, confined to Trenton gravels in Pa., and perhaps near the serpentine on S. I. 162-220 days. About sea level.

19. *Blephilia* Raf.

Pubescence short; upper leaves lanceolate or oblong, slightly serrate.

1. *B. ciliata*.

Pubescence villous; upper leaves ovate or ovate-lanceolate, sharply serrate.

2. *B. hirsuta*.

1. *B. ciliata* (L.) Raf. In dry woods and thickets: Vt. to Mich., Wisc., Ga. and Mo.

CONN. Fairfield and Litchfield counties.

PENN. Chester, Northampton, Bucks and Delaware counties.

2. *B. hirsuta* (Pursh) Torr. In woods and thickets: Vt. to Wisc., Ga. and Tex.

CONN. Northern New Haven and southern Litchfield counties.

N. Y. Dutchess, Greene and Ulster counties.

Tertiary, 0: Cretaceous, 0: Older Formations, confined to the north. Not south of the moraine. 117-160 days. 378-3,900 ft.

20. *Hedeoma* Pers.

1. *H. pulegioides* (L.) Pers. In dry fields: N. S. to Ont. and Minn., south to Fla. and Kan.

Common throughout the range, except in the pine-barrens and the coastal plain of L. I.

Hedeoma hispida Pursh has been collected as a waif, in Conn.

21. *Melissa* [Tourn.] L.

1. *M. officinalis* L. In waste places, thickets and woods: Me. to Ga. and W. Va. Naturalized from Europe.

Not rare as a weed in most parts of our range, but not recorded from and near the pine-barrens.

22. *Satureia* [Tourn.] L.

1. *S. hortensis* L. In waste places: N. B. and Ont. to Pa., west to Nev. Native of Europe.

Very rare as a weed. Not recently collected.

23. *Clinopodium* L.

- I. *C. vulgare* L. In woods and thickets: N. S. to N. Car., Minn. and Man. Also in Europe and Asia.

Common as a weed throughout the range, except in the pine-barrens and the coastal plain of L. I.

C. Acinos (L.) Kuntze, a European weed, has been collected in N. J. I can find no evidence that *C. Calamintha* (L.) Kuntze is ever "inclined to escape from cultivation," in our range. *C. Nepeta* (L.) Kuntze is recorded as a waif from N. J. and Pa.

24. *Hyssopus* [Tourn.] L.

- I. *H. officinalis* L. Along roadsides and in waste places: Ont. to Me. and N. Car. Naturalized from Europe.

Rare as an occasional adventive, scarcely persistent.

25. *Origanum* [Tourn.] L.

- I. *O. vulgare* L. In fields and waste places: Ont. to N. J. and Pa. Naturalized from Europe.

Locally abundant as a weed.

26. *Thymus* [Tourn.] L.

- I. *T. Serpyllum* L. In thickets, woods, and along roadsides: N. S. to Mass., N. Y., Pa. and N. Car. Naturalized from Europe.

Locally common as a pasture weed, especially northward.

T. vulgaris L. has been found as a waif on S. I.

27. *Koellia* Moench.

Leaves prevailingly linear, linear-lanceolate or oblong-lanceolate.

Calyx-teeth ovate-triangular, acute, one-fourth as long as the tube.

1. *K. virginiana*.

Calyx-teeth subulate, or bristle-tipped.

Leaves linear or narrowly linear-lanceolate, entire.

2. *K. flexuosa*.

Leaves lanceolate, usually serrate, sometimes entire.

Bracts appressed, erect; clusters dense.

Hirsute or pilose; leaves mainly entire.

3. *K. pilosa*.

Puberulent or glabrate; leaves mostly denticulate.

4. *K. verticillata*.

Bracts spreading; clusters loose.

5. *K. clinopodioides*.

Leaves prevailingly ovate, ovate-oblong or ovate-lanceolate.

Calyx-teeth bristle-tipped or subulate.

Bracts appressed; clusters dense.

6. *K. aristata*.

Bracts spreading; clusters loose.

7. *K. incana*.

Calyx-teeth prevailingly triangular.

8. *K. mutica*.

1. ***K. virginiana*** (L.) Mac M. In dry fields and thickets: Que. and Ont. to Minn., Ga., Ala. and Kan.
 CONN. Common throughout.
 N. Y. Frequent on L. I. and S. I., increasing **northward**.
 N. J. Very rare along the Delaware in Camden Co., thence unknown to Middlesex and Mercer counties, thence increasing **northward**; not in nor south of the pine-barrens.
 PA. Throughout the area, increasing **northward**.
 Tertiary, o: Cretaceous, very rare: Older Formations, increasing and common **northward**. 117-220 days. Sea level-3,940 ft.
2. ***K. flexuosa*** (Walt.) Mac M. In fields and thickets: Me. and N. H. to Fla., Ont., Kan., Minn. and Tex.
 Frequent throughout the range, except in the pine-barrens of N. J., there not recorded, always increasing **northward**.
3. ***K. pilosa*** (Nutt.) Britton. On prairies and in dry woods: Ohio to Ga., Kan. and Ark.
 Known in our area only from Monroe Co., Pa., and Plainfield, Conn., probably adventive from further west.
4. ***K. verticillata*** (Michx.) Kuntze. In dry fields and thickets: R. I. and Vt. to N. Y., Va., Pa. and Mo.
 Throughout the range, less common in and south of the pine-barrens of N. J. and more common **northward** than elsewhere: unknown on L. I.
 The form known as *K. Torreyi* (Benth.) Kuntze, with narrower, wholly glabrous leaves, is to be found on and near the coast from Conn. and N. Y. southward. It is scarcely specifically distinct.
5. ***K. clinopodioides*** (T. & G.) Kuntze. In dry soil: Conn. and N. Y. to Pa. and Tenn.
 CONN. The drainage of the Quinnipiac River in New Haven and southern Hartford counties, very rare.
 N. Y. Known definitely only from S. I., upper Manhattan, and in Westchester Co., very rare.
 N. J. Rare in Sussex, Passaic, Hunterdon, Bergen, Essex and Mercer counties, unknown elsewhere.
 PA. Monroe, Northampton, Bucks, Berks and Delaware counties.
 Tertiary, o: Cretaceous, o: Older Formations, increasing westward. 138-204 days. Sea level-1,038 ft.
6. ***K. aristata*** (Michx.) Kuntze. In dry soil: N. J. to Fla. and La.
 Known in our range only from the region on or near the coast in Ocean, Burlington and Atlantic counties, N. J.; only sporadically in the eastern edge of the pine-barrens.

7. **K. incana** (L.) Kuntze. In dry thickets and on hillsides: Me. to Ont., Ohio and Fla.
Throughout the range, increasing **northward**.
8. **K. mutica** (Michx.) Britton. In sandy soil: Me. to Va. and Fla., west to Mo.
CONN. Throughout the state, decreasing northward.
N. Y. Common on L. I. and S. I., and up the Hudson Valley to Putnam Co., not definitely known northward.
N. J. Rare and local in Warren, Hunterdon, Essex, Passaic and Bergen counties, mostly near the Delaware, thence increasing **southward**.
PA. Northampton, Lehigh, Bucks, Delaware and Chester counties, increasing **southward**.
Tertiary, common: Cretaceous, less common: Older Formations, decreasing northward. 179-220 days. Sea level-550 ft.

28. **Cunila** L.

1. **C. origanoides** (L.) Britton. In dry woods and thickets: N.Y. to Fla., Ohio and Ga.
N. Y. Rare and local on L. I. and S. I., thence increasing but not common **northward**.
N. J. Throughout the state except in the pine-barrens, there unknown.
PA. Luzerne, Northampton, Monroe, Bucks, Delaware and Chester counties.
Tertiary, not on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, increasing **westward**. 118-220 days. Sea level-3,800 ft.

29. **Lycopus** [Tourn.] L.

- Calyx-teeth 4 or 5, ovate, shorter than the nutlets.
Leaves mostly ovate, usually purple; base of the stem not tuberous. 1. *L. virginicus*.
Leaves mostly lanceolate to oblong; base of stem tuberous.
Leaves mostly firm, sessile or nearly so. 2. *L. uniflorus*.
Leaves membranous, slender-petioled. 3. *L. membranaceus*.
Calyx-teeth mostly 5, lanceolate or subulate, longer than the nutlets.
Bracts minute; corolla twice as long as the calyx.
Leaves sessile. 4. *L. sessilifolius*.
Leaves narrowed into a manifest petiole. 5. *L. rubellus*.
Bracts subulate or lanceolate; corolla not twice as long as the calyx.

Leaves pinnatifid or deeply incised.

Leaves coarsely dentate.

6. *L. americanus*.

7. *L. europaeus*.

1. ***L. virginicus*** L. In moist soil: N. H. to Ala., Neb. and Kan. CONN. Not uncommon near the coast, decreasing inland, and perhaps wanting in the north.
 N. Y. On L. I. and S. I., and up the Hudson Valley to Ulster Co., not definitely known from the higher elevations of the Catskills.
 N. J. Common in the north, decreasing southward; rare in the pine-barrens and unknown at Cape May.
 PA. Throughout the area.
 Tertiary, rather uncommon: Cretaceous, common: Older Formations, apparently increasing westward. 118-220 days. Sea level-2,900 ft.
2. ***L. uniflorus*** Michx. (*L. communis* Bicknell). In moist soil: Newf. to Br. Col., Va., Neb. and Ore.
 Throughout the range, except in the pine-barrens, there unknown.
3. ***L. membranaceus*** Bicknell. In wet woods: Me. to N. Y. and Mich.
 CONN. Known only from northern Windham Co.
 N. Y. Ulster, Greene, Delaware and Sullivan counties.
 N. J. Northern Passaic Co., very rare.
 PA. Raymond's Kill, Pike Co.
 Tertiary, 0: Cretaceous, 0: Older Formations, rare and local northward. Not south of the moraine. 118-141 days. 878-4,020 ft.
4. ***L. sessilifolius*** A. Gray. In wet soil: E. Mass. to Fla.
 CONN. Very rare along the coast, unknown elsewhere.
 N. Y. On L. I. and S. I., unknown elsewhere.
 N. J. Common on the coastal plain, wanting elsewhere.
 Tertiary, common: Cretaceous, common: Older Formations, rare and scattered. 189-220 days. About sea level.
5. ***L. rubellus*** Moench. In wet soil: Vt. to Fla., Ohio, Ark. and La.
 CONN. Groton, New London, Southington and Huntington.
 N. Y. L. I., S. I. and northern Manhattan.
 N. J. Camden and Cape May counties.
6. ***L. americanus*** Muhl. In wet soil: Newf. to B. Col., Fla., Tex., Utah and Cal.
 Common everywhere, except the pine-barrens, there wanting.

7. **L. europaeus** L. In waste places: N. Y. to Va. Naturalized from Europe.

Locally rare as a weed.

30. **Mentha** [Tourn.] L.

Whorls of flowers in terminal spikes, or some in the upper axils.

Plants glabrous or very nearly so.

Spikes slim, narrow, mostly interrupted; leaves sessile, or nearly so.

1. *M. spicata.*

Spikes thick, mostly dense, at first short; leaves petioled. Leaves lanceolate or oblong, acute.

2. *M. piperita.*

Leaves ovate, obtuse, or the upper acute, subcordate.

3. *M. citrata.*

Plants villous, hirsute or canescent, at least at the nodes.

Spikes slim or narrow, often interrupted.

Leaves lanceolate or ovate-lanceolate, acute.

4. *M. longifolia.*

Leaves elliptic or ovate-oblong, obtuse, reticulated beneath.

5. *M. rotundifolia.*

Spikes 10–12 mm. thick, dense, elongated or short.

Leaves sessile; spikes 2–8 cm. long; plant canescent.

6. *M. alopecuroides.*

Leaves distinctly petioled, or the uppermost sessile; spikes short.

Leaves simply serrate.

7. *M. aquatica.*

Leaves mostly incised, the margins crisped and wavy.

8. *M. crispa.*

Whorls of flowers all axillary.

Upper leaves much smaller than the lower.

9. *M. Cardiaca.*

Upper leaves not conspicuously reduced.

Stem pubescent.

Leaves rounded or obtuse at the base.

10. *M. arvensis.*

Leaves narrowed, mostly cuneate at the base.

11. *M. canadensis.*

Stem glabrous, or very nearly so.

12. *M. gentilis.*

1. **M. spicata** L. In moist fields and waste places: N. S. to Ont., Minn., Utah, Fla. and Kan. Naturalized from Europe.

Locally common as a pasture weed, often wanting; commonly cultivated and often escaping.

2. **M. piperita** L. In wet soil: N. S. to Minn., Fla. and Tenn. Naturalized from Europe.

Throughout most of the range as a weed.

3. **M. citrata** Ehrh. In wet soil: Conn., N. Y. and Ohio. Native of Europe.

Rare as a weed near New York and in Conn.

4. **M. longifolia** (L.) Huds. In waste places: Conn. to Pa. and N. J. Naturalized from Europe.

Occasional as a weed, often wanting.

5. **M. rotundifolia** (L.) Huds. In waste places: Me. to N. Car., Tex. and Mex. Naturalized from Europe.
Rare and local, scattered over most of the range, except the pine-barrens.
6. **M. alopecuroides** Hull. Along roadsides: Conn. to N. Y., Pa., N. J. and Mo. Native of Europe.
Occasional as a weed in N. J. and Pa., apparently rather rare elsewhere.
7. **M. aquatica** L. In wet places: N. S. to Pa. and Ga. Naturalized from Europe.
Rare as an occasional weed near the larger cities; perhaps not truly persistent.
8. **M. crispa** L. In swamps and roadside ditches: Conn., N. Y., N. J. and Pa. Native of Europe.
Occasional throughout our range, except in the pine-barrens, there wanting.
9. **M. Cardiaca** Gerarde. Wet grounds: N. S. to Pa. and D. C. Naturalized from Europe.
Occasional in the northern part of the range.
10. **M. arvensis** L. In dry waste places: N. B. to N. Y., N. J., Pa. and Fla. Also in Cal. and Mex. Native of Europe.
Throughout the range, except the pine-barrens; occasional.
11. **M. canadensis** L. In moist soil: N. B. to the N. W. Terr., B. Col., Va., Kan., N. Mex. and Nev.
Common throughout the area, except in the pine-barrens.
12. **M. gentilis** L. In waste places and along streams: N. S. to N. Y., N. C. and Tenn. Naturalized from Europe.
Occasional as a weed.

31. **Collinsonia** L.

1. **C. canadensis** L. In moist woods: Me. and Ont. to Wisc., Fla. and Kan.
CONN. Throughout the state.
N. Y. Rare on L. I.; S. I., thence increasing **northward**.
N. J. Occasional in Gloucester, Camden and Monmouth counties, thence increasing and becoming common **northward**; unknown in the pine-barrens and south of them.

PA. Pike, Northampton, Bucks and Chester counties.

Tertiary, 0: Cretaceous, very rare: Older Formations, increasing northward. 117-220 days. Sea level-4,020 ft.

32. *Perilla* Ard.

1. *P. frutescens* (L.) Britton. In waste places, escaped from gardens: N. Y. to Ill. Native of India.

Very rare as an escape from gardens near New York and some other places. A variety with crisped leaves, *P. frutescens nan-kinensis* (Lour.) Britton, has been collected occasionally from the area.

Sideritis montana L. and *Moldavica parviflora* (Nutt.) Britton have been collected as waifs in Conn.

SOLANACEAE

Fruit a berry; corolla plicate, its lobes generally induplicate.

Anthers unconnected; fruiting calyx bladderly-inflated.

Fruiting calyx 5-angled and deeply 5-parted.

Fruiting calyx 5-lobed, not parted, 10-ribbed.

Anthers connivent or slightly connate; fruiting calyx not enlarged.

Anthers opening by terminal pores.

Anthers longitudinally dehiscent.

Fruit a nearly dry berry; corolla campanulate.

Fruit a capsule; corolla funnelliform.

Capsule circumscissile towards the top.

Capsule opening by valves.

Capsule prickly.

Capsule not prickly.

Flowers paniculate or racemose.

Flowers solitary.

1. *PHYSALODES*.

2. *PHYSALIS*.

3. *SOLANUM*.

4. *LYCOPERSICON*.

5. *LYCIUM*.

6. *HYOSCYAMUS*.

7. *DATURA*.

8. *NICOTIANA*.

9. *PETUNIA*.

1. *Physalodes* Boehm.

1. *P. physalodes* (L.) Britton. In waste places, escaped from gardens: N. S. to Ont., south to Fla. Adventive from Peru.

Very rare as a weed in our region.

2. *Physalis* L.

Annuals with branched fibrous roots.

Fruiting calyx sharply 5-angled, the lobes at flowering time lanceolate or acuminate.

Fruiting calyx obtusely or indistinctly 5-10-angled, the lobes at flowering time triangular.

Perennial by rootstocks and roots.

Leaves broadly ovate, rounded or cordate at the base.

Leaves narrowly ovate, acutish at each end.

1. *P. pruinosa*

2. *P. subglabrata*.

3. *P. heterophylla*.

4. *P. virginiana*.

1. **P. pruinosa** L. In cultivated soil: Mass. to Iowa, Mo. and Fla.
Rare as a weed in cultivated fields. Has been confused with *P. pubescens*.
2. **P. subglabrata** Mack. and Bush (*P. philadelphica* Lam. (?)). R. I. to Ga., Ky. and Tex.
In most parts of our area, always as a weed, frequently wanting locally.
3. **P. heterophylla** Nees. In rich soil: N. B. to Sask., Fla., Colo. and Tex.
Common as a weed in most parts of our range. The forms known as *ambigua* and *nyctaginea* are found with the type. Formerly included in *P. viscosa* L.
4. **P. virginiana** Mill. In rich soil, especially in open places: Ont. to Man., Fla. and La.
Rare, as an adventive, in most parts of our range; often wanting locally.

The winter-cherry, *Physalis Alkekengi* L., the tomatillo, *P. ixocarpa* Brot. and the Strawberry-tomato, *P. peruviana* L. have all been collected as waifs. *Physalis angulata* L. has been collected near Hartford, Conn., and is recorded from N. J., otherwise unknown.

3. **Solanum** [Tourn.] L.

Glabrous or pubescent herb, not prickly.

1. *S. nigrum*.

Stellate-pubescent and prickly herbs.

Berry not enclosed by the calyx; perennial.

2. *S. carolinense*.

Berry invested by the spiny calyx; annuals.

3. *S. rostratum*.

Climbing vine, not prickly; leaves hastate or 3-lobed.

4. *S. Dulcamara*.

1. **S. nigrum** L. In waste places or cultivated soil: N. S. to N. W. Terr., Fla. and Tex.
Throughout the range as a weed, except in the pine-barrens.
2. **S. carolinense** L. In dry fields and in waste places: Ont. to Mass., Fla., Ill., Neb. and Tex.
Rare as an adventive weed in most parts of the range.
3. **S. rostratum** Dunal. Occasional in waste places as a weed: Ont. to N. H., Mass. and N. J. Adventive from the west.
Rare as an adventive weed; more common in Conn. than elsewhere.

4. **S. Dulcamara** L. In waste places or in thickets: N. B. to Minn., N. J., Pa. and Kan. Naturalized from Europe.
Common throughout the range, except in the pine-barrens.

The potato, *Solanum tuberosum* L. is an occasional waif in the area, and *S. sisymbriifolium* Lam. has been collected in New York City.

4. **Lycopersicon** Mill.

1. **L. Lycopersicon** (L.) Karst. Escaped from cultivation: N. Y. and Pa., southward. Native of South America.

Not infrequently found as a scarcely persistent escape from cultivation.

5. **Lycium** L.

1. **L. halimifolium** Mill (*L. vulgare* (Ait.) Dunal). In thickets and waste places, escaped from gardens: Ont. to Conn., Va., Minn. and Kan. Introduced from Europe.

Occasional in most parts of our range as an escape from cultivation.

6. **Hyoscyamus** [Tourn.] L.

1. **H. niger** L. In waste places: N. S. to Ont., N. Y. and Mich. Naturalized from Europe.

Rare in our area as an occasional waif.

H. albus L. has been recorded as a waif near New York; scarcely persistent.

7. **Datura** L.

Glabrous or very sparingly pubescent; leaves lobed, calyx prismatic. 1. *D. Stramonium*.
Finely glandular-pubescent; leaves entire; calyx tubular. 2. *D. Metel*.

1. **D. Stramonium** L. In fields and waste places: N. S. to Fla., Minn., and Tex. Naturalized from Asia.

Common throughout our range in waste places in some of its forms. The purple-flowered *D. Tatula* L. is not here considered as of specific rank.

2. **D. Metel** L. In waste places: R. I. to Fla. Native of Trop. Am.
Very rare as an occasional adventive.

Datura meteloides DC. has been collected as a waif in Conn., hardly persistent.

8. **Nicotiana** L.

1. **N. rustica** L. In fields and waste places: Ont. to Minn., N. Y. and Fla.

Rare as an adventive weed; cultivated and sometimes escaping.

Nicotiana longiflora Cav. has been collected in Northampton Co., Pa. and *N. Tabacum* L. has been collected in Conn. as an escape.

9. *Petunia* Juss.

Corolla white, its tube cylindrical.

1. *P. axillaris*.

Corolla violet-purple, its tube campanulate.

2. *P. violacea*.

1. *P. axillaris* (Lam.) B. S. P. In waste places, escaped from gardens: N. Y. and Pa. Native of Brazil.

Very rare as an escape from gardens, hardly persistent.

2. *P. violacea* Lindl. In waste places, escaped from gardens: N. Y. and Pa. Native of Brazil and Paraguay.

Rare as an adventive in Pa., scarcely known elsewhere; doubtfully persistent.

Petunia parviflora Juss. has been collected near N. Y. and Philadelphia as a waif. The Chili Pepper, *Capsicum annum* L., has been collected as a waif in Conn.

SCROPHULARIACEAE

Upper lip or lobes of the corolla external in the bud, or wanting
(with exceptions in *Mimulus*)*

Leaves prevailing alternate.

1. VERBASCUM.

Leaves prevailing opposite.

Corolla-tube with a spur, sac, or swelling on the lower side near the base.

Leaves palmately 3-5-veined.

2. CYMBALARIA.

Leaves pinnately veined.

Corolla-tube with an elongated spur.

Flowers solitary in the axils.

3. KICKXIA.

Flowers in terminal clusters.

4. LINARIA.

Corolla tube with a sac or swelling.

5. ANTIRRHINUM.

Corolla tube with neither spur, sac, nor swelling.

Filaments 5, 4 anther-bearing, 1 sterile more or less different from the others.

Sterile stamen a scale, adnate to the upper side of the corolla.

6. SCROPHULARIA.

Sterile stamen more developed.

Sterile stamen shorter than the others; seeds winged.

7. CHELONE.

Sterile stamen about equalling the others; seeds wingless.

8. PENTSTEMON.

Filaments 2 or 4.

Trees.

9. PAULOWNIA.

Herbs.

Anther-bearing filaments 4.

Sepals united into an angled tube.

10. MIMULUS.

Sepals distinct or nearly so.

11. CONOBEA.

Anther-bearing filaments 2.

Calyx of 5 nearly distinct sepals.

* Key adapted, in part, from Small's Flora S. E. United States.

- Anther-sacs transverse, separated. 12. GRATIOLA.
- Anther-sacs vertical, contiguous. 13. ILYSANTHES.
- Calyx of 4-5 partially united sepals. 14. MICRANTHEMUM.
- Lower lip or lobes of the corolla external in the bud.
- Sepals distinct or nearly so.
- Corolla campanulate or rotate, stamens included.
- Stamens 4; corolla nearly regular. 15. LIMOSELLA.
- Stamens 2; corolla rotate, slightly irregular. 16. VERONICA.
- Corolla tubular; stamens exserted. 17. LEPTANDRA.
- Sepals partially or wholly united into a tube.
- Corolla various, but only slightly 2-lipped.
- Corolla yellow. 18. AUREOLARIA.
- Corolla not yellow.
- Capsule not included in the calyx.
- Anthers all alike; leaves not auricled, flowers pedicelled. 19. AGALINIS.
- Anthers of shorter stamens smaller, leaves auricled at base; flowers sessile. 20. OTOPHYLLA.
- Capsule included in the calyx; corolla salverform. 21. BUCHNERA.
- Corolla strongly 2-lipped; stamens ascending under the upper lip.
- Anther-sacs unlike, the inner pendulous. 22. CASTILLEJA.
- Anther-sacs alike, parallel.
- Ovules 1-2 in each cavity; capsules 1-4 seeded. 23. MELAMPYRUM.
- Ovules several-many in each cavity; capsules many-seeded.
- Calyx split, without bractlets. 24. PEDICULARIS.
- Calyx not split.
- Calyx scarcely inflated, 2-bracteolate. 25. SCHWALBEA.
- Calyx much inflated and veiny in fruit, ebracteolate. 26. RHINANTHUS.

I. *Verbascum* [Tourn.] L.

Plants densely woolly; flowers in dense terminal spikes or spike-like racemes.

Leaves decurrent on the stem.

Leaves not decurrent or only slightly so.

Leaves white-tomentose beneath; flowers in terminal panicles.

Plant glabrous or slightly glandular.

1. *V. Thaspus*.
2. *V. phlomoides*.
3. *V. Lychnitis*.
4. *V. Blattaria*.

1. **V. Thaspus** L. In fields and waste places: N. S. to S. Dak., Fla. and Kan. Naturalized from Europe.

Common as a weed in most parts of our area.

2. **V. phlomoides** L. In fields: Mass. to N. Y. Adventive from Europe.

Rare as an occasional weed in the area.

3. **V. Lychnitis** L. In fields and waste places: Ont. to N. J. and Pa. Naturalized from Europe.

Local as a weed, in the valley of the Delaware in N. J. and Pa., perhaps wanting elsewhere.

4. **V. Blattaria** L. In fields and waste places: Que. to Fla., Minn. and Kan. Naturalized from Europe.

Common throughout the range as a weed; but often locally wanting.

Verbascum Pseudo-Lychnitis Schur., *V. sinuatum* L. and *V. orientale* Bieb. have been collected as waifs in Connecticut and New York.

2. **Cymbalaria** Medic.

1. **C. Cymbalaria** (L.) Wetts. In waste places, and along roadsides: N. Y., N. J. and Pa. Native of Europe.

Rather rare as a weed.

3. **Kickxia** Dumort.

Leaves ovate-orbicular, cordate or rounded at base.

1. *K. spuria*.

Leaves triangular, mostly hastate.

2. *K. Elatine*.

1. **K. spuria** (L.) Dumort. In waste places and ballast: N. Y. to N. Car. Native of Europe.

Occasional as a weed.

2. **K. Elatine** (L.) Dumort. In sandy waste places: Canada, N. Y. and Ga. Native of Europe.

Rare in our area as a weed; often wanting locally.

4. **Linaria** [Tourn.] Mill.

Flowers yellow, 1.5-3 cm. long.

1. *L. Linaria*.

Flowers blue to white, 6-12 mm. long.

Spur of corolla filiform, curved; native species.

2. *L. canadensis*.

Spur of corolla short, conic; European adventive species.

3. *L. repens*.

1. **L. Linaria** (L.) Karst. In fields and waste places: N. S. to Man., Va. and Kan. Naturalized from Europe.

Common throughout the range, always as a weed.

2. **L. canadensis** (L.) Dumort. In dry soil: N. S. to Fla., Ore. and Cal. Also in Central and South America.

Throughout the range, in sandy places, decreasing northward.

3. **L. repens** (L.) Mill. Newf. and in ballast about the Atlantic seaports. Adventive from Europe.

Very rare as a weed near the larger settlements.

L. striata D.C., *L. genistaefolia* (L.) Mill. and *L. supina* Desf. have been collected as waifs in New York.

5. *Antirrhinum* [Tourn.] L.

Flowers 2.5-4 cm. long; calyx segments ovate, much shorter than the corolla.

1. *A. majus*.

Flowers 1-1.5 cm. long; calyx segments linear, as long as the corolla.

2. *A. Orontium*.

1. **A. majus** L. In waste places, escaped from gardens: E. U. S. Adventive from Europe.

Rare as an escape.

2. **A. Orontium** L. In fields and waste places: Ont., N. Eng. and New York. Adventive from Europe.

Very rare as a weed; not recently collected.

6. *Scrophularia* [Tourn.] L.

Corolla dull outside; sterile stamen deep purple.

1. *S. marylandica*

Corolla shining outside; sterile stamen greenish-yellow.

2. *S. leporella*.

1. **S. marylandica** L. In woods and thickets: Me. to S. Dak., N. Car., Ga. and Tenn.

CONN. Rare in the east, increasing **northwestward**.

N. Y. Rare on L. I., and on S. I., thence increasing **northward**.

N. J. Reported from Salem, Camden, Monmouth and Ocean counties north and west of the pine-barrens, thence increasing **northward**; unknown elsewhere.

PA. Monroe, Northampton, Bucks, Delaware and Chester counties.

Tertiary, o: Cretaceous, rare and local: Older Formations, increasing but not very common **northward**. 117-220 days. Sea level-3,980 ft.

2. **S. leporella** Bicknell. In woods and along roadsides: Vt. to Conn., Minn., Va. and Kan.

Throughout the range except in the pine-barrens, always increasing **northward**.

Scrophularia canina L. and *S. aqualica* L. have been collected as waifs near New York.

7. *Chelone* [Tourn.] L.

1. **C. glabra** L. In swamps and along streams: Newf. to Fla., Man. and Kan.

Common throughout the range except in the pine barrens.

8. *Pentstemon* Mitchell.

Stem pubescent or puberulent, nearly or quite to the base.

Corolla large, over 5 mm. long; stem hirsute or canescent often glandular.

1. *P. hirsutus*.

- Corolla small, less than 5 mm. long; stem puberulent. 2. *P. pallidus*.
 Only the inflorescence or pedicels or calyx pubescent or puberulent.
 Corolla white, abruptly enlarged. 3. *P. Digitalis*.
 Corolla purplish, gradually enlarged. 4. *P. Pentstemon*.
1. ***P. hirsutus*** (L.) Willd. In dry woods and thickets: Me. to Ont., Man., Fla., Minn. and Tex.
 CONN. Rare and local, increasing **northward**.
 N. Y. Reported from but probably introduced on L. I., rare on S. I., thence increasing **northward**.
 N. J. Occasional in Camden, Burlington, Ocean and Monmouth counties, north and west of the pine-barrens, thence increasing **northward**.
 PA. Throughout the area, increasing **northward**.
 Tertiary, o: Cretaceous, rare: Older Formations, increasing and becoming common **northward**. 117-220 days. Sea level-3,400 ft.
2. ***P. pallidus*** Small. In sandy soil or swamps: Conn. and N. Y. to Mo., Fla. and Okl.
 CONN. Southwestern part of the state.
 N. Y. Westchester Co.
3. ***P. Digitalis*** (Sweet) Nutt. In fields and thickets: Me. to Ill., Kan., Va. and Ark.
 Not uncommon in most parts of our range, always as an adventive from farther west.
4. ***P. Pentstemon*** (L.) Britton. In woods and thickets: Pa. to Fla., Ky. and La.
 Rare as an adventive in Conn., N. Y. and Pa. Not native in our area.

Pentstemon tubiflorus Nutt. and *P. grandiflorus* Nutt. have both been credited to our range as waifs or adventives.

9. *Paulownia* Sieb. and Zucc.

1. ***P. tomentosa*** (Thunb.) Baill. Escaped from cultivation: N. Y. and N. J. to D. C. and Ga. Native of Japan.
 An escape from cultivation in some parts of our range.

10. *Mimulus* L.

- Corolla violet, or rarely white.
 Leaves sessile, clasping; peduncles longer than the calyx. 1. *M. ringens*.
 Leaves petioled; peduncles shorter than the calyx. 2. *M. alatus*.
- Corolla yellow.
 Plant viscid, diffuse. 3. *M. moschatus*.
 Plant puberulent, erect. 4. *M. Langsdorffii*.

1. **M. ringens** L. In swamps and along streams: N. S. to Va., Tenn., Neb. and Tex.
Common throughout the range, except in the pine-barrens, there wanting.
2. **M. alatus** Soland. In swamps: Ont. to Conn., Ill., Ga., Kan. and Tex.
CONN. Very rare in New London, Hartford and Fairfield counties.
N. Y. Known definitely only on Staten Island, in the Bronx, and near New Baltimore, Greene Co.
N. J. Known definitely only from Salem, Gloucester, Camden, Burlington, Ocean, Monmouth, Mercer and Hunterdon counties, thence scattering northward, but nowhere common; not in the pine-barrens.
PA. Northampton, Bucks, Delaware and Chester counties.
Distribution scattered and little understood.
3. **M. moschatus** Dougl. In wet places: N. S. and Ont. to N. Y. Adventive from the Pacific Coast.
Rare as an occasional adventive in parts of our range; perhaps not persistent.
4. **M. Langsdorffii** Donn. Rare as an occasional adventive from the West in Connecticut and New York.

11. *Conobea* Aubl.

1. **C. multifida** (Michx.) Benth. Along streams and rivers: Ohio to Iowa, Kan., Ky. and Tex. Introduced along the Delaware below Philadelphia.
Known definitely only from near Philadelphia as a weed.

12. *Gratiola* L.

Plants glabrous or glandular; anther-sacs transverse, separated.

Sterile filaments minute or none.

Glandular-puberulent; flowers 8-10 mm. long, capsule ovoid.

Glabrous; flowers 14 mm. long; capsule globose.

Sterile filaments 2, slender, capitate at the summit.

Plants hirsute; anther-sacs parallel, contiguous.

1. *G. virginiana*.
2. *G. sphaerocarpa*.
3. *G. aurea*.
4. *G. pilosa*.

1. **G. virginiana** L. In wet places: Que. to B. Col., Mass., Fla., Tex. and Cal.

Common throughout the range except in the pine-barrens and the region east and south of them, there rare or wanting; always increasing northward.

2. **G. sphaerocarpa** Ell. In wet places: N. J. to Fla., Ill., Tex. and Mex.
 N. J. Known only from Burlington and Cape May counties, not in the pine-barrens.
 Tertiary, unknown on Beacon Hill, increasing **southward**: Cretaceous, rare: Older Formations, unknown. 168-220 days. About sea level.
3. **G. aurea** Muhl. In sandy wet places: Que. and Ont. to N. J. and Fla.
 CONN. Rare in Fairfield Co., increasing **eastward** and up the Connecticut Valley, but wanting in the north.
 N. Y. Common on L. I.; S. I., unknown elsewhere.
 N. J. Local in Morris, Warren and Hunterdon, mostly in the drainage of the Delaware River, thence increasing **southward**, especially in the pine-barrens.
 PA. Rare and local in Monroe, Northampton and Bucks counties, all within the drainage area of the Delaware River.
 Tertiary, common: Cretaceous, less common: Older Formations, rare and scattered. 138-220 days. **Sea level**-1,000 ft.
4. **G. pilosa** Michx. In dry soil: southern N. J. to Ark. and Tex.
 N. J. Rare in Camden, Cumberland and Cape May counties; wanting in the pine-barrens.
 Tertiary, unknown on Beacon Hill, increasing **southward**: Cretaceous, rare: Older Formations, wanting. 168-220 days. About sea level.

13. *Ilysanthes* Raf.

Peduncles longer than the leaves; calyx-segments shorter than the capsule.

1. *I. dubia*.

Peduncles shorter than the leaves; calyx-segments almost as long as the capsule or longer.

2. *I. attenuata*.

1. ***I. dubia*** (L.) Barnhart. In wet places: N. E. to Fla., Ont., S. Dak. and Tex. Also on the Pacific Coast.
 CONN. Throughout, more common along the coast than elsewhere.
 N. Y. Throughout, decreasing northward.
 N. J. Rare and local along the Delaware in Camden and Burlington counties; thence increasing northward; unknown elsewhere.
 PA. Throughout the area.
 Tertiary, 0: Cretaceous, rare in the region of glacial terraces along the Delaware: Older Formations, more common. 138-220 days. **Sea level**-1,000 ft.

2. **I. attenuata** (Muhl.) Small. In wet places: Me. and Ont. to Wisc., Ark., Fla., Mo. and Kan.

Common throughout the range, except in the pine-barrens, there unknown.

14. **Micranthemum** Michx.

1. **M. micranthemoides** (Nutt.) Wetts. In tidal mud: N. J. to Fla.

Known in our area only from Burlington and Camden counties, N. J., and Philadelphia and Delaware counties in Pa., in both states exclusively on the Delaware River.

15. **Limosella** L.

1. **L. aquatica** (*L. tenuifolia* Hoffm.). In brackish mud: Lab. to N. J. Also in Europe, Australia and S. America.

Rather rare along the coast from Conn. to Cape May and up the larger rivers, always within the influence of the tides; unknown from L. I. or S. I.

16. **Veronica** [Tourn.] L.

Flowers racemose in the axils of the leaves, bracteolate.

Glabrous or minutely glandular above (No. 3 rarely hairy); brook or swamp plants.

Leaves ovate, oval, oblong or oblong-lanceolate; capsule compressed.

Stem leaves sessile, partly clasping.

All the leaves petioled, serrate.

Leaves linear or linear-lanceolate; capsule very flat.

Pubescent, dry soil plants; leaves crenate or dentate.

Leaves oval or obovate, petioled; pedicels shorter than the calyx.

Leaves ovate, nearly or quite sessile; pedicels longer than the calyx.

Flowers in terminal spikes or racemes, or solitary in the axils.

Flowers in terminal spikes.

Flowers mostly solitary in the axils.

Peduncles shorter than the leaves.

Erect; glabrous or glandular; capsule emarginate.

Diffuse; pubescent; capsule obcordate.

Peduncles as long as the leaves or longer.

Leaves ovate or oblong, crenate or dentate.

Corolla not longer than the calyx; capsule narrowly emarginate.

Corolla longer than the calyx; capsule broadly emarginate.

1. *V. Anagallis-aquatica*.

2. *V. americana*.

3. *V. scutellata*.

4. *V. officinalis*.

5. *V. Chamaedrys*.

6. *V. serpyllifolia*.

7. *V. peregrina*.

8. *V. arvensis*.

9. *V. agrestis*.

10. *V. Tournefortii*.

Leaves orbicular or broader, 3-5 lobed or crenate.

11. *V. hederæfolia*.

1. *V. Anagallis-aquatica* L. In brooks and swamps: N. S. to B. Col., N. C., Tenn., Va., Neb. and N. Mex. Also in Europe and Asia.

In most parts of the range except the coastal plain of N. J.; rare in Conn. and unknown in the Bronx.

2. *V. americana* Schwein. In brooks and swamps: Anticosti to Alask., Pa., Neb., New Mex. and Cal.

CONN. Throughout the state, increasing **northward**.

N. Y. Rare on the north shore of L. I. and on S. I., thence increasing and becoming common **northward**.

N. J. Occasional along the Delaware in Gloucester, Burlington and Ocean counties, thence increasing **northward**; not in the pine-barrens.

PA. Throughout the area.

Tertiary, 0: Cretaceous, very rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,800 ft.

3. *V. scutellata* L. In swamps: Lab. to B. Col., N. Y., Minn. and Cal. Also in Europe and Asia.

CONN. Throughout the state.

N. Y. Rare on the north side of L. I.; S. I., thence increasing **northward**.

N. J. Very rare in Camden Co., near the Delaware, thence unknown to Mercer and Middlesex counties, thence increasing **northward**, otherwise unknown.

PA. Monroe, Northampton, Lehigh, Bucks, Philadelphia, Delaware and Chester counties.

Tertiary, 0: Cretaceous, very rare: Older Formations, common and increasing **northward**. 117-220 days. Sea level-3,900 ft.

4. *V. officinalis* L. In dry fields and in waste places: N. S. to Ont., S. Dak., N. Car. and Tenn.

Common throughout the area, except in the pine-barrens, there unknown; decreasing southward.

5. *V. Chamaedrys* L. In fields and waste places: N. S. and Que. to N. Y. and Pa. Naturalized from Europe.

Rather rare as a weed in most parts of our range; wanting in the pine-barrens.

6. **V. serpyllifolia** L. In fields and thickets: Lab. to Alask., Gt., N. Mex. and Cal. Also in Europe, Asia and S. Am.
Common in most parts of our range except the pine-barrens and east and south of them.
7. **V. peregrina** L. In moist places, and common as a weed in cultivated soil: N. S. to B. Col., Fla., Mex. and Cal. Also in S. Am. and Europe.
Rather common in our area, always as a weed of cultivated or waste ground.
8. **V. arvensis** L. In fields, woods and waste places: N. S. to Ont., and Wash., Fla., Kan. and Tex. Naturalized from Europe.
Common as a weed in most parts of our range.
9. **V. agrestis** L. In fields and waste places: N. S. to N. J. and La. Naturalized from Europe.
Not common as a weed.
10. **V. Tournefortii** Gmelin (*V. byzantina* (Sibth. and Smith) B. S. P. In waste places: N. S. to N. Y. and Ohio. Naturalized from Europe.
Occasional as a weed of roadsides, waste places and cultivated ground.
11. **V. hederifolia** L. In thickets, fields and waste places: N. Y., Pa. and N. J. to S. Car. Naturalized from Europe.
Occasional as a roadside weed.

The following have been collected as waifs from the range; *Veronica Teucrium* L. mostly from Conn.; *V. longifolia* L., from L. I. and Westchester Co., N. Y.; and *V. Beccabunga* L. from near the City of New York, and in Conn.

17. *Leptandra* Nutt.

1. **L. virginica** (L.) Nutt. In meadows, moist woods and thickets: N. S. to B. Col., Ala., Mo. and Kan.
CONN. Throughout the state, increasing **northward**.
N. Y. Rare on the south side of L. I., increasing on the north side; on S. I., thence increasing **northward**.
N. J. Reported, but not definitely known from Monmouth Co., in Somerset Co., thence increasing **northward**.
PA. Throughout the range.
Tertiary, o: Cretaceous, o: Older Formations, increasing and becoming common **northward**. 117-220 days. Sea level-4,020 ft.

18. *Aureolaria* Raf. (*Dasystema* Benth., not Raf.)

Plants glandular-pubescent; corolla pubescent without; leaves finely divided; annuals or biennials.

1. *A. Pedicularia*.

Puberulent, cinereous or glabrous; corolla glabrous without; perennials.

Cinereous pubescent; leaves entire or the lower pinnatifid.

2. *A. villosa*.

Glabrous or nearly so; leaves predominately pinnatifid.

3. *A. virginica*.

1. *A. Pedicularia* (L.) Raf. In dry woods and thickets: Me. and Ont. to Minn., Fla. and Mo.

CONN. Rather rare but found over most of the state.

N. Y. Common on L. I. and S. I., decreasing up the Hudson Valley to Columbia Co.; not known from the Catskills.

N. J. Common throughout the state, especially in the pine-barrens.

PA. Northampton, Lehigh, Bucks, Delaware and Chester counties.

Tertiary, common: Cretaceous, common: Older Formations, decreasing northward. 138-220 days. Sea level-1,080 ft.

2. *A. villosa* (Muhl.) Raf. In dry woods and thickets: Mass. to Ont., Wisc., Ga. and Miss.

Common throughout the range, less frequent in the pine-barrens, and more frequent **northward** than elsewhere. Has been referred to *Dasystema flava*.

3. *A. virginica* (L.) Pennell. In dry or moist woods: Me. to Minn., Fla. and Ill.

CONN. Throughout the state, increasing **southward**.

N. Y. Frequent on L. I. and S. I., Westchester Co., decreasing up the Hudson Valley to Ulster Co., and not specifically known from the Catskills.

N. J. Very rare in Cumberland and Ocean counties, west of the pine-barrens, thence increasing northward. Reported also from Hammonton, Atlantic Co.

PA. Monroe, Northampton, Bucks, Delaware and Chester counties.

Tertiary, 0: Cretaceous, rare: Older Formations, not very common. 138-220 days. Sea level-1,080 ft.

19. *Agalinis* Raf. (*Gerardia* L. in part)

Pedicels in flower shorter than the calyx, or only slightly longer.

Corolla 2-2.6 cm. long.

1. *A. purpurea*.

Corolla 1-1.6 cm. long.

Calyx-teeth triangular-subulate, acute.

2. *A. paupercula*.

Calyx-teeth broad, short, obtuse.

3. *A. maritima*.

Pedicels in flower 2-6 times as long as the calyx.

Lobes of the corolla entire or barely emarginate.

Leaves linear, 2.5 cm. wide or less.

Leaves filiform-linear, less than 1 mm. wide.

Lobes of the corolla all obcordate.

4. *A. tenuifolia*.

5. *A. Holmiana*.

6. *A. decemloba*.

1. **A. purpurea** L. (Pennell). (*Gerardia purpurea parvula* Pennell.)
In moist fields and thickets: Me. and Ont. to Fla., mostly near the coast.

Throughout the range except the Catskills and the mountains of Pa. In the pine-barrens the type is replaced by a narrow-leaved form (*A. virgata* Raf.; *G. racemulosa* Pennell, *Torreyia* II: 15. 1911), not here maintained as a species.

2. **A. paupercula** (A. Gray) Britton. In bogs and low meadows: Que. to N. J., Tenn., Man. and Wisc.

CONN. Not uncommon along the coast, decreasing inland and becoming scarce northward.

N. Y. Rare on the north shore of L. I., rare on S. I.; Copake Falls, Columbia Co.

N. J. Known only in the drainage of the Delaware in Sussex, Warren and Hunterdon counties.

PA. Northampton, Bucks and Delaware counties.

Distribution little known, apparently coastal in Conn. and N. Y. and predominating inland in N. J. and Pa.

3. **A. maritima** Raf. In salt marshes: Me. to Fla. and La.

Common in the salt marshes throughout the range; unknown inland.

4. **A. tenuifolia** (Vahl.) Raf. In dry woods and thickets: Que. to Ga., Ont., Kan. and La.

Common throughout the range except the pine-barrens, where it is replaced by the following closely related species.

5. **A. Holmiana** (Greene) Pennell. In dry sandy woods: L. I. to Fla.

N. Y. Found only rather sparingly on L. I.; unknown elsewhere.

N. J. The pine-barrens, and in Camden Co.*

Tertiary, common on Beacon Hill, rare or wanting elsewhere: Cretaceous; only as a rare adventive.* Rare on the overwash plain on L. I. 183-220 days. About sea level.

The species has been referred to *A. setacea* (Walt.) Raf.

* See Introduction paragraph, 29.

6. **A. decemloba** Greene. In grassy places: Mass. to D. C.

N. Y. Not uncommon on the south side of L. I., on the Hempstead Plains; unknown elsewhere.

This species includes those specimens credited to *Gerardia Skinneriana* in the Manuals, but not of Wood, and has been referred to the southern *A. parvifolia* (Chapm.) Small. *A. Besseyana* Britton has been recorded from Conn.

20. **Otophylla** Benth (*Tomanthera* Raf.)1. **O. auriculata** (Michx.) Small. In moist soil: Pa. to Minn., N. Car. and Kan.

Known in our area only from Lehigh, Bucks, and Chester counties in Pa., and from Woodbridge, Middlesex Co., and from Madison, N. J., perhaps not native anywhere in our area.

21. **Buchnera** L.1. **B. americana** L. In sandy or gravelly soil: N. J. to western N. Y., Minn., Va., La., Kan. and Ark.

Known only from an old specimen collected in Burlington Co., N. J. and from more recent specimens collected in Delaware Co., Pa.

22. **Castilleja** Mutis.1. **C. coccinea** (L.) Spreng. In meadows and thickets: Me. and Ont. to Man., N. Car., Kan. and Tex.

CONN. Throughout the state but rare and scattered.

N. Y. Reported from but not definitely known on L. I., rare on S. I., unknown in the Bronx, thence increasing but not common **northward**.

N. J. Very rare in Burlington and Monmouth counties, thence increasing but not common **northward**. Not in the pine-barrens.

PA. Northampton, Lehigh, Bucks, Berks, Delaware and Chester counties.

Tertiary, o: Cretaceous, rare: Older Formations, increasing **northward** but never very common. 117-220 days. Sea level-3,050 ft.

23. **Melampyrum** [Tourn.] L.1. **M. lineare** Lam. In dry woods and thickets: N. S. to B. Col., N. Car., Ky. and Minn.

Common throughout the range, especially in the pine-barrens.

Broad-leaved specimens have been referred to *M. latifolium* Muhl.

24. *Pedicularis* [Tourn.] L.

Leaves pinnately lobed; capsules ovate, scarcely longer than the calyx.

1. *P. lanceolata*.

Leaves pinnately parted; capsule lanceolate, 3 times as long as the calyx.

2. *P. canadensis*.1. *P. lanceolata* Michx. In swamps: Ont. to Conn., Va., Man., Minn., Ohio, Mich. and Neb.

CONN. Throughout, but rare or wanting from Fairfield Co., increasing **northward**.

N. Y. Rare and local on L. I., and on S. I., and in the Bronx, thence increasing **northward**, but not definitely known from the Catskills.

N. J. Throughout, except in the pine-barrens.

PA. Luzerne, Monroe, Lehigh, Bucks, Delaware and Chester counties.

Tertiary, wanting on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, increasing **northward**. 123-220 days. Sea level-2,900 ft.

2. *P. canadensis* L. In dry woods and thickets: N. S. to Man., Fla., Miss., Colo. and Northern Mex.

Common throughout the range, except in the pine-barrens, there wanting.

25. *Schwalbea* L.1. *S. americana* L. In wet sandy soil: E. Mass. to Fla. and La., near the coast.

Known from near East Lyme, Conn., thence wanting except from Point Pleasant, N. J., south along the coast and up both sides of the Delaware to Burlington Co., N. J. and Philadelphia, Pa.; also in the pine-barrens. Apparently wanting in N. Y.; often in coastal marshes.

26. *Rhinanthus* L.1. *R. Crista-galli* L. Grassy places: N. B. to Conn.; Newf. to Alaska, south to the White Mts., and in the Rocky Mts. to N. Mex. Also in Europe and Asia.

Known in our area only from several stations in Connecticut.

Monniera caroliniana (Walt.) Kuntze has been credited to the pine-barrens of N. J. There are no specimens from that region and it is otherwise known only from Va. southward.

Digitalis purpurea L., *D. lutea* L. and *Chaenorhinum minus* (L.) Lange have all been collected as waifs.

Collinsia verna Nutt. is recorded from Easton and Germantown, Pa., probably occurring only as a waif.

LENTIBULARIACEAE

Bracts at the base of the pedicels without bractlets; calyx not enclosing the fruit.

Branches verticillate, decompound; lateral lobes of lower lip of corolla saccate.

Branches alternate or none; lateral lobes of lower lip of corolla not saccate.

Bracts and scales if present, flat, basally attached; aquatic

Bract solitary, tubular, surrounding the scape; scales none.

Bracts and scales peltate; terrestrial.

Bracts at the base of the pedicels with a pair of bractlets; calyx enclosing the fruit.

1. VESICULINA.

2. UTRICULARIA.

3. LECTICULA.

4. SETISCAPELLA.

5. STOMOISIA.

1. *Vesiculina* Raf.

1. *V. purpurea* (Walt.) Raf. (*Utricularia purpurea* Walt.). In ponds: Me. to Fla. and La., near the coast; Ind. to Minn. CONN. Mostly near the coast, decreasing inland.

N. Y. Apparently confined to L. I., rare.

N. J. Throughout the coastal plain, more common in the pine-barrens than elsewhere.

PA. Known only from near Great Lake, Carbon Co.

2. *Utricularia* L.

Scape with a whorl of inflated floats.

1. *U. radiata*.

Scape without floats.

Stems floating.

Scapes 6-20-flowered, with 1-5 scales; no cleistogamous flowers.

2. *U. macrorhiza*.

Scapes 2-5-flowered, without scales; cleistogamous flowers present.

3. *U. geminiscapa*.

Stems creeping on the bottom in shallow water.

Spur and palate conspicuous; fruiting pedicels ascending.

Segments of some leaves linear, flat, bristly-ciliate; upper lip of corolla half as long as lower.

4. *U. intermedia*.

Leaf-segments all capillary; corolla lips nearly equal.

Spurs stout, conic, shorter than the lower lip.

5. *U. gibba*.

Spur slender, equalling the lower lip or longer.

Spur tapering from base to apex; leaves all bladder-bearing.

6. *U. pumila*.

Spur conic at base, linear above; leaves not all bladder-bearing.

7. *U. fimbrosa*.

Spur a mere sac; palate obsolete; fruiting pedicels recurved.

8. *U. minor*.

1. *U. radiata* Small. In ponds: Me. to Fla. and Tex., near the coast.

CONN. Rare over most of the state, decreasing inland.

N. Y. Known definitely only from L. I., there rare.

N. J. Mt. Arlington, Morris Co., increasing southward, especially in the pine-barrens.

PA. Known definitely only from Bucks Co.

2. **U. macrorhiza** Le Conte (*U. vulgaris* of Amer. auth. not of L.). In ponds and streams: Newf. to Md., Br. Col. and Cal.

Common throughout most of the range except in the pine-barrens, there not reported.

3. **U. geminiscapa** Benj. (*U. clandestina* Nutt.). In shallow ponds: N. B. to Va.

CONN. Known only from Waterford, Fairfield and near Cromwell, N. Y. Apparently confined to L. I.

N. J. Nearly throughout the coastal plain, and common in the pine-barrens but unknown east of them.

PA. Wayne and Monroe counties.

4. **U. intermedia** Hayne. In shallow water: Newfoundland to B. Col., N. J., Ind. and Cal. Also in Europe.

Throughout the range, but local, unknown on S. I.

5. **U. gibba** L. In shallow water: Ont. to Me., Mich., Ala. and Ill. Throughout the range, rare in the pine-barrens.

6. **U. pumila** Walt. (*U. biflora* Lam.). In shallow water: E. Mass. and R. I., to Ill., La. and Tex. Rare.

Known only from Groton and Southington, Conn. and from near Georgetown, Sussex Co., N. J.

7. **U. fibrosa** Walt. In shallow ponds and swamps: L. I. to Fla. and La.

Common on L. I. and the pine-barrens of N. J., and at Elmer, N. J.; apparently wanting in Conn. and Pa.

8. **U. minor** L. In shallow ponds and in bogs: Greenl. and Lab. to B. Col., N. Y., Ark., Utah and Cal. Also in Europe.

CONN. Known only from near the coast and from Salisbury; rare. N. Y. Apparently confined to the north side of L. I.; reported but not definitely known from Pine Plains, Dutchess Co.

3. *Lecticula* Barnhart.

1. **L. resupinata** (B. D. Greene) Barnhart. In sandy bogs and borders of ponds: Me. to Fla., west to Mich. Rare.

CONN. Known only from East Lyme, Southington and Woodbury.

N. Y. Apparently confined to L. I., there rare.

N. J. Known only from Sea Isle City and Ocean View, both on the southern coast.

4. *Setiscapella* Barnhart.

Corolla yellow, the lower lip 4-8 mm. long; spur conic.

1. *S. subulata*.

Corolla white or purplish, the minute lower lip less than 0.5 mm. long; spur saccate.

2. *S. cleistogama*.

1. ***S. subulata*** (L.) Barnhart. In wet sandy soil: Mass. to Fla., west to Tex., Mex. and Ark. Also in Cuba.
N. Y. Reported from L. I., but report was probably erroneous (according to Barnhart).
N. J. Common in the pine-barrens, rare elsewhere on the coastal plain.

2. ***S. cleistogama*** (A. Gray) Barnhart. In wet soil: E. Mass. and in the pine-barrens of N. J.

Known only from the southern part of New Jersey in the pine-barrens and from Cape May; and from Wading River, L. I. Rare.

5. *Stomoisia* Raf.

Corolla much exceeding the calyx.

Lower lip of corolla 12-16 mm. long; spur 7-12 mm. long.

1. *S. cornuta*.

Lower lip of corolla 8-10 mm. long; spur 5-8 mm. long.

2. *S. juncea*.

Corolla shorter than or about equalling the calyx.

3. *S. virgatula*.

1. ***S. cornuta*** (Michx.) Raf. On borders of ponds or in bogs: Newf. to Ont., Minn., Fla. and Tex.

Scattered over most parts of the range, more common in the pine-barrens than elsewhere; rare inland and unknown from S. I.

2. ***S. juncea*** (Vahl) Barnhart. In bogs: N. Y. and N. J. to Fla. and Tex., mostly near the coast.

N. Y. Reported from Riverhead, L. I.

N. J. Not uncommon in the pine-barrens and at Cape May, unknown elsewhere.

3. ***S. virgatula*** Barnhart. In mud and bogs: N. Y., N. J., Fla. and Miss.

N. Y. Known only from near Riverhead and Woodmere, L. I.

N. J. Known only from near Jackson and Cape May.

OROBANCHACEAE

Flowers all complete and perfect.

Calyx 2-5-toothed.

Calyx about equally 5-cleft; no bracts on pedicels or calyx. 1. *THALESIA*.

Calyx unequally toothed, or split on both sides; flowers bracted. 2. *OROBANCHE*.

Calyx spathe-like, split on the lower side, 3-4-toothed on the upper. 3. *CONOPHOLIS*.

Lower flowers cleistogamous, fertile; upper complete, mostly sterile. 4. *LEPTAMNIUM*.

I. *Thalesia* Raf.

I. *T. uniflora* (L.) Britton. In woods and thickets: Newf. to B. Col., Va., Ohio., Tex. and Cal. Parasitic.

CONN. Throughout the area, increasing **northward**.

N. Y. Rare and local on L. I. and S. I., increasing **northward**.

N. J. Occasional in Burlington, Monmouth, Ocean and Mercer counties, thence increasing **northward**; not in the pine-barrens.

PA. Throughout the range.

Tertiary, o: Cretaceous, rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,500 ft.

2. *Orobanche* [Tourn.] L.

Calyx split on both sides; stem simple. 1. *O. minor*.

Calyx 4-toothed; stem mostly branched. 2. *O. ramosa*.

I. *O. minor* J. E. Smith. Parasitic on the roots of clover: N. Y. to Va. Naturalized from Europe.

Scattered in most parts of our range from New York southward.

2. *O. ramosa* L. Parasitic on the roots of tomato, hemp and tobacco: N. J., Ill., Ky. Adventive from Europe.

On tomato, New Brunswick, N. J.

3. *Conopholis* Wallr.

I. *C. americana* (L. f.) Wallr. In rich woods, usually at the bases of oak trees: Me. to Mich. and Fla. Rare.

CONN. Known only from Plainville, Southington, Guildford and New Haven.

N. Y. Known definitely only from S. I. and from Bronx and Westchester counties.

N. J. Known definitely only from Camden, Hunterdon, Essex and Bergen counties, the latter station on the Palisades opposite Yonkers, rare.

PA. Bucks, Delaware and Chester counties.

A rare and local plant.

4. **Leptamnium** Raf.

1. **L. virginianum** (L.) Raf. In beech woods: N. B. to Fla., Ont., Mich., Mo. and La.

Common throughout the range, except in the pine-barrens and at Cape May, there wanting, apparently always parasitic on the beech.

BIGNONIACEAE

Leaves compound; a vine.

1. BIGNONIA.

Leaves simple; a tree.

2. CATALPA.

1. **Bignonia** L.

1. **B. radicans** L. (*Tecoma radicans* (L.) J. St. Hil.). In moist woods and thickets: N. J. and Pa., to Fla., Tex., Kan. and Ill. N. J. Monmouth and Camden counties, increasing southward, but not in the pine-barrens.

PA. Bucks Co.

The numerous records further north are based on specimens of cultivated plants or those escaped from cultivation.

2. **Catalpa** Scop.

1. **C. Catalpa** (L.) Karst. In woods in the Gulf States: escape from cultivation in Pa. and N. Y.

Not uncommon as an escape from very frequent cultivation, in most parts of our range.

Martynia louisiana Mill. of the Martyniaceae and *Sesamum indicum* L. of the Pedaliaceae have both been collected as waifs. Neither is certainly established in the range.

ACANTHACEAE

Corolla convolute in the bud, nearly regular; stamens 4.

1. RUELLIA.

Corolla imbricated in the bud, strongly 2-lipped; stamens 2.

2. DIANTHERA.

1. **Ruellia** [Plum.] L.

Calyx-segments linear-lanceolate, scarcely exceeding the capsule.

1. *R. strepens*.

Calyx-segments filiform-linear, exceeding the capsule.

2. *R. parviflora*.

1. **R. strepens** L. In dry woods: Pa. to Wisc., Fla. and Tex.

PA. Known only from near Easton, Northampton Co.; recorded from Atlantic Co., N. J., probably erroneously.

2. **R. parviflora** (Nees) Britton. In dry soil: N. J. and Pa. to Fla., Mich., Kan. and La.

N. J. Known only from Cape May Co.

A very rare and local species, apparently reaching its most northerly station in our range; has been referred to *R. ciliosa* Pursh.

2. *Dianthera* L.

1. *D. americana* L. In water and wet places: Ont. to Mich., Kan., Ga. and Tex.
 N. Y. Known definitely only from Orange Co.
 N. J. Known only along the Delaware from Gloucester to Mercer counties.
 PA. Luzerne, Bucks and Chester counties.

PHRYMACEAE

1. *Phryma* L.

1. *P. Leptostachya* L. In woods and thickets: Can. to Minn., Fla. and Kan. Also in eastern Asia.
 Throughout the range, except in the pine-barrens, there unknown, local on the coastal plain.

PLANTAGINACEAE

1. *Plantago* [Tourn.] L.

Corolla-lobes spreading or reflexed in fruit, not closed over the top of the pyxis.

Leaves ovate, lanceolate or oblong.

Seeds several or many in each pyxis.

Pyxis ovoid, circumscissile at about the middle.

1. *P. major*.

Pyxis oblong, circumscissile much below the middle.

2. *P. Rugelii*.

Seeds 2-4 in each pyxis.

Leaves all narrowed at the base, parallel-ribbed.

3. *P. lanceolata*.

Leaves or some of them cordate; veins starting from the midrib.

4. *P. cordata*.

Leaves linear or filiform.

Leaves fleshy; plant maritime.

5. *P. maritima*.

Leaves not fleshy; plant not maritime.

6. *P. aristata*.

Corolla-lobes erect and closed over the top of the pyxis.

Leaves spatulate to obovate; stamens 4.

7. *P. virginica*.

Leaves linear-filiform; stamens 2.

8. *P. pusilla*.

1. *P. major* L. In waste places: nearly throughout N. Am. and nearly cosmopolitan in distribution, seemingly in part naturalized from Europe and in part native in our area.

Common as a weed throughout the range. A form found along the coast and on shores inland, described as *P. halophila* Bicknell, appears to be the same as *P. intermedia* Gilib., which seems to be a form of *P. major*.

2. **P. Rugelii** Dec. In fields, woods and waste places: Me. and Ont. to S. Dak., Fla., Neb. and Tex.
Common throughout the range as a weed in waste places; perhaps more frequent than the preceding.
3. **P. lanceolata** L. In fields and waste places: N. B. to the N. W. Terr., B. Col., Fla. and Kan. Naturalized from Europe.
Throughout the range as a field weed.
4. **P. cordata** Lam. In swamps and along streams: Ont. to Ala., Mo. and La.
Known only from an old collection made at Mattewan, N. Y., many years ago. Otherwise unrecorded from the area.
5. **P. maritima** L. (*P. decipiens* Barn.). In salt marshes and on sea-shores: Lab. to N. J. Also on the Pacific Coast.
Common or frequent in our maritime swamps and up the tidal rivers.
6. **P. aristata** Michx. On dry plains and prairies in the West; also as a weed: Me. to Ga.
Common in waste places, particularly along the coast.
7. **P. virginica** L. In dry soil: R. I. to Fla., Ill., Mo., Ariz. and Mex.
CONN. Not uncommon near the coast, decreasing and perhaps wanting northward.
N. Y. Common on L. I. and S. I. and up the Hudson Valley to Westchester Co., unknown northward.
N. J. Common on the coastal plain, occasional north of it; perhaps only adventive in the pine-barrens.
PA. Pike, Northampton, Delaware and Chester counties.
Tertiary, unknown on Beacon Hill as a wild plant, common elsewhere: Cretaceous, common: Older Formations, scattered. 138-220 days. Sea level-1,050 ft.
8. **P. pusilla** Nutt. In dry sandy soil: R. I. to N. Y., Va., La., Ill., S. Dak. and Tex.
CONN. Rare at Old Lyme, Blackhall and Guilford, otherwise unknown.
N. Y. Known definitely only from L. I., there rare.
N. J. Rare and local in Monmouth, Ocean, Burlington, Camden and Cape May counties; not in the pine-barrens.
PA. Apparently known only as a weed near Philadelphia.

A very localized species, whose distribution is not yet understood. It has been referred to the western *P. elongata* Pursh.

P. heterophylla Nutt. has been collected as a weed near Camden and Philadelphia.
P. Coronopus L. has been collected as a waif near Philadelphia and near New York.

RUBIACEAE

Leaves opposite, stipulate (sometimes verticillate in No. 3).

Ovules numerous in each cavity of the ovary; herbs.

Top of the capsule free from the ovary; seeds few, peltate. 1. HOUSTONIA

Capsule wholly adnate to the ovary; seeds minute, angular. 2. OLDENLANDIA.

Ovules 1 in each cavity of the ovary.

Shrubs or small trees; flowers in dense globular heads. 3. CEPHALANTHUS.

Low evergreen herbs; flowers 2 together, with their ovaries united.

4. MITCHELLA.

Herbs; flowers axillary, nearly sessile, distinct.

5. DIODIA.

Leaves appearing verticillate; herbs.

Corolla rotate; calyx-teeth minute or none.

6. GALIUM.

Corolla funnellform.

Flowers in panicles.

7. ASPERULA.

Flowers in involucrate heads.

8. SHERARDIA.

I. *Houstonia* L.

Plants 2.5-18 cm. high; peduncles 1-flowered.

1. *H. coerulea*

Plants 10-25 cm. high; flowers cymose.

2. *H. longifolia*.

1. *H. coerulea* L. In open grassy places, or on wet rocks: N. S. to Que., Mich., Ga. and Ala.

CONN. Throughout the state.

N. Y. Reported from but not definitely known on L. I.; on S. I., rare in the Bronx, thence increasing **northward**.

N. J. Throughout the state except in the pine-barrens, and at Cape May; always increasing westward and **northward**.

PA. Throughout the area.

Tertiary, unknown on Beacon Hill, rare elsewhere: Cretaceous, not common: Older Formations, increasing and becoming common **northward**. 117-220 days. Sea level-4,020 ft.

2. *H. longifolia* Gaertn. In dry open places: Me. and Ont. to Man., Ga. and Mo.

CONN. Rare and local but scattered over most of the state, more common along the coast than elsewhere.

N. Y. Common on L. I., unknown on S. I., otherwise known only from a doubtful record in Greene Co.

N. J. Known only from an old record from Lakehurst, Ocean Co. PA. Northampton, Bucks, Berks and Chester counties.

A scattered and local plant whose distribution is little known.

H. purpurea L. reported as from N. J. by Torrey in 1819, has not since been collected in the state. The record, in all probability, applies to *H. longifolia*.

2. *Oldenlandia* [Plum.] L.

1. *O. uniflora* L. In low grounds: N. Y. to Fla. and Tex. Also in Cuba and Jamaica.

N. Y. Apparently confined to L. I. and S. I., not common.

N. J. Rare in Bergen and Hudson counties, thence increasing and common southward but wanting or only rarely adventive in the pine-barrens.

3. *Cephalanthus* L.

1. *C. occidentalis* L. In swamps and low grounds: N. B. to Ont., Wisc., Neb., Fla. and Tex.

Throughout the range, not so common in the pine-barrens as elsewhere.

4. *Mitchella* L.

1. *M. repens* L. In woods: N. S. to Fla., Ont., Minn., Ark. and Tex.

Common throughout the range except in the pine-barrens, there only as a rare intruder.

5. *Diodia* L.

Leaves linear-lanceolate; style entire; stigmas capitate.

1. *D. teres*.

Leaves lanceolate or oval; style 2-cleft; stigmas filiform.

2. *D. virginiana*.

1. *D. teres* Walt. In dry or sandy soil: Conn. to Fla., Ill., Kan., Tex., N. Mex. and Sonora.

CONN. Rather rare along and near the coast, wanting inland.

N. Y. Locally common on L. I. and S. I., wanting northward.

N. J. Bergen, Warren, Hunterdon, Passaic, and Union counties, thence increasing **southward**.

PA. Northampton, Bucks, Delaware and Chester counties.

Tertiary, common, less so on Beacon Hill than elsewhere: Cre-taceous, less common: Older Formations, scattered and local. 153-220 days. Sea level-850 ft.

2. *D. virginiana* L. In moist soil: S. N. J. to Fla., Ark. and Tex. N. J. Known only from southern Cape May Co., rare.

6. *Galium* L.

I. Fruit dry.

- Fruit bristly, granular or tubercled. (Becoming glabrous in No. 5).
 Leaves in 6's or 8's.
 Fruit granular or tubercled, not bristly; ballast plant. 1. *G. tricornne*.
 Fruit bristly.
 Angles of stem retrorse-hispid; leaves in 6's or 8's;
 fruit 4-6 mm. broad. 2. *G. Aparine*.
 Stem glabrous; leaves in 6's; fruit 3-4 mm. broad. 3. *G. triflorum*.
 Leaves in 4's. 4. *G. pilosum*.
 Leaves 1-nerved. 5. *G. boreale*.
 Leaves 3-nerved. 6. *G. circaezans*.
 Leaves linear to linear-lanceolate; flowers in ter- 7. *G. lanceolatum*.
 minal panicles. 8. *G. verum*.
 Leaves lanceolate or ovate; flowers in open cymes.
 Upper leaves ovate, obtuse.
 Upper leaves lanceolate, acuminate. 9. *G. palustre*.
 Fruit smooth and glabrous. 10. *G. tinctorium*.
 Flower yellow; leaves in 6's or 8's; fruit about 2 mm. broad. 11. *G. labradoricum*.
 Flower greenish-white or white. 12. *G. Mollugo*.
 Leaves in 4's or fewer than 4's. 13. *G. erectum*.
 Flowers several in small dichotomous cymes.
 Flowers solitary or in a simple cyme.
 Leaves spreading or ascending; fruit about
 3 mm. broad. 14. *G. concinnum*.
 Leaves mostly reflexed; fruit 1-1.5 mm. broad. 15. *G. asprellum*.
 Leaves in 5's or more than 5's or in 4's in *G. Claytoni*.
 Plants erect; stems and leaves smooth, or nearly so.
 Flowering branches and pedicels strongly di-
 varicate. 16. *G. Claytoni*.
 Flowering branches and pedicels mostly ascend-
 ing. 17. *G. bermudense*.
 Plants decumbent, forming dense mats; stems and
 leaves scabrous.
 Leaves acute or cuspidate.
 Leaves linear, slightly upward scabrous on
 the margin.
 Leaves lanceolate, retrorse-scabrous.

II. Fruit fleshy.

1. ***G. tricornne* Stokes.** In waste or cultivated fields: Ont. and about the eastern seaports. Native of Europe.
 Rare as an occasional waif in our range.
 2. ***G. Aparine* L.** In various situations: N. B. to S. Dak., Fla., Mo. and Tex. Apparently naturalized from Europe, in part.
 Common as a weed in most parts of our range.

3. *G. triflorum* Michx. In woods: N. S. to Alask., Fla., La., Ind. Terr., Colo. and Cal. Also in Europe and Asia.
Throughout the range except in the pine-barrens and the region east and south of them, there wanting.
4. *G. pilosum* Ait. (*G. puncticulosum* Michx.). In dry or sandy soil: Mass. to Ind., Kan., Fla. and Tex.
Throughout the range, but rare northward.
5. *G. boreale* L. In rocky soil or along streams: Que. to Alaska, N. J., Pa., Mich., Mo., Neb., N. Mex. and Cal. Also in Europe and Asia.
CONN. Rare near the coast, increasing **northwestward**.
N. Y. Unknown on L. I. and S. I., rare and local in Westchester Co., increasing but not common **northward**.
N. J. Rare and local in Mercer and Hunterdon counties, increasing **northward**, especially in the valley of the Delaware.
PA Northampton, Bucks, Philadelphia and Chester counties.
Tertiary, o: Cretaceous, o: Older formations, increasing northward. 117-189 days. Sea level-4,020 ft.
6. *G. circaezans* Michx. In woods: Que. and Ont. to Minn., Fla., Kan. and Tex.
Common throughout the range, except in the pine-barrens, there wanting.
7. *G. lanceolatum* Torr. In dry woods: Que. and Ont. to Minn., N. J., Va., Pa. and Mich.
CONN. Very rare along the coast, increasing **northwestward**.
N. Y. Wanting on L. I., and on S. I., occasional in the Bronx, thence increasing and becoming common **northward**.
N. J. Very rare in northern Burlington and Monmouth counties, thence increasing **northward**.
PA. Pike, Luzerne, Monroe, Northampton, Bucks, Berks, Delaware and Chester counties.
Tertiary, o: Cretaceous, very rare and perhaps only adventive: Older Formations, increasing **northward**, especially in the mountains 117-220 days. Sea level-4,040 ft.
8. *G. verum* L. In waste places and fields: Ont. to Mass., N. Y. and N. J. Native of Europe.
Not uncommon as a weed in most parts of our range. The form described as *G. Wirtgeni* F. Schultz has been collected in Connecticut.

9. **G. palustre** L. In damp places: Newf. and Que. to Mass., Conn. and N. Y. Also in Europe.
 CONN. Rare in New London, New Haven and Litchfield counties.
 N. Y. Known definitely from Greene Co., in the Catskills, Bedford, Westchester Co., and from Long Beach, L. I.
 N. J. Warren and Sussex counties.
 PA. Pike and Lehigh counties, apparently unknown elsewhere.
10. **G. tinctorium** L. In damp shady places and in meadows: Can. to N. Car., Tenn., Mich., Neb. and Ariz.
 Throughout the range, except in the pine-barrens, there wanting.
11. **G. labradoricum** Wiegand. Bogs, Newf. to Wisc., Conn. and N. Y.
 Known in our area only from Norfolk and Salisbury, Conn., and from Copake Falls, N. Y.
12. **G. Mollugo** L. In fields and waste places: Newf. to Vt., N. Y., N. J., Pa. and Del. Native of Europe.
 Not uncommon as a field weed, often wanting locally.
13. **G. erectum** Huds. In fields and along roadsides: Que. to Vt. and Conn. and N. J. Native of Europe.
 Rare as a weed; perhaps not yet thoroughly established.
14. **G. concinnum** T. & G. In dry woodlands: N. J. to Va., Minn., Kan. and Ark.
 Very doubtfully in New Jersey, as the record was based on an old specimen supposed to have been collected in "N. J., near Phil." Not since recorded from the state. Reported from Bucks Co., Pa.; otherwise unknown in the range.
15. **G. asprellum** Michx. In moist soil: Newf. to Ont., N. Car., Ill., Wisc. and Neb.
 CONN. Throughout the state.
 N. Y. Occasional on L. I.; S. I.; in Bronx, Westchester and Orange counties, increasing **northward**.
 N. J. Rare in Salem, Monmouth and Ocean counties, north and west of the pine-barrens, thence increasing **northward**.
 PA. Monroe, Luzerne, Northampton, Lehigh, Bucks, Delaware and Chester counties.
 Tertiary, o: Cretaceous, rare and probably adventive: Older Formations, increasing **northward**. 117-220 days. Sea level-4,040 ft.

16. **G. Claytoni** Michx. In swamps: Mass. and N. Y. to Fla., Mich., Mo. and Tex.

Common throughout the range, except in the pine-barrens, there unknown.

17. **G. bermudense** L. (*Galium hispidulum* Michx.). In dry or sandy soil: S. N. J. to Fla. and Ga. Also in the W. I.

Known only from Cape May Co., N. J., there rare and local.

7. *Asperula* L.

Leaves oblong-lanceolate to obovate; fruit hispid.

1. *A. odorata*.

Leaves linear, 2 mm. wide or less; fruit smooth.

2. *A. glauca*.

1. **A. odorata** L. Native of Europe. Known in our area only from an old collection from New Brunswick, Middlesex Co., N. J.

2. **A. glauca** (L.) Bess. (*A. galioides* Bieb.). Fields, Conn. to Mich. Adventive from Europe.

Known, in our range, only from Southington, Conn.

A. arvensis L. also of Europe has been collected on S. I., but not recently.

8. *Sherardia* [Dill.] L.

1. **S. arvensis** L. In waste places: Ont. to eastern Mass. and N. J. Adventive from Europe.

Occasional as a weed.

Richardsonia scabra St. Hil. has been collected as a waif in our range, scarcely persistent.

CAPRIFOLIACEAE

Corolla rotate to urn-shaped; flowers in compound cymes; style deeply 2-5-lobed; shrubs or trees.

Leaves pinnate; drupe 3-5-seeded.

1. **SAMBUCUS.**

Leaves simple; drupe 1-seeded.

2. **VIBURNUM**

Corolla tubular to campanulate, often 2-lipped; style slender.

Erect perennial herbs; leaves connate.

3. **TRIOSTEUM.**

Creeping, somewhat woody herb; flowers long-peduncled, geminate.

4. **LINNAEA.**

Shrubs or vines.

Fruit a few-seeded berry.

Corolla short, campanulate, regular, or nearly so.

5. **SYMPHORICARPOS.**

Corolla more or less irregular, tubular or campanulate.

6. **LONICERA.**

Fruit a 2-celled capsule; corolla funnellform.

7. **DIERVILLA.**

1. *Sambucus* [Tourn.] L.

Cyme convex; fruit purplish black.

1. *S. canadensis*.

Cyme thyrsoid-paniculate, longer than broad; fruit red.

2. *S. pubens*.

1. ***S. canadensis* L.** In moist soil: B. N. and N. S. to Fla., Man., Kan. and Tex.

Common throughout the range, except the pine-barrens, there unknown.

2. ***S. pubens* Michx.** In rocky places: N. B. to Alask., B. Col., Ga., Colo. and Cal.

CONN. Rare along the coast, increasing **northward**.

N. Y. Unknown on L. I. or S. I., rare and local in Westchester Co., increasing and becoming common **northward**.

N. J. Bergen, Hudson, Union, Hunterdon and Essex counties, increasing **northward**.

PA. Pike, Monroe, Luzerne, Northampton, Lehigh, Schuylkill, Berks and Bucks counties.

Tertiary, 0: Cretaceous, 0: Older Formations increasing **northward**. 117-189 days. Sea level-4,040 ft.

S. Ebulus L. has been recorded as an escape from cultivation. I have seen no specimens. *S. laciniata* Mill., a cut-leaved form of *S. nigra* L., has been collected at Cape May, N. J.

2. *Viburnum* [Tourn.] L.

Outer flowers of the cyme large, radiant; drupe red.

Leaves doubly serrate, pinnately veined.

1. *V. alnifolium*.

Leaves 3-lobed, palmately veined.

2. *V. Opulus*.

None of the flowers radiant; drupe blue or black.

Leaves palmately veined.

3. *V. acerifolium*.

Leaves pinnately veined.

Leaves coarsely dentate, the veins prominent beneath.

Leaves very short petioled, pubescent.

4. *V. pubescens*.

Petioles 0.6-4 cm. long.

Leaves glabrous or with tufts of hair in the axils beneath, petioles glabrous.

5. *V. dentatum*.

Leaves pubescent beneath, the pubescence more or less stellate, petioles pubescent.

Leaves stellate-pubescent all over the under side.

6. *V. venosum*.

Leaves stellate-pubescent only on the veins beneath.

7. *V. Canbyi*.

Leaves entire, crenulate or serrulate, the veins not prominent.

Cymes obviously peduncled.

Peduncle shorter than the cyme; leaves crenulate.

8. *V. cassinoides*.

- Peduncle equalling or longer than the cyme;
leaves nearly entire. 9. *V. nudum*.
- Cymes sessile or nearly so.
Leaves prominently acuminate. 10. *V. Lentago*.
Leaves obtuse or merely acute. 11. *V. prunifolium*.
1. ***V. alnifolium*** Marsh. In low woods: N. B. to N. Car., western N. Y. and Mich.
CONN. Very rare near the coast, increasing **northwestward**.
N. Y. From Westchester Co., and the Highlands of the Hudson **northward**.
N. J. Bearfort Mt., Passaic Co.
PA. Known only from Monroe and Luzerne counties.
Tertiary, 0: Cretaceous, 0: Older Formations, rare, increasing **northward**. Not south of the moraine. 118-159 days. Sea level-4,050 ft.
 2. ***V. Opulus*** L. In low grounds: N. B. to B. Col., N. J., Mich., S. Dak. and Oregon. Also in Europe and Asia.
CONN. Occasional.
N. Y. Dutchess Co.
N. J. Warren and Sussex counties.
PA. Monroe and Berks counties.
 3. ***V. acerifolium*** L. In dry woods: N. B. to N. Car., Ont., Mich. and Minn.
Common throughout the range, except in the pine-barrens and at Cape May, there wanting. Always increasing **northward**.
 4. ***V. pubescens*** (Ait.) Pursh. In rocky woods: Que. and Ont. to Man., Ga., Ill., Iowa and Mich.
CONN. Rare along the coast and scattered **northwestward** into Litchfield Co.
N. Y. Port Washington Point, Manhattan; Rockland, Dutchess and Columbia counties, **northward**, nowhere common.
N. J. Rare in Mercer and Hunterdon counties, increasing but not common **northward**.
PA. Northampton, Bucks and Chester counties, rare.
Distribution not as yet clearly understood.
 5. ***V. dentatum*** L. In moist soil: N. B. to Ont., Ga., western N. Y., Michigan and Minn.
Common throughout the range except in the pine-barrens, there sometimes intrusive up the larger streams.

6. **V. venosum** Britton. In open places: E. Mass. to N. J., Pa. and Va.
 N. Y. Rare on the southern shore of L. I. in Suffolk Co. Not reported elsewhere.
 N. J. Known only from Monmouth and Salem counties.
 PA. Recorded, but no definite station known to me.
 A rare and local species whose distribution is mostly coastal.
7. **V. Canbyi** (Rehder) Britton (*V. venosum Canbyi* Rehder).
 Thickets and river-banks, N. J. and Pa. to Va. and Ga.
 N. J. Morris Co., increasing southward.
 PA. Chester and Bucks counties.
8. **V. cassinoides** L. In swamps and wet soil: Newf. to Man., N. J., Ga. and Ala.
 Common throughout most of the range; unknown in the Bronx. A specimen, apparently of this species, with unusually pubescent inflorescence, collected at May's Landing, N. J., has been referred to *V. rufidulum* Raf.
9. **V. nudum** L. In swamps: Conn. to Fla., Ky. and La.
 CONN. Rare near the coast of Fairfield Co., unknown elsewhere.
 N. Y. Rare on the south side of L. I. and on S. I.; Woodlawn, N. Y. City, unknown elsewhere.
 N. J. Rare and local in Morris, Warren, Hudson and Mercer counties, increasing southward.
 PA. Montgomery, Bucks, Delaware and Chester counties.
 Scattered locally, and more common on the coastal plain than elsewhere.
10. **V. Lentago** L. In rich soil: Hudson Bay to Manitoba, N. J., Ga., Kan., Ind. and Mo.
 CONN. Throughout the state, increasing northward.
 N. Y. Occasional on L. I. and on S. I. and increasing northward.
 N. J. Reported, but not definitely known from Camden Co.; common in Passaic, Warren, Morris and Sussex counties, unknown elsewhere.
 PA. Throughout the area.
 Tertiary, o; Cretaceous, o; Older Formations, increasing northward. 117-220 days. Sea level-3,090 ft.
11. **V. prunifolium** L. In dry soil: Conn. to S. Car., Mich., Kan. and Tex.
 Throughout the range, except in the pine-barrens, there wanting; rare southward and increasing northward. A form with globose fruit, *globosum*, has been collected in N. J. and Pa.

3. *Triosteum* L.

Leaves ovate or oval; flowers purplish or dull red.

Leaves or some of them connate-perfoliate; fruit orange-yellow.

Leaves narrowed to a sessile base; fruit orange-red.

Leaves lanceolate or oval-lanceolate; flowers yellowish.

1. *T. perfoliatum*.

2. *T. aurantiacum*.

3. *T. angustifolium*.

1. *T. perfoliatum* L. In rich soil: Mass. to Minn., Ala., Ky. and Kan.

CONN. Common along the coast, decreasing and perhaps wanting inland.

N. Y. Frequent on L. I. and S. I.

N. J. Rare and scattered over the state, except in the pine-barrens, there only occasionally adventive; increasing **southward**.

PA. Northampton, Berks, Bucks, Delaware and Chester counties.

Tertiary, unknown on Beacon Hill, not common elsewhere: Cretaceous, scattered; Older Formations, decreasing northward. 138-220 days. **Sea level**-1,000 ft.

2. *T. aurantiacum* Bicknell. In woods: Que. to Minn., Mass., N. Car., Ky. and Iowa.

CONN. Rare along the coast, increasing but not common **northward**.

N. Y. Rare and local on L. I. and S. I., increasing **northward**.

N. J. Very rare in northern Monmouth Co., thence increasing but never common **northward**; not in the pine-barrens.

3. *T. angustifolium* L. In rich soil: Conn. and L. I. to N. J., Pa., Ala., Ill. and La.

CONN. South Windsor, East Granby, Milford and Stratford.

N. Y. Glen Cove, L. I.

N. J. Milltown and Rocky Hill.

PA. Berks, Bucks, Philadelphia and Chester counties.

4. *Linnaea* [Gronov.] L.

1. *L. americana* Forbes. In cold woods: Newf. to Alask., S. Dak., Col., Pa., Md., Mich. and Utah.

CONN. Scattered over most of the state, increasing **northwestward**.

N. Y. Babylon, L. I.,* (not recently collected) otherwise known only from the Catskills in Greene, Delaware and Ulster counties; reported from but not definitely known now on S. I.

* See Introduction paragraph 39.

N. J. Known only from Hudson and Passaic counties (not recently collected) and from Green Pond, Warren Co.

PA. Wayne and Schuylkill counties.

Tertiary, 0: Cretaceous, 0: Older Formations, scattered northward. 117-189 days. Sea level-4,020 ft.

5. *Symphoricarpos* [Dill.] Ludwig.

Fruit white; style glabrous.

1. *S. racemosus*.

Fruit red; style bearded.

2. *S. Symphoricarpos*.

1. **S. racemosus** Michx. In rocky places and on river shores: N. S. to B. Col., Pa., Ky., S. Dak. and in Cal.

Throughout the range except in the pine-barrens; always as an escape from cultivation, but possibly native in the upper Delaware Valley.

2. **S. Symphoricarpos** (L.) MacM. Along rivers and in rocky places: N. J. and Pa. to western N. Y., Dak., Neb., Ga. and Tex.

Throughout the range, except the pine-barrens; apparently only as an escape from cultivation.

6. *Lonicera* L.

Climbing or trailing vines; flowers in heads or interrupted spikes; upper leaves connate-perfoliate.

Corolla 2-lipped, the upper lip 4-lobed, the lower entire.

Corolla glabrous within.

1. *L. Caprifolium*.

Corolla pubescent within.

Leaves pubescent, at least beneath; corolla yellow.

2. *L. hirsuta*.

Leaves glabrous on both sides, very glaucous beneath.

3. *L. dioica*.

Corolla tubular, the short limb nearly equally 5-lobed.

4. *L. sempervirens*.

Climbing vines; flowers in pairs on short axillary peduncles; garden escape.

5. *L. japonica*.

Shrubs; flowers in pairs on axillary bracted peduncles.

Leaves rarely cordate, more or less pubescent or ciliate.

Leaves pale or glaucous, thick, strongly reticulate.

6. *L. coerulca*.

Leaves bright green, thin, ciliate, not reticulate.

7. *L. canadensis*.

Leaves pale, densely pubescent beneath, even when old.

8. *L. Xylosteum*.

Leaves cordate glabrous.

9. *L. tatarica*.

1. **L. Caprifolium** L. In thickets: Conn., N. Y., N. J. and Pa. to Mich. and in the Southern States. Naturalized from Europe.

Rather rare as a naturalized plant in parts of our range, except the pine-barrens, there wanting.

2. *L. hirsuta* Eaton. In woodlands: Vt. and Ont. to Manitoba, Pa., Ohio and Mich.
Known in our area only from Monroe Co., Pa., there rare, perhaps not native.
3. *L. dioica* L. In rocky and usually dry situations: Que. to Man., N. Car., Ohio and Mich.
CONN. Throughout the state, not very common.
N. Y. Unknown on L. I.; on S. I., thence increasing **northward**.
N. J. Very rare in Burlington and northern Monmouth Co. and in Middlesex Co., thence increasing **northward**.
PA. Northampton, Bucks, Montgomery, Delaware and Chester counties.
Tertiary, 0: Cretaceous, very rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,380 ft.
4. *L. sempervirens* L. In low grounds or on hillsides: Me. to Fla., Neb. and Tex.
Scattered over most of our range except the pine-barrens; commonly cultivated, but native along the coast.
5. *L. japonica* Thumb. Escaping from cultivation: N. Y. and Pa. to N. Car., Fla. and W. Va. Naturalized from Eastern Asia.
Not uncommon, as a more or less persistent escape, in most parts of our range.
6. *L. coerulea* L. In low grounds: Newf. to Alask., R. I., Pa., Wisc. and Cal. Also in Europe and Asia.
CONN. Wanting near the coast, increasing but not common **northwestward**.
PA. Known only from Monroe Co.
A rare and local plant apparently found exclusively north of the moraine and at moderate elevations.
7. *L. canadensis* Marsh. (*L. ciliata* Muhl.). In moist woods: N. S. to Man., Conn., Pa. and Mich.
CONN. Very rare along the coast, increasing **northwestward**.
N. Y. From the northern end of the Highlands of the Hudson **northward**, particularly in the Catskills.
N. J. Reported from but not definitely known in Warren Co., otherwise unknown.
PA. Pike, Luzerne, Monroe and Lehigh counties.
Tertiary, 0: Cretaceous, 0: Older Formations, increasing **northward**. Not south of the moraine. 117-189 days. Sea level-4,020 ft.

8. **L. Xylosteum** L. Escaped from cultivation: E. N. S. Native of Europe and Asia.

Rare as an escape from gardens in most parts of the range.

9. **L. tatarica** L. Escaped from cultivation: E. N. Am. Native of Asia.

Not very common, as a garden escape.

Lonicera orientalis has been collected as an escape in Conn.; scarcely persistent. It is a native of Asia.

7. **Diervilla** [Tourn.] Mill.

1. **D. Diervilla** (L.) MacM. In dry or rocky woodlands: Newf. to the N. W. Terr., N. Car. and Mich.

CONN. Throughout the state.

N. Y. Unknown on L. I. as a wild plant; S. I., not uncommon in the Bronx, thence increasing **northward**.

N. J. Hunterdon, Somerset and Union counties, increasing **northward**; reported from Cumberland Co.

PA. Pike, Luzerne, Monroe, Northampton, Lehigh, Bucks, (?) Philadelphia, and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 117-220 days. Sea level-3,980 ft.

ADOXACEAE

1. **Adoxa** L.

1. **A. Moschatellina** L. In shaded rocky places: Arctic America to N. Y., Iowa, Wisc., S. Dak. and Col. Also in Europe and Asia.

Known in our area only from Arkville, Delaware Co., N. Y., there rare. This is a region north of the moraine with an elevation of about 2,000 ft., and a growing season of about 125 days.

VALERIANACEAE

Fruit 1-celled; persistent calyx-lobes becoming awn-like; tall herbs. 1. VALERIANA.
Fruit 3-celled; calyx-lobes minute or none; low herbs. 2. VALERIANELLA.

1. **Valeriana** [Tourn.] L.

Lower leaves spatulate, often entire; plant glabrous.
All the leaves pinnately divided; plant pubescent.

1. *V. uliginosa*.
2. *V. officinalis*.

1. *V. uliginosa* (T. & G.) Rydb. In wet soil: Me. to N. Y. and Ont., west to Mich.

Known in our area only from Pine Plains, Dutchess Co., a region with limestone predominating, an elevation of about 1,000 ft. and with a growing season of about 142 days.

2. *V. officinalis* L. Escaped from gardens to roadsides: Conn., N. Y. and N. J. Native of Europe and Asia.

Not uncommon as an escape in parts of our range. Not reported from Pa. or the pine-barrens of N. J. and L. I.

2. *Valerianella* [Tourn.] Mill.

Corolla blue or purplish; fruit about twice as broad as thick; introduced species.

1. *V. Locusta*.

Corolla white; fruit about as broad as thick; native species.

Fruit with the fertile portion fully as wide as the sterile.

2. *V. radiata*.

Fruit with the fertile portion much smaller and narrower than the sterile.

3. *V. Woodsiana*.

1. *V. Locusta* (L.) Bettke. In waste places: Conn., N. Y., N. J. and Pa. to Va. and La. Native of Europe.

Not very common as a weed, frequently wanting.

2. *V. radiata* (L.) Dupr. In moist soil: Mass. and N. Y. to Fla., Mich., Mo. and Tex. Very rare.

CONN. Known only from near Waterford.

N. Y. Near New Baltimore, Greene Co.

N. J. Mercer, Camden, and Cape May counties.

PA. Northampton, Bucks and Delaware counties.

A rare and localized plant whose distribution is little understood.

3. *V. Woodsiana* (T. & G.) Walp. In moist soil: N. Y. and Pa. to Ohio, Tenn. and Tex.

Known in our range only from Bucks and Philadelphia counties in Pennsylvania. The variety *patellaria* (Sulliv.) A. Gray has been reported from Bucks Co., Pa.

DIPSACEAE

Scales of the elongated receptacle prickly pointed.

1. DIPSACUS.

Scales of the receptacle not prickly, herbaceous, capillary, or none.

2. SCABIOSA.

1. *Dipsacus* [Tourn.] L.

1. *D. sylvestris* Huds. In waste places: Me. and Ont. to Va., west to Mich. Naturalized from Europe.

Not uncommon about waste ground. Often wanting.

Fuller's Teasel, *Dipsacus fullonum* L. has been collected as a waif; scarcely persisting in our area.

2. *Scabiosa* [Tourn.] L.

1. *S. arvensis* L. In cultivated fields and waste places: Mass., Vt., N. Y. and Pa. Adventive from Europe.

Rare as a weed near the cities.

Scabiosa australis Wulf. from Europe is very rarely found as a waif in our area; hardly persisting. *S. stellata* L. has also been collected.

CUCURBITACEAE

Fruit dehiscent at the apex or bursting irregularly; several seeded.

1. MICRAMPELIS.

Fruit indehiscent, 1 seeded.

2. SICYOS.

1. *Micrampelis* Raf.

1. *M. lobata* (Michx.) Greene. Along rivers and in waste places: Me. to Ont., Mont., Va., Ky. and Tex.

Not uncommon, especially in the northern part of our area, often as a weed; native in the valley of the Delaware.

2. *Sicyos* L.

1. *S. angulatus* L. Along river banks and in moist places: Que. and Ont. to Fla., S. Dak., Kan. and Tex. Naturalized in eastern Europe.

Throughout the range, except in the pine-barrens, and south of them, there wanting.

The pumpkin, *Cucurbita Pepo* L., the muskmelon, *Cucumis Melo* L., the watermelon *Citrullus Citrullus* (L.) Karst., the club gourd, *Lagenaria Lagenaria* (L.) Cockerell and the cucumber, *Cucumis sativus* L., are all occasional escapes. So also are several varieties of squash and *Ecbalium agreste* Rich. None are really persistent.

CAMPANULACEAE

Capsule opening by lateral pores or valves.

Corolla campanulate, rarely rotate; flowers all complete.

Corolla rotate; earlier flowers cleistogamous.

Capsule opening by terminal pores or valves.

1. CAMPANULA.

2. SPECULARIA.

3. JASIONE.

1. *Campanula* [Tourn.] L.

Corolla campanulate; flowers solitary, racemose, glomerate or panicled.

Corolla 14-30 mm. long.

Stem leaves linear, the basal orbicular.

Leaves all lanceolate or ovate.

Corolla 4-12 mm. long; a weak diffuse perennial.

Corolla rotate; flowers spicate.

1. *C. rotundifolia*.

2. *C. rapunculoides*.

3. *C. aparinoides*.

4. *C. americana*.

1. *C. rotundifolia* L. On moist rocks and in meadows: Lab. to Alask., south to N. J., Neb. and in the Rockies to Ariz. Also in Europe and Asia.

CONN. Throughout, rare in the south, increasing **northwestward**. N. Y. A single station on the south side of L. I. in Suffolk Co.,* unknown on S. I. or the Bronx, thence increasing and becoming common **northward**.

N. J. Rare in Mercer, Union and Somerset counties, thence increasing **northward** especially along the Delaware.

PA. Pike, Luzerne, Monroe, Northampton, Lehigh, Bucks and Berks counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. 118-187 days. Sea level-4,020 ft.

2. *C. rapunculoides* L. In fields and along roadsides: N. B. to Ont., southern N. Y., N. J. and Ohio. Naturalized from Europe.

Occasional as an established adventive in most parts of our range, except in the pine-barrens, there unknown.

3. *C. aparinoides* Pursh. In grassy swamps: N. B. to the N. W. Terr., south to Ga., Ky. and Colo.

Throughout the range, except in the pine-barrens.

4. *C. americana* L. In moist woods and thickets: N. B. to Ont., S. Dak., Fla., Ky., Ark. and Kan.

N. Y. Known definitely only from near Flushing and Port Washington, L. I.

N. J. Reported years ago from Warren and Hunterdon counties, not recently collected, and otherwise unknown.

PA. Northampton, Bucks, and Philadelphia counties.

A rare and local species whose distribution is little understood,

Campanula patula L., *C. urticifolia* Schmid. and *C. carpatica* L. have all been collected as waifs.

2. *Specularia* Heist.

1. *S. perfoliata* (L.) A. DC. In dry woods or fields: Me. and Ont. to Br. Col., Fla., La., Mex., Utah and Ore.

Throughout the range, decreasing in the pine-barrens; often a weed.

S. hybrida DC. and *S. Speculum* DC. have both been collected as waifs near New York and Philadelphia.

* See Introduction paragraph 39.

3. *Jasione* L.

1. *J. montana* L. In waste places: R. I. and Conn. Adventive from Europe.

Rare as a waif in Conn. and near the City of New York.

LOBELIACEAE

1. *Lobelia* L.

- Aquatic; stems simple, nearly naked; flowers light blue. 1. *L. Dortmanna*.
 Terrestrial plants of wet or dry soil; stems leafy.
- Corolla-tube 10-25 mm. long.
- Flowers bright scarlet, rarely white; corolla-tube 20-25 mm. long. 2. *L. cardinalis*.
- Flowers blue, white, or blue and white; corolla-tube 10-15 mm. long.
- Leaves glabrous or sparingly pubescent. 3. *L. siphilitica*.
- Leaves densely puberulent. 4. *L. puberula*.
- Corolla-tube only 4-8 mm. long.
- Stems mostly simple; flowers in terminal, spike-like racemes. 5. *L. spicata*.
- Stems mostly paniculately branched; flowers in loose racemes.
- Stem stout, pubescent; leaves ovate or oblong, dentate. 6. *L. inflata*.
- Stem slender, glabrous; stem-leaves narrow, the basal wider.
- Pedicels mostly longer than the flowers, 2-bracteolate near the middle. 7. *L. Kalmii*.
- Pedicels not longer than flowers, not bracteolate or only so at base.
- Sepals usually spreading; corolla 5-7 mm. long. 8. *L. Nuttallii*.
- Sepals erect and sometimes incurved; corolla 9-11 mm. long. 9. *L. Canbyi*.
1. *L. Dortmanna* L. Borders of ponds: N. J. and Pa. to N. S., N. B., the N. W. Terr. and B. Col. Also in Europe.
 Conn. Rare near the coast, perhaps wanting except in New London Co., increasing **northwestward**.
 N. Y. Reported, but not definitely known from L. I., otherwise only from Westchester, Putnam and Orange counties, **northward**.
 N. J. Warren, Morris, Sussex and Passaic counties.
 Pa. Pike, Monroe and Luzerne counties.
 Tertiary, o: Cretaceous, o: Older Formations; increasing **northward**. Not south of the moraine. 117 187 days. Sea level 4,020 ft.

2. *L. cardinalis* L. In moist soil: N. B. to Fla., the N. W. Terr., Kan. and Tex.
Throughout the range, except in the pine-barrens.
3. *L. syphilitica* L. In moist soil: Me. to Ont. and S. Dak., Ga., La. and Kan.
Throughout the range, except in New Jersey south of the "fall line," there very rare and only along the northern edge of the coastal plain.
4. *L. puberula* Michx. In moist sandy soil: S. N. J. to Fla., west to Ill., Kan. and Tex.
N. J. Mercer, Monmouth and Middlesex counties, thence increasing **southward**, but not in the pine-barrens.
PA. Known only from Chester Co.
Tertiary, common, except on Beacon Hill, there wanting: Cretaceous, common: Older Formations, rare and local near the coastal plain in Pa. 172-220 days. About sea level.
5. *L. spicata* Lam. In dry, mostly sandy soil, or in meadows: N. S. and Ont. to the N. W. Terr., N. C., La. and Ark.
Common throughout the range except in the pine-barrens, there wanting; very rare in the region adjacent to the barrens.
6. *L. inflata* L. In fields and thickets: Lab. to the N. W. Terr., Ga., Md., Ark. and Kan.
Throughout the range, but rare in the pine-barrens; often a weed.
7. *L. Kalmii* L. On wet banks and in wet meadows: N. S. to N. J., west to Ont., the N. W. Terr., Ohio, Mich. and Iowa.
CONN. Litchfield Co., increasing **northwestward**.
N. Y. Known only from Westchester and Columbia counties.
N. J. Warren and Sussex counties, unknown elsewhere.
PA. Northampton and Monroe Cos.
Tertiary, o: Cretaceous, o: Older Formations, most common on limestone and **northward**. 138-189 days. 570-1,200 ft.
8. *L. Nuttallii* R. & S. In wet meadows, and in sandy soil: L. I. to Pa., Fla. and Ga.
N. Y. The south side of L. I.
N. J. Middlesex Co., increasing and common **southward**, especially in the pine-barrens.
PA. Known only from Bucks and Delaware counties.
Tertiary, common: Cretaceous, less common: Older Formations, rare and local. 169-220 days. About sea level.

9. **L. Canbyi** A. Gray. In swamps: N. J. to S. Car.

Frequent throughout the pine-barrens of New Jersey; unknown elsewhere.

AMBROSIACEAE

Staminate and pistillate flowers in the same heads; involucre of a few rounded bracts.

1. IVA.

Staminate and pistillate flowers in separate heads, the staminate mostly uppermost; involucre of the pistillate heads bur-like or nut-like.

Involucral bracts of the staminate heads united.

2. AMBROSIA.

Involucral bracts of the staminate heads separate; involucre of the pistillate heads an oblong bur.

3. XANTHIUM.

1. **Iva** L.1. **I. frutescens** L. Along salt marshes and on muddy seashores: N. H. to Fla. and Tex.

Throughout the tidal marshes and up the Hudson River to Hastings, N. Y.

Iva xanthiifolia (Fresen.) Nutt. has been reported from the coast of Connecticut as a waif. I have seen only a single specimen from near Bridgeport.

2. **Ambrosia** [Tourn.] L.

Leaves opposite, palmately lobed or undivided.

1. *A. trifida*.

Leaves opposite and alternate, 1-2 pinnatifid.

2. *A. elatior*.1. **A. trifida** L. In moist soil: Que. to Fla., the N. W. Terr., Neb., Colo. and Ark.

Common everywhere except the pine-barrens, always as a weed. The entire-leaved form *integrifolia*, is not uncommon with the type.

2. **A. elatior** L. (*A. artemisiaefolia* L.). In dry soil: N. S. to Fla., west to B. Col. and Mex. Also in the W. I. and S. Am. Introduced into Europe as a weed.

A common and pernicious weed throughout our area.

Ambrosia bidentata Michx. has been collected in Conn.; scarcely persistent. *A. psilostachya* DC. has been recorded as a waif.

3. **Xanthium** [Tourn.] L.

Leaves lanceolate, not cordate; axils bearing 3-divided spines.

1. *X. spinosum*.

Leaves orbicular or broadly ovate, cordate or truncate; axils not spiny.

Bur 12-20 mm. long, usually nearly glabrous; beaks straight or nearly so.

2. *X. americanum*.

Bur 5-30 mm.; beaks hooked or incurved.

Body of the bur oblong, twice as long as thick or more.

Bur and its spines merely puberulent and glandular, very rarely somewhat hispid.

Bur and its spines very hispid.

Body of the bur oval or ovoid, not twice as long as thick.

3. *X. pennsylvanicum*.

4. *X. commune*.

5. *X. echinatum*.

1. **X. spinosum** L. In waste grounds: Ont. to Fla., west to W. Va., Mo. and Tex. Naturalized from Europe or Asia.
Not uncommon as a weed in parts of our area.
2. **X. americanum** Walt. (*X. glabratum* (DC.) Britton). In waste places: N. Eng. and N. Y. to Fla. and Mex., west to Neb. Throughout most of our area, except in the pine-barrens, always as a weed.
3. **X. pennsylvanicum** Wallr. In waste ground: D. C. to Penn., Ont., and Minn.
Known in our area only from Van Cortlandt, N. Y., and on waste land in Northampton Co., Pa.
4. **X. commune** Britton. In waste land: Que. to N. Y., Kan., Mo. and Ariz.
Frequent throughout most of our area except in the pine-barrens.
5. **X. echinatum** Murr. Sea, lake and river beaches: Vt. and N. N. Y. to Minn. and N. Car.
Common on sandy shores along the coast, throughout our area.

X. speciosum Kearney has been collected in Westchester Co. and on L. I., not certainly established.

COMPOSITAE

Stigmatic lines at the base of the stigma or below the middle.

Stigmas filiform or subulate, hispidulous.

TRIBE 1. VERNONIEAE.

(Genera 1 and 2. See page 589.)

Stigmas more or less clavate, papillose-puberulent.

TRIBE 2. EUPATORIEAE.

(Genera 3-7. See page 590.)

Stigmatic lines extending to the tip of the stigma or to the appendages.

Anthers without elongated appendages at the top.

Anther-sacs tailed at the base.

TRIBE 4. INULEAE.

(Genera 21-26. See page 617.)

Anther-sacs not tailed at the base.

Receptacle naked.

Bracts of the involucre well imbricated.

- Stigmas of perfect flowers with terminal appendages. TRIBE 3. ASTEREAE.
(Genera 8-20. See page 595.)
- Stigmas of perfect flowers with truncate or hairy or papillose tips.
Bracts of the involucre herbaceous. TRIBE 6. HELENIEAE.
(Genus 38. See page 630.)
- Bracts of the involucre dry and scarious. TRIBE 7. ANTHEMIDEAE.
(Genera 39-44. See page 630.)
- Bracts of the involucre little if at all, imbricated, except where the broad outer ones overlap the inner. TRIBE 8. SENECEONEAE.
(Genera 45-51. See page 635.)
- Receptacle chaffy.
Bracts of the involucre herbaceous, sometimes foliaceous. TRIBE 5. HELIANTHEAE.
(Genera 27-37. See page 620.)
- Bracts of the involucre dry and scarious. TRIBE 7. ANTHEMIDEAE.
(Genera 39-44. See page 630.)
- Anthers with elongated, cartilaginous, mostly connate appendages at the tip. TRIBE 9. CYNAREAE.
(Genera 52-58. See page 636.)

TRIBE I. VERNONIEAE

- Pappus double; heads not glomerate. 1. VERNONIA.
Pappus single; heads glomerate. 2. ELEPHANTOPUS.

I. *Vernonia* L.

- Bracts of the hemispheric involucre, or some of them with subulate or filiform tips. 1. *V. noveboracensis*.
Bracts of the involucre merely acute, obtuse or truncate. 2. *V. glauca*.

I. *V. noveboracensis* (L.) Willd. In moist soil: Mass. to Minn., Ga. and Kan.

CONN. Throughout.

N. Y. Common on L. I. and S. I. and up the Hudson Valley to the northern end of the Highlands, thence decreasing northward, and perhaps wanting in the Catskills.

N. J. Throughout the state, except in the pine-barrens, there unknown, always increasing **southward**.

PA. Delaware Co.

Tertiary, unknown on Beacon Hill, common elsewhere: Cretaceous, common: Older Formations, decreasing northward, and apparently wanting on the Piedmont Plateau in Pa. 138-220 days. Sea level-1,500 ft.

2. *V. glauca* (L.) Britton. In woods: Pa. and Md. to Ohio, south to Fla. and La.

PA. Recorded from Northampton, Bucks, Montgomery, Delaware and Chester counties.

2. *Elephantopus* L.

1. *E. carolinianus* Willd. In dry woods: S. N. J. and Pa. to Fla. Kan. and Tex. Rare in our area.

N. J. Known only from Salem Co.

PA. Philadelphia and Delaware counties.

TRIBE 2. EUPATORIEAE

Achenes 3-5-angled, not ribbed.

Pappus of 5 broad obtuse scales; aquatic herb with linear, whorled leaves.

3. *SCLEROLEPIS*.

Pappus of numerous capillary bristles.

Involute of more than 4 bracts; erect herbs.

4. *EUPATORIUM*.

Involute of 4 bracts; twining vines.

5. *MIKANIA*.

Achenes 8-10 ribbed, or 8-10 striate.

Bracts of the involucre strongly striate-nerved; heads panicled or corymbed in our species.

6. *KUHNIA*.

Bracts of the involucre faintly striate, if at all; heads spiked or racemed.

7. *LACINARIA*.

3. *Sclerolepis* Cass.

1. *S. uniflora* (Walt.) B. S. P. In shallow ponds and streams: N. H. to Fla.

Known in our area only from the southern part of the pine-barrens and in Cape May Co., N. J. Local but abundant where found.

4. *Eupatorium* [Tourn.]. L.

Leaves petioled, verticillate in 3's or 6's, or the upper opposite.

Leaves rugose, pubescent; inflorescence depressed.

1. *E. maculatum*.

Leaves nearly glabrous; inflorescence pyramidal.

2. *E. trifoliatum*.

Leaves opposite, rarely in 3's, or the uppermost alternate.

Involucral bracts imbricated in 2 or more series, the outer shorter.

Leaves not clasping nor connate-perfoliate.

Leaves narrowed at the base.

Bracts of the involucre acute or cuspidate.

Leaves linear-lanceolate, sparingly toothed, 4-12 mm. wide.

3. *E. leucolepis*.

Leaves oblong or lanceolate, scarcely toothed, 1-4 cm. wide.

4. *E. album*.

Bracts of the involucre obtuse.

- Leaves linear, crowded, usually entire, obtuse. 5. *E. hyssopifolium*.
- Leaves lanceolate, sparingly dentate, long-acuminate. 6. *E. altissimum*.
- Leaves rounded, obtuse or truncate at the base.
Plant glabrous; leaves lanceolate, long-acuminate. 7. *E. sessilifolium*.
- Plants pubescent; leaves ovate or oblong, acute or obtuse.
Leaves ovate-oblong to lanceolate, mostly rounded at the base, usually obtuse. 8. *B. verbenacifolium*.
- Leaves broadly ovate, crenate-dentate, mostly truncate at the base, obtusish. 9. *E. rotundifolium*.
- Leaves ovate, dentate, acute. 10. *E. pubescens*.
- Leaves clasping or connate-perfoliate.
Leaves connate-perfoliate; involucre bracts acute. 11. *E. perfoliatum*.
- Leaves merely clasping; involucre bracts obtuse. 12. *B. resinosum*.
- Involucre bracts in 1 or 2 series, all equal or nearly so.
Flowers white; receptacle flat.
Leaves thin, 5-12 cm. long, sharply dentate, acuminate. 13. *E. ageratoides*.
- Leaves thickish, 2-5 cm. long, blunt-toothed, acute or obtusish. 14. *E. aromaticum*.
- Flowers blue or violet; receptacle conic. 15. *E. coelestinum*.

1. ***E. maculatum*** L. In moist soil: N. Eng. to Ky., Minn., B. Col., Kan. and N. Mex.

Throughout the range, except the N. J. pine-barrens, there unknown, and not definitely known from the higher peaks of the Catskills. An opposite-leaved form, *amoenum*, has been collected in the area.

2. ***E. trifoliatum*** L. In moist soil: N. B. to Man., Fla. and Tex.

Throughout the range, except the pine-barrens. The plant known as *E. purpureum* L. does not seem to be specifically distinct.

3. ***E. leucolepis*** T. & G. In moist places: Mass. to Fla., Ga. and La.

N. Y. Recorded from near Sag Harbor, L. I. many years ago, not since collected, and otherwise unknown in the area.

N. J. Common in the pine-barrens, decreasing southward and rare in Cape May Co.; a single station along the coast at Sherburn's; otherwise unknown.

More common on the Beacon Hill formation in N. J. than elsewhere, but not confined to it.

4. **E. album** L. In sandy soil: L. I. to Fla., west to La.
 N. Y. Occasional on L. I. and S. I., unrecorded from the rest of the area.
 N. J. Mercer, Middlesex and Monmouth counties, increasing **southward**, especially in the pine-barrens.
 PA. Chester Co.
 Tertiary, common: Cretaceous, common: Older Formations, rare and local. 189-220 days. About sea level.
- A form with 3-nerved leaves, *E. album subvenosum* A. Gray, seems to be localized in N. Am. near Riverhead, L. I. and in the N. J. pine-barrens.
5. **E. hyssopifolium** L. In dry fields: Mass. to Fla. and Tex.
 CONN. Not uncommon along the coast, decreasing and perhaps wanting inland.
 N. Y. Common on L. I.; S. I., unknown elsewhere.
 N. J. The coastal plain, there common particularly in the pine-barrens.
 Tertiary, common: Cretaceous, common: Older Formations, rare and local. 166-720 days. About sea level.
6. **E. altissimum** L. In dry open places: Pa. to N. Car., Ala., S. Dak., Neb. and Tex.
 PA. Known only from Lehigh Co. in our range.
7. **E. sessilifolium** L. In dry woods: Vt. to Pa., Ill. and Ala.
 CONN. Not infrequent along the coast, decreasing northward.
 N. Y. On L. I. and S. I. and up the Hudson Valley to northern Westchester Co., thence not definitely known northward.
 N. J. A single station in Camden Co. (not recently collected from), thence unknown to Essex, Hudson and Hunterdon counties, thence increasing northward. A broad-leaved form, *Brittonianum* Porter, has been collected at Budd's Lake.
 PA. Northampton, Lehigh, Bucks, Philadelphia, Delaware and Chester counties.
 Tertiary, o: Cretaceous, a single somewhat aberrant station: Older Formations, not very common. 138-220 days. Sea level-1,000 ft.
8. **E. verbenaefolium** Michx. In moist soil: Mass. to Pa., south to Fla. and La.

CONN. Frequent along the coast, decreasing inland.

N. Y. Common on L. I. and S. I., decreasing thence to Yonkers, unknown northward.

N. J. Rare and local in the north, increasing **southward**, especially in the pine-barrens.

PA. Monroe, Northampton, Bucks, Montgomery, Delaware and Chester counties. In Montgomery and Delaware counties a pointed-leaved, sharp-toothed form, *Saundersii* Porter had been collected.

Tertiary, common: Cretaceous, less common: Older Formations, rare and scattered. 138-220 days. **Sea level**-1,180 ft.

9. **E. rotundifolium** L. In dry soil: Mass. and Pa. to Fla., Ky. and Tex.

N. Y. Reported from but doubtfully on L. I., not infrequent on S. I., unknown elsewhere.

N. J. Rare in Essex, Middlesex and northern Monmouth counties, increasing southward, especially in the pine-barrens.

PA. Montgomery and Delaware counties.

Tertiary, common: Cretaceous, less common: Older Formations, decreasing and wanting northward. Rare north of the moraine. 162-220 days. About sea level.

10. **E. pubescens** Muhl. In dry soil: N. H. and Mass. to Pa., W. Va. and Fla.

CONN. Rare at Stratford and East Haven, otherwise confined to the Connecticut River Valley.

N. Y. Unknown on L. I., not very common on S. I., unknown elsewhere.

N. J. Orange Mts.; common on the coastal plain.

PA. Serpentine barrens near Nottingham, Chester Co.

Tertiary, common: Cretaceous, common: Older Formations, more common in the predominately Triassic valley of the Connecticut River than elsewhere. 160-220 days. About sea level.

11. **E. perfoliatum** L. In wet places: N. B. to Man., Fla., Neb. and Tex.

Common throughout the range except in the pine-barrens, there wanting. The form *truncatum* A. Gray, with separated and truncate leaves is found with the type.

12. **E. resinosum** Torr. In wet places of the pine-barrens of N. J.
Known only from the pine-barrens of N. J., except for an old specimen labelled "Long Island, 1845." There seem to be no L. I. specimens of recent collection.
Apparently exclusively on the Beacon Hill formation of N. J. and unknown outside our area.
13. **E. urticaefolium** Reichard. (*E. ageratoides* L. f.). In rich woods; N. B. to Ga., Ont., S. Dak., Neb., the Ind. Terr. and La.
Throughout the range except the pine-barrens and the region to the south; always increasing **northward**.
14. **E. aromaticum** L. In dry soil: Mass. to Fla.
CONN. Rare along the coast, unknown elsewhere.
N. Y. Frequent on L. I. and S. I.; unknown elsewhere.
N. J. The coastal plain, but rare in the pine-barrens and at Cape May; reported from Hunterdon Co.
PA. Northampton, Montgomery, Delaware and Chester counties.
Tertiary, rare: Cretaceous, common: Older Formations, scattered. 166-220 days. About sea level.
15. **E. coelestinum** L. In moist soil: N. J. to Fla., Ill., Kan., Ark. and Tex. Rare in our area.
N. J. Gloucester and Cape May counties, not in the pine-barrens.
PA. Bucks, Delaware and Chester counties.
Predominating on the Cretaceous sands and gravels.

Eupatorium serotinum Michx. has been reported from S. I.; I have seen no specimens and it is otherwise known only from Delaware, southward. *E. cannabinum* L. has been collected as a waif.

5. **Mikania** Willd. (*Willughbaea* Neck.)

1. **M. scandens** (L.) Willd. In swamps and wet soil: N. H. and Mass. to N. Ont. and Ind., Fla. and Tex. Also in the W. I. and S. Am.
Throughout the range, except in the pine-barrens.

6. **Kuhnia** L.

1. **K. eupatorioides** L. In dry soil: N. J. to Ga., Ohio, W. Va. and Tex.
N. J. Camden, Middlesex, Monmouth and Burlington counties; reported but not definitely known from the pine-barrens.

Known also on the limestone rocks of Warren and Sussex counties and at Milford, Hunterdon Co.

PA. Northampton, Lehigh, Montgomery, Schuylkill, Delaware and Chester counties.

Tertiary, 0: Cretaceous, not common: Older Formations, most common on limestone. 138-220 days. Sea level-1,080 ft.

7. *Lacinaria* Hill.

Involucre hemispheric, 10-25 mm. broad, 15-45-flowered; heads peduncled.

Involucre oblong, 4-8 mm. broad, 5-15 flowered.

Involucre narrowed at base; bracts usually very punctate; heads peduncled.

1. *L. scariosa*.

2. *L. spicata*.

3. *L. graminifolia*.

1. *L. scariosa* (L.) Hill. In dry soil: Me. to Fla., Ont., Man., Neb. and Tex.

CONN. Not uncommon along the shore, rare or wanting inland.

N. Y. Apparently confined to the south side of L. I. and at Rye, Westchester Co.; formerly near Clifton, S. I.

N. J. Near Keyport, Monmouth Co.

PA. Recorded from Lackawanna and Berks counties.

A rare plant whose distribution is not clearly understood.

2. *L. spicata* (L.) Kuntze. In moist soil: Mass. to Fla., Ont., S. Dak., Ky., La. and Ark.

N. Y. L. I. and S. I.

N. J. Scattered throughout the state except the pine-barrens.

PA. Monroe Co. southward.

3. *L. graminifolia* (Walt.) Kuntze. (*L. pilosa* Pursh). In sandy soil: N. J. to Fla. and Ala.

Known in our area only on the coastal plain of N. J., increasing southward and more common in the pine-barrens elsewhere.

L. pycnostachya (Michx.) Kuntz. has been collected at Moonachie, N. J., far from its known eastern range in Ind.

TRIBE 3. ASTEREAÆ

Ray-flowers yellow (white in one species of goldenrod) or wanting; plants not dioecious.

Pappus of scales or awns or wanting, never of numerous capillary bristles.

8. GRINDELLA.

Pappus of radiate or tubular flowers, or both, of numerous capillary bristles, or of scales.

The outer series of pappus bristles scale-like.

9. CHRYSOPSIS.

The pappus wholly of capillary bristles.

Rays mostly not more numerous than the disk-flowers.

10. SOLIDAGO.

- Rays mostly more numerous than the disk-flowers. 11. EUTHAMIA.
 Ray-flowers not yellow in any of our species.
 Pappus a mere crown, or of a few awns or bristles, never of
 numerous capillary bristles.
 Receptacle conic. 12. BELLIS.
 Receptacle flat. 13. BOLTONIA.
 Pappus of numerous capillary bristles.
 Pappus of a single series of bristles, sometimes the outer
 shorter.
 Bracts of the involucre in 2 to many series.
 Involucre narrow, its bracts firm; rays few,
 white. 14. SERICOCARPUS.
 Involucre turbinate to hemispheric; bracts
 mostly thin; rays usually numerous. 15. ASTER.
 Bracts of the involucre in only 1 or 2 series, very
 narrow; heads mostly long-peduncled.
 Rays longer than the diameter of the disk. 16. ERIGERON.
 Rays shorter than the diameter of the disk. 17. LEPTILON.
 Pappus distinctly double, the inner series long, the outer
 shorter.
 Leaves lanceolate, ovate or obovate; rays white. 18. DOELLINGERIA.
 Leaves narrowly linear; rays violet. 19. IONACTIS.
 Ray-flowers none; dioecous shrub; pappus capillary. 20. BACCHARIS.

8. *Grindelia* Willd.

1. *G. squarrosa* (Pursh) Dunal. In dry soil: Ill. and Minn. to
 Man., south to Mo., Tex., Nev. and Mex. Adventive in
 southern N. J. and in Conn.

Rare as an adventive in New Jersey and Conn., perhaps not
 persistent.

G. glutinosa Dun. has been collected as a waif.

9. *Chrysopsis* Nutt.

- Leaves elongated-linear, parallel-veined. 1. *C. falcata*.
 Leaves oblong or lanceolate; plant hirsute-villous-pubescent. 2. *C. mariana*.

1. *C. falcata* (Pursh) Ell. In dry soil: eastern Mass. to N. J.

CONN. Common along the coast, rare or wanting inland.

N. Y. Local on L. I., rare on S. I.; not recorded elsewhere.

N. J. The pine-barrens, there rare or local.

Tertiary, confined to Beacon Hill: Cretaceous, 0: Older Forma-
 tions, scattered in sandy places. 189-220 days. About sea level.

2. *C. mariana* (L.) Ell. In dry soil: southern N. Y. and Pa.
 to Fla. and La.

N. Y. Common on L. I. and S. I., unknown elsewhere.

N. J. Common throughout the coastal plain and locally in sandy places in Morris Co.

PA. Bucks, Montgomery, Delaware, Philadelphia and Chester counties.

Tertiary, common: Cretaceous, common: Older Formations, scattered. 138-220 days. Sea level-980 ft.

10. *Solidago* L.*

Heads in short or raceme-like, axillary clusters, subtended by leaf-like bracts.

Stem and branches terete; leaf-blades narrow, shallowly toothed.

Stem and branches angled; leaf-blades broad, deeply toothed.

Heads in a terminal, inconspicuously bracted panicle, thyrus, or corymb.

Heads in a terminal panicle or thyrus, involucre bracts not ribbed.

Tips of the involucre bracts spreading or recurved.

Tips of the involucre bracts erect or appressed.

Inflorescence equilateral or essentially so, the heads not secund.

Upper stem-leaves not abruptly smaller than the lower, more or less spreading.

Bracts of the involucre decidedly obtuse.

Stem copiously pubescent.

Ray-flowers white.

Ray-flowers yellow.

Stem glabrous or merely puberulent.

Bracts of the involucre 1 mm.

broad at the apex or more.

Lower leaves ciliolate on the margins.

Lower leaves not ciliolate.

Bracts of the involucre less than 1 mm. broad at the apex.

Bracts of the involucre acute or acutish.

Heads 4-5 mm. high.

Heads 10-12 mm. high; plant of the north.

Upper stem leaves abruptly smaller than the lower, usually appressed.

Inflorescence 1-sided, the branches spreading or recurved; heads secund.

Leaf-blades pinnately veined, not 3-ribbed.

Plants maritime, or always near the salt water; leaves fleshy-leathery.

Plants not maritime; leaves not fleshy-leathery.

1. *S. caesia*.

2. *S. flexicaulis*.

3. *S. squarrosa*.

4. *S. bicolor*.

5. *S. hispida*.

6. *S. erecta*.

7. *S. speciosa*.

8. *S. uliginosa*.

9. *S. puberula*.

10. *S. macrophylla*.

11. *S. stricta*.

12. *S. sempervirens*.

* Key adapted, in part, from Dr. J. K. Small's treatment of the genus in the Flora of Southeastern United States.

- Internodes of the stem prominently angled below the leaves. 13. *S. patula*.
- Internodes of the stem essentially terete.
- Stem pubescent, rarely only in lines.
- Leaves glabrous and essentially entire. 14. *S. odora*.
- Leaves pubescent.
- Leaves not rugose veiny. 15. *S. fistulosa*.
- Leaves rugose veiny and serrate. 16. *S. rugosa*.
- Stem glabrous, at least below the inflorescence.
- Branches of the inflorescence pubescent.
- Involucre cylindric, few-flowered. 17. *S. ulmifolia*.
- Involucre campanulate, many-flowered.
- Branches of the inflorescence short and approximate, forming a compact pyramidal panicle. 18. *S. Elliottii*.
- Branches of the inflorescence elongate and remote. 19. *S. arguta*.
- Branches of the inflorescence glabrous.
- Involucre 5 mm. high or less. 20. *S. juncea*.
- Involucre mostly over 5 mm. high.
- Rays several; leaves broadly lanceolate. 21. *S. neglecta*.
- Rays 1-5; leaves narrowly lanceolate. 22. *S. uniligulata*.
- Leaf blades markedly 3-ribbed.
- Heads small; involucre 2.5 mm. high or less; stem glabrous or pubescent. 23. *S. canadensis*.
- Heads larger; involucre 3-6 mm. high.
- Stem glabrous. 24. *S. serotina*.
- Stem pubescent or scabrous.
- Leaves lanceolate, sharply serrate to entire. 25. *S. altissima*.
- Leaves oblanceolate to oblong, the lower crenate. 26. *S. nemoralis*.
- Heads in a terminal corymb; involucral bracts ribbed. 27. *S. rigida*.

1. *S. caesia* L. In woods and thickets: Me. and Ont. to Minn., Fla., Ark. and Tex.

Throughout the range except in the pine-barrens; there wanting; rare in the south increasing **northward**.

A supposed hybrid with *S. ulmifolia* Muhl. has been found at Hempstead, L. I.

2. *S. flexicaulis* L. In rich woods: N. B. to Ga., west to S. Dak. and Kan.

CONN. Throughout the state, but not common.

N. Y. Rare on the north side of L. I., unknown on the south side; common on S. I., thence increasing **northward**.

N. J. Rare and local in Ocean and Camden counties, north and west of the pine-barrens, thence increasing and becoming common **northward**.

PA. Throughout the area.

Tertiary, o: Cretaceous, rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,900 ft.

3. *S. squarrosa* Muhl. In rocky soil: N. B. and Ont., south to Va. and Ohio.

CONN. Unknown along the coast and in the eastern part of the state, increasing but local **northwestward**.

N. Y. Bank of the Hudson in the Bronx and from the Highlands of the Hudson **northward**, and in Columbia Co.

N. J. Bergen, Morris and Hunterdon counties, increasing **northward**.

PA. Throughout the area.

Tertiary, o: Cretaceous, o: Older Formations, increasing northward, but most common on the trap rock of the valleys of the Connecticut and Hudson, and on limestone. 123-220 days. Sea level-2,980 ft.

4. *S. bicolor* L. In dry soil: N. B. to Ga., west to Ont., Minn., and Mo.

Common throughout the range.

5. *S. hispida* Muhl. In dry soil: N. S. to W. Ont. and Minn., south to Pa., Ga. and Wisc.

Known definitely in New Haven, New London, and Hartford counties in Conn. and in Monroe and Bucks counties, Pa. and from Copake Falls, N. Y.

Distribution scattered and little understood. Formerly confused with the following species.

6. *S. erecta* Pursh. In dry soil: N. Y. and Pa. to Ga. and N. Car.
 N. Y. Recorded from L. I. but distribution not known.
 N. J. Very rare in Sussex and Bergen counties, thence wanting to the coastal plain, thence increasing **southward**, especially in the pine-barrens.
 The sporadic distribution is as yet not fully known.
7. *S. speciosa* Nutt. In rich soil: N. S. to N. Car., west to Minn., Ky., Kan. and Ark.
 CONN. Throughout the state, more common southward than elsewhere.
 N. Y. On L. I., but not recorded on S. I., also up the Hudson Valley to Westchester Co.; unknown elsewhere.
 N. J. Middlesex, Hunterdon, Essex, Bergen, Morris, Sussex and Warren counties.
 PA. Northampton, Bucks, Delaware, Philadelphia and Chester counties.
 Not fully understood as to its distribution.
8. *S. uliginosa* Nutt. In swamps and bogs: Newf. to N. N. J. and Pa., west to W. Ont., Minn. and Wisc.
 CONN. Known only from Salisbury, Litchfield Co.
 N. Y. Very rare in northern Westchester Co., thence increasing **northward**, especially in the Catskills.
 N. J. Known only from Warren, Passaic and Sussex counties.
 PA. Monroe Co.
 Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Not south of the moraine. 117-138 days. 667-4,020 ft.
9. *S. puberula* Nutt. In sandy soil: P. E. I. to Fla. and Miss.
 Throughout most of the range, sometimes locally rare, unknown in the Bronx, or in N. J. between the coastal plain and the sandy areas of the northwestern part of the state.
10. *S. macrophylla* Pursh. In rocky woods: N. Y. to Lab. and Hudson Bay, west to Lake Superior.
 Known in our area only at elevations in excess of 1,000 ft. in the Catskills of Ulster and Greene counties, N. Y., a region north of the moraine and with a growing season of 117-123 days.
11. *S. stricta* Ait. In wet sandy pine-barrens: N. J. to Fla. and La. Also in Cuba.

Known only, in our area, from that eastern part of the Beacon Hill formation, N. J., characterized by pure pine-barrens; extending to the edge of the salt marshes.

12. **S. sempervirens** L. On salt marshes, sea beaches, along tidal rivers and in sandy soil near the sea: N. B. to Fla. and Mex. Also in Bermuda.

Common throughout our area within the influence of the tides.

13. **S. patula** Muhl. In swamps: Me. and Ohio to Minn., south to Ga., Mo. and Tex.

CONN. Throughout the state, increasing **northwestward**.

N. Y. Rare on L. I., and S. I., thence increasing **northward**.

N. J. Very rare in Monmouth and Camden counties, thence increasing **northward**; unknown in and south of the pine-barrens.

PA. Throughout the range.

Tertiary, 0: Cretaceous, rare: Older Formations, increasing **northward**. 117-220 days. Sea level-4,020 ft.

14. **S. odora** Ait. In dry soil: N. S. and Mass. to Fla., west to N. Y., Ky. and Tex.

Throughout the range, rare northward, and increasing **southward**, especially in the pine-barrens.

15. **S. fistulosa** Mill. In and near moist pine-barrens: N. J. to Fla. and La.

Common from Monmouth, Ocean and Burlington counties in N. J. **southward**, especially in the pine-barrens, unknown elsewhere in our range.

Tertiary, common, especially on Beacon Hill: Cretaceous, less common: Older Formations, 0. 189-220 days. About sea level.

16. **S. rugosa** Mill. (*S. aspera* Ait.). Usually in dry soil, in fields and along roadsides: Newf. to western Ont., south to Fla. and Tex.

Throughout the range except the pine barrens, there occasional near the edges.

17. **S. ulmifolia** Muhl. In woods and copses: Me. to Ga., west to Minn. and Kan.

CONN. Throughout the state.

N. Y. Not very common on L. I. and S. I., increasing **northward**.

N. J. Very rare in the pine-barrens, and along the coast, thence increasing **northward**.

PA. Throughout our area.

Tertiary, two stations on Beacon Hill, unknown elsewhere: Cretaceous, o: Older Formations, increasing **northward**. 117-220 days. Sea level-4,020 ft.

18. **S. Elliottii** T. & G. In swamps: N. H. and Mass. to N. Car. and Ga., mainly near the coast.

CONN. Common along the coast, decreasing and perhaps wanting inland.

N. Y. Not uncommon on L. I. and S. I. and in the tidal creeks of the Bronx, unknown elsewhere.

N. J. Bergen, Hudson, Middlesex, Monmouth, Mercer, Gloucester, Ocean, Atlantic, and Cape May counties, mostly near tidal water; some pine-barren stations are known, but rare.

Rare and local in our area, except in the region of tidal creeks, there locally common.

19. **S. arguta** Ait. In rich woods: Me. and Ont. to Ohio, south to Va.

CONN. Throughout, increasing northwestward; rare in New London, Co.

N. Y. Rare on L. I.; S. I.; unknown in the Bronx, thence increasing and becoming common **northward**.

N. J. A single station in Gloucester Co., thence unknown, to Middlesex Co., thence increasing **northward**.

PA. Northampton, Lehigh, Bucks, and Chester counties.

Tertiary, o: Cretaceous, very rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,980 ft.

20. **S. juncea** Ait. (*S. juncea ramosa* Porter & Britton). In dry or rocky soil: N. B. to Hudson Bay and Man., N. Car. and Mo.

CONN. Throughout the state.

N. Y. Common throughout the area, increasing **northward**.

N. J. Gloucester, Middlesex and Camden counties, thence increasing **northward**.

PA. Throughout the range.

Tertiary, o: Cretaceous, very rare: Older Formations, increasing and common **northward**. 123-220 days. Sea level-2,500 ft.

21. **S. neglecta** T. & G. In swamps: N. B. to Wisc., Md. and Ill.

Throughout the range, but usually scattered and locally rare.

22. **S. uniligulata** (DC.) Porter. Bogs, Newf. to N. J., Ont. and Ill.
 CONN. Rare and scattered.
 N. Y. Van Cortlandt Park.
 N. J. Local on the coastal plain.
 Perhaps not specifically distinct from *S. neglecta*.
23. **S. canadensis** L. Hillsides, thickets and stream-banks, Newf. to Sask., Va. and Tenn.
 CONN. Recorded only from Lyme.
 N. J. Passaic Co.
 PA. Luzerne Co.
24. **S. serotina** Ait. In moist soil: Newf. to B. Col., south to Ga., Tex., Nev. and Ore.
 Throughout the range, except the pine-barrens and Cape May Co., there wanting. A large form is frequently found with the type. It has been called *S. serotina gigantea* (Ait.) A. Gray.
25. **S. altissima** L. Dry soil, Me. to Ont., Ga. and Tex.
 Common throughout the range, except the pine-barrens; previously confused with *S. canadensis*.
26. **S. nemoralis** Ait. (*S. nemoralis arenicola* Burgess). In dry soil: Que. to the N. W. Terr., Fla. and Tex.
 Common throughout the range.
27. **S. rigida** L. In dry sandy, rocky or gravelly soil: Ont. to the N. W. Terr., south to Ga., Tex. and Colo.
 CONN. Rare and local, but scattered over most of the state.
 N. Y. Rare on L. I., unknown on S. I. and in the Bronx, thence increasing northward.
 N. J. Locally north of the coastal plain.
 PA. Northampton, Lehigh, Bucks and Chester counties, not common.

A plant with a confusing distribution not as yet fully understood.

The occurrence of *S. racemosa* Greene (*S. Purshii* Porter) in our area is not supported by specimens. It may be in the Catskills. *S. tortifolia* Ell. has been recorded as a waif.

II. *Euthamia* Nutt

Leaves distinctly 3-5-nerved; ray-flowers 12-20.

Involucre 4-5 mm. high; its bracts yellowish.

1. *E. graminifolia*.

- Involucre less than 4 mm. high, its bracts with appressed green tips. 2. *E. floribunda*.
 Leaves 1-nerved or with a pair of indistinct lateral nerves; ray-flowers 5-12.
 Involucre campanulate. 3. *E. tenuifolia*.
 Involucre subcylindric. 4. *E. minor*.
1. ***E. graminifolia*** (L.) Nutt. In moist soil, fields and roadsides: N. B. to the N.W. Terr., Fla., Neb. and Kan.
 Throughout the range; rare in the pine-barrens.
 2. ***E. floribunda*** Greene. Fields and marshes, N. Y. to E. Penn. N. Y. Hewlett, L. I.
 N. J. Port Norris and New Egypt.
 PA. Reported from the southeastern part of the state.
 3. ***E. tenuifolia*** (Pursh) Greene (*E. caroliniana* (L.) Greene?). In dry sandy soil: eastern Mass. to Ill., Fla. and La.
 CONN. Common along the coast, decreasing inland.
 N. Y. Common on L. I.; S. I.; decreasing up the Hudson Valley to the southern end of the Highlands, unknown northward.
 N. J. Common on the coastal plain, decreasing in Hudson and Bergen counties, unknown northward.
 PA. Bucks, Montgomery, Delaware and Chester counties.
 Tertiary, common: Cretaceous, less common: Older Formations, decreasing and rare northward. 159-220 days. About sea level.
 4. ***E. minor*** (Michx.) Greene. Sandy soil: L. I. to Fla. and Miss.
 Known only from Long Beach, L. I., in our area.

12. *Bellis* [Tourn.] L.

1. ***B. perennis*** L. In waste places or occasionally spontaneous in lawns: Conn. and N. Y. to Pa., Ont., Cal. and B. Col.
 Native of Europe.
 Somewhat common as a weed of lawns and cultivated ground.

13. *Boltonia* L'Her.

1. ***B. asteroides*** (L.) L'Her. In moist soil: Conn. and N. J. to Fla., west to Minn., Neb. and La.
 N. J. Bog, Cape May Co.; and in Sussex Co.
 Known also in our area as a weed of cultivation in Conn.

14. *Sericocarpus* Nees.

- Leaves entire, linear or linear-spatulate. 1. *S. linifolius*.
 Leaves dentate, oblong or obovate. 2. *S. asteroides*.

1. **S. linifolius** (L.) B. S. P. In dry, usually sandy soil: Canada and Vt. to Ohio, Ga. and La.

CONN. Rare and local over the southern half of the state, perhaps wanting northward.

N. Y. Common on L. I. but rare on S. I. and in the Bronx, apparently unknown northward.

N. J. Hunterdon, Bergen, Union, Middlesex and Mercer counties, increasing **southward**, especially in the pine-barrens.

PA. Bucks, Delaware and Chester counties.

Tertiary, common: Cretaceous, common: Older Formations, scattered and decreasing northward. 166-220 days. About sea level.

2. **S. asteroides** (L.) B. S. P. In dry woods: Me. to Fla., Ohio, Ky. and Ala.

Common throughout the range.

15. **Aster** L.

Plants of salt marshes; leaves fleshy, narrow, entire.

Perennial; heads 12-25 mm. broad; involucre bracts lanceolate, acuminate.

Annual; heads 6-10 mm. broad; involucre bracts linear-subulate.

1. *A. tenuifolius*

2. *A. subulatus*.

Plants not of salt marshes; leaves not fleshy.

A. Basal and lower leaves with relatively broad blades, mostly of an ovate-cordate type and long petioled.

Upper cauline leaves not cordate-clasping; lower petioles not dilated-clasping.

Rays white, violet, or rose.

Ligules of ray flowers whitish or pinkish, usually 2-toothed; plants not glandular.

Involucre ovoid, campanulate or turbinate; bracts obtuse or rounded at apex; basal leaves usually small.

Leaves thin-membranous, smooth or nearly so.

3. *A. divaricatus*.

Leaves thick, firm and rough, at least when dry.

4. *A. glomeratus*.

Involucre cylindrical; bracts tapering to an obtuse tip; basal leaves large, tufted.

5. *A. Schreberti*.

Ligules of ray flowers violet, usually 3-toothed; plant glandular.

6. *A. macrophyllus*.

Rays blue or purple.

Bracts of the involucre linear and obtuse or obtusish.

Leaves thin, rough; petioles not usually winged.

7. *A. cordifolius*.

- Leaves firm, smooth; petioles mostly winged.
- Bracts of the involucre linear and acute, or subulate.
- Upper cauline, or all the leaves, cordate-clasping.
- B. Basal and lower leaves with relatively narrow blades, with more or less contracted, petiole-like bases, but not cordate.
- Stem-leaves clasping by a more or less auriculate-cordate base.
- Stem rough-pubescent or hirsute.
- Leaves entire.
- Leaves with sessile, strongly cordate-clasping blades.
- Stem rough-pubescent; involucre campanulate.
- Inflorescence broad; leaves rough; stem relatively low.
- Inflorescence narrow; leaves soft; stem relatively tall.
- Stem hirsute; involucre hemispheric.
- Leaves with slightly clasping bases.
- Leaves, at least the lower ones, toothed.
- Stem glabrous or slightly pubescent above.
- Leaves sharply serrate.
- Leaves tapering to the base.
- Leaves narrowed to the base, the lower into winged petioles.
- Leaves scarcely or gradually narrowed to the base.
- Leaves abruptly contracted into broad, petiole-like bases and often dilated near the stem.
- Leaves entire or nearly so.
- Involucre campanulate.
- Cauline leaves oblong to oval-lanceolate; inflorescence tending to a raceme-like panicle.
- Cauline leaves linear or elongated lanceolate; inflorescence tending to a corymb-like panicle.
- Involucre hemispheric.
- Bracts of the involucre in several series, unequal.
- Bracts of the involucre linear-subulate; leaves 3–8 mm. wide.
- Bracts of the involucre merely linear; leaves 6–16 mm. wide.
- Bracts of the involucre in 1 or 2 series; leaves linear-lanceolate.
- Stem leaves merely sessile or essentially so, not clasping.
8. *A. Lowrieanus.*
9. *A. sagittifolius.*
10. *A. undulatus.*
11. *A. patens.*
12. *A. phlogifolius.*
13. *A. novae-angliae.*
14. *A. amethystinus.*
16. *A. puniceus.*
15. *A. tardiflorus.*
16. *A. puniceus.*
17. *A. prenanthoides.*
18. *A. laevis.*
19. *A. concinnus.*
20. *A. junceus.*
21. *A. novi-belgii.*
22. *A. longifolius.*

- Leaves silky, silvery, or canescent on both sides. 23. *A. concolor*.
- Leaves not silky, silvery or canescent.
- Rays normally purple, blue, pink or violet, not white.
- Tips of the involucre bracts strongly squarrose.
- Involucre hemispheric or nearly so; heads 2.5 cm. broad or more. 24. *A. spectabilis*.
- Involucre turbinate; heads 12-18 mm. broad. 25. *A. gracilis*.
- Tips of the involucre bracts appressed or erect (except in forms of No. 25).
- Bracts of the involucre coriaceous or herbaceous, not linear-subulate.
- Bracts of the involucre coriaceous, obtuse. 26. *A. Radula*.
- Bracts of the involucre herbaceous, acute. 27. *A. Herveyi*.
- Bracts of the involucre linear-subulate, membranous, acute. 28. *A. nemoralis*.
- Ray essentially white (sometimes pink or purplish in 27, 28, 29, 30 and 35).
- Heads in a terminal corymb. 29. *A. acuminatus*.
- Heads solitary at the ends of slender branchlets and often disposed in racemes or panicles.
- Heads scattered, the peduncles prolonged, scaly. 30. *A. dumosus*.
- Heads decidedly racemose or paniculate, the peduncles not scaly.
- Plants glabrous or pubescent but not harsh.
- Heads paniculate, not in 1-sided racemes.
- Blades of the stem leaves of a lanceolate or narrowly oblong type.
- Heads mostly over 16 mm. broad.
- Ray-flowers usually bluish-violet; leaves firm. 31. *A. salicifolius*
- Ray-flowers usually white; leaves thinish. 32. *A. paniculatus*.

- Heads mostly less than 13 mm. broad. 33. *A. Tradescanti.*
- Blades of the stem leaves of a linear-lanceolate or subulate type.
- Heads scattered, 12-18 mm. broad. 34. *A. Faxoni.*
- Heads numerous, 8-14 mm. broad.
- Involucre hemispheric, 5-6 mm. high. 35. *ericoides.*
- Involucre top-shaped, 5 mm. high or less. 36. *A. depauperatus.*
- Heads racemose and disposed on one side of the branches.
- Stem leaves not linear or linear-lanceolate, finely toothed. 37. *A. lateriflorus.*
- Stem leaves linear or linear-lanceolate. 38. *A. vimineus.*
- Plant very rough and harsh; bracts of the involucre obtuse. 39. *A. multiflorus.*

1. *A. tenuifolius* L. In salt marshes: coast of Mass. to Fla. Throughout the coastal marshes in our range.
2. *A. subulatus* Michx. In salt marshes: coast of N. H. to Fla. Throughout the coastal marshes in our range, and up the tidal rivers a few miles, especially the Hudson.
3. *A. divaricatus* L.* (Including *Aster carmesinus*, *tenebrosus*, *stilletiformis*, *excavatus*, *castaneus*, *Claytoni*, *chlorolepis* and perhaps others, all described by E. S. Burgess, and *A. subinteger* Bicknell.) In open woodlands and thickets, in rather dry soil: Que. to Man., Ga. and Tenn. Variable and often exhibiting some constancy in its different forms.

Common throughout the range, except the pine-barrens and the region to the east and south of them, there unknown.

* The new species of Biotian asters described by Professor Burgess (Mem. Torr. Club 13: 1-419. 1906) are as yet too imperfectly understood by local botanists to enable me to record their distribution.

4. **A. glomeratus** (Nees.) Bernh. In moist thickets, swamps or ravines: Me. to N. Y. and Va.

Known, in our area, only from near New Baltimore, Greene Co., N. Y. and Montague, Sussex Co., N. J., both north of the moraine, with a growing season of about 138-160 days, and both localities with underlying limestone formations; and as reported from Catskill Junction, N. Y.

5. **A. Schreberi** Nees. (*A. curvescens* Burgess). In woods: New Eng. to Mich. and Va.

CONN. Throughout, but rare.

N. Y. Roslyn, L. I., rare on S. I., thence increasing **northward**; nowhere common.

N. J. Burlington, Union, Hudson, Passaic, Bergen and Morris counties.

PA. Pike, Monroe, Bucks and Northampton counties.

Distribution not fully understood, but usually increasing **northward**.

6. **A. macrophyllus** L. (*A. ianthinus*, *violaris* and *multiformis*, Burgess). In shaded places, usually in moderately dry soil: Canada to Minn. and N. Car.

Common nearly throughout the range, except the pine-barrens, there wanting; apparently rare on the south side of L. I., and on the coastal plain of N. J. A form approximating *A. roscidus* Burgess has been collected in Northampton Co., Pa.

7. **A. cordifolius** L. Woods and thickets: N. B. to Minn., Ga. and Mo.

CONN. Common everywhere,

N. Y. Occasional on the south side of L. I., more common on the north side and on S. I., thence increasing and common **northward**.

N. J. Rare in Ocean Co., northwest of the pine-barrens, thence unknown to Somerset and Mercer counties, thence increasing **northward**.

PA. Throughout the area, increasing **northward**.

Tertiary, o: Cretaceous, rare or perhaps wanting, except as an adventive: Older Formations, increasing **northward**. 117-220 days. Sea level-4,020 ft.

A. cordifolius polycephalus Porter is sometimes found with the type, especially in Conn. and Pa.; rare.

8. **A. Lowrieanus** Porter. In woods: Conn. and southern N. Y. to Pa., Iowa, N. Car. and Ky.
 CONN. Known only from New Haven Co.; rare.
 N. Y. Occasional on L. I. and on S. I., thence increasing **northward** to Orange, Rockland and Putnam counties, but not recorded elsewhere.
 N. J. Middlesex, Essex, Union, Somerset, Warren, Passaic, Hunterdon and Bergen counties.
 PA. Luzerne, Monroe, Northampton, Lehigh, Schuylkill, Bucks and Montgomery counties. More common here than elsewhere in the range, often being replaced by the forms known as *lanциfolius* and *Bicknellii*.
 Tertiary, o: Cretaceous, very rare: Older Formations, scattered and apparently increasing **westward**. 123-197 days. Sea level-2,080 ft.
9. **A. sagittifolius** Willd. In dry soil: N. B. to N. Dak., N. J., Ky., Kan. Rare in our area.
 Apparently wanting in Conn. and N. Y. The old S. I. record was based on a specimen of *A. cordifolius*. Reported from but not definitely known at Pine Plains, Dutchess Co., N. Y.
 N. J. Morris, Warren, Hunterdon, Union, and Mercer counties.
 PA. Northampton, Lehigh, Bucks, Delaware and Chester counties.
 A western species, most frequent along the upper drainage area of the Delaware River.
10. **A. undulatus** L. (*A. sylvestris*, *corrugiatus*, *triangularis*, *gracilens*, *loriformis* and (?) *claviger* Burgess). In dry soil: N. B. and Ont., south to Fla., Ala. and Ark.
 Common throughout the range, more common **northward**, and less common in the pine-barrens than elsewhere.
11. **A. patens** Ait. In dry open places: Mass. to northern N. Y., Minn., Kan., Fla., La. and Tex.
 Common throughout the range.
12. **A. phlogifolius** Muhl. In woods and thickets: N. Y. to Ohio, N. Car. and Tenn.
 N. Y. Apparently confined to L. I., S. I., southern Rockland Co., and to Westchester Co.
 N. J. Monmouth, Hunterdon, Hudson, and Morris counties; not in the pine-barrens.

PA. Northampton, Lehigh, Philadelphia, and Bucks counties.

A rare and local species whose distribution is little understood, perhaps not specifically distinct from the preceding.

13. **A. novae-angliae** L. In fields and along swamps: Que. to the N. W. Terr., south to S. Car., Mo., Kan. and Colo.

Throughout the range, rare in the pine-barrens, increasing northward.

14. **A. amethystinus** Nutt. In moist soil: Mass. to southern N. Y., eastern Pa., Ill. and Iowa. Perhaps a hybrid between *A. novae-angliae* \times *multiflorus*.

CONN. Rare, but scattered irregularly over the state.

N. Y. Very rare, and apparently confined to Westchester Co. and the Bronx.

PA. Northampton and Bucks counties.

A rare and very local species in our area.

15. **A. tardiflorus** L. Along streams. N. B. to Pa.

Known, in our area, only from northwestern Conn.

16. **A. puniceus** L. In swamps: N. S. to Ont. and Minn., south to N. Car., Ohio and Mich.

Common in some of its forms (*firmus*, *Crawfordii*, *compactus*, etc.), or as to the typical species, throughout the range, except the pine-barrens, there unknown.

17. **A. prenanthoides** Muhl. In moist soil: Mass. to Wisc., south to W. Va., Ky. and Iowa.

CONN. Known only from southern Fairfield Co.

N. Y. The Catskills of Greene and Ulster counties; reported from but not definitely known on L. I.

N. J. Sussex and Hunterdon counties; not recently collected.

PA. Northampton, Bucks, Delaware and Chester counties.

A rare and local species whose distribution is little understood.

18. **A. laevis** L. Usually in dry soil: Me. and Ont. to Pa., La., the N. W. Terr. and Kan.

Common throughout the range except the coastal plain in N. J., there very rare near Camden; and unknown in the pine-barrens.

19. **A. concinnus** Willd. Conn. to Pa., Va. and Ark.

Known from near Meriden and Southington, Conn. and from Luzerne Co., Pa.; Sussex Co., N. J. Very rare. Doubtfully distinct from *A. laevis*.

20. **A. junceus** Ait. In swamps and bogs: N. S. to N. W. Terr., south to N. J., Ohio, Wisc. and in the Rocky Mts.
Known in our area only from Columbia Co., N. Y., Sussex Co., N. J. and Monroe Co., Pa. These regions are north of the moraine, have a growing season of 123-138 days and an elevation of 550-1,900 ft. Most common on limestone.
21. **A. novi-belgii** L. (*A. novi-belgii litoreus* A. Gray. *A. novi-belgii Brittonii* Burgess, *A. novi-belgii atlanticus* Burgess *A. novi-belgii elodes* (T. & G.) A. Gray). In swamps: Newf. to Me. and Ga., mostly near the coast.
CONN. Common along the coast decreasing and perhaps wanting northward, except in the Connecticut River Valley.
N. Y. Common on L. I. and S. I., and up the Hudson Valley to Dutchess Co., unknown northward and in the Catskills.
N. J. Throughout the state, common especially **southward**.
PA. Delaware, Bucks and Montgomery counties.
Tertiary, common: Cretaceous, common: Older Formations, decreasing northward. 138-220 days. **Sea level**-1,080 ft.
22. **A. longifolius** Lam. In swamps and moist ground: Lab. to Sask., N. Eng., Ont. and Mont.
Known, in our range, only from Farmington and Litchfield, Conn.
23. **A. concolor** L. In dry sandy soil: eastern Mass. and R. I. to Fla. and La., mostly near the coast.
N. Y. Common on the south side of L. I., rare on the west side of S. I., unknown elsewhere.
N. J. Middlesex and Monmouth counties, increasing **southward**, especially in the pine-barrens.
Tertiary, common: Cretaceous, common: Older Formations, rare and restricted to a single station in the glaciated part of S. I., 168-220 days. About sea level.
24. **A. spectabilis** Ait. In dry sandy soil: Mass. to Del., mostly near the coast.
CONN. Very rare along the coast in New London and New Haven counties, unknown elsewhere.
N. Y. Common on L. I.; S. I., also rare in Rockland Co.
N. J. Rare in Morris and Mercer counties,* thence increasing and common on the coastal plain, especially in the pine-barrens.
Tertiary, common: Cretaceous, less common: Older Formations, rare and local.* 168-220 days. About sea level.

The recorded occurrence of *A. surculosus* Michx. in our range was erroneously based on some New Jersey specimens of *A. spectabilis*.

* See Introduction paragraph 7.

25. **A. gracilis** Nutt. In dry sandy soil: N. J. to Ky., Tenn. and N. Car.

Known in our range only from the coastal plain of N. J. and predominating in the pine-barrens.

Tertiary, common on Beacon Hill, rare elsewhere: Cretaceous, rare. Older Formations, o. Not north of the moraine. 175-220 days. About sea level.

26. **A. Radula** Ait. In swamps and low woods: Newf. to Del.

CONN. Known only from Voluntown, East Hartford, Hamden and New Windsor.

N. Y. Rare on L. I. and S. I., unknown elsewhere.

N. J. Very rare in Morris Co., unrecorded thence to Mercer, Ocean, Camden, Gloucester and Salem counties, unknown elsewhere.

PA. Monroe, Northampton, Delaware and Chester counties.

A rare species in our area.

27. **A. Herveyi** A. Gray. In dry soil: E. Mass., Conn., R. I., and N. J.

A very rare and local species, collected in our area only from near Groton and Stratford, Conn., and Plainfield, N. J.

28. **A. nemoralis** Ait. In sandy bogs: Newf. and Hudson Bay to N. J. and N. Y.

Known in our area only from the pine-barrens of New Jersey.* Formerly in Hudson Co.

29. **A. acuminatus** Michx. Moist woods: Lab. to Ont., western N. Y. and in the mountains to Ga.

CONN. Throughout the state, increasing **northward**.

N. Y. Rare on the north side of L. I. and south of Jamaica; rare on S. I., increasing and common **northward**.

N. J. Bergen and Essex counties, increasing **northward**.

PA. Throughout, except in Montgomery, Bucks, Delaware and Chester counties, apparently there wanting.

Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. Predominating north of the moraine. 117-210 days. Sea level-4,020 ft.

30. **A. dumosus** L. (*A. Gravesii* Burgess). Sandy soil. Me. to N. Y. and Ont., south to Fla., La. and Mo.

Throughout our area, increasing **southward**; common along the coast, occasional inland.

* See Introduction paragraphs 36 and 38.

31. **A. salicifolius** Lam. In moist soil: Me. and Ont. to Mass. and Fla., west to Mont., Mo. and Tex.
 CONN. Known only from Waterford, New London and Norwich.
 N. Y. L. I. and on S. I., thence increasing but not common **northward**.
 N. J. Occasional in the northern counties.
 PA. Northampton, Montgomery, Bucks, Philadelphia and Delaware counties.
 A rather scattered and local species apparently increasing **westward**.
32. **A. paniculatus** Lam. In moist soil: N. B. to Ont. and Mont., south to N. J., Va., Ky., La. and Kan.
 Throughout our range, except at Cape May, there not recorded; rare or local southward on the N. J. coastal plain. Numerous forms occur with the type.
33. **A. Tradescanti** L. (*A. agrostifolius* Burgess). In fields and swamps: Ont. to Va., west to N. W. Terr., Ill. and Minn.
 CONN. Rare, so far known only from near Hartford, Stratford and Salisbury.
 N. Y. Not rare on S. I., the Bronx and in Westchester and Orange counties, apparently wanting elsewhere.
 N. J. Hudson, Bergen and Hunterdon counties, increasing but not common **northward**.
 PA. Luzerne, Northampton and Bucks counties.
 A rare and somewhat scattered species whose distribution is little understood.
34. **A. Faxoni** Porter. On moist cliffs: Me. and Vt. to Pa., Wisc. and N. Car.
 Known, in our area, from Spring Valley, Rockland Co., N. Y. and Gravesend and Wading River, L. I.
35. **A. ericoides** L. In dry soil: Me. and Ont. to Fla., west to Wisc. and Ky.
 Throughout the range in some of its many forms; rare and perhaps only adventive in the pine-barrens; increasing **northward**.
36. **A. depauperatus** (Porter) Fernald. On serpentine barrens S. P. and W. Va.
 Known in our area only from the serpentine barrens in Delaware and Chester counties in Pa.

37. **A. lateriflorus** (L.) Britton. (*A. hirsuticaulis* Lindl.). In dry or moist soil: N. S. to western Ont., south to N. Car., La. and Tex.

Throughout the range, except the pine-barrens, there unknown; always increasing **northward**. Here taken to include four or five so called varietal forms.

38. **A. vimineus** Lam. (*A. vimineus foliolosus* (Ait.) A. Gray). In moist soil: Ont. to Mass., Fla., Minn., Kan. and Ark.

Throughout the range, except the pine-barrens, there only a rare intruder.

39. **A. multiflorus** Ait. In dry open places: Me. and Ont. to S. Dak., Ga. Tex., Ariz. and Mex.

CONN. Common throughout, often replaced by the form known as *A. exiguus* (Fernald) Rydb.

N. Y. Throughout, but rare on S. I.

N. J. Recorded from Camden Co.; Monmouth, Middlesex, Hudson, Bergen, Warren and Hunterdon counties.

PA. Apparently confined to Northampton and Bucks counties.

A rather scattered species whose distribution is not well understood.

There seems to be no evidence that *A. azureus* Lindl. has been correctly credited to our area. *A. tataricus* L. f. has been collected in Conn. as an escape. *A. Tripolium* L. has also been collected as a waif.

16. **Erigeron** L.

Heads 25-37 mm. broad; few, stem simple.

1. *E. pulchellus*.

Heads 12-25 mm. broad, numerous; stem branched.

Rays 100-150, mostly violet or purple.

2. *E. philadelphicus*.

Rays much less numerous, white, sometimes wanting.

Stem-leaves lanceolate, nearly all sharply serrate.

3. *E. annuus*.

Stem-leaves linear lanceolate, essentially entire.

4. *E. ramosus*.

1. **E. pulchellus** Michx. On hills and banks: N. S. to Ont., S. Dak., Fla. and La.

Throughout the range, except in the pine-barrens.

2. **E. philadelphicus** L. In fields and swamps: throughout N. Am., except the extreme north.

Local in nearly all parts of our range, except the coastal plain in N. J., and on S. I.; apparently there wanting.

3. **E. annuus** (L.) Pers. In fields and along roadsides: N. S. to the N. W. Terr., south to Va., Ky., Kan. and Mo. Native of Europe.

Locally abundant as a weed except in the pine-barrens.

4. **E. ramosus** (Walt.) B. S. P. In fields: N. S. to N. W. Terr., south to Fla., La. and Tex.

Common throughout the area, except the pine-barrens, as a locally abundant weed.

E. acris L. has been recorded as a waif.

17. **Leptilon** Raf.

Pubescent; bracts of the involucre green.

1. *L. canadense*.

Glabrous or nearly so; bracts purple-tipped.

2. *L. pusillum*.

1. **L. canadense** (L.) Britton. In fields and waste places: Throughout N. Am. except the southeastern states. Naturalized in the Old World.

Throughout the range, usually as a weed.

2. **L. pusillum** (Nutt.) Britton. Sandy soil, Mass. to Fla., Ky., Tex. and tropical America.

Known in our area only from Monmouth and Burlington counties southward in N. J., and from Long Beach and Bayshore, L. I., N. Y.

L. divaricatum (Michx.) Britton and *L. linifolium* (Willd.) Small, have been recorded as waifs.

18. **Doellingeria** Nees.

Leaves lanceolate to ovate; heads mostly numerous.

Leaves lanceolate to oblong-lanceolate, acuminate.

1. *D. umbellata*.

Leaves ovate to ovate-lanceolate, acute.

2. *D. humilis*.

Leaves, at least the lower, obovate; heads commonly few.

3. *D. infirma*.

1. **D. umbellata** (Mill.) Nees. In moist soil: Newf. to Ga., west to the N. W. Terr., Mich. and Ark.

Throughout the range, except the pine-barrens, there unknown.

2. **D. humilis** (Willd.) Britton. In moist soil: E. Mass. to N. J. and Pa. south to Fla. and Tex.

N. J. Rare in the pine-barrens of Ocean, Monmouth, Atlantic and Cape May counties, and near High Point, Sussex Co.

PA. Delaware Co.

3. **D. infirma** (Michx.) Greene. In dry, usually rocky soil: Mass. to N. Y., Pa. and Tenn.

CONN. Scattered, and rare, over most of the state.

N. Y. Rare on L. I. and in the Bronx; unknown on S. I., thence increasing but not common northward.

N. J. Gloucester, Camden, Ocean and Monmouth counties, north and west of the pine-barrens, thence increasing but not common northward.

PA. Luzerne, Northampton, Bucks and Chester counties, probably in the intervening territory.

Tertiary, 0: Cretaceous, rare: Older Formations, increasing northward. 117-220 days. Sea level-3,800 ft.

19. *Ionactis* Greene.

1. **I. *linariifolius*** (L.) Greene. In dry, rocky or sandy soil: Newf. to Que. and Fla., west to Minn., Mo. and Tex.

Throughout the range, locally rare.

20. *Baccharis* L.

1. **B. *halimifolia*** L. Along salt marshes and up tidal streams, sometimes beyond influence of tides: Mass. to Fla. and Tex.

Common throughout our coastal marshes, extending up the tidal rivers; Piermont-on-the-Hudson.

B. Douglasii DC. has been reported as a waif.

TRIBE 4. INULEAE

Heads small, rays none; flowers white or whitish.

Receptacle chaffy.

Receptacle naked.

Plants dioecious or polygamo-dioecious.

Bracts of the involucre not scarious; plants pubescent or glabrous, not woolly.

Bracts of the involucre scarious, mostly white or pink.

Pappus-bristles of staminate flowers thickened above.

Pappus bristles not thickened; stem leafy.

Plants not dioecious; flowers all fertile.

Heads large, rays yellow.

21. GIFOLA.

22. PLUCHEA.

23. ANTENNARIA.

24. ANAPHALIS.

25. GNAPHALICUM.

26. INULA.

21. *Gifola* Cass.

1. **G. *germanica*** (L.) Dumort. In dry fields: southern N. Y. to Pa. and N. Car. Native of Europe.

Very rare as a scarcely persistent waif near New York and southward.

22. *Pluchea* Cass.

Perennial; leaves sessile, cordate, or clasping at the base.

Annual; leaves, at least those of the stem, petioled.

1. *P. foetida*.

2. *P. camphorata*.

1. **P. foetida** (L.) B. S. P. In swamps: southern N. J. to Fla. and Tex., mainly near the coast. Also in the West Indies.
Known in our area only from southern Cape May Co., N. J. near the sea.
2. **P. camphorata** (L.) D. C. In salt marshes: coast of N. H. to Fla. and Tex.
Common throughout the salt marshes of our area, and up the Hudson to the Piermont "flats."

23. *Antennaria* Gaertn.

Basal leaves arachnoid above, at least when young.

Basal leaves small, 0.7-2 cm. long, 1-nerved, or indistinctly 3-nerved.

Basal leaves spatulate, abruptly mucronulate.

1. *A. neodioica*.

Basal leaves oblanceolate, obtuse or acutish, but not mucronulate.

2. *A. neglecta*.

Basal leaves large, 2-12 cm. long, distinctly 3-nerved, sometimes 5-nerved, the lateral nerves also often prominent.

Involucre of fertile plants 6-8 mm. high.

Basal leaves obovate to spatulate-obovate.

3. *A. plantaginifolia*.

Basal leaves nearly orbicular, or rhombic-obovate.

4. *A. calophylla*.

Involucre of fertile plants 8-10.5 mm. high.

5. *A. fallax*.

Basal leaves bright green and glabrous above from the front.

Basal leaves large, obovate, 3-nerved

6. *A. Parlirii*.

Basal leaves small, spatulate, 1-nerved.

7. *A. canadensis*.

1. **A. neodioica** Greene. In dry fields and hillsides: Que. to Vt., Va. and S. Dak.
Throughout the range, except the pine-barrens, there not recorded; more common **northward** and less common southward than elsewhere.
2. **A. neglecta** Greene (*A. petaloidea* Fernald). In fields and pastures: Me. to N. Y., Va. and Wisc.
Throughout the range, but rare in the pine-barrens; always increasing **northward**.
3. **A. plantaginifolia** (L.) Richards. In dry soil and open woods: Ont. to Fla., Ill., Kan. and Tex.
Common throughout the range except the pine-barrens, there rare.
4. **A. calophylla** Greene. Ill. and Mo. to La.
A plant approximating this has been collected, not recently, near Bryn Mawr, New York; otherwise unknown in our area.

5. **A. fallax** Greene. (*A. ambigens* Fernald). In dry soil: Me. to D. C., Wisc. and Kan.
 CONN. Throughout the state, more common southwestward, in Fairfield Co., than elsewhere.
 N. Y. Occasional on L. I. and S. I., rare in Westchester Co., and the Bronx, increasing **northward**.
 N. J. Local in Salem, Cumberland, Camden, Burlington and Monmouth counties, increasing **northward**; not in the pine-barrens.
 PA. Delaware Co.
 Tertiary, o: Cretaceous, rare: Older Formations, increasing **northward**. 118-189 days. Sea level-4,010 ft.
6. **A. Parlinii** Fernald. Me. and Vt. to N. J. and Va.
 A scattered and local species, found sporadically throughout our range, but rare. Unknown on S. I. and in the Bronx. Distribution not well understood.
7. **A. canadensis** Greene. Dry soil, Newf. to Conn. and N. J., Man. and Mich.
 CONN. Recorded as scattered nearly throughout.
 N. Y. Delaware and Columbia counties and in the Catskills.
 N. J. On the palisades opposite Yonkers.
A. occidentalis Greene has been reported from Northampton Co., Pa.

24. **Anaphalis** DC.

1. **A. margaritacea** (L.) Benth. & Hook. Dry soil: Newf. to Alask., N. Car., Kan. and Cal. Also in Asia.
 Throughout our area, sometimes as a weed.

25. **Gnaphalium** L.

Tall, erect; inflorescence corymbose or paniculate.

Leaves sessile.

Plant not viscid.

Plant glandular-viscid.

Leaves decurrent; plant glandular viscid.

Low, diffuse; inflorescence mostly capitate.

Slender, simple; heads spicate.

- 1 *G. obtusifolium*
- 2 *G. Helleni*.
- 3 *G. decurrens*
- 4 *G. uliginosum*.
- 5 *G. purpurcum*.

1. **G. obtusifolium** L. (*G. polycephalum* Michx.). In dry, mostly open places: N. S. to Fla., Man., Kan. and Tex.
 Throughout the range, always as a weed.

2. **G. Helleri** Britton. Fields and woods, N. Y. and N. J. to Ky. and Fla.
N. J. Lakewood and Forked River, Ocean Co.
3. **G. decurrens** Ives. In dry places: N. S. to Pa., west to western Ont., Mich. and B. Col., south in the Rocky Mts. to Ariz.
CONN. Rare, and scattered over most of the state.
N. Y. Unknown on L. I. or S. I., rare in Westchester Co., increasing but not common **northward**.
N. J. Known only from Warren, Morris, Sussex, and Essex counties, rare.
PA. Luzerne, Carbon, Lackawanna, Monroe and Northampton counties.
Tertiary, o: Cretaceous, o: Older Formations, rare and local **northward**. Not south of the moraine. 118-190 days. Sea level-3,900 ft.
4. **G. uliginosum** L. In damp soil: Newf. to Va., west to Ont., Minn. and Ind. Native of Europe.
Throughout the range, except in the pine-barrens, and south of them, there unknown; always increasing **northward**; mostly with the appearance of a weed.
5. **G. purpureum** L. In dry sandy soil: eastern Me. to Fla., west to Pa., W. Va., Ky., Kan., Tex. and Mex. Also on the Pacific coast and in S. Am.
Scattered and local over most of the range; more common near the coast.
G. luteo-album L. and *G. palustre* Nutt. have been recorded as waifs.

26. **Inula** L.

1. **I. Helenium** L. Along roadsides and in fields: N. S. to Ont. and Minn., south to N. Car. and Mo. Naturalized from Europe.
Occasional as an adventive in most parts of our area, except the pine-barrens
I. dysenterica L. and *I. pulicaria* L. have been recorded as waifs.

TRIBE 5. HELIANTHEAE

Disk-flowers perfect, but sterile.

Achenes thick, short, not flattened.

Achenes flattened.

27. POLYMNIA.

28. SILPHIUM.

Disk-flowers fertile.

Ray-flowers persistent upon the achenes.

29. HELIOPSIS.

Ray-flowers deciduous, or none.

Pappus a cup, or crown, or of a few teeth, awns or bristles.

Achenes, at least those of the disk-flowers, not compressed (except in *Ratibida* and *Verbesina*).

Scales of the receptacle small, awn-like or bristle-like; rays white, short.

30. ECLIPTA.

Scales of the receptacle broad, larger.

Receptacle conic or columnar.

Achenes 4-angled.

31. RUDBECKIA.

Achenes compressed, winged.

32. RATIBIDA.

Receptacle flat or convex.

Achenes not much flattened or winged or margined.

33. HELIANTHUS.

Achenes of disk flowers flattened and margined or winged.

34. VERBESINA.

Achenes very flat.

Pappus of 2 short awns or teeth, or a mere border, or none.

35. COREOPSIS.

Pappus of 2-6 awns or teeth, barbed and hispid.

36. BIDENS.

Pappus of numerous scales; leaves opposite, toothed; rays small.

37. GALINSOGA.

27. *Polymnia* L.

Rays 12-25 mm. long, yellow; achenes striate.

1. *P. Uvedalia*.

Rays minute, whitish, or none; achenes 3-ribbed.

2. *P. canadensis*.1. *P. Uvedalia* L. In rich woods: N. Y. to Ind. and Mich. to Fla., Mo. and Tex.

N. J. Known only from an old record at Weehawken, not since collected.

PA. Northampton, Berks, Montgomery, Delaware and Chester counties.

A rare and local species, apparently increasing westward.

2. *P. canadensis* L. In damp rich shaded places: Ont. to Minn., Ga., Mo. and Ark.

Apparently confined, in our area, to Middlesex and New Haven counties, Conn., and Chester and Delaware counties, Pa. Rare.

28. *Silphium* L.1. *S. perfoliatum* L. In moist soil: southern Ont. to S. Dak., south to Ga., Neb. and La.

Known in our area only as a rarely naturalized plant from the west, especially near New York.

29. *Heliopsis* Pers.

Leaves smooth or nearly so; pappus none or of 2-4 short teeth. 1. *H. helianthoides*.
 Leaves rough; pappus crown-like or of 1-3 sharp bristles. 2. *H. scabra*.

1. *H. helianthoides* (L.) B. S. P. In open places: Ont. to Fla., west to Ill. and Ky.

CONN. Scattered over most of the state, but perhaps adventive from the west; rare.

N. Y. Rare and local on L. I. and S. I., increasing **northward**.

N. J. Very rare in Camden, Burlington, Ocean and Monmouth counties, north and west of the pine-barrens, thence increasing **northward**.

PA. Northampton, Delaware, Chester and Philadelphia counties.

Tertiary, o: Cretaceous, rare: Older Formations, increasing **northward** and **westward**. 118-220 days. Sea level-3,500 ft.

2. *H. scabra* Dunal. In dry soil: Me. to N. Y., N. J., Ill., B. Col., Kan. and Ark.

CONN. Rare and local in the southern tier of counties, unknown elsewhere.

N. Y. S. I., L. I., Bronx and Westchester counties.

N. J. Rare in Middlesex, Warren and Bergen counties, unknown elsewhere.

PA. Northampton and Lehigh counties.

Scattered and rare in our area; distribution little understood.

H. buphalmoides Dun. has been recorded as a waif.

30. *Verbesina* L.

1. *V. alba* L. (*Eclipta alba* (L.) Hassk.). Along streams and in waste places: southern N. Y. to Ill. and Neb., south to Fla., Tex. and Mex. Naturalized from Trop. Am.

N. Y. In wood on Manhattan and on S. I.

N. J. Monmouth, Middlesex and Bergen counties; frequent southward on the coastal plain, except the pine-barrens.

PA. Bucks, Philadelphia, Delaware and Chester counties.

31. *Rudbeckia* L.

Disk globose or ovoid and purple or dark brown in fruit; lower leaves entire or lobed.

Lower leaves deeply 3-lobed or 3-divided; hirsute.

1. *R. triloba*.

Lower leaves neither 3-lobed or 3-divided.

Plants hispid; style-tips subulate.

2. *R. hirta*.

Plants pubescent, hirsute or glabrate; style tips obtuse.

Leaves denticulate or entire, rays 1.8-2.5 cm. long. 3. *R. fulgida*.

Leaves dentate or laciniate, rays about 3.5 cm. long. 4. *R. speciosa*.

Disk elongated or cylindric, yellowish or gray; lower leaves pinnately divided or pinnatifid. 5. *R. laciniata*.

1. ***R. triloba*** L. In moist soil: Conn. to Ga., west to Mich., Kan. and La.

CONN. Rare as an adventive from the west.

N. Y. Rare on L. I. and S. I., probably on both islands only as an adventive; increasing and perhaps native northward.

N. J. Sussex and Union counties, apparently adventive.

PA. Northampton and Delaware counties.

With the aspect of an adventive in most parts of our range, possibly native in the upper Hudson Valley.

2. ***R. hirta*** L. In fields: Que. to western Ont. and the N. W. Terr., south to Fla., Colo. and Tex.

Common throughout the northern part of the area as a field weed, decreasing southward, naturalized from the west.

3. ***R. fulgida*** Ait. In dry soil: N. Y. and Pa. to Ga., west to Mo. and Tex.

N. J. Known only from Somerset and Hunterdon counties.

PA. Lehigh, Bucks, Montgomery, Delaware and Chester counties.

A rare and local species, perhaps more widely distributed than is now apparent.

4. ***R. speciosa*** Wenderoth. In moist soil: Conn. to Mich., south to Ala. and Ark.

CONN. Occasional as an adventive.

N. Y. Formerly on S. I., perhaps introduced.

N. J. Cumberland Co., adventive.

PA. Chester, Philadelphia and Carbon counties, perhaps native in the latter.

5. ***R. laciniata*** L. In moist thickets: Que. to Man. and Mont., south to Fla., Kan. and N. Mexico.

Locally common throughout the range, except in the pine-barrens of N. J. and east and south of them, and on the coastal plain of L. I., there unknown.

R. subtomentosa Pursh has been collected in Conn. as a weed.

32. *Ratibida* Raf.

1. *R. pinnata* (Vent.) Barnhart. On dry prairies: western N. Y. to Fla., west to S. Dak., Neb. and La.

Not uncommon as an escape from cultivation, often wanting.

33. ⁷ *Helianthus* [Vaill.] L.

Disk purple, purplish or brown; receptacle flat or convex.

Leaves narrow, linear or lanceolate; perennial.

Leaves broad, ovate; annual.

1. *H. angustifolius*.

2. *H. petiolaris*.

Disk yellow or yellowish; receptacle convex or rarely conic.

Leaves prevailingly lanceolate, 3-8 times as long as broad.

Stem scabrous, scabrate or hispid, at least above; leaves sessile or nearly so.

Leaves scabrous above, hirsute beneath, flat.

Leaves very scabrous on both sides.

3. *H. giganteus*.

Plant 1-4 m. high; heads numerous; leaves mostly alternate.

4. *H. Maximiliani*.

Plant 4-7 dm. high; heads 1 or 2; leaves, all but the upper, opposite.

5. *H. Dalyi*.

Stem glabrous; leaves sessile by a truncate base.

6. *H. divaricatus*.

Stem glabrous; leaves petioled.

7. *H. grosseserratus*.

Leaves prevailingly ovate, ovate-lanceolate or oblong.

Leaves sessile or very nearly so.

Stem glabrous; leaves divaricate.

6. *H. divaricatus*.

Stem hirsute or hispid; leaves ascending.

8. *H. mollis*.

Leaves obviously petioled.

Stem puberulent or glabrous.

Leaves membranous, slender-petioled, sharply serrate.

9. *H. decapetalus*.

Leaves firm, short-petioled, less serrate or entire.

10. *H. strumosus*.

Stem hirsute or hispid.

Leaves rounded or truncate at the base, short petioled.

11. *H. hirsutus*.

Leaves, at least the upper, narrowed at the base.

12. *H. tuberosus*.

1. *H. angustifolius* L. In swamps or low grounds: Long Island, N. Y. to Fla., Ky. and Tex., mainly near the coast.

N. Y. Common along the south side of L. I., wanting elsewhere.

N. J. Rare in Mercer Co., increasing and common southward, especially in the pine-barrens.

PA. Bucks Co.

Tertiary, common on Beacon Hill, less so elsewhere: Cretaceous, less common: Older Formations, rare and scattered near the "fall line." Not north of the moraine. 168-220 days. About sea level.

2. **H. petiolaris** Nutt. On dry prairies: Minn. to the N. W. Terr. and Ore., south to Mo., Tex. and Ariz. Sometimes adventive eastward.

Not uncommon as a weed in N. Y. and Conn., often wanting.

3. **H. giganteus** L. (*H. ambiguus* (T. & G.) Britton). In swamps and wet meadows: Me. and Ont., to the N. W. Terr., south to Fla., Neb. and La.

Common throughout the range, except the pine-barrens, there wanting.

4. **H. Maximiliani** Schrad. On dry prairies: Minn. and Man. to the N. W. Terr., Neb. and Tex. Sometimes adventive eastward.

Rare as an established weed near New York and in Conn.

5. **H. Dalyi** Britton. Known only from its original collection at Sag Harbor, Long Island.

6. **H. divaricatus** L. In dry woodlands, rarely in open grounds: Me. to Ont. and the N. W. Terr., south to Fla., Neb. and La.

Throughout our range.

7. **H. grosseserratus** Martens. In open places: Me. to N. J., S. Dak., Mo. and Tex.

CONN. Newington and Oxford, apparently adventive at both localities.

N. Y. L. I. and on S. I.; rare.

N. J. Victoria, Gloucester Co.

8. **H. mollis** Lam. In dry barren soil: Ohio to Ga., west to Iowa, Kan. and Tex.; also on L. I. and in Pa.

Rare as an obvious adventive on L. I., at Pestletown, N. J., and in Delaware Co., Pa.; otherwise unknown in our area.

9. **H. decapetalus** L. In moist woods and along streams: Que. to Mich., Ga. and Ky.

Throughout the range except in the pine-barrens and south and east of them and on the L. I. coastal plain, there unknown. An upland form, from near Woodlawn, N. Y. City, has been described as *H. scrophulariifolius* Britton. Its leaves are more irregularly serrate than in *H. decapetalus*.

10. **H. strumosus** L. In dry woods and on banks: Me. and Ont. to Minn., Ga. and Ark.

Throughout the range, except in and south and east of the pine barrens, there wanting.

11. **H. hirsutus** Raf. In dry soil: Pa. and Ohio to Wisc., south to W. Va., Ga., Kan. and Tex.

Known in our area only from Northampton and Monroe counties in Pa.

12. **H. tuberosus** L. In moist soil; U. S. and Ont. to Man., Ga. and Ark.

Occasional as a relic of cultivation; perhaps native in the valley of the Delaware.

The common sunflower *Helianthus annuus* L. is somewhat common as an established escape from gardens. *H. scaberrimus* Ell. and *H. subrhomboideus* Rydb. are both reported as becoming established. *H. tracheliiifolius* Mill., *H. debilis* Nutt. and *H. laetiflorus* Pers. have all been collected from our area as waifs.

34. **Ridan** Adans. (*Actinomeris* Nutt.)

- I **R. alternifolius** (L.) Britton (*Verbesina alternifolia* (L.) Britton).

In rich soil: N. J. to western N. Y., Iowa, Fla., Kan. and La. N. J. Rare in Essex, Passaic, Hunterdon, Camden, and Burlington counties, unknown elsewhere.

PA. Northampton, Delaware and Chester counties.

Rare and apparently always adventive with us.

35. **Coreopsis** L.

Rays pink or sometimes white; leaves linear, entire.

1. *C. rosea*.

Rays yellow, with a brown base; lower leaves pinnately divided.

2. *C. tinctoria*.

Rays yellow throughout.

Leaves narrow, linear, appearing verticillate.

3. *C. verticillata*.

Leaves lanceolate, not apparently verticillate.

4. *C. lanceolata*.

- I. **C. rosea** Nutt. In open swamps: eastern Mass. to Ga., near the coast.

N. Y. Not uncommon on eastern L. I., apparently wanting elsewhere.

N. J. Local on the coastal plain, especially in the pine-barrens, unknown elsewhere.

PA. Known only from near Bristol, Bucks Co.

Tertiary, common: Cretaceous, less common: Older Formations, scattered and very local in Pa., only on Trenton gravels. 168-210 days. About sea level.

2. **C. tinctoria** Nutt. In moist soil: Minn. to the N. W. Terr., south to Neb., La. and Ariz. Escaped from gardens eastward.

A rare and doubtfully persistent escape from gardens, often locally wanting.

3. **C. verticillata** L. In dry soil: western Ont. to northern Mich., Md., N. Car., Ky., Neb. and Ark.

Known in our area only as a rare escape from gardens, doubtfully persistent.

4. **C. lanceolata** L. In dry or moist soil: western Ont. to Va., Fla., La. and Mo.

A rare and scarcely persistent escape from gardens, perhaps nowhere established in our range.

36. *Bidens* L.

Plants terrestrial, often of swampy places. erect; leaves simple or divided.

Leaves lanceolate, serrate, undivided, rarely lobed.

Rays present, large and conspicuous.

Rays sometimes wanting, if present, mostly small.

Heads nodding after flowering.

Heads persistently erect.

Pappus awns downwardly barbed.

Involucral bracts not foliaceous; stem usually purple.

Involucral bracts foliaceous; stem straw colored.

Pappus awns upwardly barbed.

Leaves, some or all of them, pinnately 1-3-parted or dissected.

Rays rudimentary, none, or very short.

Achenes flat; leaves, some or all of them, 1-3-divided.

Outer involucral bracts 4-8; achenes nearly black.

Achenes 4-4.5 mm. long; awns very short; outer bracts 4.

Achenes 6 mm. long; awns half as long as the achene; outer bracts 6-8.

Outer involucral bracts 10-16; achenes brown.

Achenes linear; leaves dissected.

Rays large and conspicuous.

Achenes cuneate or linear-cuneate.

Achenes obovate, very flat.

Bracts of the involucre glabrous or ciliate.

Bracts of the involucre densely hispid.

Plant aquatic; submerged leaves finely dissected.

1. *B. laevis*.

2. *B. cernua*.

3. *B. connata*.

4. *B. comosa*.

5. *B. bidentoides*.

6. *B. discoidea*.

7. *B. frondosa*.

8. *B. vulgata*.

9. *B. bipinnata*.

10. *B. trichosperma*.

11. *B. arifolia*.

12. *B. unioloides*.

13. *B. Beckii*.

1. **B. laevis** (L.) B. S. P. In swamps and wet meadows: Mass. to N. Car. and western N. Y.
Throughout most of the range, except in the pine-barrens, there not recorded. Most abundant along the coast.
2. **B. cernua** L. In wet soil: N. S. to Hudson Bay and B. Col., south to N. Car., Mo. and Cal. Also in Europe and Asia.
Throughout the range except in the pine-barrens and east and south of them, there unknown, always increasing **northward**.
3. **B. connata** Muhl. In swamps or moist soil: N. S. to the N. W. Terr., south to Del., Ga., Ky. and Mo.
Throughout the range, but rare and probably only intrusive in the pine-barrens.
4. **B. comosa** (A. Gray) Wiegand. In wet soil: Mass. and Ill. to Pa.
Rare or occasional in most parts of our area, except the coastal plain of N. J., there unknown.
5. **B. bidentoides** (Nutt.) Britton. On muddy shores: N. J. and Pa. to Md. and Del.
The lower Delaware Valley in Mercer, Burlington, Camden, Salem and Cape May counties in N. J. and Bucks, Philadelphia and Delaware counties, Pa.
6. **B. discoidea** (T. & G.) Britton. In swamps and wet places: Mass. to Va., Ohio, Mich., La. and Tex.
CONN. Along the coast and up the Connecticut River Valley, rare or wanting elsewhere.
N. Y. L. I., S. I. and the Bronx, not certainly reported elsewhere.
N. J. Sussex, Morris, Middlesex, Camden, Salem, Gloucester and Cape May counties.
PA. Northampton and Luzerne counties.
A rare and scattered species.
7. **B. frondosa** L. In moist soil, often a weed in fields: N. B. to Fla., Neb. and Tex.
Common throughout the range, except in the pine-barrens, there unknown.
8. **B. vulgata** Greene. In moist soil: Ont. to N. Car., B. Col., Mo. and Cal.

CONN. Throughout the area.

N. Y. L. I. and S. I., increasing **northward**.

N. J. Reported, probably as an adventive, from the pine-barrens, unknown thence to, but increasing in Essex, Morris, Passaic and Sussex counties.

PA. Northampton and Bucks counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing but not common **northward**. 118-172 days. Sea level-4,020 ft.

9. **B. bipinnata** L. In various situations, often as a weed: R. I. to Fla., west to Ohio, Neb. and Ariz. Also in Mex. and tropical Am.

Locally abundant as a weed except on L. I., there rare or occasional.

10. **B. trichosperma** (Michx.) Britton (*B. trichosperma tenuiloba* (A. Gray) Britton). In swamps and wet meadows: Mass. to Ga., Ill. and Ky.

CONN. New Haven.

N. Y. L. I. and S. I.

N. J. Common on the coastal plain, locally north of it.

PA. Bucks, Philadelphia, Delaware, and Chester counties.

11. **B. aristosa** (Michx.) Britton. In swamps and wet places: Ohio to Minn., south to La. and Mo.: southeastern Pa. and Delaware.

Known only from Delaware Co., Pa.

12. **B. involucrata** (Nutt.) Britton. In swamps: Ill. to Kan., Ark. and Tex.: southeastern Pa. and Del.

Known only from Delaware Co., Pa.

13. **B. Beckii** Torrey. In ponds and streams: Que. to N. J., west to Man. and Mo.

CONN. Rare in the southern tier of counties, perhaps wanting elsewhere.

N. J. Known only from Swartzwood Lake, Sussex Co.

A rare and local species whose distribution is little understood.

Among the waifs and occasional adventives are *Polygonum tenuiloba* Willd. and *P. tripartita* L. They have been collected from some part of our area but probably neither are established.

37. **Galinsoga** R. & P.

1. **G. parviflora** Cav. In door yards and waste places: eastern Mass. to Ore., N. Car., Kan. and Mex. Naturalized from tropical America.

Common as a weed everywhere, often replaced by the form known as *hispida* D.C.

G. caracasana (DC.) Sch. Bip. has been found in waste grounds in N. J.

TRIBE 6. HELENIEAE

Consists, in our area, of only the following genus:

38. **Helenium** L.

Stem-leaves oblong-lanceolate or ovate-lanceolate, dentate; rays fertile; disk yellow.

1. *H. autumnale*.

Stem-leaves lanceolate or linear-lanceolate, mainly entire; rays neutral; disk purple.

2. *H. nudiflorum*.

1. **H. autumnale** L. In swamps and wet meadows: Que. to Conn., Fla., S. Dak., Kan. and Ala.

Throughout the range, except in the pine-barrens, there unknown.

2. **H. nudiflorum** Nutt. In moist soil: Kan. to Ill., Tex., east to N. Car. and Fla. Adventive eastward.

Rare as an occasional adventive in parts of our range.

H. tenuifolium Nutt. and *H. quadridentatum* Labill. have been collected as waifs.

TRIBE 7. ANTHEMIDEAE

Receptacle chaffy.

Achenes flattened; involucre obovoid to campanulate; heads small.

39. **ACHILLEA**.

Achenes terete; involucre hemispheric; heads large.

40. **ANTHEMIS**.

Receptacle not chaffy, naked, or sometimes hairy.

Ray-flowers usually present, sometimes wanting; rays large.

Bracts of the involucre in several series.

41. **CHRYSANTHEMUM**.

Bracts of the involucre in few series; rays white or none.

42. **MATRICARIA**.

Ray-flowers none; heads small.

Head corymbed; pappus a short crown; flowers yellow.

43. **TANACETUM**.

Heads racemose, spicate or paniced; pappus none.

44. **ARTEMISIA**.

39. **Achillea** [Vaill.] L.

Leaves serrate.

1. *A. Ptarmica*.

Leaves finely dissected.

Rays 3-6 mm. broad; plant villous; achenes broadly margined.

2. *A. lanulosa*.

Rays 2-3 mm. broad; plant sparsely villous or glabrate; achenes scarcely margined.

3. *A. Millefolium*.

1. **A. Ptarmica** L. In moist soil: Newf. to Que., Mass. and Mich. Naturalized from Europe.
Common as a garden escape and adventive plant in parts of our range.
2. **A. lanulosa** Nutt. Plains and mountains: S. Dak. to B. Col., south to Mex. and Kan. Adventive eastward.
Recorded as adventive in Conn.
3. **A. Millefolium** L. In various situations: throughout the U. S. Adventive from Europe.
Common everywhere as a weed.

Achillea ligustica All. has been collected as a waif near Tannersville, New York, probably not persistent.

40. **Anthemis** L

Rays neutral; plant glabrous or nearly so, fetid.
Rays pistillate; plants pubescent.

Annual; chaff of the receptacle acute.

Perennial; chaff of the receptacle obtuse.

1. *A. Cotula*.

2. *A. arvensis*.

3. *A. nobilis*.

1. **A. Cotula** L. In fields and waste places: throughout temperate North America. Native of Europe.
Locally abundant as a weed; often wanting.
2. **A. arvensis** L. In fields and waste places: N. S. to Va., west to Mich., Mo. and on the Pacific Coast. Native of Europe.
Common as an occasional weed.
3. **A. nobilis** L. Escaped from gardens: R. I. to Del. and Mich. Adventive from Europe.

Rare as a weed near the larger cities, perhaps not persistent.

Anthemis tinctoria L. and *A. mixta* L. have been collected as waifs.

41. **Chrysanthemum** [Tourn.] L.

Heads large, few or solitary at the ends of the stem or branches;
leaves merely incised.

1. *C. Leucanthemum*.

Heads numerous, small, corymbose; plant escaped from gardens;
leaves pinnatifid.

2. *C. Parthenium*.

1. **C. Leucanthemum** L. In waste places and fields: throughout temperate N. Am. Native of Europe.

Common as a field and roadside weed throughout the range, except the pine-barrens, where occasional.

2. **C. Parthenium** (L.) Pers. In waste places: N. S. and Ont., to N. J. Native of Europe.

Locally common as an escape, often wanting.

C. Balsamita L. has been collected as a waif on L. I. and in Conn., and *C. coronarium* L. and *C. segetum* L. have been recorded from near New York.

42. **Matricaria** L.

Rays present, white.

Achenes obpyramidal, strongly 3-ribbed.

Achenes nearly terete, oblong, faintly 3-5 ribbed.

Rays none, achenes oblong, faintly nerved.

1. *M. inodora*.

2. *M. Chamomilla*.

3. *M. matricarioides*.

1. **M. inodora** L. In fields and waste places: Newf. to N. J. and locally in the interior. Naturalized from Europe.

Locally abundant as a weed, often wanting.

2. **M. Chamomilla** L. In waste places and on ballast: N. Eng. to Pa. Adventive from Europe.

Occasional as a weed.

3. **M. matricarioides** (Less.) Porter. Adventive eastward from the West and the Pacific Coast.

Rare as a weed.

M. maritima L. has been found as a waif near New York.

43. **Tanacetum** [Tourn.] L.

1. **T. vulgare** L. Along roadsides and in fields: N. S. and Ont. to S. Dak., south to N. Car., Mo. and Kan. Native of Europe.

Common as a weed in most parts of our area.

44. **Artemisia** [Tourn.] L.

Marginal flowers pistillate; central flowers perfect, sterile.

1. *A. caudata*.

Marginal flowers pistillate; central flowers perfect, fertile.

Receptacle villous-pubescent.

2. *A. Absinthium*.

Receptacle glabrous or sparingly pubescent.

Leaves dissected, glabrous or pubescent, green, not tomentose.

Leaves finely 2-3 pinnately divided; heads paniculate.

3. *A. annua*.

Leaves pinnately divided; segments pinnatifid; heads in leafy spikes.

4. *A. biennis*.

Leaves densely white tomentose, at least beneath.

Heads 6-8 mm. broad; racemose-glomerate; sea-beach plant.

5. *A. Stelleriana*.

Heads 2-4 mm. broad, spicate-paniculate or racemose.

Leaves deeply pinnatifid, the segments mostly incised.

6. *A. vulgaris*

Leaves finely dissected into short linear lobes.

7. *A. Pontica*.

1. **A. caudata** Michx. In dry sandy soil, abundant on sea beaches: Que. to Fla., Man., Neb. and Tex.

In our area practically confined to the sea beaches of L. I., and the coastal plain of N. J., but not in the pine-barrens.

2. **A. Absinthium** L. In waste places: Newf. and Hudson Bay to Mass., western Ont., Mont. and N. Car. Native of Europe.

Rare as an escape from gardens in our area, often locally wanting.

3. **A. annua** L. In waste places: Ont. to D. C., Tenn., Ark. and Kan.

Rare as a weed in parts of our range, often wanting locally.

4. **A. biennis** Willd. Native in the N. W. Terr. and northwestern U. S., now widely distributed as a weed from Man. to N. S., south to Kan., Ky. and Pa.

More common than the preceding in our area, always as a weed.

5. **A. Stelleriana** Bess. Sandy beaches: Me. and Mass. to N. J. Also in northeastern Asia.

Common along all our sea beaches, apparently, though perhaps not actually native with us.

6. **A. vulgaris** L. In waste places: N. S. to Ont., Mich., N. Car. and Pa. Native of Europe and Asia.

Locally abundant as a weed, often wanting.

7. **A. Pontica** L. On ballast: eastern U. S., Native of Europe.

Rare as a weed in parts of our area, except the pine-barrens.

The following have all been collected as waifs near the larger cities: *Artemisia Abrotanum* L., *A. gnaphalodes* Nutt., *A. campestris* L., *A. laciniata* Willd., *A. frigida* Willd. and the Tarragon, *Artemisia Dracunculus* L.

TRIBE 8. SENECTIONEAE

Leaves all basal; heads on scapes.

Heads solitary; flowers yellow.

45. TUSSILAGO.

Heads corymbed; flowers white or purple.

46. PETASITES.

Leaves alternate.

Flowers white, whitish or pinkish; rays none.

Marginal flowers pistillate; disk-flowers perfect.

47. ERECHITHES.

Flowers all perfect.

Involucre of about 5 bracts; sap milky.

Involucre of about 12 bracts and several smaller outer ones.

Flowers yellow; ray-flowers mostly present.

Leaves opposite; rays yellow.

48. *MESADENIA*.

49. *SYNOSMA*.

50. *SENECIO*.

51. *ARNICA*.

45. *Tussilago* [Tourn.] L.

1. *T. Farfara* L. In moist soil or along roadsides: N. S. and N. B. to Mass., N. Y. and Minn. Native of Europe.

Locally abundant as a weed, often wanting.

46. *Petasites* [Tourn.] Mill

Flowers whitish, the pistillate radiate.

Flowers all rayless, purple.

1. *P. palmata*.

2. *P. Petasites*

1. *P. palmata* (Ait.) A. Gray. In swamps and along streams: Newf. to Alask., and B. Col., south to Conn., N. Y., Wisc. and Cal.

Localized in our area near Salisbury, Conn., at elevations of about 1,500 ft.

2. *P. Petasites* (L.) Karst. In cultivated and waste ground: Mass., Conn. and E. Pa. Native of Europe.

Rare as a weed in Conn. and Pa.

47. *Erechtites* Raf.

1. *E. hieracifolia* (L.) Raf. In woodlands, thickets and waste places: Newf. to Fla., west to the N. W. Terr., Neb., Kan. and La. Also in Mex. and S. Am.

Common, always as a weed, in most parts of our area.

48. *Mesadenia* Raf.

Leaves green both sides, angulate-dentate.

Leaves glaucous beneath, green above, angulate-lobed.

1. *M. reniformis*.

2. *M. atriplicifolia*.

1. *M. reniformis* (Muhl.) Raf. In woods: N. J. and Pa. to Minn., south to N. C. and Tenn.

Known in our area, only from Camden Co., N. J., and Northampton Co., Pa.

2. *M. atriplicifolia* (L.) Raf. In woods: western Ont. to Minn., south to Fla., Mo. and Kan.

Known in our area, only from the drainage of the Delaware River in N. J. and Pa., not common.

49. *Synosma* Raf.

1. *S. suaveolens* (L.) Raf. In woods: Conn. and N. J. to Ill. and Minn., south to Fla., W. Va. and Ky.

Known in our area only from the coast of Conn. and Mercer and Monmouth counties in N. J., the latter stations not recently collected from.

50. *Senecio* [Tourn.] L.

Heads conspicuously radiate (except in forms of Nos. 2 and 5).

None of the leaves cordate.

Leaves and stems persistently woolly.

1. *S. tomentosus*.

Leaves glabrous or nearly so; stems often woolly.

Basal leaves obovate, spatulate, or oval; achenes glabrous.

Basal leaves obovate or suborbicular, crenate or dentate; involucre bracts 4-5 mm. long.

2. *S. obovatus*.

Basal leaves oval to ovate; involucre bracts 6-10 mm. long.

3. *S. Crawfordii*.

Basal leaves oblong; achenes glabrous or hispidulous.

Heads few; basal leaves mostly short.

4. *S. pauperculus*.

Heads very numerous; basal leaves long.

5. *S. Smallii*.

Basal leaves cordate or subcordate, orbicular.

6. *S. aureus*.

Heads discoid; rays none or minute.

7. *S. vulgaris*.

1. *S. tomentosus* Michx. In moist soil: southern N. J. to Fla., west to La.

Known, in our area, only from the pine-barrens of New Jersey and along the coast from Ocean Co. **southward**.

Tertiary, occasional: Cretaceous, o; Older Formations; o: 168-220 days. About sea level.

2. *S. obovatus* Muhl. In moist soil and on banks: N. S. to Fla., west to Ont., Mich., Ky. and Mo.

CONN. New Haven and Fairfield counties, increasing **northward**; unknown in the eastern part of the state.

N. Y. Throughout, increasing **northward**.

N. J. Recorded from Camden Co., occasional north of the coastal plain.

PA. Northampton and Bucks counties.

Tertiary, o; Cretaceous, rare; Older Formations, increasing **northward**. 117-180 days. Sea level 3,980 ft.

3. *S. Crawfordii* Britton. Wet meadows: Pa. and N. J.

N. J. Mercer, Burlington and Camden counties, all near the Delaware River.

PA. Near Tullytown, Bucks Co.

A rare and local species, apparently localized in the lower Delaware valley.

4. **S. pauperculus** Michx. (*S. Balsamitae* Muhl.). In dry or rocky soil: N. S. to N. Car., west to Wash., B. Col., Tex. and Neb.

CONN. Known only from Washington, Woodbury, Oxford and Southbury, rare.

N. Y. Todt Hill, S. I.

N. J. Somerset, Essex and Hunterdon counties, increasing **northward**.

PA. Monroe, Northampton, Lehigh, Bucks, Montgomery, Delaware and Chester counties.

Tertiary, o: Cretaceous, o: Older Formations, increasing **westward**. 117-220 days. Sea level-3,800 ft.

5. **S. Smallii** Britton. Meadows and thickets: S. E. Pa. to Fla. and Ala.

PA. Serpentine barrens, Delaware county.

6. **S. aureus** L. In swamps and wet meadows: Newf. to Fla., west to Ont., Mo. and Tex.

Common throughout the range except the pine-barrens, there rare, decreasing southward.

7. **S. vulgaris** L. In cultivated ground and waste places: Newf. and Hudson Bay to Va., west to Mich. and S. Dak. Also on the Pacific Coast.

Rare as an occasional weed in our area.

Senecio viscosus L., *S. Jacobaea* L. and *S. sylvaticus* L. are all sometimes adventive.

51. **Arnica** L.

1. **A. acaulis** (Walt.) B. S. P. In low woods: Del. and southern Pa. Known only from near Barnsley, Chester Co., Pa., in our area.

TRIBE 9. CYNAREAE

Achenes inserted on the receptacle by their bases, not oblique.

Receptacle densely bristly.

Filaments separate.

Involucral bracts hooked at the tip; leaves not bristly. 52. **ARCTIUM.**

Involucral bracts not hooked at the tip; leaves bristly.

Pappus-bristles plumose.

53. **CIRSIUM.**

- Pappus-bristles not plumose.
 Filaments united below.
 Receptacle fleshy, not bristly.
 Achenes obliquely inserted on the receptacle.
 Heads not subtended by bristly leaves.
 Heads sessile, subtended by bristly leaves.

54. *CARDUUS*.
 55. *MARIANA*.
 56. *ONOPORDON*.
 57. *CENTAUREA*.
 58. *CNICUS*.

52. *Arctium* L.

- Bracts densely cottony; heads corymbose.
 Bracts usually glabrous; or slightly woolly.
 Involucre 25 mm. broad or more; inner bracts equalling or exceeding the flowers.
 Involucre 10-20 mm. broad; inner bracts not exceeding the flowers.

1. *A. tomentosum*.
 2. *A. Lappa*.
 3. *A. minus*.

1. **A. tomentosum** (Lam.) Schk. In waste places: N. B. to Mass. and southern N. Y. to Pa. Adventive from Europe.
 Occasional as a weed.

2. **A. Lappa** L. In waste places: N. B. and Ont. to southern N. Y. and locally in the interior. Native of Europe.
 In N. Y. and Conn. as a weed, apparently wanting elsewhere in our range.

3. **A. minus** Schk. In waste places: E. N. Am. Native of Europe.

Abundant as an often pernicious weed throughout the area.

A. nemorosum Lejeune has been collected as a waif in Conn.

53. *Cirsium* [Tourn.] Mill.

- Outer involucrel bracts, or all of them prickly-pointed.
 Leaves glabrous or hispid above, tomentose beneath.
 All the bracts of the involucre tipped with prickles; naturalized weed.
 Outer bracts prickly-tipped, the inner merely acuminate; native species.
 Leaves undivided, lobed or dentate, rarely pinnatifid.
 Leaves deeply pinnatifid into lanceolate or linear segments.
 Leaves green on both sides, somewhat pubescent beneath.
 Bracts of the involucre not at all prickly-pointed or scarcely so.
 Heads large, few, 3-10 cm. broad; flowers all perfect and fertile.
 Heads involucrel by the upper, very spiny leaves; flowers usually yellow.
 Heads peduncled, naked or with one or two bracts at

1. *C. lanceolatum*.
 2. *C. altissimum*.
 3. *C. discolor*.
 4. *C. odoratum*.
 5. *C. horridulum*.

the base; flowers purple.

Heads small, numerous, 2.5 cm. broad or less; flowers imperfect, dioecious.

6. *C. muticum*.

7. *C. arvense*.

1. ***C. lanceolatum*** (L.) Hill. In fields and waste places: Newf. to Ga., west to Minn., Neb. and Kan. Native of Europe. Locally abundant as a weed.

2. ***C. altissimum*** (L.) Spreng. In fields and thickets: Mass. to S. Dak., Fla., Neb. and Tex.

CONN. Salisbury.

N. Y. Westchester Co.

PA. Bucks, Delaware and Chester counties.

3. ***C. discolor*** (Muhl.) Spreng. In fields and along roadsides: Que. and Ont. to Ga., S. Dak., Neb. and Mo.

Common as a weed throughout the range, except the pine-barrens.

4. ***C. odoratum*** (Muhl.) Britton. In fields: Me. to Pa. and Del. Locally rare, but found throughout the area, except the pine-barrens.

5. ***C. horridulum*** Michx. (*C. spinosissimus* Walt.). In dry or moist sandy soil: Me. to Pa., Fla. and Tex.

Mostly confined to the region near the coast in our area, but also at Spring Valley, Rockland Co., N. Y., and in Hunterdon Co., N. J.; not in the pine-barrens.

6. ***C. muticum*** Michx. In swamps and moist soil: Newf. to Fla., N. W. Terr. and Tex.

Throughout the area, except in the pine-barrens.

7. ***C. arvense*** (L.) Scop. In fields and waste places: Newf. to Va., S. Dak., Mont. and Kan. Native of Europe.

Common as a weed; at Kutztown, Pa., and perhaps elsewhere.

C. arvense mite has been collected.

C. palustre (L.) Scop. has been found as a waif near Queens, L. I.

54. ***Carduus*** [Vaill.] L.

Heads solitary, nodding.

Heads several, clustered.

1. *C. nutans*.

2. *C. crispus*.

1. ***C. nutans*** L. In waste places: Pa. and N. J. to N. B. and in ballast about the sea ports. Native of Europe and Asia.

Rare as a weed near Jersey City and Hoboken, unknown definitely elsewhere. Not recently collected.

2. **C. crispus** L. In waste places: N. B. and N. S. and in ballast about the seaports. Native of Europe.

Rare as a weed near New York and Philadelphia.

C. acanthoides L. has been collected as a waif in Conn.

55. **Mariana** Hill.

1. **M. Mariana** (L.) Hill. In ballast: eastern seaports. Native of Europe.

Rare as a weed near the vicinity of New York and Philadelphia.

56. **Onopordon** [Vaill.] L.

1. **O. Acanthium** L. In waste places: N. S. and Ont. to N. J. and Mich. Native also of Asia.

Rare as an occasional weed.

57. **Centaurea** L.

Bracts of the involucre lacerate or fimbriate, not spiny.

Annual; pappus about the length of the achene.

Perennials; pappus obsolete, or short.

Bracts of the involucre lacinate or entire.

Bracts of the involucre, or their tips, pectinate fringed.

Lower bracts pectinate-fringed to below the middle.

Lower bracts pectinate-fringed only at the tips.

Leaves entire, toothed on the lower bracts.

All but the upper leaves pinnatifid into linear segments.

Bracts of the involucre tipped with stout, nearly simple spines.

1. *C. cyanus*.

2. *C. jacea*.

3. *C. nigra*.

4. *C. vochinensis*.

5. *C. maculosa*.

6. *C. calcitrapa*.

1. **C. Cyanus** L. In waste places and escaped from gardens: Que. to N. Y., Va., S. Dak. and Kan. Native of Europe.

Rare as a weed, often wanting.

2. **C. Jacea** L. In waste places: N. Y. to Conn. and Vt., and in ballast about eastern seaports. Native of Europe.

Not very common as a weed in most parts of our range, except the pine-barrens.

3. **C. nigra** L. In waste places and in fields: Newf. to Ont. and Pa. Native of Europe.

Rare as a weed, more common near New York than elsewhere.

4. **C. vochinensis** Bernh. Waste grounds: Ont. to S. N. Y. Native of Ga.

Rare as a weed.

5. *C. maculosa* Lam. Waste grounds: Mass. to N. J. and Pa.
Rare as a weed.
6. *C. Calcitrapa* L. In waste places and ballast: Mass. to N. Y.,
N. J. and Va. Native of Europe.
Rare as a weed near the larger settlements.

Centaurea melitensis L., *C. Phrygia* L., *C. solstitialis* L. and *C. paniculata* L. have been collected as waifs.

58. *Cnicus* L.

1. *C. benedictus* L. In waste places: N. S. to Md., Penn., Ala.
and on the Pacific Coast. Native of Europe.
Very rare as an occasional weed.

There seems to be no satisfactory evidence that *Chondrophora nudata* (Michx.) Britton, credited to N. J., was ever found in that state.

The following have been collected from time to time, but are scarcely persistent; *Echinacea purpurea* (L.) Moench., *E. angustifolia* DC., *Amphiachyris dracunculoides* (DC.) Nutt., *Ageratum conyzoides* L., *Heterotheca subaxillaris* (Lam.) Britton and Rusby., *Filago arvensis* L., *F. minima* Fries, *Acanthospermum hispidum* DC., *A. humile* DC., *A. xanthioides* DC., *Parthenium Hysterophorus* L., *Melanthera deltoidea* Michx., *Spilanthes repens* (Walt.) Michx., *Guizotia oleifera* DC., *Hemizomia pungens* T. & G., *Flaveria bidentis* (L.) B. L. Robinson, *Anacyclus tomentosus* L., *Cenea turbinata* Pers., *Calendula arvensis* L., *C. officinalis* L., *Serratula tinctoria* L., and *Carthamus lanatus* L.

CICHORIACEAE

- Pappus of scales, or of scales and bristles, or none.
- | | |
|--|---------------|
| Flowers blue or white; pappus of blunt scales. | 1. CICHORIUM. |
| Flowers yellow. | |
| Pappus none; achenes 20-30 nerved. | 2. LAPSANA. |
| Pappus of rounded scales; with or without an inner series of bristles. | |
| Perennial; pappus-scales 10-15, minute. | 3. CYNTHIA. |
| Annual; pappus-scales 5, obovate. | 4. KRIGIA. |
- Pappus, at least some of it of plumose bristles.
- | | |
|---|-----------------|
| Receptacle chaffy. | 5. HYPOCHAERIS. |
| Receptacle naked. | |
| Plume-branches of the pappus not interwebbed. | |
| Plants scapose, the leaves basal. | 6. APARGIA. |
| Plants leafy-stemmed. | 7. PICRIS. |
| Plume-branches of the pappus interwebbed. | 8. TRAGOPOGON. |
- pappus of simple bristles.
- | | |
|---|---------------|
| Achenes spinulose, or with short processes near the summit. | 9. LEONTODON. |
| Achenes smooth or papillose, not spinulose toward the summit. | |
| Achenes flattened. | |
| Achenes truncate, not beaked; flowers yellow. | 10. SONCHUS. |
| Achenes narrowed at the summit or beaked; flowers blue or yellow. | 11. LACTUCA. |
| Achenes cylindric or prismatic. | |

- | | |
|--|----------------|
| Involucral bracts in 1 row. | 12. CREPIS. |
| Involucral bracts in more than 1 row. | |
| Involucre imbricated; flowers yellow or orange. | 13. HIERACIUM. |
| Involucre calyculate; flowers white, cream color or pinkish. | 14. NABALUS. |

I. *Cichorium* [Tourn.] L.

- I. **C. Intybus** L. Roadsides, fields and waste places: N. S. to Minn., N. Car., Neb. and Kan. Native of Europe.

Common in some of its numerous forms throughout the range. A form with divaricate heads, *divaricatum*, is often to be found with the type.

The endive, *Cichorium Endivia* L., sometimes escapes from gardens.

2. *Lapsana* L.

- I. **L. communis** L. Along roadsides and in waste places: Que. and Ont. to N. J. and Pa. Also on the Pacific Coast. Native of Europe.

Rare as a weed.

3. *Cynthia* D. Don.

- I. **C. virginica** (L.) D. Don. In moist woods and meadows: Mass. to southern Ont. and Man., Ga., Ky., Mo. and Kan.

Throughout the range except in the pine-barrens and along the coast near them, there rare and obviously introduced.

4. *Krigia* Schreb.

- I. **K. virginica** (L.) Willd. In dry sandy soil: Me. to Ont., Minn., Fla. and Tex.

CONN. Common along the coast, decreasing and perhaps wanting northward.

N. Y. Common on L. I. and S. I. and up the Hudson Valley to the southern end of the Highlands, not certainly known northward.

N. J. Common throughout the coastal plain, decreasing and becoming local northward.

PA. Monroe, Northampton, Lehigh, Bucks, Delaware, Schuylkill, Philadelphia and Chester counties.

Tertiary, common: Cretaceous, common: Older Formations, decreasing and becoming scattered northward. 123-220 days. Sea level-1,890 ft.

5. **Hypochoeris** [Vaill.] L.

1. **H. radicata** L. In waste places: Conn. to N. J. Native of Europe.

Rare as a weed, often wanting.

H. glabra L. has been found as a waif near New York.

6. **Apargia** Scop.

Plant nearly glabrous; scape commonly branched; pappus-bristles all plumose.

1. *A. autumnalis*.

Plant somewhat hirsute; scape simple; outer pappus of outer achenes simple.

2. *A. nudicaulis*.

1. **A. autumnalis** (L.) Hoffm. In fields and along roadsides: Newf. and Ont. to N. J., Penn. and Ohio. Naturalized from Europe and Asia.

Locally abundant as a weed, often wanting.

2. **A. nudicaulis** (L.) Britton. In ballast and in waste places: eastern seaports. Adventive from Europe.

Rare as an occasional weed, often wanting.

A. hispida (L.) Willd. (*Leontodon hastile* L.) has been collected as a waif in Conn.

7. **Picris** L.

Outer involucrel bracts linear; achenes not beaked.

1. *P. hieracioides*.

Outer involucrel bracts ovate, foliaceous; achenes short beaked.

2. *P. echioides*.

1. **P. hieracioides** L. In waste places: eastern N. Am. Native of Asia and Europe.

Rare as an occasional adventive in parts of our area; often wanting.

2. **P. echioides** L. In waste places: N. S. and Ont. and in ballast about the eastern seaports. Native of Europe.

Rare as an adventive in parts of our area, often wanting.

P. hispida All. has been recorded as a waif.

8. **Tragopogon** [Tourn.] L.

Flowers yellow; involucrel bracts equalling or shorter than the rays.

1. *T. pratensis*.

Flowers purple; involucrel bracts much longer than the rays.

2. *T. porrifolius*.

1. **T. pratensis** L. In fields and waste places: N. B. to N. J., Ont., Ohio and Man. Native of Europe.

Occasional as a weed, often wanting.

2. **T. porrifolius** L. In fields and waste places, mostly escaped from gardens: Ont. to N. J., N. Car., Minn. and Colo. Native of Europe.

Locally abundant as an escape from gardens.

9. **Leontodon** L. (*Taraxacum* Hill.)

Outer involucre bracts reflexed; achenes greenish brown, the beak 2-3 times their length.

1. *L. Taraxacum*.

Outer involucre bracts spreading or ascending; achenes red, the beak not more than twice their length.

2. *L. erythrospermum*.

1. **L. Taraxacum** L. Perhaps indigenous northward, southward naturalized as a weed from Europe.

Common nearly everywhere as a weed.

2. **L. erythrospermum** (Andrz.) Britton. In fields and waste places: Me. to Vt., southern N. Y. and Pa. Probably a native of Europe.

Less common than the preceding, but found in most parts of our area, as a weed.

10. **Sonchus** [Tourn.] L.

Involucre glandular-pubescent; heads nearly 25 mm. high.

1. *S. arvensis*

Involucre glabrous; heads 12-16 mm. high.

Auricles of the leaves acute; achenes transversely wrinkled.

2. *S. oleraceus*.

Auricles of the leaves rounded; achenes not transversely wrinkled.

3. *S. asper*.

1. **S. arvensis** L. In low grounds and on ballast: Newf. to N. J. and Pa., west to Minn. and Utah. Native of Europe.

Locally abundant as a weed, especially near salt marshes; often wanting.

2. **S. oleraceus** L. In fields and waste places: throughout cultivated N. Am. Native of Europe.

Frequent as a weed in most parts of our area.

3. **S. asper** (L.) Hill. In fields and waste places: Nearly cosmopolitan. Native of Europe.

Common throughout the cultivated part of our area.

S. tenerrimus L. has been collected as a waif.

11. **Lactuca** [Tourn.] L.

* Pappus bright white.

Leaves spiny-margined and often with spiny or hispid midribs; flowers yellow.

- Heads 6-12 flowered; involucre very narrow, 8-12 mm. high. 1. *L. virosa*.
- Heads 12-20 flowered; involucre broader. 5. *L. sagittifolia*.
- Leaves neither spiny margined or with spiny midribs.
- Achenes very thin, flat, contracted into filiform or tapering beaks.
- Leaves, or some of them pinnatifid.
- Plant glabrous throughout, 1-3 m. high. 2. *L. canadensis*.
- Leaves, at least their midribs, hirsute.
- Beak of the achene as long as its body; flowers yellow. 3. *L. hirsuta*.
- Beak of the achene less than half as long as its body; flowers blue. 4. *L. Morssii*.
- Leaves entire or dentate, none of them pinnatifid.
- Leaves oblong or oblong-lanceolate; achene longer than the beak. 5. *L. sagittifolia*.
- Leaves lanceolate; achene about equalling the beak. 2. *L. canadensis*.
- Achenes beakless or with short necks, thickish; flowers blue.
- Leaves oblong to ovate, acuminate, dentate. 6. *L. villosa*.
- Leaves pinnatifid, the terminal segment commonly triangular. 7. *L. floridana*.
- Pappus brown; flowers blue to white. 8. *L. spicata*.

1. ***L. virosa*** L. (*L. Scariola* L.). In fields and waste places: Me. to S. Dak., N. J., Ga., Neb.; Colo. and Kan. Native of Europe.

Locally abundant as a weed, often wanting.

2. ***L. canadensis*** L. In moist open places: N. S. to the N. W. Terr., south to Ga., Ala., La. and Ark.

Throughout the range, except in the pine-barrens, apparently there rare. A high mountain form with all the leaves entire has been collected in Pa. and in the Catskills; it is *L. canadensis montana* Britton.

3. ***L. hirsuta*** Muhl. In dry soil: Me. and Ont. to Minn., south to Ala. and Tex.

CONN. Rare near the coast, apparently wanting northward.

N. Y. L. I. and S. I., occasional in the Bronx, unknown elsewhere.

N. J.: Not uncommon on the coastal plain, wanting or very rare elsewhere.

Tertiary, common: Cretaceous, less common: Older Formations, scattered. 168-220 days. About sea level.

4. ***L. Morssii*** Robinson. Along salt meadows: Me. and eastern Mass. to N. Y.

A very rare species, confined so far as present records show, to the salt marshes of Westchester Co., N. Y. on L. I. Sound.

5. **L. sagittifolia** Ell. In dry open soil: N. B. and Ont. to Idaho, Ga. and Kan.

Throughout the area except in the pine-barrens.

6. **L. villosa** Jacq. In thickets: N. J. to Ill., south to Fla., Ga. and Ky.

N. J. Very rare in Burlington Co., northwest of the pine-barrens, thence unknown to Hunterdon, Somerset, Bergen and Hudson counties; nowhere common.

PA. Northampton Co. southward.

A rare and local species with a very scattered distribution.

7. **L. floridana** (L.) Gaertn. In moist open places: southern N. Y. and Pa. to Ill., Neb., Fla., La. and Kan.

N. J. Bergen Co., and in the drainage of the Delaware from Sussex to Burlington counties.

PA. Northampton Co. southward.

8. **L. spicata** (Lam.) Hitchc. In moist soil: Newf. to Man., south to N. Car., Tenn., Iowa and S. Dak.

Throughout the range, except the pine-barrens, there wanting; more common northward than elsewhere.

The Lettuce, *L. sativa* L., sometimes escapes from gardens.

12. *Crepis* L.

Stem leaves narrow, revolute-margined, sessile.

1. *C. tectorum*.

Stem leaves lanceolate, clasping, not revolute-margined.

Involucre 6-8 mm. high; achenes 10 striate.

2. *C. capillaris*.

Involucre 8-12 mm. high, achenes 13 striate.

3. *C. biennis*.

1. **C. tectorum** L. In waste places and on ballast: Ont., Mich. and Neb. to Conn., N. J. and Pa. Native of Europe.

Rare as a weed over most of the area.

2. **C. capillaris** (L.) Walby (*C. virens* L.). In fields and waste places: Conn., N. J., N. Y. and Pa. Adventive from Europe.

Not uncommon as a weed, often wanting.

3. **C. biennis** L. In waste places: Vt. to Pa. and in ballast about the seaports. Native of Europe.

Locally distributed as a weed, more common in Pa. than elsewhere.

Crepis taraxacifolia Thuill., *C. setosa* Haller, f. and *C. rigida* W. & K. have all been collected as waifs.

13. *Hieracium* [Tourn.] L.

Flowering stem leafless, or with 1-5 leaves; achenes columnar or oblong, truncate.

Stem scapose, with a single head only; introduced; principal bracts in 1 or 2 series.

Heads corymbose or paniculate; principal bracts in 2-3 series.

Leaves coarsely dentate, narrowed at both ends.

Leaves denticulate or entire.

Leaves mostly entire, spatulate to oblong; heads corymbose.

Heads 16-25 mm. broad; flowers red or orange.

Heads 10-18 mm. broad; flowers yellow.

Glaucous, slightly hispid.

Densely hirsute.

Leaves, at least some of them denticulate, mostly obovate or oval; heads corymbose-paniculate.

Stem glabrous, or nearly so; leaves usually purple-veined.

Stem pilose below; leaves green.

Flowering stem abundantly leafy at least below.

Principal bracts of the involucre in 2-4 series; heads corymbose.

Principal bracts in 1 series; heads small, paniculate or racemose.

Achenes columnar at maturity, truncate.

Plant nearly or quite glabrous.

Plant scabrous or glandular.

Peduncles stout, spreading.

Peduncles slender, ascending.

Achenes spindle-shaped, or with a tapering summit at maturity.

- | | |
|--|----------------------------|
| | 1. <i>H. Pilosella</i> . |
| | 2. <i>H. vulgatum</i> . |
| | 3. <i>H. aurantiacum</i> . |
| | 4. <i>H. florentinum</i> . |
| | 5. <i>H. pratense</i> . |
| | 6. <i>H. venosum</i> . |
| | 7. <i>H. marianum</i> . |
| | 8. <i>H. canadense</i> . |
| | 9. <i>H. paniculatum</i> . |
| | 10. <i>H. scabrum</i> . |
| | 7. <i>H. marianum</i> . |
| | 11. <i>H. Gronovii</i> . |
| 1. <i>H. Pilosella</i> L. In dooryards and fields: Ont., N. Y., Pa. and Mich. Adventive from Europe.
Locally common as a weed. | |
| 2. <i>H. vulgatum</i> Fries. In waste places: Lab. and Newf. to Que. and in N. Y., N. J. Native of Europe.
Very rare as a weed near the City of New York, perhaps not persistent. | |
| 3. <i>H. aurantiacum</i> L. In fields, woods and along roadsides: N. B. and Ont. to N. Y., N. J. and Pa. Native of Europe.
Common, especially northward, as a pernicious weed; perhaps wanting in the pine-barrens. | |

4. **H. florentinum** All. In fields, meadows and along roadsides: Me. and Ont. to N. Y. Naturalized from Europe.
Locally rare as an occasional weed, often wanting.
5. **H. pratense** Tausch. In fields and along roadsides: N. Y. and Conn. Native of Europe.
Rare as an adventive on S. I. in Delaware Co., N. Y., Sussex and Warren counties, N. J., and scattered over Conn.
6. **H. venosum** L. In dry woods and thickets: Me. to Ont. and Man., south to Ga., Ky. and Neb.
Common throughout the range.
7. **H. marianum** Willd. In dry woods and thickets: R. I. to southern N. Y., Pa., Ky., Ala. and Fla.
Apparently throughout the range except in the pine-barrens, there wanting; nothing like so common as the preceding.
8. **H. canadense** Michx. In dry woods and thickets: N. S. to Ont. and the N. W. Terr., south to N. J., Pa. and Mich.
CONN. Throughout the state.
N. Y. Rare on L. I. and in the Bronx and from the Highlands of the Hudson, **northward**.
N. J. Bergen, Morris and Sussex counties.
PA. Monroe and Bucks counties.
Tertiary, o: Cretaceous, o: Older Formations, increasing **northward**. South of the moraine only in Pa. 117-189 days. Sea level-4,020 ft.
9. **H. paniculatum** L. In dry woods: Me., Que. and Ont. to Ga., Ala. and Ky.
CONN. Throughout the state.
N. Y. Common on L. I. and S. I., increasing **northward**.
N. J. Rare and local in Middlesex Co., increasing **northward**. Not in the pine-barrens.
PA. Pike, Monroe, Northampton, Bucks, Delaware and Chester counties.
Tertiary, o: Cretaceous, very rare: Older Formations, increasing **northward**. 117-220 days. Sea level-4,040 ft.
10. **H. scabrum** Michx. In dry woods and clearings: N. S. to Minn., Ga., Neb. and Kan.
Common throughout the range except in and south and east of the pine-barrens, there unknown.

11. **H. Gronovii** L. In dry soil: Mass. to Ont., Ill., Fla. and Tex. Scattered throughout the area, more common **southward** than elsewhere.

Hieracium floribundum Wimm. & Grab. has been collected as a waif in Conn.; *H. murorum* L. was found many years ago in waste grounds, Prospect Park, Brooklyn.

14. **Nabalus** Cass.

Bracts of the involucre glabrous, or with a few scattered hairs.

Heads 5-7 flowered; involucre very narrow; light green, 2 mm. thick; pappus light straw color.

Heads 8-16 flowered; involucre broader, green, purple or glaucous, 3-6 mm. thick.

Leaves or some of them lobed, divided or pinnatifid; involucre about 3 mm. thick.

Pappus deep cinnamon-brown.

Pappus straw color or light brown.

Inflorescence paniculate.

Panicle branches divergent.

Panicle branches erect or ascending.

Inflorescence thyrsoid or glomerate; southern.

Leaves irregularly dentate or denticulate.

Bracts of the involucre hirsute-pubescent.

1. *N. altissimus*.

2. *N. albus*.

3. *N. serpentarius*.

4. *N. trifoliolatus*.

5. *N. virgatus*.

3. *N. serpentarius*.

6. *N. racemosus*.

1. **N. altissimus** (L.) Hook. In woods and thickets: Newf. to Man., south to Ga. and Tenn.

CONN. Throughout the state.

N. Y. On the north side of L. I., not reported from the south side; on S. I., thence increasing **northward**.

N. J. Rare in Burlington Co., west of the pine-barrens, frequent or common north of the coastal plain.

PA. Throughout.

Tertiary, 0: Cretaceous, very rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,980 ft.

2. **N. albus** (L.) Hook. In woods: Me. and Ont. to Man., south to Ga. and Ky.

CONN. Rare along the coast, increasing **northwestward**.

N. Y. Common on the north side of L. I., unknown on the south side, or in the Bronx, rare on S. I., thence increasing **northward**.

N. J. Rare in Burlington and Salem counties, west of the pine-barrens, thence increasing **northward**.

PA. Northampton, Montgomery, Bucks, Delaware and Chester counties.

Tertiary, 0: Cretaceous, rare: Older Formations, increasing **northward**. 117-220 days. Sea level-3,980 ft.

3. **N. serpentarius** (Pursh) Hook. In fields and thickets: Mass. to southern N. Y., Fla., Ala., Ky. and Miss.

Throughout the range except the northern counties of N. Y. and Pa., often replaced, on the coastal plain, by an entire-leaved form, *N. serpentarius integrifolius* (Cass.) Britton.

4. **N. trifoliolatus** Cass. In woods and thickets: Me. to Vt., Pa., Tenn. and Mo.

Common throughout the range, except the pine-barrens.

5. **N. virgatus** (Michx.) DC. In moist sandy soil: N. J. to Fla., near the coast.

The pine-barrens of N. J.

6. **N. racemosus** (Michx.) DC. In moist open places: N. B. and Anticosti to the N. W. Terr., south to N. Y., N. J., Mo. and Colo.

N. Y. Westchester Co. and on the L. I. coastal plain.

N. J. Bergen and Hudson counties.

PA. Reported but not definitely known from the state.

Arnoseric minima (L.) Dumort. has been reported as a waif.

NUMBER OF GENERA AND SPECIES

	Genera	Species		Genera	Species
Ophioglossaceae.....	2	9	Cyperaceae.....	15	255
Osmundaceae.....	1	3	Araceae.....	6	10
Schizaeaceae.....	2	2	Lemnaceae.....	3	6
Polypodiaceae.....	18	40	Xyridaceae.....	1	6
Marsileaceae.....	1	1	Eriocaulaceae.....	1	4
Salviniaceae.....	2	2	Commelinaceae.....	2	5
Equisetaceae.....	1	8	Pontederiaceae.....	2	3
Lycopodiaceae.....	1	11	Juncaceae.....	2	31
Selaginellaceae.....	1	2	Melanthaceae.....	10	13
Isoetaceae.....	1	7	Liliaceae.....	7	15
Pinaceae.....	8	22	Convallariaceae.....	8	15
Taxaceae.....	1	1	Smilacaceae.....	1	7
Typhaceae.....	1	2	Haemodoraceae.....	1	7
Sparganiaceae.....	1	8	Amaryllidaceae.....	3	3
Zannichelliaceae.....	3	26	Dioscoreaceae.....	1	1
Zosteraceae.....	1	1	Iridaceae.....	3	7
Naiadaceae.....	1	2	Orchidaceae.....	23	85
Scheuchzeriaceae.....	2	2	Saururaceae.....	1	1
Alismaceae.....	4	14	Salicaceae.....	2	17
Elodeaceae.....	2	4	Myricaceae.....	2	4
Hydrocharitaceae.....	1	1	Juglandaceae.....	2	7
Gramineae.....	77	263	Betulaceae.....	5	7

	<i>Genera</i>	<i>Species</i>		<i>Genera</i>	<i>Species</i>
Fagaceae.....	3	24	Linaceae.....	2	6
Ulmaceae.....	2	7	Rutaceae.....	2	2
Urticaceae.....	5	8	Simaroubaceae.....	1	1
Cannabinaceae.....	2	3	Polygalaceae.....	1	12
Moraceae.....	3	3	Euphorbiaceae.....	8	20
Loranthaceae.....	2	2	Callitrichaceae.....	1	3
Santalaceae.....	1	1	Empetraceae.....	1	1
Aristolochiaceae.....	2	4	Limnanthaceae.....	1	1
Polygonaceae.....	9	46	Anacardiaceae.....	3	7
Chenopodiaceae.....	7	27	Aquifoliaceae.....	2	8
Amarantaceae.....	2	10	Celastraceae.....	2	5
Phytolaccaceae.....	1	1	Staphyleaceae.....	1	1
Aizoaceae.....	2	2	Aceraceae.....	1	8
Portulacaceae.....	3	4	Hippocastanaceae.....	1	1
Illecebraceae.....	3	4	Sapindaceae.....	1	1
Alsiniaceae.....	8	25	Balsaminaceae.....	1	2
Caryophyllaceae.....	8	23	Rhamnaceae.....	2	4
Nymphaeaceae.....	4	8	Vitaceae.....	2	6
Ceratophyllaceae.....	1	1	Tiliaceae.....	1	3
Magnoliaceae.....	2	3	Malvaceae.....	6	13
Anonaceae.....	1	1	Hypericaceae.....	4	17
Ranunculaceae.....	22	53	Elatinaceae.....	1	1
Berberidaceae.....	4	4	Cistaceae.....	3	13
Menispermaceae.....	1	1	Violaceae.....	2	35
Lauraceae.....	2	2	Cactaceae.....	1	1
Papaveraceae.....	4	7	Thymeleaceae.....	1	1
Fumariaceae.....	4	6	Elaeagnaceae.....	1	1
Cruciferae.....	32	69	Lythraceae.....	5	8
Capparidaceae.....	2	2	Melastomaceae.....	1	3
Resedaceae.....	1	3	Onagraceae.....	10	27
Sarraceniacae.....	1	1	Haloragidaceae.....	2	8
Droseraceae.....	1	3	Araliaceae.....	2	6
Podostemaceae.....	1	1	Ammiaceae.....	23	38
Crassulaceae.....	4	6	Cornaceae.....	4	8
Penthoraceae.....	1	1	Clethraceae.....	1	1
Parnassiaceae.....	1	1	Pyrolaceae.....	3	8
Saxifragaceae.....	5	8	Monotropaceae.....	2	2
Hydrangeaceae.....	2	2	Ericaceae.....	15	20
Iteaceae.....	1	1	Vacciniaceae.....	5	16
Hamamelidaceae.....	1	1	Diapensiaceae.....	1	1
Altingiaceae.....	1	1	Primulaceae.....	9	15
Grossulariaceae.....	2	10	Plumbaginaceae.....	1	1
Platanaceae.....	1	1	Ebenaceae.....	1	1
Rosaceae.....	22	92	Oleaceae.....	2	7
Malaceae.....	7	46	Loganiaceae.....	1	1
Amygdalaceae.....	2	13	Gentianaceae.....	7	17
Caesalpiniaceae.....	4	5	Menyanthaceae.....	2	3
Fabaceae.....	26	87	Apocynaceae.....	2	7
Geraniaceae.....	3	12	Asclepiadaceae.....	4	16
Oxalidaceae.....	3	9	Convolvulaceae.....	4	8

	<i>Genera</i>	<i>Species</i>		<i>Genera</i>	<i>Species</i>
Cuscutaceae.....	1	8	Plantaginaceae.....	1	8
Polemoniaceae.....	2	7	Rubiaceae.....	8	24
Hydrophyllaceae.....	3	6	Caprifoliaceae.....	7	25
Boraginaceae.....	13	24	Adoxaceae.....	1	1
Verbenaceae.....	2	5	Valerianaceae.....	2	4
Labiatae.....	32	87	Dipsacae.....	2	2
Solanaceae.....	9	16	Cucurbitaceae.....	2	2
Scrophulariaceae.....	26	61	Campanulaceae.....	3	6
Lentibulariaceae.....	5	15	Lobeliaceae.....	1	9
Orobanchaceae.....	4	4	Ambrosiaceae.....	3	8
Bignoniaceae.....	2	2	Compositae.....	58	214
Acanthaceae.....	2	3	Cichoriaceae.....	13	43
Phrymaceae.....	1	1	Total.....	830	2651

Some of the Largest Genera.

<i>Carex</i>	155 species.
<i>Panicum</i>	63 "
<i>Aster</i>	39 "
<i>Viola</i>	33 "
<i>Crataegus</i>	29 "
<i>Rubus</i>	28 "
<i>Juncus</i>	28 "
<i>Cyperus</i>	28 "
<i>Solidago</i>	27 "
<i>Potamogeton</i>	25 "

SUMMARY

	<i>Genera</i>	<i>Species</i>	
Pteridophytes.....	31	85	
Gymnosperms.....	9	23	
Angiosperms.....			
Monocotyledones.....	182	758	
Dicotyledones.....	<u>608</u>	<u>790</u>	
	830	2651	Total number of species admitted
Deduct species introduced in the area			
Pteridophytes }			
Angiosperms }	0		
Monocotyledons.....	95		
Dicotyledons.....	<u>518</u>	<u>613</u>	
Total number of native species.....		2038	

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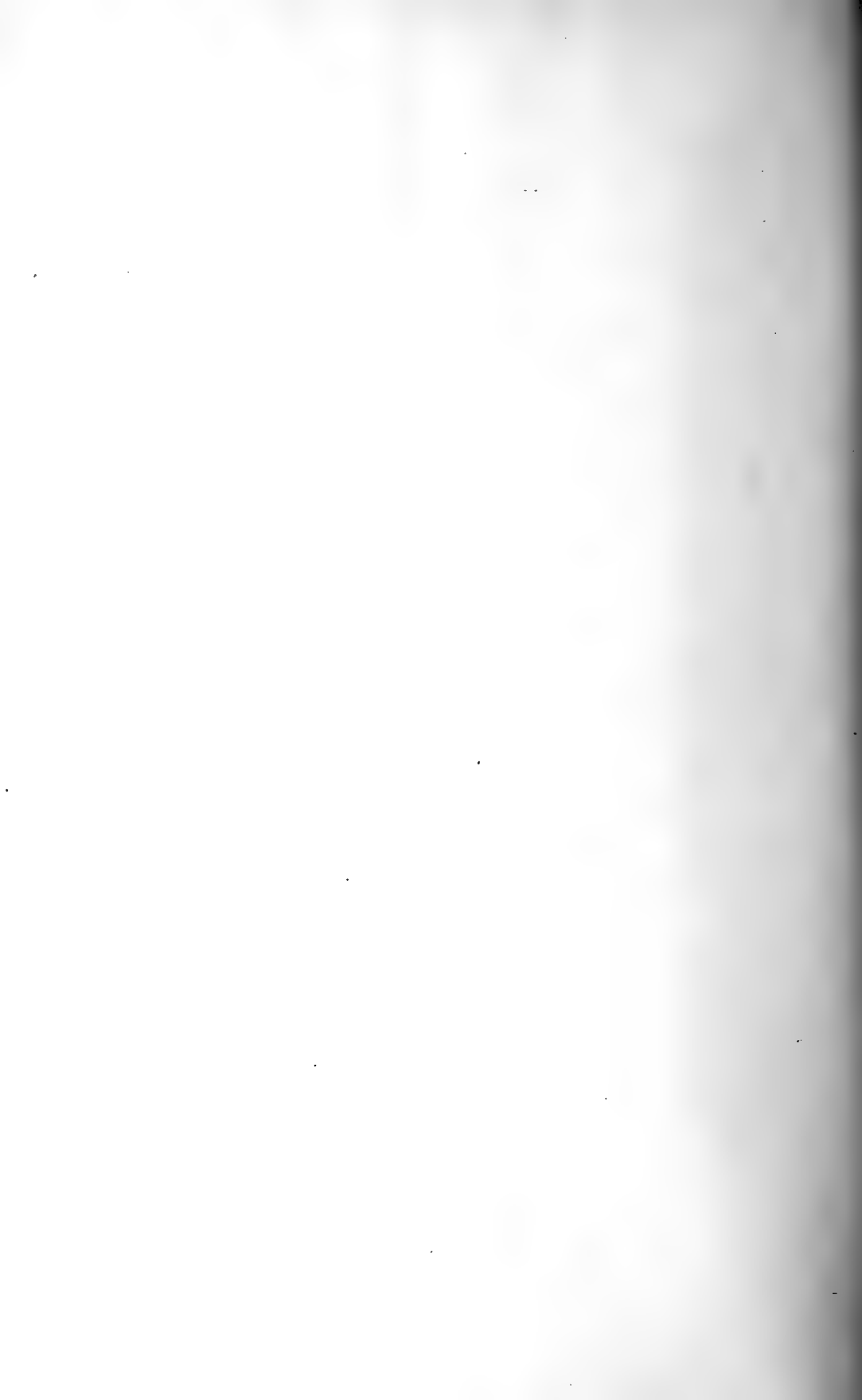
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