

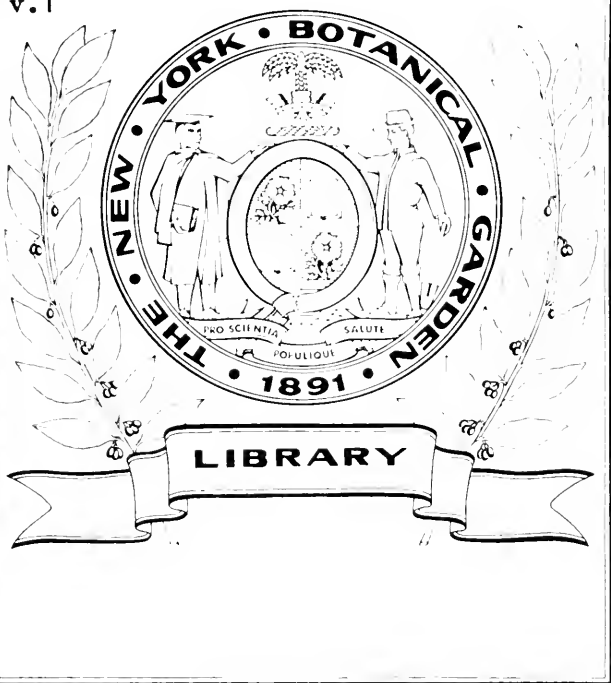


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Mr. John Stanley Barnhart  
with the regards &  
grateful acknowledgements,

L. Thomas Hines,  
Feb. 15, 1872



# THE PLANTS

OF

# SOUTHERN NEW JERSEY

With Especial Reference to the

# FLORA OF THE PINE BARRENS

And the Geographic Distribution  
of the Species

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By WITMER STONE

Curator Academy of Natural Sciences of Philadelphia  
Fellow of the American Ornithologists' Union  
Member Philadelphia Botanical Club

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## PREFACE.

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The writer began his botanical studies in Chester County, Pennsylvania, under the guidance of the classic *Flora Cestrice* of Dr. Darlington, and was fairly familiar with the plant life of this portion of the Piedmont country before he ever visited the Coastal Plain to the eastward. The first trip to the Pine Barrens, at Egg Harbor City, July 21, 1889, he will probably never forget. It was one of those delightful little excursions of botanists which, once a week, left Philadelphia for a day's tramp, under the leadership of the late Dr. J. Bernard Brinton. Nearly everything was new, and the contrast between the flowers of this wonderful Pine country and the more prosaic flora of Pennsylvania's agricultural district made an impression and started an inquiry that were largely responsible for the production of the present volume.

Other work, however, interfered for some years with the prosecution of botanical studies of any sort, and it remained for a joint meeting of the Philadelphia and Torrey Botanical Clubs, at Toms River, July 4th, 1900, to provide the stimulus which led to definite plans for a Flora of the Pine Barrens. The interim had witnessed a wonderful change in the status of American botany. The *Illustrated Flora* had appeared, and under its stimulus botanists were even daring to find new species right at home and to describe them as new, without regard to what Gray's Manual might have to say on the subject. The old solid board field-presses, covered with oilcloth and provided with carpet-bag handles, which had superseded the historic vasculum at the time of the Egg Harbor trip, had been supplanted by light slat presses, and, instead of carrying into the field twenty-five felt dryers and a like number of folders and exhausting one's gray matter in deciding just which twenty-five plants we should select for specimens, we now carried afield only folders

or single sheets, but enough to enable us to preserve 150 specimens, if necessary.

The writer's collections and notes on the South Jersey plants accumulated rapidly, and the arrangement of the data was fortunately well under way when Professor Morse offered to publish them, as part of his annual Museum Report. The basis of the present work is the field work of the author and his friends, the South Jersey material in the herbaria listed below and the published records contained in the several botanical works dealing with the region. Wherever possible, an actual herbarium specimen is cited for every locality mentioned under each species, so that questions of correct identification can readily be settled in the future by consulting this material. This plan has been followed even in the cases of common species, since general statements leave much to be desired that is sometimes supplied by actual records. The number of records is, however, no index to the relative abundance of a species, this matter being covered by the preliminary statement based upon much additional field data. The statements regarding the occurrence and abundance of the wide-ranging species in northern New Jersey, are taken direct from Britton's Catalogue. Published records not backed by actual specimens cannot well be ignored, and they have, in nearly all cases, been included in the text. When they have been proven to be wrong, or seem exceedingly doubtful, they are referred to in foot-notes, and where there seems no reason to question their accuracy they are included with the other records, but distinctly marked as to their source. In rare cases of exceedingly difficult groups where such records are of no particular additional value to the definite knowledge already possessed, and where the exact application of the names used is in doubt, they have been omitted.

#### LIST OF HERBARIA.

*Academy of Natural Sciences.*—The Local Herbarium covering roughly an area of seventy miles around Philadelphia, was begun in 1891, upon the founding of the Philadelphia Botanical Club, by the donation of a collection belonging to Isaac C. Mar-

tindale, one of the founders of the club. The members immediately began to contribute specimens, the most important South Jersey collections coming from J. H. Grove, of New Egypt; Charles D. Lippincott, of Swedesboro; and Benjamin Heritage, of Mickleton; other contributors being Dr. J. Bernard Brinton, Albrecht Jahn, Charles S. Williamson.

Soon after, Dr. Ida A. Keller presented her entire local herbarium. Of later years, extensive collections were made by Sam'l S. VanPelt and Bayard Long, while numerous contributions were received from Edwin B. Bartram, Dr. John W. Eckfeldt, W. A. Poyser, Henry A. Lang, Francis W. Pennell, Stewardson Brown, George W. Bassett, Witmer Stone. Upon the death of the veteran botanist, Mr. Charles E. Smith, his entire collection of local plants was bequeathed to the Academy and added to the herbarium.

The general herbarium of the Academy contained New Jersey material collected by all the famous botanists from the time of Nuttall and Pursh down, but outside of Nuttall's collection and those of S. W. Conrad, of Burlington, and Dr. Joseph Carson, and W. Wynne Wister, there were probably no complete herbaria, the specimens being duplicates or special donations. Such material was received from Diffenbaugh, Pickering, Read, Durand, Z. Collins, A. H. Smith, Canby, Parker, and Burk. Later on, the valuable local herbaria of Stewardson Brown, Joseph Crawford and Alexander MacElwee, were presented to the Academy, all rich in South Jersey material, while C. F. Saunders presented a number of specimens.

In 1910 and 1911, all of the local material in the general herbarium was incorporated in the local herbarium, which has thus become one of the most complete and extensive local collections in America.

Since 1903, this local herbarium has been under the care of Mr. S. S. VanPelt, aided during the past two years by Mr. Bayard Long, both of whom volunteered their services and have brought the collection to its present high standard. The thousands of plants which they have themselves collected, and which Mr. Van Pelt has so carefully mounted, are unsurpassed as herbarium specimens.

The South Jersey material contained in this herbarium has been carefully estimated at 14,000 sheets. For permission to avail myself of its riches, I am under obligations to the Academy and the Club and for various aid and assistance, to Mr. Stewardson Brown, Conservator of the Botanical Section in charge of the Academy's herbaria, and to Messrs. VanPelt and Long.

*Princeton University.*—Comprises the collection of Mr. Charles F. Parker, one of the best authorities on the flora of the Pine Barrens, and a number of other New Jersey plants, received from various sources. Mr. Parker's herbarium contains probably 3,000 specimens from the region covered by the present report, including nearly all those which served as the basis for the records published in Britton's catalogue, on the authority of Parker. The majority of the specimens were carefully examined, especially those mentioned by Britton. For this privilege I am indebted to Prof. George Macloskie.

*Philadelphia College of Pharmacy.*—This contains the herbarium of Mr. Isaac Martindale, containing a great many New Jersey specimens, only a small portion examined.

*University of Pennsylvania.*—This herbarium contains the private herbaria of Dr. Joseph Leidy, Dr. J. Bernard Brinton, Isaac Burk, all of them rich in South Jersey plants, and valuable collections made by Dr. J. M. Macfarlane and Dr. John W. Harshberger. There are approximately 3,500 specimens from our region.

For permission to examine this collection I am indebted to the last two gentlemen.

*New Jersey Geological Survey.*—This herbarium, preserved at New Brunswick, consists of some 5,000 sheets, probably half of them from our area, and forms the basis of Dr. N. L. Britton's catalogue of New Jersey plants published by the survey in 1883. Prof. B. D. Halstead gave me every facility for making a careful examination of the collection.

*State Museum, Trenton, N. J.*—Two important herbaria belong to this institution. (1) That of Mr. C. S. Gross, formerly of Landisville, containing about 2,000 sheets of plants from this vicinity, Pancoast, Pleasant Mills, Mays Landing, etc. (2) That of Prof. Austin P. Apgar, formerly of Trenton.

*Torrey Botanical Club.*—Contains probably 2,000 sheets from within our range.

*Witmer Stone.*—A local herbarium containing 5,000 sheets of southern New Jersey plants, obtained during the past ten years. Many of the collections were made in company with Mr. Van Pelt and other members of the Philadelphia Botanical Club, and much of the material is duplicated in the Academy's herbarium.

*Bayard Long.*—A herbarium of the plants of Long Beach Island, comprising 2,000 specimens. Most of Mr. Long's collections have been presented to the Academy, but this series he has retained for study.

*Benjamin Heritage.*—Contains a full series of plants from the country about Mickleton and a number from other parts of our region.

*Charles D. Lippincott.*—A fine series of the plants of Swedesboro and vicinity and many from other parts of southern New Jersey.

*O. H. Brown.*—A very full collection of the plants of lower Cape May County, probably 2,500 specimens.

Portions of the herbaria of *Dr. Thos. S. Githens*, of Philadelphia (since presented to the Academy); *Dr. Joseph Stokes*, of Moorestown; *Messrs. M. and A. N. Leeds*, and *Mr. C. S. Williamson*, of Philadelphia, have also been examined.

Number of sheets of southern New Jersey plants examined in connection with the preparation of this report:

|  |        |
|--|--------|
| Academy of Natural Sciences, Philadelphia, .....   | 14,000 |
| Herbarium of Witmer Stone, .....                   | 5,000  |
| N. J. State Herbarium, New Brunswick, .....        | 2,000  |
| N. J. State Herbarium, Trenton, .....              | 1,000  |
| Herbarium Torrey Botanical Club, .....             | 1,000  |
| Herbarium of Princeton University, .....           | 2,000  |
| Herbarium of University of Pennsylvania, .....     | 2,000  |
| Herbarium of Bayard Long, .....                    | 2,000  |
| Herbarium of Chas. D. Lippincott, .....            | 1,000  |
| Herbarium of Benj. Heritage, .....                 | 1,000  |
| Herbarium of O. H. Brown, .....                    | 1,000  |
| Herbaria of Dr. Thos. S. Githens and others, ..... | 1,000  |

Much field work has been planned and carried out in connection with the preparation of this report, which has resulted in the addition of many thousands of specimens to the herbaria of the Philadelphia Academy and the writer, and added greatly to his understanding of the several botanical regions here considered and their relationships.

At the time of Dr. Brinton's weekly field trips, certain historic localities were visited year after year, with the object of obtaining special desirable species known to occur there. The distribution of the various plants appealed more especially to the writer, and he realized the necessity of broader field work in order to secure data for this line of study. He therefore made efforts to visit as many new localities each year as possible, selecting spots that from their location on the map looked promising. This work was ably seconded later by Messrs. S. S. Van Pelt and Bayard Long. Some of these excursions proved barren of results, but the majority added many additional stations for plants hitherto known from only a few localities. The collecting of common species was prosecuted quite as diligently as the search for rarities, since the herbaria were lamentably weak in their representation of well-known plants. The collecting of series of specimens of the same species was not considered desirable in the old days, and the writer well remembers his good friend and preceptor, Mr. John H. Redfield,\* conservator of the Academy's botanical collections, carefully examining the herbarium to see if there might be room on a sheet to mount an additional duplicate that had been recently obtained. If there were not, the specimen was generally rejected rather than use up a new sheet of mounting paper. One cannot but wonder what the older botanists would have thought of the vast herbaria of to-day, in which "genus covers" have been supplanted by "species covers," so rapidly has material accumulated.

The accompanying map will show approximately the country covered by the field work of Messrs. Van Pelt, Long and the

\* 1815-1895. To Mr. Redfield's generous care the preservation of the many valuable herbaria at the Academy is largely due. He devoted many years of his life gratuitously to their care and arrangement at a time when such attention was imperative. Cf. Torrey Bull. XX. 162 for sketch of his life.

writer, from 1900 to 1910, inclusive. Some localities were visited many times and at all seasons, others only once or twice, but constantly increasing knowledge of the conditions governing plant life in this region usually made it possible to determine whether or not additional trips were worth while.



Fig. 1.—Field work of Messrs. Van Pelt, Long and Stone, 1900-1910, indicated by heavy black lines. Circles indicate ground covered by resident botanists.

The north central and northeastern portions of our area have been least studied, mainly because of their remoteness from Philadelphia, and also because their flora has but little bearing upon that of the Pine Barrens, with which this report is more

especially concerned. Further exploration of upper Monmouth and Burlington Counties would probably only add to the number of stations for the more boreal species, known to straggle down into the coastal plain, and would increase our knowledge of the true flora of the latter region but little.

At certain stations within our range we have been fortunate enough to have resident botanists who have become authorities on the plants of their home neighborhood, and who, by their collections (referred to above) and cordial co-operation, have rendered valuable assistance in this work—Messrs. J. H. Grove, of New Egypt; Benjamin Heritage, of Mickleton; Charles D. Lippincott, of Swedesboro; George W. Bassett, of Hammonton, and O. H. Brown, of Cape May.

The writer has made a rather exhaustive study of the flora about Medford, where, in conjunction with some fellow-naturalists, he has maintained a cabin camp for some ten years past, to which trips of two to four days' duration have been made at all seasons of the year and 750 specimens collected.

Mr. Bayard Long has made a similar study of the flora of Long Beach Island, where he has a summer home. Some 109 days have been spent here during the past few years and a collection of 2,000 specimens obtained.

Several wagon trips from Medford to the Plains have been taken by the writer and some fellow-naturalists, one of a week's duration, others of two or three days, and two visits of several days' duration were made to Farmingdale in May and July, 1910, by Messrs. S. Brown, B. Long, VanPelt and Stone, of the Philadelphia Botanical Club, and Mr. Norman Taylor, of the Torrey Club.

With the exception of the above the collecting trips have been one-day affairs. Trips made by Messrs. Long, VanPelt and Stone during the past ten years number 329; some were individual trips, others were participated in by two or three, while additional members of the Philadelphia Botanical Club often took part, especially Messrs. Stewardson Brown, Charles S. Williamson, Dr. J. W. Eckfeldt, Francis W. Pennell, George W. Bassett and O. H. Brown, to all of whom the writer is indebted for valuable assistance.



The writer has also traveled over all the railroads traversing South Jersey, and car-window data and general note-book records of conspicuous species have been used as supplementary evidence in estimating abundance in the general statements accompanying each species.

The entire series of South Jersey plants in the Academy herbarium was gone over critically by the writer in 1908, and subsequently much of this material has been reviewed by Mr. Bayard Long and many difficult groups have been worked over by one or both of the above. Other questions of the identity of various South Jersey species have been investigated by members of the Philadelphia Botanical Club, whose work has been of the greatest benefit to the writer. In this connection, too, he must express his indebtedness to a number of botanists who have directly or indirectly aided his work by identifying material sent to them or by examining specimens in their institutions—Prof. M. L. Fernald, Dr. B. L. Robinson, Dr. N. L. Britton, Dr. J. K. Small, Mr. Norman Taylor, Mr. A. S. Hitchcock, Mrs. Agnes Chase, Mr. K. K. Mackenzie.

The statements on the time of flowering and fruiting of each species have been drawn up almost entirely by Mr. Bayard Long from the Academy Herbarium, his own and that of the writer. The results form an exceedingly valuable contribution to a subject that is too often treated loosely and accompanied by little or no original research. Mr. Long has prepared some account of the methods employed and the objects sought in this investigation, which will be found on p. 115.

As explained beyond (p. 70), ecologic problems have necessarily received scant attention, the aim of the work being to present facts of distribution from a geographic point of view for all plants of the region as a necessary preliminary to more comprehensive discussions of both geographic and ecologic distribution in the future.

While a local flora such as the present one is of the greatest assistance to the student, it is impossible to expect it to take the place of a Manual. Every botanist must have access to either *Britton's Manual*, the new *Gray's Manual* or one of the more

popular works of like character. The present work is to be regarded as supplementary to these, to show exactly what species are present in southern New Jersey and their distribution and relative abundance.

Popular or historical accounts of some of the more striking or noted species are added, however, and to meet the request of the Museum authorities, keys, which are in some cases unavoidably based on the same characters as those of the manuals, but in others largely original and supplementary to the latter have been prepared, and vernacular names given for each species.

So far as the resources of the library of the Academy of Natural Sciences of Philadelphia have permitted, the original place of publication has been looked up, the reference verified and the type locality stated. Where the latter is general or where several localities are mentioned no attempt has been made to sift the matter to the bottom, since this usually involves the selection or examination of a type specimen, as so admirably explained in Hitchcock's paper on the types of North American grasses and in the monograph of the genus *Panicum* by Hitchcock and Chase. About one hundred additional references to volumes not in Philadelphia were verified at the New York Botanical Garden with the courteous aid of Dr. J. H. Barnhart, and a few others at Cambridge by Prof. M. L. Fernald. Only one reference remains unverified (p. 527).

As to nomenclature the botanist in America, at least, is on the horns of a dilemma. He can follow either the Vienna Code\* or the American Code.† Should he be also a zoölogist he will probably find it quite impossible to accept certain of the features of these codes which are at variance with the International Zoölogical Code (virtually identical with the A. O. U. Code).

The broad problems of Zoölogical and Botanical nomenclature are identical. The zoölogists have been "playing the game" seriously, longer than the botanists, and it seems logical to infer that, with the same tools to work with and the same object in view, men of the same intellectual ability will eventually adopt

\* Cf. Rhodora, March, 1907, pp. 29-55.

† Cf. Bull. Torr. Bot. Club, April, 1907, pp. 167-178.

the same methods. In a great many particulars the recent botanical codes are already in accord with those framed by zoölogists.

The principal points in which they differ are as follows:

I. The Vienna Code believes in a list of generic "Nomina Conservenda" which shall be excluded from the operations of the law of priority. Such reservation is not allowed by the American or the Zoölogical Codes, and is contrary to the basic principle of our rules governing nomenclature.

II. The Vienna Code does not recognize the principle of types which constitutes the only possible basis for a stable nomenclature.

III. The Vienna Code places species and sub-species on different planes, so that a plant may bear one name if it is recognized as a species and another if it is called a sub-species. This plan was long ago rejected by zoölogists and was not adopted by the original American Botanical Code, although the later one has followed the Vienna Code in this respect, a distinctly retrograde step, in the opinion of the writer.

In the present report no attempt has been made to revise the nomenclature. The names given in Britton's Manual have been adopted except where changes have been suggested in subsequent publications. In such instances an investigation has been made into the merits of the proposed change and a decision reached in accordance with the American Botanical Code, except in the treatment of species and sub-species in separate categories, a most pernicious rule which botanists will in all probability ultimately reject. The original spelling of each name has also been followed except in the case of obvious typographical errors, and all specific names have been written with a lower case initial letter, according to the custom prevalent among zoölogists, while only one authority, the authority of the specific or subspecific name has been given.

In the matter of genera considerable diversity of opinion exists as to how many it is desirable to admit, but no departure has here been made from those recognized in Britton's Manual. The question is wholly one of individual opinion and involves the problem of just what use we propose to make of technical nomenclature. The more sub-genera we raise to generic rank the less meaning

do the names convey to the general botanist, as the mind's capacity for retaining names is limited. On the other hand, if we wish to recognize every group which shows any slight difference of structure by a distinct generic name, we are building our nomenclature on a purely evolutionary basis; we are emphasizing differences rather than resemblances between groups, and the generic name becomes less and less a clue to the systematic position of the plants which it comprises. Phylogenetic relationships can be expressed just as well by sub-generic headings in manuals, etc., and it is a serious question whether the objects of a generic name are not better attained if it is used in as broad a sense as possible.

The synonymy given under each species consists of the citation of the original place of publication, with the type locality in all cases where the reference has been personally verified, and all published references to the plant in southern New Jersey, mainly in Pursh's *Flora*, Michaux's *Flora*, Nuttall's *Genera*, Barton's *Flora* and the catalogues of Knieskern, Willis, Britton, and Keller & Brown. In the last, as well as in the works of Barton and Willis, many general statements occur which are evidently intended to cover southern New Jersey, but unless this region is especially mentioned these references are not cited, since the statements are based largely upon conditions farther north or on the Pennsylvania side of the Delaware, and do not apply at all to the region under consideration. Not a few of Dr. Britton's general statements, too, while doubtless true for the northern part of the State, are quite erroneous for our region.

The illustrations are, all of them, made especially for this work. The full-page plates are from beautiful water-color paintings by Mr. Hugh E. Stone, which unfortunately lose much of their force in half-tone reproduction. Mr. Stone also prepared the line drawings. The smaller figures and views are from photographs taken by Messrs. Stewardson Brown, T. M. Lightfoot and Bayard Long, while the cones, grasses and sedges were photographed from specimens under the author's supervision.

To all those mentioned in the above pages, especially to Mr. Bayard Long, the writer wishes to express his obligations, as

well as to Mr. Silas R. Morse, Curator of the New Jersey State Museum, for his assistance and encouragement.

Owing to the extremely short time available for the final preparation of the manuscript and the rapidity with which it was put through the press, many minor errors and inconsistencies have, no doubt, crept in, which would have been avoided had there been more time for revision. Many additional records have also come to light too late to be included, but a work of this kind is never complete, and if it paves the way for more thorough work along similar lines, its purpose will have been accomplished.

WITMER STONE.

September 1, 1911.



# INTRODUCTION.

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The object of this report is to present a complete list of the native plants known to grow in the coastal plain region of New Jersey, or, more exactly, in that part of the State lying south of the northern boundaries of Burlington and Monmouth counties, together with an outline of their distribution within this area and some account of the characteristics, habitat and history of the more important species.

The demand for such a report is threefold:

(1.) It supplies to teachers and students a local botany, to be used in conjunction with the general botanical manual, which must be in the hands of all; showing them exactly which of the plants described in the more general work are to be found in southern New Jersey, and in what sections they should be looked for.

(2.) It presents to botanists of New Jersey and elsewhere a study in geographical distribution, which may be used in connection with similar reports from other parts of the country in solving the more general problems of the distribution of life.

(3.) It places on permanent record the present condition and history of one of the most interesting botanical areas in the United States; which is still one of the most extensive areas in the Middle States left in primeval condition, but which is rapidly undergoing the inevitable changes incident to deforestation, cultivation and settlement—the Pine Barrens of New Jersey.

## LIFE ZONES AND FLORAL BELTS OF EASTERN NORTH AMERICA.\*

It was the original intention to consider in this report only the flora of the Pine Barrens, but it soon became evident that a

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\* Cf. C. Hart Merriam, *Geographic Distribution of Life in North America*, *Proc. Biol. Soc. Wash.*, VII, 1-64, 1892. *Laws of Temperature Control of the Geographic Distribution of Terrestrial Animals and Plants*, *Nat. Geog. Mag.*, 1894, 229-238. *Geographic Distribution of Animals and Plants in North America*, *Year Book U. S. Dept. Agr.* 1894, 203-214.

J. A. Allen, *Geographic Distribution of North American Mammals*, *Bull. Amer. Mus. Nat. Hist.*, XIV, 199-244, 1892.

proper understanding of its nature involved a thorough knowledge of the plants of the contiguous areas which, together with it, constitute the coastal plain section of the state. Furthermore, as it is necessary in a detailed study of distribution to have some definite boundary line, the limit above mentioned was selected. While this does not exactly coincide with the upper edge of the coastal plain, it comes quite close to it and does not include any of the higher ground above the fall line.

The coastal plain extends north of Burlington and Monmouth Counties to a line connecting Trenton and Bound Brook, thence to Passaic and Hackensack behind the Palisades, and includes all the low country adjacent to the Hackensack marshes as well as Staten Island, part of Long Island and the immediate coast district of southern New England. In New Jersey this involves parts of Mercer, Middlesex, Union, Hudson, Essex, Passaic and Bergen Counties, and, while the ranges of many southern New Jersey plants touch them all, the higher parts of these counties harbor so many northern plants that to include them would be confusing. Moreover, no southern plants occur in this northern extension of the coastal plain which do not also occur south of our boundary line.

This coastal plain region of New Jersey has always attracted the attention of naturalists because of the striking differences that are presented by its flora and fauna as compared with those of the higher ground of the Piedmont country to the north and west of it. Pennsylvanians often liken it to a bit of the Southern States that has been transported northward. Its climate in winter is certainly milder; there is rarely a heavy snowfall, and what does fall soon disappears, while many southern species of plants and insects and a few birds and mammals are found there which are unknown to the west of Philadelphia or elsewhere beyond the fall line.

It may seem incongruous to find a "southern flora and fauna" by going eastward, as we do in the vicinity of Philadelphia, but this is easily explained when we examine a map of the life zones of North America. As Dr. Merriam has shown, temperature is one of the chief—if not *the* chief—factors in fixing the boundaries of these zones. If the surface of the earth were level, they



would encircle the globe like the parallels of latitude—the tropical zone at the equator, followed by the austral, transition, boreal and arctic as we pass toward the north pole. The intervention of a mountain chain, like the Alleghanies, however, running in a general way at right angles to the life zones, materially alters their direction. The higher elevations carry the boreal zone far southward, while the other zones, covering successively lower altitudes, naturally run parallel to the general direction of the mountains. We therefore find (1) that the Boreal zone of Canada and upper Maine is in evidence on the higher mountain tops all the way to western North Carolina, the elevation necessary to support it becoming higher and higher as we go southward; (2) the Transition (Alleghanian) zone of our northern tier of States, which covers most of New England and New York, spreads southward over all of central Pennsylvania and northern New Jersey, and follows the mountains on both slopes to North Carolina, northern Georgia and eastern Tennessee; (3) the Upper Austral (Carolinian) zone, covering Illinois, Indiana and Ohio, sweeps southward, rounding the lower extremity of the Alleghanies, and then, bending northward again, flanks the Transition all the way to southeastern Pennsylvania and southern New Jersey, sending up terminal arms into the valleys of the Susquehanna, Delaware, Hudson and Connecticut rivers, covering Staten Island and western Long Island, and leaving its trace on the southern coast of New England. Below the Carolinian lies the Lower Austral zone (Austro-riparian), which covers the region between the seashore and a line drawn from the mouth of the Potomac to middle Georgia; thence it bends northward to the juncture of the Ohio and Mississippi, and thence southwest. The Cape Charles peninsula belongs to this zone, and a slight tinge is seen in the plant and bird life of southern Delaware and possibly of extreme southwestern New Jersey.

Consequently, with the life zones running northeast and southwest, we experience the same sequence of animal and plant life in traveling from the higher Alleghanies of Pennsylvania to the seacoast of southern New Jersey as we do in coming from Maine southward at sea level.

RELATIONSHIP BETWEEN THE FLORA OF THE COASTAL PLAIN AND  
THAT OF THE PIEDMONT REGION.

The line separating the coastal plain from the Piedmont region to the west of it is known as the fall line and is marked throughout its extent by a more or less abrupt change of level. As already stated there is an appreciable difference in climatic conditions as we pass east or west of this line, and a more striking difference in soil conditions, the coastal plain being for the most part covered with sand and gravel in marked contrast to the heavier soils of the Piedmont. There are also frequent rock outcrops and rapid tumbling streams in the latter region, which are entirely lacking in the flat stretches of southern New Jersey. Historically, too, there are ample reasons for differences between the two regions, as the vastly older land of the Piedmont area was undoubtedly covered with vegetation before the coastal plain was elevated above the sea.

Hence it is not surprising that we should find a decided difference in the plant life of these two areas.

In the life-zone maps issued by the United States Department of Agriculture, and based mainly upon the distribution of birds and mammals, we shall notice that the line of demarcation between the Transition and Carolinian Zones is much further back towards the mountains than the line separating the coastal plain flora from that of the uplands. It is, however, well known that Carolinian birds and mammals are everywhere taking advantage of deforestation and cultivation to push northward, so that it is quite conceivable that the two lines may have been much more nearly identical in Pennsylvania and New Jersey under primeval conditions.

Whether the fall line ever did form the boundary between the faunal zones, there is no question but that it still marks a great change in plant life.

Farther south, however, it seems that a great many coastal plain plants range far west of the fall line, so that its effect upon distribution is less potent southward or else it coincides in the north more nearly with a line of demarcation in plant life due to other influences.

In plant distribution we have to reckon with other factors in addition to temperature, which are only indirectly instrumental in the distribution of vertebrate animals or are not at all in evidence.

(1) Soil conditions play a very important part in the distribution of plants, and (2) the past geological changes in the region, which necessarily caused great alterations in the ranges of both animals and plants, have often left their mark in the isolated colonies of plants still found in spots far removed from the present general habitat of the species, while in the case of free moving animals such cases are rare.

It should also be borne in mind that the life-zones of to-day are not permanently fixed, but are constantly and gradually changing, and oftentimes man accelerates these changes very materially by clearing forests, draining swamps, etc.\*

The flowering and filicoid plants of the New Jersey coastal plain comprise 1373<sup>†</sup> species. Of this number no less than 807 are more or less common in the Piedmont region. They are either of boreal affinities or plants adapted to richer, heavier soil, and have spread southeastward across the fall line into the northern and western portions of the New Jersey coastal plain, where many of them are still rare or only locally common, some of them being restricted to the immediate vicinity of the Delaware River. Only 181 of them reach the Pine Barrens, and of these only 80 are at all abundant, these being species of wide range.

On the other hand, 91 species of austral affinities, which are widely distributed over the coastal plain, occur also more or less abundantly in the Piedmont region northwest of the fall line, though they vary greatly both in abundance and in the extent of their distribution westward.

The remaining 475 species are restricted to the coastal plain except for sporadic occurrences here and there in the Piedmont

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\* Cf. Trotter, *Geological and Geographical Relations of the Land Bird, Fauna of Northeastern America*. *The Auk*, 1909, p. 231-233 (especially p. 230).

† The figures given here and beyond vary slightly from the actual number of species in the list, as a few have been added and a few relegated to footnotes or excluded entirely since this count was made.

region, where certain boggy spots seem to furnish the necessary conditions for the support of isolated colonies of coastal plain species. Quite a number of these lowland plants range right up to the fall line, occurring more or less plentifully in Pennsylvania on the strip of land lying between the Delaware River and the fall line, especially in Tinicum township, Delaware County, and about Bristol and Tullytown, in Bucks County. Among them may be mentioned:

|  |                                    |
|--|------------------------------------|
| <i>Lycopodium chapmanii</i> .              | <i>Strophostylus helvolus</i> .    |
| " <i>alopecuroides</i> .                   | <i>Polygala cruciata</i> .         |
| <i>Woodwardia virginica</i> .              | <i>Crotonopsis linearis</i> .      |
| " <i>arcolata</i> .                        | <i>Euphorbia ipsecacuanhæ</i> .    |
| <i>Chamaecyparis thyoides</i> .            | <i>Ilex glabra</i> .               |
| <i>Erianthus saccharoides</i> .            | <i>Hibiscus moscheutos</i> .       |
| <i>Andropogon corymbosus abbreviatus</i> . | <i>Ascyrum stans</i> .             |
| <i>Panicum verrucosum</i> .                | " <i>hypericoides</i> .            |
| " <i>scoparium</i> .                       | <i>Hypericum adpressum</i> .       |
| <i>Calamagrostis cinnoides</i> .           | " <i>virgatum ovalifolium</i> .    |
| <i>Eragrostis pectinacea</i> .             | " <i>gymnanthum</i> .              |
| <i>Uniola laxa</i> .                       | <i>Viola brittoniana</i> .         |
| <i>Cyperus lancastricensis</i> .           | " <i>rafinesquii</i> .             |
| <i>Eriophorum virginicum</i> .             | <i>Ludwigia spærocarpon</i> .      |
| <i>Eleocharis tricostata</i> .             | <i>Oenothera laciniata</i> .       |
| <i>Rynchospora cymosa</i> .                | <i>Kneiffia longipedicellata</i> . |
| <i>Scleria reticularis torreyana</i> .     | <i>Oxypolis rigidior</i> .         |
| <i>Carex folliculata</i> .                 | <i>Clethra alnifolia</i> .         |
| " <i>barrattii</i> .                       | <i>Leucothoe racemosa</i> .        |
| " <i>caroliniana</i> .                     | <i>Pieris mariana</i> .            |
| " <i>leptalea harperi</i> .                | <i>Arctostaphylos uva-ursi</i> .   |
| <i>Nyris torta</i> .                       | <i>Sabatia gracilis</i> .          |
| <i>Juncus dichotomus</i> .                 | <i>Limnanthemum lacunosum</i> .    |
| " <i>scirpoides</i> .                      | <i>Asclepias rubra</i> .           |
| <i>Lilium superbum</i> .                   | <i>Momarda punctata</i> .          |
| <i>Smilax tannifolia</i> .                 | <i>Linaria canadensis</i> .        |
| <i>Iris prismatica</i> .                   | <i>Gratiola aurea</i> .            |
| <i>Pogonia ophioglossoides</i> .           | <i>Gerardia purpurea</i> .         |
| <i>Betula populifolia</i> .                | <i>Utricularia inflata</i> .       |
| <i>Quercus phellos</i> .                   | <i>Lobelia nuttallii</i> .         |
| " <i>triloba</i> .                         | <i>Empatorium verbenefolium</i> .  |
| <i>Magnolia virginiana</i> .               | " <i>pubescens</i> .               |
| <i>Drosera longifolia</i> .                | <i>Solidago neglecta</i> .         |
| " <i>rotundifolia</i> .                    | <i>Euthamia caroliniana</i> .      |
| <i>Liquidambar styraciflua</i> .           | <i>Aster novi-belgii</i> .         |
| <i>Spiræa tomentosa</i> .                  | <i>Bidens trichosperma</i> .       |
| <i>Rubus cuneifolius</i> .                 | <i>Senecio crowfordii</i> .        |
| <i>Meibomia laevigata</i> .                | <i>Carduus spinosissimus</i> .     |

Certain coastal plain species occur a short distance above the fall line along river valleys, and while this is not particularly noticeable on the smaller streams flowing into the Delaware from eastern Pennsylvania, it is obvious along the Delaware River itself for some distance north of Trenton, where Dr. Britton has recorded a number of coastal plain species in his *Catalogue of New Jersey Plants*.

In the valley of the lower Susquehanna also a number of species occur within the limits of Pennsylvania, which do not range so far northward elsewhere except in the New Jersey coastal plain. Their distribution is, of course, more or less continuous down the shores of Chesapeake Bay to the coastal plain in Maryland; while they are absent in the intervening Piedmont region of southern Pennsylvania.

Such species are:

|                                  |   |                                 |
|----------------------------------|---|---------------------------------|
| <i>Pinus echinata.</i>           | 7 | <i>Ptelea trifoliata.</i>       |
| <i>Cyperus lancastricensis.</i>  |   | <i>Chionanthus virginianus.</i> |
| <i>Blephariglottis peramœna.</i> |   | <i>Asimina triloba.</i>         |
| <i>Castanea pumila.</i>          |   | <i>Dianthera americana.</i>     |
| <i>Cercis canadensis.</i>        |   | <i>Lippia lanceolata.</i>       |
| <i>Meibomia sessilifolia.</i>    |   | <i>Ipomœa lacunosa.</i>         |
| <i>Phaseolus helvolus.</i>       |   | <i>Ruellia ciliosa.</i>         |
| <i>Opuntia opuntia.</i>          |   | <i>Galium concinnum.</i>        |
| <i>Ilex opaca.</i>               |   | <i>Boltonia asteroides.</i>     |
| <i>Rhus vernix.</i>              |   | <i>Willugbœya scandens.</i>     |
| <i>Euonymus atropurpureus.</i>   |   | <i>Tecoma radicans.*</i>        |
| <i>Acer negundo.</i>             |   |                                 |

Some of these, notably *Cercis*, occur on the upper Delaware and Raritan, quite isolated from the general range of the species to the southward, but they are everywhere plants of the hilly country near the fall line and not coastal plain species.

The isolated colonies of coastal plain plants in the Piedmont region, already referred to, are probably not as numerous as formerly, owing to the general tendency to drain the bogs and

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\* Other species occur in the lower Susquehanna Valley which are not known from New Jersey and are hence omitted from this list. Many of those listed are much more common in the Susquehanna Valley than in that of the Delaware, as one would expect in passing nearer to the upper limits of the coastal plain, and on the Raritan or lower Hudson all but one or two have disappeared. A few species in the list extend casually to southern New England along the coast, and a few occur in isolated colonies in other parts of southeastern Pennsylvania.

swamps which are necessary for their existence. Some, however, still survive, and we have fortunately pretty good lists of species from others which have been destroyed. Probably the most remarkable spot of this sort is Frazer's bog, near Willow Grove, Montgomery County.

Here we find quite a plantation of swamp magnolias, with which grow a large number of coastal plain plants. From the boyhood of the oldest residents and still earlier, according to the reports handed down by their fathers, this bog has presented much the same condition as at present, but more recently strenuous efforts have been made, with but little success, to fill it in and convert it into a meadow. The flora of this bog was apparently first collected by Mr. C. F. Saunders, later Mr. Alex. MacElwee published some notes upon it,\* and Mr. S. S. Van Pelt and Bayard Long made collections. From these sources as well as from my own herbarium the following list is compiled:

|                                       |                                  |
|---------------------------------------|----------------------------------|
| <i>Panicum lucidum.</i>               | <i>Limodorum tuberosum.</i>      |
| " <i>meridionale.</i>                 | <i>Magnolia virginiana.</i>      |
| <i>Calamagrostis cinnoides.</i>       | <i>Drosera rotundifolia.</i>     |
| <i>Agrostis elata.</i>                | <i>Rubus hispidus.</i>           |
| <i>Eleocharis tuberculosa.</i>        | <i>Polygala cruciata.</i>        |
| <i>Eriophorum virginicum.</i>         | <i>Rhus vernix.</i>              |
| <i>Rynchospora glomerata.</i>         | <i>Acer rubrum carolinianum.</i> |
| " <i>alba.</i>                        | <i>Hypericum canadense.</i>      |
| <i>Scleria reticularis torreyana.</i> | <i>Triadenum virginicum.</i>     |
| <i>Carex varia emmonsii.</i>          | <i>Linum striatum.</i>           |
| " <i>interior.</i>                    | <i>Oxypolis rigidior.</i>        |
| " <i>atlantica.</i>                   | <i>Gaylussaccia dumosa.</i>      |
| <i>Xyris torta.</i>                   | <i>Gentiana saponaria.</i>       |
| <i>Juncus scirpoides.</i>             | <i>Aselepias rubra.</i>          |
| <i>Lilium superbum.</i>               | <i>Gerardia purpurea.</i>        |
| <i>Aletris farinosa.</i>              | <i>Eupatorium verbenæfolium.</i> |
| <i>Blephariglottis cristata.</i>      | <i>Aster novi-belgii.</i>        |
| <i>Pogonia ophioglossoides.</i>       |                                  |

The Smithville swamp, in Lancaster County, is a somewhat similar locality, from which Prof. Porter has recorded the following:

\* Proc. Acad. Nat. Sci. Phila., 1901, pp. 485-486.

|   |                                 |
|---|---------------------------------|
| <i>Calamagrostis cinnoides.</i>           | <i>Arethusa bulbosa.</i>        |
| <i>Andropogon corymbosus abbreviatus.</i> | <i>Blephariglotis ciliaris.</i> |
| <i>Scleria triglomerata.</i>              | <i>Quercus marylandica.</i>     |
| <i>Carex oblita.</i>                      | <i>Magnolia virginiana.</i>     |
| “ <i>vestita.</i>                         | <i>Linum striatum.</i>          |
| “ <i>polymorpha.</i>                      | <i>Rhus vernix.</i>             |
| “ <i>bullata.</i>                         | <i>Polygala nuttallii.</i>      |
| <i>Orontium aquaticum.</i>                | <i>Viburnum nudum.</i>          |
| <i>Juncus debilis.</i>                    | <i>Gaylussacia dumosa.</i>      |
| <i>Smilax glauca.</i>                     | <i>Leucothoe racemosa.</i>      |
| <i>Aletris farinosa.</i>                  | <i>Kalmia angustifolia.</i>     |
| <i>Cypripedium acaule.</i>                | <i>Azalea viscosa.</i>          |
| <i>Pogonia ophioglossoides.</i>           | <i>Asclepias rubra.</i>         |

The further tabulation of the distribution of coastal plain plants in the Piedmont of Pennsylvania and northern New Jersey cannot be too highly recommended, as it is likely to throw light upon a problem of great importance.

#### GENERAL GEOGRAPHICAL DISTRIBUTION OF THE PLANTS COMPRISING THE FLORA OF THE NEW JERSEY COASTAL PLAIN.

A detailed study of the 1,373 species of flowering and filicoid plants which occur in the New Jersey coastal plain shows that they are divisible into four categories.\*

(1) Species of wide range north and south through eastern North America and sometimes much farther—742 species.

(2) Species of northern affinities which reach the southern limit of their range on the Atlantic coast in or near southern New Jersey—121 species.

(3) Species of southern affinities which range north only as far as New Jersey or to the narrow extension of the coastal plain

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\*In making up these lists and those which follow, a series of card slips was prepared, representing all the species found in the region under consideration. On each slip was recorded the several districts of southern New Jersey (see beyond) in which the species occurs and the northern and southern limit of its distribution in eastern North America, the latter being compiled from Britton's Manual, the new Gray's Manual, and a few recent monographs. The cards were then sorted and re-sorted into the various categories and the desired lists and figures readily obtained.

As this report goes to press, a notable paper by Prof. M. L. Fernald appears in *Rhodora* (1911, pp. 109-162), on the Origin of the Newfoundland Flora, in which he adopts nearly the same method of contrasting the several elements

which is found on Long Island, N. Y., southern Connecticut and Rhode Island and eastern Massachusetts—479 species.†

(4) Species of local distribution, restricted to New Jersey and portions of the immediately adjacent States lying within the coastal plain—31 species.

PLANTS OF WIDE RANGE.—These species may be divided into three groups, as follows:

|   |     |
|---|-----|
| Ranging throughout North America, .....   | 22  |
| Newfoundland—New Brunswick on the north to Virginia—Florida on the south, ..... | 420 |
| Maine—Vermont to Virginia—Florida, .....  | 300 |

As already said, many of these plants barely enter our region on the northwest, so that the lower part of New Jersey is really on the southern boundary of their range, although since they follow the trend of the mountains to the southwest the actual southern limit of their range, given in the Manuals, is far down in the southern States. The most surprising fact in the study of these ranges is the large number of plants which range from the far north all the way to Florida and yet are rare or absent in the lower part of the New Jersey coastal plain, but the brief data of the Manuals is hardly sufficient for detailed studies of distribution and many of them may be quite as scarce in Florida as they are in southern New Jersey.

THE NORTHERN ELEMENT.—A second group of our New Jersey coastal plain plants includes those which find the absolute southern limit of their range in this region or close to it, while they extend north to Maine or the Canadian provinces. They may be divided as follows:

|   |    |
|---|----|
| Canadian Provinces to New Jersey, .....           | 60 |
| Maine to New Jersey, .....                        | 18 |
| Vermont or New Hampshire to New Jersey, .....     | 3  |
| Canadian Provinces to Delaware or Maryland, ..... | 27 |
| Maine to Delaware or Maryland, .....              | 13 |

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as I have employed in the following pages. He likewise considers *all* the species native to the region, which, as I have stated elsewhere, is the only way to logically discuss the floral relationship of a district.

† Cf. Collins, *Flora of Lower Cape Cod*, *Rhodora* XI, 125; XII, 8; XIII, 17, and Sears, *Essex Co. Mass. Rhodora* X, p. 42.



The detailed lists of species are as follows :

## CANADIAN PROVINCES TO NEW JERSEY.\*

|                                       |                                     |
|---------------------------------------|-------------------------------------|
| <i>Isoetes echinosp. braunii</i> M.   | <i>Salix bebbiana</i> M.            |
| <i>Lycopodium inundatum</i> M.        | " <i>lucida</i> C.                  |
| <i>Schizæa pusilla</i> PB.            | <i>Dondia maritima</i> C.           |
| <i>Potamogeton oakesianus</i> PB, CM. | <i>Chenopodium rubrum</i> C.        |
| <i>Scheuchzeria palustris</i> M.      | <i>Mochringia lateriflora</i> M, C. |
| <i>Triglochin maritima</i> C.         | <i>Actæa rubra</i> M.               |
| <i>Savastana odorata</i> C.           | <i>Oxygraphis cymbalaria</i> C.     |
| <i>Spartina michauxiana</i> C.        | <i>Nymphæa variegata</i> PB.        |
| <i>Phalaris arundinacea</i> M.        | <i>Rosa virginiana</i> C.           |
| <i>Panicularia canadensis</i> M.      | <i>Dalibarda repens</i> M.          |
| " <i>obtusa</i> M, PB, CM.            | <i>Geum strictum</i> M.             |
| " <i>grandis</i> M.                   | <i>Lathyrus maritimus</i> C.        |
| <i>Scirpus subterminalis</i> PB, CM.  | <i>Corema conradii</i> PB.          |
| " <i>robustus paludosus</i> C.        | <i>Geranium robertianum</i> C.      |
| <i>Eriophorum tenellum</i> M, PB, CM. | <i>Hypericum boreale</i> C, CM.     |
| " <i>gracile</i> M.                   | " <i>ellipticum</i> M.              |
| <i>Carex lanuginosa</i> M, C.         | " <i>ascyron</i> M.                 |
| " <i>trichocarpa</i> M.               | <i>Polania graveolens</i> M.        |
| " <i>exilis</i> PB.                   | <i>Arctostaphylos uva-ursi</i> PB.  |
| " <i>livida</i> PB.                   | <i>Vaccinium pennsylvanicum</i> M.  |
| " <i>canescens disjuncta</i> M, PB.   | <i>Muriophyllum tenellum</i> M, C.  |
| " <i>utriculata</i> M.                | <i>Glaux maritima</i> C.            |
| " <i>limosa</i> M.                    | <i>Limosella tenuifolia</i> M, C.   |
| " <i>silicea</i> C.                   | <i>Menyanthes trifoliata</i> M, CM. |
| <i>Eriocaulon septangulare</i> PB.    | <i>Utricularia intermedia</i> PB.   |
| <i>Juncus articulatus</i> C.          | <i>Plantago decipiens</i> C.        |
| " <i>pelocarpus</i> M, PB, CM.        | <i>Aster nemoralis</i> PB.          |
| <i>Sisyrinchium angustifolium</i> C.  | <i>Solidago uniligulata</i> PB.     |
| <i>Populus tremuloides</i> M, C.      | <i>Xanthium commune</i> M.          |
| " <i>grandidentata</i> M.             |                                     |

## MAINE TO NEW JERSEY.†

|  |  |
|--|--|
| <i>Isoetes canadensis</i> M.             | <i>Carex annectens</i> M, PB.            |
| <i>Potamogeton confervoides</i> PB, C.   | " <i>umbellata tonsa</i> M, PB.          |
| <i>Muhlenbergia foliosa</i> M.           | "    " <i>abdita</i> M.                  |
| <i>Panicularia laxa</i> M.               | " <i>festucea brevior</i> CM.            |
| <i>Sporobolus serotinus</i> PB.          | <i>Juncus greenii</i> M.                 |
| <i>Elymus striatus</i> M, C.             | <i>Chenopodium leptophyllum</i> C.       |
| <i>Scirpus smithii</i> M.                | <i>Polygonum careyi</i> M, C.            |
| "    " <i>setosus</i> M.                 | "    " <i>atlanticum</i> C.              |
| "    " <i>torreyi</i> [Vt.] M.           | <i>Hypericum majus</i> M.                |
| <i>Carex interior capillacea</i> [N. H.] | <i>Plantago major</i> M, C.              |
| M, PB.                                   | <i>Eupatorium sessilifolium</i> [Vt.] M. |

\* The letters following the names indicate the several divisions of the New Jersey coastal plain in which they occur. See p. 57.

† Those ranging only to Vt. or N. H. are so marked.

CANADIAN PROVINCES TO DELAWARE OR MARYLAND.

|                              |                             |
|------------------------------|-----------------------------|
| Botrychium neglectum M.      | Alsine uliginosa M.         |
| Puccinellia fasciculata c.   | Anemone canadensis M.       |
| Rynchospora fusca PB, CM.    | Potentilla argentea M, c.   |
| Carex umbellata M, PB, CM.   | Drymocallis arguta M.       |
| “ folliculata M, PB, CM.     | Vitis vulpina M.            |
| “ trisperma PB.              | Callitriche heterophylla M. |
| “ hormathodes c, CM.         | Cicuta bulbifera M.         |
| Juncus militaris PB, CM.     | Angelica atropurpurea M.    |
| Leptorchis lesclii M, CM, c. | Pyrola chlorantha M.        |
| Salix discolor M.            | “ elliptica M.              |
| “ interior M.                | “ secunda M.                |
| Betula populifolia PB.       | Utricularia clandestina PB. |
| Sagina procumbens c.         | Aster radula M.             |
| Alsine longifolia M.         |                             |

MAINE TO DELAWARE OR MARYLAND.

|                               |                               |
|-------------------------------|-------------------------------|
| Isoetes engelmanni [N. H.] M. | Potentilla pumila M, c.       |
| Dryopteris simulata M, PB.    | Myriophyllum humile M, c, PB. |
| Panicum scribnerianum M.      | Antennaria fallax M.          |
| Agrostis maritima c.          | “ parlinii M, CM, c.          |
| Panicularia acutiflora M.     | Bidens connata M, c.          |
| Carex vestita M, CM.          | Carduus odoratus M.           |
| “ Inpuliformis [Vt.] M.       |                               |

THE SOUTHERN ELEMENT.—The third group of New Jersey coastal plain plants comprises those which find their northern limit of distribution in or near this region. They may be grouped as follows:

| Ranging north to..... | N. J. | So. N. Y.* | R. I. or Ct. | Mass.† |
|-----------------------|-------|------------|--------------|--------|
| From Va., .....       | 4     | 1          | 3            | 14     |
| N. C., .....          | 6     | 7          | 4            | 12     |
| S. C., .....          | 6     | 2          | 4            | 3      |
| Ga., .....            | 15    | 9          | 12           | 24     |
| Fla., .....           | 133   | 58         | 46           | 116    |
|                       | 164   | 77         | 69           | 169    |

The detailed lists of species follow:

\* Staten Island and Long Island for the most part.

† Usually the immediate coast district or outlying islands.

## NEW JERSEY TO FLORIDA.\*

- Lycopodium carolinianum* PB.  
*Pinus taeda* CM.  
     " *serotina* M, CM.  
*Taxodium distychnum* CM.  
*Cœlorachis rugosa* CM.  
*Erianthus divaricatus* [Ga.] PB.  
     " *saccharoides* M, C, CM.  
*Andropogon elliotii* M, CM.  
*Paspalum membranaceum* M, CM.  
     " *laeve australe* C, CM.  
     " *angustifolium* M, C,  
         CM.  
     " *glabratum* C, CM.  
     " *plenipilum* C, CM.  
*Panicum hemitomom* CM.  
     " *condensum* C, CM.  
     " *anceps* M, CM.  
     " *angustifolium* CM.  
     " *aciculare* CM.  
     " *cærulescens* CM.  
     " *ensifolium* [Ga.], PB, CM.  
     " *leucothrix* PB.  
     " *wrightianum* CM.  
     " *oligosanthes* M, PB, CM.  
     " *scabriusculum* PB.  
     " *cryptanthum* PB.  
     " *polyanthes* [Ga.], M, CM.  
     " *lanuginosum* C, CM.  
*Amphicarpon amphicarpon* PB, CM.  
*Sacciolepis striata* CM.  
*Chaetochloa magna* C, CM.  
*Cenchrus tribuloides* C.  
*Aristida oligantha* M.  
     " *lanosa* M, CM.  
*Agrostis elata* [Ga.], PB, CM.  
*Calamovilfa brevipilis* [N. C.] PB.  
*Danthonia epilix* PB.  
*Gymnopogon ambiguus* M, CM.  
     " *brevifolius* M, CM.  
*Poa brachyphylla* [S. C.], M, CM.  
*Cyperus hystrius* [Ga.] M.  
     " *retrofractus* M.  
     " *microdontus* CM, C.  
     " *lancastriensis* [Ga.] M.  
     " *pseudovegetus* M.  
*Eleocharis tortilis* M, CM.  
     " *ocreata* CM.  
*Rynchospora smallii* M, PB.  
     " *rariflora* CM.  
     " *glomerata leptocarpa* PB.  
     " *filifolia* PB.  
     " *pallida* [N. C.], PB, CM.  
     " *oligantha* PB.  
     " *knieskernii* [Va.] PB.  
     " *axillaris microcephala*  
         PB.  
     " *cymosa* M, CM.  
*Fuirena hispida* C.  
*Fimbristylis autumnalis* M, PB, C, CM.  
*Scleria pauciflora* M, CM.  
*Carex leptalea harperi* M, CM.  
*Xyris fimbriata* PB.  
     " *elata* CM.  
     " *arenicola* PB.  
*Eriocaulon decangulare* PB, CM.  
     " *compressum* PB, CM.  
*Commelina communis* MC.  
*Juncus setaceus* CM.  
*Xerophyllum asphodeloides* PB.  
*Tofieldia racemosa* PB.  
*Uvularia nitida* [S. C.] PB.  
*Smilax tamnifolia* [S. C.] PB, CM.  
     " *laurifolia* PB, CM.  
     " *walteri* PB, CM.  
*Lophiola americana* PB.  
*Gymnadeniopsis integra* PB.  
     " *nivea* CM.  
*Blephariglottis cristata* PB, CM.  
     " *peramoena* [Ga.] M,  
         CM.  
*Pogonia divaricata* PB, CM.  
*Gyrostachys præcox* PB, CM.  
*Listera australis* M, PB.  
*Tipularia discolor* M, CM.  
*Corallorhiza wisteriana* M.  
*Myrica cerifera* CM, C.  
*Castanea pumila* M.  
*Quercus triloba* M, C, CM.  
     " *michauxii* M.  
*Polygonum setaceum* CM.

\* Species ranging only to Va., N. C., S. C., or Ga. are so marked.

- Polygonum eciliatum CM.  
 Phoradendron flavescens M, PB.  
 Asimina triloba M.  
 Itea virginica PB, CM.  
 Malus angustifolia CM.  
 Prunus angustifolia M.  
 Cercis canadensis M.  
 Æschynomene virginica M.  
 Meibomia stricta M, PB.  
 Lespedeza stuvei neglecta [Ga.] CM.  
     "    oblongifolia PB.  
 Bradburya virginiana M, C.  
 Polygala incarnata M.  
     "    mariana PB, CM.  
 Rhus toxicodendron [Ga.] M, C.  
 Vitis cordifolia M, C.  
 Hypericum densiflorum PB.  
     "    gymnanthum [Ga.] M.  
 Viola emarginata [Va.] M, C, CM.  
 Rhexia aristosa [Ga.] PB.  
 Lythrum lineare C.  
 Ludwigiantha arcuata C.  
 Ludvigia linearis PB.  
     "    hirtella PB, CM.  
 Oenothera humifusa C.  
     "    laciniata MC.  
 Eryngium aquaticum PB.  
 Thaspium trifoliatum [Ga.] N, M.  
 Oxypolis rigidior longifolius [S. C.]  
     PB  
 Dendrium buxifolium PB.  
 Vaccinium virgatum PB.  
 Chionanthus virginica M.  
 Sabbatia lanceolata PB, CM.  
 Gentiana porphyrio PB, CM.  
     "    villosa M.  
 Obolaria virginica [Ga.] M.
- Limnanthemum aquaticum M.  
 Asclepias rubra PB, CM.  
     "    lanceolata C.  
 Pyxidantha barbulate [N. C.] PB.  
 Cuscuta cephalanthi PB.  
 Breweria pickeringii [N. C.] PB.  
 Lippia lanceolata C.  
 Kœllia aristata C.  
 Gratiola pilosa M, CM.  
     "    sphærocarpa M, CM.  
 Micranthemum micranthemoides M.  
 Gerardia racemulosa PB.  
 Buchnera americana [Va.] M.  
 Melampyrum latifolium M.  
 Utricularia juncea PB, CM.  
 Tecoma radicans M, CM, C.  
 Ruellia ciliosa CM.  
 Diodia virginiana CM.  
 Galium hispidulum CM.  
     "    pilosum punctulosum PB, CM.  
     "    concinnum [Va.] M.  
 Viburnum scabellum M.  
 Lobelia canbyi [S. C.] PB.  
     "    puberula M, C, CM.  
 Lactuca sagittifolia [S. C.] M.  
 Nabalus virgatus PB.  
 Eupatorium coelestinum M, CM.  
 Kubnia eupatorioides [Ga.] M.  
 Lacinaria g. pilosa PB, C, CM.  
 Solidago stricta PB.  
     "    fistulosa PB, C, CM.  
 Aster gracilis [N. C.] PB, C, CM.  
 Doellingeria umbellata humilis PB.  
 Pluchea foetida CM.  
 Actinomeris alternifolia M.  
 Mesadenia reniformis [N. C.] M.  
 Senecio tomentosa C, CM.

## NEW YORK TO FLORIDA.

- Pinus virginiana [S. C.] M, PB, CM.  
 Andropogon littoralis C.  
 Paspalum laeve circulare C, CM.  
     "    pubescens [Ga.] M, C.  
 Panicum mattamusketense [N. C.] C.  
     "    lucidum PB, C, CM.  
 Uniola laxa M, C, CM.
- Cyperus ovularis M, C, CM.  
     "    flavescens M, PB, C, CM.  
     "    cylindricus PB, C, CM.  
 Eleocharis tricostata PB, CM.  
 Rynchospora axillaris PB.  
 Fimbristylis castanea C.  
 Psilocarya nitens C.

- Carex oblita* [N. C.] M, CM.  
 " *carolinensis* [N. C.] M.  
*Juncus scirpoides* M, C, CM.  
 " *dichotomu.* M, PB, C, CM.  
*Zygadenus leimanthoides* [Ga.] M. PB.  
*Helonias bullata* [N. C.] M, PB, CM.  
*Melanthium virginicum* [Ga.] M.  
*Chrosperma muscaetoxicum* M.  
*Quercus marilandica* PB, C, CM.  
 " *phellos* M, C, CM.  
*Sesuvium maritima* C.  
*Arenaria caroliniana* PB.  
*Ranunculus pusillus* M.  
*Nymphæa advena* M.  
*Capnoides flavulum* [Va.] M, CM.  
*Cardamine rotundifolia* [N. C.] M.  
*Hydrangea arborescens* M.  
*Porteranthus trifoliatus* [Va.] M.  
*Aronia arbutifolia* M, PB, C, CM.  
*Cratægus tomentosus* M, PB.  
*Stylosanthes biflora* M, PB, CM.  
*Meibomia levigata* M, CM.  
 " *viridiflora* M.  
*Galactia regularis* M, PB, CM.  
 " *volubilis* CM.  
*Strophostyles umbellata* M, C, CM.  
*Ptelea trifoliata* M.  
*Polygala lutea* PB, CM.  
*Euphorbia darlingtonii* [N. C.] M.  
*Euonymus americanus* M, C, CM.  
 " *atropurpureus* M.  
*Kosteletzkya virginica*, C, CM.  
*Ascyrum stans*, PB, CM.  
*Lechea racemulosa* PB, CM.  
*Viola hirsutula* [Ga.] M.  
 " *rafinesquii* [Ga.] M.  
*Rhexia mariana* PB, CM.  
*Aralia spinosa* M.  
*Chaerophyllum procumbens* [N. C.] M.  
*Oxypolis rigidior* M, C, CM.  
*Sabatia angularis* M, C, CM.  
*Asclepias variegata* M, C, CM.  
*Polemonium reptans* [Ga.] M.  
*Phlox subulata* M.  
*Mertensia virginica* [S. C.] M.  
*Scutellaria pilosa* M, CM.  
*Monarda punctata* M, C, CM.  
*Cunila origanoides* M, CM.  
*Gerardia holmiana* PB.  
*Utricularia fibrosa* PB.  
 " *virgatula* PB, CM.  
*Oldenlandia uniflora* M, C, CM.  
*Lobelia nuttallii* [Ga.] PB, C, CM.  
*Lactuca villosa* M.  
 " *floridana* M, C.  
*Eupatorium album* PB, C, CM.  
 " *leucolepis* PB, C, CM.  
*Solidago erecta* [Ga.] PB, CM.  
*Helianthus angustifolius* PB, C, CM.  
*Chrysopsis mariana* M, PB, CM.

## RHODE ISLAND OR CONNECTICUT TO FLORIDA.

- Sagittaria longirostra* [Ga.] PB, CM.  
 " *subulata* M.  
*Tripsacum dactyloides* C.  
*Panicum longifolium* PB, CM.  
 " *stipitatum* [S. C.] M.  
 " *meridionale* [Ga.] PB, C, CM.  
 " *pseudopubescens* M, PB, CM.  
 " *commonsianum* PB, C, CM.  
 " *virgatum cubense* M, PB.  
 " *amarum* [Ga.] C.  
*Chaetochloa imberbis* M.  
 " " *versicolor* C.  
*Spartina cynosuroides* C.  
*Sporobolus clandestinus* M, CM.  
*Sphenopholis obtusata* C.  
 " " *pubescens* CM,  
 C.  
*Tridens flavus* M C.  
*Eleocharis quadrangulata* [Ga.] CM.  
 " *torreyana* PB.  
*Scirpus eriophorum* M, PB, C, CM.  
*Scleria torreyana* PB, CM.  
*Carex collinsii* [Ga.] M, PB, CM.  
 " *squarrosa* [Ga.] M.  
 " *barrattii* [N. C.] PB, CM.  
 " *styloflexa* M, CM.  
 " *nigromarginata* [N. C.] M.  
*Wolffia columbiana* M.  
*Tradescantia virginica* [S. C.] M.  
*Heteranthera reniformis* M.  
*Juncus debilis* [S. C.] M, PB, CM.  
*Dioscorea villosa* M, C, CM.  
*Populus heterophylla* [Ga.]  
*Chenopodium boscianum* [N. C.]

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- Amaranthus pumilus* [N. C].  
*Aristolochia serpentaria* M, CM.  
*Heuchera americana* [Ga.] M, CM.  
*Liquidambar styraciflua* M, C, CM.  
*Rubus cuneifolius* M, PB, C, CM.  
*Prunus americanus* M.  
*Geum flavum* [Va.] M.  
*Agrimonia rostellata* [Va.] M.  
     "    *parviflora* [Ga.], M.  
*Lespedeza repens*, M, PB, C, CM.  
*Phaseolus polystachyus* M, C.  
*Polygala brevifolia* PB.  
*Crotonopsis linearis* M, PB.  
*Euphorbia ipecacuanhæ* PB, CM.  
*Rhus vernix* M, PB, C, CM.  
*Kneiffia longipedicellata*.  
*Zizia cordata* [Ga.] M.  
*Eryngium yuccaefolium* c.  
*Pieris mariana* M, PB, C.
- Diospyros virginiana* M, c.  
*Gentiana saponaria* MC, CM.  
*Ipomoea pandurata* M, CM.  
*Phlox maculata* M, CM.  
     "    *pilosa* M.  
*Salvia lyrata* M, c, CM.  
*Trichostema lineare* [Ga.] PB.  
*Mimulus alatus* [Ga.] M.  
*Plantago virginica* M, c, CM.  
*Viburnum nudum* M, PB, CM.  
     "    *prunifolium* [S. C.] M, CM.  
*Diodia teres* M, PB, C, CM.  
*Eupatorium rotundifolium* [Va.] M,  
     c, CM.  
*Boltonia asteroides* CM.  
*Helenium autumnale* MC, CM.  
*Synosma suaveolens*.  
*Bidens bipinnata* M, c.

## MASSACHUSETTS TO FLORIDA.

- Lycopodium alopecuroides* M, PB, CM.  
*Botrychium dissectum* M, c, CM.  
*Helianthium tenellum* M.  
*Andropogon corymbosus abbreviatus*  
     M, c, PB, CM.  
     "    *virginicus* M, c, PB, CM.  
*Panicum verrucosum* M, PB, CM.  
     "    *columbianum thiniium* PB,  
         c, CM.  
     "    *addisonii* M, PB, C, CM.  
     "    *oricola* PB, c.  
     "    *villossissimum* M, PB, CM.  
     "    *ashei* M, PB, CM.  
     "    *clutei* PB, CM.  
     "    *barbulatum* M, CM.  
     "    *microcarpon* M, c, CM.  
     "    *scoparium* M, c, CM.  
     "    *commutatum* CM.  
     "    *boscii* M, CM.  
*Aristida purpurascens* M, c, PB, CM.  
     "    *tuberculosa* M.  
*Muhlenbergia capillaris* M.  
     "    *tenuiflora* M.  
*Stipa avenacea* M, CM.  
*Danthonia sericea* M, PB, c.  
*Sphenopholis pallens* M, CM.  
*Spartina glabra pilosa* c.
- Diplachne fascicularis* c.  
*Cyperus filiculmis* M, CM.  
     "    *speciosus* M, c, PB, CM.  
     "    *erythrorhizos* M, c.  
*Eleocharis interstincta* M.  
     "    *engelmanni* M.  
     "    *melanocarpa* M, CM.  
     "    *tuberculosa* PB, CM.  
*Scirpus robustus* c.  
*Fuirena squarrosa* c.  
*Rynchospora macrostachya* M, CM.  
     "    *macr. inundata* M, PB.  
*Scleria triglomerata* PB.  
     "    *verticillata* c, CM.  
     "    *reticularis* CM.  
*Carex triceps* M, CM.  
     "    *glaucodea* M, CM.  
     "    *abscondita* M, CM.  
     "    *walteriana* PB, c, CM.  
     "    *willdenovii* N, M.  
     "    *hormathodes richii* M.  
*Lemna perpusilla* c.  
*Orontium aquaticum* PB, CM.  
*Xyris torta* M, c, PB, CM.  
     "    *congdoni* M, PB, CM.  
*Juncus aristulatus* PB, c, CM.  
*Gyrotheca tinctoria* PB, CM.

- Chamælorium luteum* M.  
*Uvularia perfoliata* M, CM.  
*Sisyrinchium mucronatum* M.  
*Smilax glauca* M, PB, C.  
*Isotria verticillata* M.  
*Gyrostachys vernalis* PB, C.  
*Juglans nigra* M.  
*Hicoria alba* M, CM.  
*Betula nigra* M, C, CM.  
*Quercus palustris* M, CM.  
     "    *stellata* M, C, PB, CM.  
*Rumex hastatulus* C.  
*Polygonum maritimum* C.  
     "    *punctatum* M, C, CM.  
*Atriplex arenaria* C.  
*Anychia canadensis* M.  
*Sagina decumbens* M, C.  
*Silene caroliniana* M, C.  
     "    *stellata* M, C.  
*Nelumbo lutea* M.  
*Liriodendron tulipifera* M, C, CM.  
*Magnolia virginiana* M, PB, C, CM.  
*Draba caroliniana* M.  
*Cardamine bulbosa* M.  
*Arabis canadensis* M.  
*Drosera filiformis* PB, C.  
*Ribes rotundifolium* M.  
*Cratægus pruinosa* M.  
*Agrimonia mollis* M, CM.  
*Cassia chamæcrista* M, C, CM.  
*Lespedeza angustifolia* PB, CM.  
     "    *stuvei* M, PB, CM.  
*Meibomia obtusa* M, C, PB, CM.  
     "    *michauxii* M, PB, CM.  
     "    *marilandica* M, PB, CM.  
     "    *sessilifolia* PB.  
     "    *canescens* M, CM.  
*Strophostyles helvula* M, C.  
*Geranium carolinianum* M.  
*Oxalis violacea* M.  
*Linum floridanum* PB, C.  
     "    *striatum* M, PB, C, CM.  
*Polygala nuttallii* PB, C, CM.  
*Euphorbia preslii* M.  
     "    *corollata* M, C.  
*Ilex opaca* M, C, CM.  
     "    *glabra* PB, C, CM.  
*Acer rub. carolinianum* PB, C, CM.  
*Hibiscus moscheutos* M, C, CM.  
*Ascyrum hypericoides* M, PB, C, CM.
- Hypericum adpressum* M, CM.  
*Lechea leggettii* M, PB, C, CM.  
*Viola sagittata* M, C.  
     "    *palmata* M.  
     "    *papilionacea* M.  
*Opuntia opuntia* M, C.  
*Rotala ramosior* M, PB, CM.  
*Lythrum alatum* M, C.  
*Kneiffia linearis* M, PB, C, CM.  
*Ludvigia sphærocarpa* M, PB, CM.  
     "    *alternifolia* M, C, PB, CM.  
*Myriophyllum pinnatum* M, C, CM.  
*Hydrocotyle verticillata* C, CM.  
     "    *umbellata* M, C, CM.  
*Ptilimnium capillaceum* C.  
*Angelica villosa* M, CM.  
*Chimaphila maculata* M, C, CM.  
*Azalea nudiflora* M, CM.  
     "    *viscosa glauca* PB, C.  
*Leucothoe racemosa* M, PB, CM.  
*Polycodium stamineum* M.  
*Sabatia dodecandra* C, CM.  
     "    *stellaris* C.  
     "    *gracilis* M, C, CM.  
*Bartonia paniculata* M, C, PB, CM.  
*Asclepias verticillata* M, CM.  
*Acerates viridiflora* M.  
*Cuscuta arvensis* M, PB.  
     "    *compacta* M, PB.  
*Onosmodium virginianum* M.  
*Verbena angustifolia* M, PB, C.  
*Scutellaria integrifolia* M, C, CM.  
*Agastache nepetoides* M.  
*Stachys hyssopifolia* M.  
*Stachys aspera* M.  
*Lycopus sessilifolius* M, C, PB, CM.  
*Leptandra virginica* M.  
*Scrophularia marylandica* M.  
*Pedicularis lanceolata* M, CM.  
*Castilleja coccinea* M.  
*Ilysanthes anagallidea* M, C, CM.  
*Gerardia purpurea* M, PB, C, CM.  
*Schwalbea americana* PB.  
*Utricularia subulata* PB, C, CM.  
     "    *cleistogama* PB, C, CM.  
*Plantago elongata* M, CM.  
*Valerianella radiata* M, CM.  
*Viburnum venosum* M, C, CM.  
*Triosteum perfoliatum* M, CM.  
*Adopogon virginicum* M, C, CM.

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|   |                                    |
|---|------------------------------------|
| Hieracium gronovii M, C, PB, CM.            | Euthamia caroliniana M, PB, C, CM. |
| Vernonia noveboracensis M, C, CM.           | Aster tenuifolia C.                |
| Lacinaria spicata M, C, CM.                 | " concolor M, PB, CM.              |
| Eupatorium verbenae-folium M, PB, C,<br>CM. | Coreopsis rosea M, PB.             |
| " aromaticum M, CM.                         | Bidens levis M, C, CM.             |
| " hyssopifolium M, PB, C,<br>CM.            | " trichosperma M, C, CM.           |
|   | Pluchea camphorata C.              |
| Solidago elliotii C, CM.                    | Baccharis halimifolia C.           |

LOCAL ELEMENT.—Finally we have a group of plants restricted to New Jersey or spreading only to the States immediately north and south of it, or west to Pennsylvania. Some of these undoubtedly have a wider range, as subsequent investigation will show, while others, like the very distinct *Abama americana*, *Sporobolus torreyanus*, *Eupatorium resinosum* and *Chrysopsis falcata*, are probably truly local.

NEW JERSEY.\*

|                          |   |
|--------------------------|---|
| Isoetes riparia M.       | Bidens trichosperma tenuiloba PB, C,<br>CM. |
| Juncus cæsariensis PB.   |   |
| Eupatorium resinosum PB. | Senecio crawfordii M.                       |

NEW YORK—NEW JERSEY.

|                                     |                                 |
|-------------------------------------|---------------------------------|
| Paspalum prostratum [to Del.] M, C. | Scleria minor PB, CM.           |
| Sporobolus torreyanus PB, CM.       | Eupatorium album subvenosum PB. |

NEW JERSEY—DELAWARE OR MARYLAND.

|                                   |                                     |
|-----------------------------------|-------------------------------------|
| Isoetes saccharata M.             | Hypericum virg. ovalifolium PB, CM. |
| Eriocaulon parkeri M, C.          | Hydrocotyle canbyi CM.              |
| Abama americana PB.               | Bidens bidentoides M.               |
| Callitriche austini [from Ct.] M. |                                     |

MASSACHUSETTS TO NEW JERSEY.

|                      |                           |
|----------------------|---------------------------|
| Cyperus grayi PB, C. | Sisyrinchium arenicola M. |
| Scirpus longii PB.   | Chrysopsis falcata PB.    |

MASSACHUSETTS TO MARYLAND OR DELAWARE.

|                             |                               |
|-----------------------------|-------------------------------|
| Lycopodium chapmanii C, PB. | Hicoria microcarpa M.         |
| Najas gracillima M.         | Falcata pitcheri M, CM.       |
| Scirpus planifolius M.      | Iva oraria C.                 |
| " fluviatilis M.            | Solidago neglecta, M, PB, CM. |
| Carex scorsa M.             | Aster spectabilis M, PB, CM.  |

\* Some of these occur also in eastern Pennsylvania.



## BOTANICAL SUBDIVISIONS OF THE NEW JERSEY COASTAL PLAIN.

Passing now to the consideration of the subdivisions of the New Jersey coastal plain, we find several very well marked areas.

As we cross southern New Jersey from west to east we are first struck by the sharp line of demarcation between the farming district of West Jersey and the Pine Barrens; crossing the latter we find on the coast a narrow belt separating the Pines from the maritime marshes, which has essentially the same flora as the West Jersey region, a flora that is also shared by the coast islands, although they have some additional elements peculiar to themselves. Southward in the Cape May peninsula we find the West Jersey and coast strips coming together to the partial extinction of the Pine Barrens which exist only as detached islands, while especially at the southwestern extremity of the peninsula we encounter a floral element quite different from the Pine Barrens, but related in no small degree to the flora of southern Delaware.

We thus have five distinct floral districts in southern New Jersey—(1) The West Jersey, or better, the Middle District, which covers not only the Delaware Valley region south of Trenton, but also all the country below the fall line and north of the Pine Barrens which terminate at Long Branch; (2) The Pine Barrens; (3) The Coastal Strip; (4) The Cape May District, south of the Great Cedar Swamp; (5) The Maritime District.

The northern half of the State is referred to as the Northern District without attempting to subdivide it, since it is only indirectly concerned with the present discussion. For an account of its relationship cf. Stone, Ann. Rep. N. J. State Museum for 1908, pp. 31-32.

Some attempt has been made to correlate these areas or parts of them with underlying geological formations, but a more accurate knowledge of the distribution of their plants shows that such correlation is not possible. The surface soil has far more to do with the matter than the underlying geological formation.

The western boundary of the Pine Barrens is often the eastern edge of the cretaceous formation, but in the southern part of

the State it is not so, the cretaceous lying in some places fifteen or twenty miles west of the Pines. In the same way the very distinct coast strip with its West Jersey flora is geologically the same formation as the Pine Barrens.

In West Jersey, moreover, we find considerable differences in the flora of different parts of the same formation. In the cretaceous, for instance, we have in the rich marl beds one style



Fig. 2.—Range of *Lobelia cardinalis* covering Middle and Coast Districts, but absent from the Pine Barrens.

of vegetation, while on sand deposits of the same age are plants of quite a different sort.

A number of species are restricted to one or other of the above-defined districts, some are common to two or three of them, and still others are found throughout our region or throughout the State.

Using the initial letters to indicate the several districts, the distribution of the plants of the New Jersey coastal plain as indicated by the data that we have collected is as follows:

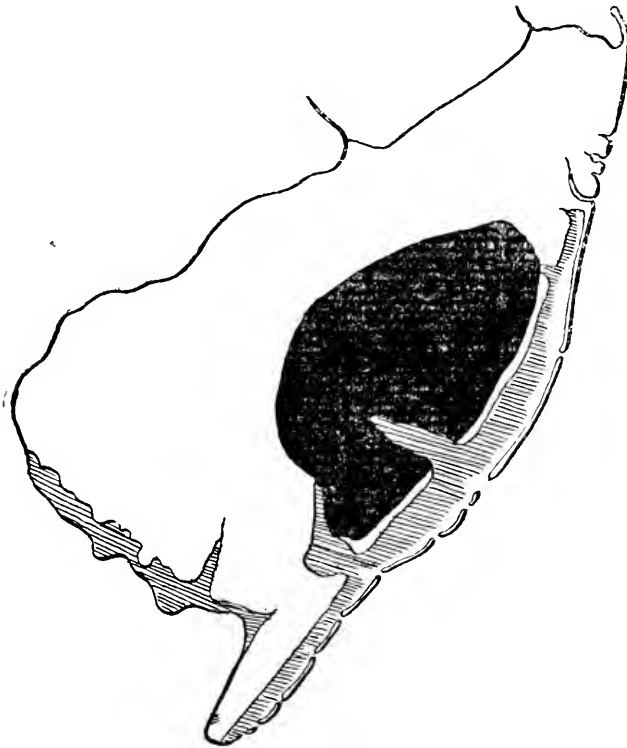


Fig. 3.—Range of *Polygala brevifolia*. Central Pine Barrens only.

|  |     |                   |      |
|--|-----|-------------------|------|
| Halophytes of the }<br>coast marshes and }<br>beach strand, ..... }<br>Coast strip only, ..... }                               | 71  | M+PB, .....       | 84   |
|  |     | M+CM, .....       | 100  |
|  |     | PB+C, .....       | 9    |
|  | 16  | PB+CM, .....      | 22   |
|  |     | C+CM, .....       | 18   |
| Middle district only, }<br>so far as our region }<br>is concerned, though }<br>many range through }<br>northern N. J., ..... } | 343 | M+CM+PB, .....    | 142  |
|  |     | M+PB+C, .....     | 50   |
|  |     | M+CM+C, .....     | 137  |
|  |     | PB+C+CM, .....    | 10   |
| Cape May only, ..... }   | 35  | Throughout, ..... | 194  |
| M*+C   | 87  |                   |      |
|  |     | Total,            | 1373 |

\* M=Middle Dist.; C=Coast Strip; CM=Cape May District; PB=Pine Barrens.

From the above list we may compute:

|  |      | <i>After excluding obvious introductions from other districts.</i> |
|--|------|--|
| Total Flora of Pine Barrens, .....                         | 565* | 386  |
| "    "    "    Coast Strip (excluding Halophytes),..       | 524  | 492  |
| "    "    "    Cape May District, .....                    | 658  | 649  |
| "    "    "    Middle District, .....                      | 1138 | 1023   |
| Common to Middle and Pine Barren Districts, .....          | 470* | 295  |
| "    "    "    "    Coast Districts, .....                 | 416  | 410  |
| "    "    "    "    Cape May Districts, .....              | 573  | 493  |
| "    "    "    "    Pine Barren and Coast Districts, ..... | 263† | 162  |
| "    "    "    "    Cape May Districts, .....              | 368  | 252  |
| "    "    "    "    Coast and Cape May Districts, .....    | 359  | 337  |

The status of each species in the above table was ascertained by a careful study of the data presented in the main text of this report after excluding such records as bore evidence of being based upon accidental occurrences such as roadside or railroad introductions. All weeds, even those of native origin, were also excluded, as their distribution has little or no bearing upon natural conditions.

A further study of the data covering the general range of the south Jersey plants (see p. 47) gives the following results for the flora of each of the four districts considered separately:

|                                       | M.   | PE. | C.  | CM. |
|---------------------------------------|------|-----|-----|-----|
| Wide Ranging, .....                   | 628  | 153 | 301 | 359 |
| Northern Element, .....               | 78   | 28  | 26  | 16  |
| Southern Element, .....               | 299  | 183 | 159 | 263 |
| Local Element, .....                  | 18   | 17  | 6   | 11  |
|                                       | 1023 | 386 | 492 | 649 |
| Percentage of Southern Element, ..... | 29%  | 48% | 31% | 40% |

\* As explained beyond, these figures include a number of recent introductions not really native to the Pine Barrens. See p. 101.

† These figures are somewhat misleading, as only such Pine Barren species as reach the Coast Islands are included. The mainland coast strip is so narrow that it is impossible to mark it off sharply from the Pine Barrens, and we cannot say which Pine Barren species spread into it and which do not, without a vast amount of further study.

It is impossible to compute the percentage of the northern element in the flora for the reason that accurate data are lacking on the actual southern boundary of the range of the species listed above as "Wide Ranging." The only fact given in the manuals as a rule is the southernmost State touched by this boundary. It is known that a large number of the 628 species of the Middle District barely touch the coastal plain on its western or northern edge, and really find the southern limit of their range all the way from New Jersey to Florida, and thus belong distinctly to the northern element of our flora. Other species, on the contrary, are found pretty generally over the coastal plain, and are truly wide ranging, but accurate data for the proper disposition of all the species in one class or the other are not at present available. Figures based entirely upon the character of their occurrence in New Jersey (p. 43) would indicate that at least three-quarters of these wide-ranging species reach their southern limit at the coastal plain, but a study of their distribution to the southward might not uphold this estimate.

A further analysis is given in the consideration of the flora of each of the several districts which follows.

#### THE PINE BARRENS.

The Pine Barrens are of especial interest from the fact that the region is one of the largest in the Middle States in which anything like primeval conditions remain. Always sandy and thickly covered with more or less scrubby vegetation, interspersed with swamps and infested by hordes of mosquitoes, settlers have been in no hurry to clear it so long as more valuable land was available to the westward. Even to-day one may travel for ten or fifteen miles in some parts of the Barrens without seeing a habitation of any sort, and this within fifty and thirty miles respectively of New York and Philadelphia. Wagon roads lead across the white sand to the sea at infrequent intervals, and ill-defined trails branch off to former charcoal clearings, all of these highways largely fallen into disuse since the establishment of railroads and the abandonment of the old iron forges. The oldest towns in the district are those located on navigable tide-

water streams like Toms River, Mays Landing, Millville, etc.; others, like Hammonton, Vineland and Egg Harbor City, owe their establishment to the railroads.

In recent years many other settlements are springing up along the railroads, and are spreading their clearings into the wilderness, while various agencies exert an important influence on vegetation.

Portable sawmills are cutting all the white cedars, and in place of the dark swamps we encounter mountains of yellow sawdust. The extension of cultivated cranberry bogs proves the death knell to many native bog plants, which do not seem able to stand the flooding. The onslaught of the Christmas venders upon the mistletoe has practically exterminated it, while berry-bearing holly is becoming scarce, and the sale of arbutus and pyxie must soon affect their abundance in certain localities. The wood pulp industry makes a market for any sort of timber, no matter what size; the use of sphagnum for packing bulbs and garden plants for shipment makes it worth while to rake some of the small bogs completely clear of this moss which is so necessary for the growth of many native bog species, and the demand for native shrubbery for planting on large estates has practically exterminated the laurel in certain regions, many carloads of these bushes being shipped at one time by a single dealer.

The advent of the automobile, too, has forced the substitution of good roads for the old sand trails in many places, and hundreds of people now visit certain remote parts of the barrens to one who went there ten years ago.

All these influences are bound to make changes in the flora of the region in the near future, and it is none too soon to make a serious effort to record its characteristic features and its component species before it is too late.

Although the New Jersey Pine Barrens have been well known as a locality for choice plants since the earliest days of botanical study in America, nevertheless very little has been published regarding their flora or even their history and physical features. We know, from casual mention in the descriptions of new species, that Rafinesque, Pursh, Nuttall and Zaccheus Collins were familiar with their barren sands and deep swamps. We know,

also, that James Goldie, the Scottish botanist, traveled through them early in the nineteenth century, and earlier still Peter Kalm, the Swede, probably touched the western border of the region, as he secured the *Hclonias* and submitted it to Linnæus for description.

William Bartram and, probably, John Bartram, his father, were undoubtedly familiar with the "Pines" and were probably the first botanists to explore the region, although they, so far as I am aware, published nothing relative to it.

In Edwards' *Gleanings of Natural History*, London, 1758, where are described a number of birds submitted by William Bartram to the author, we find a figure of the "Gentian of the Desert" reproduced from a drawing by Bartram, which is clearly *Gentiana porphyrio*, so characteristic of the remote portions of the Pine Barrens. Some of the plants sent by Bartram to Linnæus and named by the latter, such as *Blephariglottis blephariglottis*, the white-fringed orchis, undoubtedly came from the New Jersey coastal plain, although Linnæus records them from Pennsylvania, the name of Bartram being so closely identified with the latter State that it was taken for granted that all his local collections came from there.

During the first half of the nineteenth century the barrens were visited by wagon from Philadelphia or Burlington and there was considerable travel over the long sandy roads, as the fishermen-farmers of the coast were constantly bringing their produce across the State to market and returning with necessary supplies.

Audubon made the journey across to Great Egg Harbor on one of these produce wagons and describes the trip in his episode entitled "Great Egg Harbour," p. 606, vol. III of his *Ornithological Biography*. There were several half-way houses and other taverns where travelers could rest and procure refreshments, and a number of forges—many of them now only names on the map—were extracting iron from the bog ore which before the discovery of better deposits in the west had a marketable value.

Dr. John Torrey, when twenty-two years of age, made a wagon trip from Philadelphia to South Amboy during the latter part of June, 1818, in company with William Cooper, and, fortunately,

a record of it is preserved in a letter to Zaccheus Collins in the possession of the Philadelphia Academy.\* It runs as follows:

NEW YORK, July 9th, 1818.

DEAR SIR:

We arrived at South Amboy one week after we left Philadelphia, and, although our journey was rather an arduous one, we think ourselves well rewarded for all the privations we endured. The principal difficulty we experienced was in keeping the right road. Hundreds of these little roads cross each other in every direction like a labyrinth, so that it is next to a miracle if you hit the right one. We remained two days at Thompson's Tavern [at Quaker Bridge], where we were very well entertained. About this time we found a considerable number of plants which were new to us, indeed there were few plants but what we found here. The *Drosera filiformis* and *foliosa* (?) were abundant, as well as two species of *Utricularia*, one of which does not appear to be described. What pleased us more than any plant we found was the *Schizaea*. Cooper found the first specimen. It is a singular little plant, and I first doubted whether Pursh had referred it to the right genus, but subsequent examination has convinced me that he is right. The whole of the plant which we saw was confined to a very small space. There is a small patch of it about forty-five yards from the west end of the bridge on the left side as you approach it from Philadelphia and about twelve feet from the road. I have been particular to mention its locality, as this is the only spot where we found it. We found abundance of the *Leciophyllum* and *Hudsonia*, some of them in flower. The latter plant I am inclined to think is a different species from the one which grows on the seacoast. At first sight you are struck with the long peduncled flowers of the one and the almost sessile flowers of the other. We found two species of *Eriocaulon*—one common, tall and with large hemispherical heads and tuft of short leaves at the base, the other smaller, with large leaves. They are both ten-ribbed.

After we had left Quaker Bridge we fared pretty hard. Some places called Taverns that we put up at were not fit for an Arab. At a place called the Ten-mile Hollow, or Hell Hollow, we expected to sleep in the woods, for it was with difficulty that we persuaded them to take us in. This was the most miserable place we ever saw; they were too poor to use candles. No butter, sugar, etc. A little sour stuff, which I believe they called rye 'bread, but which was half sawdust, and a little warm water and molasses, were all we had for breakfast. For supper I could not see what we had, for we ate in the dark. From this place until we reached Monmouth we found scarcely a single plant in flower.

We found near Philadelphia a species of *Plantago* which may be new. It is not described in Persoon, but it may be the *P. linearifolia* of Muhl. Cat. 2d ed. I shall send you specimens of it together with most of the plants we collected on our journey. I hope you will indulge me if I trouble you in this way once in awhile.

I remain, sir, with the greatest respect, etc., yours,

JOHN TORREY.

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\* Published in Bull. Torr. Bot. Club VI, p. 83.



If there is any young botanist in your society that would be willing to commence botanical correspondence and exchange of specimens with me, I should be very glad to commence one immediately.

To ZACCHEUS COLLINS, ESQ., Philadelphia.

There were other ways of getting to the coast in these early days. An advertisement in a copy of Poulson's American Daily Advertiser, July 12th, 1823, states that "The subscriber [Seth Crane] respectfully informs the public that he has commenced running a stage between Mount Holly and Mannahawkin for the accommodation of persons disposed to visit the Grouse Plains, Mannahawkin or Tuckerton. The Stage will leave Mannahawkin every Monday and Thursday mornings at 6 o'clock and arrive at Griffith Owens' Tavern, in Mount Holly, same afternoon at 4 o'clock. From whence passengers will be conveyed to Burlington on the following morning in time to meet the Steam Boat for Philadelphia and Trenton. Returning will leave Mount Holly every Wednesday and Saturday morning at 6, and arrive at Mannahawkin same afternoon at 4 o'clock. Where Ladies and Gentlemen can be accommodated with genteel Boarding and Lodging at the moderate rate of \$3 per week; and conveyed at any time across the Bay to James Cranmer's, Hazleton Cranmer's or Stephen Inman's. Fare through \$1.75 cent.

A conveyance will be in readiness at Mannahawkin for Tuckerton."

In the same paper are advertised a line of stage and the "Union" and "Good Intent" lines of four-horse carriages direct to Tuckerton from Philadelphia. There was also the steamboat "Delaware," leaving Philadelphia for Cape May "at five o'clock in the morning on Monday and Friday during the bathing season."

Prof. S. F. Baird, when a young man, used to visit Beesley's Point, on Great Egg Harbor, by way of Cape May, going down by boat and up the coast by stage. In July, 1854, however, John Cassin, of the Philadelphia Academy, in a letter to Baird, tells him that a railroad to Absecon has been completed with stage connection for Beesley's Point, which will greatly facilitate his future trips.

It was many years later before the railroad was built to Cape May, which had always been rather inaccessible except by water. Indeed, prior to 1707, there was no wagon road out of the peninsula, merely horse paths through the dense cedar swamps which stretched away from Cedar Swamp Creek to Dennis Creek, forming an effectual barrier to traffic and making Cape May virtually an island.\*

With the advent of the railroads traffic on the old stage roads practically ceased and with it went the taverns and forges, so that the latter part of the nineteenth century found the remote parts of the Pines more of a wilderness than they were before.

Within the past decade several botanical trips have been made across the Pine Barrens which have been recorded in print.

Mr. C. F. Saunders has a charming account of a wagon trip from Tuckerton to Atsion, July 3-5, 1899,† in company with Mr. W. N. Clute. His picture of the country is very vivid. He says, after leaving Tuckerton: "Mile after mile of oak and pine barrens were passed without sign of human habitation, and when five miles were registered we came to the spot which is marked upon the maps as Munyon Field. Here, in old times, had been a house, and a family had lived here, scratching some sort of a living from the sand and fattening hogs on the abundant mast which strewed the ground under the little chinquapin oaks. Now no vestige of human occupation remains save a little clearing, which is rapidly filling up with wildings from the surrounding forest. \* \* \* Two or three miles more of a similar wilderness, and the forest growth thinned out and dwindled down to dwarf proportions as we emerged upon the rolling heathlike expanse of the east or lower plains. \* \* \* Nothing could be more restful to the eye than this rolling expanse of green plain, melting away in every direction into the misty distance, the white sand gleaming out here and there like whitecaps on an emerald sea. \* \* \* The luxuriant vines of the bearberry lay sprawling everywhere in the sun, their dry, astringent berries not yet tinged with the crimson that makes them so conspicuous

\* Cf. Dr. Maurice Beesley's Early History of Cape May, in the *Geology of the County of Cape May*, 1857.

† Proc. Acad. Nat. Sciences, Phila., vol. 52, 1900, pp. 544-549.

in winter, the pyxie, trailing arbutus, hudsonia, laurel, tephrosia and leiophyllum were so abundant that the whole place must have been like a garden in the spring. \* \* \* After leaving the plains, the old road wound now through dry sandy pine woods, bare of conspicuous flowers, save, perhaps, for the ever present *Melampyrum lineare* and the yellow banners of *Baptisia tinctoria*—now through damp swamp lands, where we had as roadside companions the thread leaved sundew's purple flowers, the orange heads of *Polygala lutea*, the magenta blossoms of the grass pink and the snake-mouth pogonia. \* \* \*

Two years later the writer, accompanied by Messrs. H. L. Coggins and J. A. G. Rehn, crossed from Medford to the plains and back, June 17-22.

In Mr. Coggins' account\* of the trip, which deals with ornithology rather than botany, occurs the following admirable picture of the plains: "A singular region, hot, level and dry. We wade into the scrub scarce able to believe that it is over the top of a dwarf forest that we are gazing for miles. Its barrenness, except for the stunted vegetation, recalls vividly to mind long forgotten descriptions of desert regions. The heat rising from the parched ground gives a blur of uncertainty to distant outlines, and we close our eyes involuntarily before the glare of the sun on the exposed gravel areas. Chewinks and brown thrashers scuffle listless in the dry soil. A mere speck in the sky, a turkey vulture, circles lazily for a time then drops from view beyond the horizon. A little tree lizard at our step scurries across a gravel patch and disappears under the dry leaves. The only other sound of life is the weary vibrant trill of the prairie warbler, which rises on the hot air like a supplication for life."

Trips through the pines, even with the certainty of much botanical reward, have drawbacks which are liable to make one hesitate, as Mr. Saunders truly says: "The sands are heavy, the flies and ticks and mosquitos are numerous, the heat is excessive, springs are few and far between and forest fires are apt to be at their devastating work." At the same time thoughts of the pungent odor of the pines, the cool shade of the cedar swamp,

\* Cassinia, 1902, p. 26.

where the road runs through, with its white bridge spanning the dark tea-like water of the stream; the refreshing draught of the water itself, always palatable in spite of its dark color; the fragrance of the magnolia, azalea and clethra, and the beauties of the ever attractive pine barren flowers, all tend to obliterate the memory of clouds of mosquitos and dripping perspiration and draw the naturalist back again and again to this wonderful wilderness.

The streams of the pine barrens are navigable by canoe, and many a trip has been made over their dark waters. One of these is admirably described by Henry Vandyke in his delightful sketch "Between the Lupin and the Laurel," and in it the reader will find an excellent account of the pine barrens in spring time.\*

As one enters the Pine Barrens from the agricultural region of Western Jersey, the most striking feature, apart from the Pines themselves, is the continuous shrubby undergrowth of Bracken *Pteridium aquilinum*, Sweet Fern *Comptonia asplenifolia* and Chain Fern *Woodwardia virginica*. Then the absence of such familiar trees as the Wild Cherry *Prunus serotina*, Sweet Gum *Liquidambar styraciflua*, Willow Oak *Quercus phellos*, etc., and the presence of White Birch *Betula alba*, and the abundance of Sassafras *Sassafras sassafras*, Sour Gum *Nyssa sylvatica*, Chestnut Oak *Quercus prinus* and the Scrub Oaks *Q. ilicifolia*, *marylandica* and *prinoides*. The White Oak *Q. alba*, Black Oak *Q. velutina* and Post Oak *Q. stellata*, occur in the outlying portions of the Pine Barrens or locally throughout, but the first two are often rare over large areas.

The abundant pine is the Pitch Pine *Pinus rigida*. The Yellow Pine *Pinus echinata* occurs, locally, sometimes in large tracts, but in other sections is absent.

The forests of the Pine Barrens to-day present considerable diversity, due to the inroads of fire and axe, and my efforts to ascertain from old residents just what the primitive condition was have resulted in such contradictory information that I am in doubt as to just what should be said on the matter.†

\*Cf. also Gustave Kobbe, "The New Jersey Coast and Pines." C. C. Abbott, "Days Out of Doors."

† Cf. for detailed discussion of N. J. Forests. Cf. Reports in Ann. Rept. State Geologist.

There are woods of rather tall Pine with practically no oaks of any size, but with an undergrowth of Scrub Oaks and Huckleberries.

Then there is a more open growth in which Oaks and Pines mingle in about equal proportion and in which the Oaks, mainly *Q. marilandica*, reach a fair height.

Other sections are covered with a dense growth of Oaks, including *Q. prinus*, *alba*, *marilandica*, *ilicifolia* and *velutina*.

It seems to me that the first two types are the natural or primitive ones, while the solid Oak growth covers recent clearings. The Pines spring up again in such tracts and reassert themselves unless fire or continuous clearing have exterminated them. Indeed, it is remarkable to see how rapidly young Pines will develop. In old abandoned open ground which has grown up in *Andropogon* grass the Pines will soon establish themselves and grow rapidly. Equally rapid growth is seen on the bottom of sand excavations along the railroads where a ridge of eight or ten feet in height has been entirely removed for grading purposes somewhere else, and in a few years the floor will be completely covered with the regular forest vegetation with flourishing young Pines on all sides.

The typical open Pine forest (see Pl. CXXVII) is characterized by the following species:

|                                 |                                  |
|---------------------------------|----------------------------------|
| <i>Pteridium aquilinum</i> .    | <i>Helianthemum canadense</i> .  |
| <i>Pinus rigida</i> .           | <i>Baptisia tinctoria</i> .      |
| <i>Panicum commonsianum</i> .   | <i>Kalmia angustifolia</i> .     |
| " <i>addisoni</i> .             | <i>Pieris mariana</i> .          |
| " <i>columbianum</i> .          | <i>Epigaea repens</i> .          |
| <i>Andropogon scoparius</i> .   | <i>Vaccinium vacillans</i> .     |
| " <i>virginicus</i> .           | <i>Caylussacia baccata</i> .     |
| <i>Smilax glauca</i> .          | <i>Hieracium venosum</i> .       |
| <i>Quercus ilicifolia</i> .     | <i>Aster concolor</i> .          |
| " <i>marilandica</i> .          | " <i>patens</i> .                |
| " <i>stellata</i> .             | <i>Sericocarpus asteroides</i> . |
| <i>Comptonia asplenifolia</i> . | <i>Solidago odora</i> , etc.     |
| <i>Sassafras sassafras</i> .    |                                  |

In bare open sandy patches occur Lichens of several species, together with:

|                                  |                                 |
|----------------------------------|---------------------------------|
| <i>Cyperus grayi</i> .           | <i>Arenaria caroliniana</i> .   |
| " <i>filiculmis macilentus</i> . | <i>Leechea racemulosa</i> .     |
| <i>Carex umbellata</i> .         | <i>Euphorbia ipecacuanhae</i> . |
| <i>Hudsonia ericoides</i> .      | <i>Cracca virginiana</i> .      |

The Cedar swamps (see Pl. CXXVII) which line all the streams of the Pine Barrens possess quite a different flora, some of the characteristic species being:

|                                   |                               |
|-----------------------------------|-------------------------------|
| <i>Chamaecyparis thyoides</i> .   | <i>Rhus vernix</i> .          |
| <i>Magnolia virginiana</i> .      | <i>Carex folliculata</i> .    |
| <i>Acer rubrum carolinianum</i> . | " <i>trisperma</i> .          |
| <i>Clethra alnifolia</i> .        | <i>Drosera rotundifolia</i> . |
| <i>Nyssa sylvatica</i> .          | <i>Osmunda cinnamomea</i> .   |
| <i>Alnus rugosa</i> .             | <i>Vaccinium corymbosum</i> . |
| <i>Hex glabra</i> .               | " <i>atrococcum</i> .         |
| <i>Viburnum nudum</i> .           | <i>Azalea viscosa</i> .       |

The natural open bogs are characterized by the presence of such species as:

|                                  |  |
|----------------------------------|--|
| <i>Oxycoccus macrocarpon</i> .   | <i>Eriocaulon decangulare</i> .          |
| <i>Sarracenia purpurea</i> .     | " <i>compressum</i> .                    |
| <i>Orontium aquaticum</i> .      | " <i>septangulare</i> .                  |
| <i>Castalia odorata</i> .        | <i>Drosera longifolia</i> .              |
| <i>Nymphæa variegata</i> .       | <i>Polygala lutea</i> .                  |
| <i>Utricularia</i> spp.          | <i>Blephariglottis blephariglottis</i> . |
| <i>Pogonia ophioglossoides</i> . | " <i>cristata</i> , etc. etc.*           |
| <i>Limodorum tuberosum</i> .     |  |

The curious elevated tract known as the Plains (see Pl. CXXVIII.), which covers portions of Burlington and Ocean Counties, presents a stunted vegetation scarcely higher than one's knees, consisting mainly of *Pinus rigida*, *Quercus marilandica* and *Q. ilicifolia*, but with all the characteristic species of the open pine woods. The additional species more or less peculiar to the Plains are *Corema conradii* and *Arctostaphylos uva-ursi*.

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\* The above lists are by no means exhaustive, and are simply given to call attention to some of the dominant or more conspicuous species of the several types of environment to be found in the Pine Barrens. No attempt has been made toward an "ecological" study of the region. While much valuable work has been done along true ecological lines, a certain amount of discredit appears to have been thrown upon the term by the fragmentary and superficial work presented under this title by certain writers. The hasty division of a flora into various societies and associations is a case in point. To my mind the only proper basis for work of this kind is the detailed study of a number of similar spots in a given area, such as the various patches of

Mr. Gifford Pinchot published an account of the Plains in the Annual Report of the State Geologist of New Jersey for 1898, and from this I have taken most of the following figures. Mr. Pinchot's conclusions agree entirely with my own observations in this interesting region.

The Plains occupy the highest part of the central Pine Barrens, ranging from 100 to 200 feet above sea level. They stretch from a point three miles east of Woodmansie south nearly to Munyon Field, varying from two to four miles wide, and are bisected by the Oswego river and its adjoining swamps. The upper section lying west of Cedar Bridge constitutes the West Plains, the lower the East Plains, the location of the former on the U. S. Geological Survey Maps being entirely wrong.

The West or Upper Plains comprise 7,737 acres and the East or Lower Plains 6,662, though with outlying tracts of similar character this region of stunted vegetation probably covers an area of nearly 20,000 acres.

The soil is exceedingly poor, consisting largely of white sand and coarse white pebbles, but it is no different in composition or in aridity from that of other dry sections of the Pine Barrens. Mr. Pinchot found that the Pine trees, such as had developed trunks with sufficiently well marked rings for counting, averaged about thirteen years in age, though one three feet high was thirty-one years old.

Most of the Pines, however, consist of sprout growth from old stumps which have been burned back by countless fires, some being almost globular burls with slender radiating stems. There are also numerous seedlings with prostrate stems. Occasionally a tree will approach a normal height of six to fifteen feet, but they are rare and usually killed by fire.

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Jersey Pine woods in the middle district of the region here considered or the various cedar swamps of the Pine Barrens. By a comparison of results it will be possible to determine what species really do occur in close association in all such similar locations. The establishment of such associations upon a few days' study seems utterly unwarranted, and when, as is usually the case, the same author proposes a different lot of "associations" for every area he studies, the utility of the whole method is called into question.

Furthermore, some writers on "ecology" are so careless in the systematic side of their work that their papers abound in misidentifications which, of course, render them practically worthless.

The prostrate character of the trees reminds one strongly of timber line vegetation on high mountains and is doubtless due to the elevated, exposed and wind-swept nature of the region, conditions congenial to the *Arctostaphylos* and *Corema*, which here reach their southern limit.

Add to this the constantly recurring fires which help to maintain the above conditions and the slow growth of all the trees in the most arid parts of the Pine Barrens, and we probably have all the factors necessary to explain the conditions found on the plains.

It seems likely that the Indians were in the habit of burning off this region long before the advent of the whites, and early intensified original conditions, a practice that the accidental fires of later years have perpetuated.

The term Pine Barrens has been used very loosely by those who have written upon the plants of New Jersey.

Rev. L. H. Lighthipe\* refers all of southern New Jersey below the triassic to the Pine Barrens.

Dr. Arthur Hollick† limits it to the portion lying south of a line from Long Branch to Salem.

Mr. C. C. Vermuele‡ gives it as "practically all of that portion of the State southeast of a line from Seabright to Glassboro and thence through Bridgeton to Delaware Bay." Both of these latter statements are based exclusively upon a study of forest trees, and as a result of careful field studies on the same line Mr. Vermeule (Ann. Rept. State Geol. N. J., 1898, p. 185) limits the coniferous forest to the region east of a line beginning at Asbury Park and passing through Farmingdale, Brindletown, New Lisbon and Taunton, with a considerable indentation south of Vincentown; thence to Atco, Andrews, Iona and south along the Maurice river. The belt between this and the previous line, he states, is composed of mixed coniferous and deciduous forest.

My studies, based upon herbs and shrubs as well as trees, show that the western border of the Pine Barren botanical region coin-

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\* Torrey II, p. 79.

† Report on Forests. Ann. Rep. N. Y. State Geologist for 1899, 182.

‡ Do. p. 16.



cides very closely with Mr. Vermeule's boundary of the coniferous forest (see colored map), the only important differences being some projections to include outlying Pine Barren "peninsulas" or "islands," especially the region southeast of Clementon, and the exclusion of the coast strip, a similar strip along the bay shore from Port Norris to Dennisville, which belongs to the Middle or West Jersey district, and the Cape May peninsula south of the great Cedar Swamp, which, although it contains some Pine Barren "islands," is mainly coastal and West Jersey in its affinities, as already explained.

The errors in most attempts to outline the Pine Barren region were due to a total lack of knowledge of the southwestern portion of the State, the prevailing idea being that the Pines must cover all of the yellow gravel tertiary area, while as a matter of fact they stop short at the Maurice river, the region west of this, especially north of Bridgeton, being fine farm land, often rolling with patches of deciduous forest here and there.

The boundary line between the Pine Barrens and the "Middle" and "Coastal" districts which bound it, respectively, on the west and east, is not a straight or sharp one; narrow tongues of the two floras interlace and often both elements will be found in the same bog or swamp along the border line. On the east, moreover, the peculiar coastal flora will be found running up the tidewater streams and their tributaries well into the Pine Barrens as far, for instance, as Toms River, Batsto, Mays Landing and Millville, where artificial dams now seem to mark the limit of the coastal intrusion. On other streams the coast plants follow back to the natural limit of tidewater, and perhaps some isolated colonies of such species well within the Pine Barrens owe their presence to the intrusion along tidewater streams that were subsequently dammed. In grouping the records in the systematic part of this report the same locality may often be put in one district under one species and another under another, when it is located on the border line between the two. Mays Landing, for instance, is cited as a Pine Barren locality for the Pine Barren species occurring above the dam, while when cited in connection with the coastal plants occurring below the dam, it is placed in the Coastal district. In addition to the main Pine Barren district

there are in the Middle or West Jersey districts certain "Pine Barren" islands, where a number of characteristic Pine Barren plants occur, often associated with species of wide range or others typical of the Middle district. One of the most important of these is the so-called Sandhill region of Middlesex Co., while Griffith's Swamp (now destroyed) near Lawnside, Camden Co., was famous in the past. Prof. J. B. Smith has indicated several of these islands in his map (Ann. Rept. N. J. State Museum for 1909), but they do not seem sufficiently well marked or equal in character to warrant such recognition.

There seems to be no peculiar geological formation correlated with these outlying colonies except that dry ground species are found where deposits of pure white sand or gravel occur, but which are not necessarily of the same age as similar deposits in the Pine Barren area proper.

Intrusions of the Middle district flora into the Pine Barrens in the form of narrow tongues along the boundary line have already been alluded to, but there are also occurrences of similar species well within the region, where extensive clearings have been effected and maintained for long periods of years; such occurrences can, I think, be safely regarded as intrusions from the Middle district, analogous to the occurrence of weeds in all spots that are brought under cultivation.

The attempts that have been made to list the typical plants of the Pine Barrens are in some respects as misleading as the efforts to outline the district, due, of course, to the fact that the writers were only familiar with a portion of the region or were relying entirely upon compilation.

Dr. Britton's list of fifty Pine Barren species\* comprises twenty-five that are as common in the Middle district as in the Pines, and six that are distinctly Middle district species and do not occur in the Pine Barrens—*Desmodium viridiflorum*, *Phlox subulata*, *Quercus phellos*, *Stipa avenacea*, *Juncus scirpoides*, *Eleocharis melanocarpa*.

Rev. Mr. Lightpipe's list† contains the following, which are not found at all in the Pine Barrens, or are very rare: *Onoclea sensi-*

\* Bull. Torr. Bot. Club VII., p. 82; XI., p. 126.

† Torreyia II., p. 79.

*bilis*, *Equisitaceæ*, *Pinus virginiana*, *Uniola laxa*, *Stipa avenacea*, *Chamælirium luteum*, *Pogonia divaricata* (one record), *Quercus phellos*, *Castanea pumila*, *Liquidambar styraciflua*, *Nelumbo lutea*, *Viola atlantica*, *Azalea nudiflora*, *Salvia lyrata*. Also the following, which were apparently wrongly attributed to New Jersey: *Aletris aurea* and *Chondrophora*.

Mr. Roland Harper\* gives as species confined to the New Jersey Pine Barrens, or much commoner in New Jersey than in adjoining States, *Dicromena colorata* and *Aletris aurea*, of which we have no definite records, and *Eriocaulon parkeri*, a middle district plant which does not occur in the Pine Barrens. *Polygala lutea*, *Clethra alnifolia* and *Sabatia lanceolata* are given in his list of characteristic North Carolina Pine Barren plants, but omitted from the New Jersey list, though it would be hard to find more generally distributed species in the latter region.

An analysis of the Pine Barren flora based upon the data presented beyond shows the following numerical results:

|  |       |
|--|-------|
| Total number of species growing in the Pine Barrens exclusive of weeds,  | 565   |
| Species occurring only locally in long-settled spots, obviously intrusions from the Middle or other districts, ..... | 179   |
|  | ----- |
| True Pine Barren Flora, .....  | 386   |

Of these there are:

|  |     |
|--|-----|
| Common to the Middle District, .....     | 295 |
| "    "    "    Coast Islands, .....      | 162 |
| "    "    "    Cape May District, .....  | 252 |
| Not found elsewhere in New Jersey, ..... | 55  |
| "    "    "    "    the world, .....     | 2†  |

Systematically they may be grouped as follows:

|                                |       |
|--------------------------------|-------|
| Pteridophytes, .....           | 11    |
| Gymnosperms, .....             | 8     |
| Monocotyledons Gramineæ, ..... | 44    |
| Cyperaceæ, .....               | 55    |
| Others, .....                  | 59    |
|                                | ----- |
|                                | 158   |
| Dicotyledons Polypetalæ, ..... | 100   |
| Monopetalæ, .....              | 114   |
|                                | ----- |
|                                | 214   |

\* Torrey's VII, 42.

† *Juncus casariensis*, *Eupatorium resinsum*.

In relation to their general range they may be grouped as follows:

## WIDE RANGING.

|  |    |
|--|----|
| Throughout North America, .....                | 5  |
| Canadian Provinces to Virginia-Florida, .....  | 72 |
| Maine-New Hampshire to Virginia-Florida, ..... | 76 |

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## NORTHERN ELEMENT.

|                              |       |             |
|------------------------------|-------|-------------|
| Plants ranging south to..... | N. J. | Del. or Md. |
| From Labrador, .....         | 3     | 0           |
| Newfoundland, .....          | 10    | 3           |
| New Brunswick, .....         | 0     | 3           |
| Nova Scotia, .....           | 2     | 2           |
| Maine, .....                 | 3     | 2           |
|                              | 18*   | 10          |

## SOUTHERN ELEMENT.

|                              |       |           |              |       |
|------------------------------|-------|-----------|--------------|-------|
| Plants ranging north to..... | N. J. | So. N. Y. | R. I. or Ct. | Mass. |
| From Virginia, .....         | 1     | 1         | 1            | 4     |
| N. Carolina, .....           | 5     | 0         | 1            | 3     |
| S. Carolina, .....           | 4     | 0         | 1            | 2     |
| Georgia, .....               | 5     | 3         | 3            | 4     |
| Florida, .....               | 55    | 29        | 18           | 48    |
|                              | 70*   | 33        | 24           | 67    |

## LOCAL ELEMENT.

|                                       |   |
|---------------------------------------|---|
| New Jersey only, or N. J.-Del., ..... | 5 |
| N. J.-Southern N. Y., .....           | 3 |
| N. J.-Mass., .....                    | 5 |
| Del.-Mass., .....                     | 4 |

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## LIST OF NEW JERSEY PINE BARREN PLANTS.

I. *Characteristic Pine Barren Species*. †—Those which occur locally or as stragglers in other districts are so indicated by the initial letters of the districts, *i. e.*, M, Middle; C, Coast; C M, Cape May.

\* Detailed lists on pp. 49-56. The number of species there attributed to the Pine Barrens may differ a trifle from the totals here given due to additional data on distribution received after these figures were compiled.

† A few species which occur only in the Pine Barrens or in the Middle District and Pine Barrens are omitted from these lists since they are rare and not typical, but they are, of course, included in the numerical statement.

- Schizæa pusilla* (c).  
*Dryopteris simulata*.  
*Lycopodium chapmanii* (c, cm).  
     "    *alopecuroides* (cm).  
     "    *carolinianum* (c, cm).  
*Chamæcyparis thyoides* (M).  
*Pinus rigida* (M, c, cm).  
*Sparganium americanum*.  
*Potamogeton oakesianus* (cm).  
     "    *confervoides*.  
*Sagittaria longirostra* (cm).  
*Erianthus saccharoides*.  
*Panicum longifolium* (cm).  
     "    *meridionale* (c, cm).  
     "    *leucotlirix*.  
     "    *spretum* (c, cm).  
     "    *ensifolium* (cm).  
     "    *clutei* (cm).  
     "    *lucidum* (c, cm).  
     "    *scabriusculum*.  
     "    *cryptanthum*.  
     "    *commonsianum* (c, cm).  
     "    *columbianum thinium* (M, c, cm).  
*Amphicarpou amphicarpon* (cm).  
*Sporobolus serotinus* (M).  
     "    *torreyanus* (cm).  
*Calamovilfa brevipilis*.  
*Agrostis elata* (cm).  
*Danthonia epilis*.  
*Cyperus cylindricus* (M, c, cm).  
     "    *dentatus* (M).  
*Eleocharis robbinsii* (M).  
     "    *torreyana* (cm).  
     "    *tuberculosa* (M, c, cm).  
     "    *tricostata* (M, cm).  
*Scirpus subterminalis* (cm).  
     "    *longii*.  
*Eriophorum tenellum* (M, cm).  
*Rynchospora pallida* (M, cm).  
     "    *oligantha*.  
     "    *alba* (M, c, cm).  
     "    *knieskernii*.  
     "    *filifolia*.  
     "    *gl. leptocarpa*.  
     "    *axillaris*.  
     "    *axillaris microcephala*.  
     "    *fusca* (cm).  
     "    *gracilentata* (cm).  
     "    *torreyana* (cm).  
*Cladium mariscoides* (c, cm).  
*Scleria triglomerata* (M).  
     "    *minor* (M, cm).  
     "    *torreyana* (cm).  
*Carex bullata* (M).  
     "    *walteriana* (M, c).  
     "    *livida*.  
     "    *barrattii* (M, cm).  
     "    *exilis*.  
     "    *atlantica* (M).  
     "    *trisperma*.  
*Orontium aquaticum* (M, cm).  
*Xyris caroliniana* (cm).  
     "    *congdoni* (M).  
     "    *fimbriata*.  
     "    *arenicola*.  
*Eriocaulon septangulare*.  
     "    *compressum* (cm).  
     "    *decangulare* (cm).  
*Juncus aristulatus* (c, cm).  
     "    *militaris* (M).  
     "    *cesariensis* (M).  
*Tofieldia racemosa*.  
*Abama americana*.  
*Nerophyllum asphodeloides* (M).  
*Uvularia nitida*.  
*Smilax tannifolia* (M, cm).  
     "    *laurifolia* (cm).  
     "    *walteri* (cm).  
*Gyrotheca tinctoria* (cm).  
*Lophiola americana*.  
*Gymnadeniopsis integra*.  
*Blephariglottis blephariglottis* (M),  
     cm).  
     "    *cristata* (M, cm).  
*Pogonia divaricata* (cm).  
*Gyrostachys præcox* (cm).  
     "    *vernalis* (c).  
*Betula populifolia* (M, c).  
*Quercus marilandica* (M, c, cm).  
     "    *ilicifolia* (M, c, cm).  
*Arenaria caroliniana*.  
*Nymphæa variegata* (M, cm).  
*Brasenia purpurea* (M, cm).  
*Sarracenia purpurea* (M, cm).  
*Drosera filiformis* (M, c).  
*Itea virginica* (M, cm).  
*Meibomia sessilifolia*.  
     "    *stricta* (M).  
*Lespedeza angustifolia* (M, cm).

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- Lespedeza oblongifolia*.  
*Clitoria mariana* (M, CM).  
*Linum floridanum* (C).  
*Polygala lutea* (M, CM).  
     " *cruciata* (M, C, CM).  
     " *brevifolia* (M).  
     " *mariana* (CM).  
*Euphorbia ipecacuanhæ* (M, CM).  
*Corema conradii*.  
*Ilex glabra* (M, C, CM).  
*Acer rubrum carolinianum* (CM).  
*Ascyrum stans* (M, CM).  
*Hypericum densiflorum* (M).  
     " *virgatum ovalifolium* (M  
         CM).  
*Hudsonia ericoides* (C).  
*Lechea minor* (M, CM).  
     " *racemulosa* (M, CM).  
*Rhexia mariana* (M, CM).  
     " *aristata*.  
*Ludvigia linearis*.  
     " *hirtella* (CM).  
*Proserpinaca pectinata* (M, CM).  
*Myriophyllum humile* (M, C).  
*Oxypolis rigidior longifolia*.  
*Azalea viscosa* (M, C, CM).  
     " " *glauca* (M).  
*Dendrium buxifolium*.  
*Kalmia angustifolia* (M, C).  
*Pieris mariana* (M, C).  
*Chamædaphne calyculata* (M).  
*Arctostaphylos uva-ursi*.  
*Gaylussacia dumosa* (M, CM).  
*Vaccinium corymbosum* (M, C).  
     " *virgatum*.  
*Oxycoccus macrocarpus* (M, C, CM).  
*Pyxidantha barbulate* (M).  
*Trichostema lineare* (M).  
*Sabbatia lanceolata* (CM).  
*Gentiana porphyrio* (CM).
- Asclepias rubra* (M, CM).  
*Breweria pickeringii*.  
*Cuscuta cephalanthi*.  
*Gerardia holmiana*.  
     " *racemulosa*.  
*Schwalbea americana*.  
*Utricularia cornuta*.  
     " *subulata* (M, C).  
     " *cleistogama* (CM).  
     " *inflata* (M, CM).  
     " *purpurea* (M, CM).  
     " *clandestina* (M).  
     " *intermedia* (M).  
     " *fibrosa* (M).  
     " *virgatula* (CM).  
*Galium pilosum punctulosum* (CM).  
*Lobelia nuttallii* (M, C, CM).  
     " *canbyi*.  
*Nabalus virgatus*.  
*Sclerolepis uniflora* (CM).  
*Eupatorium album* (M, C, CM).  
     " *album subvenosum*.  
     " *resinosum*.  
     " *leucolepis* (C, CM).  
*Lacinaria gramin. pilosa* (M, C, CM).  
*Chrysopsis falcata*.  
*Solidago stricta*.  
     " *puberula* (M, CM).  
     " *erecta* (M, CM).  
     " *uniligulata*.  
     " *fistulosa* (M, C, CM).  
*Aster nemoralis* (M).  
     " *gracilis* (M, C, CM).  
     " *spectabilis* (M, CM).  
     " *dumosus* (M, C, CM).  
*Dœllingeria umbellata humilis*.  
*Helianthus angustifolius* (M, C, CM).  
*Bidens trichosperma tenuiloba* (C,  
     CM).

II. SPECIES COMMON TO BOTH THE PINE BARRENS AND MIDDLE DISTRICT.

- Pteridium aquilinum*.  
*Woodwardia virginica*.  
     " *areolata*.  
*Osmunda cinnamomea*.  
     " *regalis*.  
*Pinus echinata*.
- Potamogeton epiphydrus*.  
*Sparganium amer. androcladum*.  
*Andropogon scoparius*.  
     " *corymbosus abbreviatus*.  
     " *virginicus*.  
*Paspalum setaceum*.

|                                 |                                    |
|---------------------------------|------------------------------------|
| <i>Panicum verrucosum.</i>      | <i>Zygadenus leimanthoides.</i>    |
| “ <i>lindheimeri.</i>           | <i>Helonias bullata.</i>           |
| “ <i>sphaerocarpon.</i>         | <i>Lilium superbum.</i>            |
| “ <i>villosissimum.</i>         | <i>Aletris farinosa.</i>           |
| “ <i>oligosanthes.</i>          | <i>Smilax rotundifolia.</i>        |
| “ <i>pseudopubescens.</i>       | “ <i>glauca.</i>                   |
| “ <i>ashei.</i>                 | <i>Hypoxis hirsuta.</i>            |
| “ <i>columbianum.</i>           | <i>Iris prismatica.</i>            |
| “ <i>addisonii.</i>             | <i>Sisyrinchium atlanticum.</i>    |
| “ <i>tsugetorum.</i>            | <i>Cypripedium acaule.</i>         |
| “ <i>virgatum cubense.</i>      | <i>Gymnandeniopsis clavellata.</i> |
| <i>Aristida dichotoma.</i>      | <i>Blephariglottis ciliaris.</i>   |
| “ <i>gracilis.</i>              | <i>Pogonia ophioglossoides.</i>    |
| “ <i>purpurascens.</i>          | <i>Arethusa bulbosa.</i>           |
| <i>Calamagrostis cinnoides.</i> | <i>Limodorum tuberosum.</i>        |
| <i>Agrostis hyemalis.</i>       | <i>Gyrostachys beekii.</i>         |
| <i>Danthonia sericea.</i>       | “ <i>cernua.</i>                   |
| “ <i>spicata.</i>               | <i>Listera australis.</i>          |
| <i>Triplasis purpurea.</i>      | <i>Populus grandidentata.</i>      |
| <i>Panicularia obtusa.</i>      | <i>Comptonia peregrina.</i>        |
| <i>Festuca octoflora.</i>       | <i>Alnus rugosa.</i>               |
| <i>Cyperus flavescens.</i>      | <i>Quercus alba.</i>               |
| “ <i>fliculmis macilentus.</i>  | “ <i>minor.</i>                    |
| <i>Eleocharis olivacea.</i>     | “ <i>prinus.</i>                   |
| “ <i>tenuis.</i>                | “ <i>prinoides.</i>                |
| <i>Scirpus americanus.</i>      | <i>Polygonella articulata.</i>     |
| “ <i>cyperinus.</i>             | <i>Phoradendron flavescens.</i>    |
| “ <i>criphorum.</i>             | <i>Castalia odorata.</i>           |
| <i>Fimbristylis autumnalis.</i> | <i>Magnolia virginiana.</i>        |
| <i>Eriophorum virginicum.</i>   | <i>Drosera longifolia.</i>         |
| <i>Rynchospora glomerata.</i>   | “ <i>rotundifolia.</i>             |
| “ <i>macrostachya inundata.</i> | <i>Sassafras sassafras.</i>        |
| “ <i>smallii.</i>               | <i>Rubus hispida.</i>              |
| <i>Carex collinsii.</i>         | “ <i>villosus.</i>                 |
| “ <i>folliculata.</i>           | “ <i>cuneifolius.</i>              |
| “ <i>pennsylvanica.</i>         | <i>Aronia nigra.</i>               |
| “ <i>umbellata</i>              | “ <i>arbutifolia.</i>              |
| “ “ <i>tonsa.</i>               | <i>Amelanchier intermedia.</i>     |
| “ <i>canescens disjuncta.</i>   | <i>Crataegus tomentosus.</i>       |
| “ <i>albolutescens.</i>         | <i>Baptisia tinctoria.</i>         |
| “ <i>annectens.</i>             | <i>Lupinus perennis.</i>           |
| <i>Xyris torta.</i>             | <i>Cracca virginiana.</i>          |
| <i>Pontederia cordata.</i>      | <i>Stylosanthes biflora.</i>       |
| <i>Juncus pelocarpus.</i>       | <i>Meibomia michauxii.</i>         |
| “ <i>effusus.</i>               | “ <i>rigida.</i>                   |
| “ <i>tenuis.</i>                | “ <i>obtusa.</i>                   |
| “ <i>dichotomus.</i>            | “ <i>marilandica.</i>              |
| “ <i>canadensis.</i>            | <i>Lespedeza repens.</i>           |
| “ <i>acuminatus.</i>            | “ <i>frutescens.</i>               |
| “ “ <i>debilis.</i>             | “ <i>stuvei.</i>                   |

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|                                    |                                   |
|------------------------------------|-----------------------------------|
| <i>Lespedeza hirta.</i>            | <i>Cuscuta compacta.</i>          |
| <i>Apios apios.</i>                | " <i>arvensis.</i>                |
| <i>Galactia regularis.</i>         | <i>Trichostema dichotomum.</i>    |
| <i>Linum striatum.</i>             | <i>Koeleria mutica.</i>           |
| <i>Polygala nuttallii.</i>         | " <i>verticillata.</i>            |
| " <i>polygama.</i>                 | <i>Lycopus sessilifolius.</i>     |
| <i>Crotonopsis linearis.</i>       | <i>Linaria canadensis.</i>        |
| <i>Rhus vernix.</i>                | <i>Gratiola aurea.</i>            |
| <i>Illeceoides mucronata.</i>      | <i>Dasystema pedicularis.</i>     |
| <i>Ilex laevigata.</i>             | <i>Gerardia purpurea.</i>         |
| <i>Asecyrum hypericoides.</i>      | <i>Melampyrum lineare.</i>        |
| <i>Hypericum canadense.</i>        | <i>Utricularia gibba.</i>         |
| <i>Sarothra gentianoides.</i>      | <i>Cephalanthus occidentalis.</i> |
| <i>Triadenum virginicum.</i>       | <i>Diodia teres.</i>              |
| <i>Helianthemum canadense.</i>     | <i>Viburnum nudum.</i>            |
| <i>Lechea villosa.</i>             | " <i>cassinoides.</i>             |
| " <i>leggettii.</i>                | <i>Adopogon carolinianum.</i>     |
| <i>Viola laucolata.</i>            | <i>Hieracium grenovii.</i>        |
| <i>Rotala ramosior.</i>            | " <i>venosum.</i>                 |
| <i>Decodon verticillatus.</i>      | <i>Nabalus trifoliatus.</i>       |
| <i>Rhexia virginica.</i>           | <i>Eupatorium pubescens.</i>      |
| <i>Ludvigia alternifolia.</i>      | " <i>rotundifolium.</i>           |
| " <i>sphaerocarpa.</i>             | " <i>verbenaefolium.</i>          |
| <i>Chamaenerion angustifolium.</i> | " <i>hyssopifolium.</i>           |
| <i>Epilobium coloratum.</i>        | <i>Chrysopsis mariana.</i>        |
| <i>Nyssa sylvatica.</i>            | <i>Solidago bicolor.</i>          |
| <i>Clethra alnifolia.</i>          | " <i>nemoralis.</i>               |
| <i>Rhododendron maximum.</i>       | " <i>odora.</i>                   |
| <i>Kalmia latifolia.</i>           | " <i>neglecta.</i>                |
| <i>Leucothoe racemosa.</i>         | " <i>rugosa.</i>                  |
| <i>Nolisma ligustrina.</i>         | <i>Euthamia caroliniana.</i>      |
| <i>Epigaea repens.</i>             | <i>Sericocarpus asteroides.</i>   |
| <i>Gaultheria procumbens.</i>      | " <i>linifolius.</i>              |
| <i>Gaylussacia baccata.</i>        | <i>Aster concolor.</i>            |
| " <i>frondosa.</i>                 | " <i>patens.</i>                  |
| <i>Vaccinium vacillans.</i>        | " <i>undulatus.</i>               |
| " <i>atrocoecum.</i>               | " <i>novi-belgii.</i>             |
| <i>Lysimachia terrestris.</i>      | <i>Ionactis linearifolius.</i>    |
| <i>Trientalis borealis.</i>        | <i>Gnaphalium obtusifolium.</i>   |
| <i>Bartonia virginica.</i>         | " <i>purpureum.</i>               |
| " <i>paniculata.</i>               | <i>Helianthus divaricatus.</i>    |
| <i>Limnanthemum lacunosum.</i>     | <i>Coreopsis rosea.</i>           |
| <i>Asclepias amplexicaulis.</i>    |                                   |

## THE MIDDLE DISTRICT.

What I have termed the Middle District occupies that portion of the coastal plain which lies west and north of the Pine Barrens, reaching around the bay shore to Dennisville, although its sepa-



ration from the Cape May district is purely an arbitrary one. To the north it stretches up to the head of the Hackensack marshes, and includes Staten Island, part of Long Island, as well as a strip of eastern Pennsylvania lying east of the fall line, comprising a considerable section of Bucks County and Tinicum township, in Delaware County. The lower part of Philadelphia also belonged to this district, though its native flora is now practically exterminated.

This is the region referred to by Dr. Arthur Hollick in his interesting paper on "The Relation Between Forestry and Geology in New Jersey"\* as the "Tension Zone," "because it is there that the two floras [*i. e.*, the deciduous forest of the northern uplands and the coniferous forest of the Pine Barrens] meet and overlap, producing a constant state of strain or tension in the struggle for advantage."

Dr. Hollick was admittedly drawing his conclusions mainly from a study of the northern edge of the Pine Barrens as seen in the "tongues" which cross a line from Monmouth Junction to Farmingdale, and was not in possession of detailed information on the distribution of species in the southern part of the State. He, therefore, missed the fact that the so-called "Tension Zone" is not merely a mixture of elements from the northern counties and the Pine Barrens, but is characterized by a large number of peculiar species which are as foreign to one of the above regions as they are to the other. Some of the trees which are peculiar to the Middle District as contrasted with the Northern Uplands and Pine Barrens are *Dospyros virginiana*, *Ilex opaca*, *Pinus virginiana*, *Quercus phellos*, *Betula nigra*, *Liquidambar styraciflua*. Dr. Hollick states that all of these occur in the Coniferous Zone, but, as a matter of fact, they are unknown in the Pine Barrens, though they re-occur on the coast strip and in the Cape May district. Therefore, while I heartily agree with Dr. Hollick's contention that "the mechanical structure of the soil" is the most potent factor in the distribution of plants, I fail to appreciate the importance of "tension" in the vegetation of this zone. To me it seems to be a division of the coastal plain of equal rank with the Pine Barrens.

---

\* Report on Forests, Ann. Rep. State Geol. N. J. for 1899, pp. 177-201.

This Middle district is eminently an agricultural one and largely given over to truck farms, so that the original flora is exterminated over large areas. Bogs and swamps have been drained to a great extent and much forest land has disappeared. There are still, however, along the banks of creeks and streams and in other situations sufficient remnants to form a pretty accurate idea of the constituents of the flora.

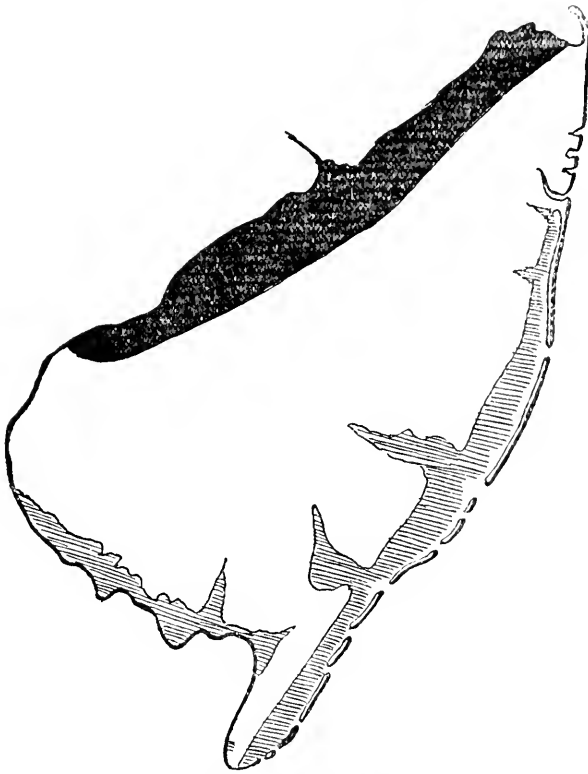


Fig. 4.—Range of *Erythronium americanum*, a species which enters the upper edge of the Middle District.

The region comprises all of the cretaceous formation, and part of the tertiary, as already explained, but peculiarities in distribution conform not to the boundaries of these areas, but rather to the areas of marl, sand or other varieties of surface soil.

Several elements or intrusions may be detected in this flora of the Middle district:

(1) Plants that have spread over from the country north of the fall line, most noticeable in the northwestern part of Burlington County and northern Monmouth County (Fig. 4).

(2) The isolated Pine Barren colonies or islands already referred to.

(3) Species which seem to have their center of abundance in the Cape May district or more properly in Delaware (Fig. 5).



Fig. 5.—Range of *Lobelia puberula*, a Cape May plant which pushes along the coast and Lower Middle District.

In the bogs at Delanco and Repaupo, close to the Delaware, and to a less extent in some of the others occur certain decidedly boreal species, which probably owe their presence here to some earlier phenomenon than the recent influx of upland species across the fall line. These occurrences are parallel with the presence of *Rhododendron* and *Ilicioides* in the swamps of the Pine Barrens.

Such species are *Muhlenbergia foliosa*, *Carex limosa*, *Eriophorum gracile*, *Scirpus torreyi*, *Schenckzeria palustris*, *Menyanthes trifoliatus*.

The district presents many varieties of vegetation. The tide-water creeks along the Delaware support *Zizania palustris*, *Typha latifolia*, *Typha angustifolia*, *Peltandra virginica*, *Sagittaria latifolia*, *Nymphaea advena*, *Polygonum sagittatum*, *P. arifolium*, *Bidens laevis*, *Cephalanthus occidentalis*, *Sambucus canadensis*, etc., etc.

In the swampy meadows characteristic species are *Eupatorium maculatum*, *E. perfoliatum*, *Solidago rugosa*, *Euthamia graminifolia*, *Mimulus ringens*, *Chelone glabra*, *Lobelia cardinalis*, *Vernonia noveboracensis*, *Aster novi-belgii*, *A. puniceus*, *Cuscuta gronovii*, *Galium asprellum*, *Alnus rugosa*, *Asclepias pulchra*, etc., etc.

Woodlands vary a great deal in composition. Near the Delaware in Camden County are some almost exclusively composed of beech, *Fagus grandifolia*, with which are associated *Quercus rubra* and *Q. alba*, with very little undergrowth and such herbs as *Leptamnium virginianum*, *Hypopitys hypopitys*, *Chimaphila maculata*, *Peramium pubescens* and *Mitchella repens*.

Pure beech woods, however, are rare, and the typical West Jersey woods, especially along the streams, consist of *Quercus phellos*, *Q. palustris*, *Q. triloba*, *Liquidambar styraciflua*, *Liriodendron tulipifera*, *Fagus grandifolia*, *Corpinus caroliniana*, *Cornus florida*, *Betula nigra*, *Nyssa sylvatica*, *Hicoria alba*, *H. glabra*, *Prunus serotina*, *Diospyros virginiana*, with undergrowth of *Viburnum dentatum*, *Ilex opaca*, *Azalea nudiflora*, *Evonymus americanus*, etc.

In other spots more remote from water an almost pure growth of *Pinus virginiana* occurs, with huckleberries here and there and such herbs as *Cypripedium acaule*, *Silene caroliniana*, *Chimaphila maculata*, *C. umbellata*, *Pyrola rotundifolia*, *P. chlorantha*, *P. secunda*, *Asclepias amplexicaulis*, various species of *Panicum*, etc., etc.

In the bogs some Pine Barren species often occur, with such other species as *Polygala viridescens*, *Castilleja coccinea*, *Lobelia cardinalis*, *Gentiana crinita*, *Gentiana saponaria*, *Sanguisorba*

*canadensis*, *Caltha palustris*, etc., none of which occur in the Pines.

|   |       |
|---|-------|
| Numerically the flora of the Middle District comprises, exclusive of weeds, .....                                   | 1138  |
| Obvious intrusions or "relicts" from the Pine Barrens or from other districts, .....                                | 114   |
| Plants common to the northern half of the State, but occurring only in the upper part of the Middle District, ..... | 655   |
|   | — 769 |
| Characteristic Middle District Flora, .....   | 369   |

Systematically these are grouped as follows:

|                                |       |
|--------------------------------|-------|
| Pteridophytes, .....           | 8     |
| Gymnosperms, .....             | 3     |
| Monocotyledons Gramineæ, ..... | 39    |
| Cyperacæ, .....                | 33    |
| Others, .....                  | 40    |
|                                | — 112 |
| Dicotyledons Polypetalæ, ..... | 128   |
| Monopetalæ, .....              | 118   |
|                                | — 246 |
|                                | 369   |

Considering the entire Middle district flora, exclusive of the 114 intrusions, *i. e.* 1,023 species, we find the range of the species is as follows:

WIDE RANGING.

|   |     |
|---|-----|
| Whole of North America, .....                 | 18  |
| Canadian Provinces to Virginia-Florida, ..... | 353 |
| Maine to Virginia-Florida, .....              | 258 |

NORTHERN ELEMENT.

|                               |       |             |
|-------------------------------|-------|-------------|
| Plants ranging south to ..... | N. J. | Del. or Md. |
| From Labrador, .....          | 7     | 3           |
| Newfoundland, .....           | 12    | 8           |
| Nova Scotia, .....            | 8     | 8           |
| New Brunswick, .....          | 2     | 2           |
| Maine, .....                  | 15    | 9           |
| New Hampshire, .....          | 0     | 1           |
| Vermont, .....                | 2     | 1           |
|                               | — 46* | — 32        |

\* For list of species, see pp. 49-56.

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## SOUTHERN ELEMENT.

| Plants ranging north to ..... | N. J.     | So. N. Y. | Ct. or R. I. | Mass.     |
|-------------------------------|-----------|-----------|--------------|-----------|
| From Virginia, .....          | 3         | 3         | 2            | 11        |
| N. Carolina, .....            | 2         | 4         | 1            | 6         |
| S. Carolina, .....            | 2         | 3         | 3            | 4         |
| Georgia, .....                | 9         | 7         | 7            | 19        |
| Florida, .....                | 53        | 39        | 35           | 85        |
|                               | <hr/> 69* | <hr/> 56  | <hr/> 48     | <hr/> 125 |

## LOCAL ELEMENT.

|                               |          |
|-------------------------------|----------|
| New Jersey only, .....        | 3        |
| New Jersey-Maryland, .....    | 2        |
| Long Island-New Jersey, ..... | 1        |
| Long Island-Delaware, .....   | 1        |
| R. I.-Delaware, .....         | 1        |
| Massachusetts to N. J., ..... | 1        |
| "    "    Delaware, .....     | 4        |
| "    "    Maryland, .....     | 5        |
|                               | <hr/> 18 |

## LIST OF CHARACTERISTIC MIDDLE DISTRICT PLANTS.

To the following 167 species are to be added the 202 common to the Pine Barrens (see p. 78) :

|                                |                               |
|--------------------------------|-------------------------------|
| <i>Lygodium palmatum.</i>      | <i>Cyperus retrofractus.</i>  |
| <i>Dryopteris thelypteris.</i> | " <i>hystericinus.</i>        |
| <i>Equisetum arvense.</i>      | <i>Carex lupulina.</i>        |
| <i>Sorghastrum nutans.</i>     | " <i>intumescens.</i>         |
| <i>Juniperus virginiana.</i>   | " <i>vestita.</i>             |
| <i>Pinus virginiana.</i>       | " <i>caroliniana.</i>         |
| <i>Paspalum prostratum.</i>    | " <i>triceps.</i>             |
| <i>Panicum stipitatum.</i>     | " <i>oblita.</i>              |
| " <i>depauperatum.</i>         | " <i>interior.</i>            |
| " <i>dichotomum.</i>           | " <i>varia emmonsii.</i>      |
| " <i>microcarpon.</i>          | " <i>vulpinoidea.</i>         |
| " <i>barbulatum.</i>           | " <i>scoparia.</i>            |
| " <i>scribnerianum.</i>        | <i>Arisæma triphyllum.</i>    |
| <i>Stipa avenacea.</i>         | " <i>pusillum.</i>            |
| <i>Deschampsia flexuosa.</i>   | <i>Peltandra virginica.</i>   |
| <i>Gymnopogon ambiguus.</i>    | <i>Spathyema foetida.</i>     |
| <i>Eragrostis pectinacea.</i>  | <i>Juncus marginatus.</i>     |
| <i>Panicularia nervata.</i>    | " <i>scirpoides.</i>          |
| " <i>pallida.</i>              | <i>Uvularia sessilifolia.</i> |

\* For list of species, see pp. 49-56.

- Uvularia perfoliata.  
 Polygonatum commutatum.  
 Medeola virginiana.  
 Dioscorea villosa.  
 Saururus cernuus.  
 Hicoria glabra.  
 Carpinus caroliniana.  
 Betula nigra.  
 Fagus grandifolia.  
 Castanea dentata.  
 Quercus rudkini.  
     " palustris.  
     " phellos.  
     " triloba.  
 Morus rubra.  
 Comandra umbellata.  
 Rumex verticillatus.  
 Polygonum tenue.  
     " punctatum.  
     " sagittatum.  
     " arifolium.  
     " scandens.  
 Silene caroliniana.  
 Liriodendron tulipifera.  
 Aquilegia canadensis.  
 Anemone quinquefolia.  
 Clematis virginiana.  
 Ranunculus hispidus.  
 Thalictrum polygamum.  
 Benzoin aestivale.  
 Spiræa latifolia.  
     " tomentosa.  
 Fragaria virginiana.  
 Potentilla canadensis.  
 Geum canadense.  
 Rosa carolina.  
 Prunus serotina.  
 Cassia nictitans.  
 Meibomia nudiflora.  
     " paniculata.  
 Lespedeza nuttallii.  
     " virginica.  
     " capitata.  
 Falcata comosa.  
 Geranium maculatum.  
     " carolinianum.  
 Polygala viridescens.  
 Rhus copallina.  
     " radicans.  
 Ilex opaca.  
     " verticillata.  
 Impatiens biflora.  
 Vitis labrusca.  
     " æstivalis.  
 Psedera quinquefolia.  
 Hypericum mutilum.  
 Viola pedata.  
     " cucullata.  
     " sagittata.  
     " primulæfolia.  
     " rafinesquii.  
 Opuntia opuntia.  
 Onagra biennis.  
 Enothera laciniata.  
 Kneiffia pumila.  
 Sanicula canadensis.  
 Cicuta maculata.  
 Sium cicutæfolium.  
 Angelica villosa.  
 Oxypolis rigidior.  
 Cornus florida.  
     " amomum.  
 Pyrola rotundifolium.  
 Chimaphila maculata.  
 Monotropa uniflora.  
 Azalea nudiflora.  
 Lysimachia quadrifolia.  
 Diospyros virginiana.  
 Sabatia angularis.  
 Asclepias tuberosa.  
     " variegata.  
 Convolvulus sepium.  
 Cuscuta gronovii.  
 Phlox maculata.  
 Myosotis virginica.  
 Verbena hastata.  
 Scutellaria lateriflora.  
     " integrifolia.  
 Hedeoma pulegioides.  
 Kœllia flexuosa.  
 Lycopus americanus.  
 Chelone glabra.  
 Mimulus ringens.  
 Dasystema flava.  
 Gerardia tenuifolia.  
 Mitchellia repens.  
 Galium aparine.  
     " claytoni.

|                                 |                               |
|---------------------------------|-------------------------------|
| <i>Galium pilosum.</i>          | <i>Aster puniceus.</i>        |
| <i>Sambucus canadensis.</i>     | " <i>lateriflorus.</i>        |
| <i>Viburnum dentatum.</i>       | " <i>ericoides.</i>           |
| <i>Specularia perfoliata.</i>   | <i>Dollingeria umbellata.</i> |
| <i>Lobelia cardinalis.</i>      | <i>Antennaria neodiocia.</i>  |
| <i>Adopogon virginicum.</i>     | " <i>neglecta.</i>            |
| <i>Lactuca canadensis.</i>      | " <i>plantaginifolia.</i>     |
| <i>Vernonia noveboracensis.</i> | " <i>parlinii.</i>            |
| <i>Eupatorium maculatum.</i>    | <i>Helianthus giganteus.</i>  |
| " <i>perfoliatum.</i>           | <i>Bidens laevis.</i>         |
| " <i>aromaticum.</i>            | " <i>comosa.</i>              |
| <i>Willughbaya scandens.</i>    | " <i>frondosa.</i>            |
| <i>Solidago serotina.</i>       | " <i>bipinnata.</i>           |
| " <i>altissima.</i>             | <i>Senecio aureus.</i>        |
| " <i>canadensis.</i>            | <i>Carduus discolor.</i>      |
| <i>Euthamia graminifolia.</i>   | " <i>maritimus.</i>           |

## THE COASTAL STRIP.

The existence of a coastal flora distinct from that of the Pine Barrens and independent of the maritime element was first recognized by the writer and pointed out in 1908.\*

This is essentially a continuation of the flora of the Middle district around the northern and southern extremities of the Pine Barrens. North of Asbury Park it practically merges into the Middle district, while south of Sea Isle Junction it is not always clearly defined from similar elements of the Cape May district. On the coast islands from Bay Head to Sewell's Point, Cape May, it is well developed and contains, in addition to the Middle district species, a certain number of Pine Barren plants. The strip on the mainland is sometimes so narrow and so cut by projecting arms of the Pine Barrens that it is obviously impossible to tell which species of the latter should be regarded as common also to the coastal strip. The only plan seems to be to include only such as have become established on the islands. While the coastal flora has been said to be largely identical with that of the Middle

\* Proc. Acad. Nat. Sci., Phila., 1907, p. 452 (issued Jan. 20, 1908). This strip appears in Prof. John B. Smith's report on New Jersey Insects in last year's Museum Report. Prof. Smith consulted with me upon the construction of this map and availed himself of the results of my studies upon the distribution of plants and vertebrate animals in New Jersey, but inadvertently failed to mention the fact or to refer to the paper just quoted.



district, there is an additional element of a distinctly boreal nature found neither in the Middle district nor in the Pine Barrens.\* Such species are starred in the following list, the other species being plants of similar boreal distribution, but which occur also occasionally in the upper part of the Middle district, although much more abundant on the coast.

|                                   |                                |
|-----------------------------------|--------------------------------|
| <i>Ophioglossum vulgatum.</i>     | <i>Fragaria virginica.</i>     |
| <i>Lycopodium flabelliforme.</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>Phascolus polystachyus.</i> |
| <i>Cyperus diandrus.</i>          | <i>Geranium robertianum.*</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>Leptorchis loeschii.</i>       | <i>Samolus floribundus.</i>    |
| <i>Gyrostachys plantaginea.</i>   | <i>Sabatia angularis.</i>      |
| <i>Populus tremuloides.</i>       | <i>Gentiana crinita.</i>       |
| <i>Morus rubra.</i>               | <i>Gentiana 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>Moebringia lateriflora.</i>    | <i>Carduus discolor.</i>       |
| <i>Aquilegia canadensis.</i>      | "    muticus.                  |
| <i>Arabis lyrata.</i>             |                                |

The coast islands form a most interesting field for botanical study, but unfortunately the spread of seaside resorts has cleared one beach after another of its native flora until there is practically no untouched forest except the tract back of Ventnor and south of Atlantic City. This contains numbers of Pitch Pine *Pinus rigida*, as well as Red Cedar *Juniperus virginiana*, White Oak *Quercus alba*, Post Oak *Q. stellata*, Spanish Oak *Q. triloba*, Shadbush *Amelanchier intermedia*, Wild Cherry *Prunus serotina*, Sumac *Rhus copalina*, Red Maple *Acer rubrum*, Grape *Vitis asti-*

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\* Dr. H. A. Pilsbry has found a precisely similar element in the Land Snail fauna of the coast strip in the woods below Atlantic City. Cf. *The Nautilus*, 1911, pp. 34-35.

*valis*, Holly *Ilex opaca*, Staff Vine *Celastrus scandens*, Sassafras *S. sassafras*, and Persimmon *Diospyrus virginiana*. To the north the island beaches support no trees except a few Red Cedars, though the spit reaching from Bay Head southward contains *Quercus phellos*, *Ilex opaca*, *Quercus ilicifolia*, *Pinus rigida*. To the south there was until two years ago, quite a wooded thicket at the upper end of Ocean City, comprising the same species as those found near Ventnor, except the Pine.

Sea Isle Beach supported only a few Cedars, as did Two-Mile Beach, just above Cape May, but the two intervening islands, Seven and Five-Mile Beaches, were thickly wooded. Pines were very rare, two small ones only, on Seven-Mile and no record for Five-Mile. The abundant species were the same as those found back of Ventnor on the Atlantic City Island, with the addition of Willow Oak *Quercus phellos*, Red Mulberry *Morus rubra*, Hackberry *Celtis occidentalis* and *Magnolia virginiana* on Seven-Mile Beach, and most of them on Five-Mile Beach as well.

On Seven-Mile Beach immense sand dunes (see pl. CXXIX), towering higher than the forest, shut it off from the sea, but my last visit there found a gang of men cutting down the forest, while steam shovels were leveling the dunes, and dirt cars carried off the sand to be used in the manufacture of concrete houses. Five-Mile Beach has suffered similar "improvement."

Fortunately good series of the flora of these two islands, now all but extinct, are preserved in the Academy of Natural Sciences and University of Pennsylvania, while Dr. Thos. S. Githens, Prof. Chas. H. LaWall\* and the writer have made considerable collections at Ventnor. An "Ecological Study of the New Jersey Strand Flora," presented by Dr. J. W. Harshberger in the Proceedings of the Philadelphia Academy, 1900, p. 623, contains a good account of the forest of Five-Mile Beach.

A list of the plants peculiar to the coast strip follows. A few of them occur occasionally in the Middle district, but they are far more abundant on the coast. These are additional to those starred in the preceding list on p. 89, and a number of them are of austral affinities.

---

\* Cf. Bartonía, 1910, pp. 12-21.

|                                |                                  |
|--------------------------------|----------------------------------|
| <i>Tripsacum dactyloides.</i>  | <i>Atriplex hastata.</i>         |
| <i>Erianthus saccharoides.</i> | <i>Cardamine arenicola.</i>      |
| <i>Panicum virgatum.</i>       | <i>Bradburya virginiana.</i>     |
| “ <i>oricola.</i>              | <i>Kosteletzkya virginica.</i>   |
| “ <i>linearifolium.</i>        | <i>Hudsonia tomentosa.</i>       |
| “ <i>scoparium.</i>            | <i>Lechea maritima.</i>          |
| “ <i>mattamusketense.</i>      | <i>Ludwigiantha arcuata.</i>     |
| “ <i>lanuginosum.</i>          | <i>Hydrocotyle verticillata.</i> |
| <i>Spenopholis obtusata.</i>   | <i>Convolvulus repens.</i>       |
| <i>Cyperus grayi.</i>          | <i>Lippia lanceolata.</i>        |
| “ <i>microdontus.</i>          | <i>Koellia aristata.</i>         |
| <i>Scleria verticillata.</i>   | <i>Baccharis halimifolia.</i>    |
| <i>Myrica carolinensis.</i>    |                                  |

The following list comprises some of the species characteristic of the Coast strip as contrasted with the Pine Barrens, but which are also common in West Jersey:

|                                 |                                 |
|---------------------------------|---------------------------------|
| <i>Juniperus virginiana.</i>    | <i>Oenothera biennis.</i>       |
| <i>Panicum huachucae.</i>       | <i>Proserpinaca palustris.</i>  |
| <i>Tridens flavus.</i>          | <i>Sium cicutifolium.</i>       |
| <i>Elymus virginicus.</i>       | <i>Oxypolus rigidior.</i>       |
| <i>Cyperus rivularis.</i>       | <i>Cornus florida.</i>          |
| <i>Carex tenuis.</i>            | <i>Sabatia angularis.</i>       |
| <i>Vagnera racemosa.</i>        | <i>Asclepias pulchra.</i>       |
| <i>Quercus phellos.</i>         | <i>Verbena hastata.</i>         |
| <i>Celtis occidentalis.</i>     | <i>Salvia lyrata.</i>           |
| <i>Polygonum scandens.</i>      | <i>Lycopus americanus.</i>      |
| “ <i>punctatum.</i>             | <i>Gerardia purpurea.</i>       |
| <i>Benzoin aestivale.</i>       | <i>Galium claytoni.</i>         |
| <i>Liquidambar styraciflua.</i> | <i>Sambucus canadensis.</i>     |
| <i>Geum canadense.</i>          | <i>Viburnum dentatum.</i>       |
| <i>Rosa carolina.</i>           | <i>Lobelia cardinalis.</i>      |
| <i>Strophostyles helvula.</i>   | <i>Vernonia noveboracensis.</i> |
| <i>Ilex opaca.</i>              | <i>Eupatorium maculatum.</i>    |
| <i>Impatiens biflora.</i>       | “ <i>perfoliatum.</i>           |
| <i>Vitis labrusca.</i>          | <i>Solidago altissima.</i>      |
| <i>Hibiscus moschentos.</i>     | <i>Helenium autumnale.</i>      |
| <i>Hypericum mutilum.</i>       | <i>Carduus spinosissimus.</i>   |
| <i>Opuntia opuntia.</i>         |                                 |

|  |             |
|--|-------------|
| The coast strip flora, exclusive of the halophytes of the strand and salt marshes, comprises ..... | 524 species |
| Of these there are local intrusions from other districts, .....                                    | 32          |
| True coast strip flora, .....  | 492         |

These range as follows :

WIDE RANGING.

|   |     |
|---|-----|
| Throughout North America, .....               | 12  |
| Canadian Provinces to Virginia-Florida, ..... | 156 |
| Maine-N. Hampshire to Virginia-Florida, ..... | 134 |

NORTHERN ELEMENT.

|                               |       |             |
|-------------------------------|-------|-------------|
| Plants ranging south to ..... | N. J. | Del. or Md. |
| From Labrador, .....          | 1     | 0           |
| Newfoundland, .....           | 10    | 1           |
| New Brunswick, .....          | 1     | 2           |
| Nova Scotia, .....            | 1     | 2           |
| Maine, .....                  | 2     | 6           |
|                               | <hr/> | <hr/>       |
|                               | 15    | 11          |

SOUTHERN ELEMENT.

|                               |       |           |              |       |
|-------------------------------|-------|-----------|--------------|-------|
| Plants ranging north to ..... | N. J. | So. N. Y. | Ct. or R. I. | Mass. |
| From Virginia, .....          | 1     | 0         | 1            | 5     |
| N. Carolina, .....            | 1     | 1         | 1            | 5     |
| S. Carolina, .....            | 1     | 0         | 0            | 3     |
| Georgia, .....                | 1     | 1         | 2            | 8     |
| Florida, .....                | 28    | 27        | 20           | 52    |
|                               | <hr/> | <hr/>     | <hr/>        | <hr/> |
|                               | 32    | 29        | 24           | 73    |

LOCAL ELEMENT.

|                                  |       |
|----------------------------------|-------|
| New Jersey only, .....           | 2     |
| Long Island to New Jersey, ..... | 1     |
| Mass. to New Jersey, .....       | 1     |
| Mass. to Delaware, .....         | 1     |
| Mass. to Maryland, .....         | 1     |
|                                  | <hr/> |
|                                  | 6     |

THE CAPE MAY DISTRICT.\*

The Cape May peninsula south of the Great Cedar Swamp, stretching from Dennisville to Sea Isle Junction, is for convenience regarded as a separate district. As a matter of fact, it consists of a joining of the coast strip flora and that of the Middle District, which comes around the bay shore from the west. The Pine Barren element is also present, but in more or less isolated patches and dilute in character.

Pine woods are comparatively scarce, and occur mainly on the

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\* Cf. "Scheyichbi and the Strand," Edw. S. Wheeler, 1876, for account of the Cape May District.

western side of the peninsula, while even there we find nothing like the open pitch pine woods of the Pine Barrens.

The country is largely cultivated along the coast and in the lower portion of the peninsula, but the native flora is nowhere destroyed as in the marl belt of the Middle District.

An interesting feature of the flora of the peninsula is the recurrence of many upland species, especially about Cold Spring and Bennett, which are rare or absent between this point and the northern portion of the Middle district in Burlington and Monmouth Counties, also the presence of certain other northern species not known elsewhere south of the fall line.

Such species are as follows:

|                                     |                                |
|-------------------------------------|--------------------------------|
| <i>Botrychium virginicum.</i>       | <i>Heuchera americana.</i>     |
| <i>Calamagrostis canadensis.</i>    | <i>Geum canadensis.</i>        |
| <i>Sphenopholis palustris.</i>      | <i>Agrimonia mollis.</i>       |
| <i>Poa brevifolia.</i>              | <i>Cassia marilandica.</i>     |
| <i>Panicularia septentrionalis.</i> | <i>Meibomia nudiflora.</i>     |
| <i>Carex buxbaumii.</i>             | <i>Oxalis violacea.</i>        |
| “ <i>festucea brevior.</i>          | <i>Linum virginianum.</i>      |
| <i>Arisaema dracontium.</i>         | <i>Sanicula marilandica.</i>   |
| <i>Veratrum viride.</i>             | <i>Angelica villosa.</i>       |
| <i>Uvularia perfoliata.</i>         | <i>Cornus florida.</i>         |
| <i>Allium canadense.</i>            | <i>Fraxinus pennsylvanica.</i> |
| <i>Blephariglottis lacera.</i>      | <i>Menyanthes trifoliata.</i>  |
| <i>Corallorhiza odontorhiza.</i>    | <i>Phlox maculata.</i>         |
| <i>Peramium pubescens.</i>          | <i>Scutellaria pilosa.</i>     |
| <i>Carpinus caroliniana.</i>        | “ <i>galericulata.</i>         |
| <i>Betula nigra.</i>                | <i>Koellia flexuosa.</i>       |
| <i>Fagus grandifolia.</i>           | <i>Cunila origanoides.</i>     |
| <i>Quercus rubra.</i>               | <i>Chelone glabra.</i>         |
| <i>Aristolochia serpentaria.</i>    | <i>Pedicularis lanceolata.</i> |
| <i>Polygonum virginianum.</i>       | <i>Pedicularis canadensis.</i> |
| <i>Liriodendron tulipifera.</i>     | <i>Galium circaezans.</i>      |
| <i>Cimicifuga racemosa.</i>         | <i>Viburnum prunifolium.</i>   |
| <i>Anemone virginiana.</i>          | <i>Triosteum perfoliatum.</i>  |
| <i>Clematis virginiana.</i>         | <i>Campanula aparinoides.</i>  |
| <i>Ranunculus hispidus.</i>         | <i>Adopogon virginicum.</i>    |
| <i>Thalictrum revolutum.</i>        | <i>Lactuca spicata.</i>        |
| <i>Menispermum canadense.</i>       | <i>Aster macrophyllus.</i>     |
| <i>Sanguinaria canadensis.</i>      | <i>Erigeron pulchellus.</i>    |
| <i>Saxifraga pennsylvanica.</i>     | <i>Senecio aureus.</i>         |
| <i>Saxifraga virginiana.</i>        |                                |

In contrast to this is a certain southern element especially noticeable to the west of Bennett and Cold Spring, but spread

more or less over the whole lower third of the peninsula. Most of these species are restricted to the Cape May District, but a few have spread northward in the lower Middle District, and constitute the "Cape May element" referred to under that head—*i. e.*, *Pinus scrotina*, *Paspalum membranaceum*, *Aristida lanosa*, *Gymnopogon brevifolius*, *Eleocharis tortilis*, *Hypericum adpressum*, *Gratiola sphaerocarpa*, *Lobelia puberula*. In the same category should probably be placed *Cyperus pseudovegetus*, *Polygala incarnata*, and a few other species rare in the Middle District and not yet detected on the Cape May peninsula.

A few of the Cape May plants also spread northward along the coast strip for a short distance.

All of the plants peculiar to Cape May, which are of southern affinities, are found immediately across the bay in Delaware, where the flora is practically the same.\*

The Cape May flora numbers in all 658 species; of these there may be deducted as local intrusions 8, leaving 650 species.

None of the Pine Barren species have been deducted, since they vary so in their abundance in the Cape May district that it is impossible to say which should be regarded as true members of the flora and which as intrusions or relicts.

Considering the general range of the species, they fall into the following categories:

## WIDE RANGING.

|   |     |
|---|-----|
| Throughout North America, .....               | 13  |
| Canadian Provinces to Virginia-Florida, ..... | 182 |
| Maine to Virginia-Florida, .....              | 164 |

## NORTHERN ELEMENT.

| Ranging south to .....   | N. J. | Del. or Md. |
|--------------------------|-------|-------------|
| From Newfoundland, ..... | 5     | 3           |
| New Brunswick, .....     | 2     | 0           |
| Nova Scotia, .....       | 0     | 2           |
| Maine, .....             | 1     | 2           |
| New Hampshire, .....     | 1     | 0           |
|                          | 9     | 7           |

\* Cf. Williamson *Torrey*, 1909, p. 160, and Harper *Torrey*, 1909, p. 217, for notes on the Delaware flora and Shreve et al. *Plant Life of Maryland* (vol. 3, publ. Md. Weather Service, 1910) for account of that of Maryland.

## SOUTHERN ELEMENT.

| Plants ranging north to ..... | N. J. | So. N. Y. | Ct. or R. I. | Mass. |
|-------------------------------|-------|-----------|--------------|-------|
| From Virginia, .....          | 1     | 2         | 1            | 6     |
| N. Carolina, .....            | 2     | 1         | 1            | 7     |
| S. Carolina, .....            | 2     | 0         | 3            | 2     |
| Georgia, .....                | 6     | 2         | 5            | 8     |
| Florida, .....                | 73    | 48        | 26           | 67    |
|                               | <hr/> | <hr/>     | <hr/>        | <hr/> |
|                               | 84    | 53        | 36           | 90    |

## LOCAL ELEMENT.

|                                  |       |
|----------------------------------|-------|
| New Jersey only, .....           | 1     |
| New Jersey to Maryland, .....    | 1     |
| Long Island to New Jersey, ..... | 3     |
| Mass. to Del. or Md., .....      | 6     |
|                                  | <hr/> |
|                                  | 11    |

*Species Peculiar to the Cape May District, or Spreading Slightly Northward in the Middle or Coast Districts.*

|                           |                            |
|---------------------------|----------------------------|
| Pinus tæda.               | Eleocharis melanocarpa.    |
| "  serotina.              | "  tortilis.               |
| Taxodium distychem.       | Psilocarya nitens.         |
| Coelorachis rugosa.       | Rynchospora macrostachya.  |
| Paspalum membranaceum.    | "  rariflora.              |
| "  plenipilum.            | (Carex buxbaumii)*         |
| "  glabratum.             | (  "  festucea brevior)*   |
| Panicum hemitomon.        | Xyris elata.               |
| "  condensum.             | Juncus setaceus.           |
| "  commutatum.            | Gymnadeniopsis nivea.      |
| "  angustifolium.         | Blephariglottis peramoena. |
| "  aciculare.             | Tipularia discolor.        |
| "  caerulescens.          | Myrica cerifera.           |
| "  wrightianum.           | Polygonum eciliatum.       |
| Sacciolepis striata.      | "  setaceum.               |
| Chaetochloa magna.        | Lespedeza stuvei neglecta. |
| Aristida lanosa.          | Galactia volubilis.        |
| Sporobolus asper.         | Falcata pitcheri.          |
| Gymnopogon brevifolius.   | Malus angustifolia.        |
| Poa brachyphylla.         | Hypericum adpressum.       |
| Eleocharis quadrangulata. | Hottonia inflata.          |
| "  ocreata.               | (Menyanthes trifoliata)*   |

\* Peculiar to the Cape May District so far as southern New Jersey is concerned, but of distinctly boreal affinities. *Poa brachyphylla* and *Panicum commutatum* occur farther north in Pennsylvania, etc., and are not quite in the same class with the other species here listed, but their affinities are austral.

|                      |                        |
|----------------------|------------------------|
| Lycopus rubellus.    | Plantago elongata.     |
| Gratiola pilosa.     | Diodia virginiana.     |
| "    sphaerocarpa.   | Galium hispidulum.     |
| Utricularia radiata. | Eupatorium celestinum. |
| "    juncea.         | Solidago elliotii.     |
| "    resupinata.     | Boltonia asteroides.   |
| Tecoma radicans.     | Pluchea foetida.       |
| Ruellia ciliosa.     | Senecio tomentosus.    |

## THE MARITIME FLORA.

It is by no means as easy as would appear at first thought to separate the truly maritime plants, the halophytes of the strand and the salt marsh from plants of the coastal strip which occur along the edge of the salt marsh where it joins the upland or interior flora. Furthermore, some plants of the latter group, while strictly coastal in New Jersey, do not seem to be so elsewhere.

The main divisions of the maritime district are easily recognized: (1) the beach, (2) the sand dunes, and (3) the salt marsh.\*

On the beach we have:

|                      |                      |
|----------------------|----------------------|
| Polygonum maritimum. | Sesuvium maritimum.  |
| Atriplex arenaria.   | Ammodenia peploides. |
| Salsola kali.        | Cakile edentula.     |
| Amaranthus pumilus.  | Xanthium echinatum.  |

Also often individuals of *Cenchrus*, *Ammophila*, *Carex*, *Oenothera* and *Euphorbia* from the dunes.

On the dunes occur:

|                                    |                           |
|------------------------------------|---------------------------|
| Panicum amarum.                    | Chenopodium leptophyllum. |
| Andropogon littoralis.             | Lathyrus maritimus.       |
| Cenchrus tribuloides.              | *Prunus maritima.         |
| Ammophila arenaria.                | Euphorbia polygonifolia.  |
| Eragrostis pectinacea spectabilis. | Hudsonia tomentosa.       |
| *Cyperus grayi.                    | Leechea maritima.         |
| Carex silicia.                     | *Polygonella articulata.  |
| Rumex hastatulus.                  | Oenothera humifusa.       |

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\* For more minute divisions cf. Harshberger, Proc. Acad. Nat. Sci. Phila. 1900, 623 et seq., 1902, 642-669.

A star before a name indicates that the species is not truly or exclusively maritime and has already been discussed in another category.



Also *Xanthium* from the beach and *Psedera quinquefolia* and other interior plants.

Both the *Prunus* and *Polygonella* occur commonly in the Middle and Pine Barren districts, while the *Hudsonia* and *Lechea* are occasional in the Pines.

The true salt marsh vegetation consists of the following species:

|                          |                          |
|--------------------------|--------------------------|
| Triglochin maritimum.    | Salicornia ambigua.      |
| Spartina cynosuroides.   | Dondia americana.        |
| "    patens.             | "    linearis.           |
| "    glabra.             | Bassia hirsuta.          |
| Diplachne fascicularis.  | *Aenida cannabina.       |
| Puccinellia fasciculata. | Tissa oligosperma.       |
| Distichlis spicata.      | Oxygraphis cymbalaria.   |
| Cyperus nuttallii.       | *Kosteletzkya virginica. |
| Eleocharis rostellata.   | Glaux maritima.          |
| Fimbristylis castanea.   | Lilacopsis linearis.     |
| Scirpus americanus.      | Sabatia stellaris.       |
| "    nanus.              | Gerardia maritima.       |
| "    robustus.           | Plantago decipiens.      |
| Juncus gerardi.          | "    halophila.          |
| Polygonum proliferum.    | Solidago sempervirens.   |
| "    atlanticum.         | Aster tenuifolius.       |
| Chenopodium rubrum.      | "    subulatus.          |
| Atriplex hastata.        | Iva oraria.              |
| Salicornia europæa.      | Baccharis halimifolia.   |
| "    bigelovii.          | Pluchea camphorata.      |

Of these *Spartina patens*, *Distichlis spicata*, *Juncus gerardi*, *Salicornia europæa*, *S. bigelovii* and *S. ambigua* make up the bulk of the vegetation on the open marsh, more sandy spots support *Cyperus nuttallii*, *Plantago maritima*, *Dondia linearis*, *D. americana*, *Bassia hirsuta*, *Polygonum atlanticum*, *P. proliferum*, etc., while along the edges of the creeks and thoroughfares which occur everywhere through the marshes grow *Spartina cynosuroides*, *Iva oraria* and *Baccharis halimifolia*.

*Solidago sempervirens* and *Atriplex hastata* occur in almost any situation except out on the open flat marsh.

Some of these plants, notably *Sabatia stellaris* and *Kosteletzkya virginica*, grow along the border of the "upland", and belong better, perhaps, with the following, which are usually associated with them:

- |                          |                                |
|--------------------------|--------------------------------|
| Chaetochloa magna.       | *Lythrum lineare.              |
| *Chaetochloa versicolor. | Eryngium aquaticum.            |
| Echinochloa walteri.     | *Sabatia dodecandra.           |
| *Festuca rubra.          | *Aselepias lanceolata.         |
| Elymus halophilus.       | *Teuerium canadense littorale. |
| Fuirena squarrosa.       | Ptilimnium capillaceum.        |
| “ hispida.               |                                |

Some of both of the last lists also occur in the moist hollows among the dunes, where we also find:

- |                         |                         |
|-------------------------|-------------------------|
| *Samolus floribundus.   | *Agrostis maritima.     |
| *Limosella tenuifolia.  | *Sphenopholis obtusata. |
| *Zanichellia palustris. | *S. obtusata pubescens. |

While the species in the last three lists are typical coast plants, some of them occur also in other districts, and some are, perhaps, better referred to the coastal strip already described than to the maritime.

In salt water along the coast we find *Zostera marina* and *Ruppia maritima*, the latter extending into brackish or even fresh ponds, and where larger streams come down to the coast or where extensive fresh marshes join the brackish ones we find *Scirpus olneyi*, *Typha angustifolia*, *T. latifolia* and *Phragmites phragmites*.

Of the eighty-nine species referred to in this discussion of the maritime flora eighteen have been considered under other sections in the preceding discussions and estimates, though, as already said, the division is sometimes an arbitrary one. These species have been starred to distinguish them from those regarded as truly maritime.

When the 71 maritime species are grouped according to their general range we find them divided as follows:

WIDE RANGING.

|   |    |
|---|----|
| Canadian Provinces to Virginia-Florida, ..... | 21 |
| Maine to Virginia-Florida, .....              | 10 |
| Maine to Delaware, .....                      | 1  |

NORTHERN ELEMENT.

|                        |       |
|------------------------|-------|
| Ranging south to ..... | N. J. |
| From Labrador, .....   | 3     |
| Newfoundland, .....    | 4     |
| Nova Scotia, .....     | 4     |
| Maine, .....           | 2     |
|                        | 13    |

SOUTHERN ELEMENT.

|                               |       |           |              |       |
|-------------------------------|-------|-----------|--------------|-------|
| Plants ranging north to ..... | N. J. | So. N. Y. | Ct. or R. I. | Mass. |
| From N. Carolina, .....       | 0     | 0         | 1            | 0     |
| Georgia, .....                | 0     | 0         | 1            | 0     |
| Florida, .....                | 4     | 3         | 3            | 13    |
|                               | 4     | 3         | 5            | 13    |

LOCAL ELEMENT.

|                                  |   |
|----------------------------------|---|
| Massachusetts to Maryland, ..... | 1 |
| New Jersey only, .....           | 1 |

WEEDS AND ADVENTIVE VEGETATION.

Important as is the study of weeds from an economic or ecologic standpoint, they have little or no significance in a geographic discussion of plant life, their principal function being to aid in obliterating all trace of the original range of the native vegetation.

In the Middle district the woodland, the beds of tide-water cr eks and an occasional undrained bog are all that remain of the original vegetation. All the cultivated and waste ground is given over to weeds or introduced plants.

In the Pine Barrens, however, the great bulk of the ground is still occupied by the native flora, and weeds creep in only where settlements have been established and even then not as abundantly as in the Middle district.

It seems as if artificial interference with the native flora was necessary to the establishment and maintenance of weeds. So soon as the ground is cleared and the sod turned, weeds appear, though previously they were unable to gain a foothold. Traffic along the roads of the Pine Barrens must bring many weed

seeds into the heart of the region, but they seldom establish themselves except when cultivated tracts give them the opportunity. Even along the railroads they seldom spread beyond the artificial road-bed, and when broad, close-cropped clearings are maintained on each side of the track as a guard against fire, and weeds do become established there, they are soon exterminated when the native vegetation is allowed to assume a normal growth.

Cultivation not only opens the way for the introduction of foreign plants brought unintentionally by man to whatever country he goes, just like the various animal pests, but it tends to develop weeds out of a portion of the native vegetation. Most native plants are exterminated immediately or in a short time after cultivation, but others seem to find ideal conditions in the altered environment and become quite as much weeds as the foreign introductions. Such species as *Polygonum pennsylvanicum*, *P. aviculare*, *Erigeron annuus*, *E. ramosus*, *Leptilon canadense*, *Oenothera biennis*, *Lobelia inflata*, *Ambrosia artemisiifolia*, *Tridens flavus*, etc., etc., are known to be native, but all trace of their original range has been lost.

In New Jersey certain species native of the Middle district have become weeds, notably *Linaria canadensis*, *Oenothera sinuata*, *Monarda punctata*, etc., and these plants seem to take hold in the Pine Barren clearings more abundantly than the foreign weeds.

In the Pine Barren bogs the flooding incidental to cranberry growing is quite as detrimental to the native flora as the clearing and plowing of the forest. Many of the orchids, *Abama*, *Tofieldia*, and other bog species are exterminated, but curiously enough *Gyrostheca tinctoria* becomes a most troublesome weed, increasing enormously in all cultivated bogs where it may be present, and *Amphicarpon amphicarpon* swarms over the recently erected sand dykes like a veritable weed of long standing.

Dr. Arthur Hollick has spoken of the Middle district as the "Tension Belt," but it seems to me the real tension belt is in cleared areas in the Pine Barrens where native and introduced weeds and certain Middle district plants have managed to get a foothold and maintain themselves as long as cultivation continues. When this ceases then the native flora asserts itself and seems generally able to re-establish its supremacy and extermi-

nate the intruders. Native weeds seem to gain the ascendancy over the foreign ones, and then the forest and underbrush gradually returns.

In old fields grown up to *Andropogon* grass young pines develop rapidly along with sassafras, followed by various smaller shrubs and herbs. In more arid sections we often find traces of a clearing with a depression marking the location of a house all covered with a growth of sand blackberry, *Rubus cuneifolius*, or sweet fern, *Comptonia asplenifolia*.

Where cedar swamps have been cut or burned over there often develops immediately an abundance of cattail, *Typha latifolia*; wool grass, *Scirpus eriophorum*, some distinctly Middle district species and often *Phragmites*, but soon the magnolia and alder send up new shoots, quantities of chain ferns, *Woodwardia virginica* appear, and later young cedars begin to grow, and eventually the intruders are exterminated.

In West Jersey (Middle District) cultivation is seldom allowed to make a retrograde movement, and settlements are seldom abandoned as they have been among the pines. In certain cases, however, I have seen examples of reforestation here just as in the Pine Barrens, only that the sweet gum is the invading pioneer instead of the pitch pine. There is no evidence of invasion of the Middle District by the Pine Barren element as suggested by Dr. Hollick, the tendency being all the other way, though, as already explained, only made possible by the agency of man. The Middle District flora long ago occupied all land where surface soil conditions were favorable right up to the Pine Barren boundary and advances to-day only where those conditions are extended artificially into the pines.

In extensive Pine Barren settlements of long standing, as Vine-land, Landisville, Hammonton, etc., a good many native plants of the Middle district have followed the weeds and become established where richer soil has been developed, and, while they are listed in the following pages, the fact of their origin should be borne in mind, and their presence at these stations should not be regarded as evidence that these species were originally found in the Pine Barrens.

ORIGIN AND RELATIONSHIP OF THE COASTAL PLAIN FLORA OF  
NEW JERSEY.

The aim of the present work is to present facts rather than to advance theories, as it is the opinion of the writer that deductions as to the origin and relationship of our flora can be more accurately drawn when we have carefully prepared lists covering the more southern sections of the coastal plain, for comparison. Certain ideas, however, have suggested themselves as the collection of data has progressed, which it may not be out of place to present.

In the first place, in regard to the distribution of plants in general, the writer was under the impression that plants were subject to so many irregularities that, except the trees and some shrubs, they did not accord very satisfactorily with the life zones as based upon the distribution of birds and mammals. This idea, however, proves to be wrong, as, with the exception of weeds, plants, down to the smaller herbs, seem to accord with remarkable accuracy to natural zones and areas, where the influence of man has not disturbed nature's equilibrium. We find certain species following the austral zones in the east up to the northern extremity of the coastal plain and pushing up the Mississippi valley, just as do the birds and mammals. This point is entirely lost in the brief statements of range given in the manuals. A plant of austral affinities may have a range similar to the above, reaching Massachusetts and Minnesota at the northernmost points of its range in the east and west respectively. The manuals will give its distribution as Massachusetts to Minnesota south to Florida, although it is absent from nearly half of that area, and in Pennsylvania, for instance, occurs only in the Delaware and Ohio valleys at the eastern and western extremities of the State. The meagreness of accurate data of this sort is a serious hindrance to the study of the geographic distribution of our plants.

The irregularities in the distribution of plants—that is to say, the departure from the boundaries of the life zones, is apparently largely due to the local nature of a plant as opposed to the free-ranging animal. Seeds washed down a river may germinate far

south of the true habitat of their species, and the immediate spot may be such as to enable the young plant to persist for a few years or a few generations, though it eventually perishes. So, too, when a species of plant is practically exterminated, local colonies will persist in spots where the immediate environment is suitable for their existence, while similar colonies of mammals require a very much larger area of congenial environment to prevent extermination.

Two lines of investigation are often confused in the study of geographic distribution: *i. e.* (1) the study of present day distribution and the mapping of existing life zones and life areas, and (2) the source of the species that make up the fauna and flora of a zone or area and the centers of dispersal from which they have spread.

Dr. Spencer Trotter\* has pointed out that a zoögeographic (or phytogeographic) map shows only a transitory condition, and that the boundaries of zones and the ranges of species are always changing, the rate of change corresponding with the rate of physical or climatic change which the earth's surface may be undergoing.

Now, in studying plant distribution it seems to me we are constantly coming upon facts that bear upon conditions previous to those now existing: the local nature of the plant making such cases much more numerous than those that we find among vertebrate animals. And most of the apparent irregularities of plant distribution—isolated colonies, etc.—may safely be regarded as remnants of a former range of the species at a time when different conditions prevailed.

I might say here, as will be further explained beyond, that I do not consider that the mere presence of similar soil conditions at two remote localities is in itself sufficient to account for a certain resemblance in the floras of the two spots. There have probably been physical or climatic changes which have brought the plants to both these and other regions at some previous time, and they have persisted where soil conditions remained congenial, and disappeared and been superseded by other plants where conditions were not suited to their needs.

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\* Auk, 1909, pp. 231-233.

To argue that the same plants will appear wherever suitable soil conditions are present implies that the seeds of all plants are constantly being scattered broadcast, which is certainly not the case, or we should have no trace of the very evident agreement between plant distribution and climatic life zones.

The matter of seed distribution by birds has, I think, been greatly exaggerated, and I doubt if birds exert any appreciable influence upon plant distribution except in cultivated areas.

Robins, for instance, devour vast numbers of wild cherries in western New Jersey and along the coast, and must scatter the seeds far and wide. The birds are frequent over the Pine Barrens, and must scatter cherry stones there as well as elsewhere, and yet the wild cherry is unknown there except in a few isolated cases in cultivated spots. On the untouched floor of the sandy pine woods the cherry stones fail to germinate or to take root, but once the ground is cleared and the soil is turned by the plow conditions are changed.

Turning now to the consideration of the coastal plain flora of New Jersey, we realize that many plants of the more elevated country to the north and west have spread southward and eastward into the coastal plain, mainly along its western border, wherever soil conditions were favorable for their support, and have replaced or mingled with the more austral flora that probably originally covered the whole of southern New Jersey, so that in certain sections this element furnishes a considerable portion of the total plant life.

As has already been stated, there is also to be found in the Piedmont region an element of the more southern flora of the coastal plain, though not so great in extent as that which this region contributes to the coastal plain. Whether these plants have spread westward from below the fall line or whether they are remnants of a similar flora to that which now covers the coastal plain, and which has been all but superseded in the Piedmont region by the more advanced flora now found there, is a question hard to solve.

Two main causes seem to be active in governing the distribution of plants—*i. e.*, climate and soil conditions. Climate, we may say, determines what species are able to exist in a certain



belt or region, while soil conditions determine their distribution within that belt. Changes in condition of either climate or soil cause changes in the distribution of plants, and, consequently, extensions or contractions of their ranges in different directions. As already explained, we have many southern plants which we often refer to as pushing northward in the coastal plain, and others of northern affinities which find their southern limit in the New Jersey Pine Barrens, these we refer to as stragglers from the north. Often both elements occur side by side in the same spot, like *Schizæa pusilla*\* and *Lycopodium carolinianum*, which are here such constant and noteworthy associates.

It is a nice point to determine whether ranges are being extended in the same area at the same time in opposite directions or whether there has been a series of successive movements first in one direction and then in another, which have resulted in the present complex associations.

It seems most likely that changes of range due to climate have been of the latter character, and that many isolated boreal plants, such as *Rhododendron*, *Schizæa*, *Arctostophylos*, *Corema* of the Pine Barrens, *Geranium robertianum*, *Vagnera stellata*, *Carex buxbaumii*, *Menyanthes* and *Scheuchzeria* of other parts of southern New Jersey, may be relics of glacial times, while plants of distinctly austral affinities found far north of their normal range may be remnants of a southern flora that pushed northward when a milder climate prevailed.

Changes due to soil conditions, however, might easily take place in opposite directions simultaneously. The gradual enrichment of the sandy soil in various parts of the New Jersey coastal plain might readily coax southern species farther and farther north and northern species southward so long as climatic conditions were not prohibitive to their advance, while sand-loving plants originally brought to the same general region from different directions through successive climatic changes would be drawn into closer association where arid conditions were most intense.

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\*Prof. Fernald (Rhodora 1911, p. 109) seems to regard *Schizæa* and *Corema* as coastal plain plants which have pushed northward, while I have always regarded them as boreal species driven south to New Jersey.

Some such action as the former of these two examples seems clearly to be under way, for, as has been shown, the New Jersey Pine Barrens are at present surrounded by a more advanced flora which is pushing in from all sides wherever conditions are favorable, and man is rendering no small assistance in the movement. Both east and west of the Pine Barrens there can be readily detected a northern and southern element apparently advancing in opposite directions in a common effort to conquer the Pine Barrens. The more or less complex character of the Pine Barren flora to-day as regards its origin is apparently due to a combination of movements such as described above.

Of course, great physical changes in the earth's surface in geologic time must have had tremendous effect upon the flora, usually producing climatic changes which acted directly upon plant life. Such changes, of course, were responsible for the great fall in temperature coincident with the glacial epoch. Subsidences, too, which are known to have occurred at different periods, must have entirely exterminated the flora of large areas.

Just how far we can correlate existing conditions of plant distribution with geologic changes it is difficult to say. Most attempts of this sort seem to suppose a definiteness of knowledge of the time relationship of various geologic phenomena which we do not possess, and there is a tendency to assume constancy in the character of the flora of certain areas, while that of contiguous areas is undergoing tremendous changes. Such hypotheses, so far as they attempt detailed explanations, are purely conjectural.

Some facts, however, are clear. We know that the coastal plain was submerged at a time when the elevated Piedmont region to the west must have been covered with vegetation, and that plant life on the region north of the terminal moraine must have been for the most part exterminated during the glacial epoch. Therefore, the area between the coastal plain and the terminal moraine must have been continuously covered with plants for a much longer period than have these two regions themselves. When the coastal plain was elevated above the sea it must have received its flora from the contiguous country to the west or southwest. Furthermore, the several partial sub-

mergences of the New Jersey coastal plain after its first upheaval which are claimed by geologists\* and other changing conditions may not only have resulted in several invasions of plants, but also in changes in the character of the plant life in the regions from which they came.

In every investigation in the plant life of the eastern United States we seem to find two elements—a boreal, more or less identical with the flora of northern Europe, and an austral, peculiarly American, and precisely the same thing is found in the study of animal life. Under prevailing conditions, however, and through adaptation certain species of animals of American austral origin have become typical boreal species to-day, and doubtless the same thing may be true of certain plants. This shows the necessity of distinguishing carefully between present geographical distribution and original source of center of dispersal of a species.

Now, supposing that the characteristic American austral flora covered the Piedmont area or a portion of it at the time the coastal plain was elevated, it is natural that it would have spread over into the new territory, or at least such species as were best adapted to its sandy stretches. Then, if from one cause or another there was an invasion of the more boreal element over the Piedmont plateau, we should probably have exactly the conditions that we find to-day—*i. e.*, the survival of the earlier flora in bogs and sandy areas and its disappearance where better soil has developed in favor of the more advanced flora now prevalent.‡ Part of the latter is also of austral origin, but, being suited only to richer soil, did not spread to any extent into the coastal plain.

In New Jersey the vegetation is at a much younger stage of its development. In the Pine Barrens we have only sand and bog plants, while in the Middle district we encounter the more advanced type of the American austral element and the evident influx of boreal plants already referred to from the north.

During the Pensauken period West Jersey was submerged, while the Pine Barrens were apparently cut off as an island.

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\* Cf. The Physical Geography of New Jersey by Rollin D. Salisbury, Vol. IV., Final Report State Geologist, 1898, especially pp. 92-170.

‡ Cf. Cowles. Physiographic Ecology of Chicago and vicinity, Bot. Gazette XXXI., 73-108, 145-182, 1901.

This submergence and the alluvial deposits along the Delaware river valley may have hastened the destruction of the true Pine Barren flora over this area and made soil conditions suitable for a more rapid influx of the type of vegetation that at present prevails there, though the isolated Pine Barren islands in the Middle District would argue rather for the gradual encroachment of the present flora coincident with a gradual change of soil.

Just what elements have been instrumental in changing conditions along the coast to make possible the existence of the coast strip already referred to I cannot say, nor does it seem worth while to theorize at present upon the possible explanations of the presence of boreal species in the Pine Barrens or the recurrence of so many boreal forms in southern Cape May.

Lists of the coastal plain bog plants that occur in the Piedmont area in Pennsylvania have already been given on page 46.

As to sandy ground plants characteristic of the coastal plain which occur in similar soil in the Piedmont region there are quite a number.

The following I have found on the mica slate and sandy hills of Chester or Delaware County, Pennsylvania:

|                                  |   |
|----------------------------------|---|
| <i>Quercus stellata</i> .        | <i>Phlox subulata</i> .                     |
| “ <i>marilandica</i> .           | <i>Galium pilosum</i> .                     |
| <i>Rubus cuneifolius</i> .       | <i>Diodea teres</i> .                       |
| <i>Cracca virginica</i> .        | <i>Eupatorium verbenæfolium</i> .           |
| <i>Stylosanthes elatior</i> .    | <i>Willugbaeya scandens</i> (swampy spots). |
| <i>Crotalaria sagittalis</i> .   | <i>Sericocarpus linifolius</i> .            |
| <i>Azcyrum hypericoides</i> .    | <i>Ionactis linariifolius</i> .             |
| <i>Lechea racemulosa</i> .       | <i>Chrysopsis mariana</i> .                 |
| <i>Gaylussaccia frondosa</i> .   |   |
| <i>Aselepias amplexicaulis</i> . |   |

Others occur on the serpentine outcrops as follows:\*

|                             |                                  |
|-----------------------------|----------------------------------|
| <i>Pinus rigida</i> .       | <i>Meibomia obtusa</i> .         |
| “ <i>virginiana</i> .       | <i>Strophostyles umbellata</i> . |
| <i>Aristida oligantha</i> . | <i>Pieris mariana</i> .          |
| “ <i>purpurascens</i> .     | <i>Angelicla villosa</i> .       |
| <i>Baptisia tinctoria</i> . | <i>Eupatorium pubescens</i> .    |
| <i>Meibomia rigida</i> .    | <i>Aster dumosus</i> .           |
| “ <i>marylandica</i> .      | <i>Phlox subulata</i> .          |

\* From F. W. Pennell, Proc. Acad. Nat. Sci. Phila. 1910, 541-584.

Dr. N. L. Britton\* many years ago called attention to the resemblance of the plants of the Kittatinny and Shawangunk mountains of northern New Jersey to those of the Pine Barrens, and listed the following species common to both :

|                            |                               |
|----------------------------|-------------------------------|
| <i>Pinus rigida.</i>       | <i>Lechea racemulosa.</i>     |
| <i>Juncus militaris.</i>   | <i>Polygala polygama.</i>     |
| <i>Orontium aquaticum.</i> | <i>Epigæa repens.</i>         |
| <i>Quercus ilicifolia.</i> | <i>Gaultheria procumbens.</i> |
| <i>Corema conradii.</i>    | <i>Azalea viscosa.</i>        |
| <i>Prunus pumila.</i>      | <i>Gaylussacia frondosa.</i>  |
| <i>Lespedeza hirta.</i>    | <i>Gerardia quercifolia.</i>  |
| <i>Cracca virginica.</i>   | <i>Solidago puberula.</i>     |
| <i>Lupinus perennis.</i>   | <i>Solidago bicolor.</i>      |

All these isolated patches of an earlier type of vegetation in a region floristically older seem to me best explained by the assumption already made that they are relics of an earlier flora now nearly exterminated over the Piedmont region, but of which the present New Jersey coastal plain flora is a derivative. I claim no originality for this theory, as Dr. John W. Harshberger has explained it in detail,† basing his deductions mainly upon the consideration of the plants of the Kittatinny and Pocono Mountains, and Dr. Roland M. Harper has referred to it‡ in connection with a study of bog and swamp plants. I merely wish to state that my investigations lead me to the same general conclusions, although, as already stated, certain other influences and elements are probably involved in the problem.

Dr. Harper brings up another interesting question in his paper, namely, the resemblance of the coastal plain flora to that of the glaciated areas on the other side of the Piedmont region. This resemblance has long been familiar to me, as during my studies of the coastal plain plants I have spent some time, nearly every year, in the mountains of Sullivan and Wyoming counties, Pennsylvania, and have found there the following species, which also occur in the New Jersey coastal plain :

\* Bull. Torrey Bot. Club XI, p. 126, and XIV, p. 187.

† Proc. Acad. Nat. Sci., Phila., 1904, p. 606-609.

‡ *Rhodora* VII, p. 69 (or VIII, p. 27).

|                                 |                                  |
|---------------------------------|----------------------------------|
| <i>Lygodium palmatum.</i>       | <i>Xyris carolinensis.</i>       |
| <i>Dryopteris simulata.</i>     | <i>Juncus pelocarpus.</i>        |
| <i>Woodwardia virginica.</i>    | <i>Drosera longifolia.</i>       |
| <i>Potamogeton oakesianus.</i>  | <i>Sarracenia purpurea.</i>      |
| “ <i>confervoides.</i>          | <i>Brasenia purpurea.</i>        |
| <i>Calamagrostis cinnoides.</i> | <i>Nymphaea variegata.</i>       |
| <i>Sporobolus scrotinus.</i>    | <i>Triadenum virginicum.</i>     |
| <i>Panicularia laxa.</i>        | <i>Illicioides mucronata.</i>    |
| <i>Rynchospora fusca.</i>       | <i>Pyrola chlorantha.</i>        |
| “ <i>alba.</i>                  | “ <i>secunda.</i>                |
| <i>Scirpus subterminalis.</i>   | <i>Rhododendron maximum.</i>     |
| “ <i>torreyi.</i>               | <i>Gaultheria procumbens.</i>    |
| <i>Eleocharis robbinsii.</i>    | <i>Vaccinium pennsylvanicum.</i> |
| <i>Eriophorum virginicum.</i>   | <i>Chamaedaphne calyculata.</i>  |
| <i>Cladium mariscoides.</i>     | <i>Limnanthemum lacunosum.</i>   |
| <i>Carex limosa.</i>            | <i>Menyanthes trifoliata.</i>    |
| “ <i>trisperma.</i>             | <i>Scutellaria galericulata.</i> |
| “ <i>canescens disjuncta.</i>   | <i>Utricularia purpurea.</i>     |
| “ <i>leptalea.</i>              | “ <i>cornuta.</i>                |
| <i>Scheuchzeria palustris.</i>  | “ <i>clandestina.</i>            |
| <i>Orontium aquaticum.</i>      | “ <i>intermedia.</i>             |
| <i>Eriocaulon septangulare.</i> | <i>Viburnum cassinoides.</i>     |

To which may be added from the other parts of the glaciated region of Pennsylvania :

*Carex collinsii.*

*Juncus militaris.*

Some few of these are of boreal origin and have been driven south at some time and remained as isolated colonies in New Jersey, but the bulk of them are identical or similar to those which Dr. Harper mentions and which I agree with him and Dr. Harshberger have spread from the Piedmont region into the mountains upon the retreat of the ice just as they spread into the coastal plain upon its elevation from the sea. I am able to cite more isolated colonies of these plants existing in the Piedmont region than were known to Dr. Harper, but this, it seems to me, strengthens rather than weakens the theory, as do the lists of dry ground plants common to the Piedmont and coastal plain. Both classes of plants exist, as already explained, only in isolated colonies in the Piedmont, but were bogs more plentiful in this region, and had their draining been carried on less assiduously, the evidences of this early flora would have been more frequent. As it is, farming has been carried on so exten-

sively and land so well cleared and cultivated that anything like a natural swamp or bog is now almost unknown. The introduction of cattle and the influx of weeds soon work havoc with a bog or swamp so far as the botanist is concerned.

The relation between the New Jersey Pine Barrens and the coastal plain to the north and south is of interest.

With the lack of definite knowledge of the limits of the Pine Barrens and of the plants which are really characteristic of the region, it has been hitherto difficult to clearly consider the question.

Dr. Roland Harper has suggested that the New Jersey Pine Barrens form a well-defined center of distribution and are isolated from the Pine Barrens of Wilmington, N. C., which he regards as the next clearly marked Pine Barren center as we go down the coast, although he admits that the apparent lack of Pine Barren plants in the intervening country may be due merely to lack of knowledge.

In the recent report on the flora of Maryland Mr. Forrest Shreve\* shows pretty conclusively that the lack of Pine Barren plants, so far as that State is concerned, is real. He says (p. 87) that the only Pine Barren species on the coastal plain of Maryland are *Cyperus grayi*, *Smilax walteri*, *Polygala lutca*, *Ilex glabra* and *Sclerolepis uniflora*.

All of these occur locally outside of the Pines in New Jersey, though they are most abundant in that region. Of Mr. Shreves' list of 94 characteristic plants of the coastal plain of Maryland; twenty do not occur as far north as New Jersey, but are not Pine Barren species; of the remainder 40 are restricted to the Middle, Coast or Cape May Districts of New Jersey (of which 4 have been found as stragglers in the Pines), while 28 are quite as abundant, or more abundant, in the Middle District, although they do occur in the Pine Barrens. To his five Pine Barren plants I should add from Mr. Shreves' Coastal Plain list *Ascyrum stans*, which in New Jersey is quite as typical of the Pines as the five he mentions.

It is obvious from this data that the coastal plain flora of

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\* Maryland Weather Service, Vol. III, 1910.

Maryland is distinctly affiliated with the Middle District flora of New Jersey and not with that of the Pine Barrens.

The investigations of the members of the Philadelphia Botanical Club in the State of Delaware would indicate that conditions there are very similar, that is to say, that the New Jersey Pine Barren element in the flora is very slight.\*

The so-called Pine Barrens of Long Island are decidedly weak in the characteristic Pine Barren plants and take their place with the several Pine Barren islands which are scattered here and there through the Middle District of New Jersey. Of sixty-two species listed in several papers on the subject† only twenty-six are included in my list of typical New Jersey Pine Barren plants (p. 77), the rest being equally common throughout our region or restricted to the Middle District. Of the twenty-six, six occur at one outlying station, thirteen at two and four at three, while only three, *Dryopteris simulata*, *Chrysopsis falcata* and *Arenaria caroliniana* are confined to the Pines in New Jersey, and the first two of these are not found in the more Southern Pine Barrens, the *Dryopteris* being possibly of boreal affinities.

It would seem, therefore, that we have in the New Jersey and North Carolina Pine Barrens the sand and bog elements of a wide-spread American austral flora, which has been largely superseded by a more advanced element of similar origin over the rest of the coastal plain, both elements being richer the farther south we go, while along the western edge of the coastal plain, more especially to the northward, a boreal element has spread down over the fall line to a greater or less degree.

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\* Cf. C. F. Williamson, *Torrey*, 1909, p. 160; R. Harper, *Torrey*, 1909, p. 217.

† N. L. Britton, *Bull. Torr. Bot. Club* VII, p. 81 (1880).

A. J. Grout, *Torrey* II, p. 49 (1902).

S. E. Jeliffe, *Torrey* IV, p. 97 (1904).

R. M. Harper, *Torrey* VIII, p. 1 (1908).



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SYSTEMATIC CATALOGUE

OF THE

Flowering Plants and Ferns of South-  
ern New Jersey

(South of the Northern Boundary of Burlington  
and Monmouth Counties)

With a Detailed Account of their Distribution and Time of  
Flowering and Fruiting.

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(113)



## EXPLANATIONS.

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*The Synonymy* consists of a reference to the original place of publication, with the type locality, and to the principal works on the region under consideration.

*The Statement on Range* of each species covers the entire State, the portion that refers to northern New Jersey being taken from Britton's Catalogue.

*The List of Localities* includes all herbarium specimens examined, and also records published in Britton's Catalogue and Keller and Brown's List, which I have no reason to doubt, even though specimens have not been seen. When records given in these two works are not substantiated by specimens from nearby stations or for any other reason seem open to question, they are discussed in foot notes. (Cf. Preface.)

When no letter is given after a locality it indicates that a specimen from this locality is in the Herbarium of the Philadelphia Academy. Specimens in other herbaria are indicated as follows :

OHB=O. H. Brown.

H=Benjamin Heritage.

CDL=Chas. D. Lippincott.

L=Bayard Long.

NB=N. J. Agricultural Exp. Sta.,  
New Brunswick.

T=N. J. State Museum, Trenton.

NY=N. Y. Botanic Garden.

CP=Phila. College of Pharmacy.

P=Princeton University.

S=Witmer Stone.

UP=University of Penna.

C=Record taken from Britton's  
Catalogue.

KB=Records from Keller and  
Brown's List.

Kn=Records from Knieskern's List.

The exact location of the stations cited and some details as to the character of their flora will be found in the list of localities, p. 780.

*The Keys for Identification* are applicable only to the region here considered, and are intentionally artificial in character, being intended merely to contrast the most obvious characters of our plants as an aid to identification. They are not supposed to take the place of a Botanical Manual, a work which all students must have.

These Keys also cover all the common weeds of our region. Their names are enclosed in brackets with foot-note references, but they do not appear in the main text.

*The Flowering and Fruiting Season* (By Mr. Bayard Long)—The feeling that in a local flora the actual seasons of flowering and fruiting of the species in the region under consideration are of considerable interest and value, and the realization of the unsatisfactory nature, from a local standpoint, of this sort of data as presented in the manuals have led to the present attempt to designate the flowering and fruiting seasons of the indigenous plants of

southern New Jersey. An effort has been made to work out as accurately as possible the average seasons of bloom and fruit, but it has not been the intention to include extreme or unusual dates. The very early or very late records, usually represent individual plants in peculiar habitats or purely aberrant cases. Unfortunately, such specimens often turn up in herbaria in rather large numbers, because the average collector has a predilection to collect specimens in aberrant bloom, and he quite frequently neglects to note the fact on his label. Considerable care must be taken to eliminate such cases.

In many plants there is considerable variability in the time of flowering as the result of early or late springs; in others there is similar variability due to climatic or temperature differences in adjacent localities, or through elevation. While there is practically no variation of the last kind in southern New Jersey, there is often quite an appreciable difference in the date of flowering of the same species in West Jersey and on the coast, and one crossing the State on the railroad can readily appreciate the difference in the general advancement of vegetation in these two sections. It has, therefore, sometimes been necessary to average up in a rather crude way the results brought about by such causes of variability.

Flowering data as given in the manuals, when given at all, very often shows a distinct difference of opinion on the part of the authors. The novice finding the flowering season of a plant given in one work as "May-July," and in another "July-September," will be confused to say the least. This is an extreme example, it must be admitted, but it is the rule rather than the exception that there is a difference of some degree.

The corollary to the above paragraph is the ideal that was set up of endeavoring to avoid as much conjecture as possible and to work out the seasons from carefully collected field data and from accurately dated herbarium specimens. Furthermore, a lack of data has been frankly noted instead of covering it up by work of the imagination in an attempt to attain uniformity of treatment for each species. Data from territory not actually covered by the report has also been used, but only in a secondary or auxiliary way. Where the data available has been too meagre to warrant a statement a blank has been left as preferable to quoting dates from the manuals. Several means have been resorted to, however, to give some idea of the flowering season in such cases. Often when only one or two specimens were available their actual flowering or fruiting condition has been given with the date of collection. Occasionally an approximation is given with the addition of the word "probably."

It is to be regretted that more data and time were not obtainable for this work, as only one who attempts a task of this kind can realize what an enormous amount of data is necessary in order to reach satisfactory conclusions. My own field notes embrace observations extending over nearly seven years, but they prove a constant source of surprise in the absence of the very data that are most desired. To obtain full and accurate seasonal data for the plants of a region such as this would probably require many years of the most rigidly systematized field work.

In most works in which flowering dates are given no greater definiteness is attempted than the use of the months or sometimes only the seasons during which the plant may be found in bloom, with occasionally the qualifying

terms "early" and "late." In a local flora such as this it was felt that a greater degree of definiteness could be attained than is possible in a work of broad range. Whenever possible the month has been divided into three parts, "early," "mid" and "late," each approximately of ten days. Where such definiteness was not attainable or desirable the name of the month has been used, or sometimes that of the season.

A few examples will illustrate the plan adopted. The fruit of the chestnut may be said to be ripe very definitely when the burs open and the nuts fall to the ground, but it takes acute observation and discrimination to say just when the fruit of the hackberry is ripe. There is no definite change such as the opening of the chestnut bur, and the period of the presence of mature fruit on the tree is much longer and indefinite; so the term "autumn" is more accurate than a more definite word. In the case of the oaks the same term is used because of a lack of definite and comparative data.

Again, many plants, while they begin to flower and fruit at a definite time, continue indefinitely during the latter part of the growing season, the termination being a matter of individual vigor, advent of frost, change in moisture conditions. The end of the flowering and fruiting season of such species is indicated by the expression "into autumn" or "into October;" "into" being intended to denote an indefinite extension of time into that month or season, not necessarily just into it.

Plants which have occurred but a few times within our limits, but which are frequent in northern New Jersey, Pennsylvania or Delaware, have often been given flowering and fruiting periods based upon data from these immediately contiguous regions.

The seasons—spring, summer, autumn and winter—are used in their conventional sense,\* beginning respectively on the first of March, June, September and December.

The word "sporadically" is used in the case of scattered or occasional bloom occurring after the ordinary season.

The fruiting season is that of fully mature—not merely well developed—fruit, *i. e.*, of dehiscent capsules, falling achenes, dropping nuts and "ripe" coloring of drupes. Many fruits develop rapidly and are fully grown long before they are "ripe," as the nuts of *Corylus*, the "bladder" of *Staphylea* and the seeds of various *Umbelliferae*.

Special treatments found necessary in certain groups are described under the family or generic headings. In some, such as *Cyperaceae*, the only dates given are those of fully developed achenes, since so much depends upon their characters that this date is really the only one of taxonomic importance.

In the case of many trees or shrubs which bloom either before or simultaneously with the appearance of the leaves the relative condition of the leaves at the flowering date is given.

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\* Century dictionary and Cyclopaedia, vol. VII, p. 5548, under season.

## Key to the Plants of Southern New Jersey.

- a. No flowers; reproduction by spores (ferns and their allies).
  - b. Sporangies (spore cases) born under the scales of a terminal cone-like spike. Stems conspicuously jointed, the nodes covered by toothed sheaths. *Equisetaceæ*, p. 137
  - bb. Sporangies born in the axils of the crowded lanceolate or subulate leaves or of reduced scale-like leaves which form an erect spike. Plants somewhat moss-like, often branched and trailing. *Lycopodiales*, p. 139
  - bbb. Sporangies born at the base of slender, awl-shaped, rush-like leaves, which grow in a tuft from a round fleshy base rooting in the mud. Plants submerged. *Isoetaceæ*, p. 144
  - bbbb. Sporangies born on the back of a leaf (frond) in round, elongated or marginal patches (sori); or in a spike or cluster on the modified terminal (or middle) portion of the frond, or on a separate stalk (really a modified frond). *Filicales*, p. 119
- aa. True flowers present; containing stamens, pistils or both; reproduction by seeds.
  - b. Trees with linear or scale-like evergreen [except *Taxodium*] leaves; a resinous odor, fruit, a cone or a woody or fleshy berry. *Pinaceæ*, p. 146
  - bb. Not evergreen coniferous trees.
    - c. Parts of the flower usually in threes or sixes, leaves mostly parallel-veined. Embryo with a single cotyledon; early leaves never opposite. Stem not divided into bark, wood and pith. *Monocotyledons*, p. 153
    - cc. Parts of the flower mostly in fours and fives, leaves net-veined. Embryo with a pair of opposite cotyledons. Stem divided into bark, wood and pith, the wood in perennial species, growing by annual layers just under the bark. *Dicotyledons*, p. 380

## PTERIDOPHYTA—Ferns and their Allies.

## Order FILICALES

Southern New Jersey, with its large areas of flat, dry, sandy ground, and its lack of rocky banks and ledges, is a poor region for ferns. While thirty-two species and sub-species have been found within the limits of this list, twenty of them are really only stragglers from farther north, and occur locally in the richer soil of the Middle District, only two or three extending even sporadically to the Pine Barrens. Four species, *Onoclea sensibilis*, *Lygodium palmatum*, *Dryopteris thelypteris* and *Asplenium platyneuron*, are characteristic plants of the Middle district and, with the exception of *Lygodium*, are rather generally distributed. *Osmunda cinnamomea*, *O. regalis*, *Woodwardia arcolata*, *W. virginica* and *Pteridium aquilinum* extend also over the Pine Barrens, where they are the only abundant ferns, while the rare *Schizæa pusilla* and *Dryopteris simulata* are for the most part confined to this region.

*Fruiting Data.*—The time of year noted under each species indicates the season of mature spores—that is, the season during which dehiscing sporangia are present.

*Key to the Species.*

- a. Plant climbing, "leaves" (frondlets) palmately divided, fruiting portion terminal. *Lygodium palmatum*, p. 129
- aa. Plant not climbing.
  - b. Sterile fronds linear and grass-like, curled and tangled about the base of the slender fertile frond (.5–1 dm. long), which bears the sporanges on minute pinne at its tip. *Schizæa pusilla*, p. 125
  - bb. Fronds not linear and grass-like.
    - c. Sporangies in a spike or panicle at the summit of the stem, with a leaf branching off horizontally from its side.
      - d. Leaf ovate, not cut or lobed; arising near the middle of the stem, plant 1–1.5 dm. high. *Ophioglossum vulgatum*, p. 122
      - dd. Leaf ovate or oblong; pinnate, plant .5–1 dm. high, sessile just below the spike. *Botrychium neglectum*, p. 122
      - ddd. Leaf more or less ternate, segments pinnately divided.
        - e. Leaf sessile about the middle of the stem, segments finely doubly pinnate. *B. virginianum*, p. 123

ec. Leaf petioled from near the base of the stem.

f. Segments pinnate, pinnæ not much cut.

*B. obliquum*, p. 123

ff. Pinnæ finely cut.

*B. o. dissectum*, p. 123

cc. Sporangies in a mass at the summit or middle of an erect "fern-like" frond or in small spots or lines (sori) on its back, or in several species on separate, modified, slender fronds. Fronds all pinnate (divided into lateral segments, which may be again divided).

d. Fronds not ternate.

e. Pinnæ finely serrate, but not lobed or cut.

f. Main stalk shining dark purplish, frond not over 25 mm. wide.

*Asplenium platyneuron*, p. 132

ff. Stalk not dark and polished.

g. Pinnæ on distinct pedicels with an acute lobe at the base.

*Polystichum*, p. 133

gg. Pinnæ widening at base and joining to form a winged margin to the stalk.

h. Frond less than 75 mm. wide round sori on back of fertile fronds.

*Polypodium vulgare*, p. 129

hh. Frond over 1 dm. wide, pinnæ finely serrulate, sometimes undulate, sori oblong in two rows on a separate frond with narrow linear pinnæ.

*Woodwardia areolata*, p. 131

ee. Pinnæ more or less lobed, but not cut to the midrib.

f. Lobes often mere undulations, pinnæ entire and distinctly narrower at the base. Fertile frond separate, a stalk with a panicle of round seed-like bodies at its summit bearing the sporangies.

*Onoclea sensibilis*, p. 137

ff. Lobes rather deeply cut, at least the basal ones, pinnæ broadest at the base, often somewhat triangular. Sori on back of frond.

*Dryopteris cristata*, p. 134

eee. Pinnæ cut nearly or quite to the midrib.

f. Pinnules not toothed or subdivided.

g. Pinnules distinctly pedicelled, minutely serrulate, sporangies in a terminal panicle plant 6-9 dm. high.

*Osmunda regalis*, p. 124

gg. Pinnules united at their bases, forming a margin to the midrib.

h. Small ferns, leafy part of the frond rarely over 3 dm. in length.

i. Lowest pinnæ longest.

*Dryopteris thelypteris*, p. 133

ii. Two lower pairs of pinnæ slightly shorter than the longest.

*D. simulata*, p. 134

iii. Six lower pairs of pinnæ rapidly decreasing in size, last about 6 mm. long.

*D. noveboracensis*, p. 133



- hh.* Large ferns, leafy often 9 dm. in height, frond seldom less than 4 dm. long.
- i.* Several pairs of lower pinnæ rapidly decreasing in size, sori elongated.  
*Asplenium acrostichoides*, p. 132
- ii.* Lower pinnæ about equal in length to the longest.
- j.* Stem with more or less rusty tomentum.
- k.* Pinnules usually more round at the tip and often slightly overlapping. Sporangies covering short pinnæ about the middle of the frond.  
*Osmunda claytoniana*, p. 125
- kk.* Pinnules more acute and clearly separated. Sporangies on a separate stalk appearing in early spring.  
*Osmunda cinnamomea*, p. 124
- jj.* Stem glabrous.
- k.* Six to nine lower pinnæ becoming rapidly smaller. Sporangies on separate modified frond.  
*Matteuccia*, p. 137
- kk.* Lower pinnæ not shorter.  
*Woodwardia virginica*, p. 131
- jjj.* Stem with brownish chaffy scales on lower part, pinnæ somewhat undulated or even lobed, sori round.  
*Dryopteris marginalis*, p. 134
- ff.* Pinnules lobed or cut into segments.
- g.* Lower pinnæ with basal pinnules becoming much shorter.  
*Phegopteris hexagonoptera*, p. 136
- gg.* Lower pinnæ not narrowed at base.
- h.* Leafy part of frond not over 1.7 dm. long.  
*Filix fragilis*, p. 135
- hh.* Leafy part of frond normally more than 3.7 dm. long.
- i.* Stem chaffy with brown scales.  
*Dryopteris spinulosa*, p. 135
- ii.* Stem glabrous or a few scales near the base.
- j.* Dark green, frond glabrous.  
*Asplenium filix-femina*, p. 132
- jj.* Light green frond pubescent below and fragrant. *Dennstædtia punctilobula*, p. 136
- dd.* Fronds ternate.
- e.* Not over 1 dm. in diameter, delicate.  
*Phegopteris dryopteris*, p. 136
- ee.* Over 3 dm. in diameter, thick. *Pteridium aquilinum*, p. 130

ccc. Sporangies under revolute edge of the pinnae or pinnules. Frond branching out more or less horizontally from the stem.

d. Frond ternate, thick, singly or doubly pinnate, 3 dm. or more across. *Pteridium aquilinum*, p. 130

dd. Frond dichotomously branched, branches pinnate and arranged somewhat palmately; stem dark brown or black and highly polished. *Adiantum pedatum*, p. 130

## Family OPHIOGLOSSACEÆ. Adder's Tongues.

### OPHIOGLOSSUM L.

#### *Ophioglossum vulgatum* L. Adder's Tongue.

*Ophioglossum vulgatum* Linnæus, Sp. Pl. 1062. 1753 [Europe.]—Britton 304. Keller and Brown 7.

*Ophioglossum bulbosum* Pursh II. 655.

*Ophioglossum arenarium* E. G. Britton, Bull. Torrey Club XXIV. 555. 1897 [Holly Beach, N. J.].—Keller and Brown 7.—J. Crawford, Bartonica I. 18. 1909.

Damp woods in the North and sparingly in the Middle district; local. Along the coast islands occurs a more slender form, often with two or three stalks from the same root, which was originally discovered by Mrs. E. G. Britton in sandy, shaded ground at Holly Beach and described as a new species *O. arenarium*. The type colony has since been destroyed, but the form has been rediscovered at Longport by Mr. Joseph Crawford and on Long Beach Island by Mr. Bayard Long, growing in hollows among the sand dunes. The drier exposed habitat is doubtless responsible for the peculiar characters, which do not seem worthy of recognition, as similar forms have been found in colonies of true *O. vulgatum*.

*Spores Mature*.—Early June to early July, apparently somewhat later in the coastal plants.

*Middle District*.—Monmouth Co. (C), Hanover (C), Browns Mills (C), Medford. Six miles west of Woodstown, Riddleton.

*Coast*.—Surf City (L), Longport, Wildwood.

### BOTRYCHIUM Swartz.

#### *Botrychium neglectum* A. Wood. Meriden Grape Fern.

*Botrychium neglectum* A. Wood, Classbook of Botany 1846. p. 635 [Meridan, N. H.].—Keller and Brown 8.

*Botrychium matricariaefolium* Britton 305.

Casual north, but very rare in our district, known only from Riddleton, Salem Co., where it was collected in low woodland.

*Spores Mature.*—Early June, during a very brief period. The fronds arise in spring and perish during the summer.

*Middle District.*—Riddleton.

**Botrychium obliquum** Muhl. **Ternate Grape Fern.**

*Botrychium ternatum obliquum* "Muhlenberg" Willdenow, Sp. Pl. V. 63. 1810 [Pennsylvania].—A. Brown, Bull. Torrey Club VII. 114.—Britton 305.

*Botrychium obliquum* Barton II. 205.

*Botrychium lunarioides* Knieskern 41.

Woods and open ground throughout, but rare in the Pine Barrens.

*Spores Mature.*—Early September to late September, rarely in October or November. Fronds arise in midsummer, the fertile portion evergreen, generally persisting into the following spring.

*Middle District.*—Monmouth Co. (K), New Egypa, Birmingham, Taunton, Delaire, Oaklyn (S), Haddonfield (UP), Lawnside (S), Orchard (S), Lindenwold, Clarksboro (UP), Tomlin, Swedesboro, Glassboro, Dividing Creek, *Coast Strip.*—Pt. Pleasant (S), Manahawkin, Surf City (L), Ship Bottom (L), Atlantic City, Ocean City (S), Anglesea (UP).

*Pine Barrens.*—Albion, Egg Harbor City.

*Cape May.*—Dennisville (S), Sea Isle Jnc., Anglesea Jnc. (S), Cold Spring (OHB), Cape May (UP).

**Botrychium obliquum dissectum** Spreng. **Feathery Grape Fern.**

*Botrychium dissectum* Sprengel, Anleit III.: 172. 1804 [Virginia].

*Botrychium ternatum dissectum* Britton 305.

Frequently occurring with the preceding, into which it seems to merge.

*Spores Mature.*—Early September to late September, rarely in October, apparently beginning to mature slightly later than the last. Life history of fronds the same.

*Middle District.*—Medford (Poyser), Oaklyn (S), Clarksboro (UP), Tomlin, Salem (S).

*Coast Strip.*—Surf City (L), Ocean Beach (UP).

*Pine Barrens.*—Albion, Mays Landing (S), Egg Harbor City (UP).

*Cape May.*—Cold Spring (OHB).

**Botrychium virginianum** (L.). **Rattlesnake Fern.**

*Osmunda virginiana* Linnæus, Sp. Pl. 1064. 1753 [Virginia].

*Botrychium virginianum* Britton 305.

A well-known fern of rich woodland in the North and Middle districts, becoming scarce southward.

*Spores Mature*.—Late May to late June, rarely in July, rather variable. Fronds arise in April; fertile portion withering shortly after maturity, but persisting into summer, sterile remaining green until early autumn.

*Middle District*.—Farmingdale, New Egypt, Bordentown, Kinkora, Medford (S), Merchantville (C), Little Timber Creek (C), Clarksboro (UP), Mickleton, Sewell (UP), Swedesboro, Quinton.

*Cape May*.—Cold Spring (OHB).

## Family OSMUNDACEÆ. Cinnamon Ferns.

### OSMUNDA L.

#### *Osmunda regalis* L. Royal Fern.

*Osmunda regalis* Linnæus, Sp. Pl. 1065. 1753 [Europe and Virginia].—Knieskern 41.—Britton 312.

In wooded or open swamps throughout.

*Spores Mature*.—Mid-May to early June, immediately after which the fertile portion withers and dies, but usually persists for some time.

*Middle District*.—Farmingdale, New Egypt, Burlington, Delanco, Medford (S), Gloucester (UP), Lindenwold (S), Sicklerville (S), Washington Park, Mickleton, Swedesboro, Beaver Dam.

*Coast Strip*.—Spray Beach (L), Surf City (L), Beach Haven Cr. (L), Wildwood.

*Pine Barrens*.—Forked River, Long Causway (S), Speedwell, Hammon-ton (Bassett), Mays Landing (UP), Egg Harbor City (UP), Williamstown Jnc., Cedar Brook.

*Cape May*.—Court House (S), Goshen (S) Cape May (OHB).

#### *Osmunda cinnamomea* L. Cinnamon Fern.

*Osmunda cinnamomea* Linnæus, Sp. Pl. 1066. 1753 [Maryland].—Knieskern 41.—Britton 312.

*Osmunda c. frondosa* Britton 312.

Moist situations, throughout. One of the most widely distributed ferns of our district.

Variety *O. c. glandulosa* Waters (Fern Bulletin X, 1902, p. 21—Maryland), occurs with the typical form at several stations.

The Cinnamon Fern is very conspicuous in early spring, when we see the tightly coiled frond tips pushing up all around the

tussock-like root stalk of last year and gradually unfurl into the erect slender cinnamon plumes, which give the plant its name, and from which clouds of the fine dust-like spores are detached when we brush against them. About the time they have reached this stage the green sterile fronds of the ordinary fern-like structure unfurl, after which the fruiting fronds wither and perish. This is our largest fern, and the broad green fronds, sometimes three feet in length, form a conspicuous feature of both wooded and open swamps.

*Spores Mature.*—Early or mid-May, as the fronds uncoil, very shortly after which the fertile fronds begin to wither and soon perish.

*Middle District.*—Farmingdale, New Egypt, Delanco, Medford (S) Delaire, Camden, Haddonfield (S), Lindenwold (S), Tomlin, Mickleton, Swedesboro, Mantua, Glassboro, Beaver Dam.

*Pine Barrens.*—Allaire (S), Atco (UP) Andrews, Cedar Brook, Hamonton (Bassett), Mays Landing (UP), Manumuskin (UP).

*Coast Strip.*—Beach Haven Terrace (L), Spray Beach (L).

*Cape May.*—Goshen (S), Cape May (OHB).

#### *Osmunda claytoniana* L. Clayton's Fern.

*Osmunda claytoniana* Linnaeus, Sp. Pl. 1066. 1753 [Virginia].—Britton 312.

North Jersey, but casual or rare in our region, occurring only in the Middle district.

*Spores Mature.*—Early or mid-May as the fronds uncoil. Fertile portion is commonly dried up by late May, but persists through the summer.

*Middle District.*—Freehold (C), New Egypt, Kinkora, Delaire, near Camden (UP), Swedesboro, Mullica Hill (H).

### Family SCHIZÆACEÆ.

#### SCHIZÆA J. E. Smith.

#### *Schizæa pusilla* Pursh. Curly Grass.

Pl. 66, Fig. 1.

*Schizæa pusilla* Pursh, Fl. Am. Sept. 657. 1814 [Quaker Bridge, Burlington Co., N. J.].—Rafinesque, Amer. Mo. Mag. II., p. 174. 1818.—Nuttall II. 249.—Knieskern 41.—Willis 79.—Britton 312.—Keller and Brown 8.—Cooper, Ann. Lyc. N. Y. II. 266. 1828.—Redfield, Bull. Torrey Club VI. 82. 1876.—Saunders, Proc. Acad. Nat. Sci. Phila. 1900, pp. 548, 549.

This curious little fern, which bears so little resemblance to a fern as popularly understood, has long been the most prized among the many botanical rarities of the Jersey Pine Barrens. It was first discovered in 1805 at Quaker Bridge, where an inn well known to the botanists of old, offered shelter to those who wished to stop over night on their way to the coast. Situated as it was in the very heart of this interesting country, it furnished one of the few available stopping places for those who desired to study the flora or fauna of the Pines, and who in the absence of railroads were unable to return to Philadelphia at night. It thus became the only known station for many species of plants which were later found to have a much wider distribution. With the coming of the railroad and abandonment of the old wagon roads to the sea, the old hostelry at Quaker Bridge disappeared, as did other similar buildings, so that the spot is now more of a wilderness and less accessible than it was a century ago. The party who had the good fortune to discover the *Schizæa* consisted of Dr. C. W. Eddy, J. Le Conte, Fredk. Pursh and C. Whitlow. Pursh described the curious little plant in his *Flora* in 1814, leaving one to infer that he alone was the discoverer, but Rafinesque, in his review of Pursh's work\* states that he did not find any of the specimens and that he described the plant without the permission of the real discoverer. Dr. Torrey has confirmed the first part of this statement, saying that Dr. Eddy was the discoverer and that Le Conte was the only other member of the party to find any specimen [Redfield Torrey Bull. VI, 82-83]. The plant was apparently not found again until July, 1818, when Dr. Torrey and Wm. Cooper drove from Philadelphia to South Amboy, by way of Quaker Bridge and Monmouth, spending a week in the Pines, while Dr. Torrey made his first acquaintance with the peculiar flora.

The order of its subsequent discovery at other stations has not been recorded; we only know that Torrey and Gray had obtained it at Toms River by 1837. Dr. Joseph Leidy collected it at Batsto in 1861 and C. F. Parker at Atsion in 1870 and at Egg Harbor City by 1884.

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\* Amer. Mo. Mag. II, p. 174.

*Schizæa* is now known from some thirty stations, all within the Pine Barrens, and it will doubtless be found in almost any spot within this region where the conditions are favorable. A moist, sandy spot on the edge of a White Cedar swamp is its favorite habitat, where it grows in close association with young Cedars, *Lycopodium carolinianum*, *Drosera filiformis*, etc. Mr. Clutes' statement in his List of N. A. Ferns—Fern. Bull. 1905, p. 120—that it is "found in Cranberry Bogs" is decidedly misleading. It may sometimes grow where cranberries grow, but not in what are known as Cranberry bogs, and I am inclined to think that the artificial cultivation, flooding, etc., would exterminate it, as it does some of our other rarities.

At Speedwell I have found it in the heart of a Cedar Swamp growing on the vertical sides of cuts in the sandy roads made by heavy wagons.

Perhaps the most interesting station is that discovered by Mr. E. B. Bartram, near Seaside Park, on a narrow point of land lying between Barnegat Bay and the ocean. Here, just back of the sand dunes, within one hundred yards of the beach, is a moist hollow with a few little White Cedars, among which grows the *Schizæa* in company with its usual associates, the *Lycopodium* and *Drosera*.

The largest specimens that I have seen bore fruiting fronds 120-150 mm. in height.

The plant is easily overlooked, though readily found when one is familiar with the fern and its haunts. The late Dr. J. Bernard Brinton, who was one of those who discovered it at Egg Harbor City, told me of his amazement when, while sitting upon the ground eating his lunch, the little plant seemed to rise up under his eyes as they for a moment became focused upon a certain spot to which something had accidentally attracted his gaze.

When the American Association for the Advancement of Science met at Philadelphia, in 1884, the botanists in attendance, including a number of prominent British naturalists who had come on from the meeting of the British Association in Canada, were taken on a special excursion to pay their respects to *Schizæa* and the Pine Barrens, probably the most notable trip ever made to this region. It has been described as follows:

“The excursion of Saturday [Sept. 6, 1884] to the Pine Barrens was, barring the heat, thoroughly enjoyable \* \* \* When the coach which was devoted to the botanists was left on the side track at Egg Harbor [City] the view that greeted their eyes was a level, sandy plain, with low vegetation interspersed with shrubs and trees here and there. It was determined to make a sally eastward first. In spite of the fact that the thermometer had passed above the nineties, the whole party of fifty, including ladies and Britishers, wandered out for a mile or so amid a vegetation remarkably rich in showy and interesting flowers and botanical rarities. But the heat would not permit much loitering, and they soon returned with red faces, but arms full of treasures. After a short rest all but a few summoned up fortitude to start out again, going westward for a full mile along the railroad track. This gave a different flora. But the zeal of the excursionists, which was emulating the temperature, reached its highest point when the cry ran all along the line that the *Schizæa* was found. There was a succession of disappearing forms down the railroad embankment into the thicket, where all, great and small, went down on hands and knees to gather the precious little ferns of such unfern-like aspect. But it is impossible to tell all that happened. A bounteous lunch was served upon the return, after which Mr. I. C. Martindale called the botanists to order. Prof. W. J. Beal presided. Dr. Gray gave some reminiscences of his early visits to this region. He thought it was in 1832 that, in company with Dr. Torrey, he first saw the Pine Barrens at Toms River and had found the *Schizæa*. The following year he spent a week at Quaker’s Bridge, and had not been in the Pine Barrens since till the present occasion. Mr. William Carruthers, of the British Museum, spoke pleasantly of the enjoyment which the day had afforded him, and his surprise to see a region so apparently barren supporting such a varied vegetation, particularly at this season of the year. He was only able to recognize *Pteris* and *Osmunda regalis* as plants he had previously seen in a living state.”\*

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\* Bot. Gazette IX. 1884, p. 161.



*Spores Mature.*—Middle or late August through a very short period. Fertile fronds uncoil with the sterile in late May and grow to full height by late July. They dry soon after maturity and usually persist into the next summer or occasionally even for a full year. Sterile frond evergreen.

*Pine Barrens.*—Toms River, Ferago=Bamber, Whittings, Double Trouble, Island Heights Inc., Forked River, Waretown, Mayetta, Tuckerton, Speedwell (S), Chatsworth, Inskip, Joes Bridge, 5 mi. N. E. Hammonton (UP), Eighth St., Atsion, Quaker Bridge, Batsto, Pleasant Mills, Opp. Crowleytown, Egg Harbor City, Hospitality Bridge, Seven mi. S. of Hammonton (UP), Pancoast, Absecon.

*Coast Strip.*—Seaside Park.

#### LYGODIUM Swartz.

*Lygodium palmatum* (Bernh.). Climbing Fern.

*Gisopteris palmata* Bernhardt, Schrad. Journ. Bot. II. 129. 1800 [Penna., Ky. and Va.].

*Lygodium palmatum* Nuttall 248.—Knieskern 41.—Willis 79.—Britton 311.—Keller and Brown 8.

This, our only trailing fern, is found in north Jersey, but is perhaps most frequent, though always local, along streams in the Middle district, especially in Burlington county. It grows in dense thickets, climbing up on the bushes and herbs to a height of two or three feet.

*Spores Mature.*—Late September into October or even later. Fertile portion of the frond uncurling with the sterile during spring; scarcely evergreen, becoming brown and dried during winter. Sterile frondlets remaining green over winter, but perishing the following spring along with the fertile.

*Middle District.*—Matawan (C), Keyport (NY), Shark River (C), Burlington (UP), New Lisbon, Brown's Mills, Moorestown (C), Four miles east of Haddonfield, Medford, East Magnolia, Clementon.

*Pine Barrens.*—White Horse (C), Atsion (KB)

### Family POLYPODIACEÆ. True Ferns.

#### POLYPODIUM L.

*Polypodium vulgare* L. Polypody.

*Polypodium vulgare* Linnæus, Sp. Pl. 1085. 1753 [Europe].—Britton 305.—Keller and Brown 9.

Common in the northern half of the State; rare and local in the Middle district.

*Spores Mature.*—Mid-July, well into autumn. Fronds evergreen, persisting with the large sori well into the next year, often to midsummer.

*Middle District.*—Bordentown, Birmingham, Vincentown (C), Delaware river below Gloucester (P), Swedesboro, Sharpstown.

#### ADIANTUM L.

##### *Adiantum pedatum* L. Maidenhair.

*Adiantum pedatum* Linnæus, Sp. Pl. 1095. 1753 [Canada and Virginia].—Britton 306.—Keller and Brown 9.

North Jersey, but rare in our region, occurring locally in the Middle district.

*Spores Mature.*—Mid-July to late September.

*Middle District.*—Keyport (C), Farmingdale, New Egypt, Vincentown (C), Auburn (C). Mr. C. D. Lippincott assures me that it formerly grew at Swedesboro, but has been exterminated.

#### PTERIDIUM Scopoli.

##### *Pteridium aquilinum* (L.). Bracken.

*Pteris aquilina* Linnæus, Sp. Pl. 1075. 1753 [Europe].—Barton II. 211.—Knieskern 40.—Willis 78.—Britton 306.

Occurs throughout, but especially abundant in the Pine Barrens, where, with the several species of Huckleberries and the "Sweet Fern," it forms the bulk of the undergrowth in open pine woods. It is indeed the most abundant of the species mentioned, and often large areas are covered by it alone, the flat tops of the fronds making an even surface which stretches away among the scattered trunks of the Pitch Pines as far as the eye can reach.

The form *P. a pseudocaudatum* Clute (Fern Bull. VIII., 39, 1900, Babylon L. I.) occurs at various stations and in all sorts of combinations and gradations to true *aquilinum*.

*Spores Mature.*—July to September, showing great variation in date.

*Middle District.*—Long Branch, New Egypt, Sicklerville, Swedesboro, Dividing Creek.

*Pine Barrens.*—Toms River (NY), E. Plains, Waretown, Barnegat, Tuckerton, Speedwell, Winslow, Taunton, Hammonton (Bassett), Egg Harbor.

*Coast Strip.*—Surf City (L), Atlantic City (L).

*Cape May.*—Bennett (S).

**WOODWARDIA J. E. Smith.**

*Woodwardia virginica* (Linn.). Virginia Chain Fern.

*Blechnum virginicum* Linnæus, Mantissa II. 307. 1771 [Virginia].

*Woodwardia virginica* Knieskern 41.—Britton 306.—Keller and Brown 10.

Casually in the North and Middle districts, but most plentiful in the Pine Barrens, where it is the most abundant fern in damp or wet localities.

*Spores Mature*.—Late June to late July, most abundantly, but sporadically on through the summer or even into early autumn.

*Middle District*.—New Egypt, Allaire, Camden (UP), Paulsboro, Bridgeport, Repaupo, Mickleton (UP), Clarksboro (UP), Sicklerville, Swedesboro, Beaver Dam.

*Pine Barrens*.—Bamber, Pasadena, Long Causway, Clementon, Bear Swamp (S), Atco (UP), Ancora (UP), Cedar Lake (T), Vineland (S), Winslow, Hammonton, Pleasant Mills (UP), Batsto, Egg Harbor City, Weekstown, Twelfth St., Folsom, Tuckahoe (S).

*Coast Strip*.—Belmar, Asbury Park (S), Deal (C), Ocean Beach (C), Forked River, Manahawkin, West Creek, Tuckahoe, Anglesea.

*Cape May*.—Goshen, Cape May (OHB).

***Woodwardia areolata* (L.). Narrow-leaved Chain Fern.**

*Acrostichum areolatum* Linnæus, Sp. Pl. 1069. 1753 [Virginia and Maryland].

*Woodwardia onocleoides* Pursh, II. 669. Nuttall II. 252.—Barton II. 212.

*Woodwardia angustifolia* Torrey Cat. N. Y. Plants 81. 1819.—Knieskern 40.

*Woodwardia areolata* Britton 307.—Keller and Brown 10.

Casual in north Jersey, plentiful in the Middle and Pine Barren districts.

*Spores Mature*.—Mid-August to mid-October, but the spores retained within the indusia and not scattered apparently until the frond perishes.

*Middle District*.—Farmingdale, Allaire (S), New Egypt, Camden, Haddonfield, Moorestown (UP), Riverton (UP), Westmont (S), Medford, Taunton (S), Washington Park, Lawnside (S), Lindenwold, Tomlin (S), Center Square, Clementon, Sicklerville (S), Swedesboro, Dividing Creek, Millville, Salem.

*Pine Barrens*.—Tom's River (UP), New Lisbon, Bamber, Pen Bryn (S), Waterford, Cedar Brook, Hammonton, Pleasant Mills, Egg Harbor City (UP).

*Coast Strip*.—Asbury Park, Forked River, Manahawkin, Coxes, Surf City (L), Beach Haven Crest (L), Anglesea (UP).

*Cape May*.—Goshen (S), Dennisville (S), Court House, Cape May (OHB).

## ASPLENIUM L.

*Asplenium platyneuron* (L.). Ebony Fern.

*Achrostichum platyneuron* Linnæus, Sp. Pl. 1069. 1753 [Virginia].

*Asplenium platyneuron* Britton 307.—Saunders Proc. Acad. Nat. Sci., Phila., 1900, p. 548.

Throughout, but most abundant northward. In our region it occurs usually on sandy shaded banks or in thickets.

*Spores Mature*.—Early June to late July. Sterile fronds semi-evergreen, the fertile with heavy sori scarcely persisting through the winter.

*Middle District*.—Shark River, Farmingdale, New Egypt, Hartford, Birmingham, Arneys Mt., Medford (S), Tomlin, Westville (UP), Pitman, Glassboro, Swedesboro.

*Pine Barrens*.—Dover Forge, Bamber, Speedwell (S), Calico.

*Coast Strip*.—Asbury Park, Peermont, Anglesea (UP).

*Cape May*.—Bennett (S), Cold Spring.

*Asplenium filix-fœmina* (L.). Lady Fern.

*Polypodium F[ilix] fœmina* Linnæus, Sp. Pl. 1090. 1753 [Europe].

*Asplenium filix-fœmina* Britton 308.—Saunders, Proc. Acad. Nat. Sci., Phila., 1900, p. 548.

*Asplenium filix-fœmina laciniatum* Moore, Bull. Torrey Club VI. 183.

A common species in North Jersey, scarcer southward and mainly restricted to the Middle district. There is a single Pine Barren record at Calico, where Mr. Saunders found this and other species growing on the inside of an old well.

*Spores Mature*.—Early July to early September; indusia very soon wither.

*Middle District*.—Navesink Highlands (C), Shark River (UP), Freehold (C), Farmingdale, Birmingham, Pemberton (C), Hartford, Camden (P), Locust Grove (S), Medford (S), Gloucester, Kirkwood (C), Sewell (S), Pitman, Mickleton (UP), Swedesboro, Yorktown (S).

*Pine Barrens*.—Calico.

*Coast District*.—Coxe's.

*Cape May*.—Cape May (OHB).

*Asplenium acrostichoides* Sw. Silvery Fern.

*Asplenium acrostichoides* Swartz Schrad. Jour. Bot. II. 54. 1800 [No locality given].—Britton 307.

A northern species reported by Willis from Freehold, within our limits. A specimen in the University of Pennsylvania from

the herbarium of the late Isaac Burk is labeled "deep swamps in Jersey." As Mr. Burk did most of his collecting in south Jersey, it is probable that this specimen came from somewhere in our region.

**POLYSTICHUM Roth.**

**Polystichum acrostichoides (Michx.) Christmas Fern.**

*Nephrodium acrostichoides* Michaux, Fl. Bor. Am. II. 267. 1803 [Pennsylvania, Carolina and Tennessee].

*Aspidium acrostichoides* Knieskern 41.—Britton 310.

*Aspidium acrostichoides schweinitzii* Britton 310.

Common northward, but only casual within our range and restricted to the Middle district, except an isolated colony which I discovered at Speedwell in the heart of the Pine Barrens and one at Cape May.

*Spores Mature.*—Early June to late June; indusia soon withering. Fronds evergreen, except the fertile portion which withers during the winter.

*Middle District.*—Farmingdale, Shark River (UP), New Egypt, Bordentown, Birmingham, Springdale (S), Woodbury, Sewell (S), Swedesboro, Salem (S).

*Pine Barrens.*—Speedwell (S).

*Cape May.*—Cape May (O. H. Brown).

**DRYOPTERIS Adanson.**

**Dryopteris noveboracensis (L.) New York Fern.**

*Polypodium noveboracense* Linnæus, Sp. Pl. 1091. 1753 [Canada].

*Aspidium Noveboracense* Knieskern 41.—Britton 309.

Common northward; southward restricted to the Middle, Coast and Cape May districts, where it is less common.

*Spores Mature.*—Late June into August.

*Middle District.*—Farmingdale, Allaire (S), Birmingham, Haddonfield (S), Westville (UP), Mickleton (H), Lawnside (S), Sewell (S), Andrews, Swedesboro, Yorktown, Dividing Creek.

*Coast Strip.*—Coxes, Manahawkin, Ocean City (UP).

*Cape May.*—Cape May (OHB).

**Dryopteris thelypteris (L.) Marsh Fern.**

*Acrostichum Thelypteris* Linnæus, Sp. Pl. 1071. 1753 [Europe].

*Aspidium Thelypteris* Britton 308.

Throughout, but not common in, the Pine Barrens.

*Spores Mature.*—Mid-August well into September.

*Middle District*.—Sandy Hook (C), Farmingdale, Pt. Pleasant, New Egypt, Hartford, Medford (S), Washington Park, Mickleton (H), Sewell (S), Clementon, Atco (C), Sicklerville (S), Glassboro, Swedesboro, Yorktown, Beaver Dam.

*Pine Barrens*.—Hammonton (S).

*Coast Strip*.—Seaside Park (UP), Barnegat, Manahawkin, Beach Haven Terrace (L), Surf City (L), Beach Haven Crest (L), Holgate's (L), Ocean City (S), Petersburg (S), Wildwood.

*Cape May*.—Goshen (S), Three miles west Court House (S), Cape May.

***Dryopteris simulata* Davenp. Massachusetts Fern.**

*Aspidium simulatum* Davenport, Bot. Gaz. XIX 495. 1894 [Seabrook Essex Co. Mass.].

*Dryopteris simulata* Stone, Proc. Acad. Nat. Sci., Phila., 1908, 457.

Originally discovered in our region at Clementon by Mr. Stewardson Brown and apparently restricted to boggy spots or cedar swamps on the edge of the Pine Barrens.

*Spores Mature*.—Early August to late September.

*Middle District*.—Glassboro, Shark River.

*Pine Barrens*.—Farmingdale, Shark River, Double Trouble, Forked River, Cox's, Clementon, Andrews, west of Sicklerville, Cedar Brook, Batsto Forks.

***Dryopteris cristata* (L.)\* Crested Fern.**

*Polypodium cristatum* Linnæus, Sp. Pl. 1090. 1753 [N. Europe].

*Aspidium cristatum* Britton 309.

Northern New Jersey; occurring locally southward in the Middle district.

*Spores Mature*.—Late June to late July; indusia commonly withering by early July.

*Middle District*.—Red Bank (C), Farmingdale, Hanover, Moorestown (UP), Camden (P), Medford (S), Lawnside (S), Mickleton (H), Tomlin, Sewell (S), Atco (C), Swedesboro, Mullica Hill (C).

*Coast Strip*.—Cox's.

*Cape May*.—Cape May (O. H. Brown).

***Dryopteris marginalis* (L.). Evergreen Wood Fern.**

*Polypodium marginale* Linnæus, Sp. Pl. 1091. 1753 [Canada].

*Aspidium marginale* Britton 309.

A common fern of the northern counties, rare and local within our limits and occurring only in the Middle district.

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\* *Dryopteris cristata clintoniana* Eaton (Gray's Man. Ed. V. 665. 1867.—New York), was reported within our limits only from Little Timber Creek, Camden Co., by I. C. Martinale in Britton's Catalogue. The specimen was not examined until after this page was in type. It seems to be correctly identified.

*Spores Mature*.—Early June to early July, indusia soon withering. Fronds evergreen, persisting with large brown sori over the winter.

*Middle District*.—Farmingdale, Bordentown, Riverton (UP), Birmingham, Camden (P), Woodbury, Mickleton (C),\* 5 mi. S. of Swedesboro (CDL).

***Dryopteris spinulosa* (Retz.). Spinulose Shield Fern.**

*Polypodium spinulosa* Retzius, Fl. Scand. Ed. 2. 250. 1795 [Scandinavia].

Common northward, south locally in the Middle district.

*Spores Mature*.—Mid-May to early June; indusia soon withering. Fronds barely persisting to the beginning of winter.

*Middle District*.—New Egypt, Glassboro, Mickleton.

***Dryopteris spinulosa intermedia* Muhl. Spinulose Shield Fern.**

*Aspidium intermedium* "Muhlenberg" Willdenow, Sp. Pl. V. 262. 1810 [Pennsylvania].—Barton II. 208.

*Aspidium spinulosum* var. *intermedium* Britton 309.

*Dryopteris spinulosa* Saunders, Proc. Acad. Nat. Sci., Phila., 1900, p. 548.

Common northward, south locally in the Middle district and rarely on the coast, to Cape May.

*Spores Mature*.—Mid-May to early June; indusia soon withering. Sterile fronds evergreen, but fertile fronds mostly perish during the winter.

*Middle District*.—Farmingdale (S), Pt. Pleasant, Bordentown, Hartford, Birmingham, Berlin, Atco (C), Woodbury (UP), Swedesboro, Yorktown.

*Coast Strip*.—Cox's.

*Cape May*.—Cape May (OHB).

**FILIX Adanson.**

***Filix fragilis* (Linn.). Brittle Fern.**

*Polypodium F[ilix]-fragile* Linnæus, Sp. Pl. 1091. 1753 [Europe].

*Cystopteris fragilis* Britton 310.

*Filix fragilis* Keller and Brown 14.

Common northward, but known within our limits only from Freehold (Willis), from Medford, where it was discovered May 30, 1903, by Mr. Stewardson Brown growing on the vertical bank of a small stream in deep woods, and from Pitman in a similar situation discovered by Mr. Bayard Long.

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\* Dr. Harshberger's specimen reported from Seaside Park (Proc. Acad. Nat. Sci., Phila., 1900, 623) proves to be *Osmunda cinnamomea*.

*Spores Mature.*—Late May to early July; indusia soon withering.

*Middle District.*—Freehold (C), Medford, Pitman, Mantua (H).

**DENNSTÆDTIA Bernhardi.**

*Dennstædtia punctilobula* (Michx.). Sweet-scented Fern.

*Nephrodium punctilobulum* Michaux, Fl. Bor. Am. II. 268. 1803 [Canada].

*Dicksonia punctilobula* Nuttall II. 253.—Britton 311.

North Jersey and locally southward in the Middle district and on the coast. Also found by the writer at Cape May.

*Spores Mature.*—Mid-June to apparently early August.

*Middle District.*—Freehold (C), Shark River, Hornerstown, Birmingham, Arneys Mt. (S), Lenola (UP), Taunton (S), Mickleton (H), Blackwood, Sewell (S), Andrews, Swedesboro, Yorktown.

*Coast Strip.*—Manahawkin, Cox's.

*Cape May.*—Cape May.

**PHEGOPTERIS Fée.**

*Phegopteris hexagonoptera* (Michx.). Broad Beech Fern.

*Polypodium hexagonopterum* Michaux, Fl. Bor. Am. II. 271. 1803 [Carolina and Virginia].

Common in rocky woods of the northern counties and occasionally in the Middle district.

*Spores Mature.*—Mid-June apparently into August.

*Middle District.*—Long Branch, New Egypt, Swedesboro.

*Phegopteris dryopteris* (L.). Oak Fern.

*Polypodium dryopteris* Linnæus, Sp. Pl. 1093. 1753 [Europe].

*Phegopteris dryopteris* Saunders, Proc. Acad. Nat. Sci., Phila., 1900, p. 548.

A typical mountain species of northern New Jersey discovered growing in the shaft of an old well at Calico, in the heart of the Pine Barrens, by Mr. C. F. Saunders, July 5, 1899. Not known from elsewhere within our range.

*Spores Mature.*—Probably in June, quite delisced in the above specimen.

*Pine Barrens.*—Calico.



## MATTEUCCIA Todaro.

*Matteuccia struthiopteris* (L.). Ostrich Fern.*Osmunda struthiopteris* Linnæus, Sp. Pl. 1066. 1753 [Northern Europe].*Onoclea struthiopteris* Britton 310.*Matteuccia struthiopteris* Keller and Brown 14.

Along the Delaware River at several points in northern New Jersey and at Crosswicks Creek on our northern boundary, where it was found by Mr. E. D. Sturtevant.\*

## ONOCLEA L.

*Onoclea sensibilis* L. Sensitive Fern.*Onoclea sensibilis* Linnæus, Sp. Pl. 1062. 1753 [Virginia].—Knieskern 41.—Britton 310.—Crawford, *Bartonia* I. 19. 1909.

Found throughout, except in the Pine Barrens; occurring in wet swamps, usually in shade.

*Spores Mature*.—Early October, apparently through autumn. Fertile fronds arise in early July, the pinnae (which form berry-like bodies inclosing the sporangia) split open by early October and allow the sporangia to dehisce and the spores to escape.

*Middle District*.—Allaire (S), Pt. Pleasant (S), New Egypt, Hartford, Pemberton (NY), Birmingham, Arney's Mt. (S), Delaire, Medford (S), Sewell (S), Sicklerville (S), Swedesboro, Salem (S).

*Coast Strip*.—Manahawkin, Cox's, Surf City (L), Ship Bottom (L), Tucker's (L), Palermo (S).

*Cape May*.—Cape May (OHB).

## Order EQUISETALES.

Rush-like plants with simple or much-branched jointed stems, leaves reduced to toothed sheaths covering the joints. Only three species occur within our district, none of them entering the Pine Barrens.

Family EQUISETACEÆ. Horsetails.

*Fruiting Data*.—The same character as for Filicales.

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\* According to Britton's Catalogue. No specimens seen.

*Key to the Species.*

- a. Stems smooth, annual.
- b. Cone-like spike containing the sporanges, on a separate plant, pale brown and without branches, appearing in spring and soon perishing. Sterile green plant with numerous branches becoming at least 75 mm. long. *E. arvense*, p. 138
- bb. Cone-like spike at the tip of the stem of a green branched plant, branches fewer and variable, mostly less than 50 mm. long. *E. fluviatile*, p. 138
- aa. Stems harsh, stiff and evergreen, simple (very rarely branched). *E. hyemale affine*, p. 138

## EQUISETUM L.

*Equisetum arvense* L. Field Horsetail.

*Equisetum arvense* Linnæus, Sp. P. 1061. 1753 [Europe].—Knieskern 40.—Britton 312.

Frequent except in the Pine Barrens, but mostly as a weed along railroads, etc.

*Spores Mature*.—Early April to late April, more rarely to early May.

*Middle District*.—Farmingdale, New Egypt, Kirkwood, Delanco, Medford (S), Albion, Swedesboro (CDL).

*Coast Strip*.—Forked River, Barnegat City (L).

*Cape May*.—Dennisville (OHB), Court House, Anglesea Inc. (S), Cape May (OHB).

*Equisetum fluviatile* L. Swamp Horsetail.

*Equisetum fluviatile* Linnæus, Sp. Pl. 1062. 1753 [Europe].

*Equisetum limosum* Britton, Cat. N. J. Plants 313.

Open wet swamps in north Jersey and occasional in the Middle district close to the Delaware River.

*Spores Mature*.—Mid-May to early June.

*Middle District*.—Delaire, Kaighns Pt., Gloucester.

*Equisetum hyemale affine* (Engelm.). Scouring Rush.

*Equisetum robustum affine* Englemann, Amer. Jour. Sci. 46:88. 1844 [St. Louis, Mo.].

*Equisetum hyemale* Knieskern 40.—Britton 313.

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\* *E. scirpoides* is given in Torrey's Catalogue 17, on the authority of Dr. Eddy, as occurring in the New Jersey Pine Barrens, but there must have been some mistake, as this species has never been found by anyone else.

North and Middle districts, usually appearing as if introduced.

*Spores Mature.*—Late May to late July, occasionally later in the summer. Undeveloped spikes persist throughout the year. Evergreen.

*Middle District.*—Keyport (C), Farmingdale (S), New Egypt, Delanco, Birmingham (C), Vincentown (C), Camden (P), Medford (S), Westville (KB), Woodstown (H).

## Order LYCOPODIALES.

Includes the Club Mosses, Selaginellas and Quillworts. The last are mainly confined to the Delaware River and its immediate tributaries. Of the Club Mosses two species are characteristic of the Pine Barren bogs and found in practically all such situations in the district, while one other species is almost restricted to the Pines—*L. carolinianum*.

The other seven are for the most part intrusions from the north, only one of which occurs (sporadically) in the Pine Barren district. Our only *Selaginella* occurs in the Middle and Coast districts only.

*Fruiting Data.*—As in the ferns.

### Key to the Species.

- a. Erect submerged plants consisting of a cluster of awl-shaped leaves arising from a fleshy bulb-like base. Sporangia concealed at the base of the leaves. *Isoetes*, p. 144
- aa. Small prostrate or assurgent moss-like plants, with sporanges at the axils of minute flat spreading leaves. *Selaginella apus*, p. 143
- aaa. Larger prostrate or erect plants with sporanges in the axils of the leaves in erect cylindrical spikes.
  - b. Plants normally erect, leaves all alike. *Lycopodium lucidulum*, p. 140
  - bb. Stems trailing, sending up erect branches, leaves all alike but top of spike, where the sporangia are born somewhat stouter.
    - c. Stems densely leafy, 15 mm. or terminal part 20 mm. in diameter. *L. alopecuroides*, p. 141
    - cc. Stems more slender.
      - d. .2—1 dm. high, central stem slender throughout. *L. inundatum*, p. 140
      - dd. 2.5—3 dm. high, decidedly more robust, central stem thicker terminally. *L. chapmanii*, p. 141
  - aaaa. Larger prostrate or erect plants with sporangia in the axils, of modified, yellowish, scale-like leaves which form a distinct slender cone-like spike.
    - b. Whole plant upright, branching. *L. obscurum*, p. 142

- bb. Plant with a prostrate creeping stem from which rise erect branches.
- c. Leaves linear subulate, not all strictly appressed.
- d. Creeping stem, short, not more than .5 dm. in length, from which rises a slender stalk with minute appressed leaves and a single terminal spike. *L. carolinianum*, p. 142
- dd. Creeping stem, 3-12 dm. long, with many erect or recumbent leafy branches, from some of which rise the slender fruit stalks, bearing one to four spikes each. *L. clavatum*, p. 143
- cc. Leaves minute, scale-like, imbricated and appressed on the flattened palmate branches, which rise from a similar creeping stem.
- d. Trailing stem deep down below the surface, branches less than two millimeters wide. *L. tristachyum*, p. 143
- dd. Trailing stem on the surface, branches two to four millimeters wide, more loosely forked. *L. flabelliforme*, p. 143

Family LYCOPODIACEÆ. Club Mosses.

LYCOPODIUM L.

*Lycopodium lucidulum* Michx. Shining Club-Moss.

*Lycopodium lucidulum* Michaux, Fl. Bor. Amer. II. 284. 1803 [Canada to Mountains of Carolina].—Britton 303.

Moist woods of North Jersey and locally in the Middle district.

*Spores Mature*.—Late July to mid-August; period of maturity brief. Evergreen.

*Middle District*.—New Egypt, Birmingham, Camden, Springdale (S), Medford (S), Woodbury, Swedesboro, Yorktown.

*Lycopodium inundatum* L. Bog Club-Moss.

*Lycopodium inundatum* Linnæus, Sp. Pl. 1102. 1753 [Europe].

Bogs of the northern counties and very rarely in the Middle district.

This species seem clearly distinct from the next, easily recognized by its slender stem and lower habit. Mr. W. A. Poyser tells me that he has specimens from Fairmount, Bergen County.

*Middle District*.—Kaighns Pt.

***Lycopodium chapmanii* Underwood. Chapman's Club-Moss.**

Pl. I., Fig. 2.

*Lycopodium chapmanii* "Underwood" Maxon, Proc. U. S. Nat. Mus. 23: 646. 1901. n. n for *L. ind. adpressum* Chapman [Caloosa Riv., Florida].

*Lycopodium inundatum* Gray, Manual Ed. I. 637. 1848.—Britton 303.

*Lycopodium inundatum* var. *Bigelovii* Gray, Manual Ed. V. 673. 1867.

One of the most characteristic plants of the bogs of the Pine Barren region, occurring casually in the Middle, Coast, and Cape May districts.

*Spores Mature*.—Early August well into October.

*Middle District*.—Allaire (S), Farmingdale, Belmar (UP), Shark River, Center Square, Lindenwold, Orchard (S), Franklinville (UP), Union Grove (S), Dividing Creek.

*Pine Barrens*.—Lakehurst (UP), Chatsworth (UP), Clementon, Waterford, Cedar Brook, Ancora (UP), Atco (UP), Millville, Hammonton, Egg Harbor City, Absecon, Opposite Crowleystown.

*Coast Strip*.—Seaside Park, Forked River, Cox's, Harvey Cedars (L), Ship Bottom (L), Surf City (L), Spray Beach (UP), Peahala (L).

*Cape May*.—Bennett, Cold Spring (S).

***Lycopodium alopecuroides* L. Fox-tail Club-Moss.**

Pl. I., Fig. 1.

*Lycopodium alopecuroides* Linnæus, Sp. Pl. 1102. 1753 [Virginia, Canada].

—Willis 79.—Britton 303.

*Lycopodium alopecoides* Knieskern 41.

A characteristic Pine Barren bog species usually associated with the preceding. It reaches its northern limit in New Jersey, and occurs outside of the Pine Barrens only at Lawrence Station and a few localities in the Middle and Cape May districts.

*Spores Mature*.—Early September through October, even until killed by frost.

*Middle District*.—Hainesport, Kaighns Pt., Griffith's Swamp, Lindenwold, Swedesboro, Bridgeton, Dividing Creek.

*Pine Barrens*.—Toms River, Brown's Mills, South of New Egypt, Waretown, Pasadena, Chatsworth, Tomlinson's, Landisville, Hammonton, Pleasant Mills, Egg Harbor City.

*Cape May*.—Bennett (S), Cold Spring (S).

The characters usually cited for distinguishing the three preceding species are apparently not very constant and we certainly have a chain of connecting links in our New Jersey bogs between *L. chapmanii* and *L. alopecuroides*. As to *L. inundatum*, the

slender stem seems to separate all northern specimens that I have seen from *L. chapmanii* and the Kaighn's Pt. specimen is apparently the northern form. The old Kaighn's Pt. Swamp harbored a number of northern plants not found elsewhere so far south in the State. The application of the name *Bigelovii* is differently construed by different authors. It has usually been associated with *inundatum* as a variety.

***Lycopodium carolinianum* L. Carolina Club-Moss.**

Pl. I., Fig. 3.

*Lycopodium carolinianum* Linnæus, Sp. Pl. 1104. 1753 [Carolina].—Gray's Man. Ed. I. 638.—Knieskern 41.—Willis 80.—Britton 304.

This delicate little species, so frequently associated with *Schizæa*, is almost entirely restricted to the Pine Barrens, which mark the northern limit of its range. It is found in moist, sandy, open spots. It occurs with *Schizæa* at Mr. Bartram's locality near Seaside Park and has been found also at one station near Bennett by Mr. Long.

*Spores Mature*.—Late August well into November.

*Pine Barrens*.—Toms River (UP), Bamber, Waretown, West Creek (S), Chatsworth, Bear Swamp (S), Ballinger's Mill (S), Hammonton, Atsion, Quaker Bridge (Bassett), Batsto, opposite Crowleystown, Pleasant Mills, Egg Harbor City, Forked River, Absecon, Mays Landing (N. Y.).

*Coast Strip*.—Seaside Park.

*Cape May*.—Bennett.

***Lycopodium obscurum* L. Ground Pine.**

*Lycopodium obscurum* Linnæus, Sp. Pl. 1102. 1753 [Philadelphia, J. Bartram].—Britton 304.

*Lycopodium dendroidum* Barton, Fl. Phila. II. 203.—Knieskern 41.

A common woodland species of North Jersey and found less abundantly in the Middle, Coast, and Cape May districts, and at one locality in the Pines, possibly an intruder from the coast.

*Spores Mature*.—Apparently from late July to mid-August; fruits rather infrequently. Evergreen.

*Middle District*.—Farmingdale, New Egypt, New Lisbon (C), Birmingham, Moorestown (C), Fish House, Medford (S), Mickleton (H), Atco (C), Sicklerville, Glassboro, Swedesboro, Yorktown, Centerton (S).

*Pine Barrens*.—Hammonton (Bassett).

*Coast Strip*.—Cox's, Tuckerton.

*Cape May*.—Court House (S), Cold Spring (OHB).

**Lycopodium flabelliforme** (Fernald.). Trailing Christmas-green.

*Lycopodium complanatum flabelliforme* Fernald, Rhodora Nov. 1901, p. 280 [Maine].

*Lycopodium complanatum* Barton 203.—Knieskern 41.—Britton 304.

The common trailing species of the North Jersey woods extending casually to the Middle district and on the coast, even to the Cape May peninsula, but not known from the Pine Barrens.

*Spores Mature.*—Early August to mid-August; a very short period. Rather rarely fruiting in our range. Evergreen.

*Middle District.*—Farmingdale, New Egypt, Arneys Mt. (S), Fish House, Swedesboro.

*Coast Strip.*—Manahawkin.

*Cape May.*—Wildwood Jnc.

**Lycopodium tristachyum** Pursh. Glauous Christmas-green.

*Lycopodium tristachyum* Pursh, Fl. Am. Sept. 653. 1814 [Sweet Springs, Mountains of Virginia].

Very rare in the Middle district and probably farther north in dry woods. Found at Shark River by Messrs. S. Brown and Norman Taylor, July 4, 1910, growing along a railroad bank and perhaps not native. Strobiles on the specimens somewhat immature.

*Middle District.*—Shark River.

**Lycopodium clavatum** L. Trailing Club-Moss.

*Lycopodium clavatum* Linnæus, Sp. Pl. 1101. 1753 [Europe].—Britton 304.—Keller and Brown 16.

Found in the woodlands of the northern counties, but known within our limits only from a very few stations in the Middle district.

*Spores mature.*—Fruiting specimens very rare, apparently. All seen from our range are sterile. Evergreen.

*Middle District.*—Bordentown, Ashland, Mickleton (C), near Millville (KB).

Family SELAGINELLACEÆ. Selaginellas.

**SELAGINELLA** Beauvois.

**Selaginella apus** (L.). Selaginella.

*Lycopodium apus* Linnæus, Sp. Pl. 1105. 1753 [Carolina, Virginia and Pennsylvania].

*Selaginella apus* Knieskern 41.—Britton 303.

Swampy ground in the North and Middle districts and down the coastal strip to Cape May, occurring among the roots of grasses and sedges or with sphagnum; especially abundant along the inner edge of the salt marshes.

*Spores Mature*.—Late June to early September. Semi-evergreen.

*Middle District*.—Farmingdale, Delanco, Mickleton (C), Center Sq. (H), Lindenwold, Sewell (S), Glassboro (S), Swedesboro.

*Coast Strip*.—Pt. Pleasant, Forked River, Cox's, Absecon (Bassett).

*Cape May*.—Court House (S), Cold Spring (S).

### Family ISOETACEÆ. Quillworts.

#### ISOETES L.

The four species of *Isoetes* recorded from the Delaware River are given on the basis of specimens in the collection of Mr. W. A. Poyser, which were identified for him by Mr. A. A. Eaton; other specimens presumably identical are in the Academy collection. Mr. Poyser tells me further that *I. saccharata*, *riparia* and *echin. braunii* seemed to prefer the sand, but *canadensis* was in the coarse gravel. All were exposed at low tide. At Fish House *I. saccharata* intergraded with *I. riparia*, but at Delair was apparently growing alone. He sent Mr. Eaton abundant material from each locality, alive.

Outside of the Delaware River *Isoetes* seems rare in our district. Specimens from Camden Co. and Toms River are cited as identified in Britton's Catalogue. Besides these I have only seen specimens from Mays Landing; these are in the Academy herbarium and are supposed to be *I. riparia*. Specimens of *I. engelmanni* identified by Eaton from Assinpink Creek, just north of our limits, are in Mr. Poyser's collection.

#### *Isoetes engelmanni* A. Br. Engelmann's Quillwort.

*Isoetes Engelmanni*, A. Braun, Flora 29: 178. 1846 [St. Louis, Mo.].—Britton 302.—Keller and Brown 17.

Ponds and lakes of the northern counties and sparingly in Camden Co.

*Middle District*.—Camden (C)



**Isoetes echinospora braunii** (Durien). **Braun's Quillwort.**

*Isoetes Braunii* Durien. Bull. Soc. Bot. France XI: 101. 1864 [Lake Winne-  
pesaukee, N. H.].—Britton 302.—Keller and Brown 17.

Sparingly on the Delaware above Camden and at Toms River,  
also in ponds and lakes of the northern counties.

*Middle District.*—Toms River (P).

**Isoetes canadensis** (Engelm.). **Dodge's Quillwort.**

*Isoetes riparia* var. *Canadensis* Engelm., Trans. Acad. Sci., St. Louis,  
IV: 383. 1882 [Maine].

*Isoetes Dodgei* Keller and Brown 17.—Stone, Proc. Acad. Nat. Sci. 1908, 457.

Sparingly on the Delaware above Camden.

*Middle District.*—Fish House.

**Isoetes saccharata** Engelm. **Canby's Quillwort.**

*Isoetes saccharata* Engelm., Gray's Man. Ed. V: 676. 1867 [Wicomico  
River, Md.].

Sparingly on the Delaware above Camden. Originally dis-  
covered in Maryland by Wm. M. Canby.

**Isoetes riparia** Engelm. **Shore Quillwort.**

*Isoetes riparia* Engelm., A. Br. Flora 29: 178. 1846 [Shore of the Dela-  
ware, near Philadelphia].—Britton 302.—Keller and Brown 17.

Plentiful along the shores of the Delaware above Camden.

*Middle District.*—Camden (P).

**SPERMATOPHYTA. Seed-bearing Plants.****Class GYMNOSPERMÆ.****Order PINALES.**

A group of trees sharply separated from all others by their  
needle or scale-like (usually evergreen) leaves, resinous odor and  
cone-like fruit, modified in some species into a berry-like struc-  
ture.

The Pitch Pine, Yellow Pine and White Cedar are the trees  
that give character to the Pine Barren district, while the Jersey  
Pine and Red Cedar are equally characteristic of the Middle

district, and the Old Field Pine of Cape May. The White Pine and Hemlock are rare intrusions from the north, and the Pond Pine and Cypress from the south.

*Key to the Species.*

- a. Seeds broadly winged, born in a typical cone, leaves evergreen.  
 b. Leaves needle-like, two to five together in a sheath.  
   c. Leaves in fives. *Pinus strobus*, p. 146  
   cc. Leaves in twos, short and somewhat twisted. *P. virginiana*, p. 147  
   ccc. Leaves in twos or threes, cone small, 25-50 mm. long, prickles weak. *P. echinata*, p. 147  
   cccc. Leaves in threes.  
     d. .7-1.2 dm. long, cone large and heavy, 16 mm. long, prickles strong. *P. rigida*, p. 148  
     dd. 1.5-2.5 dm. long. *P. scrotina*, p. 149  
       c. Cone short and ovoid, less than .7 dm. long. *P. taeda*, p. 150  
     ee. Cone long, .7-1.2 dm. long.  
 bb. Leaves short and flat, not united in sheath. *Tsuga canadensis*, p. 150  
 aa. Seeds in a spherical nut-like cone, leaves deciduous. *Taxodium distichum*, p. 151  
 aaa. Seeds in a bluish, smooth or angled berry-like fruit.  
   b. Berry angular, persisting after opening as a brownish and woody nutlet. *Chamaecyparis thyoides*, p. 151  
   bb. Berry smooth and deciduous. *Juniperus virginianus*, p. 153

Family PINACEÆ. Conifers.

PINUS L.

*Pinus strobus* L. White Pine.

Pl. IV., Fig. 5.

*Pinus strobus* Linnæus, Sp. Pl. 1001. 1753 [Virginia and Canada].—Knieskern 29.—Willis 57.—Britton 301.

Originally, at least, a common forest tree of the northern counties, but occurring only sporadically in the Middle district and in no sense a characteristic species of our region.

*Fl.*—June (apparently). *Cones* mature in early autumn of the second season, commonly falling during the winter.

*Middle District.*—Pine Brook Station (C), Bordentown, Woodbury (C), Berlin (C), Swedesboro.

***Pinus virginiana* Mill. Jersey Pine.**

Pl. III., Fig. 3. Pl. IV., Fig. 6.

*Pinus virginiana* Miller, Gard. Dict. Ed. 8. No. 9. 1768 [Virginia].—Britton 300.*Pinus inops* Pursh 641.—Michaux Fl. Bor. Am. 11. 204.—Knieskern 29.—Willis 57—Gray Manual, Ed. I. 439.

This is the characteristic pine of the Middle district, especially in West Jersey, where it often forms dense patches of woodland.\* It enters the Pine Barrens below Mays Landing and at Hamonton, apparently following the Batsto River and Egg Harbor River from the coast, where it is now very rare or absent. Mr. William T. Davis has also sent me a specimen from S. Lakehurst, but states that this locality is not typical Pine Barrens. To the northward it occurs at several stations just beyond our limits. As both *P. echinata* and *P. rigida* occur occasionally in the Middle district, it is possible to find all three growing side by side, as I have done at Medford, when their differences are rendered particularly striking.

*Fl.*—Late April to mid-May. *Cones* mature in autumn of the second season, and persist for several years.

*Middle District.*—Kinkora, Beverly, Arcola, Arney's Mt. (S), Pemberton (C), Springdale (S), Washington Park, Westville (UP), Mickleton, Swedesboro, Albion, Bridgeton.

*Pine Barrens.*—Hammonton (Bassett), Mays Landing (S), S. Lakehurst (S), (from Wm. T. Davis).

*Cape May.*—Cold Spring (S).

***Pinus echinata* Mill. Short-leaved Pine, Yellow Pine.**

Pl. III, Figs. 1 and 2. Pl. IV, Figs. 7 and 8.

*Pinus echinata* Miller, Gard. Dict. Ed. 8. No. 12. 1768. [Virginia].—Britton 301.*Pinus mitis* Knieskern 29.—Willis 57.—Gray Man. Ed. I. 440.

This species, while perhaps more plentiful in the Pine Barrens, occurs frequently in the Middle district as well as at South Amboy and in the Cape May peninsula. In some places, as at Brown's Mills, West Creek, Chatsworth, etc., it forms considerable groves.

\* In the "Tree Book" Miss Julia E. Rogers states that this is the pine of the New Jersey Pine Barrens. Where she received this quite erroneous impression, unless from the popular name of the species, I cannot imagine.

*Fl.*—Early May to late May. *Cones* mature in late summer of the second season and persist for several years.

*Middle District.*—Farmingdale, Allaire, New Egypt (C), Arney's Mt. (S), Brown's Mills, Medford (S), Lindenwold, Mickleton (KB), Clementon (S), Albion, Swedesboro, Centerton (S), Bridgeton (NB), Fairton (NB), Buckshutem.

*Pine Barrens.*—Forked River, Barnegat, Manahawkin, Inskip, Winslow Inc., Hammonton (C), Quaker Bridge (S), Pleasant Mills, Mays Landing (S).

*Cape May.*—W. of Court House.

#### ***Pinus rigida* Mill. Pitch Pine.**

Pl. II., Figs. 1 and 2 . Pl. IV., Figs. 3 and 4.

*Pinus rigida* Miller, Gard. Dict. Ed. 8, No. 10. 1768 [Virginia].—Knieskern 29.—Britton 300.

This is the common pine of the Pine Barrens. It occurs here and there in the North and Middle districts and there is a considerable grove on Absecon Beach, below Atlantic City. On the other island beaches, however, it is absent or very rare.

The Pitch Pine is *the* Pine of the New Jersey Barrens, and is largely restricted to them. Where a slight elevation of the sandy plain makes it possible for one to look out over the surrounding country, the pines extend in an unbroken sea of green clear to the horizon, and where it is only possible to see straight ahead they line the white, sandy trail with a green barrier on either side, stretching away until they seem to join together and swallow it up. In some places the pines reach a height of sixty feet and grow comparatively close together with bare trunks; again they are shorter, and scattered here and there over the white, shining sand, with branches all the way to the base; and on the so-called plains they are dwarfed and stunted with round boles half buried in the coarse sand and gravel, and prostrate branches seldom rising higher than a man's knee.

The pines lend a charm to this desolate country. In winter, when the wind is sighing through their branches and patches of snow here and there add to the whiteness of the sand, their evergreen foliage seems to warm the landscape, and their thick wall of branches offer shelter from the storm; and in summer the air of the pine land, rich with its resinous odor, seems dry,

clear and refreshing as compared with the humidity of the Delaware River country.

At all seasons there is a peculiar restfulness in these quiet stretches, over which the pines stand as silent sentinels.

And as day closes, and we pitch our camp among them, we see the light fading from their topmost branches, and the shadows deepening beneath them, while the dark limbs seem to stretch out and take the whole earth in their sheltering embrace.

Portions of the pine lands have been cut over again and again for charcoal, while fire rages through them year after year, and probably little absolutely virgin timber remains, but they seem to hold their own, and it is a frequent sight to see young pines coming up all over some deserted clearing. In some places, where the soil is perhaps richer, nearly solid oak woods have grown up where the pines have been cut, making a dense, almost impenetrable thicket, but it is a question whether even here the pines do not eventually prevail again. The opinions of natives on these points are often curiously at variance, and there is not as much reliable data on the subject as might be desired. The State reports, however, contain a great deal of information, especially the Forestry Reports appended to the Annual Report of the State Geologist for 1898 and 1899.

*Fl.*—Early May to late May. *Cones* mature in autumn of the second season and persist for quite a number of years.

*Middle District.*—Atlantic Heights (UP), Farmingdale (S), New Egypt, Arneys Mt. (S), Medford (S), Glassboro, Swedesboro.

*Pine Barrens.*—Landisville, West of Batsto, Cedar Bridge (UP), Egg Harbor City (UP).

*Coast Strip.*—Seaside Park (Ha), Sherburn's (L), Tuckerton, Barnegat City (L), Atlantic City (S), Piermont (S).

*Cape May.*—Cape May Pt.

#### ***Pinus serotina* Michx. Pond Pine.**

Pl. III., Fig. 4. Pl. IV., Fig. 2.

*Pinus serotina* Michaux, F. Bor. Am. II. 205. 1803 [Cypress swamps of Carolina and Pennsylvania].—Long, *Bartonia* II., 17, 1910.

This southern species was first detected in New Jersey by Mr. Charles D. Lippincott, who many years ago recognized several trees growing near his home at Swedesboro as differing

materially from the familiar Pitch Pine, though Mr. Bayard Long, who visited the locality in 1909, was the first to identify them.

Almost simultaneously, Mr. O. H. Brown sent to the writer specimens from a tree at Town Bank, Cape May County, which seemed to him to differ from *Pinus rigida*, and they also proved to belong to the present species. Prior to this the Pond Pine was not known to occur north of Virginia. It will doubtless be found at other points in southwestern New Jersey.

Dr. John K. Small, of the New York Botanic Garden, kindly verified the identification of the Swedesboro trees.

*Middle District.*—Swedesboro.

*Cape May.*—Town Bank.

***Pinus tæda* L. Old-field Pine.**

Pl. II., Figs. 3 and 4. Pl. IV., Fig. 1.

*Pinus Tæda* Linnæus, Sp. Pl. 1000. 1753 [Virginia].—Keller and Brown 19.—Taylor, *Torreya* 1909, 205.—Pinchot, *Garden and Forest*, May 19, 1897.—Hollick, *Plant World* I., No. 2, Nov., 1897.—Hollick, *The Forester* III., 12, 1897.—Gifford, *The Forester* III., 6, June 1, 1897.—Long, *Bartonia* II., 17, 1910.

The Old Field Pine was first discovered in New Jersey by Mr. Gifford Pinchot, early in 1897, at Town Bank, Cape May County. Later in the same year Dr. Arthur Hollick made an unsuccessful effort to locate Mr. Pinchot's tree, but discovered another near Cold Spring School-house. Mr. O. H. Brown has subsequently discovered several others in the same neighborhood from which I have collected specimens.

*Fl.*—Mid-May to early June. *Cones* mature in autumn or winter of the second season and persist for a single season only.

*Cape May.*—Cold Spring, Dias Creek.

**TSUGA Carriere.**

***Tsuga canadensis* (L.). Hemlock.**

*Pinus canadensis* Linnæus, Sp. Pl. Ed. 2. 1421. 1763 [Virginia].

*Abies canadensis* Knieskern 29.

*Tsuga canadensis* Britton 301.

The Hemlock, a characteristic tree of the mountains of northern New Jersey, is only a straggler within our limits, occurring at some half-dozen stations in the Middle District.

*Fl.*—Mid-May to late May. *Cones* mature in early autumn of the first season and persist, in part at least, until the following spring.

*Middle District.*—Crosswicks Creek above New Egypt (NB), Bordentown, Burlington (C), Vincentown (NB), Swedesboro (KB), Sharpstown, Little Timber Creek near Gloucester (P).

**TAXODIUM L. C. Rich.**

***Taxodium distichum* (L.) Bald Cypress.**

*Cupressus disticha* Linnæus, Sp. Pl. 1003. 1753 [Virginia and Carolina].—Beck, Bot. 338. 1833.—Gray, Manual Ed. 1, 443, 1848.—Hollick, Rep. on Forests, 181, 1900.

Upon what evidence the Cypress was credited to New Jersey by Beck and Gray I am unable to say, but more recent works have pretty generally excluded our State from its range, or added it with doubt. Search for it in the swamps of South Jersey failed until Mr. H. Walker Hand pointed out a single tree on the edge of Sluice Creek, not far from Dennisville, and informed me of another that formerly grew further down the stream toward the bay. The suggestion has been made that these trees were brought from farther south and planted here, but we can find no positive evidence of this, while very old residents remember them as being large trees in their youth. The locality is peculiarly suitable for Cypress, and, judging by the number of southern plants that have been discovered on the bay side of Cape May County, the occurrence of the Cypress is by no means remarkable. Dr. Arthur Hollick mentions several trees on the salt marsh near Newark, north of our limits, which were also alleged to have been introduced, but proof of the fact was not obtainable, while conditions were just such as prevail in the natural habitat of the species. This is the only other occurrence of the tree in an apparently natural condition in the State.

*Cones.*—Immature August 6.

*Cape May.*—S. Dennis.

**CHAMÆCYPARIS Spach.**

***Chamæcyparis thyoides* (L.). White Cedar.**

*Cupressus thyoides* Linnæus, Sp. Pl. 1003. 1753 [Canada].—Muhlenberg Cat. 89.—Knieskern 29.—Willis 58.—Britton 299.

Next to the Pitch Pine, this is the most characteristic tree of the Pine Barrens, following the courses of all the streams and spreading out in many places to form immense cedar swamps. Outside of the Pine Barrens, it occurs casually in the Middle district, the Cape May peninsula and in the counties just north of our limits, while a colony is also reported from the shore of Greenwood Lake.

In the primæval Cedar Swamps the straight trunks rise on every side like telegraph poles, which many of them resemble both in height and diameter. Their roots are covered with masses of wet Sphagnum moss, and numerous shrubs and herbs more or less peculiar to these dark retreats abound. The tops are closely interlaced in a dense canopy which nearly excludes the sunlight, and where one has an opportunity of surveying the landscape the courses of the streams can always be traced by the dark blue-green lines of pointed cedar tops which stand out against the lighter green background of the pines. The bluish berry-like cones, when still covered with the whitish bloom that marks their early stages of growth, are sometimes very conspicuous as the light strikes them, and I recall one occasion in particular on the eve of a heavy thunder storm, when the edge of a cedar swamp stood out in relief against an almost black sky and the masses of fruit on the topmost branches shown in the peculiar clear light with the gleam of silver against the deep-green foliage. Unfortunately the portable saw-mill is sounding the doom of the Cedar Swamps, and piles of yellow sawdust now mark many a site where a few years ago stretched one of these dark retreats. If fire can be kept out and draining discouraged, the cedars will probably grow again; indeed in some swamps that have been completely burned over the young cedars, after a lapse of a few years, may be seen rising everywhere among the bare poles left by the flames. Draining or damming for cranberry bogs proves fatal to them, however, and many of the old swamps are probably gone forever.

*Fl.*—Early April to mid-April. *Cones* mature in late summer of the first season and persist for a year at least.

*Middle District.*—Camden, Sicklerville (S), Glassboro, Swedesboro, Centerton (S), Beaver Dam (S), Dividing Creek.



*Pine Barrens*.—Pt. Pleasant, Manchester (NB), Albion, Clementon, Waretown, Forked River.

*Coast Strip*.—Seaside Park (S).

### JUNIPERUS L.

*Juniperus virginiana* L.\* Red Cedar.

*Juniperus virginiana* Linnæus, Sp. Pl. 1039. 1753 [Virginia].—Kalm, Travels 360.—Knieskern 29.—Britton 300.

A common tree in dry sandy localities in northern New Jersey and in the Middle district, the Red Cedar is particularly characteristic of the coastal strip and the coast islands, and nowhere have I seen it fruit more abundantly. In the Pine Barrens it is found only in cultivated areas, where it has been obviously introduced.

*Fl.*—Mid-March to early April with the first warm spring days, from buds formed the previous summer. *Fruit* matures in early autumn, persisting more or less through the winter.

*Middle District*.—Navesink Highlands (UP), Birmingham, Albion, Haddonfield (UP), Sharpstown, Beaver Dam (S).

*Coast Strip*.—Seaside Park (Ha), Forked River, Surf City (L), Ship Bottom (L), St. Albans (L), Barnegat City (L), Atlantic City (S), Palermo, Mays Landing (S), Anglesea (UP).

*Cape May*.—South Dennis (S), Goshen (S), Court House, Cape May.

## Class ANGIOSPERMÆ.

### Sub-class MONOCOTYLEDONES.

#### *Key to the Genera.*

(Except *Gramineæ* and *Cyperaceæ* q. v.)

a. Flowers inclosed or spikes of flowers surrounded by imbricated husk-like scales (glumes); plants grass-like.

b. Stems hollow, round or flattened, anthers attached by the middle.

*Gramineæ*, p. 174

bb. Stems solid, more or less triangular, anthers attached at the base.

*Cyperaceæ*, p. 246

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\* While the Juniper (*J. communis* Linn, Sp. Pl. 1040. 1753.—N. Europe) is found at several localities in the northern counties, its claim to a place in this list is based solely upon Torrey's statement to Willis, that it is found rarely in Monmouth Co. I have seen no specimen.

- aa. Flowers not inclosed, in husk-like glumes.
- b. Aquatic plants, entirely submerged or with some of the leaves floating on the surface.
- c. Plant a minute floating disc with several roots below or a minute floating globule. *Lemnaceæ*, p. 318
- cc. Stems branched and leafy, leaves long and grass-like or ovate.
- d. Flowers inconspicuous, axillary or in short spikes. *Najadaceæ*, p. 160
- dd. Flowers star-like, yellow, raised above the surface on slender pedicels. *Heteranthera dubia*, p. 327
- ccc. Stems mostly simple, leaves short, linear, whorled. *Philotria*, p. 173
- cccc. All leaves from the root, long and ribbon-like, flowers on separate thread-like scapes. *Vallisneria*, p. 173
- ccccc. Leaves basal in an erect tuft, lanceolate, flat or awl-shaped, flowers projecting above the surface.
- d. Flowers showy, white, in a spike remotely whorled. *Sagittaria*, p. 169
- dd. Flowers minute, forming a compact button-like head. *Eriocaulon*, p. 323
- bb. Erect plants, growing in water, swamps or dry ground.
- c. Flowers regular.
- d. Leaves whorled or palmately divided.
- e. Leaves in one whorl of three, flowers solitary. *Trillium*, p. 350
- ee. Leaves in two whorls of more than three, flowers several. *Medeola*, p. 350
- ecc. Leaves in many whorls, flowers large, red or orange. *Lilium*, p. 345
- eeee. Leaves one or two, palmately divided. *Arisæma*, p. 314
- dd. Leaves not whorled or palmately divided.
- e. Leaves all radical.
- f. Leaves sagittate.
- g. Flowers white, in a remotely whorled spike. *Sagittaria*, p. 169
- gg. Flowers blue, in a compact spike. *Pontederia*, p. 327
- ggg. Flowers minute, on a fleshy spadix, incased in a convolute spathe. *Peltandra*, p. 315
- ff. Leaves oval, ovate, etc. (at least 25 mm. wide).
- g. Leaves numerous.
- h. Flowers minute, on a fleshy spadix, no parianth.
- i. Spadix covered by a hood-like spathe, appearing before the large cabbage-like leaves. *Spathyema*, p. 316

- ii. Spadix naked, bright yellow, raised above the water on a thick scape, leaves usually floating. *Orontium*, p. 317
- hh. Flowers with a perianth, mostly showy.
  - i. Flowers in a large whorled panicle, small, white. *Alisma*, p. 168
  - ii. Flowers in a remotely whorled spike, large, white. *Sagittaria*, p. 169
  - iii. Flowers in a dense spike, lilac with blue anthers. *Helonias*, p. 340
- gg. Leaves only two.
  - h. Flowers single, lily-like, yellow, leaves spotted. *Erythronium*, p. 346
  - hh. Flowers white, in an umbel, plant garlic scented, leaves absent at flowering time. *Allium tricoccum*, p. 344
- fff. Leaves grass-like or long linear (never as much as 25 mm. wide).
  - g. Flowers in a remotely whorled spike or an umbel. *Alismaceae*, p. 168
  - gg. Flowers in a slender continuous spike.
    - h. Leaves slender, grass-like, erect, flowers minute (spike resembling that of a plantain). *Triglochin*, p. 166
    - hh. Leaves lanceolate spatulate, forming a rosette, flowers white, bell-shaped, mealy. *Aletris*, p. 347
  - ggg. Flowers in a globular compact head.
    - h. Head white, button-like. flowers minute. *Eriocaulon*, p. 323
    - hh. Head of imbricated brown scales, flowers protruding, conspicuous, yellow. *Xyris*, p. 319
  - gggg. Flowers conspicuous, star-shaped, in an open panicle.
    - h. Flowers white, leaves glabrous. [*Ornithogalum umbellatum*]\*
    - hh. Flowers yellow, leaves hairy. *Hypoxis*, p. 355

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\* Star-of-Bethlehem, introducer in meadows.

- ggggg. Flowers inconspicuous, in an open panicle, scattered singly or clustered in heads (panicle sometimes congested), green or brownish. Leaves grass-like or awl-shaped and whole plant resembling a sedge. *Juncaceæ*, p. 328
- ec. Leaves cauline.
- f. Leaves oval, ovate, etc. (at least 25 mm. wide).
- g. Flowers green, in a large open panicle.  
*Veratrum*, p. 342
- gg. Flowers white, small, star-shaped.
- h. In a dense slender spike.  
*Chamalirium*, p. 341
- hh. In a compact terminal panicle.
- i. Parts in six. *Vagnera*, p. 348
- ii. Parts in four *Unifolium*, p. 349
- ggg. Flowers white or yellow, bell-shaped.
- h. Single yellow. *Uvularia*, p. 343
- hh. In umbels, white *Polygonatum*, p. 349
- ff. Leaves sagittate, flowers blue.  
*Pontederia*, p. 327
- fff. Leaves uniform, flowers small, from a leafy spathe. *Heteranthera reniformis*, p. 327
- ffff. Leaves grass-like or long linear, sword-like (never as much as 25 mm. wide).
- g. Flowers without a perianth, very minute.
- h. Flowers in dense terminal spikes (cattails). *Typha*, p. 158
- hh. Flowers globular umbels of stamens or pistils. *Sparganium*, p. 159
- hhh. Flowers in a slender dense spike (a spadix) on the side of a flat leafy scape. *Acorus*, p. 317
- gg. Flowers with conspicuous perianth.
- h. Flowers in a spike.
- i. Yellow with chaffy bracts.  
*Abama*, p. 338
- ii. White or greenish-white.
- j. Stem glutinous.  
*Tofieldia*, p. 337
- jj. Stem not glutinous.
- k. Leaves grass-like, harsh, in a dense tuft.  
*Xerophyllum*, p. 339
- kk. Leaves linear, 18 mm. broad, smooth.  
*Chrosperma*, p. 341
- hh. Flowers in an umbel or solitary.
- i. Sepals green, petals blue.  
*Tradescantia*, p. 325

- ii. Sepals blue, like the petals.  
*Iridaceæ*, p. 358
- iii. Flowers whitish or purple, odor of garlic. *Allium*, p. 344
- hhh. Flowers in large open panicle or branched spike. *Melanthium*, p. 342  
or *Zygadenus*, p. 342
- hhhh. Flowers in a moderate panicle; flowers white, woolly.  
*Lophiola* and *Gyrotheca*, pp. 355, 354
- ggg. Flowers with inconspicuous perianth, green or brownish, in an open (or congested) panicle; scattered singly or clustered in heads. Leaves grass-like or awl-shaped, and whole plant resembling a sedge.  
*Juncus* and *Scheuchzeria*, pp. 328, 167
- cc. Flowers irregular.
  - d. Flowers slightly irregular, lateral petals larger than lower one. Included in a folded leaf-like bract. Stamens three.  
*Commelina*, p. 326
  - dd. Flowers markedly irregular, lower petal modified into a more or less elaborate lip, lateral petals much smaller, sepals slender and alike. *Orchidaceæ*, p. 361
- bbb. Vines (or upright herbs with tendrils), flowers greenish.
  - c. Flowers in umbels, stems often woody and armed with spines, fruit a berry. *Smilax*, p. 351
  - cc. Flowers in panicles or racemes, fruit winged. *Dioscorea*, p. 357

## Order PANDANALES.

Comprises the Cat-tails and Bur-reeds. The former mainly restricted to the coast and river marshes, the latter to inland or coast swamps and streams.

Family TYPHACEÆ. Cat-tails.

### Key to the Species.

- a. Leaves often nearly or quite an inch in width, staminate and pistillate portions of the spike contiguous, the former soon withering, but its stalk remaining at the end of the pistillate spike. *Typha latifolia*, p. 158
- aa. Leaves not over half an inch in width, staminate spike separated by a short intervals from the pistillate. *T. angustifolia*, p. 158

## TYPHA L.

*Typha latifolia* L. Broad-leaved Cat-tail.

*Typha latifolia* Linnæus, Sp. Pl. 971. 1753 [Europe].—Muhlenberg Gramineæ 213.—Knieskern 30.—Britton 251.

Swamps along the coast or borders of rivers and less frequently in isolated swamps in the interior; rare in the Pine Barrens, where it always seems to spring up in burned swamps, or excavations, usually disappearing later.

*Fl.*—Mid-June to late June. *Fr.*—Mid-July to late August.

*Middle District.*—Farmingdale, Swedesboro, Mickleton (H).

*Coast Strip.*—Forked River, Beach Haven Terrace (L).

*Pine Barrens.*—Wildwood, Egg Harbor City.

*Cape May.*—S. Dennis (S), Goshen (S).

*Typha angustifolia* L. Narrow-leaved or Coast Cat-tail.

*Typha angustifolia* Linnæus, Sp. Pl. 971. 1753 [Europe].—Muhlenberg Gramineæ 213.—Knieskern 30.—Barton II. 149.—Britton 252.

Distribution similar to the last, but much more plentiful along salt or brackish water and rare in the northern counties.

The Coast Cat-tail cover large areas of coastal and river marsh, forming safe retreat and shelter for many swamp-loving birds. Sometimes the growth is almost pure, in other places it is mixed with the Broad-leaved Cat-tail, or skirted by Rose Mallow, Wild Rice, etc., while here and there patches of Reed (*Phragmites*) are interspersed.

In summer the slender, erect, green leaves swaying in unison, rank upon rank, seem to be constantly changing their tone as they reflect the light and shadows from the sun and the passing clouds, while the effect produced by a stray breeze is like great billows traversing a broad green sea. In winter the yellow stalks and dry leaves rattling in the bleak wind still furnish shelter for the birds and present a warm spot in the otherwise dreary landscape. And with every attempt to push one's way through them clouds of the downy seeds are dislodged and go whirling away on the wind or cover the intruder until he appears literally "tarred and feathered."

*Fl.*—Early June to mid-June. *Fr.*—Mid-July to late August.

*Middle District*.—Farmingdale, New Egypt, Pemberton (C), Gloucester (UP), Beaver Dam.

*Coast Strip*.—Sandy Hook, Sea Girt (UP), Como (UP), Pt. Pleasant, Seaside Park (UP), N. Beach Haven (L), Holgate's (L), Sherburn's (L), Anglesea, Wildwood, Pleasant Mills.

*Cape May*.—S. Dennis (S), Sluice Creek (S), Cape May (S).

### Family SPARGANIACEÆ. Bur-reeds.

*Flowering and Fruiting Data*.—The time of fruiting indicates the season of fully developed intact fruiting heads. The Flowers appear in June and July.

#### SPARGANIUM L.

##### *Key to the Species.*

- |   |                                   |
|---|-----------------------------------|
| a. Individual seeds sessile in the head.  | <i>S. eurycarpum</i> , p. 159     |
| aa. Individual seeds stalked in the head. |                                   |
| b. Inflorescence, simple.                 | <i>S. americanum</i> , p. 159     |
| bb. Inflorescence, branched,              | <i>S. a. androcladum</i> , p. 160 |

#### *Sparganium eurycarpum* Engelm. Large Bur-reed.

*Sparganium eurycarpum* Engelmann, in Gray's Manual Ed. 2. 430. 1856 [U. S. northward and westward].—Britton 252.

*Sparganium ramosum* Barton, Fl. Phila. II. 149. 1818.

Northern counties, extending casually to the Middle district in swamps along the Delaware and coast.

*Fl.*—June and July. *Fr.*—Mid-July to mid-September.

*Middle District*.—Delair, Camden.

*Coast Strip*.—Lake Como.

#### *Sparganium americanum* Nutt. Slender Bur-reed.

*Sparganium americanum* Nuttall, Gen. II. 203. 1818 [Vicinity of Philadelphia].

Swamps in the Pine Barrens, possibly more widely distributed.

*Fl.*—June-July. *Fr.*—Late July to late September.

While often erect, as is usual with the succeeding, this form is often found floating in the more rapid Pine Barren streams, the leaves being considerably elongated, but not as markedly so as in *S. fluctuans* of the north.

*Pine Barrens*.—Forked River, Bamber, Tuckerton, Parkdale (S), Bear Swamp (S), Clementon.

**Sparganium americanum androcladum** (Engelm.). **Branching Bur-reed.**

*Sparganium simplex* var. *androcladum* Engelmann, in Gray's Manual Ed. 5. 481. 1867 [N. England southward especially westward].

*Sparganium simplex* Knieskern 30.—Barton II. 149.

*Sparganium androcladum* Britton 252.

In swamps common throughout, except in the Pine Barrens, where it is largely replaced by the preceding.

*Fl.*—June, July. *Fr.*—Mid-July to late September.

*Middle District.*—Toms River (P), Farmingdale, New Egypt, Kinkora (NY), Tomlin (S), Swedesboro.

*Pine Barrens.*—Parkdale, Bear Swamp (S), Cedar Brook, Clementon (S), Winslow (S), Landisville, Twelfth St., Egg Harbor City, Manumuskin (S).

*Cape May.*—Cold Spring.

## Order NAJADALES.

Floating or erect aquatic or swamp plants, including the Pond weeds, Arrow-heads, etc., generally distributed throughout our region.

Family NAJADACEÆ. Pondweeds, Etc.

The Pondweeds occur in most of the ponds and streams of our region often mingled in great masses with *Utricularias*, *Ceratophyllum* and other water plants. Most of the species can be recognized by the oval floating leaves, so different from the thin, usually grass-like submerged foliage, but others are entirely submerged and only to be identified by their fruit or minute flowers. The eel grass of the coast is a rather distinct and familiar species.

*Flowering and Fruiting Data.*—Dates indicate period of mature fruit. Flowers appear in late spring through the summer.

### *Key to the Species.*

- a. Stem and leaves very slender, capillary or linear.
  - b. Fruit, 2-6 in a cluster, sessile or slightly pedicelled, 2-4 mm. long, slender, curved and beaked. Leaves 25-75 mm. long.
 

*Zanichellia palustris*, p. 165
  - bb. Fruit, 5-7 in an umbel on a pedicel, often spirally twisted; 2 mm. long, ovoid, beaked. Leaves 25-75 mm. long.
 

*Ruppia maritima*, p. 165
- bbb. Fruit, solitary, sessile, ellipsoid.



- c. Leaves crowded on the branches 12-25 mm. long. 1-2 mm. wide.  
*Najas flexilis*, p. 165
- cc. Leaves capillary opposite or in whorls 12-50 mm. long.  
*Najas gracillima*, p. 166
- bbbb. Fruit sessile in a cluster or short spike borne on a common peduncle or rarely sessile.
- c. Stem much branched above, the branches continually forking; fruits smooth and plump, in an elongated spike.
- d. Fruit 2-3 mm. long in a compact spike.  
*Plamogeton confervoides*, p. 163
- dd. Fruit 3-4 mm. long in an interrupted spike, in whorls.  
*P. pectinatus*, p. 164
- cc. Stem densely dichotomously branched above.
- d. Fruit smooth and plump, in a cluster of 3-10, about 2 mm. long.  
*P. pusillus*, p. 164
- dd. Fruit flattened with a prominent spiral ridge on the side (sometimes with oval floating leaves and pedicelled spikes projecting from the surface).
- e. Submerged spikes sessile, 1-10 fruited, fruit less than 2 mm. in diameter.  
*P. dimorphus*, p. 164
- ee. Submerged spikes, short pedicelled, 1 mm. in diameter.  
*P. diversifolius*, p. 164
- aa. Leaves ovate, elliptical or oblong lanceolate. Fruits in a dense spike, supported on a peduncle.
- b. All submerged.
- c. Cordate clasping or perfoliate.  
*P. perfoliatus*, p. 163
- cc. Sessile, with margins finely serrulate and crisped.  
*[P. crispus]\**
- bb. Some leaves floating petioled thicker and more curiaceous than the thin submerged leaves.
- c. Floating leaves ovate or round ovate, 50-100×30-50 mm.
- d. Submerged leaves large elliptic.  
*P. amplifolius*, p. 162
- dd. Submerged leaves lanceolate, acuminate.  
*P. pulcher*, p. 162
- cc. Floating leaves 12-30 mm. wide. Elliptic or obovate.
- d. 25-50 mm.; submerged leaves capillary, root like.  
*P. oakesianus*, p. 162
- dd. 35-85 mm. long, somewhat obovate, obtuse; submerged leaves linear, closely ranked, 5-15 cm. long.  
*P. epiphydrus*, p. 162
- ddd. 50-150 mm. long, pointed at each end; submerged leaves lanceolate acuminate 10-30 cm. long.  
*P. americanus*, p. 163
- ccc. Floating leaves elliptic obtuse, not over 25×12 mm., usually one-third less. Submerged leaves narrowly linear grass-like.
- d. Submerged fruit clusters sessile.  
*P. dimorphus*, p. 164
- dd. Submerged fruit spikes short pedicelled.  
*P. diversifolius*, p. 164

\* Introduced in ponds and ditches.

aaa. Leaves ribbon-like, obtuse at the apex, 3-18 dm. long, 2-8 mm. wide, all submerged, branching marine plants from bays, etc., along the coast.  
*Zostera marina*, p. 166

### POTAMOGETON L.

#### Potamogeton oakeslanus Robbins.\* Oakes' Pondweed.

*Potamogeton oakesianus* Robbins, in Gray's Manual, Ed. 5. 485. 1867 [Eastern Massachusetts].—Gross, Bull. Torrey Bot. Club XI. 32. 1884.—Britton 257.—Keller and Brown 22.

Ponds in the Pine Barrens and Cape May peninsula and at Tenafly, Bergen Co. (Britton); apparently rare.

*Fr.*—Apparently mid-July to mid-September.

*Pine Barrens.*—Browns Mills (NB), Hospitality Br. 12th St., Estelville (NB), Folsom, Mays Landing (T).

*Cape May.*—Dennisville (OHB), Town Bank (OHB).

#### Potamogeton amplifolius Tuckerm. Leafy Pondweed.

*Potamogeton amplifolius* Tuckerman, Am. Jour. Sci. (II.) 6. 225. 1848 [Cambridge, Mass.].—Britton 257.—Keller and Brown 22.

Ponds and rivers of northern New Jersey extending into the Middle district along the Delaware.

*Middle District.*—Cooper's Creek, Burlington.

#### Potamogeton pulcher Tuckerm. Spotted Pondweed.

*Potamogeton pulcher* Tuckerman, Am. Jour. Sci. XLV. 38. 1843 [Medford and Stoneham, Mass.].—Willis 60.—Britton 257.—Keller and Brown 22.

Ponds and streams of the Middle and Coast districts to Cape May.

*Fr.*—Late June to late July (apparently).

*Middle District.*—Repaupo, Center Square, Elmer (P).

*Coast Strip.*—Toms River (C), Atlantic City, Anglesea.

*Cape May.*—Cape May, Cold Spring.

#### Potamogeton epihydrus Raf. Nuttall's Pondweed.

*Potamogeton epihydrus* Rafinesque, Med. Repos. II. 5. 354. 1808. [Canada].

*Potamogeton Pennsylvanicus* Britton 257.

*Potamogeton nuttallii* Keller and Brown 22.

\* *P. natans*, reported as common throughout by Britton and by Keller & Brown, I have been unable to find in southern New Jersey, nor have I seen specimens from within our limits.

Ponds and streams throughout the State, the commonest large-leaved Pondweed of our region.

*Fr.*—Late June to early September.

*Middle District.*—Farmingdale, Vincentown (NB), Kirkwood (Bassett), Paulsboro, Buckshutem, Swedesboro.

*Pine Barrens.*—Bamber, Quaker Bridge, Clementon.

*Coast Strip.*—Long Branch, Manasquan (NB), Forked River, Manahawkin.

*Cape May.*—Cape May (OHB), Cold Spring.

**Potamogeton americanus** Cham. and Schlecht.\* **Long-leaved Pondweed.**

*Potamogeton americanus* Chamisso and Schlechtendahl, *Linnaea* II. 226. 1827 [Carolina].

*Potamogeton fluitans* Pursh, *Fl. Am. Sept.* I. 120. 1814.—Britton 257.

*Potamogeton louchitis* Keller and Brown 22.

Northern counties and Middle district, not very common.

*Middle District.*—New Egypt (NY), Repaupo, Swedesboro, Salem (C).

**Potamogeton perfoliatus** L. **Clasping-leaved Pondweed.**

*Potamogeton perfoliatus* Linnæus, *Sp. Pl.* 126. 1753 [Europe].—Britton 258.

Reported as occurring in ponds throughout the State, but we have no evidence of its presence in the Pine Barrens.

*Fr.*—Well matured September 17.

*Middle District.*—Westville.

*Coast Strip.*—Bayhead (McKenzie), Island Heights Jnc., Silver Lake near Belmar, Takanassee Lake (Elberon?) (UP).

**Potamogeton confervoides** Reichb. **Alga-like Pondweed.**

*Potamogeton confervoides* Reichenbach, *l.c. Fl. Germ. and Helv.* VII. 13. 1845 [Allegheny Mts.].—Keller and Brown 23.

*Potamogeton tuckermanni* Willis 60.—Britton 258.

Restricted to ponds and streams in the Pine Barrens and does not occur in New Jersey north of our limits.

*Fr.*—Late June into September.

*Pine Barrens.*—Toms River, Browns Mills, Bamber, Island Heights Jnc., Forked River, Ten miles W. of Atlantic City, Absecon (P), Tuckerton, Atco, Landisville (T), Malaga (P), Hammonton, Atsion (C), Pleasant Mills, Spring Garden (UP).

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\* *P. heterophyllus* Schreb. seems to be restricted to the northern part of the State. One non-fruiting specimen from the Batsto river collected Sept. 14, 1861, by Wm. Wynne Wister, and now in the Philadelphia Academy herbarium, has been referred to this species, but it cannot be identified with certainty.

**Potamogeton pusillus L.\* Small Pondweed.**

*Potamogeton pusillum* Linnæus, Sp. Pl. 127. 1753 [Europe].—Britton 258.

Similar situations to the next, but apparently less common.

*Middle District*.—Kaighns Pt. (NB), Swedesboro, Woodstown.

*Cape May*.—Cape May Pt. (OHB).

**Potamogeton diversifolius Raf. Rafinesque's Pondweed.**

*Potamogeton diversifolius* Rafinesque, Med. Repos. (II.) V. 354. 1808

[Carolina].—Barton, Flor. Phil. 96, 1818.—Torrey, Flor. U. S. I. 197. 1824.—Brown and Keller 23.

*Potamogeton setaceum* Pursh, Fl. Am. Sept. I. 120, 1814.

*Potamogeton hybridus* Britton 257.

Ponds and streams throughout the State except in the Pine Barrens.

*Fr.*—Early July into September.

*Middle District*.—Ocean Grove (UP), Delanco, Brown's Mills (UP). Center Square, Landisville.

*Coast Strip*.—Manahawkin.

*Cape May*.—Dennisville (OHB), Bennett, Cape May (OHB).

**Potamogeton dimorphus Raf. Spiral Pondweed.**

*Potamogeton dimorphus* Rafinesque, Am. Mo. Mag. I. 358. 1817 [Pennsylvania].

*Potamogeton spirillus* Britton 257.—Keller and Brown 23.

Northern New Jersey, extending into the Middle district along the Delaware river.

*Fr.*—Late June into August.

*Middle District*.—Fish House, Westville (KB).

**Potamogeton pectinatus L. Fennel-leaved Pondweed.**

*Potamogeton pectinatus* Linnæus, Sp. Pl. 127. 1753 [Europe].—Torrey, Fl. U. S. I. 198, 1824.—Britton 258.

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\*The Woodstown specimen referred to by Keller and Brown as *P. foliosus* proves to be *P. pusillus*.

† We find no evidence of the occurrence of *P. robbinsii* within the limits of our list, although it occurs in the northern counties. *P. pectinatus* is given as occurring in Monmouth Co. in Willis' Catalogue on Torrey's authority, but there is no specimen from this locality extant. The records given for the two species by Keller and Brown at Island Heights and Pleasant Mills, respectively, are based upon specimens in the Academy herbarium, which prove to be *P. confervoides*.

Northern counties, and rare southward along the coast.

*Coast Strip*.—Island Heights (NY), Sherburn's (L), Long Beach.

#### RUPPIA L.

*Ruppia maritima* L. **Ruppia.**

*Ruppia maritima* Linnæus, Sp. Pl. 127. 1753 [Coast of Europe].—Knieskern 30.—Willis 59.—Beck's Bot. 385, 1833.—Britton 259.—Keller and Brown 23.

Frequent in bays and pools along the coast. Its occurrence on the Delaware Bay shore is probable, but not substantiated by specimens.

*Fr.*—Mid-July to mid-October.

*Maritime*.—Deal Beach, Seaside Park (Ha), Island Heights, Half Way House south of Bond's (L), St. Albans (L), Anchoring Island (L), Atlantic City, Somer's Point, Stone Harbor, Cold Spring, Cape May Pt., Cape May (P).

#### ZANNICHELLIA L.

*Zannichellia palustris* L. **Zannichella.**

*Zannichellia palustris* Linnæus, Sp. Pl. 969. 1753 [Europe and Virginia].—Britton 259.—Keller and Brown 24.

In 1889 this plant was known only from a locality in Bergen County. In 1896 it was discovered at Forked River by Mr. Albrecht Jahn and other members of the Philadelphia Botanical Club, and later Mr. Bayard Long extended its range southward to Long Beach. Mr. Stewardson Brown tells me that he is sure that he found it in the Manasquan River at Point Pleasant, about 1885, but no specimens are preserved.

*Fr.*—Early June to mid-October.

*Coast Strip*.—Forked River, Beach Haven (L), Holgate's (L), Sherburn's (L).

#### NAJAS L.

*Najas flexilis* (Willd.). **Water Nymph.**

*Caulinia flexilis* Willdenow, Mem. Acad. Berl. 1798:89 (1801) [Pennsylvania].

*Naias flexilis* Britton 259.

Lakes and ponds frequent in the northern counties and extending as a rare species into the Middle and upper coast districts, but apparently absent from the Pine Barrens.

*Fr.*—August and September (at least).

*Middle District*.—Camden, mouth of Cooper's Creek (UP). Westville, Repaupo (H), Mickleton (H), Salem.

*Coast Strip*.—Takanassee Lake (Elberon?) (UP), Silver Lake, Belmar.

**Najas gracillima (A. Br.). Slender Water Nymph.**

*Nais Indica* var. *gracillima* "A. Br." Engelm. in A. Gray Man., Ed. 5. 681. 1867 [Albany, N. Y., Woburn, Mass., and Missouri].—Britton 259.

Apparently restricted to ponds and creeks of western New Jersey.

*Fr.*—Mid-July into September.

*Middle District*.—Delanco, Mouth of Cooper's Creek, Palatine, Woodstown (NB).

**ZOSTERA L.**

***Zostera marina* L. Eel Grass.**

*Zostera marina* Linnæus, Sp. Pl. 968. 1753 [Baltic Sea and Atlantic Ocean].—Nuttall Genera II. 201, 1818.—Knieskern 30.—Willis 59.—Britton 259.—Keller and Brown 24.

Common in bays all along the coast. Information is lacking as to its occurrence on the Delaware Bay shore. The long ribbon-like leaves are washed up on the shores of the bays and on the salt marshes in large masses, termed "Grass-wrack" by the fishermen. Of late years this is carefully dried and shipped to manufacturers of glassware, etc., to be used as packing.

*Fl.* and *Fr.*—Seen only during June.

*Maritime*.—Seaside Park (S), Spray Beach (L), N. Beach Haven (L), Beach Haven Terrace (L), Tucker's (L), Atlantic City (H), Ocean City (S), Cape May (P).

Family SCHEUCHZERIACEÆ. Arrow-grass, Etc.

*Key to the Species.*

*a.* Leaves all basal, flowers in a terminal spike. *Triglochin*, p. 166

*aa.* Leaves scattered on the stem, flowers in a loose raceme.

*Scheuchzeria*, p. 167

**TRIGLOCHIN L.**

***Triglochin maritima* L. Seaside Arrowgrass.**

*Triglochin maritima* Linnæus, Sp. Pl. 339. 1753 [Coast of Europe].—Willis 60.—Britton 256.—Keller and Brown 24.

Edge of salt marshes in Monmouth and Ocean Counties. I am not aware of the exact locality in Monmouth County from

which the specimens recorded in Willis' list came, nor do I know the name of their discoverer.

In July, 1902, however, on an excursion of the Philadelphia Botanical Club, Messrs. Van Pelt, Brown and Jahn rediscovered this interesting plant at Point Pleasant, on the south side of the Manasquan, and this colony is still flourishing.

*Fl.*—Probably late spring to autumn. *Fr.*—Early July into autumn, often persisting for a full season.

*Maritime.*—Pt. Pleasant.

### SCHEUCHZERIA L.

*Scheuchzeria palustris* L. *Scheuchzeria*.

*Scheuchzeria palustris* Linnæus, Sp. Pl. 338. 1753 [Lapland, Switzerland, Borussia and Sweden].—Nuttall Genera I. 236, 1818.—Barton, Fl. Phila. I. 174. 1818.—Britton 256.—Keller and Brown 24.

This curious little northern bog plant is one of those species that, probably forced southward during glacial times, has managed to persist locally in cold bogs far south of its normal range. It occurs in various parts of the Pennsylvania Alleghanies and in the New Jersey mountains at Budd's Lake. In the southern part of the State it was known as early as 1818 to Barton and Nuttall, the former of whom recorded it as rare in Cranberry Swamps of Jersey not far from Philadelphia. Whether the two definite localities of which we have record were those known to the older botanists or not I cannot say. It is certainly of very rare occurrence in our region to-day, if not actually extinct. I have personally never collected it in New Jersey.

*Fl.*—Mid-May. *Fr.*—Mid-June to late June.

*Middle District.*—Longcoming, C. E. Smith, 1867 (UP, NB and P), Re-paupo, Benj. Heritage, July 15, 1892 (H), also (UP).

Family ALISMACEÆ. Arrow-heads, Etc.

Arrow-heads of one species or another are found along the shores of nearly all the streams or ponds in southern New Jersey. The Long-beaked Arrow-head is the species of the Pine Barrens and Cape May, while the Common Arrow-head takes its place in the Middle district; the others are less frequent and

occur mainly along the Delaware River or Bay. The variability in the leaves of these plants, both in size, shape and proportions, makes their identification often very puzzling, and those with lanceolate or submerged leaves (phyllodia) can only be certainly determined by their fruits, the relative size and shape of the achenes being the best character. The Water Plantain occurs in swamps except in the Pine Barrens.

*Key to the Species.*

- a. Flowers small (5 mm. broad), in a large erect panicle. *Alisma*, p. 168
- aa. Flowers large (12-35 mm. in diameter), in whorls of three on an erect scape.
  - b. Leaves arrow-shaped, basal lobes prominent.
    - c. Beak of achene erect, bracts longer than fruit pedicels. *Sagittaria longirostra*, p. 171
    - cc. Beak of achene horizontal, bracts shorter than fruit pedicel. *S. latifolia*, p. 169
  - bb. Leaves elliptic, sometimes with very short curved basal lobes (often on one side only), achene beak erect, fruit sessile. *S. rigida*, p. 171
  - bbb. Leaves ovate lanceolate or linear on slender petioles, often only submerged phyllopodia. Achene very small (1 mm.), nearly beakless; fruit long-pedicelled.\* *S. graminea*, p. 172
  - bbbb. Leaves lanceolate or linear, strap-shaped or with a narrow blade, not more than 75-100 mm. in height. Whorls of flowers 1 to 3. *S. subulata*, p. 172
- aaa. Flowers not over 16 mm. in diameter, pedicelled in a terminal umbel.
  - b. Umbel 3 flowered, leaves taller than scape, petioles widened at base. *S. subulata*, p. 172
  - bb. Umbel 2-8 flowered, leaves shorter than scape, petioles not widened at base. *Helianthium parvulum*, p. 169

**ALISMA L.**

*Alisma subcordatum* Raf. Water Plantain.

*Alisma subcordatum* Refinesque, Md. Reposit. II. 5. 362. 1808 [United States].

*Alisma plantago* Britton 255.

*Alisma parviflora* Pursh, Fl. Am. Sept. I. 253 [Salt Marshes coast of N. J. and Penna.].

Common in swamps except in the Pine Barrens, where it is absent.

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\* Occasional forms of *S. longirostra* and *latifolia* with lanceolate leaves can be recognized by their large beaked achenes.



*Fl.*—Early July to late August. *Fr.*—Early August to early October.

*Middle District.*—New Egypt, Delanco, Delair, Swedesboro.

*Coast Strip.*—Anglesea (UP).

*Cape May.*—E. of Court House, Wildwood Inc., Bennett, Cape May.

#### HELIANTHIUM Engelmann.

*Helianthium parvulum* (Engelm.). Dwarf Water Plantain.

*Echinodorus parvulus* Engelmann in A. Gray Manual Ed. 2. 438. 1856 [Michigan].

*Alisma tenellum* Stone, Proc. Acad. Nat. Sci. 1908, 457.

This delicate little plant was apparently unknown from New Jersey until August 10, 1907, when it was discovered by the writer in company with Messrs. Stewardson Brown and Samuel S. Van Pelt on the edge of Nelly's Pond, north of Delanco.

*Fl.*—Late July to late August. *Fr.*—Mid-August to mid-September.

*Middle District.*—Delanco.

#### SAGITTARIA L.

*Sagittaria latifolia* Willd. Common Arrow-head.\*

*Sagittaria latifolia* Willdenow, Sp. Pl. IV. 409. 1806 [Canada to Carolina].

*Sagittaria variabilis* Knieskern 30.

*Sagittaria sagittifolia* formæ *obtusa latifolia* et *hastata*.—Britton, p. 255.

This is the common Arrowhead of the Middle district, especially along the Delaware and other larger streams and their tributaries and also in the northern counties. While it has not been found on the coast it does occur on the lower Egg Harbor River along with species that have evidently worked their way inland.

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\* *Lophotocarpus spongiosus* Engelmann (in Gray Man. Ed. 5. 493. 1867) is included in Britton's Catalogue from tidal mud in the Delaware, Camden Co., N. J., authority of Mr. Chas. F. Parker. Mr. Parker's specimens, preserved with the rest of his herbarium at Princeton University, represent a plant that has been frequently collected at the above locality, and is well represented in the Academy herbarium. It has been generally, and I think rightly, regarded as a submerged form of *Sagittaria graminea*. The flowering scapes are 5-6 in. long, with very small flowers on pedicels  $\frac{1}{4}$ - $\frac{3}{8}$  in. long. The leaves are 2-3 in. long, tapering to a point and about  $\frac{1}{4}$  in. wide near the base. I have never seen any fruiting specimens. The plant is certainly not *Lophotocarpus*.

It grows abundantly along the shores of rivers and lakes or fills entirely smaller ditches and ponds, sometimes on mud or in swamps, entirely exposed above the roots, and at other times submerged half-way to the blades and flowers.

Well distinguished from the following species by its horizontal achene beaks and its short bracts, it is extremely variable in size and in the character of its foliage. So far as I am aware the form with pubescent leaves, perhaps a distinct species, does not occur within our limits, but our glabrous plants show apparently all possible variation in hastate leaf forms.

What is apparently the most widely prevalent form has a broad blunt blade 110 mm. long from the petiole and about the same width at the middle, while the lobes are 100 mm. long and 50 mm. wide at their middle, and more or less incurved or parallel to the petiole. Petioles about 7.5 cm. (30 in.) long.

Another style has the blade longer and acute, 180 x 85 mm., lobes acute incurved 175 x 50 mm.

A much smaller type of plant has petioles only 2 dm. (8 in.) long, blade blunt and narrow with sides nearly parallel for most of the length, 65 x 12 mm.; lobes still narrower, 60 x 6 mm. This resembles the narrow-leaved form of the next species so abundant in the Pine Barrens, and like it, occasionally presents leaves without basal lobes. In one instance I have seen such leaves on the larger plant described above, the blades measuring 150 x 30 mm. Mr. Stewardson Brown tells me that a similar plant which he placed in a garden pond later developed regular sagittate leaves.

Another form of the common Arrowhead with narrow leaves has basal lobes strongly divaricate branching from the line of the blade at an angle of 45°. Some of these are large, blade 275 x 25 mm., and lobes 225 x 18 mm., while others measure only 225 x 12 mm., lobes 200 x 9 mm. The majority of the slender-leaved plants are probably of this type. While each plant appears to produce leaves of but one type, except for the occasional ones which lack basal lobes, I cannot see sufficient constancy of form to warrant the use of varietal names.

*Fl.*—Late July to late September. *Fr.*—Fully mature rarely before September.

*Middle District*.—Navesink Hills, Belmar (NY), Farmingdale, New Egypt, Hartford, Delair, Camden, Westville, Washington Park, Albion, Jumbo.

*Coast Strip*.—Weymouth (T), Mays Landing.

*Sagittaria longirostra* (Micheli). **Long-beaked Arrowhead.**

*Sagittaria sagittifolia* (?) *longirostra* Micheli, in D. C. Monog. Phan. 3. 69. 1881. [Alabama].

*Sagittaria Engelmanniana* J. G. Smith, Ext. fr. 6th Ann. Rep. Mo. Bot. Gard. 15. 1894 (in part).—Keller and Brown 25.—Mackenzie, *Torreyia* IX. 30. 1909.

*Sagittaria sagittifolia formæ angustifolia et gracilis* Britton 255.

*Sagittaria longirostra* Mackenzie, *Torreyia* IX. 30. 1909.

Abundant on the edges of streams, bogs, etc., in the Pine Barrens and Cape May districts.

*Fl.*—Late June to late September. *Fr.*—Very rarely fully mature before late September.

*Pine Barrens*.—Lakehurst, Toms River, Brown's Mills (NB), Hanover, Forked River, Dover Forge, New Egypt, Pasadena, Hammonton, Parkdale, Quaker Bridge (NB), Mullica River (NB), Pleasant Mills (NB), Pancoast, Weymouth (T).\*

*Cape May*.—Cape May.

The common Arrowhead of the Pine Barrens shows quite as much variation in leaf form as does the *Sagittaria latifolia* of the Delaware River and its tributaries, both varying from narrowly linear to broadly hastate, though the present species seems to exhibit the slender type of leaf more frequently. In fruit the two species are readily distinguished by the beak of the achene, which is erect in this form and horizontal in *S. latifolia*.

The narrow-leaved form of the Pine Barren plant was long confused with *S. engelmanniana*, a more northern species distinct from either of those here considered.

*Sagittaria rigida* Pursh. **Sessile-fruited Arrowhead.**

*Sagittaria rigida* Pursh, Fl. Am. Sept. 397. 1814 [Oswego river, near Great Falls, N. Y.].—Keller and Brown 25.

*Sagittaria heterophylla* Wills 60.—Britton 256.

Locally in northern New Jersey and southward along the Delaware.

\* Britton records it from Sandy Hook on the authority of I. C. Martindale, but I have been unable to verify the record.

*Fl.*—Late June to late July.

*Middle District.*—Westville (KB), Gloucester (KB), Camden.

***Sagittaria graminea* Michx. Grass-leaved *Sagittaria*.**

*Sagittaria graminea* Michaux, Fl. Bor. Am. II. 190. 1803 [Canada].—Smith Ext. fr. 6th Ann. Rept. Mo. Bot. Gard. 25. 1894.—Britton 256.—Keller and Brown 25.

Locally distributed in ponds and boggy spots in northern New Jersey, southward along the Delaware and in Cape May Co. and the Pine Barrens.

Most specimens of this arrowhead have well defined lanceolate leaf blades, but in wholly submerged plants, or notably those from tidal mud and gravel on the borders of the Delaware River, the leaf blades are partly or entirely absent, being represented by nearly linear (or the basal ones lanceolate) phyllodia. The specimens from the tidal mud I have never seen fruiting, but the flowers are much reduced and on very short pedicels, sometimes nearly sessile.

Mr. J. G. Smith records a specimen of *Sagittaria teres*, "N. J. Pine Barrens, Torrey, 1833,"\* but in view of the fact that we have no other evidence of the occurrence of this species in southern New Jersey, it seems at least possible that the specimen referred to may have belonged to *S. graminea*.

*Fl.*—Late May to early September. *Fr.*—Late July into September.

*Middle District.*—Delanco, Delair, Fish House, Camden.

*Pine Barrens.*—Pleasant Mills, Main Road Sta. (T).

*Cape May.*—Bennett.

***Sagittaria subulata* (L). Subulate *Sagittaria*.**

*Alisma subulata* Linnæus, Sp. Pl. 343. 1753 [Virginia].

*Sagittaria pusilla* Willis 60.

*Sagittaria natans* Britton 256.

*Sagittaria subulata* Keller and Brown 25.

Muddy or gravelly river shores, northern New Jersey and south along the Delaware.

A low plant with club-shaped phyllodia, growing on the muddy flats along the Delaware, associated with *Isoetes*, *Erio-*

\* Ext. Sixth Ann. Rep. Mo. Bot. Gard. 28. 1894.

*caulon parkeri*, etc.; exposed at low tide and completely submerged when the tide is high.

*Fl.*—Late July to late August. *Fr.*—Fully mature very rarely before September.

*Middle District.*—Camden, Fish House, Bridgeport.

Family VALLISNERIACEÆ.

Several submerged aquatic plants with flowers that reach the surface of the water on slender scapes.

*Key to the Species.*

- a.* Leaves short (5-10 mm.), whorled or opposite. *Philotria*, p. 173
- aa.* Leaves long and narrow and grass-like, pistillate flowers on filiform scapes (6-12 dm. long), later coiling spirally, staminate flowers detached, floating. *Vallisneria*, p. 173
- aaa.* Leaves heart-shaped, broad and spongy, petioled. *Limnobium*, p. 173

**PHILOTRIA Rafinesque.**

*Philotria nuttallii* (Planch.). **Water Weed.**

*Anacharis Nuttallii* Planchon, Ann. Mag. Nat. Hist. II. 1. 86. 1848 [North America].

Ponds and streams North and Middle districts.

*Fl.*—June to August (probably).

*Middle District.*—New Egypt, Delair, Camden, Cooper's Creek, Paulsboro, Repaupo, Swedesboro.

**VALLISNERIA L.**

*Vallisneria spiralis* L. **Wild Celery. Tape Grass.\***

*Vallisneria spiralis* Linnæus, Sp. Pl. 1015. 1753 [Pisa, Italy].—Knieskern 30.—Britton 229.

Larger streams of the North and Middle districts.

*Fl.*—July to September (apparently).

*Middle District.*—Bordentown, Delaire, Cooper's Creek, Timber Creek, Westville.

*Coast Strip.*—Pt. Pleasant (NY), Island Hts. (NY).

**LIMNOBIUM L. C. Richard.**

*Limnobium spongia* (Bosc.). **Frog's Bit.**

*Hydrocharis Spongia* Bosc, Ann. Mus. Paris IX. 396. Pl. 30. 1807 [South Carolina].

*Limnobium spongia* Knieskern 30.—Willis 60.—Britton 329.—Keller and Brown 26.

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\* The plant referred to by Harshberger under this name as abundant on the shore of Barnegat Bay (Proc. Acad. Nat. Sci., Phila., 1900, p. 657) is obviously *Zostera marina*.

Reported by Knieskern from Swimming River, Monmouth Co., the only known locality in the State and not recently found there so far as I know. No specimen seen.

*Coast Strip*.—Swimming River [Knieskern].

## Order GRAMINALES.

A large group comprising the Grasses and Sedges.

### Family GRAMINEÆ. Grasses.

Grasses may be distinguished from sedges by having hollow culms, round or flattened in cross section, and fruit in the form of grains.

*Flowering and Fruiting Data*.—Dates given indicate the season of full fresh panicles, racemes or spikelets, from the beginning of the flowering season to the latest date, when fresh intact inflorescence is still commonly present.

- a. Sweet scented, odor persisting after drying.
  - b. Inflorescence in a compact spike. [*Anthoxanthum odoratum*]\*
  - bb. Inflorescence in an open panicle. *Savastana*, p. 216
- aa. Not sweet scented.
  - b. Fruit a prickly bur. *Cenchrus*, p. 213
  - bb. Fruit imbedded in the stalk (rachis), making a cylindrical, swollen, smooth or corrugated spike.
    - c. Spike uniform throughout. *Calorachis*, p. 181
    - cc. Spike with distinct staminate flowers above on a much more slender extension of the rachis. *Tripsacum*, p. 180
  - bbb. Fruit not a bur nor imbedded in the rachis.
    - c. Inflorescence obviously silky with soft hairs, appressed or in tufts.
      - d. Two large glumes embracing a spikelet of several flowers between them, plants green. *Danthonia sericea*, p. 231
      - dd. Inflorescence not in small spikelets, subtended by large glumes, plants more or less rusty purplish or glaucous.
        - e. Pubescence largely rusty, inflorescence forming a dense plume-like head 1–1.2 dm. long, 25–50 mm. broad or more, maroon or chestnut, flowers long awned. *Erianthus*, p. 181
        - ee. Pubescence white or whitish.
          - f. Hairs not reaching beyond the flower scales. Inflorescence in a long plume-like chestnut panicle. *Sorghastrum*, p. 184

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\* Sweet Vernal Grass. Extensively introduced in fields, etc.

ff. Hairs longer than the flower scales.

*Andropogon*, p. 182

cc. Inflorescence not obviously silky.

d. Plants low, creeping, flowers in flattened two-ranked spikelets.

*Eragrostis hypnoides*, p. 238

dd. Plants not creeping.

e. Flowers provided with one or more awns bent nearly at right angles and often twisted spirally.

f. Awn trifid, usually with the middle branch much longer than the others (which are erect), sometimes all three the same length.

*Aristida*, p. 217

ff. Awn single, one on each flower.

g. Flowers arranged in 3-7 scattered spikelets, each spikelet subtended by two large glumes.

*Danthonia*, p. 231

gg. Flowers (or spikelets) numerous, in an open or contracted panicle.

h. Awn 50 mm. long, seed black, soon dropping.

*Stipa*, p. 219

hh. Awn less than 25 mm. long.

i. Spikelets 9 mm. long.

[*Arrenatherum elatius*]\*

ii. Spikelets less than 6 mm. long.

j. Leaves flat.

*Sphenopholis palustris*, p. 230

jj. Leaves involute, bristle form.

*Deschampsia flexuosa*, p. 229

ee. Flowers with essentially straight awns or more frequently none at all.

f. Inflorescence in a dense cylindrical spike (like timothy, barley or wheat).

g. With very delicate inconspicuous awns or none.

h. Spikes perfectly uniformly cylindrical, .5-1 dm. long, 6 mm. in diameter.

i. No awns. [*Phleum pratense*]†

ii. Thread-like projecting awns.

*Alopecurus*, p. 222

hh. Spikes less regular, more "chaffy."

i. Spikes buff or whitish.

j. 20-35 cm. long (coast sand).

*Ammophila*, p. 228

jj. 2-7 dm. long, tips of leaves prolonged into slender, involute bristle-like tips.

*Sporobolus*, p. 222

\* Oat grass, an occasional weed.

† Timothy, extensively cultivated for hay.

- ii. Spikes greenish, not over one inch long,  
plant less than 1 dm. high.  
[*Aira praecox*]‡
- gg. With very conspicuous awns, making the whole  
spike bristly.  
h. Spike millet-like, flowers like round seeds at  
the base of the (often tawny) projecting  
bristles. *Chatochloa*, p. 212
- hh. Spikes rye-like, flowers long, spindle-shaped,  
foliage often bluish green or glaucous.  
i. Spikes compact.  
j. Awns 50 mm. long.  
[*Hordeum jubatum*]\*
- jj. Awns 12-75 mm. long. *Elymus*, p. 245
- ii. Spikes with flowers scattered in pairs.  
*Hystrix*, p. 246
- ff. Inflorescence in a dense plume-like contracted or  
glomerate panicle.  
g. Panicle 15 × 5 cm. or larger, purplish, leaves  
20-75 mm. wide.  
h. Long awns, spikelets one-flowered.  
*Echinochloa*, p. 212
- hh. Not awned spikelets, several flowered.  
*Phragmites*, p. 235
- gg. Panicle 10-15 × 2-3 cm. green or slightly pur-  
plish, leaves 12 mm. wide.  
h. Spikelets one-flowered.  
i. A small tuft of hairs inside the glumes at  
the base of the flowers.  
*Calamagrostis cinnoides*, p. 227
- ii. No tuft at the base of the flowers.  
*Phalaris*, p. 216
- hh. Spikelets two-flowered, foliage soft and  
downy. [*Holcus lanatus*]†
- fff. Inflorescence in an open panicle, branches not at all  
appressed to the main culm.  
g. Pistillate flowers above, staminate below, tall  
marsh grass. *Zizania*, p. 214
- gg. Flowers not separated.  
h. Spikelets largely sessile and massed on the  
branches.  
i. Spikelets one-flowered.  
j. Much flattened.  
*Homalocenchrus*, p. 215

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‡ Hair grass, an occasional weed.

\* Squirrel-tail grass, an occasional weed.

† Meadow soft grass, commonly established in damp meadows. Pl. X.,  
Fig. 4.



- jj. Ovate not flattened. *Panicum*, p. 189  
 ii. Spikelets many flowered. *Poa*, p. 239  
 hh. Spikelets mainly pedicelled on filiform branches.

- i. Spikelets one-flowered.  
 j. Much flattened.

*Homalocenchrus*, p. 215

- jj. Not conspicuously flattened.  
 k. Panicle very open and diffuse with long filiform branches; usually equal to  $\frac{1}{4}$  or  $\frac{1}{2}$  the entire height of the plant, flowers more or less "chaffy," often very small.

- l. Spikelets with long fluxuous hair-like terminal appendage.

*Muhlenbergia capillaris*, p. 221

- ll. Spikelets without hair-like tips.

m. Plants glabrous.

- n. Panicle bluish or grayish, erect, spikelets very minute 1.5-2 mm. bog plants.

*Sporobolus*, p. 222

- nn. Panicle redish or silvery white.

- o. Spikelets 5 mm. long, a tuft of hairs at the base of the flower.

*Calamovilfa*, p. 228

- oo. Spikelets 1.5-3 mm. no tuft of hair, branches exceedingly long and capillary.

*Agrostis*, p. 224

- mm. Plants hairy.

Panicle green or slightly red, coarse weeds.

*Panicum capillare*, p. 195

- kk. Panicle with much shorter, stiffer branches, strictly erect, flowers globose or ovate, "seed-like." One glume very short and rudimentary at the base of the spikelet.

- l. Subterranean straw colored fruits on root-like stems.

*Amphicarpon*, p. 188

- ll. No subterranean flowers.

*Panicum*, p. 189

- ii. Spikelets several or many-flowered, obviously two-ranked and more or less flattened.
  - j. Spikelets 12 mm. or more in length.
    - k. Awned. *Bromus*, p. 244
    - kk. Not awned. *Festuca*, p. 243
  - jj. Spikelets less than 12 mm. in length.
    - k. Panicles more than half the height of the plant or secondary panicles, developing all the way to the base. *Eragrostis*, p. 237
    - kk. Panicles, if more than one, equal in height and less (usually much less) than half the height of the plant.
      - l. Spikelets not over 3 mm. long. *Panicularia nervata*, p. 241
      - ll. Spikelets over 3 mm. long.
        - m. Panicle distinctly maroon. *Tridens flava*, p. 236
        - mm. Panicle whitish or straw-color. *Panicularia*, p. 241
        - mmm. Panicle green.
          - n. Flowers at the end of capillary drooping branches 50-100 mm. long. *Festuca nutans*, p. 244
          - nn. Flowers much more crowded on short branches, not over 25 mm. long. *Poa*, p. 239
- ffff. Spikelets (1) in a row or rows on slender branches attached to a main scape to which they are more or less appressed, or from which they branch out palmately or fan-like; or (2) arranged in a slender appressed raceme. Spikelets sessile or nearly so.
  - g. Spikelets one flowered.
    - h. Arranged in closely imbricated, one-sided spikes, which stand out at an angle or are appressed to the main scape. Flowers awned and much flattened. *Spartina*, p. 232
    - hh. Arranged on digitate or fan-like spikes.
      - i. Rachis flat or winged, flowers not awned nor scattered.
        - j. Spikelets flattened, disc-like, arranged in two rows. *Paspalum*, p. 184



**hh.** Spikelets sessile or nearly so in an erect (or sometimes slightly drooping) raceme.

i. Spikelets sessile, remote and alternately arranged on the somewhat zig-zag rachis.

[*Lolium perenne*]†

ii. Spikelets numerous, slightly pediceled, some in slender appressed branches, scattered along the main culm.

j. Leaves bristle-like, inflorescence 7-10 cm. in length. *Festuca*, p. 243

jj. Leaves flat, inflorescence 7-12 cm. in length. *Sphenopholis*, p. 229

jjj. Leaves flat, inflorescence, 20-25 cm. in length. *Uniola laxa*, p. 239

iii. Spikelets in a dense, erect, appressed spike.

j. Spikelets 5-15 mm. long.

k. Spike 120 × 25 mm. wide.

*Panicularia obtusa*, p. 241

kk. Spike 35 × 12 mm.

*Distichlis*, p. 239

kkk. Spike 75 × 12 mm. "wheat-like." [*Agropyron repens*]‡

jj. Spikelets 2-3 mm. long. Spike 75- × 12 mm.

*Sphenopholis obtusata*, p. 230

iiii. Spikelets in a somewhat looser but still appressed, often drooping raceme.

j. Spikelets 3 mm. long or less.

*Poa* or *Puccinellia*, pp. 239, 243

jj. Spikelets 25 mm. long.

*Panicularia septentrionalis*, p. 242

## TRIPSACUM L.

### *Tripsacum dactyloides* L. Gama Grass.

Plate VI., Fig. 1.

*Coix dactyloides* Linnæus, Sp. Pl. 972. 1753 [America].

*Tripsacum dactyloides* Nuttall Gen. I. 85. 1818.—A. Brown, Bull. Torrey Bot. Club VII. 114. 1880.—Britton 283.—Keller and Brown 30.

This large and striking grass with its peculiar thick and jointed inflorescence is restricted to the coastal strip, extending like other coastal species some distance up the larger rivers.

*Fl.*—Late July to late September.

† Ray-grass. A weed in waste and cultivated ground.

‡ Quitch-grass. An occasional weed.

*Coast Strip*.—Monmouth Beach Center (NB), Manahawkin, Ocean City, Clermont, Cape May Court House, Cape May, Fairton.

Also four miles north of Egg Harbor City (P), probably an intrusion from the river.

**CÆLORACHIS** Brongn.

***Cælorachis rugosa* (Nutt.). Wrinkled Gama Grass.**

Pl. VI., Fig. 2.

*Rottbællia rugosa* Nuttall, Gen. I. 84. 1818 [Florida].

*Manisurus rugosa* Stone, Proc. Acad. Nat. Sci., Phila., 1908, p. 458.

This southern species is restricted to the southern part of the Cape May peninsula, where it was first detected by Mr. O. H. Brown in August, 1908.

*Fl.*—Mid-August to late September.

*Cape May*.—Bennett.

**ERIANTHUS** Michaux.

*Key to the Species.*

a. Awns spirally twisted.

*E. divaricatus*, p. 182

aa. Awns straight.

*E. saccharoides*, p. 181

***Erianthus saccharoides* Michx. Plume Grass.**

Pl. XV., fig. 2.

*Erianthus saccharoides* Michaux, Fl. Bor. Am. I. 55. 1803 [Carolina].

*Erianthus alopecuroides* Gray Man. Ed. I. 616. 1848.—Willis 77.—Britton 284.—Keller and Brown 31.

*Erianthus compactus* Nash, Bull. Torr. Bot. Club XXII. 419. 1895.

West Jersey, Cape May County, and rarely in the Pine Barrens and Coast Strip, local.

This fine grass, with its ample purplish brown plumes on stalks five feet in height, is one of the handsomest species of the family. It is especially frequent in moist ground along the coast of Cape May County.

*Fl.*—Late August to late September.

*Middle District*.—Bel. Burlington (C), Mickleton, Tomlinsons, Griffith's Swp. (P), Swedesboro (NB).

*Pine Barrens*.—Cedar Lake, Hammonton, Elwood (P), Egg Harbor City (in part coast intrusions).

*Coast Strip*.—Pt. Pleasant (Mck), Palermo.

*Cape May*.—Court House, Cold Spring.

**Erianthus divaricatus (L.). Spiral-awned Plume Grass.**

*Andropogon divaricatum* Linnæus, Sp. Pl. 1045. 1753 [North America].

A specimen of this species collected by the late Frank L. Bassett, at Hammonton, is in the U. S. National Herbarium. I have examined the spot where it is supposed to have been obtained, but found only *E. saccharoides*. The species is certainly very rare in the State.

**ANDROPOGON L.***Key to the Species.*

- a. Spikes solitary, scattered along the stem.
  - b. Sheaths often greenish, spikelets 5-7 mm. *A. scoparius*, p. 182
  - bb. Sheaths always glaucous, spikelets 8-10 mm. *A. littoralis*, p. 182
- aa. Spikes in clusters of two to six.
  - b. Two to six on a long exserted common peduncle, purplish. *A. furcatus*, p. 183
  - bb. Two to three, included in spathe-like sheaths, scattered along the stem.
    - c. Spikes at length exserted, sheaths much inflated. *A. elliotii*, p. 184
    - cc. Spikes not exserted. *A. virginicus*, p. 183
- aaa. Inflorescence much branched and congested in a dense cluster. *A. corymbosus abbreviatus*, p. 183

**Andropogon scoparius Michx. Broom Beard Grass.**

Pl. VIII, fig. 6.

*Andropogon scoparium* Michaux, Fl. Bor. Am. I. 57. 1803 [Carolina].—Knieskern 40.—Britton 284.

*Andropogon purpurascens* Barton, Flor. Phil. I. 55. 1818.

Common throughout the State, except on the coast dunes, where it is replaced by the next.

This species and *A. virginicus* are the Beard Grasses which cover so many sandy fields with a tufted growth of buff or purplish stalks, some two feet in height, that persists through the winter.

*Fl.*—Late July to early October.

*Middle District.*—New Egypt, Brindletown, Hartford, Medford, Swedesboro.  
*Pine Barrens.*—Atco, Pasadena.

**Andropogon littoralis Nash. Seaside Beard Grass.**

*Andropogon littoralis* Nash, Britton's Manual 69. 1901 [Seashore of New York and New Jersey].—Keller and Brown 31.

*Andropogon maritimus* Vasey, Grasses of U. S. 19. 1883.—Watson, Gray's Manual, Ed. 6. 637. 1890.

Common on the sand dunes of the coast and all over the lower extremity of the Cape May peninsula.

*Fl.*—Late August to early October.

*Maritime.*—Sandy Hook (NB), Barnegat City (L), Harvey Cedars (L), Beach Haven (L), Holgate's (L), Wildwood, Stone Harbor (S), Cape May (S), Cape May Pt.

***Andropogon corymbosus abbreviatus* Hackel. Bushy Beard Grass.**

Pl. VI., fig. 4.

*Andropogon macrourus abbreviatus* Hackel in DeCandolle Monogr. Phan. VI.:408. 1889 [New Jersey].

*Andropogon macrourus* Barton, Fl. Phila. 56. 1818.—Keller and Brown 31.—Knieskern 40.—Willis 77.—Torrey Fl. U. S. I. 157. 1824.

*Andropogon glomeratus* Britton 284.

Common in sandy swamps in the Pine Barrens and locally in the other districts. To the northward it occurs only at South Amboy.

The dry, yellowish head-clusters of this grass, supported on their slender stems, are a characteristic feature of the winter swamps.

*Fl.*—Late August to late September.

*Middle District.*—Asbury Park (NY), Woodbury, Mickleton, Kaighns Pt.

*Pine Barrens.*—Brindletown, Forked River, Clementon, Atco, Bear Swamp, Quaker Bridge, Egg Harbor City.

*Coast Strip.*—Surf City (L), Ship Bottom (L), Spray Beach (L).

*Cape May.*—Bennett (S), Cold Spring (S).

***Andropogon virginicus* L. Virginia Beard Grass.**

Pl. VIII, fig. 8.

*Andropogon virginicus* Linnæus, Sp. Pl. 1046. 1753 [America—prob. Virginia].—Knieskern 40.—Britton 284.

Dry ground, common throughout our region and rather less frequent in the northern counties.

*Fl.*—Mid-August to late September.

*Middle District.*—Lindenwold (S), Taunton (S), Mickleton, Albion, Swedesboro.

*Pine Barrens.*—Egg Harbor City.

*Coast Strip.*—Barnegat City (L), N. Beach Haven (L), Surf City (L), Spray Beach (L), Wildwood (HA).

*Cape May.*—Bennett (S), Cold Spring (S), Cape May (S), Cape May Pt. (S), Town Bank (S).

**Andropogon furcatus** Muhl. **Forked Beard Grass.**

*Andropogon furcatus* "Muhlenberg," Willdenow Sp. Pl. IV. 919. 1806 [North America—prob. Penna.].—Knieskern 40.

*Andropogon provincialis* Britton 284.

Northern New Jersey, extending locally into the Middle district and recurring in the lower Cape May peninsula.

*Fl.*—Late July to late September.

*Middle District.*—Tracy's (C), Manchester (C), Bordentown (H), Griffith's Swamp, Mickleton (H), Swedesboro.

*Cape May.*—Cold Spring (OHB).

**Andropogon elliottii** Chapman. **Elliott's Beard Grass.**

*Andropogon Elliottii* Chapman, Fl. S. States. 581. 1860 [Florida to N Carolina].—Long, *Bartonia* II. 18. 1910.

Confined to the southern part of the Middle district; originally discovered in the State by Charles D. Lippincott at Swedesboro September 2, 1894.

*Fl.*—Early September into October or even November.

*Middle District.*—Woodbury, Swedesboro, Sharptown.

*Cape May.*—Town Bank.

**SORGHASTRUM** Nash.**Sorghastrum nutans** (L.), (Michx.). **Indian Grass.**

Pl. XI., fig. 1.

*Andropogon nutans* Linnæus, Sp. Pl. 1045. 1753 [Virginia].

*Andropogon avenaceus* Barton, Fl. Phila. I. 54. 1818.

*Sorghum nutans* Knieskern 40.

*Chrysopogon nutans* Britton 284.

Dry soil frequent throughout, except in the Pine Barrens, where it is rare or casual.

*Fl.*—Mid-August to mid-September.

*Middle District.*—New Egypt, Griffith's Swamp, Orchard (S), Mickleton, Swedesboro.

*Pine Barrens.*—Pasadena, Landisville, Hammonton, Ab. Tuckahoe (S).

*Coast Strip.*—Manahawkin, Anglesea (UP).

*Cape May.*—Cold Spring (S), Cape May (OHB).

**PASPALUM** L.*Key to the Species.*

- α. Rachis membranaceous, broader than the spikelets. Plant decumbent or floating in water. *P. dissectum*, p. 185
- αα. Rachis narrower than the spikelets.
- b. Culm simple, racemes stout.



- c. Spikelets 4 mm. in longest diameter. *P. glabratum*, p. 185  
 cc. Spikelets 3 mm. long or less.  
     d. Plant with dense long pubescence on sheaths and blades. *P. plenipilum*, p. 186  
     dd. Plant glabrous.  
         c. Racemes 3-5 cm. long, leaf-blades 1-2 cm. *P. læve*.  
         ee. Racemes 8-10 cm. long, leaf-blades, 2-4 cm. *P. l. longifolium*, p. 186  
     ddd. Plant slightly pubescent below.  
         c. Racemes as in *P. læve*. *P. l. australe*, p. 186  
         ee. Racemes long. *P. l. circulare*, p. 187  
 bb. Culm branched above, with several lateral racemes, leaves pubescent.  
     c. Plants erect, with longer leaves.  
         d. Spikelets 1.5. mm. long, pubescent. *P. setaceum*, p. 187  
         dd. Spikelets 2 mm. long, glabrous.  
             e. Culm glabrous. *P. muhlenbergii*, p. 187  
             ee. Culm densely pubescent, just below the raceme. *P. pubescens*, p. 187  
     cc. Plants prostrate, with shorter leaves, spikelets 2 mm. long, pubescent. *P. psammophilum*, p. 186

***Paspalum dissectum* L. Walter's Paspalum.**

*Paspalum dissectum* Linnæus, Sp. Pl. 57. 1753 [America].

*Paspalum membranaceum* Keller and Brown 32.

*Paspalum Walterianum* Gray Manual, Ed. V. 645. 1867.—Britton 279.

This southern species was first discovered in New Jersey by Thomas Nuttall, who found it at Cape May. Although it has not, so far as I am aware, been found there since, it has been collected at several points in the southwestern part of the State. It occurs in low wet grounds, often on the bottoms of dried-up woodland pools.

*Fl.*—Mid-September into October.

*Middle District.*—Clarksboro, Mickleton (NB), Pennsgrove (NB), Woodstown, Riddleton.

*Cape May.*—Cape May (C).\*

***Paspalum glabratum* (Engelm.). Engelmann's Paspalum.†**

Pl. XII., Fig. 6.

*Paspalum floridanum glabratum* "Engelm." Vasey, Contr. U. S. Nat. Herb. 3: 20. 1892 [N. Carolina, Texas and Arkansas].

\* Reported from Landisville in Britton's Catalogue on authority of C. A. Gross, but no specimen was found in his herbarium.

As the work is going through the press Mr. O. H. Brown reports its rediscovery at Cape May.

† *Paspalum difforme* is recorded from New Jersey by Hitchcock and Chase in the new Gray's Manual, but Mrs. Chase informs me that the specimen came from the ballast ground at Camden, so that it is obviously not native.

*Paspalum glabratum* Keller and Brown 32.—Stone Proc. Acad. Nat. Sci., Phila., 1907. 458.—Stone Proc. Acad. Nat. Sci., Phila., 1908. 458.

This is another southern species discovered at Cape May in 1891, by several members of the Philadelphia Botanical Club. It is the largest of our *Paspalum*s and does not range north of lower Cape May County.

*Fl.*—Early August to late September.

*Coast Strip.*—Anglesea (NB).

*Cape May.*—Cold Spring, Cape May.\*

***Paspalum plenipilum* Nash. Long-haired *Paspalum*.**

*Paspalum plenipilum* Nash, Britton's Manual 73. 1901 [New Jersey].

Rather frequent in the Cape May and lower Coast districts.

*Fl.*—Late July to late September or into October.

*Coast Strip.*—Absecon.

*Cape May.*—Court House, Green Creek.

***Paspalum psammophilum* Nash. Prostrate *Paspalum*.**

*Paspalum psammophilum* Nash, Britton's Manual 73. 1901 [New Jersey].

Dry ground in the Middle and Pine Barren districts.

This species, like several others of recent date, was clearly differentiated by the late Charles E. Smith some fifty years ago as shown by notes accompanying specimens in his herbarium. Unfortunately he never put his views into print.

*Fl.*—Late July into October.

*Middle District.*—Delanco, Lindenwold, Medford (S), Swedesboro, Millville.

*Pine Barrens.*—Lakehurst, Speedwell (S), Twelfth St. Folsom.

*Coast Strip.*—Seaside Park.

***Paspalum læve australe* (Nash.). Southern *Paspalum*.**

*Paspalum australe* Nash, Britton's Manual 1039. 1901 [Stone Mt., Georgia].

Frequent in the Cape May and lower Coast districts.

*Fl.*—Late July to late September or into October.

*Coast Strip.*—Palmero.

*Cape May.*—Cold Spring.

***Paspalum læve angustifolium* (LeConte.). Narrow-leaved *Paspalum*.**

Pl. XII., fig. 5.

*Paspalum angustifolium* Le Conte. Jour. de Phys. XCI:285. 1820 [Carolina].

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\* Collected Sept. 16, 1882, by C. F. Parker, and labeled *P. læve* in his herbarium at Princeton.

Frequent except in the Pine Barren district. All of our glabrous *Paspalum*s seem to be referable to this form. The short-spiked *P. læve* has not yet been collected within our limits.

*Fl.*—Late July to late September or into October.

*Middle District.*—Braddock's Mill, Mickleton.

*Coast Strip.*—Palermo.

*Cape May.*—Cold Spring, Dias Creek.

***Paspalum læve circulare* (Nash.).**

*Paspalum circulare* Nash, Britton's Manual 73. 1901 [R. I. to Ky. and Mo.; south to Fla. and Tex.].

Occasional in the Coast strip.

*Fl.*—Late July to late September or into October.

*Coast Strip.*—Manahawkin, Palermo.

***Paspalum pubescens* Muhl. Pubescent *Paspalum*.**

*Paspalum pubescens* Muhlenberg, Gram. 92. 1817 [Pennsylvania].

*Paspalum ciliatifolium* Muhlenberg, Gram. 93. 1817 [N. J. references].—Torrey Flora U. S. I., 75. 1824.

Frequent or occasional throughout our region in dry sandy ground.

*Fl.*—Mid-August into October.

*Middle District.*—Tomlin, Dividing Creek.

*Pine Barrens.*—Ballinger's Mill (S), Pancoast (S), Ocean City Jnc.

*Coast Strip.*—Manahawkin, Sherburn's (L).

***Paspalum muhlenbergii* Nash. Muhlenberg's *Paspalum*.**

*Paspalum Muhlenbergii* Nash, Britton's Manual 75. 1901 [Massachusetts].

Frequent on the coast and very rare in the Pine Barrens.

*Fl.*—Early August into October.

*Pine Barrens.*—Albion.

*Coast Strip.*—Bay Head, Manahawkin, Palermo, Tuckahoe, Cold Spring.

***Paspalum setaceum* Michx. Slender *Paspalum*.**

*Paspalum setaceum* Michaux, Fl. Bor. Am. I. 43. 1803 [So. Carolina].—Bar-ton Fl. Phila. I. 52. 1818.—Knieskern 39.—Britton 279.

This is the most plentiful of the small fruited *Paspalum*s occurring in dry ground throughout the State.

*Fl.*—Early July into October.

*Middle District.*—New Egypt, Hornerstown, Washington Park (S), Lindenwold (S), Swedesboro.

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*Pine Barrens*.—Toms River (McK), Whittings, Forked River, Pasadena, Speedwell, Landisville (T), Batsto (S), Egg Harbor City, Twelfth St., Folsom, Pancoast, Palermo, Middletown.

*Coast Strip*.—Manahawkin, Barnegat City (L), Surf City (L), St. Albans (L), Sherburn's (L).

*Cape May*.—South Dennis, Court House, Cold Spring, Cape May.

## AMPHICARPON Rafinesque.

*Amphicarpum amphicarpum* (Pursh.) Pursh's Millet Grass.

Pl. VIII., fig. 1.

*Milium amphicarpum* Pursh, Fl. Am. Sept. 1. 62, pl. 2. 1814 [New Jersey, near Egg Harbor].—Torrey Flora N. Y. 15. 1819.—Torrey Flora U. S. I. 77. 1824.

*Milium ciliatum* Muhlenberg Gram. 77. 1817.

*Amphicarpum Purshii* Knieskern 39.—Britton 279.—Keller and Brown 32.

This curious grass, originally discovered by Frederick Pursh "near Egg Harbor" (probably = Beesley's Point), does not range north of the New Jersey Pine Barrens, nor has it been found in the western part of the State beyond the limits of this region. It is plentiful in damp sandy soil among the Pines, and grows profusely in the damp sand thrown up into dykes around the cranberry bogs.

The peculiarity of this grass lies in the production of subterranean fruits scattered among the slender roots, in addition to the Panicum-like spike of normal seeds, which is conspicuous above ground.

*Fl.*—Early August to mid-September.

*Pine Barrens*.—Toms River (McK), Manchester (NB), Lakehurst, Brown's Mills, Waretown, Five miles so. New Egypt, West Creek (S), Speedwell (S), Winslow, Crowleytown, Egg Harbor City, Twelfth St. Folsom.

*Cape May*.—Bennett, Cape May Pt. (OHB).

## SYNTHERISMA Walter.

*Key to the Species.*

a. Rachis broadly winged.

b. Plant glabrous.

bb. Plant hirsute.

aa. Rachis not winged.

[*S. linearis*]\*

[*S. sanguinalis*]†

*S. filiformis*, p. 189

\* Small crab-grass, a weed about gardens, etc.

† Large crab-grass, an abundant weed everywhere in cultivated and waste ground. Grows luxuriantly on the sandy ground back of the coast dunes, creeping culms reaching a length of six or eight feet; seems like a native in such locations.

**Syntherisma filiformis (L.). Slender Finger-grass.**

Pl. VII, Fig. 6.

*Panicum filiformae* Linnæus, Sp. Pl. 57. 1753 [North America].*Panicum filiforme* Kneiskern 39.—Britton 279.*Digitaria pilosa* Pursh, Fl. Am. Sept. I. 70. 1814

Frequent in dry sandy soil throughout our region and reported from only two stations in the northern counties.

This native finger-grass may be distinguished from the introduced species so common on roadsides, fields and grass plots, by its slender erect habit. The Large and Small Crab grass *S. sanguinalis* and *S. linearis* are coarse and more or less prostrate; the former is a very abundant weed along the coast, trailing over the sand hills and appearing like a native plant.

*Fl.*—Late July to mid-September.

*Middle District.*—New Egypt, Haddonfield (S), Griffith's Swamp, Medford (S), Swedesboro.

*Pine Barrens.*—Clementon, Swedesboro (S).

*Coast Strip.*—St. Albans (L), Beach Haven (L), Peahala (L), Sherburn's (L), Ocean City.

*Cape May.*—Cold Spring (OHB), Cape May (S), Cape May Pt.

**PANICUM L.**

*Flowering and Fruiting Data.*—Dates given cover the period of both primary and secondary panicles. In most species they follow one another so closely as to leave no appreciable time when the plant is not in flower or fruit.

*Key to the Species.\****a. Annual.****b. Inflorescence, a more or less diffuse panicle.**

**c. Spikelets tuberculate.** *Panicum verrucosum*, p. 194

**cc. Spikelets not tuberculate.**

**d. First glume not more than one-quarter the length of the spikelet.** *P. dichotomiflorum*, p. 195

**dd. First glume one-half the length of the spikelet.**

**e. Panicle more than half the total height of the plant.**

*P. capillare*, p. 195

**ec. Panicle not more than half the height of the plant.**

*P. philadelphicum*, p. 195

\* Adapted from Hitchcock and Chase. Practically all the specimens listed beyond were identified by these authors when engaged upon their monograph. Additional South Jersey localities given in this work are quoted in lists of localities and credited to "H. & C."

## aa. Perennial.

b. Spikelets short pedicelled along one side of the rachis, forming spike-like racemes. *P. hemitomon*, p. 194

bb. Spikelets in open, rarely contracted panicles.

c. Basal leaves different from culm leaves, usually forming winter rosettes.

d. Spikelets glabrous.

e. Spikelets 3mm. or more long, strongly nerved.

f. Spikelets pointed, blades elongated.

*P. depauperatum*, p. 198

ff. Spikelets blunt, blades not elongated, 3.2-3.3 mm.; long sheaths or some of them hispid.

*P. scribnerianum*, p. 209

ee. Spikelets less than 3mm. long.

f. Second glume and sterile lemma exceeding the fruit and pointed beyond it, spikelets 2.2-2.9 mm. long.

g. Spikelets elliptic, fruit 2 mm. long.

*P. aculeatum*, p. 210

gg. Spikelets ovate, broadest below the middle, 2 mm. or less.

h. Sheaths (at least the secondary) hispid.

*P. scabriusculum*, p. 210

hh. Sheaths glabrous.

*P. cryptanthum*, p. 210

ff. Second glume and sterile lemma, not pointed beyond the fruit.

g. Ligule 2-3 mm. long.

*P. spretum*, p. 202

gg. Ligule obsolete.

h. Spikelets 1.5 mm. long or less.

i. Nodes bearded.

*P. microcarpon*, p. 200

ii. Nodes not bearded.

j. Spikelets 1.5-1.6 mm. blades 50-80 mm. long, 4-7 mm. wide.

*P. caeruleascens*, p. 200

jj. Spikelets 1.2-1.4 mm., blades not over. 30 mm. long, 1.5-3 mm. wide.

*P. ensifolium*, p. 207

jjj. Spikelets 2mm. long or more.

k. Culms soon prostrate, vine-like, branches divaricate.

*P. lucidum*, p. 200

kk. Culms not vine-like, branches not divaricate.

l. Nodes glabrous; autumnal form upright. *P. dichotomum*, p. 199

ll. Nodes, at least the lowest, usually bearded, autumnal form, top-heavy and reclining.

*P. barbulatorum*, p. 200

dd. Spikelets pubescent.

e. Spikelets 3 mm. or more long.

f. Blades elongated leaves 2-5 mm. wide.

*P. depauperatum*, p. 198

ff. Blades not elongated.

g. Nodes bearded, leaves 15-30 mm. wide.

*P. boscii*, p. 211

gg. Nodes not bearded.

h. Sheaths glabrous.

i. Spikelets 3.5-3.8 mm. long.

*P. latifolium*, p. 211

ii. Spikelets 3 mm. long.

*P. commutatum*, p. 208

hh. Sheaths pubescent.

i. Pubescence appressed, spikelets 3.5-4.

*P. oligosanthos*, p. 209

ii. Pubescence spreading.

j. Blades 20 mm. wide.

*P. clandestinum*, p. 211

jj. Blades 6-12 mm. wide.

*P. scrincrivanum*, p. 209

ee. Spikelets less than 3 mm. long.

f. Blades elongated.

*P. linearifolium*, p. 198

ff. Blades not elongated.

g. Spikelets attenuated at the base.

h. Autumnal blades flat, blades 80-120 × 4-8 mm.

*P. angustifolium*, p. 199

hh. Autumnal blades involute, blades 40-60 × 2-5 mm.

*P. aciculare*, p. 199

gg. Spikelets not attenuated at base.

h. Ligule manifest 1-5 mm. long.

i. Sheaths glabrous.

j. Panicle narrow  $\frac{1}{4}$ - $\frac{1}{3}$  as wide as long.

*P. sprctum*, p. 202

jj. Panicle open nearly as wide as long.

*P. lindheimeri*, p. 202

ii. Sheaths pubescent.

j. Ligule 1-1.5 mm. long, culms and sheaths appressed pubescent.

k. Spikelets 1.8-1.9 mm. long, plant bluish green. *P. tsugetorum*, p. 206

kk. Spikelets 1.5 mm. long, nearly glabrous, plant olivaceous.

*P. oricola*, p. 204

jj. Ligule 2-5 mm. long.

k. Spikelets 1-1.3 mm. long, culm and sheath soft appressed pubescent.

l. Spikelets 1.2-1.3 mm. long.

*P. leucothrix*, p. 202

- ll. Spikelets not over 1 mm. long.  
*P. wrightianum*, p. 201
- kk. Spikelets more than 1.5 mm. long.
- l. Spikelets not over 2 mm. long.
  - m. Plant grayish, velvety pubescent. *P. lanuginosum*, p. 204
  - mm. Plant pubescent, but not velvety.
    - n. Upper surface of blade glabrous.  
*P. tennesseense*, p. 203
    - nn. Upper surface of blade pubescent.
      - o. Spikelets 1.3-1.5 mm. long, blade long, pilose above.  
*P. meridionale*, p. 203
      - oo. Spikelets 1.6-2 mm. long, blade appressed, pubescent above.  
*P. huachuca*, p. 203
  - ll. Spikelets 2.2 mm. or more.
    - m. Pubescence on culm horizontal, spreading.  
*P. villosissimum*, p. 204
    - mm. Pubescence on culms appressed.  
*P. pseudopubescens*, p. 205
- kh. Ligule obsolete or less than 1 mm. long.
  - i. Nodes bearded.
    - j. Spikelets 1.5-1.6 mm. long.  
*P. microcarpon*, p. 200
    - jj. Spikelets 2.2 or more. *P. clutei*, p. 201
  - ii. Nodes not bearded.
    - j. Plants densely gray velvety throughout, a viscid ring below the nodes.  
*P. scoparium*, p. 209
    - jj. Plants not gray velvety.
      - k. Some sheaths pilose or hispid.
        - l. Pubescence papillose hispid.
          - m. Spikelets 2.3-2.6, pointed.  
*P. scabriusculum*, p. 210
          - mm. Spikelets obovate, obtuse, 3 mm. long.  
*P. clandestinum*, p. 211
        - ll. Pubescence ascending pilose.
          - m. Spikelets 2-2.5 mm. long.
          - n. Spikelets 2.4 mm. long.  
*P. commonsianum*, p. 205



- nn.* Spikelets 2-2.1 mm. long.  
*P. c. addisoni*, p. 205
- mm.* Spikelets not over 1.3-1.4 mm. long, nearly globular.  
*P. columbianum thinium*, p. 207
- kk.* Sheaths glabrous or pubescent only.
- l.* Spikelets globular, 1.8 mm. long, blades cordate, ciliate at the base.  
*m.* Panicle as broad as long.  
*P. sphaerocarpon*, p. 207
- mm.* Panicle narrow, more than  $\frac{2}{3}$  as broad as long.  
*P. polyanthes*, p. 208
- ll.* Spikelets not globular.
- m.* Culms prostrate and vine-like, branches divaricate, spikelets not over 2.1 mm. long.  
*P. lucidum*, p. 200
- mm.* Not vine-like nor divaricate.
- n.* Spikelets 2.5-3 mm. long.  
*o.* Blades rarely more than 10 mm. broad, culms crisp puberulent. *P. ashei*, p. 208
- oo.* Blades usually 1.5 or more in width, culms glabrous.  
*P. commutatum*, p. 208
- nn.* Spikelets not over 2.3 mm. long.  
*P. clutci*, p. 201
- mm.* Spikelets not over 1.7 mm. long.  
*o.* Culms conspicuously puberulent, spikelets turgid.  
*P. columbianum*, p. 206
- oo.* Culms glabrous.  
*P. ensifolium*, p. 207
- cc.* Basal leaves not different from those of the culm.
- d.* With creeping scaly root stocks, spikelets long pedicelled, not secund, in open or contracted panicle.
- e.* Panicle diffuse.  
*f.* Panicle open, spikelets 3.5-5 mm. long, beaked.  
*P. virgatum*, p. 196
- ff.* Panicle more or less contracted, 3.2 mm. long, not beaked.  
*P. v. cubense*, p. 196
- cc.* Panicle contracted, seashore species. *P. amarum*, p. 196
- dd.* Not forming a creeping scaly rootstock.

- c.* Rootstocks present, culms but little compressed, spikelets set obliquely on their appressed pedicels. *P. anceps*, p. 198
- cc.* Root stocks none, culm strongly compressed, spikelets not obliquely arranged.
- f.* Ligules ciliate, basal leaves half the length of the culm, panicle longer than the upper leaves.  
*P. longifolium*, p. 197
- ff.* Ligules not ciliate, basal leaves in short tufts, upper leaves about equaling the panicle.
- g.* Fruit stipitate, spikelets 2.5-2.8 mm. long, secund.  
*P. stipitatum*, p. 197
- gg.* Fruit not stipitate, spikelets not secund.
- h.* Spikelets 1.8-2 mm. long, branches ascending or spreading.  
*P. agrostoides*, p. 196
- hh.* Spikelets 2.5 mm. long, branches ascending, dense.  
*P. condensum*, p. 197

***Panicum hemitomom* Schultes. Narrow Panic-Grass.\***

*Panicum hemitomom* Schultes, Mant. II. 227. 1824 [n. n. for *P. walteri* Muhl.=Ell. from near Savannah].

*Brachiaria digitarioides* Stone, Bartonica II., p. 26, 1910.

This is another southern species restricted to wet swamps in the southwestern portion of the Cape May peninsula. It was discovered in August, 1909, by Mr. O. H. Brown.

In *Torreya* 1907, p. 39, the writer erroneously recorded this grass from Cape May county, the specimens proving to be *Panicum condensum* Nash. (see Proc. A. N. S. Phila., 1908, p. 458).

The same error was made by Keller and Brown, *Flora of Philadelphia*, 1905, p. 33.

*Fl.*—Late June to late July (apparently). \*

*Cape May.*—Bennett. Cape May.

***Panicum verrucosum* Muhl. Warty Panic Grass.**

*Panicum verrucosum* Muhlenberg, Gram. 113. 1817 [New Jersey].—Britton 281.—Keller and Brown 36.

Sandy swamps; common throughout the Pine Barrens and frequent in the lower part of the Middle district. This is a characteristic south Jersey grass distinguished from all the other members of the genus by the minute tubercles on the spikelets.

*Fl.*—Early August to late September.

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\* In the genus *Panicum* a number of New Jersey records published in "The North American Species of *Panicum*" by Hitchcock and Chase (Contr. from the U. S. Nat. Herb. vol. 15, 1910), are cited and marked H. & C.

*Middle District*.—Fish House, Woodbury (C), Washington Park (S), Westville, Tomlin, Mickleton, Swedesboro, Salem (S), Dividing Creek.

*Pine Barrens*.—Sea Bright (NB), Manchester (NB), Lakehurst, Forked River, Bamber, Speedwell, Bear Swamp, Clementon, Atsion, Egg Harbor City, Landisville, Tuckahoe (S), Pancoastville (T).

*Cape May*.—Court House, Clermont.

***Panicum capillare* L. Witch Grass.**

Pl. IX., fig. 3.

*Panicum capillare* Linnæus, Sp. Pl. 58. 1753 [Virginia and Jamaica].—Britton 281.

Common throughout, except in the Pine Barrens. Whatever the original habitat of this grass may have been, it is now essentially a weed abounding in cultivated and waste ground, with little to remind one of its native origin.

*Fl.*—Late August to late September.

***Panicum philadelphicum* Bernh. Wood Witch Grass.**

*Panicum philadelphicum* Bernhardt, in Nees Fl. Bras. 198. 1829 [Philadelphia].

Dry ground, edges of woods, etc., in the Middle and Cape May districts.

A more delicate ally of the preceding.

*Fl.*—Mid-August to mid-September.

*Middle District*.—Medford, Swedesboro, Riddleton.

*Pine Barrens*.—Lakehurst (H&C), Sea Isle Inc.

*Cape May*.—Wildwood Inc. (OHB), Cold Spring.

***Panicum dichotomiflorum* Michx. Spreading Panic Grass.**

*Panicum dichotomiflorum* Michaux, Fl. Bor. Am. I. 48. 1803 [Alleghany Mts.].

*Panicum proliferum* Britton, 281.

Wet places; common along the larger streams of the Middle district and the salt marshes of the coast; only casually reported from the northern counties.

*Fl.*—Mid-July to early October.

*Middle District*.—Freehold (H&C), Fish House (S), Camden, Westville, W. Deptford, Swedesboro.

*Coast Strip*.—Deal (P), Cox's, Spray Beach (L), Barnegat City (L).

*Cape May*.—Cold Spring (S), Cape May (OHB).

***Panicum virgatum* L. Broom-like Panic Grass.**

Pl. IX., Fig. 2.

*Panicum virgatum* Linnæus, Sp. Pl. 59. 1753 [Virginia].—Britton 282.

Abundant along the salt marshes and the Delaware and other large rivers; only casual elsewhere and probably introduced.

*Fl.*—Mid-July to mid-September.*Middle District.*—New Egypt, Fish House, Camden (H&C), Kaighns Pt., Swedesboro, Salem, Beaver Dam.*Pine Barrens.*—Speedwell (S), Landisville, Winslow (S), Hammonton.*Coast Strip.*—Sandy Hook, Pt. Pleasant, Seaside Park, Forked River, Ship Bottom (L), Beach Haven (L), Barnegat City (L), Spray Beach (L), Longport (S), Ocean City (S), Stone Harbor (S), Five-Mile Beach, Cape May.***Panicum virgatum cubense* Griseb. Cuban Panic Grass.***Panicum virgatum cubense* Grisebach, Cat. Pl. Cub. 233. 1866 [Hanabana Cuba].

Similar situations to the preceding. The majority of the specimens examined, however, are from farther inland, either in the Pine Barrens or Middle district.

*Fl.*—Early July to early September.*Middle District.*—Lindenwold, Burlington.*Pine Barrens.*—Hanover, Pasadena, Atsion (H&C), Egg Harbor City, Island Heights.***Panicum amarum* Ell. Beach Panic Grass.***Panicum amarum* Elliot, Bot. S. C. and Ga., I. 121. 1817 [South Carolina].—Keller and Brown 36.*Panicum amarum* var *minor* Britton 282.

Sea beaches frequent; extending up the bay shore at least as far as Town Bank.

*Fl.*—Early September to late October.*Maritime.*—Sandy Hook, Long Branch, Seaside Park, Barnegat City (L), St. Albans (L), Holgate's (L), Ocean City, Holly Beach (UP), Cape May, Cape May Point.***Panicum agrostoides* Spreng. Agrostis-like Panic Grass.***Panicum agrostoides* Sprengel, Pl. Pugill II.: 4. 1815 [Pennsylvania].—Britton 281.

Moist open ground; common in the northern counties and casual southward in the Middle district.

*Fl.*—Mid-July to early September.

*Middle District*.—Clementon, Swedesboro, Dividing Creek.

*Pine Barrens*.—Atsion (H&C), Landisville.

***Panicum stipitatum* Nash. Long Panic Grass.**

*Panicum stipitatum* Nash., Britton's Manual 83. New name for *P. clongatum* Pursh nec Salisb. [New Jersey to N. Carolina].

Moist, sandy, open ground in the lower part of the Middle district; not very common.

*Fl.*—Mid-July to early September.

*Middle District*.—Delair, Camden (H&C), Washington Park, Moorestown, Medford (S), Mickleton, Tomlin, Swedesboro (CDL).

***Panicum condensum* Nash. Clustered Panic Grass.**

Pl. XII., Fig. 1.

*Panicum condensum* Nash, in Small's Southern Flora. 93. [South Carolina and Florida].

*Brachiaria digitarioides* Keller and Brown 33.—Stone Torrey 1907, 39 [See Proc. A. N. S. Phila., 1908, 458].

Usually in shallow water, swamps and ditches, southern part of the Cape May peninsula.

First found September 1, 1902, at Peermont, by the writer, and erroneously recorded as *Brachiaria digitarioides* (see synonymy).

*Fl.*—Early August to late September.

*Coast Strip*.—Holly Beach, Piermont (S).

*Cape May*.—Cold Spring.

***Panicum longifolium* Torr. Long-leaved Panic Grass.**

Pl. VII., Fig. 5.

*Panicum longifolium* Torrey, Fl. V. S. 149. 1824 [Pine Barrens of New Jersey].

*Panicum anceps* Britton 281 (in part).

Sandy swamps throughout our region, except the upper part of the Middle district; probably most common in the Pine Barrens and along the western border of the coast marshes. Discovered in New Jersey in 1819 by James Goldie, a Scottish botanist, who travelled and collected here at that time.

*Fl.*—Early August to mid-September.

*Middle District*.—Washington Park (S), Lindenwold (S).

*Pine Barrens*.—Pt. Pleasant (S), New Lisbon, Manchester (P), Forked River, Waretown, Manahawkin, Bear Swamp (S), Speedwell (S), Clementon, Williamstown Inc., Jackson (P), Ancora (P), Cedar Brook, Parkdale (S), Atsion (H&C), Egg Harbor City, Mays Landing (S), Absecon (S), Folsom 12th St., Woodbine, Palermo (S).

*Cape May*.—Dias Creek, Bennett, Cold Spring (S).

***Panicum anceps* Michx. Beaked Panic Grass.**

*Panicum anceps* Michaux, Fl. Bor. Am. I. 48. 1803 [Carolina].—Britton 281 (in part).

Moist open ground, Middle and Cape May districts; not very common.

Apparently neither this or the preceding occur in the northern counties.

*Fl.*—Late July to early September.

*Middle District*.—New Egypt, Bordentown, Locust Grove, Medford, Mickleton (H), Woodstown (P).

*Cape May*.—Court House, Cape May (OHB).

***Panicum depauperatum* Muhl. Starved Panic Grass.**

*Panicum depauperatum* Muhlenberg, Gram. 112. 1817 [Pennsylvania].—Britton 279.

Dry sandy or rocky ground throughout the State, except in the Pine Barrens, where it is rare and perhaps introduced.

*Fl.*—Late May to late July.

*Middle District*.—Farmingdale, Allaire, New Egypt (C), Delanco, Riverside, Hainesport, Pensauken, Browns Mills, Lawnside (S), Mickleton, Grenloch, Tomlin, Franklinville (P), Almonessen, Swedesboro, Bridgeton, Millville.

*Pine Barrens*.—Toms River (S), Whitings, Waretown, Pen Bryn (S), Atco, Williamstown Inc., Newfield, Landisville (T), Inskip.

*Cape May*.—Cape May (OHB).

***Panicum linearifolium* Scribner. Linear-leaved Panic Grass.**

*Panicum linearifolium* Scribner, Britton and Brown's Ill. Flora III.: 500 f. 268a. June, 1898 ["Washington, D. C.," prob=Md.].

Very rare; only reported from one station within our limits, where it was collected by Mr. C. L. Pollard, 1897.

*Coast Strip*.—Wildwood (H&C).

**Panicum aciculare** Desv. **Bristling Panic Grass.**

*Panicum aciculare* "Desv" Poir, in Lamark Encycl. Suppl. 4:274. 1816 [S. E. United States].

Dry sandy ground in the southern part of the Cape May peninsula, where it reaches the northern limit of its range. First found in the State by the writer on June 30, 1909, near Cold Spring.

*Fl.*—Late June to late September.

*Cape May.*—Cold Spring (S), Bennett, Fishing Creek (OHB).

**Panicum angustifolium** Ell. **Narrow-leaved Panic Grass.**

*Panicum angustifolium* Elliot, Bot. S. C. and Ga. I.: 129. 1816 [Florida].

Dry sandy ground in the southern part of the Cape May peninsula, where it was discovered by Mr. O. H. Brown, September, 1909, extending the range north from Frankford, Delaware. The specimen labelled from "the Schuylkill River below Reading, Pa.," in the Philadelphia Academy Herbarium, while undoubtedly this species must have been mislabeled or introduced at that station, as the locality is so completely out of its proper habitat. Its chance introduction by canal boats is easily possible.

*Fl.*—Late June to late September (probably).

*Cape May.*—Green Creek.

**Panicum dichotomum** L. **Forked Panic Grass.**

Pl. IX., Fig. 1.

*Panicum dichotomum* Linnæus, Sp. Pl. 58. 1753 [Virginia].—Britton 280.

A species of dry woodland not particularly abundant in our region, but probably more characteristic of the Middle district than of the Pine Barrens. In the latter it is found mostly along the cleared strip of ground bordering the railroads from which the undergrowth is constantly cut away as a precaution against the spread of forest fires, and where various dry ground *Panicums* flourish luxuriantly. That some of them owe their presence to the railroads I have little doubt.

*Fl.*—Early June to mid-July.

*Middle District.*—Mickleton, Sicklerville (S), Yorktown (S).

*Pine Barrens.*—Lakehurst, Pancoast (S).

*Cape May.*—Court House.

**Panicum cærulescens** Hack. **Bluish Panic Grass.**

*Panicum cærulescens* "Hack" Hitchcock Contr. Nat. Herb. XII. 219. 1909  
[Miami, Fla.].

Vicinity of Cold Spring, Cape May Co., the northern limit of the species; collected June 30, 1909, by the writer.

*Fl.*—Late June to ———

*Cape May.*—Cold Spring (S).

**Panicum barbuiatum** Michx. **Large-fruited Barbed Panic Grass.**

*Panicum barbuiatum* Michaux, Fl. Bor. Am. I. 49. 1803 [Carolina].

This has the same distribution as *P. dichotomum*, occurring in the Pine Barrens under the same conditions.

*Fl.*—Early June to mid-July.

*Middle District.*—Woodbury, Medford (S), Clementon (S), Bridgeton (S).

*Pine Barrens.*—Pancoast, Dennisville (S).

*Cape May.*—Court House, Bennett.

**Panicum lucidum** Ashe. **Sphagnum Panic Grass.**

*Panicum lucidum* Ashe, Jour. Elisha Mitch., Sci. Soc. XV. 47. 1898 [Lake Mattamuskeet, N. C.]—Keller and Brown 36.

*Panicum sphagnicola* Nash, Brit. Man. Ed. I. 85.

Plentiful in bogs in the Pine Barrens and Cape May region, and less abundant in the Middle district.

*Fl.*—Mid-June to mid-August.

*Middle District.*—Farmingdale, Grenloch, Tomlin, Lawnside (S), Beaver Dam (S).

*Pine Barrens.*—Allaire, Lakelurst, Davenport, Forked River, Coxe's, Bamber, Speedwell, Chatsworth, High Bridge (S), Atsion (H&C), Vine-land (S), Folsom 12th St., Pancoast, Tuckahoe (S), Palermo.

*Coast Strip.*—Anglesea, Wildwood.

*Cape May.*—Court House, Dias Creek, Cold Spring.

**Panicum microcarpon** Muhl. **Barbed Panic Grass.**

*Panicum microcarpon* "Muhlenberg," Elliot Bot. S. C. and Ga. 1816  
[Georgia].

*Panicum barbuiatum* Keller and Brown 36.

?*Panicum nitidum* var. *ramulosum* Torrey, Flora Nor. U. S. 146. 1824.—  
[Quaker Bridge, N. J.].

Damp shaded spots; apparently common except in the Pine Barrens.

*Fl.*—Mid-June to mid-August.



*Middle District*.—Shark River, Farmingdale, Allaire (S), Pt. Pleasant (S). New Egypt, Birmingham, Fish House, Medford (S), Ballinger's Mill, Lawnside, Albion, Clementon, Sicklerville, Swedesboro, Yorktown, Riddleton, West of Vineland (S).

*Coast Strip*.—Palermo, Peermont (S), Avalon, Wildwood.

*Cape May*.—South Dennis (S), Court House.

***Panicum mattamuskeetense* Ashe. Mattamuskeet Panic Grass.**

*Panicum mattamuskeetense* Ashe, Jour. Elisha Mitch. Sci. Soc. XV. 45. 1898 [Lake Mattamuskeet, N. C.].

Differs from the next only in its greater pubescence; possibly not distinct, in which case all the specimens will be known by the present name, which is the older. The only specimen that seems to belong here is one collected by Mr. Stewardson Brown at Anglesea, Cape May Co., in 1897.

*Fl.*—Mid-June to early August.

*Coast Strip*.—Anglesea.

***Panicum clutei* Nash. Clute's Panic Grass.**

*Panicum clutei* Nash, Bull. Torr. Bot. Club, p. 569. 1899 [Tuckerton to Atsion, N. J.].

An abundant and easily recognized grass of damp spots in the Pine Barrens and Cape May region, and occurring here and there in the Middle district also.

*Fl.*—Mid-June to early August.

*Middle District*.—Como, Farmingdale, New Egypt, 3 miles west of Camden, Griffith's Swamp, Lawnside, Kirkwood, Yorktown, Centerton, Dividing Creek.

*Pine Barrens*.—Allaire, Pt. Pleasant, Toms River, Lakehurst, two miles south New Egypt, Bamber, Pasadena, Manahawkin, Tuckerton, Speedwell (S), Chatsworth, White Horse, Bear Swamp (S), Ballinger's Mills, Clementon, Albion, Sicklerville, Ancora, Landisville, Winslow Inc., Pancoast, Millville.

*Cape May*.—Bennett, Court House (S).

***Panicum wrightianum* Scribn. Wright's Panic Grass.**

*Panicum Wrightianum* Scribner, Bull. XI. Div. Agrost. U. S. Dept. Agr. 44. 1898 [Biloxi, Miss.].—Stone, Bartonian II., p. 29, 1910.

Bogs of southern Cape May County.

This beautiful little *Panicum*, distinguished from all our other species by the extremely minute spikelets, was discovered near Bennett, June 30, 1909, by the writer in company with several

members of the Philadelphia Botanical Club. It had not been recorded previously from north of North Carolina.

*Fl.*—Late June to late September.

*Cape May.*—Bennett.

***Panicum spretum* Schultes. Eaton's Panic Grass.**

*Panicum spretum* Schultes, Mant. II. 248. 1824 [New England].

*Panicum paucipilum* Nash, Bull. Torr. Bot. Club, p. 573. 1899 [Wildwood, N. J.].

Plentiful in bogs and wet swamps in the Pine Barren and Cape May districts. The types of *P. paucipilum* were collected by Mr. E. P. Bicknell, May 30, 1897, at Wildwood, N. J. Specimens from Lakehurst differ in having the spikelets more elongated, but are regarded as inseparable by Hitchcock and Chase.

*Fl.*—Late June to early August.

*Pine Barrens.*—Lakehurst, Bamber, Chatsworth, Bear Swamp, Winslow, Atsion (H&C), Belleplaine.

*Cape May.*—South Dennis (S), Court House, Dias Creek, Goshen, Whitesboro, Bennett.

*Coast Strip.*—Wildwood (H&C).

***Panicum lindheimeri* Nash. Lindheimer's Panic Grass.**

*Panicum Lindheimeri* Nash, Bull. Torr. Bot. Club. XXIV. 196 [Texas].

Dry ground throughout our region.

*Fl.*—Mid-June to early August.

*Middle District.*—Farmingdale, Pemberton Inc., Haddonfield (S), Medford, Washington Park, Lindenwold, Sicklerville (S), Glassboro (S) Yorktown, Bridgeton (S).

*Pine Barrens.*—New Lisbon, W. Plains (S), Speedwell (S), Ballinger's Mill, Winslow Inc. (S), Folsom Twelfth St., Manahawkin, Woodbine, Palermo.

*Coast Strip.*—Wildwood.

*Cape May.*—Dias Creek (S), Fishing Creek (OHB).

***Panicum leucothrix* Nash. Glaucous Panic Grass.**

*Panicum leucothrix* Nash, Bull. Torr. Bot. Club, XXIV. 41. 1897 [Eustis, Lake Co., Fla.]

Sandy ground in the Pine Barrens; apparently not very common.

*Fl.*—Late June to late August, probably.

*Pine Barrens.*—Forked River (H&C), Chatsworth, Atsion (H&C), Mouth of Batsto, Absecon (S).

**Panicum huachucae** Ashe. **Huachuca Panic Grass.**

*Panicum huachucae* Ashe, Jour. Elisha Mitch. Sci. Soc. XV. 51. 1898  
[Huachuca Mts., Arizona].

So far as our material goes this species seems to be restricted to the Middle district and Coastal strip, and the typical form is apparently not common in our region.

The majority of our specimens have been identified by Hitchcock and Chase as *P. h. silvicola*,\* but many others are marked as intermediate and the characters are so slight that in practice it seems impossible to recognize them as distinct.

*Fl.*—Mid-June to late July.

*Middle District.*—Farmingdale, Sicklerville, Yorktown.

*Coast Strip.*—Beach Haven (L), Piermont, Cold Spring.

**Panicum tennesseense** Ashe. **Tennessee Panic Grass.**

*Panicum tennesseense* Ashe, Jour. Elisha Mitch. Sci. Soc. XV. 52. 1898  
[La Vergne Co., Tenn.].

Distribution as in the last.

*Fl.*—Mid-June to mid-July.

*Middle District.*—Riddleton, Tabernacle (S).

*Coast Strip.*—St. Albans (L), Palermo, Piermont, Wildwood.

**Panicum meridionale** Ashe. **Gray Panic Grass.**

*Panicum meridionale* Ashe, Jour. Elisha Mitch. Sci. Soc. XV. 59. 1898  
[Chapel Hill, N. C.].

Dry ground; abundant in the Pine Barrens, also in the Coast strip and Cape May district.

Starred specimens in the list of localities have been identified by Hitchcock and Chase as *P. albemarlense*, a species which so far as this New Jersey material goes I find it impossible to separate from *P. meridionale*.

*Fl.*—Mid-June to mid-August.

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\**Panicum huachucae silvicola* Hitchcock and Chase, Rhodora X. 64. 1908  
[District of Columbia].

*Middle District.*—Ballinger's Mill (S), Medford (S), edge of Bear Swamp, Swedesboro.

*Coast Strip.*—Sea Bright, Forked River, Spray Beach (L), St. Albans (L), Surf City (L), Beach Haven (L), Barnegat City Jnc. (L), Barrel Island (L), Avalon.

*Middle District*.—Hornerstown, Grenloch,\* Medford\* (S).

*Pine Barrens*.—Allaire, Farmingdale, Lakehurst, Brown's Mills Jnc., East Plains, Chatsworth, Ballinger's Mill,\* Bear Swamp\* (S), Berlin (S), Sickler-ville, Landisville, Atsion (H&C), Winslow Jnc., Pancoast, Palermo.

*Coast Strip*.—Anglesea, Piermont (S), Surf City\* (L), N. Beach Haven\* (L), Holgates (L), Ship Bottom (L).

***Panicum oricola* Hitch. & Chase. Coast Panic Grass.**

*Panicum oricola* Hitchcock and Chase, *Rhodora* VIII. 208. 1906 [Lewes, Del.].

Apparently restricted to the Coast strip and Pine Barrens.

*Fl.*—Early June to mid-August.

*Pine Barrens*.—Toms River (H&C), Hornerstown, Forked River (H&C), Pasadena, Tuckerton (H&C), Chatsworth, E. Plains (H&C), Millville, Winslow Jnc., Hammonton (H&C), Atsion (H&C), Absecon (H&C).

*Coast Strip*.—Ship Bottom (L), Spray Beach (L), Surf City (L), Beach Haven (L), Peahala (L), Beach Haven Terrace (L), Atlantic City (H&C).

***Panicum lanuginosum* Ell.† Downy Panic Grass.**

*Panicum lanuginosum* Elliott, *Bot. S. C. and Ga.* I. 123. [Georgia].

Restricted to the coastal strip, where it is common along the edge of the salt marshes.

*Fl.*—Late June to late July.

*Coast Strip*.—Peahala (L), Beach Haven (L), St. Albans (L), Surf City (L), N. Beach Haven (L), Beach Haven Terrace (L), Palermo, Piermont (S), Anglesea, Wildwood (H&C), Bennett (S).

***Panicum villosissimum* Nash. Woolly Panic Grass.**

*Panicum villosissimum* Nash, *Bull. Torr. Bot. Club* XXIII. 149. 1896 [Ocmulgee Swamp, Ga.].

Throughout our region in sandy localities, usually in woods.

*Fl.*—Early June to early July.

*Middle District*.—Arneys Mt. (S), Grenloch, Mickleton, Glassboro (S), Sicklerville, Centerton (S), Husted (S), Millville.

\**Panicum albemarlane* Ashe, *Jour. Elisha Mitch. Sci. Soc.* XVI. 84. 1900 [Beaufort and Hyde Cos., N. C.].

† Hitchcock and Chase record *P. auburne* from New Jersey in Gray's Manual, Ed. VII., 1908, p. 111, but apparently repudiate the statement in their subsequent monograph of the genus where they do not know it north of Virginia.

*Pine Barrens*.—Bear Swamp, Ballinger's Mill, Cedar Brook, Landisville, Inskip, Winslow Inc., Folsom, Petersburg.

*Coast Strip*.—Avalon.

*Cape May*.—Court House (S), Wildwood Inc. (H&C), Dias Creek, Bennett, Cold Spring (S), Fishing Creek (OHB).

***Panicum pseudopubescens* Nash. Smoothish Panic Grass.**

*Panicum pseudopubescens* Nash, Bull. Torr. Club XXVI. 577. 1899 [Auburn, Lee Co., Ala.].

One specimen collected by Mr. Benjamin Heritage near Mickleton has been identified as this species by Hitchcock and Chase, and several other records appear in their monograph of the genus. Evidently not common.

*Middle District*.—Camden (H&C), Mickleton.

*Pine Barrens*.—Atsion (H&C).

*Cape May*.—Wildwood Inc. (H&C).

***Panicum commonsianum* Ashe. Commons' Panic Grass.**

*Panicum commonsianum* Ashe, Jour. Elisha Mitch. Sci. Soc. XV. 55. 1898 [Cape May Pt., N. J.].

Plentiful in dry ground throughout the Pine Barren and Cape May districts. The type was collected by Mr. Albert Commons, the well known authority on the Delaware flora, at Cape May Point, N. J.

*Fl.*—Early June to late July.

*Pine Barrens*.—Farmingdale (S), Lakehurst, Davenport, Toms River (H&C), Whittings, Brown's Mills, New Lisbon, Bamber, Forked River, Pasadena, E. Plains (S), Speedwell, Chatsworth (S), White Horse (S), Tabernacle, head of Batsto River, Clementon, Sumner, Albion, Sicklerville, east of Centerton (S), Vineland (S), Landisville (T), Atsion (H&C), Millville, Twelfth St., Pancoast.

*Coast Strip*.—Wildwood (H&C).

*Cape May*.—Cape May Pt. (S).

***Panicum commonsianum addisonii* Nash. Addison Brown's Panic Grass.**

*Panicum addisonii* Nash, Bull. Torr. Bot. Club XXV. 83. 1898 [Wildwood, N. J.].

Common in dry sandy ground, especially in the Pine Barrens, but locally at least throughout our region.

The type specimen of this species, which is essentially a diminutive of the preceding, was collected by Mr. E. P. Bicknell at Wildwood, May 30, 1897. It is named after Hon. Addison Brown, joint author of the "Illustrated Flora."

So many New Jersey specimens are regarded as intermediate between *commonsianum* and *addisonii* by Hitchcock and Chase, to whom they were submitted, that it seems more reasonable to regard them as sub-species rather than as full species.

*Fl.*—Early June to late July.

*Middle District.*—Farmingdale (S), Woodbury, Tomlinson's Medford (S), Lawnside (S), Union Grove (S), Bridgeton (S).

*Pine Barrens.*—Lakehurst, Toms River (H&C), Whittings, Brown's Mills, E. Plains (S), Tuckerton (H&C), Chatsworth, Albion, Ballinger's Mills, Landisville, Inskip, Atsion (H&C), Mays Landing, Somers Pt. (H&C).

*Coast Strip.*—Wildwood (H&C), Piermont (S).

*Cape May.*—Wildwood Jnc. (H&C), Dias Creek (S), Cape May (S).

***Panicum tsugetorum* Nash. Hemlock Panic Grass.**

*Panicum tsugetorum* Nash, Bull. Torr. Bot. Club XXV. 86. 1898 [N. Y. Botanic Garden].

Casually throughout our region, but most plentiful in the pine woods of the Pine Barrens in company with the two preceding and the following.

*Fl.*—Early June to late July.

*Middle District.*—Riverside, Lawnside (S), Medford (S), Glassboro (S), Centerton (S), Bridgeton (S).

*Pine Barrens.*—Forked River (H&C), Tuckerton (H&C), E. Plains (S), Chatsworth (S), White Horse (S), Atsion (H&C), Pancoast (S), Palermo.

*Cape May.*—Wildwood Jnc. (H&C), Bennett (S), Court House.

***Panicum columbianum* Scribn. Columbia Panic Grass.**

*Panicum columbianum* Scribner, Bull. VII. Div. Agrost. U. S. Dept. Agr. 78. 1897 [N. Eng. to Carolinas, Tenn. and Ala.].—Keller and Brown 37.

*Panicum psammophilum* Nash, Bull. Torr. Bot. Club XXVI. 576. 1899 [Toms River, N. J.].

Dry sandy woods of the Pine Barrens and casually in the Middle, Cape May and Coast districts.

*Fl.*—Early June to late July.

*Middle District.*—Shark River, Grenloch, Lawnside.

*Pine Barrens.*—Allaire (S), Farmingdale (S), Lakehurst (H&C), Toms River (H&C), Brown's Mills, New Lisbon, Tuckerton (H&C), E. Plains, Chatsworth, Atco, Sicklerville, Atsion (H&C), Folsom, Pancoast, Palermo.

*Coast Strip.*—Anglesea, Wildwood (H&C).

*Cape May.*—Court House.

***Panicum columbianum thinium* Hitch & Chase.**

*Panicum unciphyllum thinium* Hitchcock and Chase, *Rhodora* VIII. 209.  
[Toms River, N. J.]

Distribution similar to the last, from which it is perhaps hardly separable.

*Fl.*—Early June to late July.

*Middle District.*—Lawnside (S), Mantoloking (H&C).

*Pine Barrens.*—Toms River (H&C), Forked River (H&C), Chatsworth (S), Bear Swamp (S), Atsion (H&C), Tuckerton (H&C), Palermo, Egg Harbor City.

*Coast Strip.*—Ocean City (S).

*Cape May.*—Court House (S).

***Panicum ensifolium* Baldwin. Britton's Panic Grass.**

*Panicum ensifolium* Baldwin, in *Elliott Flor. S. Car. & Ga.* I. 126. 1817  
[Georgia].

*Panicum Brittoni* Nash, *Bull. Torr. Bot. Club* XXIV. 194. 1897 [Forked River, N. J.].

Boggy or wet sandy ground in the Pine Barren and Cape May districts, and locally in west Jersey.

This is the most delicate species after *P. wrightianum*. It was first collected in New Jersey by Dr. N. L. Britton at Forked River, in 1896, and as it was at that time thought to be a new species, Mr. Nash named it in honor of the collector.

*Fl.*—Early June to mid-July.

*Middle District.*—Lawnside (S).

*Pine Barrens.*—Allaire, Pt. Pleasant, Toms River (H&C), Forked River, Manahawkin, Penn Place (H&C), Atsion (H&C), Chatsworth, Speedwell, Pancoast.

*Cape May.*—Cold Spring.

***Panicum sphærocarpon* Ell. Round-fruited Panic Grass.**

*Panicum sphærocarpon* Elliot, *Flor. of S. Car. & Ga.* I. 125. 1817 [Georgia].  
Britton 281.—Keller and Brown 37.

Sandy ground; locally in northern New Jersey and common throughout our region. One of the most uniformly distributed and easily recognized species, the small round spikelets, broad, short and stiff leaves being particularly characteristic.

*Fl.*—Mid-June to mid-August.

*Middle District.*—Medford, Lawnside (S).

*Pine Barrens.*—Farmingdale (S), Forked River, Tuckerton, New Lisbon, White Horse, Chatsworth, Speedwell (S), Atco, Pancoast (S), Palermo, Dennisville (S).

*Coast Strip*.—Spray Beach (L.), Peahala (L.), Barnegat City Jnc. (L), Beach Haven (L), St. Albans (L), Surf City (L), Barrel Isl. (L), Longport (S), Avalon, Piermont, Wildwood.

*Cape May*.—Wildwood Jnc., Bennett, Cold Spring (S), Green Creek (S), Cape May (H&C).

***Panicum polyanthes* Schultes. Small-fruited Panic Grass.**

*Panicum polyanthes* Schultes, Mant. II. 257. 1824. New name for *P. multiflorum* Ell. [nec. Poir] [S. Carolina].

*Panicum microcarpon* Britton 281.

Damp shady ground, apparently not very common in our region, and found only in the Middle and Cape May districts.

*Fl.*—Late June to mid-July. Secondary panicles very rare.

*Middle District*.—Sea Bright, Camden Co. (C), Pemberton Jnc. (S), Medford (S), Ballinger's Mill (S), Yorktown, Maple Shade.

*Cape May*.—Bennett.

***Panicum commutatum* Schultes. Variable Panic Grass.**

*Panicum commutatum* Schultes, Mant. III. 24. 1824 [Carolina and Georgia].

Our only record is at Bennett, Cape May Co., where I collected it June 30, 1909.

*Fl.*—Early June to late July.

*Cape May*.—Bennett (S).

***Panicum ashei* Pearson. Ashe's Panic Grass.**

*Panicum Ashei* T. G. Pearson, in Ashe Jour. Elisha Mitch. Sci. Soc. XV. 35. 1898 [Wilmington, N. C.].

Plentiful in dry sandy woodland of the Pine Barrens and Cape May districts, and less abundant in the Middle district and Coast strip.

The early forked branching and general smooth rigid appearance are characteristic of this species, as is the frequent purplish coloration.

*Fl.*—Late May to mid-July, rarely later.

*Middle District*.—Shark River, Woodbury, Glassboro (S), Sewell (S), Bridgeton (S), Yorktown.

*Pine Barrens*.—Bamber, Waretown, Tuckerton (H&C), Albion (S), Sicklerville, Landisville, Millville, Atsion (H&C), Winslow Jnc., Folsom, Egg Harbor City (H&C), Pancoast, Petersburg, Dennisville (S).

*Coast Strip*.—Wildwood (H&C).

*Cape May*.—Court House, Wildwood Jnc (H&C), Bennett (S), Whitesboro (S).



***Panicum scribnerianum* Nash. Scribner's Panic Grass.**

*Panicum scribnerianum* Nash, Bull. Torr. Bot. Club XXII. 421. 1895.

New name for *P. scoparium minor* Scrib. [nec *P. capillare minor* Muhl.]

[Wysox, Pa.]—Keller and Brown 37.

*Panicum scoparium* Button, 280.

Restricted to the Middle district and certain localities in the northern counties. Locally common in dry, sandy ground. Named for Prof. F. Lamson Scribner, the well known agrostologist, who was for some years an active student of the flora of Philadelphia and vicinity and who first mounted and arranged the North American grasses in the herbarium of the Philadelphia Academy.

*Fl.*—Late May to early July.

*Middle District.*—Crosswicks Creek, Delanco, Riverside, Woodbury, Grenloch, Lawnside (S), Collingswood (S), Medford (S), Mt. Holly, Swedesboro.

***Panicum oligosanthes* Schultes. Few-fruited Panic Grass.**

*Panicum oligosanthes* Schultes, Mant. II. 256. 1824. [New name for *P. pauciflorum* Ell.—Georgia].

Known only from the Middle, Pine Barren and Cape May districts, where I have collected it in sandy soil at several localities. Previously it was not known north of Delaware.

*Fl.*—Early June to mid-July.

*Middle District.*—Medford, Lawnside (S).

*Pine Barrens.*—Atsion (H&C).

*Cape May.*—Bennett.

***Panicum scoparium* Lam. Velvety Panic Grass.**

*Panicum scoparium* Lamark, Encycl. VII. 744. 1797 [S. Carolina].—Keller and Brown 37.

*Panicum viscidum* Britton 281.

Common in moist ground along the entire coast marshes and up the Delaware River at least to Camden, following the larger streams into the limits of the Middle and Pine Barren districts at several points.

Its large size and dense velvety pubescence serve to distinguish it.

*Fl.*—Early July to late August.

*Middle District*.—Kaighns Pt., National Park, So. Westville, 8 miles west Mickleton, Centerton (S), Bridgeton (S), Dividing Creek.

*Pine Barrens*.—Williamstown Jnc., Winslow Jnc., Folsom, Woodbine (S), Demisville.

*Coast Strip*.—Avon (H&C), Pt. Pleasant, Manahawkin, Spray Beach (L) Tuckerton (H&C), Palermo, Ocean City, Estelville, Mays Landing (S), Anglesea, Wildwood (H&C), Peermont (S), Manumuskin (S).

*Cape May*.—Cold Spring, Court House, Cape May.

***Panicum cryptanthum* Ashe. Sheathed Panic Grass.**

*Panicum cryptanthum* Ashe, N. C. Agr. Sta. Bull. 175, 115. 1900 [Wilson's Mill, N. C.].

Known only from Twelfth St. (Folsom), Atlantic Co., near where it crosses Hospitality Branch in the Pine Barrens. It was collected here July 27, 1909, by Mr. Bayard Long, and thereby its range was extended far northward.

Hitchcock and Chase\* have recorded this specimen as from Atlantic City, a locality thirty miles to the east in a totally different floral district.

*Pine Barrens*.—Twelfth St. Folsom.

***Panicum aculeatum* Hitchcock & Chase. Chase's Panic Grass.**

*Panicum aculeatum* Hitchcock and Chase, Rhodora VIII. 209. 1906 [Tacoma Park, D. C.].

Just as the work is passing through the press Mr. O. H. Brown sends a *Panicum* from Cape May, which agrees in all respects with this species, except that the spikelets are a little smaller and the leaves shorter than a specimen from the District of Columbia collected by Mr. House. If not identical it represents a form exceedingly close to *P. aculeatum*. Mr. Long has apparently the same thing from Albion, September 7, 1910.

***Panicum scabriusculum* Ell. Elliot's Panic Grass.**

*Panicum scabriusculum* Elliot, Bot. S. C. and Ga. I. 121 [Savannah].

Confined to moist ground in the Pine Barrens. First discovered in the State by Mr. Bayard Long on Hospitality Branch, where it crosses Twelfth St. (Folsom), July 27, 1909.

Not previously known from north of Virginia.

*Fl.*—Early July to mid-August.

\* N. A. *Panicum*. Contrib. U. S. Nat. Herb. 15, p. 299.

*Pine Barrens*.—Twelfth St. Hospitality Branch, Pleasant Mills, N. of Atsion.

***Panicum clandestinum* L. Hispid Panic Grass.**

*Panicum clandestinum* Linnæus, Sp. Pl. 58. 1753 [Pennsylvania].—Britton 280.

Swampy thickets; common in the northern counties and also in the Middle district and Coast strip all the way to Cape May, but not recorded from the Pine Barrens.

*Fl.*—Mid-June to early September.

*Middle District*.—Farmingdale, New Egypt, Delanco, Hartford, Fish House, Haddonfield (S), Medford, Ballinger's Mill (S), Lawnside (S), Woodbury, Tomlin, Albion, Swedesboro, Yorktown, Centerton (S).

*Coast Strip*.—Sandy Hook (NB), Toms River, Manahawkin, Ocean City (S), Piermont, Wildwood (H&C), Holly Beach (UP).

*Cape May*.—Court House, Cold Spring.

***Panicum boscii* Poir. Porter's Panic Grass.**

*Panicum Boscii* Poiret, in Lam. Encycl. Suppl. IV: 278. 1816 [Carolina].

Casual in the Middle district and probably common in the northern counties. While some specimens present more pubescence than others, none seem worthy of separation under *P. b. molle*.

*Fl.*—Early June to early August.

*Middle District*.—Westville, Medford, Swedesboro, Fairton.

*Cape May*.—Bennett, Cape May.

***Panicum latifolium* L. Broad-leaved Panic Grass.**

*Panicum latifolium* Linnæus, Sp. Pl. 58. 1753 [America].—Britton 280.

*Panicum macrocarpon* Le Conte, Torrey Cat. 91. 1819.—Keller and Brown 38.

Edges of woods, dry ground; common in the northern part of the State, but rare within our region and confined to the Middle district.

*Fl.*—Early June to mid-July.

*Middle District*.—Mickleton.

**SACCIOLEPIS Nash.**

***Sacciolepis striata* (L.). Gibbous Panic Grass.**

*Holcus striatus* Linnæus, Sp. Pl. 1048. 1753 [Virginia].

*Sacciolepis gibba* Stone, Proc. Acad. Nat. Sci., Phila., 1908, p. 456.

Confined to the lower part of the Cape May peninsula, growing in moist soil. This species was discovered on the border of Lily Lake, Cape May Point, in September, 1905, by Mr. C. S. Williamson. It was not previously known from north of Virginia.

*Fl.*—Early August into October.

*Cape May.*—Cape May Pt.

#### ECHINOCHLOA Beauvois.

*Echinocloa walteri* (Pursh). Salt-Marsh Cockspur Grass.

Pl. XI, fig. 3.

*Panicum Walteri* Pursh, Fl. Am. Sept. I. 66. 1814 [Canada and New York near salt water].

*Panicum Crus-galli hispidum* Knieskern 40.—Britton 282.

Common along the edge of salt marshes on the entire coast and introduced at a few spots in west Jersey. Distinguished from the common weed "Barnyard Grass" *E. Crus-galli* (L) by its much larger head and longer bristles.

*Fl.*—Late August to early October.

*Middle District.*—Clementon.

*Maritime.*—Seaside Park (Ha), Forked River, Barnegat City (L), Harvey Cedars (L), Beach Haven (L), Ocean City (S), Tuckahoe (S), Sea Isle City (S), Avalon, Cape May, Dennisville (S).

#### CHÆTOCHLOA Scribner.

##### *Key to the Species*

- a. Bristles downwardly barbed, spikes adhering to one's clothing. [*C. verticillata*]\*
- aa. Bristles upwardly barbed.
  - b. Spike 20-50 cm. long, green. *C. magna*, p. 213
  - bb. Spike 10-20 cm. long, purplish. [*C. italica*]†
  - bbb. Spike less than 15 cm. long.
    - c. Annual, with merely a tuft of slender rootlets.
      - d. Bristles green, spikelets 2 mm. long. [*C. viridis*]‡
      - dd. Bristles tawny yellow, spikelets 2.5-3 mm. [*C. glauca*]§
    - cc. Perennial, with a creeping root stalk.
      - d. Culms tufted, green or purplish. *C. imberbis*, p. 213

\* Barbed Foxtail Grass. A weed about dwellings.

† Millet. Cultivated and escaped in waste ground.

‡ Green Foxtail Grass. A common weed.

§ Yellow Foxtail Grass. A common weed.

*dd.* Culms not tufted, bristles and tips of spikelets purplish.  
Coast plant. *C. i. versicolor*, p. 213

***Chætochloa imberbis* R. & S. Native Fox-tail Grass.**

Pl. XI., Fig. 5.

*Setaria imberbis* Roemer and Schultes, Syst. II. 891 [N. A. and Brazil].

Moist ground in the Middle district; probably more common than our collections would indicate, as it has been confused with the introduced species *C. glauca* and *C. viridis*, so common about cultivated ground. It can be told at once by the creeping root-stalk, being a perennial, while the others are annuals.

*Fl.*—Mid-July to late September.

*Middle District.*—Pemberton Jnc. (S), Delanco, Camden.

***Chætochloa imberbis versicolor* (Bicknell). Coast Fox-tail Grass.**

*Chætochloa versicolor* Bicknell, Bull. Torr. Club. 25. Feb., 1898. p. 105  
[Van Courtland Park, N. Y.].

Common along the edges of the salt marshes on the coast as well as on the bay shore of Cape May at least as far as Dias Creek.

*Fl.*—Mid-July to late September.

*Maritime.*—Seaside Park, Forked River, Manahawkin, Surf City (L), Barnegat City (L), St. Albans (L), Peahala (L), Beach Haven Terrace (L), Sherburn's (L), Beach Haven (L), Cedar Bonnet (L), Absecon (S), Atlantic City, Ocean City, Palermo, Cape May Court House, Cape May, Dias Creek.

***Chætochloa magna* (Griseb.). Giant Fox-tail Grass.**

*Setaria magna* Grisebeck, Fl. Brit. W. Indies. 1861. 554 [Jamaica].

Found on the edge of the salt marshes near the Cape May Point lighthouse, in September, 1891, by the writer, but not seen there in recent years. Re-discovered September, 1911, on the ocean side of the peninsula, below Cold Spring, by Mr. O. H. Brown. There is also a specimen in the Academy from the W. Wynne Wister herbarium labeled "N. J. 1863."

*Fl.*—Late July to late September or into October.

*Maritime.*—Wildwood (UP), Cape May Pt. (S), Near Cold Spring.

**CENCHRUS L.**

*Key to the Species.*

*a.* Bur-like involucre, 8 mm. thick, short, pubescent. *C. carolinianus*, p. 214

*aa.* Bur-like involucre, 12-14 mm. thick, densely long, pubescent.

*C. tribuloides*, p. 214

*Flowering Data.*—Time of year indicates the season during which well developed involucre and intact racemes are present.

***Cenchrus carolinianus* Walt. Hedgehog Grass. Sand Bur.**

Pl. XV., Fig. 6.

*Cenchrus carolinianus* Walter, Flor. Carolina, 79. 1788 [Carolina, probably].

*Cenchrus tribuloides* Knieskern 40.—Britton 282 (in part).—Keller and Brown 39.

*Cenchrus echinatus* Muhlenberg, Cat. 7. 1813.—Barton Flora Phila. I. 38. 1818.—Muhlenberg Gram. 51. 1817.—Torrey Fl. U. S. I. 68. 1824.

Common in sandy soil throughout our region, extending into the Northern district along the Delaware and in Bergen Co., according to Britton.

The character of the occurrence of this grass would seem to indicate that it was not originally found in the Pine Barrens or Coast region, but has entered from the surrounding areas.

*Fl.*—Mid-July to late September.

*Middle District.*—New Egypt, Delanco, Camden, Blackwood, Washington Park (S). Swedesboro.

*Pine Barrens.*—Landisville, Twelfth St., Absecon (S).

*Coast Strip.*—Beach Haven (L).

*Cape May.*—Court House (S), Goshen (S), Dias Creek.

***Cenchrus tribuloides* L. Coast Sand Bur.**

*Cenchrus tribuloides* Linnæus, Sp. Pl. 1050. 1753 [Coast of Virginia].—

Muhlenberg, Cat. 7. 1813.—Pursh Fl. Am. Sept. I. 60. 1814.—Muhlenberg Gram. 52. 1817.—Torrey Fl. U. S. I. 69. 1824.

*Cenchrus macrocephalus* Keller and Brown 39.

Common on sand dunes along the lower half of the coast.

*Fl.*—Mid-July to mid-September.

*Maritime.*—Surf City (L), Tucker's (L), Beach Haven (L), Holgate's (L), St. Albans (L), Spray Beach (L), Atlantic City, Longport (S), Ocean City, Stone Harbor (S), Anglesea, Wildwood, Cape May (OHB).

**ZIZANIA L.**

***Zizania palustris* L. Wild Rice.**

*Zizania palustris* Linnæus, Mantissa II. 295. 1771 [North America].

*Zizania aquatica* Knieskern 37.—Barton Fl. Phila. II. 168. 1818.—Britton 283.

Plentiful in water along the larger rivers and swamps of the Middle and Cape May districts and the Coastal strip, running well up into the Pine Barrens along the principal water courses, but not strictly speaking, a member of the Pine Barren flora.

This is the Wild Rice which covers the broad marshes of the Delaware as well as those of Newark and Hackensack, associated with Cat-tails, *Spartina* and *Phragmites*. By the latter part of July it is in full flower, and the drooping sprays of staminate flowers and broad green leaves remind one of a field of narrow leaved corn. In September it has become the shelter of thousands of reed birds and rail, and the gunners soon begin to beat and trample it down in pursuit of their game. The storms of autumn complete the work and by winter the acres of swaying and fluttering foliage are reduced to a dense brown mat which covers the marsh, and through which, in the following spring, the tender green sprouts of the next year's crop push their way and once again give color to the meadows.

The Rice sometimes follows the course of small streams for many miles back from the rivers or coast. I have found it on Cooper's Creek, twelve miles from its mouth, while it follows the larger streams as far as the head of tidewater. Very often a dam makes a sharp line of demarkation between the tidewater and Pine Barren floras, as at Toms River, Batsto, Mays Landing, Millville, etc., and checks abruptly the range of the Wild Rice.

*Fl.*—Mid-July through August, spikelets soon dropping.

*Middle District.*—New Egypt, Pemberton (NB), Fish House, Oaklyn (S), Mickleton, Swedesboro, Salem (S).

*Coast Strip.*—Metedeconk River (NY), Toms River (S), Forked River, Weekstown, Forks of Batsto, Mays Landing.

*Cape May.*—Cold Spring (OHB), New England Creek (OHB).

#### HOMALOCENCHRUS Mieg.

a. Spikelets 2.5–3 mm. long, greenish, panicle branches rigid.

*H. virginicus*, p. 215

aa. Spikelets 4–5 mm. long, whitish, panicle branches drooping.

*H. oryzoides*, p. 216

#### *Homalocenchrus virginicus* (Willd.). White Grass.

*Leersia virginica* Willdenow, Sp. Pl. 1. 325. 1797 [North America].—Barton, Fl. Phil. I. 41. 1818.—Knieskern 37.

*Homalocenchrus virginica* Britton 283.—Keller and Brown 39.

Common in damp shady spots in the Middle and Cape May districts.

*Fl.*—Late July to early September, spikelets of exserted panicles soon dropping.

*Middle District*.—Sea Bright (NY), New Egypt, Hartford, Merchantville (KB), Delaire, Oaklyn (S), Springdale (S), Mickleton (NY), Washington Park (S), Swedesboro, Woodstown (KB), Salem (S).

*Cape May*.—Whitesboro, Green Creek (S), Sluice Creek (S).

**Homalocenchrus oryzoides (L.). Rice Cut-Grass.**

Pl. VII., Fig. 4.

*Phalaris oryzoides* Linnæus, Sp. Pl. 55. 1753 [Virginia].

*Homalocenchrus oryzoides* Britton 284.

*Laccisia oryzoides* Barton, Fl. Phil. I. 41. 1818.—Knieskern 37.

Common in wet swamps throughout, except in the Pine Barrens, where it occurs only as an intrusion from the coast.

*Fl.*—Early August to mid-September, spikelets of exerted panicles soon dropping.

*Middle District*.—New Egypt, Delanco (S), Hartford, Camden (P), Oaklyn (S), Lawnside (S), Springdale (S) Lindenwold (S), Clementon, Albion, Tomlin, Salem (S), Dividing Creek.

*Coast Strip*.—Bay Head (NY), Barnegat City (L), Manahawkin, 4 mi. E. of Hammonton (S), Forks of Batsto, Mays Landing (S), Piermont (S), Wildwood (UP).

*Cape May*.—Seaville (S), 3 mi. W. of Court House (S), Cape May (OHB).

**PHALARIS L.**

***Phalaris arundinacea* L. Reed Canary Grass.**

Pl. X., Fig. 3.

*Phalaris arundinacea* Linnæus, Sp. Pl. 55. 1753 [Europe].—Britton 285.

Frequent in open swamps in the northern counties, extending into the upper part of the Middle district.

*Fl.*—Early June to early July.

*Middle District*.—Pt. Pleasant, New Egypt, Delair, Pemberton Jnc. (S), Mickleton, Swedesboro.

**SAVASTANA Schrank.**

***Savastana odorata* (L.). Holy Grass.**

*Holcus odoratus* Linnæus, Sp. Pl. 1048. 1753 [Europe].

*Hierochloa borealis* Willis 76.—Torrey Flor. U. S. 150. 1824.—Knieskern 39.

*Hierochloa odorata* Britton 285.

*Savastana odorata* Keller and Brown 39.

Rather common along the edge of the salt marshes of the coast, especially where they join the first low thickets of the upland. Reported from Salem, but we have no other records for the bay shore.



The coastal strip seems to have a much later awakening in spring time than the western part of the State, and when the gray-green is beginning to tinge the landscape of the lower Delaware valley the shore marshes are still wrapped in the dull brown of winter. Even then, however, careful search will disclose the little brownish spikes of the Holy Grass pushing through the sod and unfurling their sprays of yellow anthers to the cold winds that still sweep in from the ocean. The long narrow glossy leaves come later and do not attain their full growth until the flower stalk has dried up.

The Lake Como specimen has been identified as *S. nashii*, but the form does not appear separable.

*Fl.*—Late April to late May. Panicles appear in early April and after flowering become dry and persist until midsummer.

*Maritime.*—Sea Bright (C), Lake Como, Squan (C), Pt. Pleasant (KB), Bay Head, Surf City (L), Barnegat City (L), Beach Haven Terrace (L), Anglesea (H), Cape May Ct. House, Cape May, Salem.

Also a specimen collected by J. H. Grove in a roadside near Lakehurst, July 23, 1808, perhaps introduced.

#### ARISTIDA L.

##### *Key to the Species.*

- a.* Awns twisted together spirally below the middle. *A. tuberculosa*, p. 218  
*aa.* Awns separate to the base.  
*b.* Middle awn coiled at the base, lateral awns very short. *A. dichotoma*, p. 217  
*bb.* Middle awn not coiled at the base.  
*c.* Middle awn 35-70 mm. long, lateral awns not much shorter. *A. oligantha*, p. 218  
*cc.* Middle awn less than 25 mm. long.  
*d.* Lower sheaths densely woolly. *A. lanosa*, p. 219  
*dd.* Sheaths glabrous.  
*e.* 3-8 dm. tall, panicle dense. *A. purpurascens*, p. 218  
*ee.* 1.5-5 dm. tall, panicle slender. *A. gracilis*, p. 218

#### *Aristida dichotoma* Michx. Poverty Grass.

Pl. VIII., Fig. 9.

*Aristida dichotoma* Michaux, Fl. Ber. Am. I. 41. 1803 [Lincoln, N. Car.]—Knieskern 38.—Britton 286.

Dry ground throughout the State.

*Fl.*—Late August to early October.

*Middle District*.—Keyport (NB), New Egypt, Fish House (S), Orchard (S), Westmont (S), Medford (S), Mickleton, Swedesboro.

*Pine Barrens*.—Waretown, Absecon, Atsion, Landisville, Mays Landing, Palermo (S).

***Aristida gracilis* Ell. Slender Poverty Grass.**

Pl. VIII., Fig. 4.

*Aristida gracilis* Elliott, Bot. S. C. and Ga. I. 142. 1817 [Charleston, S. C.]—Knieskern 38.—Gray Man. Ed. I. 584. 1848.—Britton 286.

Dry ground throughout the State, often growing with the last.  
*Fl.*—Early August to early October.

*Middle District*.—New Egypt, Crosswicks, Medford, Clementon, Taunton.

*Pine Barrens*.—Atsion, Mays Landing.

*Coast Strip*.—Forked River, Spray Beach (L), Sherburn's (L).

*Cape May*.—Green Creek (S).

***Aristida tuberculosa* Nutt. Beach Poverty Grass.**

*Aristida tuberculosa* Nuttall, Genera I. 57. 1818 [Augusta, Ga.]—Knieskern 38.—Willis 73.—Gray Man. Ed. I. 585. 1848.—Britton 286.—Keller and Brown 40.

Sandy ground along the upper coast or inland therefrom, where it has possibly followed the railroads. It occurs at South Amboy to the north of our limits.

*Fl.*—Late August to late September.

*Middle District*.—Middletown Pt., Keyport (NB).

*Pine Barrens*.—Pasadena (introduced along railroad).

*Coast Strip*.—Sandy Hook (NB), Waretown, Toms River.

***Aristida oligantha* Michx. Few-flowered Poverty Grass.**

*Aristida oligantha* Michaux, Fl. Bor. Am. I. 41. 1803 [Prairies of Illinois].

Dry sandy ground in the lower part of the Middle district; first obtained at Swedesboro by Mr. C. D. Lippincott. I am inclined to believe that this species has been introduced from the Mississippi Valley.

*Fl.*—Late August to early October.

*Middle District*.—Fenwick, Clementon, Mickleton, Swedesboro.

***Aristida purpurascens* Poir. Purplish Poverty Grass.**

Pl. XII., Fig. 2.

*Aristida purpurascens* Poir in Lamark Encycl. Suppl. I. 452. 1810 [Carolina].—Knieskern 38.—Torrey Flora U. S. I. 81. 1824.—Britton 286.

Locally in the northern counties and locally common in dry sandy ground throughout our region.

*Fl.*—Late August to early October.

*Middle District.*—New Egypt, Freeman's, Medford (S), Haddonfield (S), Clementon, Lawnside (S), Washington Park (S), Woodbury, Tomlin, Paulsboro (H).

*Pine Barrens.*—Pasadena, Batsto, Albion, Atco, Atsion, Cedar Lake, Landisville, Malaga (S), Mays Landing (C).

*Coast Strip.*—Cox's, Seaville, Piermont, Anglesea.

*Cape May.*—Court House (S), Anglesea Inc., Bennett.

#### ***Aristida lanosa* Muhl. Woolly Poverty Grass.**

*Aristida lanosa* Muhlenberg, Gram. 174. 1817 [Carolina].

Dry sandy ground, locally in the Middle and Cape May districts. First detected at Medford by Mr. Stewardson Brown and the writer. Previously apparently confused with the preceding.

*Fl.*—Early August to mid-September.

*Middle District.*—Locust Grove (S), Medford (S), Lindenwold (S).

*Cape May.*—Town Bank (S).

#### **STIPA L.**

##### ***Stipa avenacea* L. Black Oat Grass.**

Pl. VI., Fig. 3.

*Stipa avenacea* Linnæus, Sp. Pl. 78. 1753 [Virginia].—Muhlenberg Gram. 181. 1817.—Torrey Fl. U. S. I. 80. 1824.—Knieskern 38.—Britton 286.—Keller and Brown 40.

*Stipa bicolor* Barton, Fl. Phil. I. 54. 1818.

Locally in Bergen and Passaic counties and common in dry sandy ground in the Middle district; less common in other parts of our region.

A striking grass with its long twisted awns.

*Fl.*—Late May to early June. Fruit matures very rapidly and immediately drops.

*Middle District.*—Phalanx (NY), Farmingdale, Brindletown, Browns Mills, Kaighns Pt., Westville (P), Sewell, Glassboro, Medford (S), Albion, Sickler-ville, Berlin, Lindenwold, Mickleton, Swedesboro, Millville (S).

*Pine Barrens.*—Lakehurst, Landisville, Newtonville, Winslow Inc., White Horse (P), Mays Landing, Palermo. (Probably none of these typical Pine Barrens.)

*Cape May.*—Dennisville (OHB), Cape May, Cold Spring.

## MUHLENBERGIA Schreber.

*Key to the Species.*

- a. Panicle purplish, open and diffuse, each spikelet on a filiform pedicel and with a hair-like awn. *M. capillaris*, p. 221
- aa. Panicle contracted, spike-like or exceedingly slender and appressed, culms branched.
- b. Flowering scales not awned. *M. mexicana*, p. 220
- bb. Flowering scales awned.
- c. Panicles not dense and cylindrical.
- d. Outer scales equal in length to the flowering scale. *M. sylvatica*, p. 220
- dd. Outer scales about two-thirds as long as the flowering scale. *M. tenuiflora*, p. 221
- ddd. Outer scales minute, less than one-third as long as the flowering scale. *M. diffusa*, p. 221
- cc. Panicles dense and cylindrical, spike-like. *M. foliosa*, p. 220

**Muhlenbergia foliosa Trin. Leafy Muhlenbergia.**

*Muhlenbergia foliosa* Trinius, Gram. Unifl. 190. 1824 [Pennsylvania].

Bogs of the Middle district; rare (probably also northward), only known from Lindenwold, where it was discovered by the writer September 20, 1910, and was fairly plentiful in good condition.

*Fl.*—Late August to early October.

*Middle District.*—Lindenwold.

**Muhlenbergia mexicana (L.). Meadow Muhlenbergia.**

Pl. VII., Fig. 3.

*Agrostis mexicana* Linnæus, Mant. I. 31. 1767 [America].—Barton, Fl. Phila. I. 42. 1818.

*Muhlenbergia mexicana* Knieskern 37.—Britton 287.

Throughout the northern counties; south locally in the Middle district and on the coast.

*Fl.*—Mid-August to late September.

*Middle District.*—New Egypt, Birmingham, Delair, Swedesboro.

*Coast Strip.*—Barnegat.

**Muhlenbergia sylvatica (Torr.). Wood Muhlenbergia.**

*Agrostis sylvatica* Torrey, Fl. U. S. I. 87. 1824 [Mountains of N. J.].

*Muhlenbergia sylvatica* Knieskern 37.—Britton 287.

Northern counties in shady moist ground, and reported from Monmouth and Ocean counties by Knieskern.

*Pine Barrens*.—Landisville (T), probably introduced.

**Muhlenbergia tenuiflora** (Willd.). **Slender Muhlenbergia.**

*Agrostis tenuiflora* Willdenow, Sp. Pl. I. 364. 1798 [North America].

*Muhlenbergia tenuiflora* Knieskern 37.—Britton 287.—Keller and Brown—41.

Shady ground; frequent in the northern counties and rare in the Middle district. Reported by Knieskern from Ocean and Monmouth Counties.

*Fl.*—Late July to mid-September.

*Middle District*.—Swedesboro.

**Muhlenbergia diffusa** Willd. **Nimble Will.**

*Muhlenbergia diffusa* Willdenow, Sp. Pl. I:320. 1797 [Pennsylvania].—

Knieskern 37.—Torrey, Fl. N. Y. 15. 1819.—Britton 287.

Frequent in dry shady ground in the northern counties and occasionally southward in the Middle district and Coastal Strip.

*Fl.*—Late August to late September.

*Middle District*.—New Egypt, Birmingham, Swedesboro, Mickleton (H).

*Coast Strip*.—Forked River, Anglesea, Cape May (OHB).

**Muhlenbergia capillaris** (Lam.) **Long-awned Hair-Grass.**

*Stipa capillaris* Lamark, Tabl. Encycl. I. 158. 1791 [Carolina].

*Stipa sericea* Pursh, Fl. Am. Sept. I. 73. 1814.

*Agrostis sericea* Muhlenberg Cat. 10. 1813.—Muhlenberg Gram. 64. 1817.

Willis 72.

*Trichochloa capillaris* Torrey, Fl. U. S. I. 93. 1824.

*Muhlenbergia capillaris* Britton 287.

Rare and local; occurs also in Hudson Co., at Snake Hill and Little Snake Hill.

*Fl.*—Probably during September.

*Middle District*.—Woodbury.

*Pine Barrens*.—Eighth St., Hammonton.

**BRACHYELYTRUM Beauvois.**

**Brachyelytrum erectum** Schreb. **Brachyelytrum.**

Pl. X., Fig. 5.

*Muhlenbergia erecta* Schreber, Bescher. Gras. II. 139 pl. 50. 1810 [Mts. of Penna.].—Barton, Fl. Phila. I. 40. 1818.

*Brachyelytrum aristatum* Knieskern 37.—Willis 72.—Britton 287.

Frequent in rocky woods in the northern counties and occasionally in the Middle district.

*Fl.*—Early July to late July.

*Middle District.*—Shark River (C), Pt. Pleasant (S), Haddonfield (P), Mickleton (NB), Swedesboro.

#### ALOPECURUS.

*Alopecurus geniculatus aristulatus* (Michx.). Marsh Fox-tail.

Pl. VIII., Fig. 7.

*Alopecurus aristulatus* Michaux, Fl. Bor. Am. I.: 43. 1803 [Canada].

*Alopecurus subaristatus* Barton, Fl. Phila. I. 47. 1818.—Nuttall, Gen. II. 52. 1818.

Locally in swampy ground in the Northern and Middle districts.

*Fl.*—Late May to early July.

*Middle District.*—Red Bank, Swedesboro (CDL).

#### SPOROBOLUS R. Brown.

##### *Key to the Species.*

- a. Panicles contracted and spike-like, leaves with an attenuated involute tip.
  - b. Panicle terminal, upper sheaths 75 mm. long or more.
    - c. Two middle scales of the spikelet very unequal, attenuate.
      - S. clandestinus*, p. 223
    - cc. Two middle scales of the spikelet nearly equal, blunt.
      - S. asper*, p. 223
  - bb. Panicles terminal and lateral, upper sheaths not over 35 mm. long.
    - S. vaginæflorus*, p. 222
- aa. Panicles diffuse, grayish, branches capillary, spikelets very minute.
  - b. Base of plant flattened, leaves folded longitudinally.
    - S. torreyanus*, p. 223
  - bb. Base of plant not flattened, leaves flat.
    - S. scrotinus*, p. 223

*Sporobolus vaginæflorus* (Torr.). Sheathed Rush Grass.

Pl. XIV., Fig. 3.

*Vilfa vaginæflora* Torrey, A. Gray, Gram. & Cyp. No. 3. 1834 [Pennsylvania].

*Sporobolus vaginæflorus* Britton 288.

Dry ground, northern counties, and rarely south to the Middle District.

*Fl.*—Early September to early October.

*Middle District.*—Red Bank Mon. Co. (NB), Pt. Pleasant (McK), Birmingham, Mickleton (NB), Swedesboro.

*Pine Barrens.*—Landisville (T), incursion from Middle District.

*Capo May.*—Bennett.

**Sporobolus asper** (Michx.). Long-leaved Rush Grass.

*Agrostis aspera* Michaux, Fl. Bor. Am. I. 52. 1803 [Illinois].

Cape May district, rare.

This grass was unknown from the State until discovered by Mr. O. H. Brown, near Cape May City. It is rather remarkable that it has not been found in the Middle or Northern districts.

*Fl.*—Late August to late September.

*Cape May.*—Cape May.

**Sporobolus clandestinus** (Spreng.). Rough Rush Grass.

Pl. XIV., Fig. 4.

*Agrostis clandestina* Sprengel, Mant. Fl. Hal. 32. 1807 [Pennsylvania].

*Sporobolus asper* Britton 288.

*Vilfa aspera* Knieskern 37.

Sandy ground, casual in the Northern and more plentiful in the Middle and Cape May districts.

*Fl.*—Early August to late September.

*Middle District.*—New Egypt, Birmingham, Medford (S), Mickleton (NB), Swedesboro.

*Coast Strip.*—Waretown.

*Cape May.*—Bennett, Cold Spring (S), Town Bank.

**Sporobolus torreyanus** (R. & S.). Torrey's Dropseed.

*Agrostis torreyana* Roemer and Schultes, Mantissa II. 203 [Swamps of N. J.]—new name for *Agrostis compressa* Torrey nec Willd.—[Pine Barrens N. J.].

*Agrostis compressa* Torrey Fl. N. Y. 15. 1819—Torrey Fl. U. S. I. 88. 1824.

*Sporobolus compressus* Willis Cat. N. J. Plants 72. 1878—Britton 288.

*Sporobolus torreyanus* Keller and Brown 43.

Bogs of the Pine Barrens and the Cape May peninsula; frequent.

*Fl.*—Mid-August to late September.

*Pine Barrens.*—Ancora (P), Atsion, Main Road Sta. (T), Parkdale (S), Speedwell (S), Hammonton, Egg Harbor City.

*Cape May.*—Court House (S), Bennett.

**Sporobolus serotinus** (Torr.). Late-flowering Dropseed.

Pl. XIII., Fig. 4.

*Agrostis serotina* Torrey, Fl. U. S. I. 88. 1824 [Pine Barrens of New Jersey].

*Poa uniflora* var. *capillaris* Muhlenberg, Cat. II. 1813.

*Sporobolus scrotinus* Knieskern 37.—Willis 72.—Gray Man. Ed. I. 577. 1848.—Britton 288.—Keller and Brown 43.

Pine Barren bogs common, also locally in swamps in the Middle district.

This and the preceding are exceedingly delicate little grasses characteristic of the Pine Barren bogs, and occurring outside this district only in those so-called Pine Barren islands which are found in the adjacent territory.

*Fl.*—Mid-August to early September.

*Middle District.*—Griffith's Swamp, Lindenwold (S).

*Pine Barrrens.*—Toms River, Forked River, Waretown, Manahawkin, Coxe's, West Creek (S), Pasadena, Speedwell (S), Batsto (S) opp. Crowleystown, Taunton (S), Atco, Cedar Brook, Ancora (P), Hammonton, Eighth St., Landisville, Egg Harbor City (S).

#### CINNA L.

*Cinna arundinacea* L. Wood Reed Grass.

Pl. XII., Fig. 4.

*Cinna arundinacea* Linnæus, Sp. Pl. 5. 1753 [Canada].—Barton Fl. Phila. I. 44. 1818.—Knieskern 37.—Britton 289.

Shady ground; common in the northern counties and less frequent throughout the Middle district. Common also along the coastal strip and on both sides of the Cape May peninsula.

The coast plant always develops a very heavy inflorescence. Plants of the other extreme probably accounted for the "*C. pendula*" credited to South Jersey in Willis' Catalogue, but which has very properly, I think, been omitted from subsequent catalogues, as there are no specimens extant and the plant is a typical mountain species.

*Fl.*—Late July to early September.

*Middle District.*—New Egypt, Delair, Fish House, Hartford, Lawnside (S), Gloucester (P), Mickleton (H), Swedesboro.

*Coast Strip.*—Pt. Pleasant (P), Ocean City (S), Palermo (S), Mays Landing (S), Five-Mile Beach, Piermont (S).

*Cape May.*—Goshen (S), Cape May (OHB).

#### AGROSTIS L.

*Key to the Species.*

- a. Spikelets consisting of two glumes and two flower-scales, the shorter one at least one-third as long as the other.
- b. Panicle large and open.



- c. Larger flower scale with a short awn. *A. alba aristata*, p. 225  
 cc. Larger flower-scale not awned. [*A. alba*]\*  
 bb. Panicle contracted, dense and spike-like, usually about 2 in. long.  
*A. maritima*, p. 225
- aa. One flower-scale wanting, or exceedingly minute.  
 b. Spikelets 1.5-2 mm. long.  
 c. Culms weak and often prostrate, panicle green, branches dividing at or below the middle, spikelets scattered. *A. perennans*, p. 226  
 cc. Culms erect, panicle silvery or purplish, exceedingly capillary and diffuse, branches dividing above the middle, spikelets crowded toward the tips. *A. hyemalis*, p. 226
- bb. Spikelets 2-3 mm. long, culms erect.  
 c. Branches of the panicle dividing above the middle, spikelets crowded at the ends, panicle purplish. *A. elata*, p. 225  
 cc. Branches of the panicle dividing below the middle, panicle greenish or slightly purple. *A. pseudointermedia*, p. 226

***Agrostis alba aristata* Gray. Awned Herd Grass.**

*Agrostis alba aristata* Gray, Man. Ed. I. 578. 1848 [E. North America].—Hitchcock, Bureau Pl. Indst. U. S. Dept. Agr. 68: 27. 1905.

This awned form of *A. alba* was collected by Mr. Charles S. Pollard at Wildwood, N. J., July 4, 1897, and reported by Hitchcock in 1905. It doubtless occurs elsewhere, and is probably native along the coast.

***Agrostis maritima* Lam. Coast Bent Grass.**

*Agrostis maritima* Lamarck, Encycl. I. 61. 1783 [Narbonne, France].

*Agrostis alba maritima* Hitchcock, Bull. Bur. Pl. Ind., U. S. Dept. Agr. 68:27. 1905.

Damp spots along the coast, especially among the sand dunes. Also at one station in the Pines along the Egg Harbor river (coast intrusion?).

*Fl.*—Early June into July.

*Coast Strip.*—Spray Beach (L), Surf City (L), Peahala (L), Palermo, Wildwood, Anglesea, Bennett, Cape May.

*Pine Barrens.*—Folsom.

***Agrostis elata* Pursh. Tall Bent Grass.**

*Agrostis elatum* Pursh, Fl. Am. Sept. I. 61. 1814 [Sandy deep swamps, N. J.].—Willis 72.

*Trichodium elatum* Torrey, Fl. U. S. I. 83. 1824.

*Agrostis altissima* Britton 288.—Keller and Brown 44.

*Agrostis perennans elata* Hitchcock, Bull. Pl. Indust., U. S. Dept. Agr. 68:27. 1905.

\* Red-top, or Herd-grass, abundantly introduced. Pl. XII, Fig. 3.

Swamps of the Pine Barrens frequent. Rare and local in the Cape May peninsula.

*Fl.*—Mid-August into October.

*Pine Barrens.*—Forked River, Pasadena, West Creek (S), Speedwell (S), Atsion, Batsto, Hammonton (C), Atco (C), Landisville, Kenilworth (S), Clementon (S), Egg Harbor City (P).

*Cape May.*—Cold Spring (OHB).

***Agrostis pseudointermedia* Farwell. Upland Bent Grass.**

*Agrostis pseudointermedia* Farwell, Ann. Rep. Com. Parks and Boul'vds, Detroit, Mich. II. 46. 1900 [N.n for *A. intermedia*, Sm. nec. Balb. 1802, Pine Mt., Tenn.]

This is apparently the commoner form throughout the Middle and Cape May districts, the more delicate *A. perennans* being more northern.

*Fl.*—Early August into October.

*Middle District.*—Swedesboro, Millville.

*Coast Strip.*—Pasadena.

*Cape May.*—Greenfield.

***Agrostis perennans* (Walt.). Thin Grass.**

*Cornucopia perennans* Walter, Fl. Car. 74. 1788 [South Carolina].—Britton 288.

Throughout the northern counties in moist ground. Rare in the upper part of the Middle district.

*Fl.*—Early August into October.

*Middle District.*—Prosperstown, Medford (S), Tomlin.

***Agrostis hyemalis* (Walt.). Rough Hair Grass.**

*Cornucopia hyemalis* Walter, Fl. Car. 73. 1788 [South Carolina].

*Agrostis scabra* Knieskern 37.

*Agrostis hyemalis* Britton 288.

Common in dry ground throughout the State.

*Fl.*—Early June into August.

*Middle District.*—Camden, Washington Park, Tomlinson's, Sicklerville, Swedesboro.

*Pine Barrens.*—Toms River (S), Speedwell (S), Bear Swamp (S), Balingler's Mill (S), Berlin (S), Williamstown Inc., Belleplain (S), Millville (S).

*Coast Strip.*—Surf City (L).

*Cape May.*—Whitesboro (S), Cold Spring (S).

**CALAMAGROSTIS Adanson.**

*Key to the Species.*

- a. Panicle contracted and spike-like, green tinged with purple. *C. cinnoides*, p. 227
- aa. Panicle open spreading purplish. . . . . *C. canadensis*, p. 227

**Calamagrostis canadensis (Michx.). Blue Joint Grass.**

- Arundo canadensis* Michaux. Fl. Bor. Am. I. 73. 1803 [Canada].—Knieskern 37, 1857.
- Arundo agrostoides* Pursh, Fl. Am. Sept. I. 86. 1814 [Bogs of New Jersey and Penna.].
- Calamagrostis canadensis* Willis, 73.—Keller and Brown 44.
- Deyeuxia canadensis* Britton 289.

Frequent in swamps of the northern counties, extending south locally through the Middle district to Cape May.

*Fl.*—Early June to early July.

- Middle District.*—Squan (S), Shark River (C), Farmingdale, Hartford, Mickleton (NB), Gibbstown (H), Repaupo (NY), Egg Harbor City (KB).
- Cape May.*—Bennett (S), Cape May (OHB).
- Coast Strip.*—Beach Haven (L) (introduced?)

**Calamagrostis cinnoides (Muhl.). Nuttall's Reed Grass.**

Pl. X., Fig. 1.

- Arundo cinnoides* Muhlenberg Gram. 187. 1817 [Pennsylvania and Massachusetts].—Barton Fl. Phila. I. 70.
- Calamagrostis Nuttalliana* Willis 13.
- Arundo coarctata* Torrey, Fl. U. S. I. 94. 1824.
- Deyeuxia Nuttalliana* Britton, 289.
- Calamagrostis cinnoides* Keller and Brown 44.
- Calamagrostis coarctata* Knieskern 37.

Occasional in the northern counties, and frequent in swamps of the Middle district and plentiful in the Pine Barrens and Cape May peninsula. Rare on the coast.

*Fl.*—Late July to mid-September.

*Middle District.*—Shark River (NB), New Egypt, Griffith's Swamp, Camden (P), Mickleton, Dividing Creek.

*Pine Barrens.*—Forked River, Waretown, West Creek (S), Manahawkin, Coxe's, Speedwell (S), Taunton (S), Landisville, Hammonton, Atsion (S), Quaker Bridge (P), Egg Harbor City, Woodbine, Petersburg (S), Ocean City Jnc.

*Coast Strip.*—Surf City (L).

*Cape May.*—Court House (S), Bennett, Cape May (OHB).

## AMMOPHILA Host.

*Ammophila arenaria* (L.). Sea Sand Reed.

Pl. V., Fig. 2.

*Arundo arenaria* Linnæus, Sp. Pl. 82. 1753 [Europe].—Muhlenberg Gram. 181. 1817.*Phalaris maritima* Nuttall, Gen. I. 48. 1818.*Calamagrostis arenaria* Knieskern, 38.—Willis 73.*Ammophila arenaria* Britton, 289.—Keller and Brown 43.

Abundant on the sand dunes of the entire coast. The Beach Grass is one of the most characteristic plants of the coastal islands. Its pale glaucous green leaves and whitish spike give to these bare mounds their first verdure, while the long roots, which ramify in all directions, play an important part in binding the sand together and holding it against the wind which is always drifting it this way and that. The stiff stalks and leaves adapted as they are for this constant battle with the elements, persist through the winter, dried and bleached to a pale buff, and bend and flutter in the fierce storms as gaily as in the milder blasts of summer, ever holding the beach line against the encroachment of wind and wave.

*Fl.*—Mid-August to mid-September, the dried panicles persisting into winter.

*Maritime.*—Sandy Hook, Deal, Pt. Pleasant, Waretown, Seaside Park (Ha), Barnegat Pier, Spray Beach (L), Atlantic City, Longport (S), Ocean City (S), Sea Isle City (S), Stone Harbor (S), Wildwood, Cape May.

## CALAMOVILFA Hackel.

*Calamovilfa brevipilis* (Torr.). Pine Barren Reed Grass.

Pl. XIII., Fig. 1.

*Arundo brevipilis* Torrey, Fl. U. S. I. 95 [Quaker Bridge, N. J.].*Calamagrostis brevipilis* Knieskern, 38.—Willis 73.*Ammophila brevipilis* Britton, 290.*Calamovilfa brevipilis* Keller and Brown 45.

Common in Pine Barren bogs; does not range north of this district.

This is one of the characteristic grasses of the Pine Barrens. In general appearance it strikingly recalls *Tridens flavus*.

*Fl.*—Early July to late August, or rarely a little later.

*Pine Barrens*.—Toms River, Prospertown, Forked River (S), Atco (P), Speedwell (S), Chatsworth, Buena Vista, Parkdale (S), Hammonton, Quaker Bridge, Egg Harbor City.

One specimen in the Academy herbarium is marked "Atlantic City, C. A. Boice." It seems probable, however, that it came from the mainland west of Atlantic City, and not from the island beach, as we have no definite evidence of its occurrence on the coast, and it would seem very unlikely.

### DESCHAMPSIA Beauvois.

#### *Deschampsia flexuosa* (L.). Wavy Hair Grass.\*

Pl. VII., Fig. 1.

*Aira flexuosa* Linnæus, Sp. Pl. 65. 1753 [Europe].—Barton Fl. Phil. I. 57. 1818.—Knieskern 39.—Britton 290.

Frequent in dry ground in the northern, Middle and Cape May districts, but apparently rare and recently introduced in the Pine Barrens.

*Fl.*—Late May to late June.

*Middle District*.—Red Bank, Farmingdale, New Egypt, Crosswicks, Kin-kora, Mt. Holly, Arneys Mt. (S), Fish House (S), Medford (S), Westville, National Park, Washington Park, Woodbury, Mickleton (NB), Swedesboro, Centerton (S), Millville.

*Pine Barrens*.—Forked River, New Germany, Folsom.

*Cape May*.—Anglesea Juc. (OHB), Bennett (S), Cape May, Cape May Pt. (S).

### SPHENOPHOLIS.

#### *Key to the Species.*

- a. Spikelets with a conspicuous bent awn. *S. palustris*, p. 230
- aa. Spikelets not awned.
  - b. Culm erect, densely flowered and spike-like.
    - c. Sheaths and leaves glabrous. *S. obtusata*, p. 230
    - cc. Sheaths and sometimes leaves pubescent. *S. o. pubescens*, p. 230
  - bb. Culm slender, inflorescence lax, loosely flowered.
    - c. Glumes nearly the same length, one narrow, one broad. *S. nitida*, p. 230
    - cc. Narrow glume much shorter than the obovate one. *S. pallens*, p. 230

\* *Deschampsia cespitosa* Linnæus.

(*Aira cespitosa* Linnæus, Sp. Pl. 64. 1753 [Europe]).

The only evidence of the occurrence of this grass within our limits is Dr. Knieskern's statement that it occurs in "damp places" in Ocean and Monmouth Counties "rare." I have seen no specimens. To the north it has been found along the Delaware above the Water Gap.

**Sphenopholis obtusata** (Michx.). **Blunt-scaled Eatonia.**

*Aira obtusata* Michaux, Fl. Bor. Am. I. 62. 1803 [Carolina and Florida].

*Eatonia obtusata* Britton 293.—Keller and Brown 50.

Several stations in the northern counties and southward along the Coastal strip to Cape May.

*Fl.*—Early June into July.

*Middle District.*—Farmingdale.

*Coast Strip.*—Beach Haven (L), Spray Beach (L), Stone Harbor, Cape May (OHB).

**Sphenopholis obtusata pubescens** Scribner and Merrill.

*Sphenopholis obtusata pubescens* Scribner and Merrill, Circ. U. S. Dept. Agr. 27, p. 6. 1900 [Stackville, Miss.].

Along the Coast strip apparently as frequent as the last.

*Fl.*—Early June into July.

*Coast Strip.*—Surf City (L), Spray Beach (L), Sherburn's (L).

**Sphenopholis nitida** Spreng. **Slender Eatonia.**

*Aira nitida* Sprengel, Fl. Hal. Mant. I. 32. 1807 [Pennsylvania].

*Eatonia Dudleyi* Britton 293.

*Eatonia nitida* Keller and Brown 50.

One record for Hunterdon County, locally in the Middle district. Sandy ground.

*Fl.*—Early May to mid-June.

*Middle District.*—Mickleton, Swedesboro, Tomlin, Riddleton, Auburn.

**Sphenopholis pallens** (Spreng.). **Pale Eatonia.**

Pl. XIV., Fig. 5.

*Aira pallens* Sprengel, Fl. Hal. Mant. I., p. 33. 1807 [Pennsylvania].

*Eatonia Pennsylvaniae* Britton 293.

Shady ground; common in the northern counties, ranging southward in the Middle district.

*Fl.*—Late May to early July.

*Middle District.*—Farmingdale, New Egypt, Delair, Camden (Bassett), Medford (S), Washington Park, Sewell (S), Mickleton (NY) Swedesboro, Millville (S), Buckshutem.

**Sphenopholis palustris** (Michx.). **Marsh Eatonia.**

*Avena palustris* Michaux, Fl. Bor. Am. I. 72. 1803 [Georgia and Carolina].

—Barton Fl. Phila. I. 69. 1818.

*Trisetum pennsylvanicum* Britton 290.—Keller and Brown 45.

Moist open ground in the northern counties, southward locally in the Middle and Cape May districts.

Mr. Long refers the Farmingdale specimen to var. *flexuosa* Scribn.

*Fl.*—Late May to late June.

*Middle District.*—Farmingdale, Clementon, Medford (S), Lindenwold (S), Mickleton, Pitman, Swedesboro.

*Cape May.*—Cold Spring.

**DANTHONIA De Candolle.**

*Key to the Species.*

- a. Awned flower scale, notched at the end with triangular pointed tips. *D. spicata*, p. 231
- aa. Awned flower scale with tips prolonged into slender bristles.
  - b. Awned scale, silky hairy. *D. sericea*, p. 231
  - bb. Awned scale, glabrous. *D. epilis*, p. 232

**Danthonia spicata (L.)\* Wild Oat Grass.**

Pl. VIII., Fig. 5.

*Avena spicata* Linnæus, Sp. Pl. 80. 1753 [Pennsylvania].

*Danthonia spicata* Knieskern 39.—Britton 291.

Dry sandy ground; common except in the Pine Barrens.

*Fl.*—Late May to late June.

*Middle District.*—Farmingdale (S), New Egypt, Asbury, Medford (S), Albion, Glassboro (S), Swedesboro, Riddleton, Husted (S), Centerton (S).

*Pine Barrens.*—Winslow, Speedwell (S).

*Coast Strip.*—West Creek (S), Peermont (S).

*Cape May.*—Cape May (OHB).

**Danthonia sericea Nutt. Silky Wild Oat Grass.**

*Danthonia sericea* Nuttall, Gen. I. 71. 1818 [Carolina to Florida].—Barton, Fl. Phila. I. 65. 1818.—Willis 75.—Gray Manual Ed. V. 640. 1867.—Britton 291.

*Danthonia glumosa* Knieskern 39.

Frequent in the Pine Barrens in dry sandy soil, and locally in the lower part of the Middle district.

*Fl.*—Late May to late June.

*Middle District.*—Spring Garden (NB), Lindenwold, Gibbsboro, Tomlinsons, Williamstown (KB), Sicklerville (S).

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\* Specimens from within our limits referred to *D. compressa* and all referable to *D. spicata*, so far as I have been able to examine them.

*Pine Barrens*.—Manchester (C), Browns Mills, Speedwell (S), Albion, Cedar Brook, Waterford (P), White Horse (P), Landisville, Winslow Jnc., Hammonton, Atsion (P), Quaker Bridge, Batsto, Folsom, Egg Harbor City (P), Mays Landing, Dennisville (P).

*Coast Strip*.—Ocean Beach (C).

**Danthonia epilis** Scribn. **Smooth Wild Oat Grass.**

*Danthonia epilis* Scribner, U. S. Div. Agrost. Circ. 30, p. 7 [n. n. for *D. glabra* Nash nec Philippi—Little Stone Mt., Ga.].

Restricted to the Pine Barren region, which marks the northern limit of the species.

Abundant on natural bogs, growing in the wet sphagnum entirely different in habitat from the preceding, and very distinct.

*Fl.*—Probably late May to late June.

*Pine Barrens*.—Forked River, Three mi. S. E. of Chatsworth, Three mi. N. of Atsion.

**SPARTINA** Schreber.

*Key to the Species.*

- a. Glumes unequal, shorter one equal to flower scales. *S. michauxiana*, p. 232
- aa. Glumes unequal, shorter one-half as long as flower scales.
  - b. Both glumes scabrous on the keel.
    - c. Leaves 12 mm. wide or more. *S. cynosuroides*, p. 233
    - cc. Leaves not over 6 mm. wide. *S. patens*, p. 233
  - bb. Shorter glume glabrous.
    - c. Spikelets overlapping. *S. glabra pilosa*, p. 234
    - cc. Spikelets more remote, barely overlapping. *S. g. alternifolia*, p. 234

**Spartina michauxiana** Hitchc. **Tall Marsh Grass.**

*Spartina michauxiana* Hitchcock, Contr. Nat. Herb. XII. 3. 153 [new name for *Trachynotia cynosuroides* Michx. nec *Dactylis cynosuroides* L. [Illinois].

*Spartina cynosuroides* Britton 283.—Keller and Brown 47.

Larger rivers along the coast, extending inland to Hammonton. Casual also in Bergen and Hunterdon Counties.

*Fl.*—Mid-July into September. Panicles persist through autumn.

*Coast Strip*.—Pt. Pleasant (S), Seaside Park (S), Toms River (S), Barnegat Pier, Forked River, Manahawkin, Barnegat, Tucker's (L), West Creek, Absecon, Longport (Ha), Ocean City (S), N. of Weekstown, Hammonton, Town Bank (OHB).



**Spartina cynosuroides (L.). Salt Reed Grass.**

Pl. XV., Fig. 1.

*Dactylus cynosuroides* Linnæus, Sp. Pl. 71. 1753 [Virginia, Canada and Louisiana].*Spartina polystachya* Knieskern 38.—Willis 73.—Britton 283.—Keller and Brown 47.

Common on the edges of salt marshes and along brackish creeks; not extending inland, as does the preceding.

*Fl.*—Early August into September. Panicles persist through autumn.

*Maritime.*—Forked River, Seaside Park, Manahawkin, Surf City (L), Barnegat City (L), Barnegat City Inc. (L), Absecon, Atlantic City, Palermo, Cedar Bonnet (L), Dennisville, Cape May (OHB), Sluice Creek, Upper English Creek (T), Salem.

**Spartina patens Ait. Salt Meadow Grass.**

Plate XV., Fig. 5.

*Dactylis patens* Aiton, Hort. Kew. I. 104. 1789 [North America].*Spartina juncea* Muhlenberg Cat. 8. 1813.—Muhlenberg Gram. 54. 1817.—Knieskern 38.—Willis 73.—Britton 283.*Spartina patens* Keller and Brown 47.

Abundant all over the salt meadows.

This grass, along with *Distichlis spicata* and *Juncus gerardi* forms the bulk of the low even vegetation that covers the firmer parts of the salt meadows, the mass of tangled roots of the three species being mainly responsible for holding together the black mud and sand which form the meadows.

*Dondia*, *Salicornia*, and other salt marsh plants occur in more sandy spots, and along the creeks is a taller growth of *Spartina glabra*, but the green carpet which covers miles upon miles of our coastal marshes consists mainly of the three species above mentioned, and the "salt hay" that the farmers along the shore are in the habit of gathering is composed of the same plants.

Hay-making in the autumn is a common sight on the "meadows," and once or twice I have seen the crop being hauled in in mid-winter.

The more robust form regarded as a species, *S. juncea* by Merrill (Bull. Pl. Indust. U. S. Dept. Agr. IX 12, 1902), originally described as *Trachynotia juncea* by Michaux (Fl.

Bor. Am. I 64, 1803—Carolina and Georgia) apparently occurs in sandy localities near the marshes, but I cannot satisfactorily separate it from the typical form.

*Fl.*—Early July to late September.

*Maritime.*—Sandy Hook, Deal, Pt. Pleasant, Barnegat Pier, Surf City (L), Barnegat City (L), Beach Haven (L), St. Albans (L) Harvey Cedars (L), Spray Beach (L), Atlantic City, Ocean City, Palermo (S), Estelville, Stone Harbor, Anglesea, Cape May, Salem, Beaver Dam, Dias Creek (S), Cold Spring (S).

***Spartina glabra pilosa* Merrill. Smooth Marsh Grass.**

*Spartina glabra pilosa* Merrill, Bull. Pl. Indust. U. S. Dept. Agr. IX., p. 9. 1902 [Atlantic City, N. J.]

*Spartina glabra* Knieskern 38.

*Spartina stricta* var. *glabra* Britton 283.

*Spartina stricta* Keller and Brown 47.

Common along creeks and ditches on the salt marshes of the coast and Delaware Bay.

*Fl.*—Late July to mid-September.

*Maritime.*—Deal Beach, Pt. Pleasant, Forked River, Beach Haven (L), St. Albans (L), Half Way House south of Bond's (L), Marsh Elder Isl. (L), Anchoring Isl. (L), Ocean City (S), Palermo, Stone Harbor (S), Wildwood, Holly Beach (T), Cold Spring (S), Dennis (S), Salem (P).

***Spartina glabra alterniflora* (Lois.).**

*Spartina alterniflora* Lois, Fl. Gall. II. 719. [Circa Baionam at Ripas Aturi].

*Spartina stricta* var. *maritima* Britton 283.

*Spartina stricta alterniflora* Keller and Brown 47.

*Spartina glabra alterniflora* Merrill, Bull. Pl. Indust. U. S. Dept. Agri. IX., p. 12, 1902.

Similar situations to those occupied by the last, but less abundant.

*Maritime.*—Seaside Park, Atlantic City, Cape May (S), Salem (S).

**GYMNOPOGON Beauvois.**

*Key to the Species.*

- |  |                                |
|--|--------------------------------|
| a. Spikes bearing spikelets for their whole length.  | <i>G. ambiguus</i> , p. 234    |
| aa. Spikes bearing spikelets only beyond the middle. | <i>G. brevifolius</i> , p. 235 |

***Gymnopogon ambiguus* (Michx.). Broad-leaved *Gymnopogon*.**

Pl. IX., Fig. 6.

*Andropogon ambiguus* Michaux, Fl. Bor. Am. I. 58. 1803 [Carolina].—Muhlenberg, Cat. 94. 1813.—Muhlenberg Gram. 285. 1817.

*Anthropogon Lepturoides* Barton, Fl. Phila. I. 71. 1818.

*Gymnopogon racemosus* Willis 73.—Torrey Flora U. S. I. 99. 1824.

*Gymnopogon ambiguus* Britton 292.—Keller and Brown 47.

Locally through the lower part of the Middle district and in the Cape May peninsula, in dry ground. Also at one or two points in the Pine Barrens, where it has probably entered along the rail-roads. New Egypt seems to be the northern limit of its range, as it is not known north of our region.

*Fl.*—Early August to mid-September.

*Middle District.*—New Egypt, Griffith's (P), Springdale (S), Lindenwold (S), Clarksboro (NB), Mickleton, Tomlin (S), Clementon, Berlin (S), Albion, Swedesboro.

*Pine Barrens.*—Hammonton.

*Cape May.*—Court House (S), Anglesea Jnc., Whitesboro (S).

***Gymnopogon brevifolius* Trin. Short-leaved *Gymnopogon*.**

*Gymnopogon brevifolius* Trinius, Unifl. 238. 1824 [Delaware].—Britton Manual 122. 1901.—Stone Torrey 1907, 39.—Keller and Brown 47.

Dry ground in the Middle and Cape May districts. Rare. Known from only two localities. Originally discovered in the State by Mr. Chas. D. Lippincott, near Swedesboro.

Trinius quotes this species as "*Anthropogon brevifolius* Nuttall," and probably the name should be so credited. So far as I am aware, Nuttall never published it, but very likely sent out specimens with this name in manuscript.

*Fl.*—Late August to mid-October.

*Middle District.*—Two and a half miles north of Swedesboro.

*Cape May.*—Cold Spring, Bennett.

**PHRAGMITES Trinius.**

***Phragmites phragmites* (L.). Reed.**

Pl. XI., Fig. 2.

*Arundo phragmites* Linnæus, Sp. Pl. 81. 1753 [Europe].

*Phragmites communis* Knieskern 39.—Willis 75.

*Phragmites vulgaris* Britton 293.

*Phragmites phragmites* Keller and Brown 48.

Open swamps usually growing in water, locally throughout the State except in the Pine Barrens.

The Reed is most plentiful in our region along the coast in swamps lying back of the salt marshes. It often covers large areas, looking at a distance like growing corn.

*Fl.*—Mid-August into September.

*Middle District.*—Kaighns Pt., Beaver Dam, Pen Bryn (S) [Introduced?].

*Coast Strip.*—Sandy Hook, Avon, Pt. Pleasant, Bay Head (N. Y.), Seaside Park, Barnegat City (L), N. Beach Haven (L), Peahala (L), Sea Isle City (H), Holly Beach (UP), Court House, Cold Spring (OHB), Cape May (S), South Dennis (S), Sluice Creek (S).

#### TRIDENS Roemer and Schultz.

##### *Tridens flavus* (L.). Tall Red-top.

Pl. XIII., Fig. 3.

*Poa flava* Linnæus, Sp. Pl. 68. 1753 [Virginia].

*Tricuspis seslerioides* Knieskern 38.—Torrey, Fl. U. S. I. 118. 1824.

*Triodia seslerioides* Britton 292.

Plentiful in dry soil in the Northern, Middle and Cape May districts and all along the coastal strip, but not found in the Pine Barrens, except where it follows up the tide water creeks.

*Fl.*—Early August to early September.

*Middle District.*—New Egypt, Medford (S), Oaklyn (S), Albion, W. Deptford, Swedesboro, Beaver Dam.

*Coast Strip.*—Forked River, Beach Haven (L), Pleasant Mills, Atlantic City, Sea Isle City (S), Five-Mile Beach.

*Cape May.*—Three miles west of Court House (S), S. Dennis (S), Cape May (OHB).

#### TRIPLASIS Beauvois.

##### *Triplasis purpurea* (Walt.). Sand Grass.

Pl. VIII., Fig. 3.

*Aira purpurea* Walter, Fl. Car. 78. 1788 [South Carolina].

*Tricuspis purpurea* Knieskern 38.—Willis 73.

*Triplasis purpurea* Britton 292.—Keller and Brown 48.

Sandy ground or pure sand common along the coast strip and in the lower part of the Middle district, and less abundant in the Pine Barrens.

*Fl.*—Early August to late September.

*Middle District.*—Griffith's Swamp, Kaighns Pt., Washington Park (S), Lindenwold (S), Lawnside (S), Westville, Woodbury, Mantua.

*Pine Barrens.*—Browns Mills, Clementon, Albion, Atsion (S), Pleasant Mills (S).

*Coast Strip.*—Manahawkin, Barnegat City (L), St. Albans (L), Sherburn's (L), Atlantic City, Ocean City (S), Piermont, Cape May (OHB).

**DIPLACHNE Beauvois.****Diplachne fascicularis (Lam.). Salt Meadow Diplachne.***Poa fasciculata* Torrey, Fl. U. S. I. 107 [N. Y. City] 1824.*Leptochloa fascicularis* Willis 73.*Diplachne fascicularis* Britton 292.—Kellar and Brown 48.

Edges of the salt meadows along the coast. Not abundant.

*Fl.*—Mid-August to mid-October.*Maritime.*—Barnegat City (L), Beach Haven Terrace (L), Atlantic City (P), Sea Isle City, Wildwood, Cape May.**ERAGROSTIS Beauvois.***Key to the Species.*

- a. Culms creeping. *E. hypnoides*, p. 238
- aa. Culms not creeping.
  - b. Much branched and decumbent at base, spikelets dull purplish or lead colored.
    - c. Spikelets 2-5 flowered, not over 3 mm. long. *E. capillaris*, p. 237
    - cc. Spikelets 5 to many flowered, 3-15 mm. long.
      - d. Spikelets 1.5 mm. wide. *E. pilosa*, p. 237
      - dd. Spikelets 2 mm. [*E. major*]\*
  - bb. Simple and erect, rigid spikelets, bright redish purple.
    - c. Sheaths sparingly pilose. *E. pectinacca*, p. 238
    - cc. Sheaths glabrous. *E. p. spectabilis*, p. 238

**Eragrostis capillaris (L.). Hair-like Eragrostis.***Poa capillaris* Linnæus, Sp. Pl. 68. 1753 [Virginia and Canada].*Poa hirsuta* Pursh, Fl. Am. Sept. I. 80. 1814.*Eragrostis capillaris* Knieskern 38.—Britton 294.—Keller and Brown 49.

Dry ground, local; known from four localities in the northern counties and three in the Middle district.

*Fl.*—Mid-August to early October.*Middle District.*—Camden, Birmingham, Swedesboro.**Eragrostis pilosa (L.). Tufted Eragrostis.**

Pl. XIII., Fig. 2.

*Poa pilosa* Linnæus, Sp. Pl. 68. 1753 [Italy].*Poa tenella* Pursh, Fl. Am. Sept. I. 80. 1814.*Eragrostis pilosa* Knieskern, 38.—Britton 293.—Keller and Brown, 49.*Eragrostis Purshii* Britton 294.—Keller and Brown 49.

\* Strong-scented Eragrostis, a weed in waste ground.

Common throughout the Middle and coast districts, and occasional in the northern counties and Pine Barrens. In part, at least, introduced.

*Fl.*—Late June to late September.

*Middle District.*—New Egypt, Delaire (S), Kaighns Pt., Mullica Hill (NB), Swedesboro.

*Pine Barrens.*—Lakehurst.

*Coast Strip.*—Pt. Pleasant, Surf City (L), Barnegat City (L), Beach Haven (L), Wildwood (KB), Dias Creek (S).

***Eragrostis pectinacea* (Michx.). Purple Eragrostis.**

Pl. IX., Fig. 5.

*Poa pectinacea* Michaux, Fl. Bor. Am. I. 69. 1803 [Illinois].—Pursh. Fl. Am. Sept. I. 81. 1814.

*Eragrostis pectinacea* Britton 294.

Dry ground throughout the State, except the Pine Barrens, where it occurs only along railroads. This is one of those grasses that seems to thrive in cultivated ground and tends to become a weed.

*Fl.*—Late July to mid-September.

*Middle District.*—New Egypt, Birmingham, Kaighns Pt., Albion, Mickleton, Swedesboro, Dividing Creek.

*Pine Barrens.*—Bamber, Landisville.

*Coast Strip.*—Seaside Park, Manahawkin, Atlantic City (S), Ocean City (S), Sea Isle City (S), Cape May (OHB).

***Eragrostis pectinacea spectabilis* Gray. Coast Eragrostis.**

*Eragrostis spectabilis* Gray Man. Ed. I. 598. 1848 [Mass. to Penna. near the coast].

Along the sand dunes of the coast, frequent.

*Fl.*—Early August to late September.

*Maritime.*—Waretown, Surf City (L), N. Beach Haven (L), Sherburn's (L), Atlantic City (S), Ocean City (S), Sea Isle City (S).

***Eragrostis hypnoides* (Lam.). Creeping Eragrostis.**

*Poa hypnoides* Lamarck, Tabl. Encycl. I. 185. 1791 [South America].—

*Eragrostis hypnoides* Britton 293.—Keller and Brown 49.

Found only along the shores of the Delaware or its vicinity from Warren to Salem Counties: local.

*Fl.*—Late July into October.

*Middle District*.—Kaighns Pt. (KB), Petty's Isl. (P), Swedesboro, Middleton.

UNIOLA L.

*Uniola laxa* (L.). Slender Spike Grass.

Pl. XIV., Fig. 6.

*Holcus laxus* Linnæus, Sp. Pl. 1048. 1753 [Virginia and Canada].  
*Uniola gracilis* Muhlenberg, Gram. 157. 1817.—Barton Fl. Phila. II. 220.  
 1818.—Torrey Fl. N. Y. 19. 1819—Knieskern 39.—Willis 75.  
*Uniola laxa* Britton 294.—Keller and Brown 50.

Common throughout the Middle and Cape May districts and on the Coastal strip, also at South Amboy to the northward. Absent from the Pine Barrens.

*Fl.*—Early August to early September.

*Middle District*.—Keyport (NB), New Egypt, Westmont (S), Griffith's Swamp, Medford (S), Washington Park (S), Lawnside (S), Lindenwold, Mickleton (NB), Tomlin, Clementon (S), Swedesboro, Salem (S), Dividing Creek.

*Coast Strip*.—Long Branch, Pt. Pleasant (S), Bay Head (NY), Manahawkin, Coxe's, Beesley's Pt. (S), Five-Mile Beach, Sea Isle Inc. (S).

*Cape May*.—Court House, Bennett (S).

DISTICHLIS Rafinesque.

*Distichlis spicata* (L.). Marsh Spike Grass.

Pl. VIII., Fig. 2.

*Uniola spicata* Linnæus, Sp. Pl. 71. 1753 [North America].  
*Brizopyrum spicatum* Knieskern 38.—Willis 74.  
*Distichlis spicata* Britton 284.—Keller and Brown 50.

Salt meadows along the coast; common.

*Fl.*—Mid-August into September.

*Maritime*.—Sandy Hook (NB), Deal Beach, Pt. Pleasant, Waretown, Barnegat City (L), Beach Haven Terrace (L), Barnegat City Inc. (L), Beach Haven (L), Cedar Bonnet (L), Atlantic City, Ocean City (S), Sea Isle City, Wildwood, Piermont, Cape May (S), Dennisville (S).

POA L.

*Key to the Species.*

a. Culms tufted.

b. Low, not more than 2 dm. high.

[*P. annua*]\*

bb. Taller, 3-9 dm. high.

\*Low Spear Grass. Common in lawns and waste ground.

- c. Basal leaves nearly equalling panicle, upper stem leaves very short, spikelets 5-7 mm. long. *P. brachyphylla*, p. 240
- cc. Basal leaves much shorter than panicle.
- d. Spikelets 3 mm. long, culm scabrous below panicle. [*P. trivialis*]†
- dd. Spikelets 4-5 mm. long, culm smooth. [*P. pratensis*]‡
- aa. Culms not tufted, bluish green, panicle contracted. [*P. compressa*]§

***Poa brachyphylla* Schultes. Short-leaved Spear Grass.**

*Poa brachyphylla* Schultes, Mant. II: 304. 1824. n. n. for *P. brevifolia* Muhl. nec Gaud. [Pennsylvania].

This species was only known from Warren and Hunterdon Counties until discovered by Mr. O. H. Brown at Cape May, though I am inclined to think that the *P. alsodes* of Dr. Knieskern's catalogue, which he says occurs on the "borders of woods, not common," belongs here. It was later found in west Jersey by Mr. Long.

*Fl.*—Mid-April to early May.

*Middle District.*—Bordentown.

*Cape May.*—Cape May.

**PANICULARIA Fabricius.**

*Key to the Species.*

- a. Spikelets not over 7 mm. long.
- b. Panicle dense, club-shaped, spike-like, 75-100 mm. long. *P. obtusa*, p. 241
- bb. Panicle open, spreading.
- c. Spikelets 3-4 mm. wide, becoming whitish or straw color.
- d. Spikelets larger, 5-10 flowered. *P. canadensis*, p. 241
- dd. Spikelets smaller, 3-5 flowered. *P. laxa*, p. 241
- cc. Spikelets less than 2.5 mm. wide.
- d. 3-4 mm. long, purplish, branches of panicle drooping. *P. nervata*, p. 241
- dd. 4-6 mm. long, green, branches of panicle erect. *P. grandis*, p. 243
- ddd. 6-7 mm. long, pale green or whitish. *P. pallida*, p. 242
- aa. Spikelets 12 mm. long or more.
- b. Flowers obtuse. *P. septentrionalis*, p. 242
- bb. Flowers acute. *P. acutiflora*, p. 242

† Rough Meadow Grass. Introduced in meadows and waste ground.

‡ Blue Grass. Cultivated for hay and abundantly naturalized. Pl. VII., Fig. 2.

§ Wire Grass. Common in waste ground, fields, etc.



**Panicularia canadensis (Michx.)\* Rattlesnake Grass.**

Pl. XV., Fig. 3.

*Briza Canadensis* Michaux, Fl. Bor. Am. I. 71. 1803 [Canada].—Barton, Fl. Phila., I. 63. 1818.

*Glyceria canadensis* Knieskern 38.—Britton 295.

Swamps of the Northern and Middle districts, common; rarely in the Pine Barrens.

*Fl.*—Mid-June to mid-July.

*Middle District.*—Farmingdale, New Egypt, Riverside, Pemberton (C), Birmingham, Fish House, Haddonfield (S), Griffith's Swamp, Gibbstown (NB), Elm (C), Kirkwood (C), Mickleton, Clementon (S), Albion, Sickler-ville (S), Gloucester, Salem (C), Beaver Dam.

*Pine Barrens.*—Bamber, Landisville, Vineland.

**Panicularia obtusa (Muhl.) Blunt Manna Grass.**

Pl. XV., Fig. 4.

*Poa obtusa* Muhlenberg, Gram. 147. 1817 [Pennsylvania, New Jersey and New England].—Barton, Fl. Phila., I. 62. 1818.—Torrey, Fl. U. S. I. 112. 1824.

*Glyceria obtusa* Knieskern 38.—Britton 295.

*Panicularia obtusa* Keller and Brown 52.

Swamps and bogs throughout our region and locally in Hudson and Middlesex Counties to the north.

*Fl.*—Early July to late August and sporadically into October.

*Middle District.*—Farmingdale (S), Hartford, Birmingham, Delaire, Fish House, Griffith's Swp., Westmont (S), Lindenwold (S), Repaupo, Tomlin (S), Mickleton (NY), Paulsboro, Sicklerville (S), Swedesboro.

*Pine Barrens.*—Allaire, Lakehurst, Toms River (S), Bear Swamp (S), Hammonton, Parkdale (S), Egg Harbor City, Eighth St. (T).

*Cape May.*—Green Creek, Cold Spring (OHB).

**Panicularia nervata (Willd.) Nerved Manna Grass.**

*Poa nervata* Willdenow, Sp. Pl. I. 389. 1798 [North America].—Barton, Fl. Phila., I. 61. 1818.

*Glyceria nervata* Knieskern 38.—Britton 296.

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\* *Panicularia laxa* Scribner (Bull. Torr. Club XXI., 37. 1894.—Mt. Desert, Me.), is reported from Mickleton and Swedesboro. Specimens in the Academy herbarium show smaller spikelets, but I cannot find in this character or in those advanced by Prof. Fernald (*Rhodora* 1910, p. 135) sufficient constancy to make the recognition of this form desirable so far as local material is concerned. At most it can only be regarded as a sub-species. It was collected by Mr. Heritage at Mickleton before it was described by Scribner.

Swamps; common in the Northern and Middle districts; very rare in the Pine Barrens and occasional in the Cape May peninsula.

*Fl.*—Mid-May to mid-June.

*Middle District.*—Farmingdale, New Egypt, Delanco, Browns Mills, Medford (S), Washington Park, Mickleton, Sewell (S), Albion, Pitman, Glassboro (S), Swedesboro, Yorktown.

*Pine Barrens.*—Speedwell.

*Cape May.*—Cold Spring.

***Panicularia pallida* (Torr.). Pale Manna Grass.**

*Windsoria pallida* Torrey, Cat. N. Y. Plants 91. 1819 [swamp behind Elgin Garden, N. Y., and Pine Barrens of N. J.].

*Glyceria pallida* Knieskern 38.—Britton 296.

*Poa dentata* Torrey, Fl. U. S. I. 107. 1824.

Frequent in shady swamps or streams of the northern Middle and Cape May districts, often growing in the water. Rare in the Pine Barrens.

*Fl.*—Mid-May to mid-June, and sporadically during July and August.

*Middle District.*—Delanco, Kaighns Pt., Repaupo, Mickleton, Sicklerville, Glassboro (S), Riddleton, Centerton (S).

*Pine Barrens.*—Winslow Inc., Landisville, Richland, Woodbine (S).

*Cape May.*—Bennett, Nummeytown (S), Cold Spring (OHB).

***Panicularia septentrionalis* (Hitche.). Floating Manna Grass.**

Pl. IX., Fig. 4.

*Glyceria septentrionalis* Hitchcock, Rhodora 1906. 211 [Guttenburg, N. J.].

*Festuca fluitans* Barton, Fl. Phila. I. 66. 1818.

*Glyceria fluitans* Knieskern 38.—Britton 296.

Swamps, usually growing in water. Frequent, except in the Pine Barrens.

*Fl.*—Late May to early July, and sporadically through the summer.

*Middle District.*—Riddleton.

*Coast Strip.*—Stone Harbor, Anglesea.

*Cape May.*—Cape May (OHB).

***Panicularia acutiflora* (Torr.). Sharp-scaled Manna Grass.**

*Glyceria acutiflora* Torrey, Fl. U. S. I. 104 [New York, New Jersey and Massachusetts].—Willis 74.—

*Glyceria brevifolia* Britton 296.

*Panicularia acutiflora* Keller and Brown 53.

Locally in swamps of the Northern and Middle districts and coast strip.

*Fl.*—Early June to mid-July, sporadically into August.

*Middle District.*—Cooper's Pt., Merchantville (P), Gloucester (P), Mickleton (NB).

*Pine Barrens.*—Waterford (P).

*Coast Strip.*—Manahawkin.

**Panicularia grandis (Wats.). Reed Meadow Grass.**

*Glyceria grandis* Watson, Gray's Man. Ed. 6. 667. 1890 [New England to Minnesota, etc.].

*Glyceria arundinacea* Britton 296.

A northern species probably now extinct within our limits, but represented in the State herbarium at New Brunswick by one specimen collected many years ago at Cooper's Bridge, by Mr. E. Diffenbaugh.

*Middle District.*—Cooper's Bridge (NB). Coll. by E. Diffenbaugh, 1863.

**PUCCINELLIA Parlatore.**

***Puccinellia fasciculata* (Torr.). Spreading Meadow Grass.**

*Poa fasciculata* Torrey, Fl. U. S. I. 107. 1824 [Salt marshes about N. Y. City].

*Glyceria distans* Britton 296.

*Puccinellia distans* Keller and Brown 53.

Borders of salt marshes on the coast.

*Fl.*—Late May into September.

*Maritime.*—Surf City (L), Barnegat City (L), Spray Beach (L), Absecon (NB), Cape May, Fortesque Beach (NB).

**FESTUCA L.**

*Key to the Species.*

a. Short, erect grasses, 1-6 dm. high, with involute wiry leaves, and greenish or reddish, usually contracted panicles.

b. Flower scales with an awn of equal length. *F. octoflora*, p. 244

bb. Flower scales, awnless or awn much shorter than the scale.

c. Plant over 3 dm. in height, panicle reddish. *F. rubra*, p. 244

cc. Plant less than 3 dm. in height, panicle green. [*F. ovina*]<sup>1</sup>

aa. Taller plants 6-15 dm. high, with flat, green leaves.

b. Branches of panicle short and erect, spikelets 5-10 flowered.

[*F. elatior*]<sup>2</sup>

bb. Branches of panicle long and drooping, spikelets mostly near the ends, 3-6 flowered. *F. nutans*, p. 244

<sup>1</sup> Sheep Fescue Grass, occasionally established in waste ground.

<sup>2</sup> Tall Fescue Grass, frequent in fields, etc. Pl. XIV., Fig. 1.

**Festuca octoflora** Walt. **Slender Fescue Grass.**

Pl. XIV., Fig. 1.

*Festuca octoflora* Walter, Pl. Car. 81. 1788 [South Carolina].—Britton 296.—Keller and Brown 53.*Festuca tenella* Knieskern 39.

Dry sandy soil, casual in the northern counties, frequent throughout our region.

*Fl.*—Mid-May to mid-June.*Middle District.*—Delanco (S), Medford (S), Mickleton.*Pine Barrens.*—E. Plains (S), Tabernacle (S), Cedar Brook, Landisville, Pleasant Mills, Tuckahoe.*Coast Strip.*—Beach Haven (L), N. Beach Haven (L), Barnegat City (L).**Festuca rubra** L. **Red Fescue Grass.***Festuca rubra* Linnaeus, Sp. Pl. 74. 1753 [Europe].

Sandy ground along the coast marshes.

This is one of several plants of wide distribution which occur along the coast, and are often regarded as introductions from Europe. Some of them grow under such conditions as to make them appear certainly native, while in the case of others the evidence is less convincing. It has been thought best to include them all.

*Fl.*—Late May to mid-June.*Maritime.*—Sherburn's (L), Surf City (L), Spray Beach (L), Peahala (L), Beach Haven (L), Barnegat City (L), Holgate's (L), Beach Haven Terrace (L).**Festuca nutans** Spreng. **Nodding Fescue Grass.***Festuca nutans* Sprengel, Pl. Hal. Mantissa 34. 1807 [Pennsylvania].—Knieskern 39.—Willis 74.—Britton 297.

Rocky woods of the northern counties and southward in the Middle district.

*Fl.*—Late May to early June.*Middle District.*—Pemberton (C), Medford (S), Mickleton, Swedesboro.**BROMUS L.***Key to the Species.*

- a. Plant tall, 2-5 feet high (in woodlands), flowers pubescent, panicle weak and drooping. *B. purgans*, p. 245
- aa. Plants lower, rarely over two feet high (waste ground plants).

**Bromus purgans L. Wood Chess.**

*Bromus purgans* Linnæus, Sp. Pl. 76. 1753 [Canada].

*Bromus ciliatus* Knieskern 39.—Britton 297.

Woods of the northern counties, casually entering the upper part of Monmouth Co., according to Knieskern, and discovered by Mr. Benjamin Heritage at Wildwood in the lower coast district.

*Coast Strip*.—Wildwood (11).

**ELYMUS L.**

*Key to the Species.*

- a. Glumes awl-shaped, spike nodding. *E. striatus*, p. 245
- aa. Glumes lanceolate.
  - b. Glumes indurated below, spikes erect.
    - c. Plant seldom over 6 dm. high, leaves narrow. *E. halophilus*, p. 245
    - cc. Plant 9–12 dm. high, leaves broad. *E. virginicus*, p. 245
  - bb. Glumes not indurated below, spike nodding. *E. canadensis*, p. 246

**Elymus striatus Willd. Slender Wild Rye.**

Pl. XI., Fig. 4.

*Elymus striatus* Willdenow, Sp. Pl. I. 470. 1797 [North America].—Knieskern 39.—Britton 299.—Keller and Brown 56.

Northern counties, south locally in the Middle district and along the coastal strip; banks of streams.

*Fl.*—Late June to late July.

*Middle District*.—Swedesboro, Westville.

*Coast Strip*.—Atlantic City, Anglesea, Cape May.

**Elymus virginicus L. Virginia Wild Rye.**

Pl. XI., Fig. 6.

*Elymus virginicus* Linnæus, Sp. Pl. 84. 1753 [Virginia].—Knieskern 39.—Beck's Botany 415. 1833.—Britton 298.

Northern and Middle districts, casual along the coast and in the Cape May peninsula; banks of streams.

*Fl.*—Late July to early September.

*Middle District*.—New Egypt, Pemberton Inc. (S), Medford (S), Washington Park, Jumbo, Swedesboro.

*Coast Strip*.—Avon, Anglesea, Court House, Cold Spring.

**Elymus halophilus Bicknell. Coast Wild Rye.**

*Elymus halophilus* Bicknell, Torr. Bull. 35. Apr., 1908, p. 201 [Nantucket].

Edge of salt marshes along the coast and on the lower bay shore.

*Fl.*—Late July to early September.

*Maritime.*—Sandy Hook (NB), Pt. Pleasant, Manahawkin, Surf City (L), Barnegat City Inc. (L), Beach Haven (L), Harvey Cedars (L), Peahala (L), Ship Bottom (L), Atlantic City (NB), Cape May Ct. House, Dias Creek.

***Elymus canadensis* L. Nodding Wild Rye.**

*Elymus canadensis* Linnæus, Sp. Pl. 83. 1753 [Canada].—Knieskern 39.—Willis 75.—Britton 298.

River banks, Northern and Middle districts.

*Fl.*—Early July to early September, or occasionally later.

*Middle District.*—Shark River (C), Delair, Swedesboro.

**HYSTRIX Moench.**

***Hystrix hystrix* (L.). Bottle-brush Grass.**

*Elymus Hystrix* Linnæus, Sp. Pl. Ed. 2. 124. 1762 [original habitat unknown].—Britton 299.—Keller and Brown 57.

Rocky woods of the northern counties; reported by Dr. Britton from one station in the Middle district.

*Middle District.*—Arneytown (C).

Family CYPERACEÆ. Sedges.

Distinguished from Grasses by their usually solid, more or less triangular stems and closed sheaths to the leaves. Fruit an achene.

*Flowering and Fruiting Data.*—In all the genera of this family, except *Cyperus* and *Carex* (q. v.) and certain special cases noted under individual species, the time of year indicates the season during which well developed (and generally mature) achenes are commonly to be found and intact spikelets occur.

*Key to Genera.*

- a. Flowers all of one kind, perfect.
  - b. Spikelets two-ranked.
    - c. Flattened or linear, arranged in terminal umbles, in loose spikes or spherical clusters. *Cyperus*, p. 248
    - cc. Flattened, arranged in two ranks on peduncles from the axils of the short leaves, inflorescens extending for same distance along the culm. *Dulichium*, p. 256

- bb.* Spikelets cylindrical or ovate with flowers on all sides, not two-ranked.
- c.* No apparent leaves (reduced to mere sheaths). *Elcocharis*, p. 257
- d.* Leaves present.
- e.* Inflorescence in compact heads, provided with soft silky or cotton-like white or whitish hairs, which become long and plume-like in autumn. *Eriophorum*, p. 273
- ec.* Inflorescence not provided with white or whitish hairs.
- f.* Flowers 1 to 2 (rarely 3-4) in a spike.
- g.* Achene, with a conspicuous beak or cap distinctly different from the main portion. *Rynchospora*, p. 275
- gg.* Achene uniform throughout, no beak. *Cladium*, p. 282
- ff.* Flowers numerous, always more than four in a spikelet.
- g.* Lowest leaves at least (often whole plant), hispid. *Fuirena*, p. 274
- gg.* Leaves never hispid.
- h.* Spikelets 1 or 2-12 sessile in a terminal cluster. *Scirpus*, p. 266
- hh.* Spikelets pedicelled, or at least some of them, sometimes several on each pedicel.
- i.* Plant less than 3.7 dm. high.
- j.* Leaves filiform, shorter than the inflorescence. *Stenophyllis*, p. 265
- jj.* Leaves linear, flat.
- k.* Spikes half a line wide, leaves much shorter than the inflorescence. *Fimbristilis autumnalis*, p. 265
- kk.* Spikes one line wide, leaves equalling inflorescence. *Psilocaria*, p. 265
- ii.* Plants more than 6 dm. high.
- j.* Leaves rigid, involute. *Fimbristilis castanca*, p. 265
- jj.* Leaves not involute. *Scirpus*, p. 266
- aa.* Flowers of two kinds, some staminate, some pistillate.
- b.* Achene inclosed in a sack or perigynia, open at the tip and often prolonged into a slender toothed beak.
- c.* Staminate and pistillate flowers in distinct spikes or in different parts of the same spike. *Carex*, section "a," p. 285
- cc.* Staminate and pistillate flowers, mingled together in (or staminate at the base of) a terminal branching, "prickly" cluster (green or straw color) or in several scattered star-like clusters (green). *Carex*, section "aa," p. 288
- ccc.* Staminate and pistillate flowers, mingled (staminate usually at the base) in uniform ovoid heads, clustered or usually separate, at the end of the scape; each composed of numerous closely imbricated, flat achenes and scales (chestnut or green). *Carex*, section "aaa," p. 290
- bb.* Achene naked, resembling a hard, round, bony seed, supported on a hard disc, generally white and shining sometimes blackish. *Scleria*, p. 282

## CYPERUS L.

*Flowering and Fruiting Data.*—The time of year denotes the season during which intact inflorescences, heads, and spikelets of characteristic shape, are present.

Mature achenes are present some times after the season here designated, but the spikelets are then losing their characteristic shape through the dropping of the scales.

*Key to the Species.*

- a. Spikelets flat, two-ranked and closely imbricated, more than 1.5 mm. wide, sessile in radiating umbels or occasionally one or two secondary umbels on pedicels.
  - b. Edges of the spikelet sharply and finely notched owing to the projecting points of the scales.
    - c. Scales brown with a green keel, tips very sharp, slightly mucronate. Head often proliferous. *C. dentatus*, p. 251
  - cc. Scales yellowish brown, tips not mucronate, not proliferous.
    - d. Spikelets 2 mm. wide or over; maritime. *C. nuttallii*, p. 250
    - dd. Spikelets less than 2 mm. wide, usually several short-pedicelled umbels. *C. microdontus*, p. 251
  - bb. Edges of the spikelet nearly entire, the tips of the scales blunt and not projecting.
    - c. Spikelets yellow or yellowish, 1.5–2.5 mm. broad. *C. flavescens*, p. 249
  - cc. Spikelets brown or green, spotted or bordered with brown.
    - d. Spikelets 5–10 mm. long, branches of the styles projecting from the scales, secondary umbels always present. *C. diandrus*, p. 250
    - dd. Spikelets 10–20 mm. long, smooth and shining, style branches rarely visible, secondary spikelets occasional. *C. rivularis*, p. 250
- aa. Spikelets less than 1.5 mm. wide, often terete in cylindrical spikes at least one inch long, mostly on peduncles which are usually branched and sometimes very compound, forming masses of inflorescence 1–2 dm. or more in diameter.
  - b. Peduncles branched.
    - c. Spikes very dense, scales falling away from the rachis of the spikelet at maturity. *C. erythrorhizos*, p. 252
  - cc. Spikes often loose, scales persistent on the rachis until the spikelet itself falls off.
    - d. Spikelets terete. *C. speciosus*, p. 252
    - dd. Spikelets distinctly flattened. *C. strigosus*, p. 253
  - bb. Peduncles not branched.
    - c. Lower spikelets not reflexed, heads rather loose, roots with small root tubers. *C. esculentus*, p. 252



- cc. Lower spikelets always reflexed, forming a dense ovoid head, no root tubers. *C. lancastricensis*, p. 253
- aaa. Spikelets in several peduncled dense umbels or short spikes (cylindrical, ovoid or top-shaped), not over 15 mm. long (exclusive of reflexed spikelets). Spikelets less than 1.5 mm. in width, or else scales spreading and not closely imbricate and main umbel sessile, with or without secondary pedicelled umbels.
- b. Spikelets linear, appressed, more or less terete, prevailing color brownish.
- c. Umbels globular ovoid or cylindrical, spikelets not bristly pointed, only the basal ones reflexed.
- d. Head globular or ovoid. *C. ovularis*, p. 254
- dd. Head cylindrical. *C. cylindricus*, p. 255
- cc. Umbels ovoid or top-shaped, spikelets bristly pointed, mostly reflexed.
- d. Umbels ovoid, long. *C. lancastricensis*, p. 253
- dd. Umbels top-shaped, 10-25 mm. long, all spikelets reflexed.
- e. Culms glabrous. *C. hystricinus*, p. 253
- cc. Culms scabrous above.
- f. Heads obovoid, contracted at base. *C. retrofractus*, p. 254
- ff. Heads cylindric or subcylindric. *C. dipsaciformis*, p. 254
- bb. Spikelets broader, scales loosely arranged, prevailing color green.
- c. Rachis of spikelet winged, secondary pedicelled umbels always present. *C. grayi*, p. 255
- cc. Rachis of spikelet not winged.
- d. Secondary umbels often lacking.
- e. Spikelets 10-16 mm. long, 8-12 flowered. *C. filiculmis*, p. 256
- ee. Spikelets 3-8 mm. long, 4-8 flowered. *C. f. macilentus*, p. 256
- aaaa. Spikelets as broad as long (3-6 mm.), sessile in compact heads in large compound umbels, forming a mass of inflorescence .5-7 dm. in diameter. *C. pseudovegetus*, p. 251

### **Cyperus flavescens L. Yellow Sedge.**

Pl. XVI., Fig. 9.

*Cyperus flavescens* Linnæus, Sp. Pl. 46. 1753 [Germany, Switzerland and France.]—Knieskern 33.—Willis 67.—Britton 260.—Keller and Brown 58.

Damp ground, common in our region, except in the Pine Barrens, casual in North Jersey.

*Fr.*—Early August to early October.

*Middle District.*—Good Luck Pt. (C), New Egypt, Burlington, Kaighns Pt., Westville, Washington Park (S), Mickleton (NB), Swedesboro (KB), Jericho.

*Pine Barrens.*—Lakehurst, Chatsworth, Clementon, Hammonton, Atsion, Mays Landing (C), Pleasant Mills.

*Coast Strip*.—Forked River, Toms River (NB), Palermo, Sea Isle Jnc. (S), Wildwood.

*Cape May*.—Dias Creek.

**Cyperus diandrus** Torrey. **Low Sedge.**

Pl. XVI., Fig. 14.

*Cyperus diandrus* Torrey Cat. Pl. N. Y. 90. 1819 [Salt Meadows at Hoboken, N. J.].—Knieskern 33.—Willis 67.—Britton 260.—Keller and Brown 59.

Damp ground; rare in the Middle district along the Delaware River and more frequent along the coast.

*Fr.*—Mid-August to early October.

*Middle District*.—Gloucester Pt., Swedesboro.

*Coast Strip*.—Barnegat City (L), Harvey Cedars (L), Brant Beach (L), Spray Beach (L), Beach Haven Terrace (L), Holgate's (L), Beach Haven (L), St. Albans (L), Waretown.

**Cyperus rivularis** Kunth. **Shining Sedge.**

Pl. XVI., Fig. 13.

*Cyperus rivularis* Kunth Enum. 2: 6. 1837 [Georgia.].—Keller and Brown 59.  
*Cyperus diandrus* var. *castaneus* Knieskern 33.—Willis 67.—Britton 260.

Damp ground; common in the Northern and Middle districts and on the Coastal strip.

*Fr.*—Mid-August to early October.

*Middle District*.—New Egypt, Birmingham, Swedesboro, Fish House (S), W. Deptford.

*Coast Strip*.—Sandy Hook (NB), Spring Lake (NY), Barnegat City (L), Brant Beach (L), Ship Bottom (L), Beach Haven (L), Spray Beach (L), West Creek (S), E. of Egg Harbor City, Palermo (S).

**Cyperus nuttallii** Eddy. **Nuttall's Sedge.**

Pl. XVI., Fig. 15.

*Cyperus Nuttallii* Eddy, Spreng. Neue. Entd. I. 240. 1820 [Submaritime Swamps of N. J.].—Knieskern 33.—Torrey Ann. Lyc. N. Y. III. 252. 1836.—Willis 67.—Britton 260.—Keller and Brown 59.

*Cyperus minimus* Barton, Flor. Phila. I. 26. 1818.—Nuttall, Gen. 1. 35. 1818.  
*Cyperus Cleaverii* Torrey, Ann. Lyc. N. Y. III. 258 [Monmouth Co., N. J.].—Gray, Man. Ed. 2. 491. 1858.

Edges of salt marshes all along the coast and on the bay shore.

*Fr.*—Early August to early October.

*Maritime*.—Deal Beach, Sea Bright (NB), Bay Head, Island Heights, Toms River (NB), Seaside Park (S), Waretown, Barnegat City (L), Surf City (L), Ship Bottom (L), Peahala (L), Spray Beach (L), West Creek (S), Atlantic City, Longport, Ocean City (S), Sea Isle City (S), Piermont, Wildwood, Cape May, Dennisville, Beaver Dam.

**Cyperus microdontus Torr. Small-toothed Sedge.**

*Cyperus microdontus* Torrey, Am. Lyc. N. Y. III.: 255. 1836 [Salem, N. C.]  
—Robinson and Fernald, Gray's Man. Ed. 7, 174.—Emile F. Williams,  
Rhodera III. 1901, 36.

Only known in the State from a specimen in the Gray herbarium, collected by Dr. J. B. Brinton, August 1, 1880, at Cape May, but labelled *C. nuttallii*; from Pleasant Mills, where it was discovered September 27, 1887, by Mr. C. A. Gross, possibly from the shores of Mullica River, within the limits of tidewater; and from Claypot Creek, Navesink Highlands, where it was obtained by Mr. E. F. Williams, September 2, 1900, and identified by Prof. Fernald. Previously not known from north of Virginia.

*Fr.*—Early August to early October.

*Coast Strip.*—Navesink (E. F. Williams), Pleasant Mills, Cape May (Gray Herb.).

**Cyperus pseudovegetus Steud. Marsh Sedge.**

Pl. XVI., Fig. 7.

*Cyperus pseudovegetus* Steud., Syn. Pl. Cyp. 24. 1855 [So. Carolina].—  
Stone Torreya, 1907, 40.

Lower portion of the Middle district. Discovered near Riddleton, September 16, 1894, by Charles D. Lippincott. Rare.

*Fr.*—Early July to early October.

*Middle District.*—Riddleton.

**Cyperus dentatus Torr. Toothed Sedge.**

Pl. XVI., Fig. 8.

*Cyperus dentatus* Torrey, Fl. U. S. I. 61. 1824 [Pine Barrens of New Jersey].—Knieskern 34.—Torrey Ann. Lyc. N. Y. III., 271. 1836.—Willis 67.  
—Britton 260.—Keller and Brown 59.

*Cyperus parviflorus* Barton, Fl. Phila. I.: 28. 1818.

Wet sandy spots in the Pine Barrens and locally in the Northern and Middle districts.

We have both the typical form, which has the spikelets frequently abortive, and the var. *ctenostachys* of Fernald, which seems to me to be merely a fully developed normal extreme of the same thing.

*Fr.*—Late July to late September.

*Middle District*.—Burlington, Delanco, Medford (S), Riddleton (KB), Elwood (KB).

*Pine Barrens*.—Asbury Park (NB), Bay Head, Lakehurst, Toms River, Browns Mills Jnc. (KB), Forked River (H), Waretown, Pasadena, Speedwell, Chatsworth, Taunton, Berlin, Bear Swamp, Hammonton, Atsion, Parkdale, Quaker Bridge, Batsto, Pleasant Mills, Weckstown, Egg Harbor City, Mays Landing (KB).

**Cyperus esculentus L. Nut Grass.**

Pl. XVI, Fig. 16.

*Cyperus esculentus* Linnæus, Sp. Pl. 45. 1753 [Monspelii].—Britton 260.

*Cyperus phymatodes* Barton, Flor. Phila. I.: 27. 1818.—Willis 67.

*Cyperus repens* Torrey, Ann. Lyc. N. Y. III.: 264. 1836.

Common in open swampy ground, except in the Pine Barrens; most plentiful on the coastal strip, often increasing enormously where swamp land is cultivated.

*Fr.*—Early August to late September or early October.

*Middle District*.—Phalanx (NB), New Egypt, Lawnside (S), Swedesboro, Salem (S).

*Pine Barrens*.—Landisville (T).

*Coast Strip*.—Spring Lake (NB), Seaside Park, Beach Haven Terrace (L), Surf City (L), Tucker's (L), Atlantic City (S), Palermo (S), Ocean City (S), Mays Landing, Sea Isle Jnc. (S), Piermont, Anglesea, Cold Spring, Cape May (S), Cape May Pt. (S).

**Cyperus erythrorhizos Muhl. Red-rooted Sedge.**

Pl. XVI, Fig. 12.

*Cyperus erythrorhizos* Muhlenberg, Gram. 20. 1817 [Pennsylvania].—Willis 67.—Britton 261.

Locally in swampy ground of the Middle and Coast districts. Found abundantly along Big Timber Creek, near Westville, September, 1911, by Mr. Bayard Long.

*Fr.*—Mid-August into October.

*Middle District*.—Camden (NB), Petty's Isl. (NB), Westville, Swedesboro, Millville.

*Coast Strip*.—Anglesea (UP).

**Cyperus speciosus Vahl. Michaux's Sedge.**

Pl. XVI, Fig. 11.

*Cyperus speciosus* Vahl, Emun. 2: 364. 1806 [Virginia].—Britton 261.—Keller and Brown 60.

*Cyperus Michauxianus* Willis 67.

Swamps along the coast, also at Camden (probably on ballast).

*Fr.*—Early August to late September.

*Middle District.*—Camden.

*Coast Strip.*—Seaside Park, Waretown, Barnegat City (L), Surf City (L), Spray Beach (L), Atlantic City (S), Ocean City (S), Piermont, Stone Harbor, Wildwood, Cape May (KB).

*Cape May.*—Dennisville (S).\*

**Cyperus strigosus L. Straw-colored Sedge.**

Pl. XVI., Fig. 10.

*Cyperus strigosus* Linnæus, Sp. Pl. 47. 1753 [Jamaica and Virginia].—Barton Fl. Phila. I.; 27. 1818.—Knieskern 34.—Willis 67.—Britton 261.

*Cyperus strigosus* var. *capitatus* Britton 261 (dwarfed).

Plentiful in swamps and moist open ground throughout the State except in the Pine Barrens. Very variable, but not satisfactorily divisible into definite varieties.

*Fr.*—Early August to late September.

*Middle District.*—New Egypt (S), Camden, Morris, Medford, Taunton (S), W. Deptford, Lawnside (S), Mickleton, Tomlin, Wenonah, Clementon, Swedesboro, Salem (S), Millville, Beaver Dam.

*Pine Barrens.*—Landisville.

*Coast Strip.*—Barnegat City (L), Surf City (L), Harvey Cedars (L), Ship Bottom (L), Barnegat City Inc. (L), Spray Beach (L), Barrel Isl. (L), West Creek (S), Ocean City (S), Seaville (S), Sea Isle City (S), Wildwood, Cold Spring (S), Cape May (S).

**Cyperus lancastriensis Porter. Lancaster Sedge.**

Pl. XVI., Fig. 1.

*Cyperus lancastriensis* Porter, Gray's Manual, Ed. V. 555. 1867 [Banks of the Susquehanna, Lanc. Co., Pa.].—Watson, Gray's Man., Ed. VI. 572. 1890.—Britton 261.—Keller and Brown 60.

Locally in sandy soil, Middle district and on the Delaware below Trenton.

*Fr.*—Late July to early October.

*Middle District.*—Centerville (C), Near Woodbury, Swedesboro.

**Cyperus hystricinus Fernald. Bristling Sedge.**

Pl. XVI., Fig. 2.

*Cyperus hystricinus* Fernald, Rhodora, July, 1906: 127 [near Haddonfield, N. J.]

*Cyperus retrofractus* Britton 261 (in part).—Keller and Brown 60 (in part).

\* The records for Mays Landing (C) and Hammonton (KB) on authority of Benj. Heritage prove to be *C. dentatus*.

Locally in the Middle district.

*Fr.*—Late July to late September.

*Middle District.*—Red Bank, Westville, Washington Park (S), National Park, Malaga (S), Locust Grove, Swedesboro (CDL).

*Pine Barrens.*—Hammonton.

**Cyperus retrofractus (L.). Rough Sedge.**

*Scirpus retrofractus* Linnæus, Sp. Pl. 50. 1753 [Virginia].

*Mariscus retrofractus* Barton, Fl. Phila. I. 30. 1818.—Torrey Ann. Lyc. N. Y. III. 283. 1836.—Willis 67.

*Cyperus retrofractus* Britton 261.—Keller and Brown 60.

Locally in the Middle and Pine Barren districts and near Hoboken to the northward.

*Fr.*—Late July to late September.

*Middle District.*—Medford (S), Locust Grove, Malaga.

*Pine Barrens.*—Weymouth.

**Cyperus dipsaciformis Fernald. Teasel-like Sedge.**

*Cyperus dipsaciformis* Fernald, Rhodora 106, p. 127 [near Washington, D. C.].

I am informed by Prof. M. L. Fernald that there is a specimen in the Gray Herbarium from the herbarium of Thomas Morong, labelled in Morong's handwriting "Sandy Pine Barrens, New Jersey, Coll. Morong, September, 1873." This is our only evidence of its occurrence in our region.\*

**Cyperus ovularis (Michx.). Globose Sedge.**

Pl. XVI., Fig. 4.

*Kyllingia ovularis* Michaux, Fl. Bor. Am. I. 29. 1803 [Georgia and Carolina].

*Mariscus glomeratus* Barton, Fl. Phila. I. 30. 1818.

*Cyperus ovularis* Knieskern 34.—Willis 67.—Britton 261.—Keller and Brown 60.

Common in open sandy ground throughout our region, except in the Pine Barrens, and casual in the northern counties.

*Fr.*—Early July to early September.

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\* A specimen collected many years ago by S. W. Conrad at Fish House on the Delaware, and now in the Philadelphia Academy Herbarium, has been identified by Dr. Britton as *Cyperus refractus*. The plant, however, is abortive and not well developed, and I do not think it can be certainly identified with this species. There is no other record for the state.

*Middle District*.—New Egypt, Burlington, Arney's Mt. (S), Delaire, Medford (S), Swedesboro (CDL).

*Coast Strip*.—Manahawkin, Surf City (L), Ship Bottom (L), Barrel Isl. (L), Atlantic City (KB), Palermo (S), Holly Beach (UP).

*Cape May*.—Three mi. W. Court House (S), Dias Creek, Rio Grande, Bennett, Cold Spring, Cape May.\*

***Cyperus cylindricus* (Ell.). Pine Barren Sedge.**

Pl. XVI., Fig 3.

*Mariscus cylindricus* Elliott, Bot. S. C. and Ga. I. 74. 1816 [probably South Carolina].

?*Mariscus echinatus* Barton, Fl. Phila. I. 1818.

*Cyperus kyllingoides* Pursh, Fl. Am. Sept. I. 50.

*Cyperus Torreyi* Britton 261.

*Cyperus cylindricus* Keller and Brown 60.

Open sandy ground, common throughout the Pine Barrens, Cape May and Coast districts, rare and local in the Middle district.

*Fr.*—Late July to mid-September.

*Middle District*.—Lindenwold, Dividing Creek.

*Pine Barrens*.—Hornerstown, Lakehurst, Toms River (NB), Woodmansie (KB), Forked River, Bear Swamp (S), Taunton, Lucaston, Albion, Landisville, Winslow (S), Parkdale, Forks of Batsto, Egg Harbor City, Tuckahoe (S).

*Coast Strip*.—Manahawkin, St. Albans (L), Beach Haven (L), Surf City (L), Sherburn's (L), Atlantic City, Palermo (S), Ocean City (S), Piermont, Wildwood, Anglesea, Holly Beach.

*Cape May*.—Bennett, Cold Spring (S).

***Cyperus grayi* Torr. Gray's Sedge.**

Pl. XVI., Fig. 6.

*Cyperus Grayii* Torrey, Ann. Lyc. N. Y. III. 268. 1836 [Pine region of New Jersey].—Knieskern 34.—Willis 67.—Britton 261.—Keller and Brown 61.

Common on the sandhills of the coast and in the Pine Barrens. Rare and local in the Middle district.

*Fr.*—Early August to late September.

*Middle District*.—New Egypt, Camden.

*Pine Barrens*.—Manchester (NB), Weymouth Island Hts. Inc., Forked River, Speedwell, Chatsworth, Taunton (S), Clementon, Penbryn (S), Waterford, Franklinville, Landisville, Atsion (S), Pleasant Mills, Weymouth.

\* The records for Hammonton and Forked River (KB) reported by Benj. Heritage and J. Crawford prove to be the next.

*Coast Strip*.—Sandy Hook (C), Pt. Pleasant, Seaside Park (S), Waretown, Forked River (NY), Barnegat City (L), Spray Beach (L), Sherburn's (L), West Creek (S), Atlantic City, Ocean City (S), Sea Isle City (S), Piermont, Stone Harbor, Wildwood, Cape May Pt. (S).

**Cyperus filiculmis Vahl. Slender Sedge.**

*Cyperus filiculmis* Vahl Enum., II. 378. 1806 [Carolina].—Knieskern 34.—Willis 67.—Keller and Brown 60.

*Cyperus autumnalis* Barton Fl. Phila. I. 28. 1818.

Common, perhaps, in the northern counties, but rare in our limits, spreading along railroads, etc.

*Fr.*—Late June into October.

*Middle District*.—Woodbury, Kaighns Pt., Wenonah.

*Cape May*.—Court House, Cape May.

**Cyperus filiculmis macilentus Fernald.**

Pl. XVI., Fig. 5.

*Cyperus filiculmis* var. *macilentus* Fernald Rhodera, July, 1906: 128 [Orono, Me.].

Dry sandy soil; most plentiful along the sand-dunes of the coast, also in the Pine Barrens and Middle districts.

*Fl.*—Late June into October.

*Middle District*.—New Egypt, Fish House, Morris, Woodbury, Washington Park, Wenonah, Lawnside (S), Lindenwold (S), Mickleton, Swedesboro, Beaver Dam.

*Pine Barrens*.—Vineland, Landisville, Bamber, Twelfth St., Albion, Forks of Batsto, Egg Harbor City.

*Coast Strip*.—Asbury Park (NB), Pt. Pleasant, West Creek (S), Surf City (L), Barnegat City (L), Ship Bottom (L), Peahala (L), Tucker's (L), St. Albans (L), Sherburn's (L), Barrel Isl. (L), Longport (S), Atlantic City (S).

*Cape May*.—Fishing Creek (OHB), Cape May (OBH), Cape May Pt.

**DULICHIMUM. L. C. Richard.**

**Dulichium arundinaceum (L.). Dulichium.**

Pl. XVII., Fig. 4.

*Cyperus arundinacea* Linnæus, Sp. Pl. 44. 1753 [Virginia].

*Dulichium spathaceus* Barton, Fl. Phila. I.: 30. 1818.—Knieskern 34.—Willis 67.—Britton 262.

Common in wet swamps and along the edge of streams in the Northern, Middle and Coastal districts. The few Pine Barren records seem to have followed up the tidewater streams.

*Fr.*—Mid-July into October.



*Middle District*.—New Egypt, Florence, Birmingham, Delanco (S), Medford (S), Lindenwold, Paulsboro, Swedesboro, Sharpstown, Dividing Creek.

*Pine Barrens*.—Toms River (NY), Lakehurst, Forked River, Waretown, Bear Swamp (S), Hammonton (NY), Landisville, Petersburg (S), Egg Harbor (NB).

*Cape May*.—Cape May, Town Bank.

ELEOCHARIS R. Brown.

*Key to the Species.*

- a. Spikes 2-6 cm. long of nearly or quite the same diameter as the culms.
  - b. Scales blunt and rounded, spike blunt, cylindrical.
    - c. Culm, four-angled. *E. quadrangulata*, p. 258
    - cc. Culm terete. *E. interstincta*, p. 258
  - bb. Scales sharp pointed, spike linear, awl-shaped. *E. robbinsii*, p. 258
- aa. Spike much thicker than the culm.
  - b. Spike 6-15 mm. long.
    - c. Mature spikes at least 3 mm. thick.
      - d. Scales pointed, tips spreading.
        - e. Culms 3-15 dm. tall, stout. *E. palustris*, p. 260
        - cc. Culms 2-4.5 dm. tall, slender. *E. glaucescens*, p. 260
      - dd. Scales blunt, spikes more or less globose.
        - e. Scales short and rounded, closely imbricated.
          - j. Spikes globose. *E. obtusa*, p. 259
          - ff. Spikes oblong, cylindrical. *E. engelmanni*, p. 260
        - ee. Scales longer and more loosely arranged.
          - f. Scales brown with a lighter mid-vein. *E. melanocarpa*, p. 262
          - ff. Scales greenish with a dark mid-vein.
            - g. Spike ovoid, culms not rooting at tip. *E. tuberculosa*, p. 261
            - gg. Spike spindle shaped, sterile culms often rooting at tip. *E. rostellata*, p. 264
    - cc. Mature spikes less than 3 mm. thick.
      - d. Scales minute, rounded, closely imbricated, spike cylindrical, 6-15 mm. long. *E. tricostata*, p. 262
      - dd. Scales larger, more loosely arranged, spikes 4-6 mm. long. *E. tenuis*, p. 263
  - bb. Spikes 2-6 mm. long.
    - c. Culms spirally twisted. *E. tortilis*, p. 263
  - cc. Culms not twisted.
    - d. Culms 2-4 dm. high. *E. tenuis*, p. 263
    - dd. Culms not over 2 dm. high (seldom over 1-5 dm.).
      - e. Culms capillary.
        - f. Spikes two to six-flowered, 1 mm. broad. *E. acicularis*, p. 260
        - ff. Spikes six to many-flowered, culms often proliferous. *E. torreyana*, p. 261
- ee. Culms thicker.

- f.* Spikes 2 mm. broad, scales reddish brown, with a green mid-vein. *E. olivacea*, p. 259  
*ff.* Spikes 2-3 mm. broad, scales very pale. *E. ocreata*, p. 259

**Eleocharis interstincta (Vahl). Knotted Spike-rush.**

Pl. XVII., Fig. 5.

*Scirpus interstinctus* Vahl, Emun. II.: 251. 1806 [Caribaeis].—Keller and Brown 61.—Stone, Proc. Acad. Nat. Sci., Phila., 1908. 458.

Known only from a swamp at Repaupo in the Middle district, where it was first discovered by Benjamin Heritage, July 15, 1892.

*Fr.*—Mid-July to late August.

*Middle District.*—Repaupo.

**Eleocharis quadrangulata Michx. Quadrangular Spike-rush.**

Pl. XVII., Fig. 6.

*Scirpus quadrangulatus* Michaux, Fl. Bor. Am. I. 30. 1803 [Carolina].

*Eleocharis quadrangulata* Torrey, Ann. Lyc. N. Y. III. 297. 1836.—Willis 68.

*Eleocharis mutata* Britton, Jour. N. Y. Micros. Soc. V. 98. 1889.—Britton 262.—Keller and Brown 62.

Found in our region only in wet swamps in the Cape May district, but occurs also at Swartswood Lake, Sussex Co.

*Fr.*—Mid-July to mid-August.

*Cape May.*—Dennisville, Dias Creek, Bennett, Cape May.

**Eleocharis robbinsii Oakes. Robbin's Spike-rush.**

Pl. XVII., Fig. 7.

*Eleocharis Robbinsii* Oakes, Hovey's Magazine VII. 178. 1848 [Pondicherry pond, Jefferson, N. H.].—Willis 67.—Britton, Jour. N. Y. Micros. Soc. V. 99. 1889.—Gray Manual Ed. V. 557. 1867.—Britton 262.—Keller and Brown 62.

Growing in the water in Pine Barren streams and ponds, frequent; rare and local in similar situations in the Middle district.

*Fr.*—Mid-July to mid-September, good fruit somewhat infrequent.

*Middle District.*—Delanco, Union Grove (S), Fairton.

*Pine Barrens.*—Toms River, Forked River, Dover Forge, Pasadena, Pleasant Mills, Mullica River, Quaker Bridge, Chatsworth, Hammonton, Berlin, Browns Mills (H), Dennisville.

*Cape May.*—Town Bank.

***Eleocharis ocreata* (Nees.). Pale Spike-rush.**

Pl. XVII., Fig. 14.

*Eleocharis ocreatus* Nees., in Mart. Fl. Bras. II. Part 1. 102. 1842 [Bahia, Rio Janiero, etc.].—Stone Proc. Acad. Nat. Sci. Phila. 1908. 458.

Restricted to the southern part of the Cape May peninsula, where it was first found by Mr. S. S. Van Pelt on the shores of Lily Lake, July 17 and September 16, 1905.

*Cape May*.—Cape May Pt.

***Eleocharis olivacea* Torr. Green Spike-rush.**

*Eleocharis olivacea* Torrey, Ann. Lyc. N. Y. III. 300. 1836 [Pine Barrens of New Jersey].—Knieskern 34.—Willis 68.—Britton 262.—Keller and Brown 62.

Frequent in moist open ground throughout the State, but most plentiful in the Pine Barrens and along the coast.

*Fr.*—Late July into October.

*Middle District*.—New Egypt, Hainesport, Birmingham, Delaire, Mickleton (H), Swedesboro, Millville, Beaver Dam.

*Pine Barrens*.—Lakehurst, Browns Mills, Bamber, Chatsworth, Jackson, Clementon, Atco, Landisville, Hammonton, Parkdale, Atsion, Batsto, Forks of Batsto, Pleasant Mills, Quaker Bridge, Absecon (Bassett).

*Coast Strip*.—Seaside Park, Forked River, Waretown, Manahawkin, Surf City (L), Absecon (S), Palermo.

*Cape May*.—Bennett, Cape May, Cape May Pt. (S).

***Eleocharis obtusa* (Willd.) Obtuse Spike-rush.**

Pl. XVII., Fig. 17.

*Scirpus obtusus* Willdenow, Enum. Hort. Berol. 76. 1809 [North America].

*Eleocharis obtusa* Knieskern, 34.—Willis 68.

*Eleocharis ovata* Britton 262.

Common throughout the State except in the Pine Barrens, where it is found only along tidewater streams or introduced in cultivated ground.

*Fr.*—Mid-June to early October.

*Middle District*.—Keyport (NY), New Egypt, Delanco, Birmingham, Delaire, Camden, Lindenwold, Woodbury, Swedesboro, Clementon, Millville.

*Pine Barrens*.—Pleasant Mills (T), Landisville, Four mi. E. Hammonton (S), Mays Landing.

*Coast Strip*.—Deal, Manahawkin, Anglesea.

*Cape May*.—Court House (S), Bennett (S), Cape May.

**Eleocharis engelmanni Steud. Engelmann's Spike-rush.**

*Eleocharis engelmanni* Steud. Syn. Pl. Cyp. 79. 1855 [St. Louis, Mo.].

*Eleocharis ovata* var. *engelmanni* Britton Jour. N. Y. Micros. Soc. V. 103. 1889.—Britton 262.

Reported in our region only from Kaighns Point. Occasionally in the northern counties.

*Fr.*—Mid-June to late August.

*Middle District.*—Blackwoodstown Turnpike (from Chas. E. Smith's Herbarium and doubtless the specimens reported on his authority in Britton's Catalogue from "Kaighns Pt.").

**Eleocharis palustris (L.). Creeping Spike-rush.**

*Scirpus palustris* Linnæus, Sp. Pl. 47. 1753 [Europe].

*Eleocharis palustris* Keller and Brown 62.

Wet swamps; rather frequent in the northern counties, rare and local in the Middle and Coast districts. The record in Britton's Catalogue for Gloucester Co. belongs to the next.

*Middle District.*—New Egypt.

*Coast Strip.*—N. Wildwood.

**Eleocharis glaucescens Willd. Glaucous Spike-rush.**

Pl. XVII., Fig. 11.

*Scirpus glaucescens* Willdenow, Enum. 76. 1809 [North America].

*Eleocharis palustris* var. *glaucescens* Britton 262.

Common in swamps in the Northern, Middle and Coast districts to Cape May.

There seem to be two forms of this species as pointed out to me by Mr. Bayard Long. Those marked with an asterisk have a yellow achene with a nearly sessile truncate beak, while in the others the achene is brown with an acute pedicelled beak.

*Fl.*—Mid-June to late August.

*Middle District.*—Delanco, Lindenwold, Medford, Tomlinson's.

*Coast Strip.*—Deal,\* Pt. Pleasant, Manahawkin,\* Spray Beach (L), Barnegat City (L),\* Surf City (L),\* Ship Bottom (L),\* St. Albans (L), Mays Landing (T), Piermont,\* Wildwood (S), Cold Spring.

*Cape May.*—Dias Creek,\* Cape May.\*

**Eleocharis acicularis (L.). Needle Spike-rush.**

Pl. XVII., Fig. 15.

*Scirpus acicularis* Linnæus, Sp. Pl. 48. 1753 [Europe].

*Eleocharis acicularis* Knieskern 34.—Willis 68.

*Scirpus trichodes* Barton Fl. Phila. I. 32. 1818.

Wet muddy places, shores of streams, etc. Common in the Northern and Middle districts, occurs also in the Cape May peninsula.

*Fr.*—Mid-July into October; good fruit quite uncommon.

*Middle District.*—New Egypt, Delanco (S), Swedesboro, Millville, Mantua (H).

*Pine Barrens.*—Landisville.

*Cape May.*—Nummerytown (S), Cold Spring (OHB).

***Eleocharis tuberculosa* (Michx.). Tubercled Spike-rush.**

Pl. XVII., Fig. 8.

*Scirpus tuberculosus* Michaux, Fl. Bor. Am. I. 30. 1803 [Lower Carolina].

*Eleocharis tuberculosa* Knieskern 34.—Beck Botany 424. 1833.—Torrey, Ann.

Lyc. N. Y. III. 307. 1836.—Willis 68.—Britton Jour. N. Y. Micros. Soc.

V. 106. 1889.—Britton 262.—Keller and Brown 62.

Wet sandy ground throughout the Pine Barrens and Cape May districts, rare and local in the lower part of the Middle district. This is the characteristic *Eleocharis* of the Pine Barrens, taking the place of *E. obtusa* of the Middle district. Its occurrence outside the Pines is limited to the so-called Pine Barren Islands of west Jersey.

*Fr.*—Mid-July to mid-September.

*Middle District.*—Shark River, Griffith's Swamp, Centerton (S), Dividing Creek.

*Pine Barrens.*—Allaire, Lakehurst, Toms River (S), Island Heights, Forked River, Brindletown, Manahawkin, Mayetta, West Creek, Speedwell (S), White House (S), Bear Swamp, Berlin, Atco, Jackson, Landisville, Hamonton (S), Parkdale (S), Atsion, Quaker Bridge, Pleasant Mills, Forks of Batsto (S), Egg Harbor City, Cologne, Pancoast (S), Eighth St. (T), Mays Landing (S), Manumuskin (S), Sea Isle Inc.

*Coast Strip.*—Sherburn's (L).

*Cape May.*—Cold Spring (S), Bennett, Cape May.

***Eleocharis torreyana* Boeckl. Torrey's Spike-rush.**

Pl. XVII., Fig. 16.

*Eleocharis Torreyanus* Boeckl, Linnæa 36, 440. 1870 [new name for "*E. microcarpa* b ? *filiculmis* Torrey," Pine Barrens of N. J.].

*Eleocharis microcarpa* Willis 68.—Britton Jour. N. Y. Micros. Soc. V. 107. 1889.—Britton 263.—Keller and Brown 62.

*Eleocharis microcarpa* b ? *filiculmis* Torrey, Gray's Manual, Ed. I. 525. 1848.

Restricted to damp sandy spots in the Pine Barrens and upper part of the Cape May district.

Originally described by Torrey from specimens collected in the New Jersey Pine Barrens, apparently in Ocean County.

*Fr.*—Early July to early October.

*Pine Barrens.*—Forked River (H), Double Trouble, Bamber, Manahawkin, Speedwell (S), Pleasant Mills, Quaker Bridge (C), Ballinger's Mill (S), Twelfth St. Folsom, Williamstown Jnc., Egg Harbor City.

*Cape May.*—Anglesea Jnc., Bennett Court House (S), Cold Spring.

***Eleocharis melanocarpa* Torrey. Black-fruited Spike-rush.**

Pl. XVII., Fig. 9.

*Eleocharis melanocarpa* Torrey, Ann. Lyc. N. Y. III. 311. 1836 [Pine Barrens near Savannah, Co.].—Willis 68.—Britton 263.—Stone, Proc. Acad. Nat. Sci. Phila. 1908. 458.—Long, Bartonica II. 18. 1910.

Apparently restricted to the lower part of the Middle district. The first specimens I have seen from the State were collected at Delanco, August, 1907, by Messrs. S. S. Van Pelt, Stewardson Brown and the writer. The plant was quite plentiful then, and the tips of the leaves were rooting after the manner of *E. rostellata*.

The earlier published records "Pine Barrens," Parker, and "Sandy Swamps, Monmouth Co.," Willis, unsupported by specimens may be regarded with suspicion, at least until we obtain other records from the Pines.

*Fr.*—Early July to mid-August, probably.

*Middle District.*—Delanco, Below Millville.

*Cape May.*—Bennett.

***Eleocharis tricostata* Torr. Three-ribbed Spike-rush.**

Pl. XVII., Fig. 10.

*Eleocharis tricostata* Torrey, Ann. Lyc. N. Y. III. 310. 1836 [Georgia and Florida].—Knieskern 34.—Willis 68.—Gray Manual Ed. I. 524. 1848.—Britton Jour. N. Y. Micros. Soc. V. 108. 1889.—Britton 263.—Keller and Brown 62.

Swamps in the Cape May and Pine Barren districts; rare and local in the Middle district.

Dr. Knieskern first detected this species in the State at Quaker Bridge, but it has since proved to be not uncommon, especially in the Cape May peninsula.

*Fr.*—Early July to late August.

*Middle District*.—Delanco.

*Pine Barrens*.—Double Trouble, Quaker Bridge (C), Williamstown Inc., Inskip, Newtonville, Grassy Pond, Twelfth St. and Jackson Road, Egg Harbor City.

*Cape May*.—Bennett, Whitesboro, Nummeytown (S), Rio Grande.

***Eleocharis tenuis* (Willd.). Slender Spike-rush.\***

Pl. XVII., Fig. 18.

*Scirpus tenuis* Willdenow, Enum. Hort. Berol. I. 76. 1809 [North America].

*Scirpus filiformis* Pursh Fl. Am. Sept. I. 54.

*Eleocharis tenuis* Knieskern 34.—Torrey Ann. Lyc. N. Y. III. 309. 1836.—Willis 68.—Britton 263.

Damp places; common throughout the State.

*Fr.*.—Early June to early July; scales then drop during July, but achenes persist on the rachis often until October.

*Middle District*.—New Egypt, Burlington, Delanco (S), Camden, Lawnside (S), Tomlinson's Glassboro (S), Swedesboro, Riddleton, Millville.

*Pine Barrens*.—Allaire, Toms River, Forked River, Manahawkin, West Creek, E. and W. Plains, Landisville, New Germany, Weymouth.

*Coast Strip*.—Spray Beach (L).

*Cape May*.—Cape May (OHB).

***Eleocharis tortilis* (Link.). Twisted Spike-rush.**

Pl. XVII. Fig. 13.

*Scirpus tortilis* Link, Jahrb. III. 78. 1820 [North America].

Moist open ground; rare and local in the southern Middle district, but more common in the Cape May peninsula. Reaches its northern limit in southern New Jersey.

This interesting species easily recognized by its spirally twisted stem, was first collected in the State by Mr. Chas. D. Lippincott, September 6, 1896, near Swedesboro.

*Fr.*.—Early July to early September.

*Middle District*.—Two miles north of Swedesboro.

*Cape May*.—Dias Creek, West Cape May, Cold Spring (OHB).

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\* *Eleocharis intermedia* Muhlenberg [Gram. 31. 1817—Pennsylvania] is given in Britton's Catalogue as rare and local in Northern New Jersey. It was recorded by Willis from Ocean and Monmouth Counties, but this record has been rejected by Dr. Britton, and as Mr. Heritage's record in Keller and Brown's Catalogue proves to be *E. olivacea*, the species seems to have no place in our list.

**Eleocharis rostellata Torr. Beaked Spike-rush.**

Pl. XVII., Fig. 12.

*Scirpus rostellatus* Torrey, Ann. Lyc. N. Y. III. 318. 1836 [Penn Yan Yates Co. N. Y. and So. Carolina].

*Eleocharis rostellata* Willis 68.—Britton Jour. N. Y. Micros. Soc. V. 110. 1889.—Britton 262.—Keller and Brown 63.

Common along the edge of the salt marshes of the coast and on the Hackensack marshes north of our limits.

This species is noted for the rooting of the tips of the sterile scapes, which thus form loops or arches that continually catch the feet as one walks through the meadows.

*Fr.*—Late June to mid-August.

*Maritime.*—Ocean Grove, Pt. Pleasant, Seaside Park, Barnegat Pier, Manahawkin, Spray Beach (L), Beach Haven (L), Sherburn's (L), Atlantic City (C), Somers Pt., Cape May Ct. House, Cold Spring, Cape May (S), Dennis.

**DICHROMENA Michaux.****Dichromena colorata (L.). Narrow-leaved Dichromena.**

*Schoenus coloratus* Linnaeus, Sp. Pl. 43. 1753 [Jamaica and Bahamas].

*Dichromena leucocephala* Gray Man. Ed. I. 531. 1848.—Willis 69.

*Dichromena cephalotes* Britton 263.

The occurrence of this plant in New Jersey seems to be based upon the statement in the first edition of Gray's Manual (1848), where this State is included in the range, though upon what evidence it is now impossible to ascertain. No one is quoted as authority, and Prof. Fernald writes me that he can find no specimen, that might have been responsible for the record, in the Gray Herbarium.

Willis gives it as occurring in "wet places among the pine forests, Ocean and Monmouth Counties." but it is not mentioned by Knieskern, and Willis' statement was doubtless based upon Gray. Britton simply quotes Gray and Willis, adding "not recently collected."

Notwithstanding the lack of specimens or any definite information, New Jersey is quoted in the range of the plant in all the manuals down to the present time.

It is included here simply to emphasize the facts regarding its reported occurrence in the State, which up to the present time I have been utterly unable to substantiate.



**PSILOCARYA** Torrey.***Psilocarya nitens* (Vahl).**

*Scirpus nitens* Vahl, Emun. 2. 272. 1806 [Carolina].—Long, Bartonica II. 18, 1910.

Very rare in the lower part of the Cape May peninsula, where it was collected by Mr. O. H. Brown in September, 1909.

*Cape May*.—Cape May.

**STENOPHYLLUS** Rafinesque.***Stenophyllus capillaris* (L.). Hair-like Sedge.**

Pl. XVII., Fig. 3.

*Scirpus capillaris* Linnæus, Sp. Pl. 49. 1753 [Virginia].—Barton, Fl. Phila. I. 34. 1818.

*Fimbristylis capillaris* Knieskern 34.—Willis 69.—Britton 263.

*Isolepis capillaris* Torrey Ann. Lyc. N. Y. II. 351. 1836.

Common in dry ground in the Northern and Middle districts and Coastal strip to Cape May. Rare and probably introduced in the Pine Barrens. Both this and the next are often weeds along railroads, etc.

*Fr.*—Early August to late September.

*Middle District*.—Burlington, Morris, Camden, Bridgeport, Tomlin, Swedesboro.

*Pine Barrens*.—Speedwell (S), Landisville (T), Mays Landing (NB), Tuckahoe.

*Coast Strip*.—Sherburn's (L), Ship Bottom (L), Barrel Isl. (L), West Creek (S), Palermo (S), Cape May (S).

**FIMBRISTYLIS** Vahl.

Pl. XVII., Fig. 2.

***Fimbristylis autumnalis* (L.). Autumnal Sedge.**

*Scirpus autumnalis* Linnæus, Mant. II. 180. 1771 [Virginia].—Pursh, Fl. Amer. Sept. I. 57. 1814.—Barton, Fl. Phila. I. 34. 1818.

*Fimbristylis autumnalis* Knieskern 34.—Willis 68.—Britton 263.

*Trichostylis mucronulatus* Torrey, Am. Lyc. N. Y. III. 355. 1836.

Common in moist ground, throughout the State.

*Fr.*—Mid-August to late September.

*Middle District*.—New Egypt, Delanco, Camden, Lawnside (S), Clementon, Medford (S), Swedesboro, Dividing Creek.

*Pine Barrens*.—Berlin, Landisville (T), Main Road Sta., Mays Landing.

*Coast Strip*.—Coxe's, West Creek (S), N. Beach Haven (L), Beach Haven Terrace (L), Sherburn's (L).

*Cape May*.—Dennisville (S), three miles west Court House (S), Cape May (OHB).

***Fimbristylis castanea* (Michx.). Chestnut Sedge.**

Pl. XVII., Fig. 1.

*Scirpus castaneus* Michaux, Fl. Bor. Am. I. 31. 1803 [Florida].

*Fimbristylis spadicea* Knieskern 34.—Torrey, Am. Lyc. N. Y. III. 346. 1836.  
—Willis 68.

*Scirpus ferrugineus* Torrey, Fl. U. S. I. 53. 1824.—Muhlenberg, Gram. 35. 1817.

*Scirpus spadiceus* Muhlenberg, Gram. 35. 1817.

*Fimbristylis castanea* Britton 263.—Keller and Brown 63.

Common in salt marshes all along the coast and rarely in sandy swamps in the Pine Barrens. None of the lists refer to this species as occurring away from the coast, although specimens collected by Cooper at Quaker Bridge have long been in the Academy herbarium; they and other Pine Barren material show no difference whatever from the maritime plant.\*

*Fr.*—Early August to late September.

*Pine Barrens*.—Atsion, Quaker Bridge, Cedar Grove (S), Hammonton (T).

*Maritime*.—Pt. Pleasant, Manahawkin, Surf City (L), Beach Haven (L), Sherburn's (L), Atlantic City, Ocean City, Palermo, Mays Landing (NB), Sea Isle City, Piermont, Stone Harbor, Holly Beach, Anglesea, Anglesea Jnc. (S), Cape May (S).

**SCIRPUS L.**

*Key to the Species.*

- a. Spikelet single, terminal.
  - b. Plants not over .5 dm. high. *S. nanus*, p. 267
  - bb. Plants 1.5–9 dm. high.
    - c. 1.5–3.5 dm. tall, terrestrial. *S. planifolius*, p. 268
    - cc. 3–9 dm. long, floating. *S. subterminalis*, p. 268
- aa. Spikelets several, sessile, with a single bract.
  - b. Culms terete or nearly so, .7–6 dm. tall, spikelets 5–10 mm. long.
    - c. Achene biconvex. *S. debilis*, p. 268
    - cc. One face of the achene flat.
      - d. Bristles wanting. *S. smithii*, p. 269
      - dd. Bristles present. *S. s. setosus*, p. 269
  - bb. Culms sharply 3-angled, usually over 6 dm. tall, spikelets 5–15 mm. long.

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\* In Ann. Lyc. N. Y. III. 345. 1836. Dr. Torrey mentions a specimen of *F. congesta* [= *F. vahlii*] in the Herbarium of the Philadelphia Academy from New Jersey, but I do not find it.

- c. Involucral leaf blunt. *S. torreyi*, p. 270
- cc. Involucral leaf pointed.
- d. Plant smaller, 3-12 dm. tall; involucral leaf 35-100 mm. *S. americanus*, p. 269
- dd. Plant larger, 6-21 dm. tall; involucral leaf 12-35 mm. *S. olneyi*, p. 269
- bbb. Culms, three angled, spikelets 10-20 mm. long, 6-10 mm. thick. *S. paludosus*, p. 271
- aaa. Spikelets numerous, in clusters or single on pedicels, forming an umbel.
- b. Spikelets large and thick, 15-40 mm. long.
- c. Spikelets pale brown. *S. fluciatilis*, p. 271
- cc. Scales of spikelets streaked with red (maritime). *S. robustus*, p. 270
- bb. Spikelets small, not over 6 mm. long.
- c. Culm terete, leaves reduced to sheaths on the culm. *S. validus*, p. 270
- cc. Culm triangular.
- d. Heads dense, star-shaped, spikelets blackish green. *S. atrovirens*, p. 271
- dd. Umbel more open, spikelets often solitary or only 2 or 3 on a peduncle.
- e. No hair-like bristles projecting from the scales. *S. lineatus*, p. 272
- cc. With projecting hair-like bristles, giving the spikelets a downy appearance.
- f. Spikelets blackish green, with a black band below the inflorescence. *S. longi*, p. 272
- ff. Spikelets rusty brown.
- g. Spikelets in clusters of 3-15. *S. cyperinus*, p. 272
- gg. Spikelets on individual peduncles. *S. eriophorum*, p. 273

**Scirpus nanus** Spreng. Dwarf Club-rush.

Pl. XX., Fig. 3.

*Scirpus nanus* Sprengel, Pug. I. 4. 1813 [Saxony].—Britton 264.—Keller and Brown 64.

*Eleocharis pygmaea* Torrey, Ann. Lyc. N. Y. III. 313. 1836.—Willis 68.

Salt marshes on the coast. In Britton's list, as well as that of Keller and Brown, this species is said to be frequent, but I have not found it so, nor do there seem to be many specimens preserved from the State.

*Fr.*—Early July into September.

*Maritime.*—Pt. Pleasant, St. Albans (L), Ship Bottom (L), Beach Haven Terrace (L), Beesley's Pt. (H), Cold Spring.

**Scirpus planifolius** Muhl. Few-flowered Club-rush.

Pl. XX., Fig. 2.

*Scirpus planifolius* Muhlenberg, Gram. 32. 1817 [Pennsylvania and Delaware].  
—Britton 264.—Keller and Brown 64.

In woods; frequent in the Northern and occasional southward in the Middle district.

*Fr.*—Late May to mid-June.

*Middle District.*—Mullica Hill (C), Mickleton, Swedesboro.

**Scirpus subterminalis** Torr. Water Club-rush.

Pl. XX., Fig. 6.

*Scirpus subterminalis* Torrey, Fl. U. S. I. 47. 1824 [Deerfield, Mass.]—  
Knieskern 34.—Torrey, Ann. Lyc. N. Y. III. 317.—Willis 68.—Britton  
264.—Keller and Brown 64.

Common in Pine Barren streams, occurring locally also in the lower part of the Middle and Cape May districts.

A characteristic species in the dark brown waters of the Pine Barrens, where it grows in great masses, its long leaves and stems swaying in the current and often associated with *Eleocharis robbinsii*. In ponds where the water has been drained off, it often grows upright with much shorter and stiffer stems, presenting quite a different appearance.

*Fr.*—Early July to late August; fruit rather uncommon.

*Middle District.*—Repaupo (KB), Swedesboro, Fairton.

*Pine Barrens.*—Toms River, Ferrago (P), Bamber, Forked River, Waretown, Pasadena, West Creek (S), Tuckerton, Speedwell, Chatsworth (S), Browns Mills (KB), Cedar Brook (KB), Berlin, Jackson, Parkdale, Hamonton (NB), Quaker Bridge, west of Atlantic City, Pancoast.

*Cape May.*—Dennisville (S), Nummeytown.

**Scirpus debilis** Pursh. Weak-stalked Club-rush.

Pl. XX., Fig. 4.

*Scirpus debilis* Pursh, Fl. Am. Sept. 55. 1814 [Pennsylvania].—Barton, Fl. Phila. I. 36. 1818.—Willis 68.

Occasional in damp spots in the Northern and Middle districts. Rare within our limits.

*Fl.*—Late August into October.

*Middle District.*—Delanco, Birmingham, Mickleton (H).\*

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\* The references to *S. debilis* by Harshberger, Proc. Ac. Nat. Sci., 1900, 623-671, must surely apply to *S. americanus*, as I have never found *S. debilis* growing as there described, nor do I know it from the coast.

**Scirpus smithii Gray. Smith's Club-rush.**

*Scirpus Smithii* A. Gray, Man. Ed. V. 563. 1867 [Lake Ontario to Illinois and Delaware Bay].—Willis 68.—Britton Trans. N. Y. Acad. Sci. XI. 78. 1892.—Britton 264.—Keller and Brown 65.

Damp open ground; along the Delaware river and very rare on the coast. Named in honor of Charles E. Smith (1820-1900), of Philadelphia, who brought it to Dr. Gray's attention. Mr. Smith was the leading authority on the plants of Philadelphia and vicinity. 1850-1870.\*

*Fr.*—Late July into October.

*Middle District.*—Barrack Creek, Burlington, Delair, Fish House, Mouth of Cooper's Creek.

*Coast Strip.*—Sea Isle City (CDL).

**Scirpus smithii setosus Fernald. Bristly Club-rush.**

*Scirpus smithii setosus* Fernald Rhodora, Oct. 1901, p. 252 [Illinois].—Long, Rhodora, 1910, p. 155.

Rare; apparently confined to the Middle district.

*Fr.*—August 1, achenes mature and a few scales dropping.

*Middle District.*—Clementon.

**Scirpus americanus Pers. Chair-maker's Rush. Three-square.**

Pl. XX, Fig. 7.

*Scirpus Americanus* Persoon, Syn. I. 68. 1805 [South Carolina].—Barton, Fl. Phila. I. 34. 1818.

*Scirpus pungens* Knieskern 34.—Willis 68.—Britton 264.

Swamps and along the larger streams throughout the State, but most abundant along the coast marshes.

*Fr.*—Late June to early September.

*Middle District.*—Riverton, Camden, Medford (S), Beaver Dam.

*Pine Barrrens.*—Quaker Bridge (S), Long Causeway (S), High Bridge (S), Landisville (T), Estelville, Mays Landing (NY).

*Maritime.*—Sandy Hook (NB), Ortley (NY), Seabright, Forked River, Surf City (L), Atlantic City, Ocean City (S), Stone Harbor, Piermont (S), Anglesea, Clermont (T), Cold Spring, Cape May (S), Dennisville, Sluice Creek (S).

**Scirpus olneyi Gray. Olney's Bull-rush.**

Pl. XX., Fig. 8.

*Scirpus Olneyi* Gray, Bost. Jour Nat. Hist. V. 238. 1845 [Salt Marshes, near Providence, R. I., and New Jersey].—Knieskern 34. Willis 68.—Britton 264.—Keller and Brown 65.

\* Cf. National Magazine, 1893. 567.

Frequent with the preceding along the coast and on the Bay shore of the Cape May peninsula in shallow water bordering the salt marshes or tidewater creeks, northward to the Hackensack meadows.

*Fr.*—Late July to early September.

*Maritime.*—Squan (C), Toms River (C), Forked River, Manahawkin, Surf City (L), Barnegat City (L), Brant Beach (L), Capt May Ct. House (S), Cold Spring, Cape May Pt. (S), Dennis, Sluice Creek (S), Beaver Dam.

***Scirpus torreyi* Olney. Torrey's Bull-rush.**

Pl. XX, Fig. 5.

*Scirpus Torreyi* Olney, Proc. Providence Frank. Soc. I. 32. 1847 [near Providence, also West Point—Torrey].—Stone Proc. Acad. Nat. Sci. Phila. 1908, p. 458.

Found for the first time in the State on August 10, 1907, by the writer. It was growing along the edge of a shallow pond above Delanco near the Delaware River.

*Fr.*—Mid-July to mid-September.

*Middle District.*—Delanco.

***Scirpus validus* Vahl. Bull-rush.**

Pl. XX., Fig. 1.

*Scirpus validus* Vahl, Enum. II. 268. 1806 [Carabees and Jamaica].

*Scirpus lacustris* Barton I. 33. 1818.—Knieskern 34.—Britton 264.—Keller and Brown 65.

Frequent in open swamps or in shallow water, except in the Pine Barren district.

*Fr.*—Late June to early August.

*Middle District.*—New Egypt, Camden, Mickleton, Mullica Hill (NB), Lindenwold (S), Beaver Dam, Swedesboro.

*Coast Strip.*—Pt. Pleasant, Bayhead, Toms River, Forked River, Estelville, Piermont, Anglesea, Cold Spring.

*Cape May.*—Court House, Cape May (S), Cape May Pt. (S).

***Scirpus robustus* Pursh. Salt Marsh Bull-rush.**

Pl. XXI., Fig. 7.

*Scirpus robustus* Pursh, Fl. Am. Sept. 56. 1814 [Salt marshes and banks of rivers—probably N. J.].

*Scirpus maritimus* Knieskern 34.—Willis 68.—Keller and Brown 65.

*Scirpus maritimus* var. *macrostachyos* Britton 264.

Common all along the coast and up the bay shore, in salt marshes.

*Fr.*—Mid-July to early September.

*Maritime.*—Swimming River (NB), Deal, Spring Lake (NB), Asbury Park (S), Barnegat Pier, Seaside Park, Forked River, Beach Haven Terrace (L), Absecon, Atlantic City (S), Ocean City, Stone Harbor, Anglesea, Wildwood, Holly Beach, Cold Spring, Cape May, Cape May Pt., Green Creek, Dias Creek (S), Sluice Creek (S), So. Dennis.

***Scirpus robustus paludosus* (A. Nelson). Pale Marsh Bull-rush.**

*Scirpus paludosus* A. Nelson, Bull. Torr. Club. XXVI. 5. 1899 [Granger, Wyo.].

With the preceding, but not common.

I am not satisfied that this is identical with Nelson's species, but until more material is available its status cannot be positively determined.

*Maritime.*—Deal, Seaside Park, Cold Spring (S).

***Scirpus fluviatilis* (Torr.). River Bull-rush.**

Pl. XXI. Fig. 8.

*Scirpus maritimus* var. *fluviatilis* Torrey, Ann. Lyc. N. Y. III. 324. 1836 [Western N. Y. and the Missouri above St. Louis].

*Scirpus fluviatilis* Britton 265.—Keller and Brown 65.

*Scirpus macrostachyos* Barton, Fl. Phila. I. 35. 1818.

Lower part of the Middle district along the Delaware River.

*Fr.*—Early July to early September; flowering culms apparently quite rare, or frequently only at certain stations.

*Middle District.*—Pensauken, Cooper's Creek, Mickleton = Old Mans Creek, Swedesboro.

***Scirpus atrovirens* Muhl. Dark-green Bull-rush.**

Pl. XX., Fig. 9.

*Scirpus atrovirens* "Muhlenberg." Willdenow Enum. Hort. Berol. 79. 1809 [North America].—?Barton Fl. Phila. I. 35. 1818.—Torrey Ann. Lyc. N. Y. III. 326. 1836.—Britton 265.—Keller and Brown 65.

Common in wet meadows in the Northern, and southward in the Middle district. Rare and probably introduced in the Pine Barrens. Specimens from Yorktown and Winslow seem to represent the form *S. georgianus* of R. M. Harper.

*Fr.*—Late June to early August.

*Middle District.*—Freehold (NB), Browns Mills (KB), Wolferts Sta. (H), Swedesboro.

*Cape May.*—Cape May (OHB), Cape May Pt. (OHB).

***Scirpus lineatus* Michx. Reddish Bull-rush.**

Pl. XX., Fig. 10.

*Scirpus lineatus* Michaux, Fl. Bor. Amer. I. 32. 1803 [Carolina].—Pursh, Fl. Am Sept. I. 56. 1814.—Long, Bartonica II. 19. 1910.

Open wet ground; rare; Northern, Middle and Pine Barren districts.

*Fr.*—Achenes mature and immediately drop with their scales in regular sequence from mid-June to mid-July.

*Middle District.*—New Egypt.

*Pine Barrens.*—Winslow Jnc.

***Scirpus longii* Fernald. Long's Wool-grass.**

Pl. XX., Fig. 11.

*Scirpus Longii* Fernald, Rhodora Jan., 1911. 6 [Andrew's, Camden Co., N. J.].

Discovered by the writer in a Pine Barren swamp about two miles north of Speedwell July 9, 1909. Local and restricted to the Pine Barrens, usually growing in water and blooming much earlier than the closely allied *S. atrocinctus* in the Pennsylvania Alleghanies. Named for Mr. Bayard Long, who has made a critical study of the Philadelphia flora for several years past and has rendered valuable assistance in the preparation of the present volume.

*Fr.*—Achenes mature and soon drop with their scales in regular sequence from mid-June to mid-July.

*Pine Barrens.*—Two miles north of Speedwell, Andrews, Sicklerville, Winslow Jnc.

***Scirpus cyperinus* (L.). Wool-grass.**

Pl. XX., Fig. 13.

*Eriophorum cyperinum* Linnæus, Sp. Pl. Ed. II. 77. 1762 [North America].

—Britton 265.

*Scirpus Eriophorum* Willis 68.

Frequent in swamps throughout the State, but less abundant than the following within our limits, especially in the Pine Barrens and Coast district.

*Fr.*—Mid-July into October.



*Middle District*.—Delanco, Mt. Holly, Clementon.

*Coast Strip*.—Barnegat City (L), Surf City (L), Beach Haven Terrace (L), Manahawkin.

*Pine Barrens*.—Folsom, Kenilworth (S).

**Scirpus eriophorum Michx. Pedicelled Wool-grass.**

Pl. XX., Fig. 12.

*Scirpus Eriophorum* Michaux, Fl. Bor. Am. I. 33. 1803 [Virginia to Georgia].—Knieskern 34.—

*Scirpus Eriophorum* var. *laxus* Willis 68.—Britton 265.

Swamps throughout the State, especially abundant in the Pine Barrens and along the Coastal strip.

*Fr.*—Mid-August into October; maturing distinctly later than the preceding.

*Middle District*.—Washington Park (S), Lindenwold (S), Millville.

*Pine Barrens*.—Penbryn (S), Malaga (S), Hammonton (S), Bamber Folsom.

*Coast Strip*.—Surf City (L), Anglesea, Atlantic City (S), Absecon (S), Ocean City (S), Forked River, Cox's.

**ERIOPHORUM L.**

*Key to the Species.*

a. Leaves very slender, 1-1.5 mm. broad, triangular-channelled, a single involucre bract, pappus pure white.

b. Upper cauline leaf with blade very short, less than sheath.

*E. gracile*, p. 274

bb. Upper cauline leaf with blade longer than sheath. *E. tenellum*, p. 273

aa. Leaves flat, involucre bracts, two or more, pappus more or less rusty.

*E. virginicum*, p. 274

**Eriophorum tenellum Nutt. Few-nerved Cotton-grass.**

Pl. XIX., Fig. 5.

*Eriophorum tenellum* Nuttall, Gen. Additions (p. 1), 1818 [New Jersey].

*Eriophorum angustifolium* Barton, Fl. Phila. I. 37. 1818.

*Eriophorum polystachyon* Knieskern 34.—Willis 68.—Britton 265.

*Eriophorum gracile* Keller and Brown 66.

In bogs of the Pine Barren district, also very rare or local in similar situations in west Jersey and the Cape May peninsula. As all the specimens so far obtained in our region are *E. tenellum* (except one colony of *E. gracile*), I am inclined to think that Dr. Knieskern's were the same and not *E. polystachyon*, as he stated. Willis and Britton simply copied his record.

*Fr.*—Early June to late June.

*Middle District*.—Swedesboro.

*Pine Barrens*.—Jackson, Speedwell (S), Tuckerton (KB), Estelville.

*Cape May*.—Cold Spring.

**Eriophorum gracile Koch. Slender Cotton-grass.**

*Eriophorum gracile* Koch, Roth. Cabal. Bot. 2. 259. 1800 [Kaiserlantern Palatinatu].

Very rare within our limits, but probably more common northward. Mr. Benjamin Heritage discovered this species June 10, 1892, in the bog at Repaupo, where so many other northern plants occur.

*Fr.*—Early May to late May.

*Middle District*.—Seven miles west of Mickleton [Repaupo].

**Eriophorum virginicum L. Virginia Cotton-grass.**

Pl. XIX., Fig. 1.

*Eriophorum virginicum* Linnæus, Sp. Pl. 52. 1753 [Virginia].—Knieskern 34.—Willis 68.—Britton 265.

Common in bogs throughout the State, especially abundant in the Pine Barrens, where its tufts of white "cotton" on their long slender stems are a conspicuous feature in the autumn.

*Fr.*—Mid-August to late September.

*Middle District*.—Haddonfield, Lindenwold, Clementon, Mickleton, Swedesboro.

*Pine Barrens*.—Brindletown, Hanover, Forked River, West Creek (S), Absecon, Bear Swamp, Albion, Cedar Brook, Williamstown Inc., Landisville, Pleasant Mills (S), Forks of Batsto, Eighth St. (T), Egg Harbor, Manumuskinn (S).

*Cape May*.—Cold Spring (S).

**FUIRENA Rottboell.**

*Key to the Species.*

a. Leaves and upper sheaths glabrous.

*F. squarrosa*, p. 274

aa. Leaves and sheaths hirsute.

*F. hispida*, p. 275

**Fuirena squarrosa Michx. Smooth Fuirena.**

*Fuirena squarrosa* Michaux, Fl. Bor. Am. I. 37. 1803 [Georgia and Carolina].

—Pursh, Fl. Am. I. 58. 1814.—Barton, Fl. Phila. I. 37. 1818.—Britton 266.—Keller and Brown 66.

*Fuirena squarrosa* var. *pumila* Knieskern 34.—Willis 67.

Salt marshes on the coast, apparently less common than the next.

*Fr.*—Late August to early October.

*Maritime.*—Spring Lake (NY), Spray Beach (L), N. Beach Haven (L), Absecon, Ocean City, Palermo (S), Mays Landing (NY), Anglesea, Cape May, Cape May Pt.

**Fuirena hispida** Ell. **Bristly Fuirena.**

Pl. XIX., Fig. 4.

*Fuirena hispida* Elliot, Bot. S. C. and Ga. I. 579. 1821 [Milledgeville, Ga.].

*Fuirena squarrosa* Knieskern 34.—Muhlenberg, Gram. 50. 1817.—Willis 67.

*Fuirena squarrosa* var. *hispida* Britton 266.—Keller and Brown 66.

Frequent along the edge of the salt marshes.

*Fr.*—Early August to early October.

*Maritime.*—Bay Head (S), Forked River (S), Ocean View, Cold Spring, Cape May (NB), Dias Creek.

**RYNCHOSPORA** Vahl.

*Key to the Species.*

- a. Spikelets spindled-shaped, 25 mm. long, in an open compound umbel plant, 9–21 dm. tall.
  - b. Spikelets sessile on a few short rays. *R. macrostachya*, p. 276
  - bb. Spikelets scattered, rays long and flexuous. *R. m. inundata*, p. 276
- aa. Spikelets 1–4; 6–8 mm. long, terminal, plant 1.5–4 dm. tall.
  - R. oligantha*, p. 277
- aaa. Spikelets numerous in dense axillary or terminal clusters.
  - b. Clusters corymbose.
    - c. Spikelets white or whitish.
      - d. No bristles at base of achene. *R. pallida*, p. 278
      - dd. Bristles present. *R. alba*, p. 277
    - cc. Spikelets chestnut or brown.
      - d. Spikelets 2 mm. long. *R. knieskernii*, p. 278
      - dd. Spikelets 4–5 mm. long.
        - e. Spikelets 5 mm. long, plants seldom over 3 dm. in height. *R. fusca*, p. 280
    - cc. Spikelets 3–4 mm. long, plants 3–9 dm. high.
      - f. Bristles of achene upwardly barbed.
        - g. Leaves filiform, involute. *R. filifolia*, p. 279
        - gg. Leaves flat grass-like.
          - h. Plant very slender, spikelets usually few in an umbel. *R. gracilentata*, p. 277
          - hh. Plant more robust with larger, numerous-flowered umbels. *R. smallii*, p. 279
      - ff. Bristles of achene downwardly barbed.
        - Plant slender, leaves slender. *R. glomerata leptocarpa*, p. 279

- hh.* Plant more robust, leaves wider. *R. glomerata*, p. 279
- bb.* Clusters in dense globular heads, spikelets brown.
- c.* Clusters 15-25 mm. in diameter. *R. axillaris*, p. 280
- cc.* Clusters 7-15 mm. in diameter. *R. a. microcephala*, p. 280
- aaaa.* Spikelets pedicelled or clusters pedicelled in a more or less open panicle.
- b.* Leaves filiform, spikelets on filiform pedicels. *R. rariflora*, p. 281
- bb.* Leaves involute, spikes sessile. *R. torreyana*, p. 281
- bbb.* Leaves flat, spikelets sessile. *R. cymosa*, p. 281

**Rynchospora macrostachya Torr. Horned Rush.**

Pl. XVIII, Fig. 1.

- Rynchospora macrostachya* Torrey, Gray Ann. Lyc. N. Y. III. 206. 1835.  
[Amherst and New Bedford, Mass.]. Willis 69.
- Ceratoschoenus macrostachya* Knieskern 34.—Gray Man. Ed. I. 532. 1848.
- Rynchospora laxa* var. *macrostachya* Britton 268.
- Rynchospora corniculata macrostachya* Keller and Brown 67.
- Rynchospora corniculata* Keller and Brown 67.

Locally common in swampy ground along the lower Delaware River; more plentiful in the Cape May peninsula and casual in the Pine Barrens, usually near the coast.

*C. corniculata*, reported by Keller and Brown from Center Square, proves to be this species.

This is a giant among our other *Rynchosporas*, and with its large clusters of long spikelets recalls some of the larger species of *Cyperus*, although it is taller even than they are.

*Fr.*—Mid-August to late September.

*Middle District.*—Center Square, Berlin, Pennsgrove (C), Franklinville (P).

*Pine Barrens.*—Manchester (C), Forked River (S), Mays Landing (T), Eighth St.

*Cape May.*—Bennett, Cold Spring, Green Creek, Cape May.

**Rynchospora macrostachya inundata (Oakes.). Slender Horned Rush.**

- Ceratoschoenus macrostachyus inundata* Oakes, Harvey's Magazine VII. 1841.  
185 [West Pond, Plymouth, Mass.].

Less common, but range probably the same as the last.

*Fr.*—Mid-August to late September.

*Middle District.*—Swedesboro, Repaupo.

*Pine Barrens.*—Pasadena, Manchester (P).

**Rynchospora gracilentia** Gray. **Slender Beaked-rush.**

*Rynchospora gracilentia* Gray, Ann. Lyc. N. Y. III. 216. 1835 [Pine Barrens of N. J.].—Knieskern 34.—Willis 69.—Britton Tran. N. Y. Acad. Sci. XI. 90. 1892.—Britton 267.—Keller and Brown 68.

Frequent in swamps or bogs in the Pine Barrens and Cape May districts, here reaching the northern limit of its range.

*Fr.*—Mid-July to early September.

*Pine Barrens.*—Lakehurst, Toms River, Forked River, Bamber Absecon, Quaker Bridge, Speedwell (S), Atsion, Parkdale (S), Landisville, Eighth St., Hammonton, Egg Harbor City, Dividing Creek.

*Cape May.*—Bennett, Whitesboro (S), Cold Spring (S), Green Creek (S).\*

**Rynchospora oligantha** Gray. **Few-flowered Beaked-rush.**

Pl. XVIII., Fig. 9.

*Rynchospora oligantha* Gray, Ann. N. Y. Lyc. III. 212. 1835 [Fayetteville and Wilmington, N. C.].—Stone, Proc. Acad. Nat. Sci. Phila., 1908, p. 458.

Known only from bogs along the Wading River above Speedwell in the heart of the Pine Barrens, where it was first found by Mr. S. S. Van Pelt June 29, 1906. Not previously known north of Delaware. In July, 1909, Mr. Van Pelt and the writer found a patch of this sedge probably half an acre in extent.

*Fr.*—Late June to mid-August.

*Pine Barrens.*—Between Speedwell and Chatsworth.

**Rynchospora alba** (L.). **White Beaked-rush.**

Pl. XVIII., Fig. 10 (lower).

*Schoenus albus* Linnæus Sp. Pl. 44. 1753 [N. Europe].

*Rynchospora alba* Barton Fl. Phila. I. 25. 1818.—Knieskern 35.—Willis 69.—Britton 267.

Common in bogs of the Pine Barren and Cape May districts, and casually in the Middle district.

*Fr.*—Early August to mid-September.

*Middle District.*—Tomlin, Swedesboro.

*Pine Barrens.*—Allaire, Lakehurst, Island Hts. Inc., Forked River, Waretown, West Creek (S), Speedwell (S), Forks of Batsto, Parkdale, Berlin, Pen Bryn (S), Landisville (T), Egg Harbor City (S), Palermo, eight m. W. Atlantic City.

*Coast Strip.*—Sherburn's (L).

*Cape May.*—Cold Spring (S).

\* The record for Mickleton (KB). Heritage, proves to be a depauperate *R. glomerata*.

**Rynchospora pallida** M. A. Curtis. **Pale Beaked-rush.**

Pl. XVIII., Fig. 10 (upper).

*Rynchospora pallida* M. A. Curtis, Am. Jour. Sci. (II.) 7. 409. 1849 [Wilmington, N. C.].—Willis 69.—Gray Man. Ed. V. 568. 1867.—Britton Trans. N. Y. Acad. Sci. XI. 87. 1892.—Britton 267.—Keller and Brown 67.

Common in bogs of the Pine Barren, Cape May and locally in the lower Middle districts. It does not range north of the New Jersey Pines.

*Fr.*—Mid-July to early September.

*Middle District.*—New Egypt, Bordentown, Merchantville, Woodbury, Lindenwold, Dividing Creek.

*Pine Barrens.*—Lakehurst, Manchester, Forked River, Toms River, Browns Mills (P), Chatsworth, Bear Swamp, Clementon, Atsion, Parkdale, Quaker Bridge, Landisville, Buena Vista (T), Batsto (P), Hammonton (S), Egg Harbor City.

*Cape May.*—Court House.

**Rynchospora knieskernii** Carey. **Knieskern's Beaked-rush.**

Pl. XVIII., Fig. 2.

*Rynchospora Knieskernii* Carey, Am. Jour. Sci. (II.) 4. 25. 1847 [Pines of New Jersey].—Knieskern 35.—Willis 69.—Britton Trans. N. Y. Acad. Sci. XI. 88. 1892.—Britton 267.—Keller and Brown 67.

Confined to the Pine Barren region, where it is said to always occur on deposits of bog iron; rare.

Remarkably fine specimens were obtained by Mr. C. A. Gross, which measured 6 dm. in height.

The species was first discovered by Dr. Knieskern, after whom it was named, at Point Hollow, two miles from Manchester (now Lakehurst), on the road to Cassville, where the doctor resided. Knieskern was one of the pioneer botanists of the Pine Barrens, and his name appears frequently in Gray's Manual—His Catalogue of Plants of Monmouth and Ocean Cos. 1856, was the first publication dealing directly with the flora of the Pines.

*Fr.*—Late July to late September.

*Pine Barrens.*—Hope Village on Shark River (P), Cassville, Bamber, Whitings, West Creek (S), Pleasant Mills, Atsion, Egg Harbor City, Quaker Bridge (C).

Original specimens at the New York Botanical Garden are labelled by Knieskern "*R. Grayana* Kn. (NSp)," a name that was apparently never published.

**Rynchospora glomerata (L.). Clustered Beaked-rush.**

Pl. XVIII., Fig. 7.

*Schoenus glomeratus* Linnæus, Sp. Pl. 44. 1753 [Virginia].*Rynchospora glomerata* Knieskern 35.—Willis 69.—Britton 267.—Keller and Brown 67.

Open wet ground, bogs, etc.; frequent throughout the State, and abundant in the Pine Barrens. The most common species of the genus.

*Fr.*—Late July to late September.*Middle District.*—New Egypt, Lindenwold, Tomlin, Swedesboro, Salem (S), Dividing Creek.*Pine Barrens.*—Lakehurst, Waretown, Atsion, Weymouth (T), Clementon, Landisville, Woodbine.*Coast Strip.*—Pt. Pleasant, Seaside Park, Barnegat City (L), St. Albans (L), Sherburn's (L), N. Beach Haven (L), West Creek (S), Ocean City (S).*Cape May.*—Cape May (S).**Rynchospora glomerata leptocarpa** Chapm.*Rynchospora glomerata leptocarpa* Chapman, Britton, Trans. N. Y. Acad. Sci. II. 88. 1892 [So. Carolina].

Apparently rather frequent in the heart of the Pine Barrens. This is a more slender form with narrower leaves, perhaps identical with *minor* of Britton. The variety *discutiens*\* of Clarke is reported from New Jersey, but I have not found it.

*Fr.*—Early August to mid-September.*Pine Barrens.*—Jones Mill (S), Batsto, four mi. E. Hammonton (S) Manumuskin, Franklinville (P).**Rynchospora smallii** Britton. **Small's Beaked-rush.***Rynchospora Smallii* Britton in Small's Southern Flora, p. 1321 [Hendersonville to Solola Mt.].—Long, Bartonica II. 19. 1910.

Occasional and perhaps more abundant than it at present appears to be. Its close resemblance to *R. glomerata* makes it difficult to recognize.

*Fr.*—Late July to mid-September.*Middle District.*—Delanco.*Pine Barrens.*—Parkdale.**Rynchospora filifolia** Torrey. **Thread-leaved Beaked-rush.***Rynchospora filifolia* Torrey Ann. Lyc. N. Y. III. 1836. 366 [N. Carolina and Florida].

\* Britton's Manual, p. 185.

Apparently very rare, and known only from swamps along the coast and the west of Woodbine, Cape May County, where it was collected by Mr. Stewardson Brown August 30, 1900, and from Fenner's, Cape May County, B. Long, August 11, 1911.

Not previously known from New Jersey.

*Fr.*—August 30 achenes mature; some scales gone.

*Pine Barrens*.—Woodbine.

*Cape May*.—Bennett.

**Rynchospora axillaris (Lam.). Capitata Beaked-rush.**

Pl. XVIII., Fig. 8.

*Schoenus axillaris* Lamarek, Tabl. Encycl. I. 137. 1791.

*Rynchospora cephalantha* Knieskern 35.—Willis 69.—Gray Ann. Lyc. N. Y. III. 218. 1835.

*Rynchospora axillaris* Britton 267.—Keller and Brown 67.

Bogs in the Pine Barrens; rare. First found in the State by Dr. Torrey.

*Fr.*—Late July to mid-September.

*Pine Barrens*.—Manchester (C), Bamber, Chatsworth, Jones Mill (S), Speedwell, Quaker Bridge, Atsion (P), Parkdale, Hammonton, Batsto (P), Egg Harbor City (P).

**Rynchospora avillaris microcephala Britton. Small-headed Beaked-rush.**

*Rynchospora axillaris* var. *microcephala* Britton Trans. N. Y. Acad. Sci. XI. 89. 1892 [Monmouth Co., N. J.].

Pine Barren bogs; rare. Dr. Britton described this form from one of Dr. Knieskern's specimens, the latter apparently not distinguishing it from the last.

*Fr.*—Late July to mid-September.

*Pine Barrens*.—Speedwell, Parkdale.

**Rynchospora fusca (L.). Brown Beaked-rush.**

Pl. XVIII., Fig. 6.

*Schoenus fuscus* Linneus Sp. Pl. Ed. 2. 1664. 1763 [Switzerland, England and Italy].

*Rynchospora fusca* Knieskern 34.—Willis 69.—Gray Ann. Lyc. N. Y. III. 215. 1835.—Britton 267.—Keller and Brown 68.

Bogs of the Pine Barren and Cape May districts frequent.

*Fr.*—Late June to early September.



*Middle District*.—New Egypt.

*Pine Barrens*.—Lakehurst, Manchester (C), Forked River, Toms River, Bamber, Mayetta, Manumuskim, Chatsworth, Speedwell (S), Quaker Bridge (C), Absecon, Cedar Lake, Spring Garden (P), Eighth St., Vineland, Landisville (T), Pancoast, Egg Harbor City, Belleplain (S).

*Cape May*.—Bennett.\*

***Rynchospora cymosa* Ell. Grass-like Beaked-rush.**

Pl. XVIII., Fig. 3.

*Rynchospora cymosa* Elliott, Bot. Sc. and Ga. I. 58. 1816 [South Carolina].—Knieskern 34.—Gray Ann. Lyc. N. Y. III. 196. 1835.—Willis 69.—Britton 266.—Keller and Brown 68.

Bogs of the Northern, Middle, and Cape May districts, and also on the Coast Strip; not very common.

*Fr.*—Early July to mid-August.

*Middle District*.—Griffith's Swp. (P) Lindenwold, Mickleton (H).

*Coast Strip*.—Squan (C), Manahawkin.

*Cape May*.—Bennett, Cold Spring.

***Rynchospora torreyana* Gray. Torrey's Beaked-rush.**

Pl. XVIII., Fig. 5.

*Rhynchospora Torreyana* Gray Ann. Lyc. N. Y. III. 197. 1835 [Monmouth Co. and Quaker Bridge, N. J.].—Knieskern 34.—Willis 69.—Britton 266.—Keller and Brown 68.

Bogs of the Pine Barren and Cape May districts rather frequent. This takes the place of *R. cymosa* in the Pines, but at Cold Spring, Cape May County, I have found the two growing in close proximity.

*Fr.*—Mid-July to early September.

*Middle District*.—New Egypt.

*Pine Barrens*.—Quaker Bridge (C), Pleasant Mills (C), Batsto, White Horse (S), Parkdale, Atsion, Main Road Sta., Egg Harbor City.

*Cape May*.—Anglesea Inc., Rio Grande, Bennett, Cold Spring, Nummeytown (S).

***Rynchospora rariflora* Michx. Rare-flowering Beaked-rush.**

Pl. XVIII., Fig. 4.

*Schoenus rariflora* Michx., Fl. Bor. Am. I. 35. 1803 [Georgia].—Stone, Torrey. 1908. 16.

\* The record for Mickleton (C) has not been verified.

Discovered by the writer in a bog near Bennett, Cape May County, August 4, 1907. Previously not known from north of North Carolina.

*Fr.*—Probably July. Later specimens show few intact panicles.

*Cape May.*—Bennett.

**CLADIUM P. Browne.**

***Cladium mariscoides* (Muhl.). Twig Rush.**

Pl. XIX., Fig. 2.

*Schocnus mariscoides* Muhlenberg, Gram. 4. 1817 [Pennsylvania].

*Cladium mariscoides* Knieskern 35.—Torrey, Am. Lyc. N. Y. III. 372. 1836.

—Willis 69.—Britton 268.—Keller and Brown 68.

Common in wet bogs or marshes in the Northern, Pine Barren, Coast and Cape May districts.

*Fr.*—Mid-July into October.

*Pine Barrens.*—Toms River, Forked River (NB), Bamber, Speedwell, Chatsworth, Berlin, White Horse (S), Cedar Brook, Main Road Sta. (T), Eighth St. (T), Parkdale, Batsto, Quaker Bridge (NB), Egg Harbor City, Estelville, Dennisville (P).

*Coast Strip.*—Pt. Pleasant, Spray Beach (L), Beach Haven Terrace (L), opposite Ocean City, Ocean View.

*Cape May.*—Cold Spring, Bennett (S), Cape May (S).

**SCLERIA Berg.**

*Key to the Species.*

a. Spikelets in a terminal, or a terminal and 1-3 smaller lateral stalked clusters.

b. Achene smooth and shining.

c. 2 mm. high. Plant 4.5-9 dm. tall. *S. triglomerata*, p. 282

cc. 1 mm. high. Plant more delicate, 3-6 dm. tall. *S. minor*, p. 283

bb. Achene irregularly reticulate.

c. Lobes of hypogynium emarginate or cleft, somewhat obtuse, achene 1-1.5 mm. *S. reticularis*, p. 283

cc. Lobes acute or acuminate, achene 2-2.5 mm., plant taller and more lax. *S. r. torreyana*, p. 283

bbb. Achene papillose. *S. pauciflora*, p. 284

aa. Spikelets in several, separate, sessile, somewhat whorled clusters.

*S. verticillata*, p. 284

***Scleria triglomerata* Michx. Nut-rush.**

Pl. XIX., Fig. 6.

*Scleria triglomerata* Michaux, Fl. Bor. Am. II. 168. 1803 [Carolina].—

Knieskern 35.—Willis 69.—Britton 268.—Keller and Brown 68.

Common in bogs and wet places in the Pine Barren, and locally in the Northern and Middle districts.

*Fr.*—Early July to early September.

*Middle District.*—Griffith's Swamp, Lindenwold (S), Gloucester, Tomlin, Yorktown, Dividing Creek.

*Pine Barrens.*—Browns Mills, West Creek (S), Tuckerton, Chatsworth, Speedwell (S), Jones Mill (S), White Horse (S), Bear Swamp (S), Clementon, Waterford, Penbryn (S), Sicklerville (S), Winslow, Landisville, Parkdale (S), Egg Harbor City, Quaker Bridge (NY).

*Coast Strip.*—Atlantic City (possibly from the mainland, opposite).

***Scleria minor* (Britt.). Slender Nut-rush.**

*Scleria triglomerata minor* Britton Ill. Flora I. 282. [So. N. J.] (new name for *S. f. gracilis* Br.).

*Scleria triglomerata* var. *gracilis* Britton Ann. N. Y. Acad. III. 230. 1883 [Leeds Pt., Haddonfield, Quaker Br.]—Britton 268.

Apparently restricted to the swamps of the Pine Barrens and locally in the Cape May district and in Long Island.

*Fr.*—Late June to late August.

*Middle District.*—Griffith's Swamp (NB), Dividing Creek.

*Pine Barrens.*—Forked River, Bamber, Pasadena, Manahawkin, Chatsworth, Speedwell (S), Quaker Bridge (Britton), Buena Vista (T), Main Road Sta. (T), Landisville, Hammonton, Leeds Pt. (Britton).

*Cape May.*—Bennett, Whitesboro (S).

***Scleria reticularis* Michx. Reticulated Nut-rush.**

*Scleria reticularis* Michaux Fl. Bor. Am. II. 167. 1803 [Carolina].—Pursh, Fl. Am. Sept. I. 45. 1814.—Gray Man. Ed. I. 534. 1848.

Only known from the Cape May district; apparently quite rare. Most of the records of this species in our region refer to the next.

*Fr.*—Early August to mid-September.

*Cape May.*—Bennett.

***Scleria reticularis torreyana* (Walp.). Torrey's Nut-rush.**

Pl. XIX., Fig. 7.

*Scleria Torreyana* Walp, Ann. III. 696. 1852-3 [New Jersey, Long Island] (new name for *S. laxa* Torr., Gray Man. 534).—Britton 268.—Keller and Brown 69.

*Scleria laxa* Torrey Ann. Lyc. N. Y. III. 443. 1836.—Knieskern 35.—Willis 69.

*Scleria reticularis pubescens* Keller and Brown 69.

*Scleria verticillata* Gross, Bull. Torr. Bot. Club XI. 32. 1884.—Britton 268.—Keller and Brown 68.

Pine Barren and Cape May districts locally common. The width of the leaves and pubescence of the achenes are characters which are very variable. The several varieties of Dr. Britton I cannot distinguish, as they seem to be merely individual variations, without satisfactory correlation of characters.

*Fl.*—Early August into September.

*Pine Barrens.*—Manchester (C), Toms River (P), Forked River (S), Coxé's, Speedwell, Chatsworth, Quaker Bridge, Batsto (P), Palermo (S).

*Cape May.*—Cold Spring.

***Scleria pauciflora* Muhl. Papillose Nut-rush.**

*Scleria pauciflora* "Muhl." Willdenow, Sp. Pl. IV. 318. 1805 [probably Pennsylvania. Willd. cites Carolina, but this is taken from Michaux whose *S. oligantha* is erroneously cited as a synonym].—Knieskern 35.—Wills 69.—Britton 268.

Dry ground, Middle district not common; also rare and local in the Pine Barrens, where it has, perhaps, been introduced, and at stations in Warren County.

*Fr.*—Early July to early September.

*Middle District.*—Allaire (S), Shark River, Clementon, Mickleton (H), Fairview (H), Hammonton.

*Pine Barrens.*—Da Costa, Buena Vista (T), (near Landisville, which is the locality quoted by Britton), Whitings (H).

*Cape May.*—Bennett.

***Scleria verticillata* Muhl. Whorled Nut-rush.**

Pl. XIX., Fig. 3.

*Scleria verticillata* "Muhl." Willdenow Sp. Pl. IV. 317. 1805 [Virginia and Carolina].

Common along the edge of the salt marshes of the coast of Cape May County (probably further north also). It was first collected here by Mr. C. S. Williamson, at Cold Spring. Dr. Britton's list has it only from the Hackensack marshes.

*Fr.*—Early August to mid-September (possibly).

*Coast Strip.*—Palermo, opp. Ocean City, opp. Anglesea, Cold Spring, W. Cape May (OHB).

## CAREX L.

The genus *Carex* is represented by but few species in the Pine Barrens, but in other parts of our region a number of species occur. Some of northern affinities barely enter our limits, while others are widespread.

*Flowering and Fruiting Data.*—Time of year noted indicates the season during which characteristic, fully developed perigynia, generally with mature achenes, are present, and intact spikes occur—satisfactory study of the genus can only be undertaken at this season.

*Key to the Species.*

- a. Staminate and pistillate spikes clearly distinct, although they may be closely contiguous.
- b. Staminate spike long-stalked, so that it stands entirely clear of the adjacent pistillate spike even when the latter is appressed to the stalk.
- c. Staminate spike single.
  - d. Pistillate spikes large, at least 12 mm. in diameter.
    - e. Sessile and nearly globular, several close together, green.
      - C. intumescens*, p. 291
    - ec. Peduncled, cylindrical, 25 mm. or more long, lowest spike often drooping on a very slender peduncle.
      - C. hystericina*, p. 293
    - dd. Pistillate spikes medium, 8 mm. in diameter, plant glaucous.
      - C. livida*, p. 303
  - ddd. Pistillate spikes, small, less than 6 mm. in diameter.
    - e. Tall, upright flower stalks nearly or quite equaling the leaves or exceeding them.
      - f. Leaves broad, many of them, 6 mm. broad or more, glaucous, lower pistillate spikes on long flexuous peduncles six times their length.
        - C. laxiculmis*, p. 302
      - ff. Leaves narrow, 4 mm. broad or less.
        - g. Beak of perigynia elongated and twisted to one side, lower pistillate spikes on long flexuous peduncles.
          - C. styloflexa*, p. 302
        - gg. Beak not produced or twisted, very short.
          - h. Staminate spike with peduncle, 75–100 long.
            - C. tetanica*, p. 301
          - hh. Staminate spike with peduncle, 25–50 mm. long or less.
            - i. Pistillate spikes, 3 mm. in diameter, lowest on filiform peduncles, achenes sharply 3-angled.
              - C. digitalis*, p. 302
            - ii. Pistillate spikes, 5 mm. in diameter, none slender peduncles, achenes not sharply 3-angled.
              - C. conoidca*, p. 301

- cc. Low tufted, pistillate spikes nearly sessile, staminate elevated 25-50 mm., both far exceeded and concealed by the old dry leaves, which persist in large numbers.
- f. Perigynia puberulent. *C. umbellata*, p. 304
- ff. Perigynia glabrous, or puberulent only on the angles of the beak. *C. u. tonsa*, p. 304
- cc. Staminate spikes, several.
- d. Perigynia beak notched or toothed at tip.
- c. Perigynia pubescent.
- f. Teeth at tip of perigynia, less than 1 mm. long. *C. lanuginosa*, p. 296
- ff. Teeth at tip of perigynia more than 1 mm. long. *C. trichocarpa*, p. 294
- cc. Perigynia glabrous.
- f. Pistillate spikes, 17 mm. thick, about twice as long as thick, usually single, staminate spikes usually 2. *C. bullata*, p. 292
- ff. Pistillate spikes, 10-12 mm. thick, about three times as long as thick.
- g. Perigynia yellow straw color, much inflated at the base, abruptly contracted into a slender beak.
- h. Spongy at the base of the stem. *C. utriculata*, p. 292
- hh. Base of stem not spongy. *C. monile*, p. 292
- gg. Perigynia brownish, tapering gradually.
- h. Staminate spikes 3-4, pistillate spikes 25-100 mm. long. *C. lacustris*, p. 294
- hh. Staminate spikes 2, pistillate spikes 10-50 mm. long. *C. walteriana*, p. 295
- dd. Perigynia tapering into a hollow slender beak, obliquely truncate at the tip, not notched. *C. polymorpha*, p. 301
- ddd. Perigynia plano-convex, not beaked, pistillate spikes very slender, 3 mm. thick, with closely imbricated perigynia. Swamp species forming dense tussocks. *C. stricta*, p. 296
- bb. Staminate spike sessile or on a short peduncle, so that it does not stand clear of the adjacent pistillate spike when the latter (or the perigynia composing it) is brought close against the stem. Staminate spike always single.
- c. Achenes 7-12 mm. long.
- d. Spindle-shaped, tapering gradually.
- e. Spike 1 of only 3-6 achenes, spreading or reflexed. *C. collinsii*, p. 290
- cc. Spikes about 4 of numerous achenes in fan-shaped clusters, rather remote and not over 15 mm. long. *C. folliculata*, p. 291
- dd. Sharply triangular, abruptly narrowed to a long, very slender twisted beak, spikes 4-5, dense and cylindrical 40 mm. long.
- e. Achenes rhombic ovoid, the angles round knobbed in the middle. *C. lupuliformis*, p. 292

- ee.* Achenes ellipsoid ovoid, angles not prominently knobbed.  
*C. lupulina*, p. 292
- ddd.* Swollen at base tapering to a slender beak.
- e.* Spikes erect or somewhat pendant, but achenes and scales never reflexed, 25-65 × 20 mm. *C. lurida*, p. 293
- ee.* Spikes all pendant and scales and achenes reflexed, 35-50 × 12 mm. *C. comosa*, p. 293
- cc.* Achenes 5 mm. long or less.
- d.* Stems scabrous, achenes long beaked, often partly reflexed.  
*C. scabrata*, p. 295
- dd.* Stems not scabrous.
- e.* Achenes reflexed, staminate spike strictly sessile, oblique from base of upper pistillate spike, the lacter yellow.  
*C. flava*, p. 300
- ce.* Achenes not reflexed.
- f.* Spikes pendant.
- g.* Pistillate spike 50 mm. long or more, 12 mm. thick, achenes plano-convex.
- h.* Leaf sheaths glabrous. *C. crinita*, p. 298
- hh.* Leaf sheaths scabrous hispid.  
*C. gynandra*, p. 298
- gg.* Pistillate spikes 25-50 mm. long, 5-6 mm. thick.
- h.* Scales largely deep purplish black, spikes 25 mm. long. *C. barrattii*, p. 297
- hh.* Scales brown or purplish, spike 16 mm. long.  
*C. limosa*, p. 297
- hhh.* Scales green or brownish, spikes very slender, tip of staminate spike often pistillate, all spikes filiform peduncled.
- i.* Achenes short. *C. prasina*, p. 297
- ii.* Achenes long and slender.
- j.* Achene twice as long as the scale.  
*C. tenuis*, p. 299
- jj.* Achene three times as long as the scale.  
*C. oblita*, p. 299
- ff.* Spikes erect.
- g.* Achenes densely pubescent, pistillate spikes one or two close to the staminate spike. *C. vestita*, p. 295
- gg.* Achenes glabrous.
- h.* Pistillate spikes 2-3 close to the staminate spike (none half way down the stalk), spikes thick and short 12 × 5 mm. *C. pallescens*, p. 301
- hh.* Pistillate spikes somewhat remote, one always well below the others.
- i.* Perigynia ovoid, beakless.
- j.* Plant densely glaucous.  
*C. glaucodea*, p. 300
- jj.* Plant green, not glaucous.  
*C. grisea*, p. 300

- ii. Perigynia with short beak, twisted to one side, ribbed.
    - j. Pistillate spikes dense, closely imbricated. *C. granularis*, p. 300
    - jj. Pistillate spikes, rather loosely flowered, especially below, not closely imbricated.
      - k. Leaves 3-7 mm. wide, spikes and perigynia short, latter 2.5-4 mm. *C. laxiflora*, p. 301
      - kk. Leaves 6-20 mm. wide, spikes and perigynia long, latter 2-2.5 mm. *C. l. patulifolia*, p. 302
    - hhh. Pistillate spikes forming 1-3 small clusters at the base of the sessile staminate spike. Entire inflorescence occupying less than one inch of the top of the stem.
      - i. Perigynia densely wooly, beaked; beak long and flat.
        - j. Plant stoloniferous, the elongated, often leafless stolons scaly and creeping, inflorescence purplish. *C. pennsylvanica*, p. 303
        - jj. Plant cespitose not stoloniferous, inflorescence greenish. *C. varia emmonsii*, p. 304
  - ii. Perigynia glabrous, ellipsoid, not beaked. *C. leptalca harperi*, p. 305
- bbb. Inflorescence much exceeded by the leaves, but not sessile.
- c. Scales more or less dark purple margined.
    - d. Inflorescence all at the summit of the stalk, pistillate and staminate spikes closely associated. *C. nigromarginata*, p. 305
    - dd. Inflorescence in several rather remote heads. *C. pedunculata*, p. 303
  - cc. Scales green.
    - d. Staminate spike at tip of pistillate, the latter of only 3-9 achenes. *C. willdenovii*, p. 305
    - dd. Staminate spike at base of pistillate, the latter of typical form, many flowered. *C. abscondita*, p. 303
- aaa. Staminate and pistillate flowers mingled in the same spike, sometimes occupying different parts of it.
- b. Spike regular cylindrical.
    - c. Staminate portion terminal.
      - d. Spikes 7-50 mm. long, always dark brown, more or less variegated, perigynia white, beakless. *C. burxbaumii*, p. 296
      - dd. Spikes green, scales whitish 4-16 mm. long. *C. l. harperi*, p. 305
    - cc. Staminate portion basal, persisting as a sheath of imbricated scales, embracing the base of the spike.
      - d. Perigynia not reflexed.
        - e. Spikes 12 mm. thick.



- f. 15 mm. long, pistillate scales sharp pointed.  
*C. squarrosa*, p. 294
- ff. 25 mm. long, pistillate scales blunt.  
*C. typhinooides*, p. 294
- ee. Spikes 6 mm. thick or less.
- f. Spikes three-clustered at the top of the culm, 4-6 mm. thick, but little longer.
- g. Leaves hairy. *C. triceps*, p. 298
- gg. Leaves smooth. *C. caroliniana*, p. 299
- ff. Spikes several, 3-4 mm. thick, often slightly drooping.  
*C. swanii*, p. 298
- dd. Perigynia reflexed, spikes solitary, 5 mm. thick.  
*C. exilis*, p. 306
- bb. Spike elongated or globular, dense and bristling, somewhat irregular and branched on very short peduncles.
- e. Spikes yellow or tawny when mature.
- f. Perigynia enlarged and inflated at the base, long slender beak, much longer than the body. *C. stipata*, p. 306
- ff. Perigynia firm and not enlarged or inflated at the base, beak shorter than the body.
- g. Leaves equal to or exceeding the culms.  
*C. vulpinoidea*, p. 306
- gg. Leaves shorter than the culms. *C. annectens*, p. 307
- ee. Spikes green.
- f. Heads nearly globular, 7-15 mm. long, leaves soft.  
*C. cephalophora*, p. 307
- ff. Heads elongated, 15-40 mm. long, leaves stiff and wiry.  
*C. muhlenbergii*, p. 307
- bbb. Inflorescence, a series of star-like (ovoid in *canescens*) clusters, sometimes close together at the end of the culm, usually with the lower remote.
- c. Staminate flowers at the base of the spike.
- d. Perigynia plano-convex, spikes 6-12 mm. long.  
*C. canescens disjuncta*, p. 310
- dd. Perigynia with thin or winged margins.
- e. Perigynia broadest at the base, beak rough or serrulate.
- f. Perigynia never more than half as broad as long, 3-4 mm. long. *C. cephalantha*, p. 309
- ff. Perigynia more than half as broad as long.
- g. Scales sharp pointed, leaves 2.5-4.5 mm. broad, inflorescence 15-35 mm. long, spike 15-50 flowered, plant coarse. *C. atlantica*, p. 309
- gg. Scales blunt, leaves narrower, inflorescence 10-20 mm. long, spike 5-15 flowered; plants slender.
- h. Leaves 1-2 mm. broad. *C. interior*, p. 308
- hh. Leaves still narrower. *C. i. capillacea*, p. 308
- ee. Perigynia broadest near the middle, less than 2 mm. broad, beak short and smooth. *C. seorsa*, p. 309

- cc. Staminate flowers at tip of spike. Perigynia widest above the base, 2.5-4 mm. long, edges minutely serrulate, spikes 3-8, remote except at top of culm, 6-15 flowered, plant weak.  
*C. rosea*, p. 307
- bbbb. Inflorescence consisting of 2-3 clusters of 2-5 flowers, remote on a filiform branched culm, perigynia 3.3-3.8 mm. long.  
*C. trisperma*, p. 310
- aaa. Staminate and pistillate flowers mingled, (staminate usually at the base), in uniform ovoid heads, clustered or usually separate at the end of the scape, each composed of a number of closely imbricated flat perigynia and scales.
- b. Perigynia lanceolate or ovate, 2-5 times as long as wide.
- c. Spikes green-brown, blunt. *C. tribuloides*, p. 311
- cc. Spikes brown or chestnut. *C. scoparia*, p. 310
- bb. Perigynia ovate, not more than twice as long as wide.
- c. Perigynia spreading, heads clustered. *C. straminea*, p. 311
- cc. Perigynia erect and appressed, heads usually single, scattered along the stem.
- d. Heads silvery green or nearly white, sea beach species.  
*C. silicia*, p. 311
- dd. Heads brown or green-brown. *C. hormathodes*, p. 312
- bbb. Perigynia orbicular or broadly ovate, as broad or even broader than long.
- d. Heads green or silvery-green. *C. albolutescens*, p. 313
- dd. Heads brown.
- c. Achene short stalked. Heads 8-15 mm. long.  
*C. alata*, p. 312
- cc. Achene sessile. Heads 6-8 mm. long.  
*C. festucea brevior*, p. 312

**Carex collinsii Nutt. Collins' Sedge.**

Pl. XXII., Fig. 3.

*Carex Collinsii* Nuttall, Gen. II. 205. 1818 [New Jersey].—Keller and Brown 76.

*Carex subulaxi* Kneskern 37.—Torrey Ann. Lyc. N. Y. III. 419. 1836.—Willis 71.—Britton 269.

Pine Barren and Middle districts; frequent in almost all the Cedar swamps and in other wooded swamps in the southwestern part of the State, also locally in Hudson, Bergen and Middlesex Counties. This little sedge was named in honor of Zaccheus Collins, a Philadelphia botanist, who, though he published nothing, had probably the most thorough field knowledge of the local flora, of the men of his time. He contributed much information to Nuttall and Barton, and is frequently quoted by them.

*Fr.*—Mid-June to early July, scattered spikes persisting through the summer.

*Middle District*.—Shark River, Farmingdale, New Egypt, Griffiths, bel. Washington Park, Lindenwold (KB), Gloucester (KB), Mickleton (H), Swedesboro, Centerton (S), Yorktown.

*Pine Barrens*.—Allaire, Pt. Pleasant, Manchester (NY), Toms River (KB), Forked River, Waretown, Bamber, Barnegat, Manahawkin, Coxe's, Stafford Forge (S), Browns Mills, Clementon, Jackson, Albion, Cedar Brook, Andrews, Malaga (P), Landisville (T), Hammonton, Folsom, Pancoast, Forks of Batsto, Absecon, Dennisville (OHB).

*Cape May*.—New England (OHB).

**Carex folliculata L. Long Sedge.**

Pl. XXII., Fig. 4.

*Carex folliculata* Linnæus, Sp. Pl. 978. 1753 [Canada].—Knieskern 37.—Willis 71.—Britton 269.

*Carex folliculata xanthrophysa* Muhlenberg Gram. 244. 1817. Schweinitz and Torrey Ann. Lyc. N. Y. I. 340. 1825.

Frequent in swamps and wet thickets throughout the State, but most abundant in the Pine Barrens.

*Fr.*—Early June to mid-July.

*Middle District*.—Shark River, New Egypt, Delaire, Kaighns Pt., Washington Park, Lindenwold (S), Glassboro, Swedesboro, Yorktown.

*Pine Barrens*.—Allaire, Toms River, Forked River, Coxe's, Browns Mills, Cedar Brook, Albion, Andrew's, Speedwell, Forks of Batsto, Folsom, Hammonton (Basset), Egg Harbor City.

*Cape May*.—Court House (S).

**Carex intumescens Rudge. Bladder Sedge.**

Pl. XXII., Fig. 5.

*Carex intumescens* Rudge, Trans. Linn. Soc. VII. 97. 1804 [Carolina].—Knieskern 37.—Willis 71.—Britton 269.

Common throughout the State in swampy woods and thickets, except in the Pine Barrens, where it is rather rare and confined to Cedar swamps. The alleged specimens of *C. Asa-grayi* from our region belong to this species.

*Fr.*—Mid-June to mid-July.

*Middle District*.—Farmingdale, New Egypt, Kaighns Pt., Camden (Basset), Medford (S), Glassboro, Mickleton (NB), Swedesboro, Centerton (S), Yorktown, Manumuskin (S).

*Pine Barrens*.—Allaire, Landisville (T), Head of Batsto, Egg Harbor City.

*Coast Strip*.—Wildwood.

**Carex lupulina** Muhl. **Hop Sedge.**

Pl. XXII., Fig. 1.

*Carex lupulina* "Muhl.," Schkuhr Riedgr. II. 34. 1806 [Pennsylvania].—Bar-  
ton Fl. Phila. II. 156. 1818.—Willis 71.—Britton 269.

Edges of swamps in the Northern, Middle and Cape May districts and down the Coastal Strip. Rather uncommon except northward.

*Fr.*—Mid-June to mid-September (apparently).

*Middle District.*—Clarksboro, Medford (S), Swedesboro, Salem (S).

*Pine Barrens.*—Cedar Brook.

*Coast Strip.*—Anglesea, Wildwood.

*Cape May.*—Cape May, Dias Creek.

**Carex lupuliformis** Sartwell. **Hop-like Sedge.**

*Carex lupuliformis* "Sartwell," Dewey Am. Jour. Sci (II.) IX. 29. 1850 [N.  
States and Canada].

Very rare. Known from one station each in Bergen and Sussex Counties, and one in the Middle district.

*Fr.*—September 16 spikes over mature beginning to break up.

*Middle District.*—Riddleton.

**Carex rostrata utriculata** (Boott.)\* **Bottle Sedge.**

*Carex utriculata* "Boott.," Hooker Fl. Bor. Am. II. 221. 1840 [British  
America].—Britton 269.—Keller and Brown 77.

Swampy ground, northern counties, and once recorded in the Middle district.

*Middle District.*—Kaighns Pt. (NB).

**Carex bullata** Schk. **Button Sedge.**

Pl. XXII., Fig. 2.

*Carex bullata* Schkuhr. Riedgr. Nachtr., 1806. 85 [North America].—Britton  
269.—Knieskern 37.—Willis 71.

Swamps and bogs of the Pine Barrens common; also locally in the Middle district. I am not fully convinced that this sedge

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\* *Carex monile* reported by Keller and Brown from Sumner (Clementon) proves to be sterile *C. bullata* with abnormally long heads as determined by Mr. Bayard Long.

should take the name *greenii*, as argued by Prof. Fernald,\* and prefer to hold to the familiar name for the present.

*Fr.*—Mid-June into September.

*Middle District.*—Lindenwold (S), Lawnside (S), Mickleton (H), Reapaupo, Yorktown.

*Pine Barrens.*—Farmingdale, Allaire, Asbury Park, Lakehurst, Toms River, Browns Mills, Speedwell, Sumner, Cedar Brook, Penbryn (S), Iona (S), Andrews, Folsom, Pancoast, Egg Harbor City, Tuckahoe (S).

**Carex lurida** Wahl. **Sallow Sedge.**

Pl. XXIII, Fig. 1.

*C[arex] lurida* Wahlenberg, Kongl. Acad. Handl. (II.) 24. 153. 1803  
[North America].—Britton 270.

*Carex tentaculata* Knieskern 37.—Willis 71.

Common in swamps throughout the State except in the Pine Berrens, where it is rare and for the most part close to the border.

*Fr.*—Mid-June to late July.

*Middle District.*—Scabright, Farmingdale, New Egypt, Riverside, Browns Mills, Haddonfield (S), Sharpstown, Swedesboro.

*Pine Barrens.*—Allaire (S), Forked River, Winslow (S), Albion, Penbryn (S), Landisville, Hammonton, Egg Harbor City.

*Coast Strip.*—Piermont.

*Cape May.*—Cape May, Cold Spring.

**Carex hystericina** Muhl. **Porcupine Sedge.**

*Carex hystericina* "Muhl," Willdenow Sp. Pl. IV. 282. 1805 [Pennsylvania].

*Carex hystericina* Knieskern 37.—Willis 71.—Britton 270.

Swampy ground in the Northern and Middle districts; apparently not common within our limits.

*Fr.*—Late May to late June.

*Middle District.*—New Egypt, five mi. S. of Mickleton, Lindenwold (S).

**Carex comosa** Boott. **Bottle-brush Sedge.**

PL XXIII, Fig. 2.

*Carex comosa* Boott, Trans. Linn. Soc. XX. 117. 1846 [Boston, Mass.]

*Carex Pseudo-cyperus* Britton 270.

Frequent in swamps of the Northern and Middle districts and Coastal Strip. Not reported from the Pines.

*Fr.*—Early June to mid-July, and more rarely through the summer.

\**Rhodora* 1906, p. 202.

*Middle District*.—New Egypt, Lindenwold, Medford (S), Washington Park, Five miles south of Mickleton, Swedesboro, Salem (C).

*Coast Strip*.—Piermont, Wildwood, Anglesea, Holly Beach (T), Court House, Cold Spring (S), Cape May.

**Carex squarrosa L. Squarrose Sedge.**

*Carex squarrosa* Linnaeus, Sp. Pl. 973. 1753 [Canada].

Damp open ground of the Northern and locally in the Middle district. Rare within our limits.

*Fr.*—Mid-June into August.

*Middle District*.—One mile south of New Egypt, Moorestown (H), Swedesboro (H).

**Carex typhinoides Schwein. Cat-tail Sedge.**

*Carex typhinoides* Schweinitz, Ann. Lyc. I. 66. 1824 [North Carolina].

Swampy ground, lower part of Middle district, very rare. Known from a single station only.

*Fr.*—Mid-June probably into August.

*Middle District*.—Riddleton.

**Carex trichocarpa Muhl. Hairy-fruited Sedge.**

Pl. XXV., Fig. 5.

*Carex trichocarpa* (Muhl.) Willdenow, Sp. Pl. IV. 302. 1805 [Pennsylvania].—Britton 271.—Keller and Brown 78.

Open swampy ground in the Northern district, and rare and local in the Middle district.

This species was found by the writer near Medford; previously it was only known from the northern counties.

The record from Cedar Brook, given by Keller and Brown, proves to be erroneous.

*Fl.*—Full flower May 30, but achenes well formed.

*Middle District*.—Medford (S).

**Carex lacustris Willd. Riverbank Sedge.**

Pl. XXIII., Fig. 6.

*Carex lacustris* Willdenow, Sp. Pl. IV. 306. 1805 [Pennsylvania].

*Carex riparia* Barton, Fl. Phila. II. 158. 1818.—Britton 271.—Keller and Brown 78.

Wet open swamps in the northern counties, local southward in the Middle and rarely in the Pine Barren and Cape May districts.

*Fr.*—Late May to late June.

*Middle District*.—Crosswicks Creek, Bordentown, Delair, Swamps Gloucester Co. (C), Woodstown, Salem (H).

*Pine Barrens*.—Manchester (P).

*Cape May*.—Cold Spring.

**Carex vestita Willd. Velvet Sedge.**

Pl. XXV., Fig. 7.

*Carex vestita* Willdenow, Sp. Pl. IV. 263. 1805 [N. America].—Knieskern 36.—Willis 71.—Britton 270.—Keller and Brown 78.

Damp sandy soil; most plentiful in the Middle district, occasional in the Northern and Cape May districts and rare in the Pine Barrens.

*Fr.*—Late May to late July.

*Middle District*.—Farmingdale, Delanco, Merchantville (P), Camden (KB), Haddonfield (KB), Lindenwold (S), Clementon (S), Washington Park (KB), Woodbury, Mickleton (S), Sicklerville, Swedesboro.

*Pine Barrens*.—Allaire, Winslow Jnc., Spring Garden (P), Hammonton (Bassett), Egg Harbor City (B. Smith), Palermo.

*Cape May*.—Rio Grande (OHB), New England (OHB), Cape May (S).

**Carex walteriana Bailey.\* Walter's Sedge.**

Pl. XXIII., Fig. 7.

*Carex Walteriana* Bailey, Bull. Torr. Club. XX. 429. 1893 (new name for *C. striata* Michaux) [Carolina].—Keller and Brown 78.

*Carex striata* Knieskern 36.—Willis 71.

*Carex striata* var. *brevis* Britton 271.

Plentiful in bogs of the Pine Barrens, where it is the most characteristic and abundant *Carex*; rare and local in the lower Middle district and on the coastal islands.

*Fr.*—Early June to late July.

*Middle District*.—New Egypt (NB), Mickleton (S).

*Pine Barrens*.—Lakelhurst, Manchester (C), Pt. Pleasant, Toms River, Forked River, Waretown, Barnegat, Tuckerton, High Bridge (S), Speedwell, White Horse (S), Bear Swamp, Jackson, Clementon, Cedar Brook, Berlin (KB), Williamstown (H), Iona (S), Winslow Jnc., Quaker Bridge, Hammonton (KP).—Landing, Sea Isle Jnc., Woodbine (S).

\* A specimen of *Carex scabrata* is in the collection of the Phila. Academy, labeled Cedar Brook, N. J., July 12th, 1892, Herbarium of Jos. Crawford. Mr. Crawford, however, was at Hamburg, Pa., on this date and other specimens of this sedge obtained by him at Hamburg, July 11th, 1892, are exactly like this one. I therefore feel sure that an error has been made in writing this label. We have no other evidence of the occurrence of the plant within our limits.

*Coast Strip*.—Wildwood.

*Cape May*.—Cape May (OHB).

***Carex lanuginosa* Michx. Woolly Sedge.**

Pl. XXIII., Fig. 3.

*Carex lanuginosa* Michaux, Fl. Bor. Am. II. 175. 1803 [Iacus Mistassins]  
—Knieskern 36.—Willis 71.—Keller and Brown 78.

*Carex filiformis* var. *lanuginosa* Britton 271.

Frequent in the northern counties in low moist ground, and down the coast strip to Cape May. Rare in the Middle district and unknown from the Pine Barrens.

*Fr.*—Early June to early July.

*Middle District*.—Mickleton (H).

*Coast Strip*.—Squan (C), Bayhead, Toms River (NY), Palermo, Piermont, Cape May Ct. House, Cold Spring.

*Pine Barrens*.—Landisville (T). (introduced ?).

***Carex buxbaumi*. Brown Sedge.**

Pl. XX., Fig. 4.

*Carex Buxbaumi* Wahlenberg, K. Vet. Akad. Handl. 164. 1803 [Sweden and Lapland].—Britton 271.

Marshes and bogs; rare. A few stations in the Northern and Middle districts north of our limits and one in the Cape May peninsula.

*Fr.*—Mid-May to early June, rarely slightly later.

*Cape May*.—Cold Spring.

***Carex stricta* Lam.\* Tussock Sedge.**

Pl. XXV., Fig. 1.

*Carex stricta* Lamarck, Encycl. III. 387. 1789 [Virginia, Pennsylvania, etc.].  
—Knieskern 36.—Willis 70.—Britton 271.

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\* *Carex haydeni* Dewey (Amer. Jour. Sci. II., 18. 103. 1854.—Missouri R. near Ft. Pierre), is recorded from Morris Co. and Assinpink marsh, both north of our range. Also stated to occur in Camden Co. by Mr. C. E. Smith, but no definitely labelled specimens are extant to corroborate his record. I am also unable to find anything to verify the record for *C. aquatilis*, given in Britton's Catalogue, on the authority of Mr. C. F. Parker, for Camden Co. Possibly it referred to the same plant as Mr. Smith's record of *C. haydeni*—possibly an aberrant *C. stricta*.

*C. salina*, reported with some doubt by Knieskern from near Manchester, has not been verified.



Common in open swamps of the Northern and Middle districts, forming the familiar "tussocks."

*Fr.*—Mid-May to mid-June.

*Middle District.*—Farmingdale, New Egypt, Toms River (NB), Delanco, Delaire, Camden, Medford (S), Lindenwold (S), Glassboro, Pitman, Mickleton, Repaupo, Swedesboro, Quinton.

*Coast Strip.*—Toms River (NY), Cold Spring.

**Carex prasina** Wahl. **Drooping Sedge.**

*Carex prasina* Wahlenberg, Kongl. Vet. Akad. Handl. (II.) 24. 161. 1803 [North America].—Britton 272.—Kellar and Brown 79.

Damp ground, usually in woods; Northern and Middle districts.

*Fr.*—Late May to mid-June.

*Middle District.*—Mullica Hill (H), Mickleton (H), Swedesboro.

**Carex barrattii** Schw. and Torr. **Barratt's Sedge.**

Pl. XXIII., Fig. 4.

*Carex Barrattii* Schweinitz and Torrey, Ann. Lyc. N. Y. I. 361. 1825 [Cape May, N. J.].—Willis 70.—Britton 272.

*Carex littoralis* Schweinitz, Ann. Lyc. N. Y. I. 70. 1824 [Cape May, N. J.]. (nec. *C. littoralis* Koch 1814)—Kellar and Brown 79.

*Carex flacca* Gray, Man. Ed. I. 549. 1848.—Knieskern 36.

Swamps in the Pine Barrens and west Jersey; local and not common. Occasional also in southern Cape May County. A beautiful species first discovered by Zaccheus Collins.

*Fr.*—Mid-May to mid-June.

*Middle District.*—Shark River, Mickleton (NB), Clarksboro.

*Pine Barrens.*—Manchester (NB), Browns Mills, Cedar Brook, Spring Garden, Winslow (P), White Horse, Egg Harbor.

*Cape May.*—Cold Spring (S).

**Carex limosa** L. **Mud Sedge.**

Pl. XXIII., Fig. 5.

*Carex limosa* Linnæus, Sp. Pl. 977. 1753 [Europe].—Britton 272.—Kellar and Brown 79.

Bogs, not common, restricted to the Northern and Middle districts.

*Fr.*—Early June to early July, or possibly later.

*Middle District.*—Repaupo, Swedesboro.

**Carex crinita** Lam. **Fringed Sedge.**

Pl. XXI., Fig. 6.

*Carex crinita* Lamarek, Encycl. III. 393. 1789 [Virginia].—Knieskern 36.  
—Willis 70.—Britton 272.

Common in swamps throughout the State, except in the Pine Barrens, where it is rare.

*Fr.*—Early June to mid-July.

*Middle District.*—Farmingdale, Riverside, Millville, Yorktown.

*Pine Barrens.*—White Horse, Landisville.

*Coast Strip.*—Beach Haven (L).

*Cape May.*—West of Wildwood Inc., Goshen (S), Cape May (S).

**Carex gynandra** Schwein. **Nodding Sedge.**

*Carex gynandra* Schweinitz, Ann. Lyc. N. Y. I. 70. 1824 [Lower South Carolina].

Occasional in swampy ground of the Northern, Middle and Coast districts.

*Fr.*—Late May to early July.

*Middle District.*—New Egypt, Albion, Washington Park, Lindenwold (S), Swedesboro.

*Coast Strip.*—Five-Mile Beach.

**Carex swanii** (Fernald.). **Downy Green Sedge.**

Pl. XXV., Fig. 6.

*Carex virescens* var. *Swanii* Fernald, Rhodora 1906. 183 [Manchester, Vt.]  
(new name for *C. virescens* of recent authors which is the same as *C. costellata* Britton).

Common in dry woods throughout the State, except in the Pine Barrens, where it is rare (and perhaps introduced).

*Fr.*—Early June to late June.

*Middle District.*—Farmingdale, Washington Park, Repaupo, Mickleton, Riddleton, Swedesboro, Yorktown, Millville.

*Pine Barrens.*—Cedar Brook, Atsion, Egg Harbor City, Belleplain (P).

*Coast Strip.*—Barnegat City (L), Avalon, Wildwood.

*Cape May.*—Fishing Creek.

**Carex triceps** Michx. **Hirsute Sedge.**

Pl. XXV., Fig. 2.

*Carex triceps* Michaux, Fl. Bor. Am. II. 170. 1803 [Carolina].

*Carex triceps* var. *hirsuta* Britton 272.

Dry woods and fields; common throughout the State, except in the Pine Barrens, where it is rare. Specimens from Swedesboro and Egg Harbor City are referable to *C. t. bushii* according to Mr. Bayard Long.

*Fr.*—Early June to early July.

*Middle District.*—Clarksboro, Swedesboro, Riddleton.

*Pine Barrens.*—Landisville (T), Egg Harbor City.

*Cape May.*—Cold Spring (S), Whitesboro (S), Green Creek (OHB), Bennett (OHB), Cape May (P).

***Carex caroliniana* Schw. Carolina Sedge.**

*Carex caroliniana* Schweinitz Ann. Lyc. N. Y. I. 67. 1824 [Carolina].—Keller and Brown 80.

*Carex Smithii* Willis 70.—Britton 272.

Confined to low moist ground in the Middle district along the Delaware River.

*Fr.*—Early June to late June.

*Middle District.*—Crosswicks, Camden (NB), Timber Creek, Washington Park, Red Bank, Clarksboro, Riddleton.

***Carex tenuis* Rudge. Slender-stalked Sedge.**

*Carex tenuis* Rudge, Trans. Linn Soc. VII. 97. 1804 [Long Island, N. Y.].—Keller and Brown 81.

*Carex flexuosa* Barton, Fl. Phila. II. 158. 1818.

*Carex debilis* Knieskern 36.—Willis 71.—Britton 273.

Woodland; common in the Northern and Middle districts.

*Fr.*—Early June to late June.

*Middle District.*—Delair, Washington Park, Medford (S), Center Square, Mickleton, Pitman, Glassboro, Swedesboro, Riddleton.

*Coast Strip.*—Asbury Park, Pt. Pleasant, Manahawkin.

***Carex oblita* Steud. Dark-green Sedge.**

Pl. XXV., Fig. 3.

*Carex oblita* Steudel, Syn. Pl. Cyp. 231. 1855 [New Orleans, La.].—Keller and Brown 81.

*Carex glabra* Willis 71.

*Carex venusta* var. *glabra* Britton 273.

In bogs of the Middle and Cape May districts frequent; and occasional in the Pine Barrens, especially near the coast.

*Fr.*—Early June to late June.

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\* Mr. Lippincott's record of *C. arctata*, at Swedesboro, in Keller and Brown's list proves to be young *C. styloflexa*.

*Middle District*.—Farmingdale, Camden, Grenloch, Lindenwold, Griffith's Swamp, Lawnside (S), Washington Park, Clementon, Albion, Mickleton (H), Glassboro, Yorktown.

*Pine Barrens*.—Allaire (S), Forked River, Vineland (S), Winslow Jnc., Absecon, Mays Landing (KB), Egg Harbor City.

*Cape May*.—Cape May.

**Carex grisea** Wahl. **Gray Sedge.**

Pl. XXIV., Fig. 2.

*Carex grisea* Wahlenberg, Kongl. Vet. Akad. Handl (II.) 24. 154. 1803 [North America].—Knieskern 36.—Willis 70.—Gray Man. Ed. I. 552. 1848.—Britton 273.—Keller and Brown 81.

In meadows in the northern counties; south locally in the Middle district.

*Fr.*—Late May to mid-June.

*Middle District*.—Farmingdale, New Egypt, Delair, Medford (S), Washington Park, Mickleton (NB).

**Carex glaucodea** Tuckerm. **Glaucous Sedge.**

*Carex glaucodea* "Tuckerman," Olney Proc. Am. Acad. VII. 395. 1868 [Summits of Mt. Holyoke and Mt. Tom].—Britton 277.—Keller and Brown 81.

*Carex grisea* var. *mutica* Knieskern 36.—Willis 70.

Dry ground; tolerably common in the Middle district, casual farther north and rare in the lower Cape May peninsula.

*Fr.*—Early June to late June.

*Middle District*.—Hornerstown (C), Haddonfield (P), Almonessen, Woodbury (H), Clarksboro, Swedesboro, Riddleton.

*Cape May*.—Cape May (OHB).

**Carex granularis** Muhl. **Meadow Sedge.\***

Pl. XXIV., Fig. 5.

*Carex granularis* "Muhl.," Willdenow, Sp. Pl. IV. 279. 1805 [Pennsylvania]. Britton 273.—Keller and Brown 81.

In meadows; frequent in the Northern counties, rare in the Middle and Cape May districts. The Cape May plant is not typical and was questionably referred to *C. halcana* Olney, but its peculiarities are probably merely the result of its environment.

*Fr.*—Early June to late June.

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\* *Carex flava* L., accidentally omitted from the text, was collected in the Kaighn's Pt. swamp by Parker in 1865 (Britton's Catalogue). What *C. oederi* reported by Martindale from Atsion, may have been I cannot suggest. No specimen has been seen.

*Middle District*.—New Egypt, Medford (S), Grenloch, Red Bank, Swedesboro, Riddleton.

*Cape May*.—Cold Spring.

***Carex polymorpha* Muhl.\* Variable Sedge.**

*Carex polymorpha* Muhlenberg, Gram. 239. 1817 [Pennsylvania].—Knieskern 36.—Willis 71.—Gray Man. Ed. I. 550.—Britton 275.—Keller and Brown 82.

Meadows; rare and local. Discovered June 9, 1890, at Mickleton by Mr. Benj. Heritage; also known from two stations in the northern counties and given in Knieskern's list. Mr. Crawford's record from Cedar Brook (K. and B.) was apparently something else.

*Middle District*.—Mickleton.

***Carex conoidea* Schk. Field Sedge.**

*Carex conoidea* Schkuhr, Riedgr. Nachtr. 67, t. 168. 1806 [North America].—Britton 274.—Keller and Brown 82.

Damp open ground of the northern counties; very rare in the Middle district. Collected by C. D. Lippincott at Swedesboro, June 4, 1893.

*Fr.*—Late May to mid-June.

*Middle District*.—Swedesboro.

***Carex tetanica* Schk. Wood's Sedge.**

Pl. XXIV., Fig. 4.

*Carex tetanica* Schkuhr, Riedgr. Nachtr. 68, figs. 100, 207. 1806 [Pennsylvania].

Bogs; not common. Northern and Middle districts. Discovered by the writer at Lindenwold, and previously by Mr. C. D. Lippincott at Swedesboro.

*Fr.*—Early June to early July.

*Middle District*.—Lindenwold (S), Swedesboro.

***Carex laxiflora* Lam. Loose-flowered Sedge.**

*Carex laxiflora* Lamarck, Encycl. III. 392. 1789 [N. Y., Penna., Va.].—Knieskern 36.—Willis 71.—Britton 274.

*Carex anceps* Pursh Fl. Am. Sept. I. 42. 1814.—Barton Fl. Phila. II. 157. 1818.

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\* *Carex pallascens* is given by Keller and Brown from Swedesboro on authority of Chas. D. Lippincott, and from New Egypt in Knieskern's list. Mr. Lippincott, however, states that he never found the species, and Knieskern's specimen is not extant.

This species is apparently very rare within our limits and does not seem to spread into the coastal plain to any extent.

*Fr.*—Late May to late June.

*Middle District.*—Medford (S), Swedesboro, Camden (P).

**Carex laxiflora patulifolia** (Dewey.). **Ribbon-leaved Sedge.**

Pl. XXIV., Fig. 3.

*Carex anceps* var. *patulifolia* Dewey. Wood's Bot. 423. 1845 [no locality given].

*Carex laxiflora* var. *patulifolia* Knieskern 36.—Willis 71.—Keller and Brown 82.

In dry woods of the Middle and probably also the Northern district.

*Fr.*—Late May to late June.

*Middle District.*—Pt. Pleasant, Medford (S), Mickleton, Swedesboro, Camden (P).

**Carex styloflexa** Buckley. **Bent-beaked Sedge.**

Pl. XXIV., Fig. 7.

*Carex styloflexa* Buckley, Amer. Jour. Sci. 45. 174. 1843 [Mountains of Macon Co., N. C.].—Keller and Brown 82.

*Carex laxiflora styloflexa* Willis 71.—Britton 274.

Wet meadows; Northern, Middle and Cape May districts.

*Fr.*—Late May to late June.

*Middle District.*—Farmingdale, New Egypt, Asbury Park, Medford (S), Washington Park, Mickleton, Lindenwold.

*Cape May.*—Cape May.

**Carex digitalis** Willd. **Slender Wood Sedge.**

*Carex digitalis* Willdenow, Sp. Pl. IV. 298. 1805 [Pennsylvania].—Knieskern 36.—Willis 71.—Britton 274.

Dry woods of the northern counties; rare in the Middle district.

*Fr.*—Late May to late June.

*Middle District.*—Squan (C), Riddleton, Swedesboro (CDL).

**Carex laxiculmis** Schwein.\* **Spreading Sedge.**

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\* *C. albursina* is included in Keller and Brown's list from Swedesboro and Mickleton, but I can find no specimens to substantiate the record. Specimens of *C. laxiculmis* have sometimes been mistaken for it.

## Pl. XXIV., Fig. 6.

*Carex laxiculmis* Schweinitz, Ann. Lyc. N. Y. I. 70. 1824 [Carolina].

Rich woods, northern counties; rare in the Middle district.

*Fr.*—Late May to late June.

*Middle District.*—Sewell (S), Mickleton.

**Carex abscondita** Mackenzie. **Thicket Sedge.**

## Pl. XXIV., Fig. 8.

*Carex abscondita* Mackenzie, Bull. Torr. Bot. Club, May, 1910, p. 244 [new name for *C. ptychocarpa* Steud., nec Link 1799—New Orleans, La.]

*Carex ptychocarpa* Keller and Brown 83.

Woods, Middle and Cape May districts; casual northward.

*Fr.*—Late May to late June.

*Middle District.*—Farmingdale, Pt. Pleasant (S), Bayhead, New Egypt, Riverside, Medford (S), Kirkwood, Center Square, Albion, Sumner, Swedesboro, Riddleton, Yorktown.

*Cape May.*—Dennisville (OHB), Cold Spring, Cape May.

**Carex livida** (Wahl.). **Livid Sedge.**

## Pl. XXIV., Fig. 1.

*Carex limosa* var. *livida* Wahlenberg, Kongl. Vet. Akad. Handl. (II) 24. 162. 1803 [Lapponiæ Enontekensis].

*Carex livida* Gray, Man. Ed. I. 550. 1848.—Torrey, Ann. Lyc. N. Y. III. 417. 1836.—Kneiskern 36.—Willis 70.—Britton 275.—Keller and Brown 83.

Rather frequent in bogs in the Pine Barrens.

*Fr.*—Late May to late June.

*Pine Barrens.*—Lakehurst, Toms River (McK), Double Trouble, Bamber, High Bridge (S), Speedwell, Cedar Brook, Ancora, Atsion (P).

**Carex pedunculata** Muhl. **Long-stalked Sedge.**

*Carex pedunculata* Muhlenberg, Willdenow, Sp. Pl. IV. 222. 1805 [Pennsylvania].

Occasional in the northern counties. Very rare within our limits.

*Fr.*—Early May to late May.

*Middle District.*—New Egypt.

**Carex pennsylvanica** Lam. **Pennsylvania Sedge.**

## Pl. XXVI., Fig. 12.

*Carex Pennsylvanica* Lamarck, Encycl. III. 388. 1791 [Pennsylvania].  
Knieiskern 36.—Willis 71.—Britton 275.

Dry ground; common throughout the State, unless it be on the coast and Cape May peninsula.

*Fr.*—Mid-May to mid-June.

*Middle District.*—Asbury Park, Hainesport, Delanco, Westville, Mantua, Sewell (S), Woodbury, Washington Park.

*Pine Barrens.*—Brown's Mills, Clementon, Cedar Brook, Pleasant Mills, Hammonton, Mays Landing (S).

**Carex varia emmonsii. Emmons' Sedge.**

Pl. XXVI., Fig. 9.

*Carex varia* var. *Emmonsii* "Dewey," Torrey, Ann. Lyc. N. Y. II. 411. 1836 [Massachusetts].—Britton 275.—Keller and Brown 84.

*Carex Nova-anglicæ* Knieskern 36.

*Carex Emmonsii* Willis 71

Common in dry ground except in the Pine Barrens.

*Fr.*—Early May to early June.

*Middle District.*—Bordentown, Kinkora, Delaire, Fish House, Merchantville, Haddonfield, Medford (S), Woodbury, Wenonah, Glassboro, Pitman, Mickleton, Swedesboro, Alloway, Quinton.

*Coast Strip.*—Sea Bright (NB), Surf City (L), Barnegat City (L), N. Beach Haven (L), Palermo.

*Cape May.*—Cold Spring.

**Carex umbellata Schk. Umbel-like Sedge.**

Pl. XXVI., Fig. 15.

*Carex umbellata* Schkuhr, Riedgr. Nachtr. 75. f. 171. 1806 [Pennsylvania].—Knieskern 36.—Willis 71.—Britton 276.—Keller and Brown 84.

Rather frequent in the Middle district.

*Fr.*—Late April to early June.

*Middle District.*—Allaire, Farmingdale, Mantua.

*Coast Strip.*—Tuckahoe.

**Carex umbellata tonsa Fernald.**

*Carex umbellata* var. *tonsa* Fernald, Proc. Am. Acad., vol. 37. 1902. 507 [Maine and Connecticut].

Frequent in the Middle and Pine Barren districts.

*Fr.*—Late April to early June.

*Middle District.*—New Egypt, Hainesport, Mt. Holly, Browns Mills, Lindenwold, Clementon.

*Pine Barrens.*—Albion, Whitings, Hammonton, Tuckahoe.



**Carex umbellata abdita** Bicknell.

*Carex umbellata* var. *abdita* Bicknell, Bull. Torr. Bot. Club, XXXV, 492. 1908 [Richmond Hill, L. I.].

Apparently not rare; confined to the Middle district.

*Fr.*—Late April to early June.

*Middle District.*—Bordentown, Woodbury Hts., Alloway, Quinton.

**Carex nigro-marginata** Schw. **Black-edged Sedge.**

*Carex nigro-marginata* Schweinitz, Ann. Lyc. N. Y. I. 68. 1824 [Carolina].  
—Gray, Man. Ed. V., Issue 8, p. 682. 1868.

Locally through the Northern, Middle and Coast districts in dry ground.

*Fr.*—Late April to late May.

*Middle District.*—Hartford, Fish House, Camden (P), Mantua, Woodbury, Wenonah, Glassboro, Pennsgrove (C), Alloway.

*Coast Strip.*—Surf City (L), Palermo, Wildwood, Cape May Ct. House, Cape May.

**Carex willdenowii** Schk. **Willdenow's Sedge.\***

*Carex willdenowii* Schkuhr, Riedgr. Nachtr. 33. f. 145. 1806 [North America].—Britton 276.—Keller and Brown 84.

In woods of the northern counties; very rare within our limits, resting solely on Mr. C. E. Smith's record for the vicinity of Woodbury. No specimen has been seen.

*Middle District.*—Woodbury (C).

**Carex leptalea harperi** Fernald. **Harper's Sedge.**

Pl. XXVI, Fig. 14.

*Carex harperi* Fernald, Rhodora, Sept., 1906. 181. [Near Louisville].—Long, Bartonian II. 19. 1910.

Bogs of the lower Middle and Cape May districts. It may be that true *C. leptalea* occurs along our northern border, but Mr. Bayard Long, who has studied the material carefully, is of the opinion that specimens so identified are merely immature.

*Fr.*—Late June to late July.

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\* *Carex pubescens* is recorded from Swedesboro by Keller and Brown on authority of C. D. Lippincott, but Mr. Lippincott tells me that there was an error in transcribing his list, as he never found the species at Swedesboro.

*Middle District*.—Delanco, Lindenwold, Clementon, Mickleton.

*Coast Strip*.—Forked River.

*Cape May*.—Goshen, Bennett, Cold Spring.

**Carex exilis** Dewey. **Coast Sedge.**

Pl. XXVI, Fig. 13

*Carex exilis* Dewey, Am. Jour. Sci. XIV. 351. 1828 [Danvers, Mass].—Torrey, Ann. Lyc. N. Y. III. 387. 1836.—Knieskern 35.—Willis 70.—Britton 277.—Keller and Brown 85.

Frequent in swamps in the Pine Barrens, reaching the edge of the salt marsh occasionally where arms of the Pine Barrens extend seaward.

*Fr.*—Mid-May to mid-June.

*Pine Barrens*.—Shark River (C), Farmingdale, Davenport, Manchester (P), Burrsville (C), Pt. Pleasant, Toms River (NY), Bamber, West Creek, Tuckerton, Hanover (C), New Germany (T), Hammonton (KB), Absecon (C), Palerma, Egg Harbor City (H).

**Carex teretiuscula** Gooden. **Little Paniced Sedge.**

*Carex teretiuscula* Goodenow, Tr. Linn. Soc. II. 163. 1794 [Norwich, England].—Keller and Brown 85.

Occasional in swamps of the northern counties and very rare in the Middle district, where it was found by Mr. Benj. Heritage

*Middle District*.—Mickleton.

**Carex stipata** Muhl. **Awl-fruited Sedge.**

Pl. XXI, Fig. 1.

*Carex stipata* "Muhl." Willdenow, Sp. Pl. IV. 233. 1805 [Pennsylvania].—Knieskern 35.—Willis 60.—Britton 275.—Keller and Brown 85.

Meadows and open swamps: common in the Northern and Middle districts.

*Fr.*—Mid-May to late June.

*Middle District*.—Farmingdale, New Egypt, Camden (P), Delaire, Delanco, Medford (S), Washington Park, Woodbury, Pitman, Mickleton, Swedesboro.

**Carex vulpinoidea** Michx. **Fox Sedge.**

Pl. XXI, Fig. 2.

*Carex vulpinoidea* Michaux, Fl. Bor. Am. II. 169. 1803 [Canada and New England].—Knieskern 35.—Willis, 69.—Britton 276.

Meadows and open swamps: common in the Northern and Middle districts and occasional on the coast.

*Fr.*—Early June to mid-July.

*Middle District*.—Scabright, New Egypt, Riverside, Medford (S), Camden (P), Mickleton, Swedesboro, Yorktown.

*Pine Barrens*.—Landisville (introduced?).

*Coast Strip*.—Avalon, Beach Haven (L).

**Carex annectens** Bicknell. **Yellow-fruited Sedge.**

*Carex xanthocarpa annectens* Bicknell, Bull. Torr. Bot. Club XXIII. 22. 1896 [New York].

*Carex xanthocarpa* Keller and Brown.

Frequent in low grounds of the Middle district and occasional in the Pine Barrens.

*Fr.*—Early June to early July.

*Middle District*.—Farmingdale, Medford (S), Lindenwold (S), Browns Mills Inc., Yorktown.

*Pine Barrens*.—Forked River, Landisville.

**Carex rosea** Schk. **Stellate Sedge.**

*Carex rosea* Schkuhr Riedgr. Nachtr. 15 f. 179. 1806 [North America].—

Knieskern 35.—Willis 69.—Britton 276.

*Carex rosea* var. *radiata* Britton 276.

Common in dry woods in the Northern and Middle districts.

*Fr.*—Mid-May to mid-June.

*Middle District*.—Farmingdale, Sewell (S), Glassboro, Mickleton, Swedesboro.

**Carex cephalophora** Muhl. **Oval-headed Sedge.**

Pl. XXI, Fig. 4.

*Carex cephalophora* "Muhl." Willdenow, Sp. Pl. IV. 220. 1805 [Pennsylvania].—Knieskern 35.—Willis 69.—Britton 277.—Keller and Brown 86.

Common in the northern counties, but rare southward within our limits.

*Fr.*—Early June to late June.

*Middle District*.—Sewell (S), Swedesboro.

*Cape May*.—Cold Spring.

**Carex muhlenbergii** Schk. **Muhlenberg's Sedge.\***

Pl. XXI, Fig. 3.

*Carex Muhlenbergii* Schkuhr. Riedgr. Nachtr. 12. f. 178. 1806 [North America].—Muhlenberg, Gram. 221. 1817.—Knieskern 35.—Willis 69.—Britton 277.—Keller and Brown 86.

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\* The records of *C. sparganoides* and *cephaloidea*, given in Keller and Brown's list for our region, all prove to belong to *muhlenbergii* or *cephalophora*, and we have no evidence of the occurrence of the former species within our limits.

Frequent in woods and thickets in the Northern and Middle districts, occasional on the Coast and Cape May peninsula.

*Fr.*—Early June to mid-July.

*Middle District*.—Pemberton Jnc. (S), Griffith's Smp. (C), Haddonfield (S), Medford (S), Mickleton (NB), Swedesboro.

*Pine Barrens*.—White House (S).

*Coast Strip*.—Somers Pt., Atlantic City (P), Wildwood, Cold Spring.

*Cape May*.—Bennett. \*

**Carex interior Bailey.\* Inland Sedge.**

Pl. XXVI, Fig. 10.

*Carex interior* Bailey, Bull. Torr. Bot. Club. XX. 426. 1893 [Me. to Minn. and Kansas].

*Carex stellulata* var. *sterilis*, *scirpoides* Knieskern 35.

*Carex echinata* var. *radiata* Britton 277.

*Carex interior* Keller and Brown 87.

*Carex sterilis cephalantha* Keller and Brown 87.

Somewhat local in bogs and swampy ground of the Middle district. According to Prof. Fernald this species should bear the name *C. scirpoides* Schkuhr., but I prefer to adopt Mr. Mackenzie's views upon the subject.\*

*Fr.*—Mid-May to mid-June.

*Middle District*.—New Egypt, Lindenwold, Swedesboro.

**Carex interior capillacea (Bailey).\* Thread-like Sedge.**

*Carex interior* var. *capillacea* Bailey, Bull. Torr. Bot. Club XX. 426. 1893 [Mass., N. J. and Penna.].

*Carex stellulata* var. *angustata* Knieskern 35.

Frequent in bogs of the Middle and Pine Barren districts, especially in the latter, and occasional on the Coast Strip and Cape May peninsula. *C. scirpoides capillacea* according to Fernald.

*Fr.*—Mid-May to mid-June.

*Middle District*.—New Egypt, Medford (S), Mickleton, Yorktown.

*Pine Barrens*.—Forked River, Browns Mills, Bear Swamp, Cedar Brook, Andrew's, Ancora, Clementon.

*Coast Strip*.—Spray Beach (L).

*Cape May*.—Cape May (S), Cold Spring.

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\* Cf. Fernald, Proc. Amer. Acad. XXXVII. 457-485, 1902. Mackenzie, Bull. Torr. Bot. Club XXXVII., 249, 1910.

**Carex cephalantha** (Bailey). Prickly Sedge.

*Carex echinata* var. *cephalantha* Bailey, Mem. Torrey Bot. Club. I. 58. 1889  
[Penna., Mass., N. Y. and Mich.]

Frequent along the upper coast strip and occasional in the upper Middle district to Cape May. Probably common northward.

*Fr.*—Late May to mid-June.

*Middle District.*—New Egypt, Mt. Holly, Center Square.

*Coast Strip.*—Asbury Park, Forked River, N. Beach Haven (L), Peahala (L), Spray Beach (L), Beach Haven Terrace (L).

*Cape May.*—West Cape May.

**Carex atlantica** Bailey.\* Coastal Plain Sedge.

Pl. XXVI., Fig. 11.

*Carex atlantica* Bailey, Bull. Torrey Bot. Club XX. 425. 1893 [Newfoundland to Florida, coastal].

*Carex stellulata* Knieskern 35.—Willis 70.

*Carex Atlantica* Keller and Brown 87.

*Carex echinata conferta* Britton 277.

Common in bogs of the Pine Barrens and occasional in the Middle and Cape May districts.

*Fr.*—Late May to late June.

*Middle District.*—Farmingdale, Lindenwold, Swedesboro (CDL), Yorktown.

*Pine Barrens.*—Asbury Park, Pt. Pleasant, Davenport, Lakehurst, Bear Swamp, Sumner, Albion, Andrews, Cedar Brook, Ancora (H), Jackson, Browns Mills.

*Cape May.*—Cape May.

**Carex seorsa** Howe Howe's Sedge.

*Carex seorsa* E. C. Howe, Rept. N. Y. Mus. Nat. Hist. No. 48. 40. 1895  
[Lansingburgh, Rensselaer Co., N. Y.]

Occasional in the Middle and Cape May districts.

*Fr.*—Mid-May to early June.

*Middle District.*—Medford, Albion, Yorktown.

*Cape May.*—Dennisville.

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\* One specimen from Medford resembles *Carex incompta* Bicknell.

**Carex canescens disjuncta** Fernald. **Silvery Sedge.\***

Pl. XXI., Fig. 5.

*Carex canescens* var. *disjuncta* Fernald, Proc. Amer. Acad. 37. 488. 1902 [Eastern N. A.].*Carex canescens* Knieskern 35.—Willis 70.—Britton 278.—Keller and Brown 87.*Carex brunnescens gracilior* Keller and Brown 87.

Bogs of the Middle and Pine Barren districts, locally common.

*Fr.*—Late May to early June.*Middle District.*—Farmingdale, Delanco, Camden, Mt. Holly, Westville (P), Medford (S), Center Square, Glassboro, Pitman, Mickleton.*Pine Barrens.*—Toms River (NY), Forked River, Speedwell, Jackson, Albion, Clementon, Landisville.**Carex trisperma** Dewey. **Three-fruited Sedge.***Carex trisperma* Dewey, Am. Jour. Sci. IX. 63. 1825 [Williamstown and Deerfield, Mass.].—Knieskern 35.—Willis 70.—Britton 278.—Keller and Brown 87.

Bogs of the Northern district and Pine Barren Cedar Swamps, frequent.

Variety *billingsii* Knight, credited to New Jersey in the new Gray's Manual, seems to be too poorly characterized to warrant recognition, at least so far as our material is concerned.*Fr.*—Mid-June to late August, or occasionally into early autumn.*Pine Barrens.*—Manchester (C), Lakehurst, Toms River (S), Bamber, Pasadena, Double Trouble, Spring Garden (P), Waterford, Cedar Brook (KB), Malaga (P), Andrews, Landisville, Dennisville (P).**Carex scoparia** Schk. **Pointed Broom Sedge.**

Pl. XXVI., Fig. 1.

*Carex scoparia* Schkuhr, Riedgr. Nachtr. XX. f. 175. 1806 [North America].—Knieskern 35.—Willis 70.—Britton 278.

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\* *Carex brunnescens* has several times been recorded from southern New Jersey, but no authentic specimens have come to my notice, and it is, I think, safe to say that the records were the result of misidentification. Such as I have examined seem to be young of the present species.

Common in moist open ground throughout the Northern, Middle and Cape May districts. Local and apparently of recent introduction in the Pine Barrens.

*Fr.*—Late May to mid-July (apparently).

*Middle District.*—Farmingdale, Sea Bright, New Egypt, Browns Mills, Medford (S), Lindenwold, Clementon (S), Glassboro, Swedesboro.

*Pine Barrens.*—Landisville, Cedar Brook, Egg Harbor City.

*Cape May.*—Cape May.

*Carex tribuloides* Wahl. **Blunt Broom Sedge.**

Pl. XXVI, Fig. 2.

*Carex tribuloides* Wahlenberg, Koug. Vet. Acad. Handl. (II.) 24. 145. 1803 [North America].—Britton 278.—Keller and Brown 87.

*Carex lagopodioides* Willis 70.

Rather frequent in low ground of the Northern and Middle districts.

*Fr.*—Early June to late July.

*Middle District.*—New Egypt, Mt. Holly, Riverside, Medford (S), Mickleton, Swedesboro.

*Carex straminea* Willd. **Straw Sedge.**

Pl. XXVI, Fig. 7.

*Carex straminea* "Willd.," Schkuhr Riedgr. Nachtr. 49, f. 34. 1801 [North America].—Knieskern 35.—Willis 70.—Britton 278.

Low ground of the northern counties; less common southward in the Middle district.

*Fl.*—Late May to early July.

*Middle District.*—Farmingdale, Mickleton, Riddleton.

*Carex silicea* Olney. **Sea Beach Sedge.**

Pl. XXVI, Fig. 3.

*Carex silicea* Olney, Proc. Amer. Acad. VII. 393. 1868 [new name for *C. straminea moniliformis* Tuckerm.].—Keller and Brown 88.

*Carex moniliformis* Britton 278.

*Carex straminea* var. *moniliformis* Knieskern 35.—Willis 70.

Frequent along the coast, in moist spots among the sand dunes, etc.

*Fr.*—Early June to early July.

*Maritime.*—Deal, Forked River, Seaside Park, Spray Beach (L), Atlantic City, Longport (S), Piermont (S), Stone Harbor, Wildwood. Cape May.

**Carex festucacea brevoir** (Dewey). **Shorter Fescue Sedge.**

Pl. XXVI, Fig. 8.

*Carex brevior* Dewey, Am. Jour. Sci. II. 158. 1820 [no loc.].

Occasional in the Cape May district where it was collected by Mr. O. H. Brown. Our specimens were identified by Prof. M. L. Fernald.

*Fr.*—Late May to early July.*Cape May.*—Cape May (S).**Carex hormathodes** Fernald. **Marsh Straw Sedge.**

Pl. XXVI, Fig. 4.

*Carex hormathodes* Fernald Rhodora, Aug., 1906, p. 165 [new name for *C. tenera* Dewey, Amer. Jour. Sci. VIII. 97. 1824—no locality].

*Carex tenera* Keller and Brown 88.*Carex festucacea* var. *tenera* Knieskern.*Carex straminea* var. *foenea* Britton 278.

Frequent along the edge of the salt marshes on the coast.

*Fr.*—Late May to early July.

*Coast Strip.*—Pt. Pleasant, Spray Beach (L), Earnegat City Jnc. (L), Palermo, Piermont, Avalon, Holly Beach, Cold Spring.

**Carex hormathodes richii** Fernald. **Rich's Sedge.**

*Carex hormathodes* var. *Richii* Fernald, Proc. Amer. Acad. 37. 1901-2. 475 [Mass. and Conn.]

*Carex straminea* var. *foenea* Britton 278 (as to inland localities).

Occasional in swamps of the Middle district.

*Fr.*—Late May to early July.*Middle District.*—Delanco, Swedesboro.**Carex alata** Torr. **Broad-winged Sedge.**

Pl. XXVI., Fig. 5.

*Carex alata* Torrey, Ann. Lyc. N. Y. III. 396. 1836 [Newbern, N. C., Macon, Ga.].—Willis 70.—Keller and Brown 88.

*Carex staminea* var. *alata* Britton 278.

Rather frequent in the Cape May district, the lower coast islands and lower Middle district.

*Fr.*—Early June to early July.

*Middle District.*—New Egypt, Grenloch, Medford (S), Lindenwold (S), Swedesboro.

*Coast Strip.*—Avalon, Piermont (S), Holly Beach, Wildwood.*Cape May.*—Cold Spring, Cape May.



*Carex albolutescens* Schw. Greenish-white Sedge.

Pl. XXVI., Fig. 6.

*Carex albolutescens* Schweinitz, Ann. Lyc. N. Y. I. 66. 1824 [Carolina and Pennsylvania].—Keller and Brown 88.

Frequent throughout our region, least common in the Middle district.

*Fr.*—Early June into July and sparingly through the summer to as late as October.

*Middle District.*—Farmingdale, New Egypt, Delanco (S), Riverside, Medford (S), Lawnside (S), Mickleton, Swedesboro, Riddleton.

*Pine Barrens.*—Lakehurst, Clementon, Landisville (T), Winslow Jnc., Egg Harbor City, Tuckerton to Atsion, Speedwell (S).

*Coast Strip.*—Sandy Hook, Barnegat City (L), Barnegat City Jnc. (L), Spray Beach (L), Sherburn's (L), Somers Pt., Stone Harbor, Piermont, Holly Beach (S), Anglesea.

*Cape May.*—Bennett, Cold Spring, Whitesboro.

## Order ARALES.

Inflorescence on a fleshy spadix, often surrounded by a hood-like spathe. Fleshy, water or swamp plants or minute, degenerate floating plants.

Family ARACEÆ. Arums, Etc.

Plants mainly of the Middle district, only one species, the Golden Club, is distinctly a Pine Barren species, while one other, the Arrow Arum, enters the region along the streams.

### Key to the Species.

- a. Leaves oblong elliptic, often floating on the water, spadix naked yellow. *Orontium*, p. 317
- aa. Leaves sagittate or hastate, spadix enclosed in a slender green spathe. *Peltandra*, p. 315
- aaa. Leaves large, ovate cordate, spadix in an inflated green and maroon spathe, appearing before the leaves. *Spathyema*, p. 316
- aaaa. Leaves sword shaped, spadix naked from the side of a somewhat three-sided scape. *Acorus*, p. 317
- aaaaa. Leaves three to many parted, spadix surrounded by a green or purple striped spathe, and with a terminal projection beyond the inflorescence.

- b. Spathe funnel-like, open down the side, clear of the spadix all around, top forming a flap which usually hangs over the tip of the spadix. Leaves three-parted.
- c. Top of spathe always drooping over, inside green or dark purplish or striped. Leaves glaucous beneath.  
*Arisæma triphyllum*, p. 314
- cc. Top of spathe often erect, always uniform, dark purple within. Leaves not glaucous beneath. Averages much smaller than the preceding.  
*A. pusillum*, p. 314
- bb. Spadix long attenuate, reaching far beyond the tip of the spathe which is narrow and closely wrapped about it. Leaves 5-15 parted.  
*A. dracontium*, p. 315

## ARISÆMA Martens.

*Arisæma triphyllum* (L.)\* Jack-in-the-Pulpit.

XXXIX., Fig. 2.

*Arum triphyllum* Linnæus, Sp. Pl. 965. 1753 [Virgima].*Arisæma triphyllum* Knie-kern 29.—Willis 58.—Britton 252.

Common in damp woods in the Northern and Middle districts, and locally in the Cape May peninsula.

The familiar Jack-in-the-Pulpit is one of those plants that disappears as soon as we enter the Pine Barrens. In northern and western Jersey we find it in damp woods associated with the Skunk Cabbage, Dog-toothed Violet, Spring Beauty and May Apple, but in the swamps of the Pine region not one of the group is to be found.

*Fl.*—Late April to mid-May.

*Middle District.*—Farmingdale, New Egypt, Bordentown, Kinkora, Delanco, Pemberton, Delair, Camden (S), Gloucester (P), Springdale (S), Medford, Washington Park, Woodbury, Sewell (S), Pensauken, Salem (C).

*Cape May.*—Cold Spring (S), Cape May.

*Arisæma pusillum* Peck. Dwarf Jack-in-the-Pulpit.

*Arisæma pusillum* Peck, Rep. N. Y. State Museum, 51. 297. [Millbrook, Dutchess Co., N. Y.].—Stone, Torrey, 1903. 171.—Keller and Brown 89.

This little "Jack" occurs with the preceding, blooming a couple of weeks later. It is easily distinguished by its smaller size, more erect "flap" to the spathe, which is always deep purplish inside, and by the shiny green (not glaucous) under surface to the leaves. It was first noted in our district by Mr. Stewardson Brown at Clementon.

*Fl.*—Early May to late June.

*Middle District*.—Farmingdale, Pensauken, Haddonfield (S), Springdale (S), Medford, Pitman, Lindenwold (S), Tomlin (S), Clementon, Sickler-ville (S).

*Pine Barrens*.—Hammonton (P).

*Cape May*.—Go-hen (S), Cold Spring.

***Arisæma dracontium* (L.). Green Dragon.**

*Arum Dracontium* Linnæus, Sp. Pl. 964. 1753 [America].

*Arisæma dracontium* Britton 253.—Keller and Brown 80.

Local in meadows and low woodland in the northern counties and rare in the upper part of the Middle district near the Delaware and in the lower Cape May peninsula.

*Fl.*—Late May to early June.

*Middle District*.—Farmingdale, Bordentown (C), Haddonfield (C).

*Cape May*.—Cold Spring (OHB).

**PELTANDRA Rafinesque.**

***Peltandra virginica* (L.). Green Arrow Arum.**

Pl. XXVII, Fig. 2.

*Arum virginicum* Linnæus, Sp. Pl. 966. 1753 [Virginia].

*Peltandra virginica* Knieskern 29.—Willis 58.—Britton 253.

Plentiful, growing in water along the edges of all the rivers and tributary streams of the State.

Along the muddy shores of the Delaware and the tidewater creeks below Philadelphia its broad arrow-shaped leaves are familiar, mingling with the similar but more delicate ones of the *Sagittaria* and the rounder ones of the big yellow *Splatterdock*, the three forming a sort of border to the beds of Wild Rice and Cat-tails.

The flower, which resembles a very slender green calla lily, raises itself among the leaf stems for a short time, and then, as the seed develops, the stalk curves downward, drawing the pod beneath the water and burying it in the soft mud.

Arrow Arums frequently follow the smaller streams far back toward their sources, and we come upon them sometimes even in the Cedar Swamps of the Pine Barrens where some of these tidewater or river associates have succeeded in penetrating. Mr. Ivar Tidestrom (*Rhodora* 1910. 47) proposes to separate two varieties based on leaf form, but I cannot regard them as any-

thing but individual variations such as occur in *Sagittaria* and other similar plants.

*Fl.*—Early June to late June.

*Middle District.*—Farmingdale, New Egypt, Birmingham, Pensauken (S), Sieklerville (S), Camden (P).

*Pine Barrens.*—Folsom, Pancoast (S), Forks of Batsto.

*Coast Strip.*—Toms River (NB), Forked River, Manahawkin.

*Cape May.*—Goshen (S), Court House (S), Bennett.

#### SPATHYEMA Rafinesque.

*Spathyema fœtida* (L.). Skunk Cabbage.

Pl. XXIX., Fig. 2; Pl. XXX.

*Dracontium fatidum* Linnæus, Sp. Pl. 967. 1753 [Virginia].

*Symplocarpus fatidus* Knieskern 30.—Willis 58.—Britton 254.

Frequent in swampy ground, especially in woods, throughout the Northern, Middle and Cape May districts.

As early as February we may find the maroon spathes of the Skunk Cabbage pushing their noses out of the mud in some springhead where the ground is not deeply frozen, sometimes uniformly colored, sometimes streaked with yellowish green, and if we look inside we shall probably find a dust of pollen on the bottom of the chamber, showing that the plant is truly in bloom. It will be some weeks before the leaves begin to show themselves, and by that time the spathes will be pretty well withered or decomposed. Most plants that bloom very early make serious preparation the autumn before, and if we dig up a Skunk Cabbage plant and slit open the base so as to expose the flower bud, we shall find everything in readiness long before winter sets in. A specimen in my collection from Medford, collected October 6, shows the spathe characteristically colored and already four inches high, with spadix half an inch in diameter and flowers fully formed.

The Skunk Cabbage is not found in the Pine Barrens, though inasmuch as the boundary line is irregular, with interlacing arms, there is a narrow strip wherein plants of West Jersey and the Pines grow side by side, which has given rise to the few Pine Barren records. In the Cape May peninsula it reappears, but is apparently absent from the coast strip, as diligent search has failed to detect it between Cape May Court House and Bay Head.

*Fl.*—February, or more rarely January (depending upon the openness of the winter and the individual habitat) to late March.

*Middle District.*—Shark River, Farmingdale, Allaire, Pt. Pleasant, Bordentown, Delanco, Delaire, Merchantville, Morristown, Camden (Bassett), Medford (S), Lawnside (S), Woodbury, Sumner, Glassboro, Mickleton (H), Yorktown, Sharpstown, Alloway.

*Cape May.*—Court House, Dias Creek (S), Cold Spring.

#### ORONTIUM L.

##### *Orontium aquaticum* L. Golden Club.

*Orontium aquaticum* Linnæus, Sp. Pl. 324. 1753 [Virginia and Canada].—Barton, Fl. Phila. I. 169. 1818.—Knieskern 30.—Willis 59.—Britton 253.—Keller and Brown 89.

Bogs and ponds locally in the Northern and Middle districts, plentiful in the Pine Barrens; casual in the Cape May peninsula.

The Golden Club is one of the attractions of the Pine Barrens in springtime, when the surface of the pools bristle with its brilliant, slender, orange-yellow spikes bordered below with white where they join the green stalks, and later we find the floating leaves with their peculiar velvety upper surface from which the water rolls off as from the proverbial duck's back.

*Fl.*—Early April to late May.

*Middle District.*—Delaire, Camden (P), Repaupo (H), Alloway, Woodbury (P).

*Pine Barrens.*—Manchester (NB), Barnegat, Speedwell (S), Two miles north of Speedwell, Chatsworth, Bear Swamp (S), Albion, Landisville, Pleasant Mills, Forks of Batsto, Folsom, Pancoast.

*Cape May.*—West of Court House, Cold Spring (OHB).

#### ACORUS L.

##### *Acorus calamus* L. Calamus.

*Acorus calamus* Linnæus, Sp. Pl. 324. 1753 [Europe].—Knieskern 30.—Willis 59.—Britton 254.

Swamps and wet meadows, frequent in the Northern and Middle districts. Apparently rare elsewhere and perhaps introduced.

*Fl.*—Early May to early July.

*Middle District.*—New Egypt, Delaire, Kinkora, Medford (S), Gibbsboro (S), Aura (S), Camden (P), Mickleton (H).

*Pine Barrens.*—Pleasant Mills (T), Hammonton (Bassett).

*Coast Strip.*—Beach Haven Terrace (L).

*Cape May.*—Cold Spring (OHB).

## Family LEMNACEÆ. Duckweeds.

Minute floating aquatic plants, consisting of a disc-like or globular thallus, often with thread-like roots below. Growth mostly by lateral branching, the branches soon separating and forming new plants. Flowers rare, consisting of either a single stamen or single pistil, appearing on the upper surface of the thallus. The smallest flowering plants known. Apparently absent from the Pine Barrens.

*Key to the Species.*

- a. Frond disc-like, 2-8 mm. in diameter.  
 b. Rootlets several, diameter of frond 3-8 mm. *Spirodela polyrhiza*, p. 318  
 bb. Rootlet single.  
 c. Frond round oval, diameter 2-5 mm. *Lemna minor*, p. 318  
 cc. Frond pointed at one end, diameter 2-3 mm.  
*Lemna perpusilla*, p. 318  
 aa. Frond globular, 7-1.5 mm. in diameter. *Wolffia columbiana*, p. 319

**SPIRODELA Schleiden.*****Spirodela polyrhiza* (L.). Larger Duckweed.**

*Lemna polyrhiza* Linnæus, Sp. Pl. 970. 1753 [Europe].—Willis 59.—Britton 255.

Floating on the water in ponds, ditches, etc. Frequent in the Northern, Middle and Cape May districts.

*Middle District.*—Fish House, Delair, Medford (S), Mickleton (H).  
*Cape May.*—Green Creek.

**LEMNA L.*****Lemna minor* L. Smaller Duckweed.**

*Lemna minor* Linnæus, Sp. Pl. 970. 1753 [Europe].—Willis 59.—Britton 254.

Frequent in the same situations as the last and with the same distribution.

*Middle District.*—Farmingdale, Fish House, Delair, Blackwood (S).  
*Cape May.*—Cape May.

***Lemna perpusilla* Torr.**

*Lemna perpusilla* Torrey, Fl. N. Y. II. 245. 1843 [Pond on Staten Island].  
 Willis 59.—Britton 254.

Similar situations; reported only from the Northern district and from one locality within our range, *i. e.*, "Atlantic City—

Diffenbaugh," given in Dr. Britton's Catalogue. We have been unable to verify this record or to locate the original specimens.

#### WOLFFIA Horkel.

*Wolffia columbiana* Karst. **Columbian Wolffia.**

*Wolffia columbiana* Karsten, Bot. Unters I. 103. 1865-67 [no locality given].  
Willis 59.—Britton 255.—Keller and Brown 90.

Middle district, extending to Bergen County.

The little green discs of the Duckweed, with their slender rootlets hanging beneath, reproducing by branching and separation from the parent disc and rarely found blossoming, seem far enough removed from our conception of a flowering plant, but the still more minute *Wolffia* is the extreme in this direction. The plants consist of minute green globules about a millimeter in diameter, which float just below the surface of the water.

*Middle District.*—Fish House, Kaighns Pt. (C), Bridgeport, Pedricktown (H), Jumbo (H).

### Order XYRIDALES.

Monocotyledenous herbs, flowers usually regular, parts in 3's or 6's. Ovary compound, superior. Endosperm of seed mealy.

Family XYRIDACEÆ. Yellow-eyed Grasses.

Characteristic plants of the Pine Barren district. Three of the six species occur sporadically in the Middle and Cape May districts, and one other is restricted to the latter.

The yellow flowers are quite showy, but only last a short time.

#### XYRIS L.

##### *Key to the Species.*

- a. Base distinctly bulbous thickened.
  - b. Lateral sepals projecting beyond the bracts and fringed.
    - X. arenicola*, p. 322
  - bb. Lateral sepals not projecting beyond the bracts and not fringed. Bracts tightly imbricated even when ripe, uniform chestnut, heads nearly spherical.
    - X. torta*, p. 320
- aa. Base not bulbous thickened.
  - b. Lateral sepals projecting beyond the bracts. Plants large. 6-9 dm. high, leaves 20 mm. broad.

- c. Sepals fringed. *X. fimbriata*, p. 322  
 cc. Sepals not fringed, but slightly lacerate.  
 d. Heads globular or ovoid. *X. congdoni*, p. 320  
 dd. Heads cylindrical, twice as long as thick or more.  
*X. elata*, p. 321  
 bb. Lateral sepals not projecting beyond the scales. (This and the last easily distinguished from *torta* by the broad green central part to each scale). Plant smaller, less than 5 dm. high.  
*X. caroliniana*, p. 321

***Xyris torta* J. E. Smith. Slender Yellow-eyed Grass.**

*Xyris torta* J. E. Smith, Rees, Cycl. 39 vol. 1819 [North America].

*Xyris flexuosa* Barton Fl. Phila. I. 25. 1818.—Willis 66.—Britton 247.

*Xyris bulbosa* Gray Man. Ed. I. 513. 1848.

In swampy spots, locally in the northern counties and common throughout the region covered by this list.

This species is more conspicuously twisted than the equally common *X. caroliniana*, the leaves being frequently spiral. Smith's description certainly applies to this species and not to *X. arnicola* to which his name was so long applied. (cf. Harper, Torrey, 1905, 128).

*Fl.*—Early July to late August. *Mature Heads.*—Late July persisting into winter.

*Middle District.*—New Egypt, Florence, Camden, Paulsboro, Lindenwold, Swedesboro, Beaver Dam, Dividing Creek (S).

*Pine Barrens.*—Long Branch, Belmar (NY), Pt. Pleasant, Toms River (S), Forked River, Seaside Park, Jones Mill (S), Parkdale (S), Pleasant Mills (T), Main Road Sta., Pancoast (NB), Eighth St., Egg Harbor City, Beesley's Pt. (S), Palermo (S), Woodbine.

*Coast Strip.*—Holgate's (L), Sherburn's (L).

*Cape May.*—Cape May (S), Town Bank.

***Xyris congdoni* Small. Congdon's Yellow-eyed Grass.**

*Xyris congdoni* Small, Britton's Manual, 2nd Ed. 1067. 1907 [So. Kingston, R. I.]

Rather frequent in swamps of the Pine Barrens and occasional in the Middle and Cape May districts in isolated bogs. This large species was confused with the smaller *X. caroliniana* in the past. It is closely allied to *X. smallii* of the south, but sufficiently distinct and apparently isolated from it geographically.

*Fl.*—Mid-June to late August. *Mature Heads.*—Mid-July persisting into October.



*Middle District*.—Repaupo, Center Square.

*Pine Barrens*.—Near Williamstown, Woodmansie, Batsto, Bamber, Manahawkin, Pasadena, Chatsworth, Speedwell, Hammonton, Egg Harbor City, Woodbine.

*Cape May*.—Bennett.

*Xyris elata* Chapm. **Chapman's Yellow-eyed Grass.**

*Xyris elata* Chapmann, Fl. So. States. 501. 1860 [W. Florida].

Rare and local, restricted to the lower part of the Cape May peninsula. The very large cylindrical head makes this species conspicuous.

It was first detected in the State by Mr. Chas. S. Williamson.

Dr. John K. Small identifies this plant as *elata* in a letter to Mr. Bayard Long, while specimens from the same spot, which I sent to Dr. B. L. Robinson, are regarded by him as rather aberrant "*X. smalliana*." Judging from the lack of any connecting forms and the marked difference between these and *X. congdoni* as it occurs in New Jersey, I am inclined to adopt Dr. Small's view of their relationship.

*Fl.*—Late July to late September.

*Mature Heads*.—Late August, persisting into November.

*Cape May*.—Bennett.

*Xyris caroliniana* Walter. **Carolina Yellow-eyed Grass.**

*Xyris Caroliniana* Walter, Fl. Car. 69. 18 [Carolina].

*Xyris Caroliniana* Pursh, Fl. Amer. Sept. I. 33. 1814.—Knieskern 33.—Willis

66.—Gray, Man. Ed. I. 513. 1848.—Britton 247.—Keller and Brown 91.

*Xyris brevifolia* Barton, Fl. Phila. I. 97. 1818.

*Xyris flexuosa* var. *pusilla* Britton 247.

*Xyris montana* Taylor, Torrey 1909, 260.

Frequent throughout the Pine Barren, Middle and Cape May districts.

Easily distinguished from *X. torta* by the absence of a bulbous swelling at the base of the plant. Both species vary in size, and very minute examples, only a few inches high, are responsible for the records of *X. montana*. Mr. Norman Taylor tells me that the Torrey specimens recorded by Dr. Britton and himself and by Mr. Heinrich Ries,\* as *montana* (= *pusilla*) are *caro-*

\* Bull. Torr. Bot. Club, 19. 38.

*liniana*, and I have myself examined Dr. Peters' Mays Landing specimens and find them to be the same.

*Fl.*—Mid-July to early September. *Mature Heads.*—Mid-August persisting into October.

*Middle District.*—Florence, Delanco (S), Kaighns Pt., Center Square, Repaupo, Tomlin, Washington Park (S), Haddonfield (S), Dividing Creek.

*Pine Barrens.*—Long Branch, Asbury Park, Pt. Pleasant, Avon, Toms River (NY), Forked River, Waretown, Manchester (NB), Parkdale, Pleasant Mills, Hammonton, Ballengers Mills, Egg Harbor City.

*Coast Strip.*—Harvey Cedars (L), Spray Beach (L), Ship Bottom (L).

*Cape May.*—Bennett, Court House.

***Xyris fimbriata* Ell.\* Fringed Yellow-eyed Grass.**

*Xyris fimbriata* Elliot Bot. S. C. and Ga. I. 52. 1816 [Georgia].—Darlington, Fl. Cestrica 12. 1837.—Gray Man. Ed. I. 514. 1848.—Knieskern 33.—Willis 66.—Britton 248.—Keller and Brown 91.

Swamps of the Pine Barrens, apparently not very common.

*Fl.*—Mid-July to early September. *Mature Heads.*—Mid-August, persisting through September.

*Pine Barrens.*—Manchester (C), Jones Mill (S), Speedwell, Jackson (P), Hammonton (C), Quaker Bridge, Parkdale, Egg Harbor City, Eighth St.

***Xyris arenicola* Small.† Twisted Yellow-eyed Grass.**

*Xyris arenicola* Small, Southern Flora, 234 (new name for *X. torta* Kunth nec Smith). [North America.]

*Xyris torta* Gray, Man. Ed. V. 548. 1867.—Willis 66.—Britton 248.

*Xyris conocephala* Keller and Brown 91.

Dry sand, Pine Barren region, apparently only once collected in the past, by D. C. Eaton, near Batsto, in 1860. Gray quotes "near Batsto, D. C. Eaton," in the fifth edition of the Manual, and Prof. Fernald writes me that there are two sheets in the Gray Herbarium bearing printed labels "In vicinis Quaker

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\* C. D. Lippincott's specimen from Repaupo, quoted by Keller and Brown, proves to be *X. congdoni*, and Jahn's record from Paulsboro was doubtless the same, although no specimen was preserved.

† In Britton's catalogue it is recorded from Taunton, on authority of Dr. J. Stokes, and Keller and Brown quote Woodmansie and Forked River (Heritage) and Hammonton (Crawford). There are no specimens to substantiate these records, however, and subsequent search has failed to discover the species at these localities. In view of the frequent misidentification of species of this genus it seems safe to reject them, especially as the three gentlemen responsible for the records concur in this opinion.

Bridge Nov. Caes. coll. D. C. Eaton, 1860," on one of which Eaton has written "Batsto in arenosis." Mr. Norman Taylor writes me that there is a similar sheet in the herbarium of the N. Y. Botanical Garden.

Just as the report is going to press I have the satisfaction of reporting the rediscovery of the plant in New Jersey. On July 19, 1911, Mr. Stewardson Brown, in company with Mr. Bayard Long and the writer, found a patch of this *Nyris* not far from where the Batsto River crosses the New Jersey Central Railroad above Atsion. The plants were growing in sand, not in wet spots, to which the other species are so partial. They were sheathed below, forming the characteristic long bulb-like base. The plants grew several together, the "bulbs" somewhat spirally twisted around one another or arranged in a circle around what had apparently been the location of old plants now dead and rotted away—resembling the base of a tussock. At the date of discovery they were only in bud.

*Pine Barrens*.—Batsto (Gray Herb. and NY), Atsion.

#### Family ERIOCAULACEÆ. Pipeworts.

Typical Pine Barren bog plants, two of which reach their northern limit in this region. Parker's Pipewort is restricted to the muddy river shores of the Middle district where it is the representative of the Seven-angled Pipewort of the bogs. It is the only one to occur outside the Pine Barrens and Cape May region.

#### ERIOCAULON L.

##### *Key to the Species.*

- a. Leaves obtuse at the tip, scape 3-9 dm. high. *E. decangulare*, p. 325
- aa. Leaves sharp pointed.
  - b. Heads over 6-12 mm. in diameter, chaff (bracts among the flowers) obtuse, scapes 1.5-9 dm. high, leaves not over 1.2 dm. long. *E. compressum*, p. 324
  - bb. Heads not over 6 mm. in diameter, chaff acute, scapes not over 2 dm. high, usually much less.
    - c. Mature heads 5-9 mm. broad, depressed globose. *E. septangulare*, p. 324
    - cc. Mature heads 3-4 mm. broad, surrounded by a campanulate involucre. *E. parkeri*, p. 324

*Flowering Data*.—Dates given cover the period when well expanded heads of flowers or of intact fruit occur.

***Eriocaulon septangulare* With. Seven-angled Pipewort.**

Pl. XXVIII, Fig. 1.

*Eriocaulon septangulare* Withering, Bot. Arr. Britt., pl. 784. 1776 [Isle of Skye].—Knieskern 33.—Willis 67.—Britton 260.—Keller and Brown 91.  
*Eriocaulon pellucidum* Pursh Fl. Amer. Sept. I. 92. 1814.

Ponds and bogs of the Pine Barrens and locally in lakes of the northern counties.

This species is subject to great variation in size and character of foliage according to habitat. In submerged specimens the leaves become well developed, nearly or quite a foot (3 dm.), with scapes about as long. In others the leaves are only half the length of the scape, while plants on the edge of a pond or bog are often only 75–100 mm. in height, with leaves 25–25 mm. long, exceedingly dwarfed specimens reaching a height of only 25–50 mm. *E. decangulare* never develops the long floating leaves of *E. septangulare*, and so far as I can ascertain *E. compressum* does not do so either.

*Fl.*—Early July to early October.

*Pine Barrens.*—Pt. Pleasant (Mackenzie), Manchester (NY), Bamber, Toms River (S), Island Hts. Inc. (NY), Waretown, Speedwell (S), Clementon, Hammonton (NB), Twelfth St. Folsom, Egg Harbor City, Absecon.

***Eriocaulon parkeri* Robinson. Parker's Pipewort.**

*Eriocaulon Parkeri* Robinson, Rhodora V. 175. 1905 [Camden].—Keller and Brown 92.—Long, Bartonian II. 20. 1910.

Tidewater mud banks of western New Jersey, local. First recognized by Dr. Robinson as distinct from the last and described from a specimen collected at the mouth of Cooper's Creek on the Delaware, by the late Chas. F. Parker (1820–1883), one of the best informed botanists on the Pine Barrens of New Jersey.\*

*Fl.*—Late July, into October or November.

*Middle District.*—Bordentown, Morris, Fish House, Camden ab. Cooper's Creek, Red Bank, Millville.

*Coast.*—Mullica River above Crowleystown.

***Eriocaulon compressum* Lam. Flattened Pipewort.**

Pl. LXIV., Fig. 2.

*Eriocaulon compressum* Lamarek, Encycl. III. 276. 1879 [So. Carolina].—Keller and Brown 92.

\* Cf. Proc. Acad. Nat. Sci., Phila., 1883, p. 260, for biography.

*Eriocaulon gnaphalodes* Willis 67.—Gray Man. Ed. II. 489. 1858.—Britton 259.

Wet swamps in the Pine Barrens and Cape May district; frequent.

The early flowering, large grayish heads and short leaves distinguish this fine species from the preceding, while *E. septangulare* is usually smaller and later in flowering.

*Fl.*—Mid-May to late June, rarely into July.

*Pine Barrens.*—Toms River, Forked River, Speedwell, Berlin, Jackson, Eighth St. (NY), Hammonton (Bassett), Quaker Bridge, Pleasant Mills (S), Pancoast, Manumuskin (S), Franklinville (P), Atsion (P), Elmer (P), Egg Harbor City (P)

*Cape May.*—Bennett.

**Eriocaulon decangulare L. Ten-angled Pipewort.**

Pl. XXVIII., Fig. 2.

*Eriocaulon decangulare* Linnæus, Sp. Pl. 87. 1753 [North America].—Pursh Flor. Amer. Sept. I. 91. 1814.—Gray Man. Ed. I. 515. 1848.—Knieskern 33.—Willis 67.—Britton 259.—Keller and Brown 92.

Pine Barren swamps, the most plentiful species, extending to the edge of the salt meadows at certain points, and also to the Cape May district.

*Fl.*—Mid-July to early October.

*Pine Barrens.*—Toms River, Montclair (NB), Toms River (NY), Forked River (NB), Island Hts., West Creek, Tuckerton, Jones Mill (S), Speedwell (S), High Bridge (S), Bear Swamp (S), Berlin (KB), Atco, Cedar Brook, Hammonton, Atsion, Landisville (NY), Parkdale (S), Quaker Bridge, Batsto (S), Forks of Batsto, Egg Harbor City, Folsom Twelfth St., Eighth St. (T), Mays Landing (H), Weymouth (NY), Beesleys Pt. (H), Manumuskin (S), Ocean View (S), Bel. Palermo, Dennisville (OHB).

*Cape May.*—Dias Creek.

Family COMMELINACEÆ. Spiderworts.

*Key to the Species.*

- a. Perfect stamens, 3, rarely 2, bracts spathe-like.
  - b. Margins of spathe united. *Cammelina hirtella*, p. 326
  - bb. Margins of spathe free, flowers blue. *C. communis*, p. 326
- aa. Perfect stamens, 6, rarely 5, bracts leaf-like *Tradescantia*, p. 325

**TRADESCANTIA L.**

***Tradescantia virginiana* L. Spiderwort.**

*Tradescantia virginiana* Linnæus, Sp. Pl. 288. 1753 [Virginia].—Knieskern 33.—Britton 248.

Perhaps native along the upper Delaware in the Middle district, but for the most part, if not entirely, an escape from cultivation.

*Fl.*—Late May to mid-June.

*Middle District.*—New Egypt, Bordentown (C), Swedesboro (C), Salem (C).

#### COMMELINA L.

##### *Commelina communis* L. Common Spiderwort.

*Commelina communis* Linnæus, Sp. Pl. I. 40. 1753 [America].

Frequent in the Northern and Middle districts, and locally on the coast; largely if not entirely introduced as a weed.

All alleged records of *C. virginica* from our district prove to be this.

*Fl.*—Early August to late September.

*Middle District.*—Beverly (C), Kinkora (NY), Fish House, Merchantville (C), Moorestown (C), Kaighns Pt., Haddonfield (S), Oaklyn (S), Lawnside (S), Woodbury (C), Pennsgrove (C).

*Coast Strip.*—Beach Haven (L), Atlantic City (NB), Pleasantville (NY).

##### *Commelina hirtella* Vahl.

*Commelina hirtella* Vahl., Enumerat. 2. 166. 1806 [new name for *C. longifolia* Mich., nec Lam.—Virginia].

Very rare in the Middle district. Collected by Chas. E. Smith at Kaighns Point many years ago.

*Middle District.*—Kaighns Pt.

#### Family PONTEDERIACEÆ. Pickerel Weeds, etc.

Several water plants of very dissimilar general appearance belong here. They all agree in having six-parted flowers, which grow singly or several to many together in a sheath or spathe, which is leaf-like, often covering only the base of the spike.

Only the Pickerel Weed enters the Pine Barrens.

#### *Key to the Species.*

- a. Leaves ovate, cordate sagittate, flowers in an exposed spike, blue. *Pontederia*, p. 327
- aa. Leaves uniform, flowers inconspicuous, whitish or bluish. *Heteranthera reniformis*, p. 327
- aaa. Leaves floating, grass-like; flowers star-like, yellow. *H. dubia*, p. 327

## PONTEDERIA L.

*Pontederia cordata* L. Pickerel Weed.

Pl. XXVII., Fig. I.

*Pontederia cordata* Linnæus, Sp. Pl. 288. 1753 [Virginia].—Knieskern 33.—Willis 66.—Britton 246.

Frequent in water along streams throughout the State, extending well back into the heart of the Pine Barrens. The variety *angustifolia* Pursh seems to be merely an extreme leaf from such as we find in *Sagittaria* and other aquatic plants.

*Fl.*—Late June to mid-September.*Middle District.*—Pensauken (S), Hartford, Fish House, Medford (S), Salem (S), Centerton (S), Franklinville (P).*Pine Barrens.*—Toms River (S), Speedwell (S), Pleasant Mills, Quaker Bridge (C), Hammonton (Bassett), Eighth St., Manumuskin (S).*Cape May.*—Timber and Beaver Creek (S), Cape May.

## HETERANTHERA Ruiz and Pavon.

*Heteranthera reniformis* Ruiz & Pavon. Mud Plantain.*Heteranthera reniformis* Ruiz and Pavon, Fl. Per. I. 43. 1798 [Cercado, Peru].—Barton Fl. Phila. I. 23. 1818.—Willis 66.—Britton 247.

Northern and Middle districts on muddy river banks and borders of ponds and ditches, frequent. In our area reported only from the shores of the Delaware.

*Fl.*—Early July into September.*Middle District.*—Bordentown, Delair, Kaighns Pt., Bridgeport (NB), Salem Co. (C).*Heteranthera dubia* (Jacq.). Water Star Grass.*Commelina dubia* Jacquin, Obs. Bot. II. 9, pl. 59. 1768 [Virginia].—Britton 247.

Streams and lakes of the Northern district, rarely in the Delaware within our limits.

*Fl.*—Late July into September.*Middle District.*—Delaware River, Camden Co. (NB).

## Order LILIALES.

Differs from the previous order in having the endsperm of the seed fleshy or horny.

### Family JUNCACEÆ. Rushes.

Grass-like plants often popularly confused with the sedges, but easily distinguished by the fact that they have perfect flowers with three acute stiff petals and three similar sepals which persist around the nearly spherical or cylindrical seed capsule. Seeds abundant, very minute (spore like), often with an elongated "tail" at each end. Common mostly in damp ground or in water throughout our region.

*Flowering or Fruiting Data.*—The time of year noted indicates the season when the capsules are full-grown (but not necessarily mature), through the period of dehiscence (*i. e.*, as long as there are present undehisced capsules).

### *Key to the Species.*

- a. Plant not hairy, leaf sheaths open.
  - b. Inflorescence apparently growing from the side of the scape, not from the end (the part above the inflorescence is really the involucreal leaf which is terete and appears exactly like a continuation of the scape).
    - c. Sheaths at base of the scape leafless. *Juncus effusus*, p. 329
    - cc. Sheaths, or at least the inner one, bearing long terete scape-like leaves. *J. setaceus*, p. 332
  - bb. Inflorescence obviously terminal.
    - c. Leaves flat or somewhat terete, never septate.
    - d. Flowers inserted singly on the branches of the inflorescence, each with a small bract.
      - e. Annual, root fibrous, inflorescence more than one-third the height of the plant. *J. bufonius*, p. 330
      - ce. Perennial, from a root-stock, inflorescence not one-third the height of the plant.
    - f. Leaves flat or somewhat involute in drying.
      - g. Cauline leaves 1-2, perianth parts obtuse, salt meadow species. *J. gerardi*, p. 330
      - gg. Cauline leaves none, perianth parts acute, inland species. *J. tenuis*, p. 331



- ff. Leaves terete, channeled along the upper surface.
  - g. Capsule not longer than the perianth. *J. dichotomus*, p. 331
  - gg. Capsule distinctly longer than the perianth. *J. greenii*, p. 331
- dd. Flowers without individual bracts, collected in heads, leaves flat.
  - e. Stamens exerted in fruit, plant 4-10 dm. high. *J. aristulatus*, p. 332
  - ee. Stamens not exerted in fruit, plant 2-7 dm. high.
    - f. Perianth plainly exceeded by the capsule. *J. greenii*, p. 331
    - ff. Perianth not exceeded by the capsule. *J. marginatus*, p. 332
- cc. Leaf-blade hollow terete, and provided with septa at regular intervals.
  - d. Stamens six, one opposite each part of the perianth.
    - e. Heads containing 1 or rarely 2 flowers. *J. pelocarpus*, p. 333
  - ee. Heads containing 2 to many flowers.
    - f. Epidermis rough with minute tubercles. *J. cesariensis*, p. 334
    - ff. Epidermis smooth.
      - g. Plants with submerged capillary leaves in addition to the normal ones. *J. militaris*, p. 333
      - gg. Plants without capillary leaves. *J. articulatus*, p. 334
  - dd. Stamens three.
    - e. Capsule obtuse or acute, not subulate pointed. *J. canadensis*, p. 335
    - f. Seeds large, 1-1.8 mm. long.
    - ff. Seeds 0.4-0.5 mm. long.
      - g. Tip of capsule exceeding the calyx. *J. debilis*, p. 335
      - gg. Capsule shorter than the calyx. *J. acuminatus*, p. 336
- aa. Plant somewhat hairy, leaf sheaths closed. *Juncoides campestre*, p. 336

**JUNCUS L.**

***Juncus effusus* L. Common Rush.**

Pl. XXXI, Fig. 4.

*Juncus effusus* Linnæus, Sp. Pl. 326. 1753 [Europe].—Knieskern 33.—Willis 65.—Britton 249.

*Juncus conglomeratus* Barton, Fl. Phila. I. 170. 1818.—Britton 249.

Common in swamps throughout the State.

This is probably the most familiar species of *Juncus*, easily distinguished from the other common species by its lateral, more or less congested, inflorescence.

*Full-grown Capsules*.—Mid-June to mid-July.

*Middle District*.—Farmingdale, Haddonfield (C), Medford (S), Camden (P), Union Grove (S), Yorktown.

*Pine Barrens*.—Landisville (T), Winslow Jnc., Folsom, Atsion (NB), Egg Harbor City.

*Coast Strip*.—Seaside Park (HA), Barnegat City\* (L), Beach Haven Terrace\* (L).

***Juncus bufonius* L.† Toad Rush.**

Pl. XXXI., Fig. 2.

*Juncus bufonius* Linnæus, Sp. Pl. 328. 1753 [Europe].—Knieskern 33.—Willis 66.—Britton 249.

In moist places throughout the State except in the Pines.

*Full-grown Capsules*.—Late May into July.

*Middle District*.—Medford (S), Mickleton (H).

*Coast Strip*.—Atlantic City, Piermont (S), Spray Beach (L).

*Cape May*.—Cape May, Cape May Pt. (S).

***Juncus gerardi* Lois. Black Grass.**

Pl. XXXI., Fig. 3.

*Juncus Gerardi* Loiseleur Deslongchamps, Journ. de Bot. II. 284. 1809.

[Provence, France].—Willis 66.—Britton 249.—Keller and Brown 95.

*Juncus bulbosus* Gray Man. Ed. II. 483. 1858.

Salt marshes, abundant.

*Full-grown Capsules*.—Mid-June to mid-July.

*Maritime*.—Seaside Park (Hor), Pt. Pleasant, Barnegat City Jnc. (L), Spray Beach (L), Peahala (L), Atlantic City (NB), Ocean City (S), Estelville (T), Piermont (S), Cold Spring (S).

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\* These specimens have been identified by Prof. Fernald and Mr. Wiegand as var. *solutus* and one from Egg Harbor City as var. *conglomeratus*.

† We can find no New Jersey specimens of *J. maritimus* or *J. roemerianus*, and their inclusion in the New Jersey flora seems to rest wholly upon a statement of Pursh (Fl. Amer. Sept. I. 235. 1814). He gives "*Juncus acutus* on the sandy seacoast New Jersey, &c." In the first edition of Gray's Manual this record is quoted under *Juncus maritimus*, while in the fifth edition and earlier in Trans. St. Louis Acad. II. 439. 1866, Engelmann shows that the *J. maritimus* of American authors is really *J. roemerianus*, which he continues to cite from New Jersey. Prof. M. L. Fernald, who corroborates the above, also calls my attention to this statement by Englemann (Trans. St. Louis Acad. II. 490)—"The New Jersey locality rests on the doubtful authority of Pursh; I have seen no specimens collected farther north than Wilmington, N. C." As no one has found it in the State subsequently, I think we may safely expunge it from the list.

**Juncus tenuis** Willd. **Slender Rush.**

Pl. XXXI., Fig. 1.

*Juncus tenuis* Willdenow, Sp. Pl. II. 214. 1799 [North America].—Willis 66.—Britton 250.

Plentiful throughout, usually in low shady ground, except in the Pine Barrens, where it apparently does not occur except rarely as a weed.

*Full-grown Capsules.*—Mid-May to mid-July.

*Middle District.*—Allaire (NY), Farmingdale (NY), Ortlely (NY), Lawnside (S), Albion, Yorktown (S).

*Pine Barrens.*—Landisville (T).

*Coast Strip.*—Manahawkin, Spray Beach (L), West Creek, Palermo (S).

*Capc May.*—Bennett (S).

**Juncus greenei** Oakes and Tuckerm. **Greene's Rush.**

*Juncus Greenei* Oakes and Tuckerman, Amer. Jour. Sci. 45. 37. 1843 [Tewkesbury, Mass.].

Reported from Middlesex and Sussex Counties in Britton's Catalogue, and collected at New Egypt by Mr. Norman Taylor, August 23, 1910.

*Middlesex District.*—New Egypt (NY).

**Juncus dichotomus** Ell.\* **Forked Rush.**

Pl. XXXI., Fig. 7.

*Juncus dichotomus* Elliott, Bot. S. C. and Ga. I. 406. 1817 [prob. S. C.] Willis 66.—Britton 250.—Keller and Brown 95.

Plentiful throughout our range in moist sandy ground, not reported from the northern counties.

*Full-grown Capsules.*—Late June to late July.

*Middle District.*—Farmingdale, Timber Creek (KB), Haddonfield (P), Medford (S), Lindenwold, Sicklerville (S), Swedesboro, Yorktown (S), Elmer (P).

*Pine Barrens.*—Toms River (NY), Forked River, Speedwell, Chatsworth (S), Atsion, Quaker Bridge, Landisville, Spring Garden (P), Dennisville (P).

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\* *Juncus secundus* "Beauv." (Poiret Encycl. Sup. III. 160. 1813), is reported from one station in Warren Co., and given in Britton's Catalogue on authority of C. F. Parker as occurring in Gloucester Co. Parker's specimen is preserved in his herbarium at Princeton and is labeled "*J. tenuis* approaching *secundus*," which seems to be a very proper disposal of it.

*Coast Strip*.—Sandy Hook (NB), Seabright, Sherburn's (I.), Atlantic City (P), Stone Harbor, Holly Beach (KB).

*Cape May*.—Court House (S), Cape May.

***Juncus setaceus* Rostk. Awl-leaved Rush.**

Pl. XXXI., Fig. 8.

*Juncus setaceus* Rostkovius, Diss. Junc. 13, pl. 1, f. 2. 1801 [Pennsylvania (=N. J.?).—Stone, Proc. Acad. Nat. Sci. Phila. 1908. 458.

Moist ground in the Cape May district; frequent.

An unidentified specimen collected by Mr. Jos. Crawford in Cape May Co., July 15, 1892, was found by the writer in the herbarium of the Philadelphia Academy, and subsequent field work showed it to be of frequent occurrence, though local.

*Full-grown Capsules*.—Mid-July into Autumn or even winter.

*Cape May*.—Court House, Cold Spring (OHB), Cape May.

***Juncus marginatus* Rostk. Grass-leaved Rush.**

Pl. XXXI., Fig. 5.

*Juncus marginatus* Rostkovius, Diss. Junc. 38, pl. 2, f. 3. 1801 [Pennsylvania].—Willis 65.—Britton 249.

*Juncus marginatus* var. *paucicapitatus* Engelm., Tr. St. Louis Acad. II. 455. 1868.—Britton 249.

Common in open moist ground in the Northern and Middle districts, less frequent elsewhere.

*Full-grown Capsules*.—Late June to late July.

*Middle District*.—Hornerstown, Pemberton Jnc. (S), Medford, Woodbury, Beaver Dam.

*Pine Barrens*.—Lakehurst, Chatsworth, Pleasant Mills (T), Landisville, Pancoast (S).

*Coast Strip*.—Waretown, Spray Beach (L), West Creek (CM), Court House (S), Cape May (S).

***Juncus aristulatus* Michx. Bristly Rush.**

Pl. XXXI., Fig. 6.

*Juncus aristulatus* Michaux, Fl. Bor. Am. I. 192. 1803 [Georgia and Carolina].

*Juncus marginatus aristulatus* Keller and Brown 95.

*Juncus marginatus* var. *biflorus* Britton 249.

Plentiful in bogs and swamps of the Pine Barrens and Cape May district, extending out frequently to the edge of the salt marshes and on the coast islands.

*Full-grown Capsules*.—Early July to early August.

*Pine Barrens*.—Pt. Pleasant (S), Hanover, Bamber, Forked River, Pasadena (NB), Landisville, Atsion, Parkdale (S), Hammonton, Folsom, Egg Harbor City (P), Woodbine (S), Dennisville.

*Coast Strip*.—Sea Bright (NB), Deal, Waretown, Manahawkin, West Creek (S), N. Beach Haven (L), Holgates (L), Atlantic City (C), Absecon (S), Ocean City (S), Palermo (S), Beaver Dam.

*Cape May*.—Court House, Whitesboro (S), Cold Spring, Bennett, Cape May.

***Juncus pelocarpus* E. Meyer. Proliferous Rush.**

Pl. XXXII., Fig. 6.

*Juncus pelocarpus* E. Meyer, Syn. Luz. 30 [Massachusetts].—Willis 66.—Britton 250.—Keller and Brown 96.

*Juncus conradi* Tuckermann, Torrey Fl. N. Y. II. 328.

Rare and local in the Northern and Middle districts and plentiful in Cedar Swamps and bogs of the Pine Barrens and Cape May peninsula.

*Full-grown Capsules*.—Late August to late September; good mature capsules with seeds quite rare, flowers frequently profliferous.

*Middle District*.—Crosswicks, Delanco (S), Center Sq. (H).

*Pine Barrens*.—Pt. Pleasant, Lakehurst (NB), Toms River (S), Pasadena, West Creek, Speedwell (S), Berlin, Jackson, Landisville (T), Hammonton (S), opp. Crowleytown, Egg Harbor City, Pancoast, Weymouth (T), Mays Landing (S), Absecon (S), Tuckahoe (S), Palermo, Dennisville (S).

*Coast Strip*.—Harvey Cedars (L), N. Beach Haven (L), Ship Bottom (L), Sherburn's (L), Brant Beach (L).

*Cape May*.—Dias Creek (S).

***Juncus militaris* Bigel. Bayonet Rush.**

Pl. XXXII., Fig. 4.

*Juncus militaris* Bigelow, Fl. Bost. Ed. II. 139. 1824 [Tewksbury, Mass.].—Krieskern 33.—Willis 66.—Englemann Trans. St. Louis Acad. II. 460. 1868.—Gray Man. Ed. I. 1848.

Common in the streams of the Pine Barrens, and rare and local in the northern counties. This species is especially interesting from the curious submersed thread-like leaves that grow from the root stalk and which are spread out in the current like masses of waving hair.

In a dam at Fairton, Cumberland Co., I found long non-fruiting stems of a *Juncus* growing in deep water, which I have no doubt belonged to this species, probably washed down from the Pine Barrens of the interior.

*Full-grown Capsules*.—Late July or August (apparently). Good mature capsules with seeds apparently very rare.

*Pine Barrens*.—Manchester (P), Toms River, Pasadena, Speedwell, Chatsworth, Cedar Lake (T), Quaker Bridge (NB), Atsion, Twelfth St. (T), Weymouth (T), Mays Landing (NB).\*

*Cape May*.—Seaville (C).

**Juncus articulatus L. Jointed Rush.**

*Juncus articulatus* Linnæus, Sp. Pl. 327. 1753 [Europe].—Britton 250.—Keller and Brown 96.

Along the edge of the salt marsh on the coastal islands and the mainland, apparently rather frequent.

*Full-grown Capsules*.—Mid-June to early August.

*Coast Strip*.—Ortley (NY), Mantoloking (NY), Forked River, Barnegat City Inc. (L), Beach Haven (L), Spray Beach (L), Ocean City, Palermo, Piermont (S), Cold Spring.

**Juncus cæsariensis Coville. New Jersey Rush.**

Pl. XXXII., Fig. 5.

*Juncus cæsariensis* Coville, Mem. Torr. Bot. Club V. 106. 1894 [new name for *J. asper* Engelm., Quaker Bridge, N. J.].—Keller and Brown 96.

*Juncus asper* Engelm. Trans. St. Louis Acad. II. 478. 1868.—Willis 66.—Britton 251.

Bogs and cedar swamps of the Pine Barrens and formerly at one station in western New Jersey. Not known to grow outside of the State.

This, our only rough-stemmed *Juncus*, is characteristic of deep cedar swamps mainly on the eastern side of the Pine Barrens. It was first discovered by Dr. Pickering, near Quaker Bridge. The occurrence at Griffith's Swamp (locality now destroyed) is one of the most striking illustrations of isolated colonies of Pine Barren plants in the Middle district.

*Full-grown Capsules*.—Late August into October.

*Middle District*.—Griffith's Swamp.

*Pine Barrens*.—Toms River (NY), Bamber, Forked River, Dover Forge, Waretown, Chatsworth, Quaker Bridge, Batsto, Forks of Batsto, Pancoast, near Landisville (NY).

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\* The record for Stafford Forge attributed to the writer in Keller and Brown's list was an error, and I have no specimens from there, though it probably occurs in the vicinity. Mr. C. D. Lippincott tells me that the same is true of the Browns Mills record attributed to him.

**Juncus scirpoides** Lam. **Scirpus-like Rush.**

Pl. XXXII., Fig. 3.

*Juncus scirpoides* Lamarek, Encycl. Meth. Bot. III. 267. 1789 [South Carolina.—Knieskern 33.—Willis 66.—Englemann Tr. St. L. Acad. II. 467. 1868.—Britton 251.—Keller and Brown 96.

*Juncus scirpoides* var. *macrostylus* Englemann Tr. St. L. Acad. II. 463. 1868.

Rare northward and in the Pine Barrens, but common in swampy ground elsewhere.

*Full-grown Capsules*.—Late August to late September or early October.

*Middle District*.—Farmingdale, Haddonfield (S), Lindenwold, Mickleton (H), Swedesboro (KB), Centerton (S), Dividing Creek.

*Pine Barrens*.—Bamber, Landisville (T), Hammonton (T), Mays Landing (S).

*Coast Strip*.—Pt. Pleasant, Spray Beach (L), So. Atlantic City (P), Ocean City (S), Piermont (S), Wildwood (NY).

*Cape May*.—Dennis (S), Bennett, Cold Spring, Cape May (S).

**Juncus canadensis** J. Gay. **Canada Rush.**

Pl. XXXII., Fig. 2.

*J[uncus] Canadensis* "J. Gay," Laharpe, Mem. Soc. Hist. Nat. Paris III. 134. 1827 [Canada.]—Britton 251.—Keller and Brown 96.

*Juncus Canadensis longicaudatus* Willis 66.

Swamps, common throughout the State.

*Full-grown Capsules*.—Late August into October.

*Middle District*.—New Egypt, Florence, Delanco, Hartford, Westmont (S), Lawnside, Griffith's Swamp, Lindenwold, Medford, Tomlin, Clarksboro, Swedesboro, Dividing Creek.

*Pine Barrens*.—Clementon, Weekstown, Whittings (NY), Pleasant Mills, Quaker Bridge, Landisville, Ocean City Jnc.

*Coast Strip*.—Deal, Pt. Pleasant, Forked River, Toms River (NY), Waretown, Barnegat City (L), Ship Bottom (L), Surf City (L), Spray Beach (L), Absecon (S), Ocean City, Palermo, C. M. Court House, Holly Beach, Cold Spring.

*Cape May*.—Two mi. W. of Ct. House (S), Sluice Creek (S).

**Juncus canadensis subcaudatus** Engelm.

*Juncus Canadensis subcaudatus* Engelmann, Trans. St. L. Acad. II. 474. 1868 [Connecticut to Georgia, incl. New Jersey].—Britton 251.—Keller and Brown 96.

Landisville (Gross) and Camden (Parker). Specimens in Gross' collection seem to be *J. debilis*, but possibly the label has

been misplaced. Parker's specimens are at Princeton and appear to be this form, but I have not examined them critically.

*Middle District*.—Red Bank (NY), identified by Dr. Britton.

***Juncus acuminatus* Michx. Sharp-fruited Rush.**

Pl. XXXII., Fig. 1.

*Juncus acuminatus* Michaux, Fl. Bor. Am. I. 192. 1803 [South Carolina].—Britton 250.—Keller and Brown 96.

Swamps, rather frequent throughout, apparently least common in the Pine Barrens.

*Full-grown Capsules*.—Early June to late June, rarely sporadically through the summer.

*Middle District*.—New Egypt, Andrew's, Glassboro (S), Centerton (S), Riddleton, Swedesboro, Griffith's Swamp (P).

*Pine Barrens*.—Landisville, Winslow Jnc. (S), Spring Garden (P), Malaga (P).

*Coast Strip*.—Pt. Pleasant (NB), Surf City (L), Beach Haven Terrace (L), Spray Beach (L), West Creek, Holly Beach, C. M. Court House (S), Cold Spring, Cape May.

***Juncus debilis* Gray. Weak Rush.**

*Juncus debilis* Gray Man. 506. 1848 ("southward" and "westward").

*Juncus acuminatus* var. *debilis* Willis 66.—Englemann Tr. St. L. Acad. II. 463. 1868.—Britton 250.—Keller and Brown 96.

Rather frequent in the Pine Barren and Cape May districts and rare in the Middle district.

*Full-grown Capsules*.—Mid-June into September.

*Middle District*.—Haddonfield, Griffith's Swp., Riddleton, Haleyville (P).

*Pine Barrens*.—Double Trouble, Manahawkin, Tuckerton, Pancoastville (T), Atsion (P), Egg Harbor City, Mays Landing, Palermo, Dennisville.

*Cape May*.—Whitesboro, Bennett.\*

**JUNCOIDES Adanson.**

***Juncoides campestris* (L.). Wood Rush.**

*Juncus campestris* Linnaeus, Sp. Pl. 329. 1753 [Europe].

*Luzula campestris* Kneskern 33.—Britton 251.

Common in woods in the Northern and upper Middle districts and occasional on the coastal strip.

*Fl.*—Late April to early May. *Fr.*—Mid-May to late May.

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\*The records in Keller and Brown for Center Square and Atsion prove to be *J. pelocarpus*, that for Brown's Mills remains unverified.



*Middle District*.—Freehold (NY), Farmingdale, New Egypt, Bordentown, Kinkora, Delanco, Delaire, Birmingham, Moorestown, Medford (S), Camden (Bassett), Wenonah, Sewell (S), Glassboro, Mickleton, Quinton.

*Coast Strip*.—Pt. Pleasant (S), Barnegat City (L), Barnegat City Jnc. (L), Palermo, Cold Spring.

Family MELANTHACEÆ. Bunch-flowers, etc.

Plants of diverse appearance, differing from the Rushes in having the petals at least (often the sepals, too) conspicuous and colored. Fruit, a capsule which splits longitudinally. Plants rarely bulbous.

*Key to the Species.*

- a. Flowers numerous in terminal, erect, spike-like racemes or panicles.
  - b. Flowers yellow, with erect bracts, somewhat resembling a head of wheat, in fruit. *Abama*, p. 338
  - bb. Flowers lilac, stamens blue. *Helonias*, p. 340
  - bbb. Flowers white, inflorescence in a narrow raceme.
    - c. Leaves very narrow, grass-like and harsh. *Xerophyllum*, p. 339
    - cc. Leaves linear, lanceolate or spatulate, smooth.
      - d. Raceme 7-20 cm. long, flowers dioecious. *Chamaelirium*, p. 341
      - dd. Raceme 2-12 cm. long, flowers perfect.
        - c. Stem viscid pubescent. *Tofieldia*, p. 337
        - cc. Stem glabrous. *Chrosperma*, p. 341
    - bbbb. Flowers green, inflorescence in an open panicle.
      - c. Plant glabrous, leaves linear. *Zigadensus*, p. 342
      - cc. Plant pubescent.
        - d. Leaves linear. *Melanthium*, p. 342
        - dd. Leaves oval or elliptic. *Victratum*, p. 343
- aa. Flowers solitary, terminal, pendant yellow.
  - bb. Leaves perfoliate. *Uvularia perfoliata*, p. 343
  - bb. Leaves not perfoliate.
    - c. Under surface glaucous. *U. sessilifolia*, p. 343
    - cc. Under surface green, shining. *U. nitida*, p. 343

TOFIELDIA Hudson.

*Tofieldia racemosa* (Walt.). Viscid Asphodel.

Pl. XXXIII., Fig. 1.

*Melanthium racemosum* Walter, Fl. Cor. 126. 1788 [probably Santee River, S. C.].

*Tofieldia pubens* Knieskern 32.—Willis 64.

*Tofieldia racemosa* Britton 244.—Saunders, Proc. Acad. Nat. Sci. Phila., 1900, 545.—Stone *do.* 1908. 459.

Bogs in the heart of the Pine Barrens, local. This plant is limited to the same area that the *Abama* inhabits, but is much rarer. It was originally discovered in the State by Dr. P. D. Knieskern at Manchester [= Lakehurst]. The older botanists, as well as Canby, A. H. and C. E. Smith, who were familiar with the *Abama*, never found the *Tofieldia*, and curiously enough Knieskern apparently never succeeded in finding the former.

After forty years the plant had not been found again, and Dr. Britton could only quote Knieskern's record. On July 4, 1899, however, Mr. C. F. Saunders collected it between Tuckerton and Atsion on a savanna near Symmes' Place.

On July 4, 1904, after reading Mr. Saunders' account, Mr. H. L. Coggins and I visited a spot near High Bridge, over the Wading River, where I thought conditions were favorable to its growth, and sure enough the minute we entered on the flat savanna land bordering the river, the white spikes of starry flowers, like miniature Turkey-beard, were seen on either hand, their heads reaching just above the grass and sedge. The following day, below Speedwell, we found it again, and on Pole Branch that afternoon a great patch of it was found mingled with the yellow spikes of the *Abama*, a truly wonderful sight, and not content with the sandy bog, individual plants had established themselves in damp spots in the middle of the old road, as if they knew that they had little to fear from passing traffic.

*Fl.*—Late June to mid-July.

*Pine Barrens.*—Manchester (C), Symmes' Place, High Bridge (S), Speedwell, below Chatsworth, Pole Branch.

#### ABAMA Adanson.

*Abama americana* (Ker.). Bog Asphodel.

Pl. XXXIII., Figs. 2, 3.

*Narthecium americanum* Ker., Bot. Mag. pl. 1505. 1812 [Quaker Bridge, N. J.].—Pursh, Fl. Amer. Sept. I. 227. 1814.—Torrey, Cat. N. Y. Plants, 35.—Torrey, Fl. U. S. I. 347.—Britton 243.  
*Narthecium ossifragum* var. *americanum* Willis 65.  
*Abama americana* Keller and Brown 97.—Saunders, Proc. Acad. Nat. Sci. Phila.

Locally common in bogs in the heart of the Pine Barrens.

This remarkable plant was discovered by Frederick Pursh (1774-1820),\* one of the first botanists to publish on the Pine Barren flora, on one of his excursions in the swamps about Quaker Bridge. At the time Dr. Britton's Catalogue was published, seventy-five years later, there were but five stations known where it grew, while to-day I have seen specimens from only a dozen, all of which lie between Tom's River on the north and Atsion and Pleasant Mills on the south, mostly east of the New Jersey Southern Railroad—roughly speaking an area twenty by thirty miles. This has been supposed to be the only spot in the world where the plant occurs, but in the Commons herbarium at the Academy of Natural Sciences, Philadelphia, there are specimens of both *Abama* and *Tofieldia* from near Lewes, Delaware, collected by Mr. Albert Commons, August 1 and 15, 1895, respectively. Probably some of the older localities are now extinct, as the *Abama* is one of those plants which are exterminated by cranberry culture. The damming and flooding of the bogs covers the low wet sandy spots frequented by the plant and it disappears—at least I have never been able to find it on the edges of cultivated bogs. On the branches of the Wading River about Chatsworth and Speedwell, where broad, wet sandy bogs abound, I have seen great patches of *Abama*, the short stiff leaves curving up from the root stalks in thick ranks like short grass, and the yellow spikes standing close together make a golden sheen over the bog that can be seen at quite a distance. Even when in fruit they make quite a show, the seed capsules being rich reddish brown and the stalks and bracts buff like wheat chaff.

*Fl.*—Mid-June to late July.

*Pine Barrens.*—Toms River, Ostrom (NY), Forked River, Pasadena, Jones Mill (S), Pole Branch (S), Speedwell, Chatsworth, Atsion, Quaker Bridge, Batsto (C), opposite Crowleytown, below Batsto, Mullica River (same as last?), Pleasant Mills.†

\* Bot. Gazette VII., 141.

† The record at Barnegat quoted by Keller and Brown, from Britton's catalogue, is not in the catalogue, and it was apparently entirely erroneous. The Woodbury record given by Britton on authority of Mrs. W. McGeorge is in all probability based upon a misidentification. As nearly as Dr. Britton can recollect, the record was one of a number sent to the Geological Survey without accompanying specimens and which were included at the request of the Survey authorities.

## XEROPHYLLUM Michaux.

*Xerophyllum asphodeloides* (L.). Turkey-beard.

Pl. XXXV.

- Helonias asphodeloides* Linnæus, Sp. Pl. Ed. II. 485. 1762 ["Pennsylvania"]  
—Muhlenberg Cat. p. 37. 1813—Pursh, Fl. Am. Sept. I: 243. 1814.  
*Xerophyllum scitifolium* Torrey Cat. N. Y. Plants 37. 1819—Torrey Fl. U.  
S. I: 371. 1824.  
*Xerophyllum asphodeloides* Nuttall, Gen. I: 235. 1818—Knieskern 32.—Willis  
64.—Britton 243.—Keller and Brown 97.

Common in low sandy ground in the Pine Barrens, also very rare and local in the Middle district—Craner's Mill, Middlesex County, and east of Sewell, Gloucester County.

Linnæus states that he received the original specimen from "Barthram," and as he was well known to live in Pennsylvania, that State is given as the type locality. Bartram, however, traveled frequently over southern New Jersey and undoubtedly got his specimens there.

There is no evidence of the plant ever having grown in Pennsylvania.

*Fl.*—Late May to early July.

*Middle District.*—E. of Sewell (S), Fairview (H).

*Pine Barrens.*—Allaire, Ocean Beach (C), Manchester (NB), Toms River (NY), Brown's Mills, Archertown, Bamber, Pemberton (NB), Forked River, Muayon Field, Speedwell (S), Bear Swamp, Clementon, Albion, Jackson, Andrews, Sicklerville (S), Williamstown Inc., Atco, Cedar Brook, Landisville, Winslow Inc., Newtonville, Hammonton, Union Hall, Pleasant Mills (NB), Egg Harbor City, Mays Landing (S).

## HELONIAS L.

*Helonias bullata* L. Swamp Pink.

Pl. XXXVI.

- Helonias bullata* Linnæus, Sp. Pl. 342. 1753 ["Pennsylvania"—Pennsneck, N. J.].—Knieskern 32.—Willis 64.—Hall, Bull. Torr. Club II: 31, 1871 and III: 25. 1872—Northrup Bull. Torr. Club. XV. 175. 1888—Britton 243.—Keller and Brown 98.—Brown, *Bartonia* III., 1, 1911.  
*Helonias latifolia* Muhlenberg, Cat. 37. 1813—Pursh, Fl. Amer. Sept. I: 242. 1814.

Swamps of the Pine Barrens, Middle and Cape May districts, frequent. Occurs also at Succasuna and Budds Lake, Morris County.

This is one of the most characteristic plants of the southern half of New Jersey and is one of the earliest spring flowers of

the region. Its dense spike of lilac blossoms, with their bright, blue stamens, is quite conspicuous in the still brown bogs. It begins to bloom when the spike is almost sessile in the center of the rosette of narrow spatulate leaves, but the scape lengthens rapidly and is a foot tall at the height of the flowering season.

*Fl.*—Early April to mid-May.

*Middle District.*—Freehold (C), New Egypt, Haddonfield (KB), Medford, Westville, Gloucester (KB), Red Bank, Washington Park, Woodbury, Clarksboro, Laurel Springs, Wenonah (KB), Sicklerville (S), Glassboro, Daretown (KB), Berkley (KB).

*Pine Barrens.*—Manchester (NB), Bamber, 3 miles east New Egypt, Barnegat, Bear Swamp, Lucaston (KB), Atco (N), Berlin (KB), Clementon, Sumner (S), Jackson, Union Hall, Cedar Brook (KB), Newfield (T), Millville, Hammonton (NB), Collier's Mills (C).

*Cape May.*—Court House (S), Dias Creek, Cold Spring, Cape May Pt. (S).

#### CHAMÆLIRIUM Willdenow.

*Chamælirium luteum* (L.). **Blazing Star.**

*Veratrum luteum* Linnæus, Sp. Pl. 1044. 1753 [Virginia and Canada].

*Chamaelirium luteum* Willis 64.—Britton 243.—Keller and Brown 98.

Woods in the Northern Counties occasional; and very rare in the upper Middle district.

Through a curious misconception Dr. Britton states that this plant is frequent in the southern counties, and Keller and Brown, influenced no doubt by this, give it as frequent in New Jersey. As a matter of fact, none of our local botanists have ever collected it on the New Jersey side of the Delaware in South Jersey, and I have seen only two specimens from within the limits of this list.

*Fl.*—Late May to mid-June.

*Middle District.*—Burlington, Mickleton (H).

#### CHROSPERMA Rafinesque.

*Chroserma muscætoxicum* (Walt.). **Fly-poison.**

*Melanthium muscætoxicum* Walter, Fl. Car. 125. 1788 [Probably Santee R., S. C.].

*Amianthium muscætoxicum* Willis, 64.—Gray Man. Ed. I. 501.—Britton 246.

Low sandy ground, locally in the Middle district and occasional in the Pine Barrens.

*Fl.*—Early June to late June.

*Middle District*.—New Egypt, Burlington, Pemberton, Moorestown (NB), Beverly (C), Sumner (S), Sicklerville, Williamstown, Camden (C), Mickleton, Tomlin, Swedesboro, Auburn.

*Pine Barrens*.—Bear Swamp, Vineland (T).

#### ZIGADENUS Michaux.\*

*Zigadenus leimanthoides* Gray. Coastal Zygadine.

*Amianthium leimanthoides* Gray, Ann. Lyc. N. Y. IV. 125. 1837 [near Haddonfield, N. J.].

*Zygadenus leimanthoides* Knieskern 32.—Willis 64.—Gray, Man. Ed. I. 501. 1848.—Britton 246.—Keller and Brown 99.

Swamps of the Middle and Pine Barren districts local. The first specimen mentioned by Dr. Gray in describing this plant was sent to him by Elias Durand, who collected it near Haddonfield, N. J., no doubt at the famous Griffith's Swamp, where specimens were later collected by Charles E. Smith.

*Fl.*—Late June to mid-July.

*Middle District*.—Farmingdale, New Egypt, Moorestown (H), Griffith's, Tomlin, Lindenwold, Mt. Pleasant (C).

*Pine Barrens*.—Toms River (P), Atsion.

#### MELANTHIUM L.

*Melanthium virginicum* L.† Bunch-flower.

*Melanthium virginicum* Linnæus, Sp. Pl. 339. 1753 [Virginia].—Knieskern 32.—Willis 64.—Britton 245.—Keller and Brown 99.

Swamps of the Northern and Middle districts frequent.

*Fl.*—Early July to late July.

*Middle District*.—Keyport (C), New Egypt, Burlington, Pemberton (NB), Camden (C), Lindenwold, Kirkwood (KB), Mickleton (H), Swedesboro (KB).

*Pine Barrens*.—Cedar Brook.

*Melanthium latifolium* Desr. Crisped Bunch-flower.

*Melanthium latifolium* Desroussoux in Lam. Encycl. IV. 25. 1797 [Virginia].—Keller and Brown 99.

Frequent in woods of the northern counties, known within our limits only from Swedesboro, where it was discovered by Mr. C. D. Lippincott, July 1, 1894.

*Middle District*.—Swedesboro (CDL).

\* Dr. Small, without any explanation, has proposed *Occanorus* as the generic name for this plant in his Southern Flora.

† The Tomlin record, given by Keller and Brown, proves to be *Zigadenus*.

## VERATRUM L.

*Veratrum viride* Ait. False Hellebore.

*Veratrum viride* Aiton. Hort. Kew. III. 422. 1789 [North America].—Knieskern 32.—Britton 245.

Common in shaded swamps in the Northern and upper Middle districts and rare in the Cape May district.

*Fl.*—Mid-May to early June.

*Middle District.*—New Egypt, Little Timber Creek (C), Haddonfield (C), Moorestown (C), Tomlin, Mickleton (H), Swedesboro, Marlboro (C), Stoe Creek (C).

*Cape May.*—Cold Spring (OHB).

## UVULARIA L.

*Uvularia perfoliata* L. Perfoliate Bellwort.

*Uvularia perfoliata* Linnæus, Sp. Pl. 304. 1753 [Virginia and Canada].—Barton, Fl. Phila. I. 167. 1818.—Willis 64.—Britton 244.

*Uvularia flava* Pursh, Fl. Am. Sept. I. 231. 1814.—Gray Man. Ed. V. 528. 1867.

Common in the woods of the Northern and less common in the Middle and Cape May districts.

*Fl.*—Early May to mid-May.

*Middle District.*—New Egypt, Burlington, Westville, Oaklyn, Medford (S), Mickleton, Swedesboro, Quinton.

*Cape May.*—Cold Spring (OHB).

*Uvularia sessilifolia* L. Sessile-leaved Bellwort.

*Uvularia sessilifolia* Linnæus, Sp. Pl. 305. 1753 [Canada].—Knieskern 32.—Willis 64.—Britton 244.

Common in woods of the Northern and Middle districts; very rare in the Pine Barrens and casual on the coast.

*Fl.*—Late April to mid-May.

*Middle District.*—Shark River, Allaire (S), Farmingdale, Sea Bright (NB), New Egypt, Bordentown, Fish House, Delaire, Merchantville (P), Pensauken (S), Medford (S), Lindenwold (S), Westville, Pitman, Glassboro, Woodbury (P), Mickleton, Swedesboro, Albion, Andrews, Yorktown (S), Alloway, Quinton, Bridgeton (NB).

*Pine Barrens.*—Landisville, Belleplain (S).

*Coast Strip.*—Manahawkin, Cox's, Cold Spring (OHB).

*Uvularia nitida* (Britton.) Pine Barren Bellwort.

*Oakesia sessilifolia* var. (?) *nitida* Britton, Trans. N. Y. Acad. Sci. IX. 13. 1889 [Toms River and Cedar Bridge, N. J.].—Britton 244.

*Uvularia nitida* Mackenzie, Torrey 1908, 13.—Long, Barton II. 20. 1910.

Edges of swamps in the Pine Barrens; rare and local.

*Fl.*—Early May to late May (probably).

*Pine Barrens.*—Pt. Pleasant, Farmingdale, Toms River (NB), Lakewood (NY), Cedar Bridge (C), Manahawkin, Coxes, West Creek, Browns Mills, Two miles south of Chatsworth.

### Family LILIACEÆ. Lilies, etc.

Similar in structure to the last, entire perianth conspicuously colored (not green); bulbous; fruit a loculicidal capsule.

#### *Key to the Species.*

- a. Plants without onion-like odor.
  - b. Flowers blue, nearly globular, in an erect raceme. [*Muscari botryoides*]\*
  - bb. Flowers red or yellow.
    - c. Leaves basal or nearly so.
      - d. Leaves two, mottled with brown, flower single yellow. *Erythronium*, p. 346
      - dd. Leaves numerous, linear, flowers several at the end of the leafless scape, tawny and orange. [*Hemerocallis fulva*]†
    - cc. Leaves cauline, verticillate.
      - d. Flowers 1-3 erect, red. *Lilium philadelphicum*, p. 345
      - dd. Flowers 1-40, yellow or red, nodding.
        - c. Flowers 1-16, generally yellow, petals slightly reflexed at tip. *L. candense*, p. 346
        - cc. Flowers 3-40, orange or reddish orange, petals strongly reflexed from below the middle. *L. superbum*, p. 346
  - bbb. Flowers white.
    - c. Small and cylindric in a slender spike-like raceme. *Alettris*, p. 347
    - cc. Large, opening in sunshine, corymbose, leaves narrow, fleshy. [*Ornithogalum umbellatum*]‡
- aa. Plants with strong onion-like odor, flowers white or purplish in globose heads.
  - b. Leaves oblong lanceolate, absent at flowering time. *A. tricoccum*, p. 344
  - bb. Leaves linear, present at flowering time.
    - c. Covering of the bulb fibrous reliculated. *A. canadense*, p. 345
    - cc. Covering of the bulb membranaceous. [*A. vineale*]§

### ALLIUM L.

#### *Allium tricoccum* Ait. Wild Leek.

*Allium tricoccum* Aiton, Hort. Kew. I: 428. 1789 [North America].—Britton 241.—Keller and Brown 100.

\* Grape Hyacinth, occasionally escaped from gardens.

† Day Lily, often escapes from cultivation.

‡ Star-of-Bethlehem, introduced in damp meadows.

§ Garlic, a frequent and well-known weed.



Rich woods of the northern counties occasional, and rare in the Middle district.

The two basal leaves appear in mid-April and last until early June, perishing before the flowers appear.

*Fl.*—Late June to early July. *Fruits.*—Abundantly.

*Middle District.*—Swedesboro, Woodstown (H), Salem (C).

**Allium canadense L. Meadow Garlic.**

*Allium canadense* Linnæus, Sp. Pl. 1195. 1753 [Canada].—Britton 241.—Keller and Brown 101.

Frequent in low ground of the northern counties and occasional southward in the Middle and Cape May districts.

This native garlic is much less abundant than the introduced *A. vineale*, and never produces so many flowers. Both have the flowers often replaced to a great extent by bulblets, and in the present species this is the usual condition; some few flowers, however, are usually present, but they rarely produce fruit. I have never seen a head composed entirely of flowers, as is often the case in *A. vineale*.

*Fl.*—Late May to mid-June.

*Middle District.*—Farmingdale, Delair, Camden (P), Westville (KB), Medford (S), Mickleton (H), Swedesboro.

*Cape May.*—Cold Spring (edge of salt marsh) (S).

**LILIUM L.**

**Lilium philadelphicum L. Red Lily.**

*Lilium philadelphicum* Linnæus, Sp. Pl. Ed. II: 435. 1762 [Linnæus gives Canada as type locality, but this is obviously a lapsus calami, as his only reference is to Miller whose specimen came from John Bartram, Philadelphia].—Knieskern 32.—Willis 65.—Britton 242.—Keller and Brown 101.

Frequent in open ground in the northern counties, but very rare in the Middle district. Two of the four records refer to single plants. Knieskern's statement for Monmouth and Ocean Counties, "open copses not rare" is surely a misprint.

*Fl.*—Late June to late July.

*Middle District.*—Keyport (C), Mickleton (H), Swedesboro.

*Pine Barrens?*—Mays Landing (C) once.

**Lilium canadense L. Yellow Lily.**

Pl. XXXIX., Fig. 1.

*Lilium canadense* Linnæus, Sp. Pl. 303. 1753 [Canada].—Knieskern 32.—Willis 65.—Britton 242.

Frequent in swamps and meadows of the northern counties; very scarce in the Middle district. One of the localities given by Britton in Pemberton Junction, but lilies collected there in July, 1910, proved to be a yellow form of *L. superbum*. These may or may not have been the plants referred to.

*Fl.*—Mid-June to mid-July.

*Middle District.*—Farmingdale, Birmingham (NB), Pemberton Jnc. (C), Washington Park.

**Lilium superbum L. Turk's-Cap Lily.**

*Lilium superbum* Linnæus, Sp. Pl. Ed. II: 434. 1762 [North America].—Barton Fl. Phila I: 166. 1818—Knieskern 32.—Willis 65.

Common in swamps and low grounds from the Hackensack meadows throughout the Middle, Pine Barren and Cape May districts.

This is *the* lily of southern New Jersey and one of the showiest summer wild flowers. In the Pine Barren swamps it is often only two or three feet high with a single flower, while in the richer ground of West Jersey it attains twice this size and bears a great pyramid of blossoms, sometimes twenty to thirty on a single stalk.

*Fl.*—Early July to late July.

*Middle District.*—Lindenwold (S), Tomlin (S), Pemberton Jnc. (S), Pemberton (NB), Dividing Creek.

*Pine Barrens.*—Toms River (S), Wareham, Folsom, Ballenger's Mill (S), Penbryn (S), Winslow (S), Landisville, Crowleystown, Mays Landing (S), Manumuskin (S).

*Cape May.*—Cold Spring (OHB).

**ERYTHRONIUM L.**

**Erythronium americanum Ker. 'Dog-toothed Violet.' Yellow Adder's Tongue.**

Pl. XL., XLI., Fig. 1.

*Erythronium Americanum* Ker. Bot. Mag. pl. 113, I. Je. 1898 [North America].—Knieskern 32.—Willis 65.—Britton 242.

Common in low woods and along streams in the Northern district, but much rarer and local within our limits, where it occurs only in the Middle district, being entirely absent from the Pine Barrens and coast.

*Fl.*—Early April to late April.

*Middle District.*—New Egypt, Bordentown, Kinkora, Little Timber Creek (C), Merchantville (P), Gloucester (P), Haddonfield (C), Medford (S), Mickleton (H), Swedesboro, Alloway.

#### ALETRIS L.

*Aletris farinosa* L. Colic Root.

*Aletris farinosa* Linnaeus, Sp. Pl. 319. 1753 [Pennsylvania].—Knieskern 31.—Willis 63.—Britton 237.

*Aletris aurea* Britton 237.—Rusby, Bull. Torr. Bot. Club VI. 289. 1879.—? Pursh Fl. Amer. Sept. I. 225. 1814.—Willis 63.

Casually in the northern counties in sandy ground and common throughout our limits.

There is a form of this plant with shorter leaves and shorter, more nearly spherical, flowers found especially near the "plains," but the differences do not seem sufficiently well marked or constant to warrant separation. While certainly not *A. aurea*, this plant seems to have been the basis for the inclusion of that species in Britton's Catalogue; the Rusby plant referred to was in fruit and its identity was not clearly determined. Pursh, who reported *A. aurea* from New Jersey, may have had the same form in mind.

*Fl.*—Mid-June to late July.

*Middle District.*—Mattewan (NY), Pt. Pleasant, Farmingdale, Paulsboro, Lindenwold (S), Lawnside (S), Sicklerville (S), Swedesboro, Elmer (P).

*Pine Barrens.*—Allaire (S), Speedwell (S), E. Plains (S), near Atsion (C), Jackson (P), Williamstown Inc., Winslow Inc., Pancoast (S).

*Coast Strip.*—Spray Beach (L), Manahawkin, Stone Harbor.

*Cape May.*—Cold Spring, Bennett (S).

Family CONVALLARIACEÆ. Solomon's Seal, etc.

Differ from the Lilies in having simple or branched root stalks—not bulbs; and in having fleshy berry-like fruit. *Trillium* has the perianth clearly divided into sepals (green) and petals (white or pink).

*Key to the Species.*

- a. Leaves reduced to scales, whole plant a feathery mass of filiform branches. [*Asparagus officinalis*]\*
- aa. Leaves oblong, lanceolate or oval, alternate.
- b. Flowers white in a terminal panicle or raceme.
- c. Leaves 1-3. *Unifolium*, p. 349
- cc. Leaves more than 3.
- d. Flowers in a panicle, numerous. *Vagnera racemosa*, p. 348
- dd. Flowers larger and fewer in a raceme. *V. stellata*, p. 348
- bb. Flowers axillary, single or 2-10 in an umbel, drooping. *Polygonatum*, p. 349
- aaa. Leaves whorled, lanceolate, obovate or rhombic.
- b. One whorl of three leaves, with a central flower.
- c. Flower erect, white or purple. *Trillium erectum*, p. 350
- cc. Flower recurved under the leaves. *T. cernuum*, p. 350
- bb. Leaves in two whorls of 3-10. Flowers several, recurved under the upper whorl, greenish yellow. *Medeola*, p. 350

**VAGNERA Adanson.*****Vagnera racemosa* (L.). Wild Spikenard.**

*Convallaria racemosa* Linnæus, Sp. Pl. 315. 1753 [Virginia and Canada].

*Smilacina racemosa* Knieskern 31.—Willis 64.

*Unifolium racemosum*—Britton 240.

Common in woods of the Northern and Middle districts, occasional in the Cape May and Coast regions, but absent from the Pine Barrens.

*Fl.*—Mid-May to early June.

*Middle District.*—Freehold (NB), Farmingdale, New Egypt, Bordentown, Pemberton Jnc. (S), Kinkora (NY), Delaire, Fish House, Medford (S), Washington Park, Lawnside (S), Lindenwold (S), Mickleton, Mantua, Sewell (S), Glassboro, Swedesboro, Yorktown, Riddleton, Salem (S).

*Coast Strip.*—Atlantic City (S).

*Cape May.*—Cold Spring (OHB).

***Vagnera stellata* (L.). Star-flowered Spikenard.**

*Convallaria stellata* Linnæus, Sp. Pl. 316. 1753 [Canada].

*Smilacina stellata* Willis 64.—Britton Bull. Torrey Bot. Club XV. 97. 1888.

*Unifolium stellatum* Britton 241.

*Vagnera stellata* Keller and Brown 103.

Northern counties and southward along the coast strip to Cape May, but not found elsewhere in the State.

\* *Asparagus*, escaped from cultivation in some places.

This curious distribution, which is shared by *Geranium robertianum* and some other species, is discussed at p. 105.

*Fl.*—Early May to late May.

*Middle District.*—Freehold (C).

*Coast Strip.*—Sandy Hook, Sea Bright (NB), Barnegat City (L), Cedar Bonnet (L), Beach Haven Terrace (L), Ocean City (S), Wildwood, Peermont, Cold Spring, Cape May Pt. (KB), Sea Breeze, Salem Co. (P).

#### POLYGONATUM Hill.

*Polygonatum commutatum* (R. & S.). Smooth Solomon's Seal.

*Convallaria commutata* Roemer and Schultes Syst. 7. 1671. 1830 [Pennsylvania].

*Polygonatum giganteum* Knieskern 32.—Willis 65.

*Polygonatum commutatum* Britton 240.

*Polygonatum biflorum* Knieskern 32.—Willis 65 (in part).—Britton 240 (in part).

In woods of the Northern, Middle and Coast districts rather common; rare and perhaps recently introduced in the Pine Barrens.

In spite of the general statements in the catalogues of Britton and Keller and Brown, I can find no authentic specimens of *P. biflorum* from our region. The present plant is extremely variable in size, width of leaves and number of flowers, and would lead one to suppose that more than one species were represented, but it is impossible to find any constant differences between them and none are referable to *S. biflora* of the northern counties.

*Fl.*—Mid-May to early June.

*Middle District.*—Farmingdale, New Egypt, Bordentown (C), Delaire, Camden (P), Washington, Medford (S), Mickleton, Lindenwold (S), Albion, Pitman, Iona (S), Swedesboro, Shiloh (C), Yorktown (S), Riddleton, Daretown (C), Quinton, Centerton (S), Bridgeton (C).

*Pine Barrens.*—Atco (C), Cedar Lake, Landisville, Folsom.

*Coast Strip.*—Surf City (L), Atlantic City (S), Ocean City (S), Piermont (S), Anglesea, Wildwood (UP).

*Cape May.*—Cold Spring (OHB), Cape May Pt. (S).

#### UNIFOLIUM Adanson.

*Unifolium canadense* (Desf.). False Lily-of-the-Valley.

Pl. XXXVIII., Fig. 1.

*Maianthemum Canadense* Desfontaine, Ann. Mus. Paris IX. 54. 1807 [new name for *Convallaria biflora* Michx. from Canada].

*Smilacina biflora* Knieskern 32.—Willis 64.

*Unifolium Canadense* Britton 241.

*Smilacina canadensis* Barton, Fl. Phila. 1. 167. 1818.

Common in woods throughout the State except in the Pine Barrens.

*Fl.*—Early May to early June.

*Middle District.*—Farmingdale, Pt. Pleasant, New Egypt, Pemberton (NY), Bordentown, Delanco, Springdale (S), Medford (S), Lindenwold (S), Tomlin, Pitman, Swedesboro, Yorktown, Centerton (S).

*Coast Strip.*—Surf City (L), Cox's, Atlantic City (S), Anglesea.

*Cape May.*—Goshen (S), Cold Spring (OHB).

#### MEDEOLA L.

##### *Medeola virginiana* L. Indian Cucumber.

*Medeola virginiana* Linnæus, Sp. Pl. 339. 1753 [Virginia].—Knieskern 32.—Britton 244.

Rich woods of the Northern, Middle and Cape May districts; very rare in the Pine Barrens.

*Fl.*—Late May to mid-June.

*Middle District.*—Farmingdale, New Egypt, Bordentown, Kinkora, Burlington, Birmingham, Delair, Camden (P), Vincentown (NB), Medford (S), Washington Park, Lawnside (S), Tomlin, Sewell (S), Mickleton, Sicklerville (S), Pitman, Glassboro, Swedesboro, Yorktown, Dividing Creek.

*Pine Barrens.*—Landisville (T), Hammonton (Bassett), Belleplain (S).

*Coast Strip.*—Manahawkin.

*Cape May.*—Goshen (S), Cold Spring (OHB).

#### TRILLIUM L.

##### *Trillium erectum* L. Ill-scented Wake-robin.

*Trillium erectum* Linnæus, Sp. Pl. 340. 1753 [Virginia].—Britton 437.

Rich woods; at a number of stations in the northern counties and at one in the Middle district within our limits.

*Fl.*—Early May to mid-May.

*Middle District.*—Bordentown (C).

##### *Trillium cernuum* (L.). Nodding Wake-robin.

*Trillium cernuum* Linnæus, Sp. Pl. 339. 1753 [Carolina].—Willis 64.—Britton 245.—Keller and Brown 103.

Rich woods; frequent in the northern counties, rare and local southward in the Middle district.

*Fl.*—Early May to mid-May.

*Middle District.*—New Egypt, Woodbury (C), Mickleton, Mullica Hill (NB), Swedesboro, Swedesbridge (KB), Woodstown (KB).

Family SMILACEÆ. Smilax.

Woody or herbaceous vines, with berry-like fruit; flowers similar to those of the last family, but dioecious, in axillary umbels; green.

SMILAX L.

*Key to the Species.*

- a. Stem herbaceous, not armed with prickles.
  - b. Flowers carrion-scented, leaves ovate thin.
    - c. Leaves glabrous. *S. herbacea*, p. 351
    - cc. Leaves pubescent below. *S. pulverulenta*, p. 351
  - bb. Flowers not carrion-scented, leaves hastate, somewhat coraceous.
    - S. tannifolia*, p. 352
- aa. Stem woody, usually with strong prickles.
  - b. Leaves ovate, stem prickly at base or not at all, berries red.
    - S. walteri*, p. 354
  - bb. Leaves ovate or rounded, branches and stems with strong prickles, berries black with a bloom. *S. rotundifolia*, p. 352
  - bbb. Leaves lanceolate, thick and evergreen, stem but not branches armed with prickles, berries black. *S. laurifolia*, p. 353
  - bbbb. Leaves variously shaped, ovate to oblong lanceolate, always glaucous, stem usually prickly, berries bluish black. *S. glauca*, p. 353

*Smilax herbacea* L. Carrion-flower.

*Smilax herbacea* Linnaeus, Sp. Pl. 1030. 1753 [Virginia and Maryland].—Willis 63.—Britton 239.

Frequent in the Northern and Middle districts in low ground. *Fl.*—Late May to early June. *Fr.*—Late summer of the first season.

*Middle District.*—Allaire (S), Farmingdale, New Egypt, Bordentown, Kaighns Pt., Lindenwold (S), Washington Park, Westville (NB), Woodbury, Mickleton (H).

*Smilax pulverulenta* (Michx.). Hairy Carrion Flower.

*Smilax pulverulenta* Michaux, Fl. Bor. Am. II. 238. 1803 [Canada and Penna.].

Similar situations to the last, but much less common. *Fl.*—Mid-May to late May. *Fr.*—Late summer of the first season.

*Middle District.*—Swedesboro, Mickleton (H).

***Smilax tamnifolia* Michx. Halberd-leaved Smilax.**

*Smilax tamnifolia* Michaux, Fl. Bor. Am. II. 238. 1803 [Carolina].—Knieskern 32.—Willis 63.—Gray Man. Ed. I. 486. 1848.—Britton 240.

?*Smilax panduratus* Pursh Fl. Amer. Sept. I. 251. 1814 [as relates to N. J.].

?*Smilax tamnoides* Willis 63.

?*Smilax pseudochina* Pursh Fl. Amer. Sept. I. 250. 1814 [as relates to N. J.].  
—Willis 63.

Frequent or common in moist sandy ground, usually in shade, throughout our region, but no farther north. Most plentiful in the Pine Barrens.

The variations in leaf-form exhibited by this species may have had something to do with the inclusion of *Smilax bona-nox* (= *panduratus*) and *S. pseudochina* among the plants of New Jersey in the various editions of Gray's Manual, Willis' list, etc. Both are given by Pursh as occurring in the State, and subsequent records are merely copied from him. Whatever may have been the source of his statement, it was apparently quite erroneous, as there is no evidence that either species is found in New Jersey.

*Fl.*—Mid-June to early July. *Fr.*—Early autumn of the first season.

*Middle District.*—Lake Como (NB), Spring Lake (C), Freehold (C), Farmingdale. Pt. Pleasant (S), Repaupo, Camden (P), Tomlin (S), Yorktown, Beaver Dam.

*Pine Barrens.*—Hanover, Speedwell (S), Barnegat, Waretown, Coxe's, Clementon (S), Sumner, Sicklerville, Waterford, Cedar Brook, Iona (S), Vineland (S), Hammonton (S), Pleasantville, Egg Harbor City (S), Absecon (S), Maurice River.

*Cape May.*—Goshen (S), Court House, Bennett, Cold Spring (OHB), Whitesboro (3), Cape May.

***Smilax rotundifolia* L. Greenbrier.**

*Smilax rotundifolia* Linnæus, Sp. Pl. 1030. 1753 [Canada].—Knieskern 31.—Willis 63.—Britton 239.

Common in swampy thickets throughout the State.

This is the commonest and stoutest of the Greenbriers. While apparently not common in the Pine Barrens proper, it makes the thickets along the edge of the coast strip almost impenetrable with its strong woody stems and stout thorns.



*Fl.*—Early May to early June. *Fr.*—Mid-autumn of the first season persisting well into winter.

*Middle District.*—Farmingdale, Delaire, Kinkora, Birmingham, W. Deptford, Woodbury, Pitman, Glassboro, Salem (S).

*Pine Barrens.*—Toms River (NB), Quaker Bridge (S), Speedwell (S), Tuckahoe (S), Manumuskin.

*Coast Strip.*—Sandy Hook (NB), Seaside Park (Ha) Surf City (L), Beach Haven Crest (L), Barnegat City (L), Beach Haven Terrace (L), Holgate's (L), Manahawkin, Atlantic City (S), Ocean City (S), Cold Spring (S).

***Smilax glauca* Walt. Glaucous-leaved Greenbrier.**

*Smilax glauca* Walter, Fl. Car. 245. 1788 [South Carolina, probably Santee River].—Willis 63.—Britton 239.—Keller and Brown 104.

Occasional in the northern counties and plentiful throughout our region in dry, sandy soil.

*Fl.*—Late May to late June. *Fr.*—Mid-autumn of the first season persisting well into winter.

*Middle District.*—Keyport (NY), Farmingdale (NY), Griffith's Swamp, Washington Park.

*Pine Barrens.*—Lakewood (NY), Manahawkin, Quaker Bridge (NB), Speedwell (S), Plains (S), Tabernacle (S), Albion, Williamstown Inc. (S), Sicklerville (S), Winslow (S), Batsto (NY).

*Coast Strip.*—Barnegat City (L), Spray Beach (L), Holgate's (L), Atlantic City (S), Ocean City (S), Anglesea.

*Cape May.*—Cold Spring (OHB), Town Bank.

***Smilax laurifolia* L. Laurel-leaved Greenbrier.**

*Smilax laurifolia* Linnaeus, Sp. Pl. 1030. 1753 [Virginia and Carolina].—Pursh Fl. Am. Sept. I. 250. 1814.—Willis 63.—Britton 239.—Keller and Brown 105.

Wooded swamps of the Pine Barren and Cape May regions rather local.

This is a distinctively Pine Barren species, and its long, thick, glossy leaves hanging in festoons from the trees and bushes on the edge of the deep swamps at once attract attention as being strikingly different from anything we are familiar with in other parts of the State. In winter it is still more conspicuous, owing to the evergreen character of the leaves.

*Fl.*—Early August to early September. *Fr.*—Early autumn of the second season, persisting into winter.

*Pine Barrens*.—Toms River (C), Forked River, Bamber, Barnegat, Speedwell, Quaker Bridge, Hammonton, Batsto Creek (NB), Herman, Elwood (KB), Egg Harbor City, Eighth St.

*Cape May*.—Dias Creek, New England.

***Smilax walteri* Pursh. Walter's Greenbrier.**

*Smilax Walteri* Pursh, Fl. Am. Sept. 249. 1814 [Low, sandy counties of Virginia and Carolina].—Willis 63.—Britton 239.—Keller and Brown 105.—Grays Man. Ed. V., p. 519. 1867.

Deep swampy thickets of the Pine Barren and Cape May districts, local.

This is another southern smilax, but since its leaves bear a general resemblance to those of *S. rotundifolia*, it is easily overlooked in summertime unless one is especially searching for it. In autumn and winter, however, the coral red berries make it particularly conspicuous and distinguish it at once from all other species.

Its discovery in New Jersey is somewhat involved in doubt. It is first recorded from the State in Gray's Manual, fifth edition.

*Fl.*—Early May to early June. *Fr.*—Mid-autumn of the first season, persisting well into winter.

*Pine Barrens*.—Atsion (P), Quaker Bridge, Vineland (KB), Landisville, Twelfth St. Folsom, Weymouth to Elwood, N. of Weekstown, Egg Harbor City (NB), Petersburg, Mays Landing (CP).

*Cape May*.—Cold Spring (OHB).

**FAMILY HAEMODORACEÆ. Red-root.**

Differs from all the preceding families and agrees with the following in having the ovary inferior. Stamens 3, opposite the inner segments of the perianth.

**GYROTHECA.**

***Gyrotheca tinctoria* (Walt.). Red-root.**

*Anonymos tinctoria* Walter, Fl. Car. 67. 1788 [South Carolina, probably Santee River].

*Lachnanthes tinctoria* Knieskern 31.—Willis, 63.

*Gyrotheca tinctoria* Britton 236.—Keller and Brown 105.

*Dilatris Heritiera* Barton, Fl. Phila I. 22. 1818.

Swamps and bogs of the Pine Barren and Cape May districts, common.

Unlike many other bog plants, this species is not injured by the cultivation and flooding of the cranberry bogs: on the contrary, it increases under these conditions until it becomes a positive weed, and great heaps of the plants are often to be seen stacked up on the dykes after the weeding of the bog. It bears a resemblance to *Lophiola*, but is not so delicate in color, the wooly covering being always duller and more rusty.

*Fl.*—Early July to late August.

*Pine Barrens.*—Near New Egypt, Toms River, Forked River, Island Hts. (NY), Manchester (NY), Bamber, Pasadena, West Creek, Tuckerton, Browns Mills, Hanover, Clementon, Jackson (P), Bear Swamp, Ballengers Mills, Braddock's Mills, Williamstown Inc., Cedar Brook, Parkdale, Atsion, Quaker Bridge, Butsto, Pleasant Mills, Herman, Hammonton, Hospitality Br, Eighth St., Twelfth St., Mays Landing.

*Cape May.*—Court House (S), Bennett (OHB).

#### FAMILY AMARYLLIDACEÆ. Stargrass, etc.

Differs from the preceding in having 6 stamens.

##### *Key to the Species.*

- a. Stem leafy, flowers densely wooly. *Lophiola*, p. 355  
 aa. Leaves basal grass-like, flowers not wooly. *Hypoxis*, p. 355

#### HYPOXIS L.

##### *Hypoxis hirsuta* (L.). Stargrass.

*Ornithogalum hirsutum* Linnaeus, Sp. Pl. 306. 1753 [Virginia and Canada].

*Hypoxis graminea* Pursh, Fl. Am. Sept. I. 224. 1814.

*Hypoxis erecta* Barton, Fl. Phila. I. 162. 1818.—Knieskern 31.—Willis 63.

*Hypoxys* Britton 238.

Frequent in sandy ground throughout the State except the coast and Cape May districts (?)

*Fl.*—Mid-May, and rarely and irregularly through the summer even to September.

*Middle District.*—Shark River, New Egypt, Delanco, Sewell (S), Lindenwold (S).

*Pine Barrens.*—Allaire (S), Plains (S), Manahawkin, Landisville (T), Hammonton (S).

#### LOPHIOLA Kerr.

##### *Lophiola aurea* Kerr. Golden-crest.

Pl. XXXIV., Fig. 2.

*Lophiola aurea* Kerr, Curtis Bot. Mag. pl. 1596. Nov. 1, 1813 [N. America].

*Conostylis Americana* Pursh, Fl. Am. Sept. I. 224. 1814 [Pine Barrens of New Jersey and Carolina].—Torrey, Fl. U. S. I. 344. 1824.

*Helonias tomentosa* Muhlenberg Cat. 37.

*Lophiola aurca* Knieskern 31.—Willis 63.

*Lophiola tomentosa* Britton 237.

*Lophiola americana* Keller and Brown 105.

Frequent in Pine Barren swamps and bogs.

This is a striking plant found only in the heart of the Pine Barrens. The dense, wooly covering of the flowers recalls the *Eidelweiss* of the Swiss mountains, and from the downy, white clusters the little yellow flowers peep out like tiny stars. The plant has a close general resemblance to *Gyrotheca*, but its wooly coat is denser and much purer white. This was one of the plants first discovered by Frederick Pursh in his tramps across the wilds of New Jersey and was published by Kerr in Curtis' Botanical Magazine, from Pursh's original specimens shortly before the appearance of his Flora.

The untouched bogs of the Wading River are the headquarters for *Lophiola*. One well-known spot I always associate with it. A low, scattered growth of Pitch Pines slopes down on either side to the moist savanna, through which flows the rapid, tea-colored stream. On the edge of the moist ground is a dense, low, shrubby growth of White Azalea, three or four species of Huckleberries and the Inkberry—*Ilex glabra*. White Cedars mark the course of the stream, now forming dense clusters, now scattering, with young ones standing out here and there in the grassy, open stretches, and with the Cedars along the bank are Red Maples, Wax Myrtles and beds of Royal Fern, *Carex livida* and *Eleocharis tuberculosa*.

The "Savannas" are covered with the tall stalks of *Danthonia epilis*, while the denser growth below contains *Panicum ensifolium*, *Rynchospora* of several species, *Scleria minor*, etc., all rising from a bed of sphagnum or from patches of wet, white sand and scattered all about in definite clumps are the Pitcher plants, with pitchers of all shades and combinations of green and crimson, and the button-topped stalks of the Pipeworts *Eriocaulon compressum* and *decangulare*—the former at this date, July 4, scattering its chaff at the slightest touch, the latter only in

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\* Record for Browns Mills (KB) proves to be *Gyrotheca*.

bud. With them, but not so definitely tufted, are the yellow spikes of the *Abama*, the white, gummy-stemmed *Tofieldia* and beds of the snowy, wooly heads of the *Lophiola*. There are crimson *Limodorums* and pink *Pogonias* starring the grass here and there, and where shallow, rusty, iron-stained pools are formed on either side of the rapid-flowing stream; there are solid masses of yellow *Utricularias*, shining like beds of gold in the sunlight. And in the deep water are white pond lilies and velvety leaves of the Golden Club, now gone to seed, erect emerged spikes of *Juncus militaris* and *Xyris congdoni* and great beds of *Eriocaulon septangulare* and *Scirpus subterminalis*, their leaves and stems ever swaying in the steady current. Truly one of nature's flower gardens, and it stretches for miles, following the course of the streams through the wilderness of pine, cedar and white sand, now narrowing, now widening out into broad stretches. Some seasons it is saturated with water and one can only browse along the edges, at others the dried vegetation forms a crust upon which one can walk with ease, though ever mindful that beneath is an almost bottomless morass of mud and decayed vegetation, so that it is safer in such spots to trust to fallen cedar logs and dense clumps of rushes in shaping one's course.

*Fl.*—Late June to late July.

*Pine Barrens*—Manchester (NB), Toms River, Whitings, Hanover, Clementon (H), Double Trouble, Island Hts. (KB), Woodmansie (KB), Forked River, Waretown (KB), West Creek (S), Stafford Forge (S), Tuckerton, Jones Mill (S), High Bridge (S). Speedwell, Chatsworth, Berlin (KB), Atco (KB), Jackson (P), Hammonton (Bassett), Atsion, Parkdale, Quaker Bridge, Elwood (KB), Pleasant Mills (S), Eighth St.

#### Family DIOSCOREACEÆ. Yams.

Trailing vines with flowers similar to those of the last family, but dioecious.

#### DIOSCOREA L.\*

#### *Key to the Species.*

*a.* Leaves somewhat pubescent beneath.

*D. villosa*, p. 358

*aa.* Leaves glabrous.

*D. v. glabrifolia*, p. 358

\* Cf. Bartlett Bull. 189, Bur. Plant Indust. U. S. Dep. Agr.

**Dioscorea villosa** L. Wild Yam.

*Dioscorea villosa* Linnaeus, Sp. Pl. 1033. 1753 [Virginia and Florida].—  
Knieskern 31.—Willis 63.—Britton 238.

Thickets, usually in damp ground, throughout the State, except in the Pine Barren and coast districts, frequent.

Only one of Linnæus' references is based upon an identifiable plant, and as that is our species, I prefer to retain his name.

*Fl.*—Mid-June to mid-July. *Fr.*—Early autumn.

*Middle District.*—New Egypt, Birmingham, Hartford, Medford (S), Chairville (S), Washington Park, Dividing Creek.

*Pine Barrens.*—Landisville (T), Twelfth St., Albion, Weekstown.

*Coast Strip.*—Manahawkin, Barnegat, Coxe's, Five-Mile Beach (T).

*Cape May.*—Goshen (S), Dias Creek (S), Cold Spring (S).

**Dioscorea villosa glabrifolia** (Bartlett). Smooth Wild Yam.

*Dioscorea paniculata glabrifolia* Bartlett, Bull. 189, U. S. Dept. Agr., Bureau Pl. Indust., 1910. 15 [Cherokee Co., Kas.].

Less common than the preceding and collected only in the Middle district.

*Fl.* and *Fr.*—Similar to that of the preceding.

*Middle District.*—Farmingdale, Pt. Pleasant, Hartford, Yorktown.

## Family IRIDACEÆ. Flags, etc.

Stamens, three opposite the outer segments of the perianth, style sometimes with large petal-like divisions. Comprises our Flags and Blue-eyed Grasses.

*Key to the Species.*

a. Flowers blue.

b. Style branches broad and petal-like, flowers large.

c. Leaves 12–25 mm. wide.

*I. versicolor*, p. 359

cc. Leaves 3–5 mm. wide.

*I. prismatica*, p. 359

bb. Style branches filiform or obsolete, flowers small.

c. Stem usually simple with a sessile terminal spathe.

d. Capsules dark, 4–6 mm. high, pedicels about as long as the inner bract, stems 1.5–3 mm. broad, spathes usually green.

*Sisyrinchium angustifolium*, p. 360

dd. Capsules pale, 2–4 mm. high, pedicel longer than the inner bract, stems 5–1.5 mm. broad, spathes usually purplish.

*S. mucronatum*, p. 360

cc. Stem branched above, bearing two or more spathes.

- d. Inner bract scarious obtuse, 10-15 mm. long, stems wiry, often geniculate, plant pale and glaucous. *S. atlanticum*, p. 360
- dd. Inner bract acute, not scarious.
- e. Pedicels about as long as the inner bract. *S. angustifolium*, p. 360
- ee. Pedicels longer than bract.
- f. Stems .5-1.5 mm. broad, narrowly winged, not black when dry. *S. mucronatum*, p. 360
- ff. Stems 1.5-6 mm. broad, black when dried.
- g. Base of tufts covered with fibers, stem narrowly winged. *S. arenicola*, p. 360
- gg. Base of tufts without coarse fibers stem, broadly winged. *S. graminoides*, p. 360
- aa. Flowers crimson and purple mottled. [*Gemmingia chinensis*]\*

IRIS L.

*Iris versicolor* L. Large Blue Flag.

XXXVII., Fig. 1.

*Iris versicolor* Linnæus, Sp. Pl. 39. 1753 [Virginia, Maryland and Pennsylvania].—Knieskern 31.—Willis 63.—Britton 273.

Swamps or meadows; common throughout the State except in the Pine Barrens.

*Fl.*—Mid-May to mid-June.

*Middle District.*—New Egypt, Delanco, Timber Creek, Camden, Medford (S), Haddonfield, Lindenwold (S), Sewell (S), Swedesboro, Dividing Creek.

*Pine Barrens.*—Landisville (introduced?).

*Coast Strip.*—Cox's, Ship Bottom (L), Barnegat City Inc. (L), Piermont, Holly Beach (UP), Cold Spring (OHB).

*Iris prismatica* Pursh. Slender Blue Flag.

*Iris prismatica* Pursh, Fl. Am. Sept. 30. 1814 [New Jersey near Egg Harbor].

—Barton, Fl. Phila. I. 21. 1818.—Britton 273.—Keller and Brown 106.

*Iris virginica* Knieskern 31.—Willis 63.

Swamps; occasional in the northern counties, common in the Middle and Pine Barren districts.

*Fl.*—Late May to late June.

*Middle District.*—New Egypt, Shark River, Pt. Pleasant, Pemberton Inc. (S), Burlington, Lindenwold.

*Pine Barrens.*—Forked River, High Bridge (S), White Horse, Bear Swamp, Landisville, Sicklerville (S), Williamstown Inc., Winslow Inc., Hammonton, Egg Harbor City, Tuckahoe (S).

*Coast Strip.*—Sherburn's (L), Holgate's (L).

*Cape May.*—Cold Spring (OHB).

\* Blackberry Lily, an Iris-like plant, occasionally escaping from cultivation.

## SISYRINCHIUM L.

**Sisyrrinchium mucronatum** Mich. **Michaux's Blue-eyed Grass.**

*Sisyrrinchium mucronatum* Michaux, Flor. Bor. Am. II. 23. 1803 [Pennsylvania].

*Sisyrrinchium intermedium* Bicknell, Bull. Torrey Bot. Club 26. Sept., 1899. 498 [Mickleton, N. J.].

Occasional in the Middle district and at Mays Landing, probably more common northward. *S. intermedium* Bicknell, seems to be merely an aberrant form of this, without constant distinguishing characters.

*Fl.*—Mid-May to mid-June. *Fr.*—Early June to early July.

*Middle District.*—Burlington, Mickleton.

*Pine Barrens.*—Mays Landing.

**Sisyrrinchium angustifolium** Mill. **Northern Blue-eyed Grass.**

*Sisyrrinchium angustifolium* Miller, Gard. Dict. Ed. 8. 2. 1768 [no loc.]—Britton 238 (in part).

Rare and local, apparently coastal.

*Fl.*, etc.—Probably similar to *S. mucronatum*.

*Coast Strip.*—Herman (below Batsto), Tuckerton.

**Sisyrrinchium graminoides** Bicknell. **Broad-leaved Blue-eyed Grass.**

*Sisyrrinchium graminoides* Bicknell, Bull. Torr. Club 23. 133. 1896 [Eastern U. S., Mass. southward].

?*Sisyrrinchium mucronatum* Barton Fl. Phila. I. 23. 1818.

Common in meadows and moist ground in the Middle and rare in the coast district.

*Fl.*—Late May to late June. *Fr.*—Mid-June to mid-July.

*Middle District.*—New Egypt, Farmingdale (S), Burlington, Wenonah, Washington Park, Andrews, Buckshutem, Swedesboro.

*Coast Strip.*—Piermont.

**Sisyrrinchium atlanticum** Bicknell. **Coastal Blue-eyed Grass.**

*Sisyrrinchium Atlanticum* Bicknell, Bull. Torr. Club 23. 134. 1896 [Van Courtland Park, N. Y. City].—Keller and Brown 106.

?*Sisyrrinchium anceps* Torrey Fl. U. S. I. 42. 1824.

*Sisyrrinchium Bermudiana* Knieskern 31.—Willis 63.

Common in swamps and meadows throughout our region and probably northward as well. Most plentiful in the Pine Barrens.

*Fl.*—Mid-May to mid-June. *Fr.*—Early June to early July.



*Middle District*.—Farmingdale (S), Pt. Pleasant, New Egypt, Pemberton (NY), Lindenwold, Washington Park, Glassboro, Yorktown, Buckshutem.

*Pine Barrens*.—Allaire (S), Bayhead, Forked River, Bamber, Manahawkin, West Creek, Browns Mills, Albion, Landisville, Bear Swamp, Williamstown Jnc., Cedar Lake, Egg Harbor City, Tuckahoe.

*Coast Strip*.—Surf City (L), Barnegat City (L), Beach Haven (L), Spray Beach (L), Beach Haven Terrace (L), Avalon.

***Sisyrinchium arenicola* Bicknell. Sand Blue-eyed Grass.**

*Sisyrinchium arenicola* Bicknell, Torrey Club Bull. 26. Sept. 1899. 496  
[Coast of Long Island and New Jersey].

Middle district, not very abundant.

*Fl.*—Late May to late June. *Fr.*—Mid-June to mid-July.

*Middle District*.—Red Bank (NY), New Egypt, Birmingham, Asbury Park, Clementon, Millville, Yorktown.

## Order ORCHIDALES.

### Family ORCHIDACEÆ. Orchids.

Perennial herbs with tuberous roots or bulbs. Flowers curiously irregular, composed of six segments, the three outer (sepals) similar to one another, the lateral inner ones (petals) similar, but the middle one developed into a lip, usually larger than the others, fringed or spurred. Stamens often united with the style, pollen in several stalked masses; stigma, a viscid surface opposite the lip.

Includes many of our most interesting and curious plants. Well represented in the bogs of the Pine Barrens.

#### *Key to the Species.*

- a. Anthers 2; lip forming a large inflated sack.
  - b. Flower purple, leaves at base. *Cypripedium acaule*, p. 363
  - bb. Flower yellow, leaves scattered on the stem.
    - c. Lip 30–50 mm. long. *C. pubescens*, p. 364
    - cc. Lip 25–30 mm. long. *C. parviflorum*, p. 364
- aa. Anther 1; lip not inflated into a sack.
  - b. Flowers with a distinct slender spur, arranged a spike.
    - c. Leaves present at flowering time.
    - d. Flowers white.
      - e. Lip with long fringe. *Blephariglottis blephariglottis*, p. 367
      - ea. Lip not fringed. *Gymnadeniopsis nivea*, p. 366

- dd. Flowers orange.  
 e. Lip fringed.  
 i. Five mm. long. *Blephariglottis cristata*, p. 367  
 ff. Ten mm. long. *B. ciliaris*, p. 367  
 cc. Lip not fringed. *Gymnadeniopsis integra*, p. 365
- ddd. Flowers pink.  
 e. Lip fringed.  
 f. 10-12 mm. broad, spike 30 mm. in diameter. *B. psycodes*, p. 369  
 ff. 18-20 mm. broad, spike 50 mm. in diameter. *B. grandiflora*, p. 369  
 cc. Lip not fringed, but somewhat irregular. *B. peramoena*, p. —
- dddd. Flowers green or greenish white.  
 e. Lip fringed. *B. lacera*, p. 369  
 ee. Lip not fringed, but somewhat irregular.  
 f. Lip three parted at tip, flowers greenish white. *Gymnadeniopsis clavellata*, p. 365  
 ff. Lip truncate at tip, flowers pale yellowish green. *Perularia flava*, p. 364
- dddd. Flowers pink and white, leaves two, at base. *Galcaris spectabilis*, p. 364  
 cc. Leaf (single at base) absent at flowering time, flowers green tinged with purple. *Tipularia discolor*, p. 378
- bb. Flowers without a spur.  
 c. Flowers at least 15 mm. in diameter, single or several on a stalk.  
 d. Leaf linear or lanceolate grass-like, flowers pink.  
 e. Flowers 4-10. *Limodorum tuberosum*, p. 372  
 cc. Flower solitary (leaf absent at flowering time). *Archuthusa bulbosa*, p. 372
- dd. Leaf oval or oblong lanceolate, flowers pink.  
 e. Lip lacerate, sepals 20 mm. long. *Pogonia ophioglossoides*, p. 370  
 cc. Lip toothed, sepals 40-50 mm. long. *P. divaricata*, p. 370
- ddd. Leaves five in a whorl at the top of the stem, petals greenish yellow, sepals slender terete, much elongated, purplish. *Isotria verticillata*, p. 371
- cc. Flowers less than 15 mm. in diameter, in a spike or raceme.  
 d. No leaves, whole plant purplish.  
 e. Lip three lobed. *Corallorhiza maculata*, p. 379  
 cc. Lip entire or margin undulate.  
 f. Flowers 6-8 mm. long, blooms in Aug.-Sept. *C. odontorhiza*, p. 379  
 ff. Flowers 14 mm. long, blooms in spring. *C. wisteriana*, p. 379
- dd. Leaves present.  
 e. Leaves basal, variegated with white lines, forming a sort of mesh work. *Peramium pubescens*, p. 376

- ec.* Leaves not variegated.  
*f.* Flowers not white.  
*g.* Leaf single.  
     *h.* At base of scape. *Aplectrum hyemale*, p. 378  
     *hh.* About the middle of scape. *Acroanthes unifolia*, p. 376  
*gg.* Leaves two.  
     *h.* About the middle of scape. *Listera australis*, p. 375  
     *hh.* At base of scape.  
         *i.* Flowers yellowish green. *Leptorchis laselii*, p. 377  
         *ii.* Flowers brownish purple. *L. liliifolia*, p. 377  
*ff.* Flowers white, usually in a spirally arranged spike.  
     *g.* Leaves oblong lanceolate, 1 dm. long by 10 mm. wide, blooming in spring or early summer. *G. plantaginica*, p. 373  
*gg.* Leaves long and grass-like, .7-3.5 dm. long, blooming in late summer or autumn.  
     *h.* Flowers in several ranks. *G. cernua*, p. 373  
     *hh.* Flowers in a single rank.  
         *i.* Scape almost glabrous, 4-7 dm. high. *G. praecox*, p. 374  
         *ii.* Scape pubescent above, 1.5-5 dm. high. *G. vernalis*, p. 374  
*ggg.* Leaves ovate or elliptic, absent at flowering time—late summer or autumn.  
     *h.* Plant 2-6 dm. high, lips of flower green, a cluster of tuber-like roots. *G. gracilis*, p. 375  
     *hh.* Plant 1.2-2.5 dm. high, lip white, a single tuber-like root. *G. beckii*, p. 375

CYPRIPEDIUM L.

*Cyripedium acaule* Ait. Moccasin Flower.

Pl. XLII.

*Cyripedium acaule* Aiton, Hort. Kew. III: 303. 1789 [North America].—Knieskern 31.—Willis 62.—Rafinesque Med. Fl. I: 144. 1828.—Britton 236.—Keller and Brown 107.

*Cyripedium humile* Barton Fl. Phila. II: 145. 1818.

Sandy woods throughout the State; frequent.

*Fl.*—Early May to early June.

*Middle District.*—Farmingdale, New Egypt, Arney's Mt. (S), Camden, Westville, Washington Park, Orchard (S), Medford (S), Swedesboro, Bridgeton (S).

*Pine Barrens.*—Manahawkin, Speedwell (S), Jackson, Cedar Brook, Williamstown Jnc. (S), Landisville, Pleasant Mills, Egg Harbor City, Beesley's Pt. (S), Tuckahoe.

*Cape May.*—Dennisville, Cold Spring, Cape May (OHB).

**Cypripedium pubescens Willd. Large Yellow Slipper-Plant.**

*Cypripedium pubescens* Willdenow, Syst. Pl. IV., 143, 1805 [North America].—Willis 62.—Britton 236.—Keller and Brown 108.

Rich woods; frequent in the northern counties, rare and local southward in the Middle district.

*Fl.*—Early May to late May.

*Middle District.*—Englishtown (C), Washington Park (KB), Bet. Mullica Hill and Mickleton (H), Swedesboro.

**Cypripedium parviflorum Salisb. Small Yellow Slipper-Plant.**

*Cypripedium parviflorum* Salisbury, Trans. Linn. Soc. I: 77. 1791 [Virginia].—Pursh, Fl. Am. Sept. II: 594. 1814.

Rich woods of the northern counties, local. Very rare in the Middle district, only one station recorded in Britton's catalogue on authority of R. W. Brown and no specimen seen.

*Middle District.*—Keyport (C).

**GALEARIS Rafinesque.\*****Galearis spectabilis (L.). Showy Orchis.**

Pl. XLIV.

*Orchis spectabilis* Linnæus, Sp. Pl. 943. 1753 [Virginia].—Willis 61.—Britton 233.

Rich woods; common in the northern district and occasional southward in the Middle district.

*Fl.*—Early May to late May.

*Middle District.*—Keyport (C), Freehold (C), Bordentown (C), New Egypt, Swedesboro, Sharpstown (H), Oliphant's Mill (H).

**PERULARIA Lindley.****Perularia flava (L.). Pale-green Orchis.**

*Orchis flava* Linnæus, Sp. Pl. 942. 1753 [Virginia].—Nuttall Gen. II. 188. 1818.

*Habenaria flava* Britton 234.

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\* The generic name *Galearis* of Rafinesque 1836, has usually been rejected as too near *Galcaria* Presl 1830, and *Galcorchis* was proposed by Rydberg as a substitute. There is a tendency now, however, to retain all names possible which are not absolutely identical or differ only in gender terminations, and I think *Galearis* can safely be retained.

Swamps; frequent in the northern district, very rare within our limits. Only one specimen seen.

Toms River (NB).

*Fl.*—Early June to early July.

**GYMNADENIOPSIS Rydberg.**

***Gymnadeniopsis integra* (Nutt.). Southern Yellow Orchis.**

*Orchis integra* Nuttall Gen. II: 188. 1818 [Swamps of New Jersey (=Egg Harbor.)].

*Habenaria integra* Willis 61.—Britton 234.

?*Gymnadenia flexa* Knieskern 30.

*Gymnadeniopsis integra* Keller and Brown 108.

Pine Barren swamps; very rare and local.

Nuttall's original specimens in the Philadelphia Academy herbarium are labeled "Egg Harbour," which in those days meant Beesley's Point, on Great Egg Harbor. Chas. Pickering later found the plant at Quaker Bridge, and on August 26, 1863, Chas. F. Parker also collected it there. All these specimens I have examined. Prior to 1856 Dr. Knieskern had collected the plant somewhere in Ocean or Monmouth County, according to his List, although there seems to me some question whether the plant to which he refers was not *Blephariglottis cristata*. This is well known from Dr. Knieskern's territory, and yet he does not mention it. Rev. Saml. Lockwood also reported *C. integra* to Dr. Britton from Allaire. The only recent record that we have is a specimen collected by Mr. Geo. Reddles at Quaker Bridge some ten years ago and identified as this, though unfortunately it was not preserved.

All our efforts to find this orchid have failed, although likely spots in the Pine Barrens have been diligently searched.

*Pine Barrens.*—Allaire (C), Quaker Bridge (C. Pickering in A. N. S. and C. F. Parker in U. of P.), "Egg Harbor"—Beesley's Pt.

***Gymnadeniopsis clavellata* (Michx.). Green Wood Orchis.**

*Orchis clavellata* Michaux, Fl. Bor. Am. II: 155. 1803 [Carolina].

*Gymnadenia tridentata* Knieskern 30.

*Habenaria tridentata* Willis 61.—A. Brown, Bull. Torrey Bot. Club VII. 114. 1880.—Britton 234.

*Gymnadeniopsis clavellata* Keller and Brown 108.

Swamps especially in woodland; frequent throughout the State.

*Fl.*—Late July to mid-August.

*Middle District.*—Pt. Pleasant, New Egypt, Camden, Mt. Ephraim (P), Medford (S), Lindenwold, Swedesboro.

*Pine Barrens.*—Toms River (NJ), Forked River, Manchester (NB), Bamberg, Waretown, Barnegat, Coxes, Berlin, Clementon, Eighth St. (T), Quaker Bridge, Batsto, Forks of Batsto, Palermo, Sea Isle Inc. (S).

*Cape May.*—Goshen, Green Creek (S), Dias Creek (S), Cold Spring, Whitesboro (S).

***Gymnadeniopsis nivea* (Nutt.). Snowy Orchis.**

PL. XLVII.

*Orchis nivea* Nuttall, Gen. II: 188, 1818 [Betwixt St. Mary's and Satilla River, W. Florida].

*Gymnadeniopsis nivea* Long, *Torrey* 1908, 16. Stone, Proc. Acad. Nat. Sci. Phila., 1908, 458.

Open bogs in southern Cape [May County; locally common.

One of the greatest surprises of recent botanical investigations in southern New Jersey was the discovery of this plant by Mr. Bayard Long on July 24, 1907.

It was hard to imagine that in a region so frequently scoured by botanists an undetected and conspicuous orchid had been blooming all these years, and yet such was the case. The explanation probably lies in the fact that the bogs in which the plant grows are off the usual line of travel and directly away from the sea and the salt marshes, which seem always to have attracted the botanists who visited the region. Then, again, the late blooming of this species was doubtless also a factor in concealing its presence, as the usual conspicuous bog flowers are, for the most part, over before it starts to blossom.

The systematic efforts of the members of the Philadelphia Botanical Club to explore all the bogs of this region that were marked on the maps were responsible for discovering the locality, and to Mr. Long is due the credit for recognizing the plant from the leaves and old withered flower stalk. A later visit by Mr. Van Pelt and the writer revealed the plant just beginning to bloom, while on September 4, 1907, it was at its height and was found to be far more plentiful than at first supposed, its white spikes rising above the grass all over the bogs.

The bogs in which this orchid grows seem to be peculiar in their flora, and other species known only from Delaware, southward, occur there commonly, such as *Boltonia asteroides*, *Myrica elata*, *Coelorachis rugosa*, etc. Mr. O. H. Brown informs me that a peculiar white clay underlies this chain of bogs which is not found elsewhere in Cape May County, so far as he is aware.

When examining the State Herbarium at New Brunswick I found a specimen of this orchid from the herbarium of W. H. Leggett labeled "Southern N. J." with a note by Dr. Britton to the effect that he does not believe it came from New Jersey.

*Fl.*—Early August to mid-September.

*Cape May.*—Bogs near Bennett.

#### BLEPHARIGLOTTIS Rafinesque.

##### *Blephariglottis cristata* (Michx.) Crested Yellow Orchis.

*Orchis cristata* Michaux, Fl. Bor. Am. II. 156. 1803 [Carolina].—Barton, Fl. Phila. II. 138. 1818.

*Habenaria cristata* Willis, 61.—Britton 234.

*Blephariglottis cristata* Keller and Brown 109.

Bogs and damp ground; frequent in the Pine Barren and Cape May regions and rare and local in the Middle district, even to Hudson County.

*Fl.*—Late July to late August.

*Middle District.*—Gloucester Pt., Griffiths Swamp, Haleyville (P).

*Pine Barrens.*—Long Branch, Asbury Park (C), Spring Lake (NB), Pt. Pleasant (S), Speedwell (S), Jones Mill (S), Atsion (Bassett), Pleasant Mills (S), Hammonton, Winslow, Pancoast (NB), Egg Harbor City, Beesley's Pt. (S).

*Cape May.*—Court House (S), Dias Creek (S), Green Creek (S), Nummeytown, Whitesboro (S).

##### *Blephariglottis ciliaris* (L.) Yellow Fringed Orchis.

Pl. XLV.

*Orchis ciliaris* Linnaeus, Sp. Pl. 939. 1753 [Virginia and Canada].—Barton, Fl. Phila. II. 136. 1818.

*Platanthera ciliaris* Knieskern 31.

*Habenaria ciliaris* Willis 61.—Britton 235.

*Blephariglottis ciliaris* Keller and Brown 109.

Bogs in the Middle and Cape May districts, casually northward (Bergen, Essex and Hudson counties), and occasional in the Pine Barrens; local and not very common.

*Fl.*—Late July to late August.

*Middle District*.—Red Bank, Mon. Co. (NB), Lindenwold, Woodbury, Swedesboro.

*Pine Barrens*.—Forked River (NY), Bamber, Landisville, Hammonton.

*Cape May*.—Bennett.

***Blephariglottis blephariglottis* (Willd.). White Fringed Orchis.**

*Orchis blephariglottis* Willdenow, Sp. Pl. IV. 9. 1805 [Pennsylvania (Prob. = N. J.)].—Pursh, Fl. Am. Sept. 385. 1814.—Barton, Fl. Phila. II. 136. 1818.

*Platanthera blephariglottis* Knieskern 31.

*Habenaria blephariglottis* Willis 61.—Britton 235.

*Blephariglottis blephariglottis* Keller and Brown 109.

Bogs, abundant in the Pine Barren and Cape May districts and locally in the Middle district, extending to Bergen, Hudson and Mercer counties.

The White Fringed Orchis impresses the visitor to the Pine Barrens more than any other plant. There is a delicacy and beauty about it that seem to remove it entirely from the class of "wild flowers" and it seems as if it belonged rather with the greenhouse exotics.

Throughout midsummer nearly every boggy spot in the Pine Barrens is decked with the white plumes of this orchid, some of the flower spikes being 15–18 cm. in length.

Between this and the last there is scarcely any difference, except in the matter of color, and when they are dried it is well nigh impossible to tell them apart.

Two hybrids occur in which this species is concerned. *B. bicolor* Rafinesque is *B. blephariglottis* × *B. ciliaris* and has been found at Bamber by Mr. Bayard Long, August 25, 1909.

*B. canbyi* Ames\* (*B. blephariglottis* × *B. cristata*) has been collected a number of times in the Pine Barrens and Cape May peninsula. It varies both in size and color of the flowers. I have it from Cape May Court House and Belleplain.

*Fl.*—Mid-July to mid-August.

*Middle District*.—Camden, Red Bank, Paulsboro, Woodbury, Lindenwold, Tomlin (S), Swedesboro, Dividing Creek (S), Haleyville (P).

*Pine Barrens*.—Long Branch, Asbury Park, Ocean Grove (P), Pt. Pleasant (S), Toms River (S), West Creek (S), Jones Mill (S), Atsion (S), Speed-

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\* *Rhodora* 1908, 70 [Lewes, Del.]



well (S), Ballenger's Mill (S), Bear Swamp (S), Landisville, Winslow (S), Pleasant Mills (S), Folsom, Egg Harbor City (S), Belleplain (S), Woodbine (S).

*Cape May*.—Goshen, Court House (S), Whitesboro (S), Bennett (S).

**Blephariglottis lacera** (Michx.). **Green Fringed Orchis.** Ragged Orchis.

Pl. XLVI.

*Orchis lacera* Michaux, Fl. Bor. Am. II. 156. 1803 [Carolina].

*Habenaria lacera* Willis 61.—Britton 235.

*Blephariglottis lacera* Keller and Brown 109.

Swamps and bogs frequent in the Northern, Middle and Cape May districts; occasional on the Coast.

*Fl.*—Late June to late July.

*Middle District*.—Farmingdale, Pt. Pleasant, Brindletown, Burlington, Pemberton Jnc. (S), Camden (P), Lindenwold (S), Tomlin, Kirkwood, Centerton, Swedesboro.

*Pine Barrens?*.—Landisville.

*Coast Strip*.—Holgate's (L), Beach Haven Terrace (L).

*Cape May*.—Cold Spring, Bennett, Cape May (P).

**Blephariglottis grandiflora** (Bigel.). **Large Purple Fringed Orchis.**

*Orchis grandiflora* Bigelow, Fl. Bost. Ed. II. 321. 1824 [Massachusetts].

*Habenaria fimbriata* Britton 235.

*Blephariglottis fimbriata* Keller and Brown 109.

Rich woods and moist clearings; very rare in the Middle district, more frequent northward.

*Fl.*—Early June to early July.

*Middle District*.—Camden, Mickleton (H), Swedesboro.

**Blephariglottis psycodes** (L.). **Small Purple Fringed Orchis.**

*Orchis psycodes* Linnæus, Sp. Pl. 943. 1753 [Canada].

*Habenaria psycodes* Britton 235.

*Blephariglottis psycodes* Keller and Brown 109.

Open swamps; northern counties frequent, and very rare southward in the Middle district.

*Fl.*—Mid-July to mid-August.

*Middle District*.—Freehold (C), Red Bank, Mullica Hill, July, 1891 (H), Swedesboro, River Swamp near Camden, Aug. 1861 (P).

**Blephariglottis peramœna** (Gray.). **Fringeless Purple Orchis.**

*Habenaria (Platanthera) peramœna* Gray, Am. Jour. Sci. 38: 310. 1840 [New York to Virginia].

*Blephariglottis peramœna* Stone, Bartonica I. 21. 1909.

Open swamps in the upper Middle district in Mercer and Monmouth counties and along the border of the salt marsh in Cape May County; rare and local.

The "Haddonfield" specimen in the Martindale Herbarium\* at the Philadelphia College of Pharmacy was one of several found by John Harned, August, 1879, on Coopers Creek, two miles above Stoy's Landing.

*Fl.*—Mid-July to mid-August.

*Middle District.*—Haddonfield (CP), Sharon (C).

*Cape May.*—Court House.

#### POGONIA Jussieu.

*Pogonia ophioglossoides* (L.). Rose *Pogonia*.

Pl. XLVIII.

*Arethusa ophioglossoides* Linnæus, Sp. Pl. 951. 1753 [Virginia and Canada].  
*Pogonia ophioglossoides* Knieskern 31.—Willis 62.—Britton 233.—Keller and Brown 110.

Open bogs throughout the State, common in the Northern, Pine Barren and Cape May districts, less common and local in the Middle district.

This is a beautiful orchid and one that is generally distributed through the bogs of southern New Jersey, the large pink flowers being very showy. As a rule there is but a single flower on each plant, but in a large bog near Bennett on June 30, 1909, I found them quite frequently two-flowered. Occasionally white flowers occur.

*Fl.*—Early June to early July, rarely later.

*Middle District.*—Shark River, Pemberton, Lindenwold (S), Westville, Camden, Swedesboro, Mickleton.

*Pine Barrens.*—Pt. Pleasant (S), Forked River, Island Heights (NY), Manahawkin, Tuckerton, West Creek, High Bridge (S), Speedwell (S), Albion, Malaga (S), Andrews, Landisville (T), Twelfth St. (T), Hammonton, Prospertown, Brindletown, Bear Swamp, Lakehurst, Quaker Bridge, Jackson, Atsion, Inskip, Sumner, Cedar Brook.

*Coast Strip.*—N. Beach Haven (L), Spray Beach (L), Seaside Park.

*Cape May.*—Cold Spring, Bennett (S), Cape May.

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\* cf. Torr. Bull.:XX. 98. Isaac C. Martindale (1842-1895) an active botanist of Camden, N. J., and an authority on the plants of the southern part of the State.

***Pogonia divaricata* (L.). Spreading Pogonia.**

*Arethusa divaricata* Linnaeus Sp. Pl. 951. 1753 [North America].

*Pogonia divaricata* Gray, Man. Ed. V. 507. 1897.—Willis 62.—Britton 233.—Keller and Brown 110.—Stone, Bartonica II., 26. 1910.

Open swampy or boggy spots, Pine Barren and Cape May districts, very rare and local.

This splendid Orchid was apparently first collected in the State by D. C. Eaton, at Batsto (in 1860?), and again July 7, 1864, at Quaker Bridge, by W. H. Leggett. From that time on there is no evidence of its having been found in New Jersey until June 30, 1909, when the writer discovered a small colony of plants near Bennett, Cape May Co., N. J. These specimens were not growing out in the wet bog where *P. ophioglossoides* abounded, but in a dryer spot near the edge, well concealed among various sedges, grasses, etc. They bloomed again in 1910 and produced seed, although the farmer's scythe passed within a couple of feet of them and they narrowly escaped being transformed into hay.

*Fl.*—June 30 and July 7.

*Pine Barrens.*—Batsto (C), Quaker Bridge (NB).

*Cape May.*—Bennett.

**ISOTRIA Rafinesque.*****Isotria verticillata* (Willd.). Whorled Pogonia.\***

Pl. XLIX.

*Arethusa verticillata* "Muhl.," Willdenow Sp. Pl. IV.:81. 1805 [Pennsylvania].

*Pogonia verticillata* Knieskern 31.—Willis 62.—Britton 233.

*Isotria verticillata* Keller and Brown 110.

Low woodlands; frequent in the northern counties and less common in the Middle district. Very rare in the Pine Barrens.

This curious species flowers before the leaves are fully developed. The flower, though rather inconspicuously colored—green and purplish brown—is striking on account of its peculiar structure, the long terete sepals resembling the appendages on the mouth of a cat-fish.

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\*The *Triphora trianthophora* recorded in Keller and Brown's list on the authority of Miss Cora S. Ware (from road beyond Elmer) cannot be verified, and is pretty certainly based on an error of identification. No specimen was preserved, and Miss Ware cannot remember who reported the plant to her. It was thought to have been collected in June, while *Triphora* does not bloom until August, and is altogether unlikely in the coastal plain.

The whorl of leaves later in the summer would easily be mistaken for a young plant of *Medeola* in which only one whorl had been developed.

*Fl.*—Mid-May to late May.

*Middle District.*—Keyport (C), Florence (C), Camden, Westville, Had-donfield (S), Mickleton (H), Wenonah (KB), Red Bank, Clarksboro (H), Yorktown, Swedesboro (CDL), Woodstown (KB), Salem (C).

*Pine Barrens.*—Hammonton (NB), Ancora (KB).

#### ARETHUSA L.

##### *Arethusa bulbosa* L. *Arethusa*.

*Arethusa bulbosa* Linnæus, Sp. Pl. 950. 1753 [Virginia and Canada].—Barton Fl. Phila. II: 141. 1818.—Knieskern 31.—Willis 62.—Britton 232.—Keller and Brown 110.

Open bogs; occasional in the northern counties and Middle district, locally common in the Pine Barrens and Cape May peninsula.

Of the three large flowered pink bog orchids of the Pines—*Pogonia*, *Limodorum* and *Arethusa*—the last I think easily holds first place. There are no leaves at flowering time, the single narrow blade appearing later on, and the whole plant is suffused with pink and crimson. The bulb seems to rest loosely in the sphagnum and can usually be easily lifted up, too easily for the safety of the species.

Though rare and local in some spots, in others it is exceedingly abundant, and I have seen hundreds of the beautiful blossoms decking the bogs near Bay Head on Decoration Day, which marks the height of its flowering season.

*Fl.*—Mid-May to mid-June.

*Middle District.*—Between Pemberton and New Lisbon (NB), Kaighns Pt., Woodbury (KB), Griffith's Swamp, 10 miles east Mickleton, 2 miles east Sewell (S), Daretown (KB).

*Pine Barrens.*—Belmar (P), Pt. Pleasant, Farmingdale, Toms River, Forked River, Tuckerton, Whitings, Quaker Bridge (Bassett), Pleasant Mills, Hammonton (KB), Egg Harbor City, Tuckahoe, Richland (H).

*Cape May.*—Cold Spring, Cape May (S).

#### LIMODORUM L.

##### *Limodorum tuberosum* L. *Grass-pink*.

Pl. XXXIII., Figs. 4, 5.

*Limodorum tuberosum* Linnæus, Sp. Pl. 950. 1753 [North America].—Keller and Brown 111.

*Calopogon pulchellum* Knieskern 31.—Willis 62.

*Calopogon tuberosum* and var. *albiflorus* Britton 232.

Open bogs throughout the State; most plentiful in the Pine Barrens and northern counties.

The *Limodorum* seems to be less restricted to the bogs than either the *Arethusa* or *Rose Pogonia*, and its beautiful cluster of crimson blossoms will be found in every little damp sandy spot where *Drosera filiformis* and *Utricularia cleistogama* like to grow. As we drive over the long white sandy roads in early July these brilliant banners are almost the only touch of bright color to be seen.

*Fl.*—Early June to late July.

*Middle District.*—Shark River, Pt. Pleasant, New Egypt, Pemberton (NB), Lindenwold, Lawnside (S), Sicklerville (S), Mickleton, Dividing Creek (S).

*Pine Barrens.*—Toms River (S), Forked River, Lakhurst, West Creek, Tuckerton, Spedwell, White Horse, Atsion, Atco, Cedar Brook, Jackson, Bear Swamp (S), Albion, Williamtown Inc., Winslow (S), Hospitality Bridge, 8th St., Richland, Landisville, Quaker Bridge, Hammonton, Egg Harbor City, Mays Landing, Woodbine, Belleplaine (S).

*Capo May.*—Dennisville (OHB), Cold Spring.

*Coast Strip.*—Surf City (L), Spray Beach (L), N. Beach Haven (L).

#### GYROSTACHYS Persoon.\*

*Gyrostachys plantaginea* (Raf.). **Wide-leaved Ladies' Tresses.**

*Neottia plantaginea* Rafinesque, Am. Mo. Mag. II. 206. 1818 [Fishkill, N. Y.].  
*Speiranthes latifolia* Britton 231.

Reported from three localities in Sussex and Warren Counties in Britton's Catalogue. Known in our region only from Palermo in the coast strip, where it was collected by Messrs. S. S. Van Pelt and C. S. Williamson; and from the Delaware shore above Burlington, where Mr. Isaac Burk found it June 22, 1873.

*Fl.*—Late May to late June.

*Coast Strip.*—Palermo, Above Burlington (P).

*Gyrostachys cernua* (L.). **Nodding Ladies' Tresses.**

Pl. LII.

*Ophrys cernua* Linnæus, Sp. Pl. 946. 1753 [Virginia and Canada].  
*Speiranthes ceruna* Knieskern 31.—Willis 61.—Britton 231.

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\* Mr. House advocates the substitution of *Ibidium* for this genus, on the ground that *Gyrostachys* was not properly published. The citation of several species is really far better than a diagnosis, and the making of actual combinations with the new generic name a trivial matter, which does not affect its status. By usage customary among zoologists the validity of *Gyrostachys* could not be questioned. (cf. House, Bull. Torr. Bot. Club 32, 380—1905.)

Damp ground; frequent throughout the State, least abundant in the Pine Barrens.

*Fl.*—Early September to mid-October.

*Middle District.*—New Egypt, Camden, Medford (S), Orchard (S), Had-donfield, Lindenwold (S), Clementon, Swedesboro, Woodbury (P).

*Pine Barrens.*—Forked River, Waretown, Whittings, Atco, Pleasant Mills, Hammonton (Bassett), Egg Harbor City, Sea Isle Juc. (S).

*Cape May.*—Cold Spring.

*Coast Strip.*—Sandy Hook (NB), Seaside Park (S), Coxes, Barnegat City (L), Harvey Cedars (L), Ship Bottom (L), Spray Beach (L), Palermo (S), Ocean View (S).

***Gyrostachys præcox* (Walt.). Grass-leaved Ladies' Tresses.**

*Limodorum præcox* Walter, Fl. Cor. 221. 1788 [South Carolina, probably Santee River].

*Speiranthès graminea* var. *præcox* Britton 231.

*Gyrostachys præcox* Keller and Brown 111.

Swamps and damp ground; frequent in the Pine Barren, Cape May and Coast districts, less so in the Middle district.

Besides *G. vernalis* we have a larger species of Ladies' Tresses growing in wet bogs instead of damp sand and blooming later. Structurally it differs in having the stem nearly glabrous above. Mr. Oakes Ames in his monograph\* has identified specimens from several of our localities as *G. præcox*, and we have so regarded it. Dr. John K. Small, however, regards typical specimens from Bennett as *G. vernalis*. As I do not feel able to unite the two forms, I let them stand subject to further study.

*Fl.*—Early August to late September.

*Middle District.*—Seven miles west of Mickleton.

*Pine Barrens.*—Atsion, Speedwell, Hospitality Br., Crowleytown, Quaker Bridge (P).

*Cape May.*—Bennett.

***Gyrostachys vernalis* (Engelm. and Gray.).**

*Speiranthès vernalis* Engelmann and Gray, Bost. Jour. Nat. Hist. V. 236. 1845 [Galveston, Texas].

Rather frequent along the coast strip and rarely in the Pine Barrens.

*Fl.*—Late June—early August.

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\* Orchidaceae Fasc. I., pp. 113-156.

*Pine Barrens*.—Winslow Inc., Woodbine.

*Coast Strip*.—Toms River, Avon, Absecon, Atlantic City, Ocean City, Longport, Wildwood, Anglesea, Cold Spring, Spray Beach (L), Beach Haven Terrace (L), Barnegat City (L).

*Gyrostachys beckii* (Lindley). **Beck's Ladies' Tresses.**

*Spiranthes Beckii* Lindley, Gen. and Sp. Orchids. 472. 1840 [Massachusetts, New Jersey and Delaware].—Willis 61.—Britton 232.

*Gyrostachys simplex* Keller and Brown 111.

Frequent in sandy ground throughout our limits and north to Bergen Co.

*Fl.*—Mid-July to mid-September.

*Middle District*.—Shark River (NB), Keyport (C), Wrightstown (C), Brindletown, Camden (P), Cooper's Creek, Lindenwold, Clarksboro, Franklintonville (C), Swedesboro, Bridgeton, Dividing Creek.

*Pine Barrens*.—Manahawkin, Speedwell (S), Atsion (S), Clementon (S), Taunton (S), Hammonton (Basset), Egg Harbor City, Absecon (S), Palermo (S).

*Cape May*.—Court House (S), Cold Spring (OHB), Bennett, Cape May (KB).

*Gyrostachys gracilis* (Bigel.). **Slender Ladies' Tresses.**

Plate LI.

*Neotia gracilis* Bigelow Fl. Bost. Ed. II. 322. 1824 [Dry, hilly woods, Boston].

*Spiranthes gracilis* Knieskern 31.—Willis 61.—Britton 232.

Frequent in the northern counties according to Britton, common along the coastal strip, and occasional in the lower Middle and Cape May districts. Always near the coast or bay shore.

*Fl.*—Early July to mid-September.

*Middle District*.—Long Branch, Camden (P), Gloucester (P), Englishtown (NY), Bridgeton, Beaver Dam, Dividing Creek.

*Coast Strip*.—Manahawkin, Barnegat City (L), West Creek, Palermo, Mays Landing (S), Cape May Court House.

**LISTERA R. Brown.**

*Listera australis* Lindl. **Southern Twayblade.**

*Listera australis* Lindley, Gen. and Sp. Orch. 456. 1840 [Carolina].—Willis 61.—Britton 231.—Keller and Brown 112.

*Epipactis convallarioides* Parsh Fl. Amer. Sept. II. 591. 1814.

*Listera cordata* Nuttall Gen. II. 191. 1818.—Barton Fl. Phila. II. 140. 1818.

Very rare and local in the Middle and Pine Barren districts; only known from three stations.

In 1818 Barton states that the plant is "very rare in the dark swampy wood bordering a road leading from Kaighn's Point to the Woodbury road," and specimens in the Philadelphia Academy Herbarium are labelled "Camden to Kaighn's Pt." and "Below Gloucester Pt." Just how many stations were known to the older botanists I cannot say, but they all seem to have been in the immediate vicinity of Camden, and all seem to have been covered by the encroachment of the city and adjoining towns. It was, therefore, a matter of no small interest when Mr. Geo. W. Bassett, on June 1, 1908, found a specimen of *Listera* in a cedar swamp on Alberson's branch, five miles north of Hammonton, an entirely new locality. Possibly further search in cedar swamps will result in its discovery elsewhere.

*Fl.*—Probably very early. Specimen May 24 has capsules dehisced and broken up.

*Middle District.*—Camden to Kaighns Pt. below Gloucester Pt.

*Pine Barrens.*—Five mi. N. Hammonton.

#### PERAMIUM Salisbury.

*Peramium pubescens* (Willd.). Rattlesnake Plantain.

Pl. L.

*Neottia pubescens* Willdenow, Sp. Pl. IV. 76. 1805 [Canada-Florida.]

*Goodyera pubescens* Britton 232.

*Peramium pubescens* Keller and Brown 112.

Rich woods of the northern counties, frequent, and less common southward in the upper Middle district and in southern Cape May County.

*Fl.*—Late July to early August.

*Middle District.*—Asbury Park, Allentown, New Egypt, Brindletown, Birmingham, Kirkwood (C), Medford (S), Camden (P), Gloucester (P), Mickleton (H).

*Pine Barrens.*—Arcola, Near Hammonton (Bassett).

*Cape May.*—Bennett (S), Cold Spring (OHB).

#### ACROANTHES Rafinesque.

*Acroanthes unifolia* (Michx.). Green Adder's-Mouth.

*Malaxis unifolia* Michaux, Fl. Bor. Am. II. 157. 1803 [Carolina-Florida].

*Malaxis ophioglossoides* Nuttall Gen. II. 196. 1818.—Barton Fl. Phila. II. 143. 1818.

*Microstylis unifolia* Britton 229.

*Acroanthes unifolia* Keller and Brown 112.



Woods; Northern and upper Middle districts rare and local, also once in the Pine Barrens.

Barton records it from three miles north of Woodbury, and Mr. Lippincott has collected it at a station near Swedesboro, in July, 1890, 1891 and 1894.

*Fl.*—Early July to early August.

*Middle District.*—Red Bank Mon. Co. (C), Keyport (C), Swedesboro (CDL), Hammonton (A. N. S. coll. by G. W. Bassett July 13, 1879).

#### LEPTORCHIS Thouars.

*Leptorchis liliifolia* (L.). Large Twayblade.

PL. XLIII.

*Ophrys liliifolia* Linnæus, Sp. Pl. 946. 1753 [Virginia].

*Liparis liliifolia* Knieskern 31.—Willis 62.—Britten 229.

*Leptorchis liliifolia* Keller and Brown 112.

Frequent in woods of the northern counties and rare southward in the Middle district.

*Fl.*—Late May to late June.

*Middle District.*—Keyport (C), New Egypt, Bordentown (C), Camden, Gloucester (P), Auburn, Medford (S), Mickleton (H), Oliphant's Mill (KB), Riddleton (KB).

*Pine Barrens?*—Manchester (C).

*Cape May.*—Cold Spring (OHB).

*Leptorchis loeselii* (L.). Loesel's Twayblade.

*Ophrys Loeselii* Linnæus, Sp. Pl. 947. 1753 [Suecia and Borussia].

*Liparis Loeselii* Britton 230.

*Leptorchis Loeselii* Keller and Brown 112.—Crawford, Barton I. 18. 1909.—Stone do. 20.

Locally in the Northern and upper Middle districts; also rare on the coast to southern Cape May County and once in the Pine Barrens.

*Fl.*—Late May to late June.

*Middle District.*—Browns Mills (NB), Medford (S), Kirkwood (KB), Mickleton (H).

*Pine Barrens.*—Hanover (C), Atsion.

*Coast Strip.*—Surf City (L), Beach Haven Terrace (L), Longport, Anglesea (OHB).

*Cape May.*—Cold Spring (S).

## TIPULARIA Nuttall.

*Tipularia discolor* (Pursh.). Crane-fly Orchis.

*Orchis discolor* Pursh, Fl. Amer. Sept. II. 586. 1814 [Pine Barrens, N. J. to S. C.].

*Tipularia discolor* Willis 62.

*Tipularia unifolia* Britton 231.—Keller and Brown 113.—Van Pelt, Bartonian I. 25. 1909.

Rare and local in woods of the Northern and Middle districts and in the lower Cape May peninsula.

This curious orchid was found in lower Cape May County a number of years ago by Mr. Joseph Crawford, but was not discovered again until detected by Mr. O. H. Brown, who has in the last few years found it at a number of scattered stations in dark oak and pine woods of the lower third of the peninsula. The single leaf arises in autumn and persists throughout the winter, but perishes before the flowers appear. The absence of any foliage and the spidery character and obscure coloring of the flowers makes it an exceedingly difficult plant to detect.

Pursh's type locality was Pine Barrens of New Jersey, but he probably used the term loosely.

*Fl.*—Early July to early August.

*Middle District.*—Freehold (C), Birmingham, Swedesboro.

*Cape May.*—Road to Fishing Creek (OHB), Cape May, N. of New England Creek.

## APLECTRUM Nuttall.

*Aplectrum hyemale* Muhl. Adam-and-Eve, Putty-root.

*Aplectrum hyemale* "Muhlenberg," Willdenow Sp. Pl. 4. 107. 1805 [Pennsylvania].

*Aplectrum spicatum* Britton 230.—Keller and Brown 113.

Rather rare and local in the Northern district and collected at Swedesboro, Salem County, June 26, 1892, by Mr. Charles D. Lippincott, the only record for the region covered by this list. A close ally of the preceding and almost as difficult to discover. The leaf develops in late summer, persists over winter, but perishes shortly after the flowering season.

*Fl.*—Late May to early June.

*Middle District.*—Swedesboro.

## CORALLORHIZA R. Brown.

*Corallorhiza wisteriana* Conrad. **Wister's Coral-root.**

*Corallorhiza Wisteriana* Conrad, Jour. Acad. Nat. Sci. Phila. VI. 145. 1829 [Schuylkill below Falls and Wissahickon Creek, Phila.].

Rare in woodlands of the Middle district. Known from only one station. Named in honor of its discoverer, Mr. Charles J. Wister (1782-1865), an early Philadelphia botanist.\*

*Fl.*—Late April to early June.

*Middle District.*—Swedesboro.

*Corallorhiza odontorhiza* (Willd.). **Small Coral-root.**

## Pl. LIII.

*Cymbidium Odontorhiza* Willdenow. Sp. Pl. IV. 110. 1805 [Canada Virginia].

*Corallorhiza Odontorhiza* Nutt. Gen. II. 197. 1818.—Barton, Fl. Phila. II. 144. 1818.—Britton 230.—Keller and Brown 112.

Frequent in woods of the northern counties and rare and local southward in the Middle District, also in southern Cape May County.

*Fl.*—Mid-August well into September, or even later.

*Middle District.*—New Egypt, Medford (S), Camden (P), Gloucester (P), Mickleton (H), Swedesboro (CDL), Mullica Hill (NB), Woodbury Road, Sewell (C).

*Cape May.*—Cold Spring.

*Corallorhiza maculata* Raf. **Large Coral-root.**

*Corallorhiza maculata* Rafinesque, Amer. Mo. Mag. II. 119. 1817 [Flatbush, L. I.].—Britton 230.—Keller and Brown 114.

Rather frequent in woods of the northern counties. Rare southward in the Middle district.

*Fl.*—Late July into September.

*Middle District.*—New Egypt, Camden (NB).

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\* Cf. Gardner's Monthly, VII., 271.

## Sub-Class II. DICOTYLEDONES.

*Key to the Groups.*

- a. Insectivorous plants, usually somewhat suffused with crimson.  
 b. Leaves cup-like, lined on the inside with reflexed bristles.  
*Sarraceniaceæ*, p. 467  
 bb. Leaves slender; covered with glandular, sticky hairs.  
*Droseraceæ*, p. 467  
 aa. Parasitic plants.  
 b. Growing on the branches of trees, yellowish-green with inconspicuous flowers and globular, somewhat translucent, white berries.  
*Loranthaceæ*, p. 416  
 bb. Growing from the roots of trees, shrubs or herbs, devoid of green coloring.  
 c. Corolla of 4-5 separate petals, plant white or yellowish, somewhat tinged with pink, resembling a fungus.  
*Monotropaceæ*, p. 611  
 cc. Corolla tubular, more or less two-lipped, plant brown or yellowish.  
*Orobanchaceæ*, p. 694  
 bbb. Growing on bushes or herbs, a trailing vine with naked orange stem.  
*Cuscutaceæ*, p. 654  
 aaa. Plants neither insectivorous nor obviously parasitic.  
 b. Plants aquatic or semi-aquatic; floating, submerged or creeping on mud.  
p. 380  
 bb. Plants with woody stems, *i. e.*, trees, shrubs and woody climbing vines.  
p. 381  
 bbb. Plants with herbaceous stems, *i. e.*, herbs and vines with herbaceous stems.  
p. 385

## AQUATIC OR SEMI-AQUATIC DICOTYLEDENOUS PLANTS.

- a. Some or all of the leaves entire, undivided, floating on the surface of the water.  
 b. Leaf-blades at least 25 mm. in length, often much more.  
 c. Flowers on separate pedicels, large or medium sized, white, yellow or purplish.  
*Nymphaeaceæ*, p. 443  
 cc. Flowers small, in a cluster at the base of the floating leaf; white or yellow.  
*Limnanthemum*, p. 644  
 ccc. Flowers small, in a short, erect spike, pink. *Polygonum*, p. 419  
 bb. Leaves small, much less than 25 mm. long, flowers minute, greenish.  
*Callitriche*, p. 529  
 aa. None of the leaves floating on the surface, most of the plant submerged, leaves finely divided, usually into linear or filiform segments.  
 b. Leaf-segments bearing little bladders; flowers conspicuous yellow or purple, irregular and spurred, raised above the surface, several on a slender scape.  
*Utricularia*, p. 688  
 bb. No bladders present.

- c. Leaves whorled around the stem, flowers minute, greenish.
  - d. Leaves about 1 mm. broad at the base, branching and only the terminal divisions filiform, flowers sessile, axillary. *Ceratophyllum*, p. 446
  - dd. Leaves filiform throughout, except on a stalk which rises above the surface, bearing minute greenish flowers and small lacinate-toothed leaves. *Myriophyllum*, p. 587
- cc. Leaves not in whorls.
  - d. Flowers single with showy white or yellow petals, 5-8 mm. long. *Ranunculaceae*, p. 448
  - dd. Flowers small, greenish, whorled on an erect hollow stalk. *Hottonia*, p. 630
- aaa. Plant growing in water or creeping on the mud, flowers small and inconspicuous.
  - b. Leaves uniform or rounded, 4-20 mm. broad, flowers axillary toward the end of the stem, brownish with red anthers. *Chrysosplenium*, p. 472
  - bb. Leaves opposite spatulate entire, 12-25 mm. long, flowers axillary. *Isnardia*, p. 580
  - bbb. Leaves alternate lanceolate, 20-50 mm. long, sharply serrate or incised pinnatifid. *Proserpinaca*, p. 586
  - bbbb. Leaves minute, oblong linear, flowers very minute.
    - c. Leaves opposite.
      - d. Stem slender, leaves lanceolate, no perianth. *Callitriche*, p. 529
      - dd. Stem stout, leaves nearly orbicular, petals and sepals present. *Elatine*, p. 558
      - ddd. Plant fleshy, leaves oblong, 8-15 mm. long. *Glaur*, p. 633
    - cc. Leaves alternate, divided into several short, remote, linear lobes. *Myriophyllum*, p. 587
  - bbbbb. Leaves (or sterile stems) terete or widening slightly into a blade, 2-8 mm. high, erect from the trailing stem.
    - c. Flowers in peduncled umbels. *Lilacopsis*, p. 598
    - cc. Flowers single on slender pedicels. *Limosella*, p. 681
    - ccc. Flowers sessile in a slender spike higher than the terete sterile stems. *Myriophyllum*, p. 587

TREES, WOODY SHRUBS OR WOODY VINES.

- a. Prostrate or low shrubby plants, less than 3 dm. in height.
  - b. Stem trailing.
    - c. Leaves oval or nearly orbicular, thick evergreen, flowers delicate pink, salver-shaped. *Epigaea*, p. 619
    - cc. Leaves 4-8 mm. long, narrowly oblanceolate, awl-pointed flowers, star-like, white. *Pyridanthera*, p. 629
    - ccc. Leaves 6-17 mm. long, linear oblong, whitish below, corolla 4-parted, petals reflexed, white or pinkish. *Oryzococcus*, p. 677
    - cccc. Leaves 12-25 mm. long spatulate, flowers urn-shaped, pinkish or white. *Arctostaphylos*, p. 621

- ccc. Leaves 3-5 foliate, stem prickly, flowers white. *Rubus*, p. 476
- bb. Stem erect.
- c. Leaves linear, 4-6 mm. long, no perianth, stamens purple. *Corema*, p. 530
- cc. Leaves oval or obovate, 20-30 mm. broad, corolla white, urn-shaped. *Gaultheria*, p. 620
- ccc. Leaves 3-foliate, stem not prickly, flowers small, greenish. *Rhus*, p. 536
- aa. Woody climbing vines.
- b. Flowers large, tubular, orange, leaves pinnate. *Tecoma*, p. 695
- bb. Flowers white, leaves 3-foliate, fruit long-plumose. *Clematis*, p. 454
- bbb. Flowers small, greenish.
- c. Leaves 3-foliate. *Rhus*, p. 536
- cc. Leaves 5-foliate. *Psedera*, p. 548
- ccc. Leaves lobed.
- d. Fruit "hops." [*Humulus*]\*
- dd. Fruit "grapes." *Vitis*, p. 546
- cccc. Leaves oval. Fruit round orange pods, splitting and displaying red seeds. *Celastrus*, p. 543
- aaa. Upright trees or shrubs.
- b. Leaves pinnate or digitate.
- c. Stem prickly.
- d. Leaves 3-5 foliate, fruit a many-seeded berry, flowers white, showy shrubs. *Rubus*, p. 476
- dd. Leaves 5-9 foliate, fruit a pod containing black seeds, flowers inconspicuous. *Zanthoxylum*, p. 518
- ddd. Leaves 7-15 foliate, fruit a flat pod, flowers white papilionaceous in a pendant raceme. *Robinia*, p. 495
- dddd. Leaves about 24 foliate, leaflets small, less than 1 in. (25 mm.) long, fruit a flat pod 8-15 ins. (2-4 dm.) long. [*Gleditsia triacanthos*]†
- cc. Stem not prickly.
- d. Leaves digitate, 5-foliate. [*Æsculus hippocastanum*]‡
- dd. Leaves 3-foliate.
- c. Entire, fruit a flat winged seed. *Ptelea*, p. 519
- cc. Freely and regularly serrate, fruit in a bladder-like bag; a shrub. *Staphylea*, p. 543
- ccc. Coarsely toothed on terminal half, fruit a samara. *Acer*, p. 543
- cccc. Several deep irregular lobes, fruit globular white berries, shrubs or small trees. *Rhus*, p. 536
- ddd. Leaves 5-11 foliate.
- e. Trees with small greenish flowers in catkins or clusters.
- f. Leaves sharply and regularly serrate, fruit a hard nut enclosed in a thick hull. *Hicoria*, p. 397
- ff. Leaves obscurely or bluntly serrate, fruit a samara. *Fraxinus*, p. 635

\* Hope Vine, escaped from cultivation.

† Honey Locust Tree, escaped.

‡ Horse Chestnut, escaped.

- cc. Shrubs with small white flowers in dense cymes, developing black, juicy berries. *Sambucus*, p. 708
- dddd. Leaves 11-17 foliate.
- e. Leaves entire, fruit a samara. [*Ailanthus glandulosus*]\*
- ce. Leaves serrate.
- f. Fruit a dense cluster of pubescent seeds (usually crimson red). *Rhus*, p. 536
- ff. Fruit a hard nut inclosed in a hull. *Juglans*, p. 307
- bb. Leaves lobed or coarsely toothed.
- c. Lobing irregular, some leaves lobed and some not, often a sinus on one side and not on the other.
- d. Leaves very rough, fruit a compound berry.
- [*Broussonetia papyrifera*]†
- dd. Leaves glabrous, fruit a cluster of stalked berries. *Sassafras*, p. 459
- cc. Lobing on both sides of each leaf and more or less symmetrical.
- d. Truncate at the end (mid vein terminating at the bottom of a sinus not at the extremity of a lobe). *Liriodendron*, p. 448
- dd. Leaf more or less star-shaped, with 3-5 acute lobes, lower pair often much smaller than the others.
- e. Margin finely and regularly serrate. *Liquidambar*, p. 474
- cc. Margin irregularly serrate.
- f. Flowers reddish crimson, appearing before the leaves.
- Acer*, p. 543
- ff. Flowers appearing after the leaves are expanded, small, white, in dense cymes. *Viburnum*, p. 708
- ddd. Leaf with three short obtuse lobes, irregularly crenate.
- e. Flowers white, in umbels. *Opulaster*, p. 477
- ee. Flowers greenish solitary. *Ribes*, p. 473
- dddd. Leaf lanceolate, pinnatifid; low, sweet-scented shrub, staminate flowers in catkins. *Comptonia*, p. 396
- dddd. Leaves with several obtuse or acute lobes on each side, fruit an acorn, staminate flowers in catkins. *Quercus*, p. 404
- dddd. Leaves triangular, narrowed at the base, coarsely toothed at the end, seeds with long white down. Coastal.
- Baccharis*, p. 764
- bbb. Leaves not lobed.
- c. Entire.
- d. Reniform orbicular.
- e. Flowers large, bell-shaped, white, spotted within, fruit a cylindrical pod. [*Catalpa bignonioides*]‡
- cc. Flowers pink, papilionaceous, pod flat. *Cercis canadensis*, p. 493
- dd. Ovate.
- e. Opposite.
- f. Flowers white in terminal cymes, petals short.
- g. Petals 4. *Cornus*, p. 601

\* *Ailanthus* Tree introduced from Asia and frequently escaping.

† Paper Mulberry escaped in some places.

‡ *Catalpa* Tree, escaped from cultivation.

- gg. Petals 5. *Viburnum*, p. 708
- ff. Flowers white, in loose drooping panicles, petals long and slender. *Chionanthus*, p. 636
- cc. Whorled on small branchlets or scattered and alternate.
- f. Fully developed leaves at least 50 x 25 mm.
- g. Flowers small, fruit a berry.
- h. Small branches swollen at each joint, berry black, nearly sessile. *Dirca*, p. 574
- hh. Joints not swollen.
- i. Fruit blue, pedicelled. *Nyssa*, p. 603
- ii. Fruit red sessile, flowers early, before the leaves. *Benzoin*, p. 460
- iii. Flowers in cymes, white, fruit blue. *Cornus*, p. 601
- gg. Flowers large, showy.
- h. White, fruit cone-like, with red seeds hanging from it by threads. *Magnolia*, p. 446
- hh. Maroon, fruit fleshy, cylindrical, banana-like. *Asimina*, p. 448
- hhh. Pink or white, fruit a dry dehiscent capsule. *Ericaceæ*, p. 612
- ff. Fully developed leaves less than 50 x 25.
- g. Flowers white, bell-like or pink, cup-shaped. *Ericaceæ*, p. 612
- gg. Acorn bearing tree, flowers in catkins. *Quercus*, p. 404
- ecc. Whorled at intervals down the stem.
- f. Flowers white, in globular masses. *Cephalanthus*, p. 702
- ff. Flowers purple, in axillary whorls. *Decodon*, p. 575
- cccc. Leaves scattered along the stem, not opposite. *Salix*, p. 392
- cc. Leaves undulate or sinuate crenate.
- d. Flowers with linear twisted petals, blooming in autumn when the leaves are falling. *Hamamelis*, p. 473
- dd. Flowers small without petals, staminate in catkins, fruit an acorn. *Quercus*, p. 404
- ccc. Leaves or some of them slightly crenate at the tip; fruit clusters of sessile wax-covered berries. *Myrica*, p. 395
- cccc. Leaves regularly, finely or remotely serrate or dentate.
- d. Leaves oblique at base, and assymmetric, ovate or cordate.
- c. Flowers attached to a membranaceous bract, petals cream colored, fruit a hard green, globular berry. *Tilia*, p. 548
- cc. Flowers inconspicuous greenish, not attached to a bract.
- f. Fruit a many-seeded fleshy berry. *Morus*, p. 414
- ff. Fruit a globular rather dry berry. *Celtis*, p. 413
- fff. Fruit a small winged seed. *Ulmus*, p. 412
- dd. Leaves symmetrical at base, or nearly so, not oblique, shape varied, lanceolate to obovate, oval or deltoid.
- c. No petals.
- f. All the flowers in short, downy catkins, erect or pendant, seeds copiously silky with long white hairs. *Salicaceæ*, p. 390



*ff.* Staminate flowers in pendant, pistillate in erect catkins,  
leaves finely and closely serrate. *Betulacea*, p. 399

*fff.* Staminate flowers only, in catkins, fruit inclosed in a bur.  
*Fagacea*, p. 402

*cc.* Petals present.

*f.* Separate from one another.

*g.* Stamens 4-5.

*h.* Flowers small, greenish, scattered along the  
stem or in small racemes.

*i.* Berries naked, red or black. *Ilicacea*, p. 539

*ii.* Berries red, enclosed in a red or orange  
splitting pod. *Celastracea*, p. 542

*hh.* Flowers white.

*i.* In slender elongated terminal racemes.

*Itea*, p. 472

*ii.* In umbel-like clusters forming a terminal  
corymb. *Ceanothus*, p. 546

*gg.* Stamens 8-10, flowers white.

*h.* In flat terminal cymes. *Hydrangea*, p. 472

*hh.* In long terminal spike-like racemes, fragrant.

*Clethra*, p. 608

*ggg.* Stamens, numerous, petals five, white or pink.

*h.* Fruit a follicle or achene, sometimes forming  
a compound berry. *Rosacea*, p. 475

*hh.* Fruit apple-like with a central "core" contain-  
ing seeds. *Pomacea*, p. 486

*hhh.* Fruit plum or cherry-like containing a hard  
seed. *Drupacea*, p. 490

*ff.* Petals united.

*g.* Leaves opposite, flowers small, white, in flat cymes or  
yellow and tubular. *Cabrifoliacea*, p. 707

*gg.* Leaves alternate, flowers pink or white, bell-shaped,  
or tubular with flaring tips, or round cup-shaped.

*Eriacea*, p. 612

#### HERBS OR HERBACEOUS VINES.

*a.* No leaves.

*b.* Plants consisting of branched, jointed, cylindrical, fleshy stems,  
flowers inconspicuous, inhabitants of salt marshes. *Salicornia*, p. 430

*bb.* Plants consisting of irregular, oval, flattened joints, armed with  
spines; and large, showy yellow-petalled flowers. *Opuntia*, p. 573

*aa.* Leaves present.

*b.* Neither petals nor sepals present.

*c.* Flowers several, minute, contained in an involucre, the sinuses of  
which bear glands often with petal-like appendages. Staminate  
consist of a single stamen and are placed around the inside of the  
involucre. Pistillate flower central and exerted in fruit. Plants  
with milky juice. *Euphorbia*, p. 527

*cc.* Flowers not enclosed in an involucre.

- d. Flowers white in a long, feathery cylindrical raceme.  
 c. Leaves ovate, acuminate. *Saururus*, p. 390  
 ce. Leaves pinnately compound. *Ranunculaceæ*, p. 448  
 dd. Flowers similar in an open white or greenish panicle.  
*Thalictrum*, p. 458  
 ddd. Flowers minute, greenish, in a dense terminal spike or axillary clusters.  
*Acnida*, p. 434  
 bb. Sepals present; (petals, if present, very minute, and flowers small, greenish and inconspicuous).  
 c. Flowers conspicuous, sepals petal-like, white, yellow or blue.  
*Ranunculaceæ*, p. 448  
 cc. Flowers in long, slender, terminal spike, white.  
*Sanguisorba*, p. 484  
 ccc. Flowers one or several, purplish at the base of the stem, often buried among dead leaves, etc. *Aristolochiaceæ*, p. 418  
 cccc. Flowers pink, white or greenish, or tinged with crimson, seeds usually three-angled or three-winged, in terminal racemes or axillary spikes or racemes. Joints of the stem covered by scarious, sheath-like stipules. *Polygonaceæ*, p. 419  
 ccccc. Flowers greenish white or yellowish green, 3mm. broad or more.  
 d. In a flat terminal cyme, plant 3-6 dm. high.  
 c. Leaves serrate. *Penthorum*, p. 470  
 cc. Leaves entire. *Comandra*, p. 418  
 dd. In long, cylindrical, pendant racemes, in fruit, round black berries with crimson juice; plant 6-9 ft. high.  
*Phytolacca*, p. 343  
 ccccc. Flowers greenish or tinged with red in a few species, inconspicuous and often minute, never 3 mm. broad; in open panicles, or dense heads, spikes or clusters; terminal or axillary, or both.  
 d. Plants erect.  
 c. Leaves entire.  
 f. Plants less than 3 dm. high.  
 g. Leaves delicate sessile or nearly so, less than 25 mm. long. *Caryophyllaceæ*, p. 435  
 gg. Leaves coarse and fleshy spatulate, whole plant turning red. *Amaranthus pumilus*, p. 433  
 ff. Plants more than 3 dm. high.  
 g. Delicate, leaves petioled, the largest 25 mm. long or more.  
 h. Flowers in axillary clusters.  
*Parietaria*, p. 416  
 hh. Flowers in open, slender, axillary or terminal panicles. *Chenopodium boscianum*, p. 429  
 gg. Fleshy, leaves linear, less than 25 mm. long.  
*Chenopodiaceæ (Dondia, Bassia)*, p. 432  
 ggg. Wiry, leaves less than 25 mm. long, linear or ovate sessile, flowers minute globular or pyriform in an open panicle. Plant later produces short prostrate root branches. *Lechea*, p. 562

gggg. Coarse and often tall, leaves spatulate or lanceolate, flowers in dense spikes or small clusters, with dry, scarious, often redish bracts.

*Amaranthaceæ*, p. 433

ee. Leaves crenate or dentate.

f. Slightly crenate, flowers in toothed axillary bracts.

*Acalypha*, p. 526

ff. Irregularly dentate; lanceolate or hastate.

*Chenopodiaceæ*, p. 432

fff. Sharply and evenly dentate, flowers in axillary or terminal flat panicles or cylindrical spikes.

*Urticaceæ*, p. 414

dd. Plants prostrate.

e. Leaves verticillate.

*Mollugo*, p. 434

ee. Leaves opposite, fleshy seashore plants.

f. Leaves broad at base, 8-15 × 4-7 mm., strictly opposite.

*Ammodenia*, p. 441

ff. Leaves spatulate, 5-15 × 3-5 mm., somewhat whorled.

*Sesuvium*, p. 435

eee. Leaves lanceolate or linear.

f. Seeds three-angled, joints with scarious sheaths.

*Polygonum*, p. 419

ff. Seeds not three-angled, joints without sheaths.

[*Scleranthus*]\* or *Sagina*, p. 439

bbb. Calyx apparently absent.

c. Flowers at base of stem, single or several, maroon or brown.

*Aristolochiaceæ*, p. 418

cc. Flowers at summit of pedicels or stems, white, blue or yellow.

*Ranunculacæ*, p. 448

bbbb. Sepals and petals present, the latter conspicuous.

c. Petals united at their bases, often forming a tube or cup. p. 604

cc. Petals separate from one another.

d. Stamens numerous, more than ten and more than twice the number of sepals or calyx lobes.

c. Plants consisting of oval, flattened, fleshy joints, with prickles or bunches of minute spines, flowers large, yellow.

*Opuntia*, p. 573

cc. Plants with cup-like leaves.

*Sarracenia*, p. 467

eee. Plants of normal structure, with leaves linear or flat.

f. Leaves peltate.

*Podophyllum*, p. 459

ff. Leaves not peltate.

g. Stamens united in an erect spike or column.

*Malvaceæ*, p. 549

gg. Stamens not forming an erect column.

h. Leaves opposite.

*Hypericaceæ*, p. 553

hh. Leaves not opposite.

i. Sepals 2.

\* Knapel, a weed in waste ground.

- j. Plant prostrate, fleshy, flowers yellow.  
[*Portulaca oleracea*]†
- jj. Plant erect, juice milky or orange, petals 4  
or 8-12. *Papaveraceæ*, p. 460
- ii. Sepals 4, leaves 3-foliolate fruit a pod.  
*Polanisia*, p. 466
- iii. Sepals 5 (or occasionally 3).  
j. Flowers pendant, red and yellow with petals  
produced into long spurs. *Aquilegia*, p. 452
- jj. Flowers normal, no long spurs.  
k. Flowers yellow.  
l. Fruit a dehiscent capsule.  
*Helianthemum*, p. 559
- ll. Fruit a naked cluster of flattened  
achenes, each with a short style on  
its tip. *Ranunculus*, p. 450
- lll. Fruit a cluster of seeds, often bristly,  
with persistent styles, calyx persistent  
at top or base. *Rosaceæ*, p. 475
- kk. Flowers white or pink.  
Fruit a fleshy berry, formed of a num-  
ber of separate segments or else a cluster  
of dry seeds. *Rosaceæ*, p. 475
- dd. Stamens 10 or less, never twice as many as the petals.  
e. Plants covered with reddish glutinous hairs. *Drosera*, p. 468
- ee. Plants not covered with glutinous hairs.  
f. Flowers very irregular.  
g. Sepals petal-like, enlarged into a swollen spurred sac.  
*Impatiens*, p. 545
- gg. Petals 5, two upper ones larger and somewhat reflexed,  
lower one spurred or gibbose at base. *Viola*, p. 564
- ggg. Petals 5, single upper petal largest and reflexed, two  
lower ones united in a keel, enclosing the stamens and  
pistil. *Papilionaceæ*, p. 494
- gggg. Petals 3, lower one keeled, others lateral, flaring.  
*Polygala*, p. 520
- ggggg. Petals 4, forming a sort of sac, enlarged at base and  
narrowed to a slightly flaring tip, pendant.  
*Fumariaceæ*, p. 461
- gggggg. Corolla 5-parted, a crown of 5 hooded bodies, filaments  
united into a tube which encloses the pistil, juice milky.  
*Aesclepiadaceæ*, p. 646
- ff. Flowers regular, *i. e.*, petals all alike, or essentially so.  
g. Flowers small in umbels, heads or panicles.  
*Araliaceæ*, p. 589
- hh. Fruits dry, usually flattened, splitting into two.  
*Umbelliferae*, p. 590

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† Purslane, a common garden weed.

- gg. Flowers not in umbels.
- h. Petals four.
- i. Leaves 3-foliate. *Polanisia*, p. 466
- ii. Leaves not pinnate.
- j. Leaves opposite
- k. Flowers pink, large. *Rhexia*, p. 576
- kk. Flowers pinkish, small. *Epilobium*, p. 582
- jj. Leaves alternate.
- k. Flowers white or pink.
- Crucifera* or *Chamaenerion*, pp. 462 or 582
- kk. Flowers yellow.
- l. Stamens 6. *Crucifera*, p. 462
- ll. Stamens 4-8. *Onagracea*, p. 578
- hh. Petals 2. *Circea*, p. 585
- hhh. Petals 5.
- i. Leaves radical.
- j. Flowers pale lavender, leaves entire, salt marsh plant. *Limonium*, p. 633
- jj. Flowers white or greenish, leaves dentate, inland plants. *Saxifragaceæ*, p. 470
- jjj. Flowers purple, leaves palmately 3-foliate. *Oxalis*, p. 516
- ii. Leaves cauline, opposite (or whorled).
- j. Leaves, only one pair.
- k. Plant fleshy, flowers white, striped with pink, pendant, leaves lanceolate entire. *Claytonia*, p. 435
- kk. Plant not fleshy, flowers small, white, leaves acute, heart shaped, toothed. *Mitella*, p. 472
- jj. Leaves more than one pair.
- k. Flowers yellow. *Hypericaceæ*, p. 551
- kk. Flowers white or pink. *Caryophyllaceæ*, p. 435
- iii. Leaves cauline, alternate (lower opposite in some species).
- j. Leaves 3-foliate.
- k. Pinnately; leaflets serrate, lanceolate, acute, flowers white. *Porteranthus*, p. 478
- kk. Palmately; leaflets triangular, flowers yellow. *Oxalis*, p. 516
- jj. Leaves pedately 3-5 parted (rarely pinnate), segments lobed, flowers purple or whitish. *Geraniaceæ*, p. 514
- ijj. Leaves simple.
- k. Flowers blue. *Linum*, p. 517
- kk. Flowers yellow.
- l. Plant fleshy, prostrate. *Portulaca*, p. 435

ll. Plant erect, low and shrubby.

m. Leaves short, awl-like or close appressed and scale-like.

*Hudsonia*, p. 560

mm. Leaves scattered, linear or lanceolate, plant slender, flowers in an open panicle. *Linum*, p. 517

kkk. Flowers white or pinkish, in a naked spike, leaves close together in a sort of whorl at the base, thick and more or less evergreen. *Pyrolacæ*, p. 608

## Series I. CHORIPETALÆ.

### Order PIPERALES.

Family SAURURACEÆ. Lizard Tails.

#### SAURURUS L.

*Saururus cernuus* L. Lizard's Tail.

*Saururus cernuus* Linnæus, Sp. Pl. 341. 1753 [Maryland and Virginia].—Knieskern 27.—Britton 212.—Keller and Brown 114.

In swamps, often growing in water; frequent in the Northern, Middle and Cape May districts and occasional on the coast strip. Absent from the Pine Barrens.

*Fl.*—Late June to early August. *Fr.*—Late summer into autumn.

*Middle District.*—Medford (S), Kaighns Swamp (P), Red Bank (P), Washington Park, Mickleton.

*Coast Strip.*—Palermo (S).

*Cape May.*—Goshen (S), Court House, Nummcytown, Cold Spring.

### Order SALICALES.

Family SALICACEÆ. Willows and Poplars.

#### *Key to the Species.*

a. Bracts fimbriate or incised leaves as broad as long.

b. Petioles terete, not strongly flattened.

c. Leaves dark green above, white wooly beneath, coarse toothed.

[*Populus alba*]\*

cc. Leaves glabrous when mature, ovate, denticulate.

*P. heterophylla*, p. 391

\* The White or Silver Poplar is a frequent introduction about old houses, often increasing enormously by suckers and forming dense thickets where neglected. Some old deserted houses in the Pine Barrens have been completely enveloped by these trees, the suckers even forcing their way through the rotten floors.

- bb. Petioles strongly flattened.
  - c. Leaves coarsely dentate. *P. grandidentata*, p. 392
  - cc. Leaves finely crenulate-denticulate. *P. tremuloides*, p. 392
- aa. Bracts entire, leaves longer than broad.
  - b. Leaves pubescent beneath.
    - c. Dull grayish, tomentous beneath.
      - d. Linear-oblanccolate, 1-5 cm. long, crowded. *Salix tristis*, p. 394
    - dd. Oblanceolate or lanceolate, 5-15 cm. long, not crowded.
      - e. Petioles very short, young twigs less densely pubescent, leaves averaging more regularly lanceolate. A frequent species. *S. humilis*, p. 394
      - cc. Petioles longer, young twigs less densely pubescent, leaves more frequently oblanceolate, a rare species in our range, entering from the north. *S. hebbiana*, p. 394
  - cc. Lustrous and silky beneath. *S. sericea*, p. 395
    - e. Trees with inconspicuous greenish flowers in catkins or panicles.
- bb. Leaves glabrous beneath or glabrate.
  - c. Regularly, finely and closely serrate.
    - d. With petiolar glands; long acuminate. *S. lucida*, p. 395
  - dd. Without glands.
    - e. Stipules persistent.
      - f. Leaves narrowly lanceolate; long attenuate. *S. nigra*, p. 392
      - ff. Leaves oblong lanceolate; acuminate. *S. cordata*, p. 393
    - ee. Stipules deciduous.
      - f. Leaves pale and glaucous beneath, usually very sparsely silvery silky. [*S. fragilis*]\*
      - ff. Leaves green beneath, perfectly glabrous, except very rarely along the midrib. *S. nigra*, p. 392
  - cc. Irregularly or remotely serrate or toothed.
    - d. Green beneath, remotely denticulate; slender lanceolate. *S. interior*, p. 393
    - dd. Glaucous beneath, irregularly crenate-serrate; ovate or broadly lanceolate. *S. discolor*, p. 394

POPULUS L.

*Populus heterophylla* L. Swamp Poplar.

*Populus heterophylla* Linnæus, Sp. Pl. 1034. 1753 [Virginia].—Britton 227. —Keller and Brown 115.

Wet woods of the Middle district; very rare. Known from one tree, found by Mr. Albert Commons, July 27, 1880, on Fortesque Beach, and a small grove discovered by Mr. Bayard

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\* Brittle Willow; a common tree along streams in cultivated districts. some other species of Willows are introduced about houses and occasionally escape or persist where farms have been deserted. Notable among these is the Weeping Willow (*S. babylonica*).

Long on the edge of the salt marsh near Cape May Court House, August 13, 1911.

*Middle District*.—Low woods on Delaware Bay, June 27, 1880, Commons (NB), evidently the basis of the Fortesque Beach record in Britton's catalogue.

*Coast Strip*.—Cape May Ct. House.

**Populus grandidentata Michx. Large-toothed Aspen.**

*Populus grandidentata* Michaux, Fl. Bor. Am. II. 243. 1803 [Canada].—Britton 227.—Keller and Brown 115.

Woodland; common in the norther counties; casual southward in all districts. Probably introduced in the Pine Barrens.

*Fl.*—Early April to mid-April, appearing before the leaves.

*Fr.*—Early May to mid-May.

*Middle District*.—Farmingdale (S), Shark River, Holmdel (C), Phalanx (NB), Birmingham, Bordentown, Moorestown (C), Griffith's Swamp (NB), Woodbury, Glassboro, Mickleton (KB), Swedesboro (KB), Yorktown.

*Pine Barrens*.—Bamber, Albion, Andrews, Ateo (C), Winslow Jnc., Batsto.

*Coast Strip*.—Barnegat City (L).

*Cape May*.—Whitesboro (S).

**Populus tremuloides Michx. American Aspen.**

*Populus tremuloides* Michaux, Fl. Bor. Am. II. 243. 1803 [Canada and New York].—Knieskern 29.—Britton 227.—Keller and Brown 115.

Woodland; common in the northern counties; rare within our limits and apparently confined to the Middle and Coast districts.

*Fl.*—Late March to early April, before the leaves. *Fr.*—

Late April to early May.

*Middle District*.—Navesink Highlands (UP), Farmingdale, Browns Mills, Mt. Holly, Griffiths (P), Andrews.

*Coast Strip*.—Sandy Hook, Barnegat City (L).

**SALIX L.**

*Flowering and Fruiting Data*.—The flowers appear in spring before, or while, the leaves expand. The fruit matures rapidly, generally before the leaves are fully expanded. The leaves scarcely reach maturity before summer.

**Salix nigra Marsh. Black Willow.**

*Salix nigra* Marshall, Arb. Am. 139. 1785 [Eastern U. S.].—Knieskern 29.—Britton 226.—Keller and Brown 116.



Common in the Middle district and also at one station in Passaic County and occasional in the coast strip.

Introduced in the Pine Barrens where ponds have been dug out.

Much or most of the New Jersey material examined proves to be the form *S. n. falcata*.

*Fl.*—Early May to late May, when leaves are partly expanded.

*Fr.*—Late May to mid-June.

*Middle District.*—Farmingdale, New Egypt, Birmingham, Burlington, Kirkwood, Andrews, Yorktown, Westville (UP), Mickleton (UP).

*Pine Barrens.*—Pleasant Mills, Winslow Jnc.

*Coast Strip.*—Sandy Hook, Surf City (L), Barnegat City (L), Tuckerton.

***Salix cordata* Muhl. Heart-leaved Willow.**

*Salix cordata* Muhlenberg, Neue Schrift. Ges. Nat. Fr. Berlin IV. 236, pl. 6, f. 3. 1803 [Lancaster, Penna.]—Britton 226.—Keller and Brown 117.

Frequent northward and south into our region, mainly along the Delaware River.

*Fl.*—Mid-April to early May, appearing before or with the leaves.

*Fr.*—Mid-May to early June.

*Middle District.*—Bordentown, Kinkora, Delanco, Fish House, Washington Park.

***Salix interior* Rowlee. Sand-bar Willow.**

*Salix interior* Rowlee, Bull. Torr. Bot. Club, XXVII.: 1900. 253. n. n. for *S. rubra* Rich, nec Huds. 1762 [Boreal, N. A.].

*Salix longifolia* Britton 227.

Gravelly shores of the Delaware from Sussex to Gloucester counties; local.

*Fl.*—Early May, appearing with the leaves, and sporadically into July or even August. *Fr.*—Early June, sporadically through the summer.

*Middle District.*—Fish House, Kaighns Pt., Gloucester Co. (C).

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\* A willow was collected by Charles E. Smith April 29, 1866, at Griffith's Swamp and identified as *S. cordata*, and by Isaac C. Martindale and C. F. Parker six days later half a mile below Kaighns Pt., and identified as *S. petiolaris*. These form the basis for the record of *Salix petiolaris* Sm. within our limits, but Mr. Bayard Long, who has studied our local willows with great care, is of the opinion that these are not *petiolaris*, but more likely represent a hybrid between *S. cordata* and *S. sericea*.

**Salix discolor** Muhl. **Glaucous Willow.**

*Salix discolor* Muhlenberg, Neue Schrift Ges. Nat. Fr. Berlin IV. 234, pl. 6, f. 1. 1803 [Lancaster, Penna.].—Britton 225.—Keller and Brown 117.

Common in the northern counties and less common southward in the Middle district.

Specimens from our range are somewhat variable and show tendencies toward the forms known as *criocephala* Michx., *prinoides* Pursh and *squamata* Rydberg, according to Mr. Long.

*Fl.*—Early April to mid-April, before the leaves. *Fr.*—Early May to mid-May.

*Middle District.*—Sandy Hook, Farmingdale, New Egypt, Mt. Holly, Andrews.

**Salix bebbiana** Sarg. **Bebb's Willow.**

*Salix Bebbiana* Sargent, Garden and Forest VIII. 463. 1895 [N. N. for *Salix rostrata* Rich nec Thuellier 1799]. [Boreal, N. A.].

Rare; only recorded from one locality within our range.

*Fr.*—Mature May 28-30, 1910, at Farmingdale.

*Middle District.*—Farmingdale.

**Salix humilis** Marsh. **Prairie Willow.**

*Salix humilis* Marshall, Arb. Am. 140. 1785 [U. S.].—Willis 57.—Britton 25.—Keller and Brown 117.

Frequent throughout the State in dry sandy ground.

*Fl.*—Early April to mid-April, before the leaves. *Fr.*—Early May to mid-May.

*Middle District.*—Farmingdale, Burlington, Clarksboro (UP), Gloucester (UP), Westville (UP), Swedesboro, Andrews, Yorktown.

*Pine Barrens.*—Winslow Jnc., Weekstown, Egg Harbor City (UP).

*Cape May.*—Cold Spring.

**Salix tristis** Ait. **Sage Willow.**

*Salix tristis* Aiton, Hort. Ken. III. 393. 1789 [Pennsylvania].—Pursh Fl. Am: Sept. II. 609. 1814. Britton 225.—Keller and Brown 117.

Alt one station each in Bergen, Hunterdon and Middlesex counties and frequent throughout our region.

*Fl.*—Early April to mid-April, before the leaves. *Fr.*—Early May to mid-May.

*Middle District*.—Farmingdale, Burlington, Merchantville (P), Garden Lake, 4 mi. bel. Westville, Swedesboro, Yorktown, Andrews, Bridgeton (NY), Salem Creek (C).

*Pine Barrens*.—Allaire, Landisville, Winslow Inc., Egg Harbor City (UP).  
*Cape May*.—Cold Spring.

*Salix sericea* Marsh. **Silky Willow.**

*Salix sericea* Marshall, Arb. Am. 140. 1785 [Eastern U. S.].—Willis 57.—Britton 225.—Keller and Brown 118.

Frequent in the Northern and upper Middle districts.

*Fl.*—Early April to late April, before or with the leaves. *Fr.*—Mid-May to early June.

*Middle District*.—Farmingdale, Delanco, Kaighns Pt. (UP).

*Salix lucida* Muhl. **Shining Willow.**

*Salix lucida* Muhlenberg, Neue Schr. Ges. Nat. Fr. Berlin 1803 IV., p. 230 [Lancaster, Penna.].

Very rare within our range: reported from five stations in the northern counties and from Sandy Hook, where it was collected October, 1897, by Mr. Alexander MacElwee.

*Coast Strip*.—Sandy Hook.

## Order MYRICALES.

Family MYRICACEÆ. Bayberries.

### *Key to the Species.*

- a. Leaves serrate or entire, no stipules.
  - b. A large shrub or small tree, 30-45 dm. high, leaves lanceolate, acute, often rusty with resinous dots, berries 2 mm. in diameter. *M. cerifera*, p. 396
  - bb. A shrub 6-24 dm. high, leaves broader, oblong, resinous dotted but green, berries 3-4 mm. in diameter. *M. carolinensis*, p. 395
- aa. Leaves pinnatifid, stipulate. *Comptonia*, p. 396

### MYRICA L.

*Myrica carolinensis* Mill. **Bayberry.**

*Myrica carolinensis* Miller, Gard. Dict. Ed. 8, No. 3. 1768 [Lower Carolina].

*Myrica cerifera* Knieskern 28.—Britton 220.—Keller and Brown 118.

Low grounds, borders of swamps, etc. Casual in the Northern and Middle districts; frequent in the Pine Barrens and Cape May peninsula and abundant on the coast.

*Fl.*—Early May to early June, before or with the leaves. *Fr.*  
—Late July into August, persisting over winter.

*Middle District.*—Farmingdale (S), Brindletown, Riverton, Browns Mills, Tomlinson's, Woodbury, E. of Sewell (S), Alloway, W. of Bridgeton (S), Dividing Creek.

*Pine Barrens.*—Bamber, Speedwell (S), Bear Swamp (S), Waterford, Cedar Brook, Landisville, Pleasant Mills (T), Tuckahoe.

*Coast Strip.*—Pt. Pleasant (S), Toms River, Seaside Park (S), Surf City (L.), N. Beach Haven (L.), Absecon, Atlantic City, Ocean City (S), Anglesea.

*Cape May.*—Seaville (S), Bennett (S), Cape May (S), 2 mi. E. Dias Creek (S), Sluice Creek (S).

#### ***Myrica cerifera* L. Wax Myrtle.**

*Myrica cerifera* Linnæus, Sp. Pl. 1024. 1753 [Carolina, Virginia and Penna].

—Sargent Manual N. A. Trees. 147. 1905.—Long, Barton II. 21. 1910.

Low ground; mainly restricted to the western part of the lower Cape May peninsula, where it is common, though not to the exclusion of the other species which occurs with it. This species was first recorded from New Jersey by Prof. C. S. Sargent, on the basis of a specimen collected by Isaac C. Martindale in Cape May County.

*Fl.*—Early May to early June, before or with the leaves. *Fr.*  
—Early August into September, persisting over winter.

*Coast Strip.*—Palermo.

*Cape May.*—W. of Cape May Ct. House, Dias Creek, Green Creek (S).

#### **COMPTONIA Banks.**

##### ***Comptonia asplenifolia* (L.). Sweet Fern.**

Pl. LIV., Fig. 2.

*Myrica asplenifolia* Linnæus, Sp. Pl. 1024. 1753 [N. America].—Britton 220.

*Comptonia asplenifolia* Barton Fl. Phila. II. 159. 1818.—Knieskern 28.

Dry ground, common throughout the State, especially plentiful in the Pine Barrens, where, in association with the Bracken, it often forms a large part of the shrubby underbrush.

*Fl.*—Late April to early May, before or with the leaves. *Fr.*  
—mid-June into July.

*Middle District.*—Farmingdale, Birmingham, Riverside, Sicklerville, Yorktown.

*Pine Barrens.*—Allaire (S), Waretown, Speedwell (S), Plains (S), Bear Swamp (S), Albion, Landisville, Mays Landing (S).

*Coast Strip.*—Beach Haven (L.), Ocean City (S).

*Cape May.*—Court House (S).

## Order JUGLANDALES.

Family JUGLANDACEÆ. Walnuts and Hickories.

*Key to the Species.*

- a. Husk not splitting.  
 b. Fruit globular, petioles puberulent. *Juglans nigra*, p. 397  
 bb. Fruit oblong, pointed, petioles pubescent with viscid hairs. *J. cinerea*, p. 397
- aa. Husk splitting when fruit is ripe.  
 b. Husk of fruit thick, splitting freely to the base, foliage and twigs pubescent.  
 c. Leaflets 3-5, bark shaggy, splitting off in long plates. *Hicoria ovata*, p. 398  
 cc. Leaflets 7-9, bark close. *H. alba*, p. 398
- bb. Husk of fruit thin, splitting only at the top, foliage glabrous at maturity.  
 c. Leaflets narrow, lanceolate 7-9, bark close, nut sub-globose. *H. cordiformis*, p. 399  
 cc. Leaflets oblong or ovate lanceolate 5-7, bark splitting in shaggy plates, nut nearly globose. *H. microcarpa*, p. 399  
 ccc. Leaflets obovate, or oblong 3-7, bark close, nut obovoid or oblong. *H. glabra*, p. 398

## JUGLANS L.

*Juglans nigra* L. Black Walnut.

*Juglans nigra* Linnæus Sp. Pl. 997. 1753 [Virginia and Maryland].—Knieskern 28.—Britton 219.

Rich woodlands; frequent in the northern counties and occasional in the Middle district within our limits. Many trees have undoubtedly been introduced, and probably all those in Cape May County come under this head.

*Fl.*—Early May to late May, when the leaves are partly expanded. *Fr.*—Autumn of the first season.

*Middle District.*—Farmingdale, Oaklyn (S), Sewell (S), S. of Millville.\*

## HICORIA Rafinesque.

*Fruiting and Flowering Data.*—Flowers appear after the leaves have unfolded. Fruit ripens the first season.

\* *Juglans cinerea* Linnæus, Sp. Pl. Ed. II. 1415. 1763 [North America] is frequent in woods in the northern counties, but within our limits known only from the statements of Knieskern and Willis, who record it respectively from Ocean and Monmouth and Burlington Counties, where it seems hardly likely to have been native.

**Hicoria ovata** (Mill.). **Shag-bark, Shell-bark Hickory.**

*Juglans ovata* Miller, Gard. Dict. Ed. 8, No. 6. 1768 [Virginia].—*Carya laciniosa* Barton Fl. Phila. II. 178 ?  
*Hicoria ovata* Britton 219.

Common in woods of the northern counties, occasional in the Middle district.

*Fl.*—Mid-May to early June, when the leaves are almost fully expanded. *Fr.*—Autumn of the first season.

*Middle District.*—Mickleton, Swedesboro.

**Hicoria alba** (L.). **Mocker Nut.**

*Juglans alba* Linnæus, Sp. Pl. 997. 1753 [Virginia].  
*Carya tomentosa* Knieskern 28.  
*Hicoria alba* Britton 219.

Woodland; common in the northern counties, less frequent in the Middle and Cape May districts, rare on the coast and absent from the Pine Barrens.

Hickories are rare and questionably native in the Pine Barrens, but frequent in West Jersey, growing singly in fields or bordering the edge of Woodland. Frequently this and the two following grow in close proximity, as at Medford.

*Fl.*—Early May to late May, when the leaves are almost fully expanded. *Fr.*—Autumn of the first season.

*Middle District.*—Belmar (NY), Allaire, New Egypt, Medford (S), Lawnside (S), Mickleton.

*Pine Barrens.*—Folsom (introduced?).

*Coast Strip.*—Beesley's Pt. (S).

*Cape May.*—Sluice Creek (S), Dias Creek (S).

**Hicoria glabra** (Mill.). **Pig-nut Hickory.**

*Juglans glabra* Miller, Gard. Dict. Ed. 8, No. 5. 1768 [Virginia].  
*Carya amara* Knieskern 28.  
*Hicoria glabra* Britton 219.

Common in woods of the Northern and Middle districts, much less common elsewhere.

*Fl.*—Early May to late May, when the leaves are almost fully expanded. *Fr.*—Autumn of the first season.

*Middle District.*—New Egypt, Bordentown, Medford (S), Camden (C), W. Deptford, Oaklyn (S), Union Grove (S), Mickleton, Bridgeton (NB).

*Pine Barrens.*—Manahawkin, Albion, Winslow Jnc. (S).

*Cape May.*—Dias Creek (S).

**Hicoria cordiformis** (Wang.). **Bitter-nut Hickory.**

*Juglans cordiformis* Wangenheim, N. A. Holz, p. 25. 1787 [New York and New England].

*Hicoria minima* Britton 219.

Woodland of the Northern and Middle districts, occasional.

*Fl.*—Mid-May to early June, when the leaves are almost fully expanded. *Fr.*—Autumn of the first season.

*Middle District.*—Pemberton Inc. (C), Medford (S).

**Hicoria microcarpa** (Nutt.). **Small-fruited Hickory.**

*Carya microcarpa* Nuttall, Gen. II. 221. 1818 [Banks of the Schuylkill, near Philadelphia].

*Hicoria microcarpa* Britton 219.

Reported in Britton's Catalogue from Sea Breeze, Cumberland Co., on authority of Mr. Albert Commons.

*Fl.*—Mid-May to early June, when the leaves are almost fully expanded. *Fr.*—Autumn of the first season.

**Order FAGALES.**

Family BETULACEÆ. Birches, Hazels, etc.

a. Fruit small, narrowly margined or winged between the bracts of a cone-like ament.

b. Bracts of ament deciduous with the winged seeds.

c. Bark chalky white, peeling somewhat, leaves deltoid, acuminate.

*Betula populifolia*, p. 400

cc. Bark reddish or greenish brown, peeling off in thin, ragged sections, leaves rhombic, cuneate at base, light colored beneath.

*B. nigra*, p. 401

ccc. Bark brown, not peeling off in layers, leaves ovate, cordate or rounded at base.

*B. lenta*, p. 401

bb. Bracts woody and persistent.

*Alnus*, p. 402

aa. Fruit small in small aments, each seed subtended by a flat, green bractlet, much cut and lobed.

*Carpinus*, p. 399

aaa. Fruit small, enclosed in an inflated, green bag-like bractlet.

*Ostrya*, p. 400

aaaa. Fruit a large, woody-shelled nut inclosed by a leafy involucre.

*Corylus*, p. 400

**CARPINUS L.**

**Carpinus caroliniana** Walt. **Hornbeam, Water Beech.**

*Carpinus caroliniana* Walter, Fl. Car. 236. 1788 [South Carolina].—Britton 221.

*Carpinus americana* Knieskern 28.

Common in woods of the northern counties, less common southward in the Middle district and rare on the Cape May peninsula.

*Fl.*—Mid-April to late April, as the leaves begin to expand.

*Fr.*—Well grown by mid-summer, not usually mature until early autumn.

*Middle District.*—Farmingdale, New Egypt, Bordentown, Kinkora, Birmingham (S), Medford (S), Woodbury, Yorktown.

*Cape May.*—Goshen.

#### OSTRYA Scopoli.

*Ostrya virginiana* (Mill.). Hop-Hornbeam, Iron-wood.

*Carpinus virginiana* Miller, Gord. Dict. Ed. 8. No. 4. 1768 [Virginia].

Frequent in the northern counties, very rare within our limits. A single station on steep banks of the Delaware at Kinkora, facing the north (B. Long).

*Fl.*—Mid-April to late April, as the leaves begin to spread.

*Fr.*—Well grown by mid-summer, mature in early autumn.

*Middle District.*—Kinkora.

#### CORYLUS L.

*Corylus americana* Walt. Hazel-nut.

*Corylus americana* Walter, Fl. Cor. 236. 1788 [South Carolina].—Knieskern 28.—Britton 222.

Thickets of the Northern and Middle districts; frequent.

*Fl.*—Early March to early April, before the leaves. *Fr.*—Well grown by mid-summer, but not commonly mature before early autumn.

*Middle District.*—Farmingdale, New Egypt, Bordentown, Birmingham, Pemberton Jnc. (S), Medford (S), Haddonfield, Mickleton, Swedesboro, Yorktown, Quinton.

#### BETULA L.

*Betula populifolia* Marsh. White Birch.

*Betula populifolia* Marshall, Arb. Am. 19. 1785 [New Jersey].—Britton 220.

*Betula alba* var. *populifolia* Knieskern 29.

Generally in moist ground, common northward and in the Pine Barrens, less abundant and more local in the Middle district.

This is a characteristic species of the coastal swamps and eastern Pine Barrens. Its white trunks are always conspicuous against the evergreens, particularly in winter.



*Fl.*—Mid-April to early May, when the leaves are partly expanded. *Fr.*—Late summer to early autumn.

*Middle District.*—Farmingdale, Pt. Pleasant (S), New Egypt, Kinkora, Hartford, Medford (S), Sicklerville (S).

*Pine Barrens.*—Belmar (NY), Manahawkin, West Creek (S), Lakehurst, Bear Swamp, Batsto, Pleasant Mills, Mays Landing (S), Egg Harbor City (UP).

*Coast Strip.*—Ship Bottom (L).

***Betula lenta* L. Cherry Birch, Sweet Birch.**

*Betula lenta* Linnaeus, Sp. Pl. 983. 1753 [Virginia and Canada].—Britton 220.

A tree of the woodlands of the northern part of the State occurring within our limits as a rare and local species of the Middle district.

Mr. Gifford Pinchot\* records forty-two trees of this species in one acre of cedar swamp near Whitings, but there must have been a mistake in identification, as we have never found the tree anywhere in the Pine Barrens; perhaps the name is a misprint for White Birch.

*Fl.*—Late April to early May, when the leaves are partly expanded. *Fr.*—Late summer.

*Middle District.*—Navesink Highlands (UP), Bordentown, Kinkora, Glassboro, ravine east of Mullica Hill (H).

***Betula nigra* L. River Birch, Red Birch.**

*Betula nigra* Linnaeus, Sp. Pl. 982. 1753 [Virginia and Canada].—Pursh, Fl.

Am. Sept. II. 621. 1814.—Knieskern 29.—Britton 221.

*Betula papyrifera* Barton, Fl. Phila. II. 175. 1818.

River and lake shores; common in the Northern and Middle districts and rarely on the coastal streams below the head of tide-water, and on ponds at Cape May Point.

*Fl.*—Mid-April to early May, when leaves are partly expanded. *Fr.*—Late May to early June.

*Middle District.*—Farmingdale, Pt. Pleasant (S), Walnford (NB), Crosswicks, Delanco (S), Fish House, Gloucester (UP), Hartford, Pemberton Jnc. (S), Medford (S).

\* Forestry Report appended to Ann. Rept. State Geol. N. J. 1898, pp. 98-100.

*Coast Strip*.—Mays Landing (S).\*

*Cape May*.—Cape May Pt., on Lily Lake (OHB).

**ALNUS Gaertner.**

*Alnus rugosa* (DuRoi). Alder.

*Betula Alnus rugosa* DuRoi, Harbk. Wild. Baumzt. I. 112. 1771 [North America].

*Alnus serrulata* Knieskern 29.—Britton 221.

Low grounds, forming swamp thickets; common in the Northern and Middle districts and in the cedar swamps of the Pine Barrens, rare on the Coast and apparently not common on the Cape May peninsula (?).

The swelling of the staminate catkins of the Alder is the first sign of awakening spring in the swamps of south Jersey, but they often attain their full length and flexibility some time before the pollen is actually liberated, and they may be said to be in bloom.

*Fl.*—Mid-March to early April, before the leaves expand; from catkins formed the previous summer. *Fr.*—September.

*Middle District*.—Farmingdale (S), Pt. Pleasant (S), Birmingham, Pemberton Inc., Bordentown, Kinkora, Masonville, Camden, Lawnside (S), Medford (S), Washington Park, Swedesboro.

*Pine Barrens*.—Toms River (NY), Manahawkin, Barnegat, Speedwell, Bear Swamp, Atco, Albion, Penbryn (S), Pancoast, Folsom, West Creek.

*Coast Strip*.—Surf City (L).

Family FAGACEÆ. Beeches, Chestnuts and Oaks.

a. Nuts two, sharply triangular, enclosed in a thin four-valved bur, tomentous outside and with soft prickles. Bark very smooth, light gray.

*Fagus*, p. 402

aa. Nuts plano-convex, in a large spiny bur.

b. Nuts 1-5, leaves glabrous; a large tree. *Castanea dentata*, p. 403

bb. Nut 1, leaves tomentous below, a shrub. *C. pumila*, p. 403

aaa. Nut, single, an acorn with scaly basal cup. *Quercus*, p. 404

**FAGUS L.**

*Fagus grandifolia* Ehrhart. Beech.

*Fagus grandifolia* Ehrhart., Beitr. Nat. Wiss., vol. III., p. 22. 1788 [North America].

*Fagus ferruginea* Knieskern 28.—Willis 56.—Britton 225.

\*This tree as well as *Pinus virginiana* and some other species occurs along the river below the dam at Mays Landing, along with species characteristic of the Coast Strip. These, however, have not been found on the coast and are completely cut off by the Pine Barrens from their relatives in the Middle district.

Common in woodlands of the Northern and upper Middle districts, rarer southward to Cape May County.

In certain parts of Camden County, near to the Delaware, there are considerable areas of almost pure Beech forest, practically devoid of underbrush.\*

*Fl.*—Late April to early May, when leaves are fully expanded. Fruit matures by late July or early August, soon dropping.

*Middle District.*—Freehold (Willis), Squam and Shark River (Kn.), Pt. Pleasant (S), Birmingham, Arneys Mt. (S), New Egypt, Medford (S), Oaklyn (S), Woodbury, Mickleton, Fairton (S).

*Coast Strip.*—Manahawkin.

*Cape May.*—Sluice Creek (S), Cold Spring (OHB).

#### CASTANEA Adanson.

##### *Castanea dentata* (Marsh.). Chestnut.

*Fagus-Castanea dentata* Marshall, Arb. Am. 4<sup>o</sup>. 1785 [Eastern U. S.].

*Castanea vesca* Knieskern 28.

*Castanea sativa* var. *americana* Britton 224.

Common in woods of the Northern and parts of the Middle districts, rare in Cape May County and in the Coast strip.

*Fl.*—Late June to mid-July, when the leaves are fully expanded. *Fr.*—Matures late September or during October.

*Middle District.*—Shark River (Kn.), Farmingdale, Squam (Kn.), New Egypt, Fish House (S), Paulsboro, Repaupo, Medford (S), Albion, Mickleton, Sicklerville (S), Bridgeton (C), Fairton (C), Yorktown.

*Coast Strip.*—Waretown, Manahawkin.

*Cape May.*—Sluice Creek (S).

##### *Castanea pumila* (L.). Chinquapin.

*Fagus pumila* Linnæus, Sp. Pl. 998. 1753 [North America].—Pursh, Fl. Am. Sept. II. 625. 1814.

*Castanea pumila* Britton 224.—Keller and Brown 121.

Locally in the Middle district from Mercer to Salem Counties.

*Fl.*—Early June to early July, when the leaves are fully expanded. *Fr.*—Matures during September.

*Middle District.*—Clarksboro, Tomlin, Mickleton, Swedesboro, Jericho (C), Pennsgrove (S).

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\* The Coastal Plain Beech should be *F. g. caroliniana* Loudon (cf. Rehder, Rhodora 1907, p. 114), but I fail to separate it from the northern form.

## QUERCUS L.

*Flowering and Fruiting Data.*—Flowers in late spring when leaves are usually one-third to one-half expanded. Fruit ripe and dropping in early or mid-autumn of either the first or second season.

*Key to the Species.*

- a. Leaves or their lobes bristle-tipped.
- b. Leaves oblong or linear oblong, entire (or with 1-2 irregular points or lobes).
- c. Linear-oblong, never lobed. *Q. phellos*, p. 408
- cc. Oblong occasionally with an irregular lobe or two.
- Q. rudkini*, p. 411
- bb. Leaves obovate, generally 3-5 lobed above the middle, rusty tomentose or pubescent beneath. *Q. marilandica*, p. 407
- bbb. Leaves pinnately lobed.
- c. Green beneath.
- d. Cup or acorn shallow, saucer-like.
- c. Cup 16-25 mm. broad, acorn ovoid. *Q. rubra*, p. 405
- cc. Cup 8-16 mm. broad, acorn subglobose. *Q. palustris*, p. 405
- dd. Cup turbinate, or hemispheric.
- c. Cup brown, the scales finally glabrate and shiny. *Q. coccinea*, p. 405
- cc. Cup ashy, with persistent dull pubescence. *Q. velutina*, p. 405
- cc. Grayish-white beneath.
- d. Large tree, leaf lobes, lanceolate, sometimes falcate. *Q. triloba*, p. 406
- dd. Small tree or usually shrub, leaf lobes triangular. *Q. ilicifolia*, p. 407
- aa. Leaves or their lobes not bristle-tipped, more or less rounded.
- b. Leaves pinnately lobed.
- c. Pale or glaucous and glabrous beneath. *Q. alba*, p. 408
- cc. Brown tomentose beneath, lyrate-pinnatifid. *Q. stellata*, p. 409
- ccc. White tomentous beneath, lyrate-pinnatifid. *Q. lyrata*, p. 409
- bb. Leaves crenate or dentate, not lobed.
- c. Low shrub, leaves ovate or obovate, 6-13 × 5-8 cm. *Q. prinoides*, p. 410
- cc. Tall tree, leaves much larger.
- d. Leaves white tomentulose beneath, peduncle of acorn much larger than the petioles. *Q. bicolor*, p. 409
- dd. Leaves gray, tomentulose beneath, peduncles equalling or shorter than the petioles.
- c. Bark, white flaky, leaves broadly obovate, teeth sharper. *Q. michauxii*, p. 410
- cc. Bark close, leaves narrower, teeth rounder. *Q. prinus*, p. 410

**Quercus rubra L. Red Oak.**

*Quercus rubra* Linnæus, Sp. Pl. 996. 1753 [Virginia and Carolina].—Knieskern 28.—Britton 224.

Common in rocky woods of the northern part of the State, rare and local in the Middle district and lower Cape May peninsula. Reported from Landisville in Britton's Catalogue on authority of C. A. Gross, but there are no specimens in his herbarium.

*Fl.*—Late April to early May, when the leaves are partly expanded. *Fr.*—Autumn of the second season.

*Middle District.*—Farmingdale (NB), Birmingham, Atco (C), Camden (C), Mickleton, Springdale (S), Swedesboro (S).

*Cape May.*—Cold Spring.

**Quercus palustris DuRoi. Pin Oak.**

*Quercus palustris* DuRoi, Harbk. II. 268. Pl. 5, f. 4. 1772 [North America].—Britton 224.

Common in low woods in the northern part of the State, and frequent in similar situations in the Middle and Cape May districts.

*Fl.*—Late April to early May, when the leaves are partly expanded. *Fr.*—Autumn of the second season.

*Middle District.*—New Egypt, Medford, Swedesboro.

*Cape May.*—Court House (S), Green Creek (S).

**Quercus coccinea Muench. Scarlet Oak.**

*Quercus coccinea* Muenchausen, Hansv. V. 254. 1770 [ ].—Willis 56.—Britton 224.

Rather common throughout, but least plentiful in the Pine Barrens.

*Fl.*—Early May to mid-May (probably), when the leaves are partly expanded. *Fr.*—Autumn of the second season.

*Middle District.*—Navesink Highlands (UP), Shark River (UP), Keyport (NB), New Egypt, Moorestown, Medford (S), Fish House (S), Oaklyn (S), Springdale (S), Swedesboro.

*Pine Barrens.*—Atsion (S), Atco, Whitings (NY), Applepie Hill (S), Mays Landing (S), Tuckahoe (S).

*Coast Strip.*—Forked River, Manahawkin, Cox's, Atlantic City (S).

*Cape May.*—Bennett (S).

**Quercus velutina Lam. Black Oak.**

*Quercus velutina* Lamarck, Encycl. I. 721. 1783 [Virginia].

*Quercus tinctoria* Knieskern 28.—Britton 224.

Distribution apparently as in the last. The two have not been carefully distinguished by our botanists.

*Fl.*—Early May to mid-May (probably), when the leaves are partly expanded. *Fr.*—Autumn of the second season.

*Middle District.*—New Egypt, Arneys' Mt., Medford (S), Farmingdale (NY), Mantua, Springdale (S).

*Pine Barrens.*—Ancora (UP).

*Coast Strip.*—Pasadena, Mays Landing (S), Anglesea Jnc. (S), Pleasantville (NY).

***Quercus triloba* Michx. Spanish Oak.**

*Quercus triloba* Michaux, Hist. Chenes Amer. No. 14, t. 26. 1801 [New England to Georgia].

*Quercus falcata* Pursh, Fl. Am. Sept. II. 631. 1814.—Barton, Fl. Phila. II 170. 1818.—Knieskern 28.—Willis 56.

*Quercus digitata* Keller and Brown 123.

*Quercus cuneata* Britton 224.

Common in low woods of the Middle district and in meadows from Monmouth County southward, also on the Coast strip and Cape May peninsula.

This tree is a constant associate of the Sweet Gum and Willow Oak, the three having an almost identical distribution in New Jersey and Pennsylvania, limited sharply on the west by the fall line.

The dark-glossy upper surface and lighter lower surface, together with the long falcate terminal segments of the leaves, give to the foliage a characteristic appearance.

The outline of individual leaves varies greatly even on the same tree, but I cannot by any character separate our Spanish Oaks into two forms, although Dr. Britton credits *Q. pagodaefolia* to our range. There is a form specially prevalent on the coast, with long triangular leaves, with three nearly equal, rather blunt, terminal lobes.

*Fl.*—Early May to mid-May, when the leaves are partly expanded. *Fr.*—Autumn of the second season.

*Middle District.*—Keyport (C), Farmingdale, Pt. Pleasant (S), Birmingham, Pemberton (C), Moorestown (C), Medford, Springdale (S), Orchard (S), Oakton (S), W. Deptford, Gloucester, Sicklerville (S), Tomlin, Woodstown (NB), Swedesboro, Bridgeton (NB), Sharpstown, Mickleton (UP), Moorestown (UP), Woodbury (UP).

*Pine Barrens.*—Afaire (S), Chairville (S), Landisville (T), Winslow Jnc., Hammonton, Mays Landing (S).

*Coast Strip*.—Seaside Park (UP), Forked River, Surf City (L), Atlantic City (S), Beesley's Pt. (S), Five-Mile Beach.

*Cape May*.—Court House (S), Dias Creek (S), Cold Spring, Cape May.

*Quercus ilicifolia* Wang. Scrub Oak.

*Quercus ilicifolia* Wangenheim, Nord. Am. Holz, 79, pl. 6, f. 17. 1787 [Hamstead, Long Island].—Knieskern 28.—Willis 56.—Britton 224.

*Quercus Bannisteri* Michaux Fl. Bor. Am. H. 199. 1803.—Pursh Fl. Am. Sept. II. 631. 1814.

Common in sandy soil throughout the State. One of the most abundant oaks of the Pine Barrens, forming with *Q. marilandica* most of the scrub growth of the Plains.

*Fl.*—Early May to mid-May, when the leaves are partly expanded. *Fr.*—Autumn of the second season.

*Middle District*.—Farmingdale (S), Shark River, Belmar (UP), Sicklerville (S).

*Pine Barrens*.—Waretown, Whitings, Speedwell (S), Bear Swamp (S), Applepie Hill (S), E. and W. Plains (S), Cedar Brook, Albion, Landisville (T), Egg Harbor City, Absecon (S), Dennisville (OHB), Hammonton (UP), Williamstown Jnc. (UP).

*Coast Strip*.—Seaside Park (S).

*Quercus marilandica* Muench. Black-Jack Oak.

*Quercus marilandica* Muenchausen, Hansv. V. 253. 1770 [ ].

*Quercus nigra* Pursh Fl. Am. Sept. II. 629. 1814.—Knieskern 28.—Britton 223.

Common in sandy ground from Middlesex and Mercer counties southward; most abundant in the Pine Barrens.

*Fl.*—Early May to mid-May, when leaves are partly expanded. *Fr.*—Autumn of the second season.

The Black-Jack is the typical oak tree of the most barren stretches of southern New Jersey and the most characteristic tree of the Pine Barrens after the Pitch Pine and White Cedar. Its broadly obovate leaves and the bright rusty coloration of their under surface makes it a conspicuous and easily recognized species. While it becomes a mere shrub on the "plains," its normal growth is higher than that of *Q. ilicifolia* and it is usually a tree of ten to twenty feet in height.

*Middle District*.—Keyport (NB), Farmingdale (S), New Egypt, Arneys Mt. (S), Orchard (S), Mantua, Lawnside (S), W. Deptford, Swedesboro, Yorktown, 2 mi. W. Bridgeton (S), Fairton (S).

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*Pine Barrens*.—Toms River (NB), Waretown, E. and W. Plains (S), Speedwell (S), Applepie Hill (S), White Horse (S), Bear Swamp (S), Pleasant Mills.

*Coast Strip*.—Seaside Park (S), Barnegat City (L).

*Cape May*.—Cape May (S), Bennett.

### *Quercus phellos* L. Willow Oak.

*Quercus Phellos* Linnæus, Sp. Pl. 994. 1753 [North America].—Michaux Fl. Bor. Am. II. 197. 1803.—Pursh Fl. Am. Sept. II. 625. 1814.—Barton Fl. Phila. II. 167. 1818.—Knieskern 28.—Willis 55.—Britton 223.

*Quercus phellos* var. *humilis* Pursh Fl. Am. Sept. II. 625. 1814.—Britton 223.

Low woods of the Middle, Coast and Cape May districts, from Mercer and Middlesex counties southward, common.

A typical tree of the coastal plain crossing the Delaware into Pennsylvania, but never passing west of the fall line, and pushing up the Delaware only a very short distance above Trenton.

There is a broader-leaved Willow Oak ranging from Salem to western Cape May County, which is perhaps referable to *Q. p. laurifolia*, although the leaves on some trees at least show a slight tendency to lobing, such as we find in certain hybrids (cf. p. 411).

*Fl.*—Early May to mid-May, when the leaves are expanding.

*Fr.*—Autumn of the second season.

*Middle District*.—Keyport (NB), Farmingdale, Allaire, Belmar (UP), Long Branch (C), Pt. Pleasant (S), New Egypt, Arney's Mt. (S), Birmingham, Medford, Bridgeport, Oaklyn (S), W. Deptford, Lawnside (S), Sicklerville (S), Glassboro, Yorktown, Salem (S), Beaver Dam (S), Dividing Creek, Millville.

*Pine Barrens*.—Landisville (T), introduced?

*Coast Strip*.—Seaside Park (S), Peermont (S), Anglesea, West Creek (S).

*Cape May*.—Bennett, Court House.

### *Quercus alba* L. White Oak.\*

*Quercus alba* Linnæus Sp. Pl. 996. 1753 [Virginia].—Knieskern 28.—Britton 222.

Common in woodlands throughout the State, except in the Pine Barrens, where it is local and largely in second growth.

A good deal of variation in leaf form occurs, some trees having exceedingly deep cut lobes, while in others they are very shallow.

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\* The record of *Q. macrocarpa* from Ventnor (Githens) in Keller and Brown's list is apparently based on *Q. stellata*; that from Quaker Bridge in Britton's Preliminary Catalogue was canceled in his later work.



*Fl.*—Early May to mid-May, when the leaves are partly expanded. *Fr.*—Autumn of the first season.

*Middle District.*—Farmingdale (S), New Egypt, Arneys Mt. (S), Pemberton Inc. (S), Medford, Springdale (S), Locust Grove (S), Red Bank, Reapaupo, Swedesboro, Sicklerville (S), Yorktown, Bridgeton (NB).

*Pine Barrens.*—Bear Swamp (S), Albion, Landisville (T), Mays Landing (S).

*Coast Strip.*—Manahawkin, Surf City (L), Absecon, Atlantic City (S), Pleasantville (NY).

*Cape May.*—Cape May.

***Quercus stellata* Wang. Post Oak.**

*Quercus stellata* Wangenheim, Nordam Holz. 78, p. 6, f. 15. 1787 [New York].

*Quercus obtusiloba* Knieskern 28.—Willis 55.

*Quercus minor* Britton 222.

Dry ground; rather frequent throughout our region and casual farther north.

The leaf lobes are sometimes forked again, making quite a complicated outline.

*Fl.*—Early May to mid-May, when the leaves are partly expanded. *Fr.*—Autumn of the first season.

*Middle District.*—Shark River (UP), Farmingdale, New Egypt, Arneys Mt. (S), Pemberton (NB), Medford, Orchard (S), W. Deptford, Glassboro, Swedesboro, Yorktown, Bridgeton (S), Fairton (S).

*Pine Barrens.*—Speedwell, White Horse, Bear Swamp (S), Landisville (T), Folsom, Pleasant Mills (S), Mouth of Batsto, Mays Landing (S).

*Coast Strip.*—Forked River, Manahawkin, Absecon, Atlantic City (S), Pleasantville (NY), Piermont, Five-Mile Beach.

*Cape May.*—Cape May (S).

***Quercus bicolor* Muhl. Swamp White Oak.**

*Quercus bicolor* Muhlenberg in Wildenow, Neue Schrift Gess. Nat. Fr. Berlin III. 396. 1801 [North America, prob. Penna.].—Britton 222.

*Quercus platanooides* Keller and Brown 124.

Swamps and meadows in the northern counties, southward in the Middle district, mainly along the Delaware river, local and not very common within our limits.

*Fl.*—Early May to mid-May (probably), when the leaves are partly expanded. *Fr.*—Autumn of the first season.

*Middle District.*—Farmingdale, Moorestown, Medford, Marlton (C), Mickleton (H), Swedesboro, Riddleton (KB), Salem (S).

***Quercus lyrata* Walter. Swamp Post Oak.**

*Quercus lyrata* Walter, Fl. Car. 235. 1788 [S. Carolina], Keller and Brown 123.

Only known from the tree at Riddleton, discovered by Messrs. Heritage, Lippincott and Crawford. The records for Ventnor and Mickleton (KB) were errors. See also under Hybrid oaks.

*Middle District*.—Riddleton\*.

**Quercus prinus L. Rock Chestnut Oak.**

*Quercus prinus* Linnæus, Sp. Pl. 995. 1753 [North America].—Knieskern 28.—Willis 55.—Britton 222.

Common in the woods of the Northern and Middle districts, and somewhat less plentiful or local in the Pine Barrens and Cape May peninsula.

*Fl.*—Early May to mid-May (probably), when the leaves are partly expanded. *Fr.*—Autumn of the first season.

*Middle District*.—Shark River (UP), Farmingdale (S), Arneys Mt. (S), Fish House, Springdale (S), Lawnside (S), Below Washington Park (S), Repaupo, Clarksboro, Mickleton (UP).

*Pine Barrens*.—Barnegat, Kenilworth, Bear Swamp (S), Tabernacle, Quaker Bridge (S), Landisville (T), Cedar Brook, Albion, Palermo (S).

*Cape May*.—Goshen (S), Court House (S), Cape May (S).†

**Quercus michauxii Nutt. Basket Oak.**

*Quercus Michauxii* Nuttall, Gen. II. 215. 1818 [The Delaware to St. Mary's, W. Florida].—Keller and Brown 124.

Local in the lower part of the Middle district.

*Middle District*.—Moorestown, Repaupo (C), Upper Pennsgrove.

**Quercus prinoides Willd. Scrub Chestnut Oak.**

*Quercus prinoides* Willdenow, Neue Schrift Ges. Nat. Fr. Berlin III. 397. 1801 [N. A.—probably Penn.].—Keller and Brown 124.—Knieskern 28.

*Quercus chinquapin* Barton, Fl. Phila. II. 173. 1818.

*Quercus prinus* var. *humilis* Willis 55.

*Quercus Muhlenbergii* var. *humilis* Britton 223.

Locally common in dry woods of the Middle and Pine Barren districts.

In some sections of the Pines this little oak makes up a large proportion of the underbrush, and the branches are weighted

\* Harsbberger (Phytogeographic Survey of N. A., p. 414) quotes *Q. lyrata* as a component of the forest at Peermont, but none of the other botanists who have visited the locality have found this tree. *Q. stellata* is the common species there.

† The records of *Q. acuminata* from Mullica Hill and Bridgeton are apparently referable to *Q. prinus*, which varies greatly in the shape of its leaves.

down with the abundance of acorns. It is frequently only two feet in height, and rarely more than four.

*Fl.*—Mid-May to late May, when the leaves are partly expanded. *Fr.*—Autumn of the first season.

*Middle District.*—Farmingdale, New Egypt (NY), Birmingham, Locust Grove (S), Gloucester, W. Deptford, Swedesboro, Bridgeton (NB), Clarksboro (UP), Mickleton (UP).

*Pine Barrens.*—Toms River (NB), Edge of E. Plains (S), Speedwell (S), Chatsworth, Applepie Hill (S), Tabernacle (S), Clementon (S), Landisville, Hammonton, Mays Landing (S), Absecon (S).

#### HYBRID OAKS.

Besides exhibiting a great range of variation oaks hybridize readily and perplexing forms are constantly presenting themselves.

One of the most famous hybrids is the Bartram Oak, *Q. heterophylla* Michaux f. (Hist. Arb. Am. II. 87. 1812) originally from the vicinity of Bartram's residence below Philadelphia. This tree is frequent throughout West Jersey, south to Cape May. Specimens have been examined as follows:

*Middle District.*—Farmingdale, New Egypt, Arneys Mt. (S), Millville (S).

*Cape May.*—Green Creek, New England (OHB), Bennett.

*Coast Strip.*—Manahawkin.

While *Q. phellos* is one of the parents of this form the other is in doubt. It has usually been given as *Q. rubra*, but that is certainly not the case in New Jersey, and it seems more likely to be *Q. coccinea* or *Q. velutina*, which are fairly plentiful, while *Q. rubra* is extremely rare. Perhaps the so-called *Q. heterophylla* is not all of similar origin. Some specimens somewhat pubescent below may easily be *Q. phellos* x *triloba*.

An oak with larger, irregularly toothed leaves is *Q. rudkini* Britton (Bull. Torrey Club IX. 13. 1882—Keyport, N. J.) supposed to be a cross between *Q. phellos* and *Q. marilandica*. This I have seen from

*Middle District.*—Keyport, Cliffwood, Mickleton, Medford (S), Swedesboro, Tomlin, Salem (S).

*Cape May.*—Green Creek.

Between this and the preceding there is no very sharply defined line.

A narrow-leaved, irregularly lobed form collected near Woodbury by Mr. Isaac Burk, has the leaves white beneath, and is, I

think, as he suggests, *Q. phellos* x *Q. ilicifolia*. A hybrid between these two is also mentioned by J. E. Peters in *Torrey Bull.* XX. 295, from Mays Landing.

Mr. W. T. Davis has described as *Q. brittoni* a hybrid between *Q. marilandica* and *Q. ilicifolia*, from Watchogue, Staten Island (*Bull. Torrey Club* XIX. 301. 1892). He states that the specimens vary greatly, forming a perfect connecting series between the two. To this category no doubt belong numerous scrub oaks growing on the "Plains" where these two species abound, although I have always been in doubt whether they were not merely extreme types of variation.

At Medford I found one tree of another hybrid, *Q. velutina* (or *coccinea*) and *Q. triloba*. The leaf outline that of the former, with only an occasional tendency toward an elongated central lobe, but with the under side densely gray, pubescent like *triloba*.

Several curious chestnut oaks occur at Mullica Hill, Swedesboro, etc., with very deep acute marginal dentations on the leaves, resembling those of *Q. acuminata*, but obviously not that species.

We have also an oak at Riddleton, which has passed for *Q. lyrata*, but I suspect may be of hybrid origin, though it bears acorns plentifully, as does *Q. rudkini*. The leaves are similar to *lyrata* and as white beneath as *Q. bicolor*. At Pemberton Junction I found a similar tree growing near *Q. bicolor*, and beside it another with similar leaf outline, but leaves thinner and the downy lower surface dull grayish-green.

## Order URTICALES.

Family ULMACEÆ. Elms and Hackberries.

- a. Fruit a winged seed, twigs and trunk not warty. *Ulmus*, p. 412  
 aa. Fruit a drupe, twigs and trunk usually with warty excrescences. *Celtis*, p. 413

### ULMUS L.

*Ulmus americana* L. White Elm.

*Ulmus americana* Linnæus, Sp. Pl. 226. 1753 [Virginia].—Knieskern 27.—Britton 216.

Low ground, especially along rivers; common in the Northern district and less abundant southward in the Middle district.

Mainly restricted to the shores of large rivers or their tributaries, or to low meadowland.\*

*Fl.*—Late March to early April, before the leaves expand. *Fr.*—Late April to mid-May, when the leaves are partly expanded.

*Middle District.*—Farmingdale, Pt. Pleasant (S), Bordentown, Pemberton Jnc. (S), Moorestown, Medford (S), Mickleton, Atco (C), Salem (C).

### CELTIS L.

#### *Celtis occidentalis* L. Hackberry.

*Celtis occidentalis* Linnaeus, Sp. Pl. 1044. 1753 [Virginia].—Barton, Fl. Phila. I. 151. 1818.—Knieskern 27.—Willis 54.—Britton 216.

Frequent in woods and thickets of the Middle Coast and Cape May districts, and occasional northward. Absent from the Pine Barrens.

The tree of the coast strip has rather small, practically glabrous, leaves, and the same form occurs in the Middle district, but there occur with it trees with very rough, usually larger, leaves, and others with larger leaves which are nearly glabrous. The length of both pedicels and petioles varies greatly. While I at one time supposed that both *C. georgiana* and *C. crassifolia* occurred in our region, I have found it impossible to separate our material, the characters being so variable and occurring in such different combinations, so it was thought best to record all of them under *C. occidentalis*.

*Fl.*—Late April to late May, when the leaves are expanding. *Fr.*—Late August into early autumn.

*Middle District.*—Leedsville, Mon. Co. (NB), Crosswicks, Fish House (S), Camden, Merchantville, Oaklyn (S), Gloucester, Lawnside (S), Woodbury, Salem (S).

*Coast Strip.*—Sandy Hook, Toms River (Kn), Barnegat City (L), Surf City (L), St. Albans (L), West Creek (S), Absecon (Bassett), Pleasantville (NY), Piermont (S), Anglesea (UP).

*Cape May.*—Goshen, Court House, Dias Creek (S).

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\* *Ulmus fulva* Michx., a tree of the northern counties is said by Willis to occur in Monmouth county, and Dr. Britton gives it in his list from Clementon (H. A. Green). All Elms from the latter vicinity seem to be *U. americana*, however, and we have seen no specimen of *U. fulva* from within our limits

## Family MORACEÆ. Mulberries.

*Key to the Species.*

- a. Staminate and pistillate flowers in spikes.  
 b. Leaves rough above, pubescent beneath, fruit purple. *Morus rubra*, p. 414  
*[M. alba]\**  
 bb. Leaves glabrous, fruit whitet.  
 aa. Pistillate flowers capitate. *[Broussonetia papyrifera]†*

## MORUS L.

*Morus rubra* L. Red Mulberry.

*Morus rubra* Linnæus, Sp. Pl. 986. 1753 [Virginia].—Knieskern 27.—Britton 217.

Frequent in woods of the Northern district, occurring less abundantly within our limits and confined to the upper part of the Middle district and the coast strip south to Cape May County.

*Fl.*—Mid-May to late May, when the leaves are partly expanded. *Fr.*—Late June to early July.

*Middle District.*—Keyport (C), Pemberton (C), Medford (S), Mickleton, below Millville.

*Coast Strip.*—Piermont (S), Court House (S).

The record at Winslow, in Britton's catalogue, refers to an introduced tree.

## Family URTICACEÆ. Nettles.

*Key to the Species.*

- a. Herbs with stinging hairs.  
 b. Leaves alternate. *Urticastrum*, p. 415  
 bb. Leaves opposite.  
 c. Length of petiole exceeding half the breadth of the leaf. *U. gracilis*, p. 415  
 cc. Length of petiole less than half the breadth of the leaf. *[U. dioica]‡*  
 aa. Herbs without stinging hairs.  
 b. Flowers in axillary clusters, surrounded by leafy bracts. *Parietaria*, p. 416  
 bb. Flowers in naked axillary clusters, plant shining, and pellucid. *Adicea*, p. 415  
 bbb. Flowers in dense slender axillary or terminal spikes, plant not pellucid. *Boehmeria*, p. 415

\* White Mulberry, an escape about houses.

† Paper Mulberry, an escape.

‡ Stinging Nettle, a weed in waste ground, etc.

## URTICA L.

*Urtica gracilis* Ait. Slender Nettle.*Urtica gracilis* Aiton, Hort. Kew. III. 341. 1789 [Hudson Bay].—Britton 217.—Keller and Brown 126.

Common in the northern counties, but barely enters our region.

*Middle District*.—Bordentown (C).\*

## URTICASTRUM Fabricius.

*Urticastrum divaricatum* (L.). Wood Nettle.*Urtica divaricatum* Linnæus, Sp. Pl. 985. 1753 [Virginia and Canada].  
*Laportea canadensis* Britton 218.

Common in the northern counties, but rare within our limits, occurring only along the Delaware and on the Coast.

*Fl. and Fr.*—Mid-August to mid-September.*Middle District*.—Kinkora (NY), Delair, Fish House, Camden (CP), Mullica Hill (C), Swedesboro, New Egypt.

## ADICEA Rafinesque.

*Adicea pumila* (L.). Clearweed.*Urtica pumila* Linnæus, Sp. Pl. 984. 1753 [Canada].  
*Pilea pumila* Britton 218.

Damp shady places; most common northward, but occurs locally throughout the Middle district and in the Cape May peninsula.

*Fl. and Fr.*—Late July to late September.*Middle District*.—New Egypt, Birmingham, Hartford, Fish House, Kinkora (NY), Springdale (S), Clementon (NB), Oaklyn (S), Lawnside (S), Washington Park.*Cape May*.—Cape May.

## BOEHMERIA Jacquin.

*Boehmeria cylindrica* (L.). False Nettle.*Urtica cylindrica* Linnæus, Sp. Pl. 984. 1753 [Jamaica, Virginia and Canada].  
*Boehmeria cylindrica* Britton 218.

Common northward and down the Coast strip to Cape May County; less frequent in the Middle district and very rare in

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\* Mr. Lippincott informs me that the specimens credited to Swedesboro on his authority (KB) came from Pennsylvania.

the Pine Barrens. Apparently the majority of our material is referable to *B. c. drummondiana* Weddell (Ann. Sci. Nat., 4 Ser: 201-1854—Texas).\*

*Fl.* and *Fr.*.—Early July to early September.

*Middle District.*—New Egypt, Fish House, Camden (Bassett), Kaighns Pt., Medford (S), Mickleton (H), Salem (S).

*Pine Barrens.*—Hammonton.

*Coast Strip.*—Surf City (L), Mays Landing (S), Ocean City (S), Holly Beach (UP), Cold Spring (S), Cape May Court House.

### PARIETARIA L.

#### *Parietaria pennsylvanica* Muhl. Pellitory.

*Parietaria pennsylvanica* Muhlenberg in Willdenow, Sp. Pl. IV. 955. 1806 [Pennsylvania].—Willis 55.—Britton 218.—Keller and Brown 127.

Occasional on cliffs and rocky places northward; obtained but once within our limits.

*Coast Strip.*—Sandy Hook (NY), [Ruger July 5, 1870].

## Order SANTALALES.

### Family LORANTHACEÆ. Mistletoes.

#### PHORADENDRON Nuttall.

##### *Phoradendron flavescens* (Pursh.). Mistletoe.

*Viscum flavescens* Pursh, Fl. Am. Sept. 114. 1814 [North America].

*Phoradendron flavescens* Knieskern 27.—Britton 213.—Keller and Brown 127.

Formerly frequent through much of the Middle district and occasional on the edge of the Pine Barrens, but now nearly exterminated in the State. Monmouth County was the most northern known station for the plant.

Comparatively little has been left on record regarding this interesting plant, now all but exterminated in the State. The most northern station was three and a half (or four) miles north of Keyport, near the shore of Raritan Bay, where it grew on an old Liquidambar according to Rev. Saml. Lockwood, as late as 1864, when the plant formed a mass as big as a bushel measure. By

\* Cf. Fernald *Rhodora* XII, p. 11.



1880, it was gone, although the tree still remained.\* Mr. I. H. Hall recorded a specimen forty feet up on a Red Maple two feet in diameter at the base, growing on the edge of the Pines May 3, 1872.†

It also grew in 1884 between Trenton and New Brunswick and at Lakewood.‡ In July, 1891, I found a large bunch, over a foot in diameter, growing on a gum tree (*Nyssa sylvatica*) below Clementon.

In the Martindale Herbarium, at the Philadelphia College of Pharmacy, are specimens collected at Kaighn's Point, September, 1860; Camden, June 15, 1874; Atco, May, 1878, and Mays Landing, July 4, 1888.

It still grows on a tree at Fenwick, carefully guarded by the colored people who live close by and make a profit by selling it. It also grows on a certain Red Maple not far from Medford, though it rarely reaches a height of more than one inch. If it grew larger it would, no doubt, suffer the fate of the berry-bearing Holly of the neighborhood and find its way to the street corners of Philadelphia at Christmas time.

In the central Mississippi Valley the Mistletoe is regularly killed off by severe winters, but several mild seasons will restore it to its former abundance.

In that neighborhood, and doubtless in New Jersey as well, it blooms September 15—October 25, while the fruit matures during November of the following year, remaining on the branches well through the winter.§

*Middle District.*—Four miles north Keyport (C), New Lisbon (C), Medford, Clementon, Kaighns Pt. (P), Glassboro, Woodbury (C), Mickleton (H), Swedesboro, Atco (CP), Vineland (C), Fenwick, Riddleton, Woodstown (C), Bridgeton (C), Millville (KB).

*Pine Barrens.*—Lakewood (NB), Hammonton, Landisville (T), Jackson (P), Mays Landing (NY).

\* Torrey Bulletin XI., p. 87.

† Torrey Bulletin III., p. 25.

‡ Torrey Bulletin XI., p. 76.

§ cf. Schneck. Botanical Gazette IX., 1884, p. 94.

## Family SANTALACEÆ. Sandalwood, etc.

## COMANDRA Nuttall.

*Comandra umbellata* (L.). False Toad-flax.

*Thesium umbellatum* Linnaeus, Sp. Pl. 208. 1753 [Virginia and Pennsylvania].  
*Comandra umbellata* Knieskern.—Britton 214.

Common throughout the State in sandy ground, most plentiful in the Middle district.

*Fl.*—Mid-May to late June. *Fr.*—Apparently not very common.

*Middle District.*—Farmingdale, New Egypt, Browns Mills, Delanco, Washington Park, Sewell (S), Lindenwold (S), Mickleton, Sicklerville (S), Swedesboro, Yorktown, Dividing Creek.

*Pine Barrens.*—Forked River, Manahawkin, Sumner, Landisville, Hammon (Bassett), Absecon (P).

*Cape May.*—Burleigh (OHB).

## Order ARISTOLOCHIALES.

## Family ARISTOLOCHACEÆ. Birthwort, etc.

*Key to the Species.*

- a. Leaves reniform, paired, flower growing from between the petioles. *Asarum*, p 418  
 aa. Leaves ovate lanceolate, alternate on a somewhat zig-zag stem. *Aristolochia*, p. 418

## ASARUM L.

*Asarum canadense* L. Wild Ginger.

*Asarum canadense* Linnaeus, Sp. Pl. 442. 1753 [Canada].—Britton 212.

Rich woods; common northward, rare and local within our limits and confined to the upper Middle district.

*Fl.*—Late April to late May.

*Middle District.*—Freehold (C), New Egypt, Pemberton (NB), Bordentown (C), Camden Co. (C), Swedesboro.

## ARISTOLOCHIA L.

*Aristolochia serpentaria* L. Virginia Snakeroot.

Pl. LXVI, Fig. 3.

*Aristolochia serpentaria* Linnaeus, Sp. Pl. 961. 1753 [Virginia].—Barton Fl. Phila. II. 146. 1818.—Britton 212.

Not very plentiful, and locally distributed in the Northern and Middle districts and rarely in the Cape May peninsula.

*Fl.*—Early June to early July. *Fr.*—Late July to late August.

*Middle District.*—Keyport (C), Holmdel (C), Haddonfield, Medford, Mantua, Mullica Hill (H), Malaga (S). Swedesboro, Riddleton, Locust Grove.

*Cape May.*—Cold Spring (OHB).

## Order POLYGONALES.

Family POLYGONACEÆ. Buckwheats, Smartweeds, etc.

- a. Calyx of six parts, the three inner ones often developing into wings, one or all of them bearing a tubercle.
- b. Leaves hastate, flowers dioecious, plants not over 4 dm. high.
- c. Inner sepals not developing wings. [*R. acetosella*]\*
- cc. Inner sepals developing wings. *R. hastatulus*, p. 421
- bb. Leaves not hastate, flowers perfect, tall plants.
- c. Leaves flat, edges not crisped, pedicels clavate. *R. verticillatus*, p. 421
- cc. Leaves crisped on the edges.
- d. Wings of fruiting calyx entire, somewhat undulate. [*R. crispus*]\*
- dd. Wings of fruiting calyx toothed or fringed. [*R. obtusifolius*]\*
- aa. Calyx five parted, leaves very slender linear, or almost filiform, pedicels solitary. *Polygonella*, p. 427
- aaa. Calyx four or five parted, leaves not filiform, pedicels usually in fascicles.
- b. Flowers in terminal spike-like racemes, calyx five parted.
- c. Raceme solitary or two, aquatic plants. *Polygonum emersum*, p. 421
- cc. Racemes several or numerous.
- d. Ocreæ (sheathing the joints) naked or ciliate.
- e. Racemes drooping. [*P. lapathifolium*]\*†
- ee. Racemes erect.
- f. Stem glandular below the inflorescence. *P. pennsylvanicum*, p. 422
- ff. Stem glabrous below the inflorescence. *P. eciliatum*, p. 423
- dd. Ocreæ fringed with bristles.
- e. Racemes dense, not interrupted.
- f. Racemes erect.
- g. Leaves 65 x 12 mm., bristles 3 mm. long, flowers deep red, in waste ground. [*P. persicaria*]\*‡
- gg. Leaves 35 x 10 mm., bristles 6 mm. long, flowers white, usually strongly tinged with pink.

\* *R. crispus* Yellow Dock, *R. obtusifolius* Bitter Dock, *R. acetosella* Horse Sorrel, common weeds about cultivated and waste ground.

† Dock-leaved Smartweed, apparently always an introduced weed.

‡ Lady's Thumb.

- h.* Calyx lobes entirely covering the achene. *P. hydro Piperoides*, p. 422  
*hh.* Calyx lobes shorter than the achene. *P. h. opclousanum*, p. 422  
*ggg.* Leaves 150 x 20 mm., bristles 12 mm. long, flowers usually whitish. *P. setaceum*, p. 424  
*ff.* Racemes drooping. *P. careyi*, p. 422  
*cc.* Racemes slender, interrupted. [*P. hydro Piper*]\*  
*f.* Achene dull.  
*ff.* Achene smooth and shining.  
*g.* Leaves hispid above 150 x 20 mm. *P. setaceum*, p. 424  
*gg.* Leaves glabrous.  
*h.* Leaves 100 x 15, plant medium. *P. punctatum*, p. 423  
*hh.* Leaves 140 x 35, plant tall. *P. p. robustius*, p. 423  
*bb.* Flowers in a very long terminal, naked, interrupted raceme, calyx four parted, leaves ovate, acuminate. *P. virginianum*, p. 424  
*bbb.* Flowers axillary or in small axillary clusters, plants prostrate or erect.  
*c.* Plants prostrate.  
*d.* Foliage nearly white, maritime. *P. maritimum*, p. 424  
*dd.* Foliage bluish green. *P. aviculare*, p. 424  
*cc.* Plants erect.  
*d.* Stems sharply angled, leaves linear. *P. tenue*, p. 425  
*dd.* Stems terete.  
*c.* Leaves elliptic obtuse. *P. erectum*, p. 424  
*ec.* Leaves lanceolate acute.  
*f.* Pedicels exserted, leaves lanceolate, acute. *P. atlanticum*, p. 425  
*ff.* Pedicels covered by the sheaths, leaves linear, oblong, often obtuse. *P. prolificum*, p. 425  
*bbbb.* Flowers in axillary and terminal clusters or paniced racemes, climbing vines.  
*c.* Outer segments of fruiting calyx keeled, not winged. [*P. convolvulus*]\*  
*cc.* Outer segments of fruiting calyx winged. *P. scandens*, p. 426  
*bbbb.* Flowers in capitate clusters or racemes, stems covered with recurved prickles.  
*c.* Leaves sagittate. *P. sagittatum*, p. 426  
*cc.* Leaves halberd-shaped. *P. arifolium*, p. 426

\* All the Polygonums seem to have a tendency to become weeds. *P. aviculare*, *P. erectum*, *P. pennsylvanicum* and *P. careyi*, while natives of North America, seem to be entirely weeds, to-day, within our limits, and to these may be added *P. hydro Piper*. Common Smartweed, *P. persicaria*, Lady's Thumb, and *P. convolvulus*, Black Bindweed, all common in waste or cultivated ground, and all natives of Europe, though the first does occur native in the northwest. The brilliant crimson-spiked Prince's Feather, *P. orientale*, of old garden, sometimes escapes into waste ground.

## RUMEX L.\*

**Rumex verticillatus L. Swamp Dock.**

*Rumex verticillatus* Linnæus, Sp. Pl. 334. 1753 [Virginia].—Knieskern 26.  
—Britton 211.—Keller and Brown 128.

Damp shaded spots throughout the State, except in the Pine Barrens, apparently not common.

*Fr.*—Early June to early August.

*Middle District.*—Medford (S), Salem (H).

*Coast Strip.*—Piermont (S), Wildwood, Holly Beach.

*Cape May.*—Nummeytown (S), Green Creek (OHB).

**Rumex hastatulus Bald. Engelmann's Sorrel.**

*Rumex hastatulus* Baldwin, Elliot, Fl., S. C. and Ga. II., p. 416, 1821  
[Georgia and E. Florida]—Crawford, Bartonian I. 18. 1909.

Known only from the sand hills at Longport, where it was discovered in August, 1890, by Mr. Charles E. Smith, and later reported by Messrs. Joseph Crawford and Stewardson Brown, who found it in abundance June 23, 1907.

*Fr.*—Mid-June to late August.

*Coast Strip.*—Longport.

## POLYGONUM L.†

**Polygonum emersum (Michx.). Swamp Smartweed.**

*Polygonum amphibium* var. *emersum* Michaux, Fl. Bor. Am. I. 240. 1803  
[Banks of the Ohio].

*Polygonum coccineum* Barton, Fl. Phila. I. 188. 1818.

*Polygonum emersum* Britton 209.—Keller and Brown 130.

Borders of swamps and ditches; frequent in the northern counties and south to about the center of the Middle district, reappearing in the southern part of the Cape May peninsula.

*Fr.*—Late August to late September.

*Middle District.*—Mickleton (NB), Repaupo.

*Pine Barrens.*—Ancora (Bassett). Native?

*Cape May.*—Bennett.

\* Knieskern's record of "*R. maritimus* salt marshes of Ocean and Monmouth counties, not rare," has not been verified; both it and the records of *R. brittanica* for Anglesea (KB) are probably referable to *R. verticillatus*.

† For studies of this genus cf. Robinson, Rhodora, April, 1902, p. 63, Small, Torrey Bulletin XX. 214, XXI. 168, XXI. 476.

**Polygonum pensylvanicum L. Pennsylvania Smartweed.**

*Polygonum pensylvanicum* Linnæus, Sp. Pl. 362. 1753 [Pennsylvania].—Knieskern 26.—Britton 209.

Common throughout the State. While a native plant of eastern North America, this is one of those species which have found themselves perfectly adapted for existence in cultivated and waste ground, and has thus become a weed to such an extent that all record of its original habitat and distribution has been lost. It seems useless to cite localities, as it occurs in waste and cultivated ground everywhere, even on the coastal islands.

*Fr.*—Early August to late September or into October.

**Polygonum careyi Olney. Carey's Smartweed.**

*Polygonum Careyi* Olney, Proc. Prov. Franklin Soc. I. 29. 1847 [Providence, R. I.].—Willis 52.—Britton 208.—Keller and Brown 130.

Frequent in sandy swamps of the northern counties and now spreading over the southern half of the State as a weed. Whether originally native within our limits it is impossible to say.

*Fr.*—Mid-July into September.

*Middle District.*—Pemberton (C), Browns Mills, Medford (S), Haddonfield, Mickleton.

*Pine Barrens.*—Manchester, Winslow (P), Landisville (T), Hammonton (C), Egg Harbor City.

*Coast Strip.*—Ocean Grove (P), Toms River (C).

**Polygonum hydropiperoides Michx. Mild Smartweed.**

*Polygonum hydropiperoides* Michaux, Fl. Bor. Am. I. 239. 1803 [Pennsylvania, Virginia and Carolina].—Britton 209.

Swamps of the Middle and Coast districts to Cape May; common. Apparently less abundant northward and absent from the Pine Barrens.

*Fr.*—Late July to late September or into October.

*Middle District.*—New Egypt, Birmingham, Bear Swamp (S), Ballengers Mills (S), Clementon, Repaupo, Mickleton, Sharpstown, Salem (S).

*Coast Strip.*—Manahawkin, Ocean City, Cold Spring (S).

**Polygonum hydropiperoides opelousanum Riddell. Riddell's Smartweed.**

*Polygonum Opelousanum* "Riddell" Small, Bull. Torr. Bot. Club XIX. 354. [Opelousas, La.].

Rather frequent in the Middle and Coast districts.

*Fr.*—Apparently similar to the last.

*Middle District.*—Delanco.

*Coast Strip.*—Surf City (L), Ocean City, Cold Spring, Cape May Ct. House.

**Polygonum punctatum Ell. Dotted Smartweed.**

*Polygonum punctatum* Elliot, Bot. S. C. and Ga. I. 455. 1817 [South Carolina].

Swamps; common throughout the State, except in the Pine Barrens, where it is absent.

*Fr.*—Late July to late September or into October.

*Middle District.*—New Egypt, Fish House, Masonville, Medford (S), Swedesboro, below Washington Park (S), Beaver Dam.

*Coast Strip.*—Seaside Park, Island Hts. Jnc., N. Beach Haven (L), Ship Bottom (L), Surf City (L), Holgate's (L), Atlantic City (S), Ocean City, Piermont (S), Cape May Ct. House, Cape May (S).

**Polygonum punctatum robustius Small. Larger Dotted Smartweed.**

*Polygonum punctatum robustior* Small, Bull. Torr. Bot. Club XXI. 477. 1894 [Mass. to Mexico and S. A.].

At one station in the Middle district, probably elsewhere. A well marked large and robust form of *P. punctatum*.

*Middle District.*—Moorestown.

**Polygonum eciliatum (Small). Bristleless Smartweed.**

*Polygonum punctatum* var. *eciliatum* Small, Bull. Torrey Bot. Club XX. 214. 1893 [Valley of Toluca Mex.]

Borders of ponds in the lower Cape May peninsula and lower coast islands; local.

This handsome *Polygonum* was discovered by Mr. Alexander McElwee September 11, 1892, at Wildwood. He proposed to describe it as new, but for some reason did not do so, and his manuscript description is still attached to the specimen in the Philadelphia Academy herbarium. On September 5, 1909, Mr. C. S. Williamson collected it at West Cape May. The pink flowers are quite showy.

*Fr.*—Late August to late September.

*Coast Strip.*—Wildwood.

*Cape May.*—West Cape May.

**Polygonum setaceum** Baldwin. **Bristly Smartweed.**

*Polygonum setaceum* "Baldwin" Elliott, Bot. S. C. and Ga. I:455. 1817  
[Savannah.]

Damp ground in the lower part of the Cape May peninsula; locally common.

First obtained in the State by the writer September 6, 1909, on the borders of a stream east of Cape May Court House.

*Fr.*—Late August, probably into October.

*Cape May.*—Court House, Dias Creek.

**Polygonum virginianum** L. **Virginia Knotweed.**

*Polygonum virginianum* Linnæus, Sp. Pl. 360. 1753 [Virginia].—Britton 209.

Common in woods of the northern counties, south locally in the Middle district and rarely in the Cape May peninsula.

*Fr.*—Early August into October.

*Middle District.*—New Egypt, Haddonfield (S), Springdale (S), below Washington Park (S), Mickleton, Swedesboro.

*Cape May.*—Court House (OHB).

**Polygonum aviculare** L. **Knotgrass.**

*Polygonum aviculare* Linnæus, Sp. Pl. 362. 1753 [Europe].—Britton 210.

Common in cultivated and waste ground throughout the State; although of native origin it has become a typical weed, and citation of localities seems useless.

*Fr.*—Late August into October.

**Polygonum erectum** L. **Erect Knotweed.**

*Polygonum erectum* Linnæus, Sp. Pl. 363. 1753 [Philadelphia].—Britton 210.

*Polygonum aviculare* var. *erectum* Knieskern 26.

Similar in distribution and history to the last species.

*Fr.*—Late August into October.

**Polygonum maritimum** L. **Seaside Knotweed.**

*Polygonum maritimum* Linnæus, Sp. Pl. 361. 1753 [Italy and Virginia].—

Willis 52.—Britton 210.—Keller and Brown 131.

*Polygonum glaucum* Nuttall, Man. I. 254. 1818 [Egg Harbor, N. J.].

Sands of the sea beaches, but apparently not common.

The plant here referred to is often whitish and always with silvery sheaths. Other prostrate *Polygonums* occur along



the coast, probably introduced, to some extent at least. It is impossible, with the material at hand, and the rather involved condition of the synonymy of this group, to positively settle their identity.

*Maritime*.—Long Branch, Waretown, Anglesea, Cape May.

***Polygonum prolificum* (Small). Bushy Knotweed.**

*Polygonum ramosissimum* var. *prolificum* Small, Bull. Torr. Bot. Club, XXI. 171. 1894 [Exeter Neb.].

*Polygonum prolificum* Bicknell, Bull. Torr. Bot. Club XXXVI. 449.

Coast district frequent.

*Fr.*—Early September into October.

*Maritime*.—Spring Lake, Forked River, Harvey Cedars (L), Spray Beach (L), Beach Haven Terrace (L), Cedar Bonnet (L), Sea Isle City, Stone Harbor, Cape May.

***Polygonum atlanticum* (Robinson). Atlantic Knotweed.**

*Polygonum ramosissimum* forma *atlanticum* Robinson, Rhodora IV: 72. 1902 [Edgartown, Mass.].

*Polygonum ramosissimum* Britton 210.—Keller and Brown 131.

Frequent along the coast. I agree with Mr. Bicknell that *P. exsertum* represents a plant in which the embryos are developing prematurely in the seeds.

*Fr.*—Early September into October.

*Maritime*.—Seaside Park, Barnegat Pier, Barnegat City Inc. (L), Harvey Cedars (L), Spray Beach (L), Ship Bottom (L), Surf City (L).

***Polygonum tenue* Michx. Slender Knotweed.**

*Polygonum tenue* Michaux, Fl. Bor. Am. I. 238. 1803 [Canada].—Pursh, Fl. Am. Sept. I. 270. 1814.—Britton 210.

*Polygonum linifolium* Barton, Fl. Phila. I. 186. 1818.

Frequent in dry ground in the Northern and Middle districts, and occasional on the coast and on the Cape May peninsula.

*Fr.*—Mid-August to early October.

*Middle District*.—Keyport (C), New Egypt, Florence Heights, Birmingham, Camden (CP), Woodbury, Oaklyn (S), Mullica Hill (NB), Mickleton (H), Swedesboro, Bridgeton.

*Pine Barrens*.—Landisville, introduced?

*Coast Strip*.—Forked River.

*Cape May*.—Dias Creek, Cold Spring (OHB).

**Polygonum scandens L. Climbing Bindweed.**

*Polygonum scandens* Linnæus, Sp. Pl. 364. 1753 [America].

*Polygonum dumetorum* Knieskern 26.

*Polygonum dumetorum* var. *scandens* Britton 210.

Common in swamps and thickets of the Northern and Middle districts, also down the coast and at Cape May. This seems to be the only form of trailing bindweed found native in our region.

*Fr.*—Late August to early October.

*Middle District.*—New Egypt, Medford (S), Orchard (S), Springdale (S), Haddonfield (S), Lawnside (S), below Washington Park (S), Mickleton.

*Coast Strip.*—Forked River, Surf City (L), N. Beach Haven (L), Barrel Island (L), Holly Beach, Cape May (OHB).

**Polygonum sagittatum L. Arrow-leaved Tear-thumb.**

*Polygonum sagittatum* Linnæus, Sp. Pl. 363. 1753 [Virginia and Maryland].

—Knieskern 26.—Britton 210.

Common in swamps of the Northern, Middle and Coast districts down to Cape May.

This species and the following are two of the plants of late summer which give to the swamps of west Jersey a character which at once contrasts them with the bogs of the Pine Barrens. Associated with these Tear-thumbs are usually found *Eupatorium perfoliatum*, and *maculatum*, *Vernonia noveboracensis*, several species of *Bidens*, *Aster puniceus*, etc., all of them lacking from the Pines.

*Fr.*—Mid-August to mid-September.

*Middle District.*—New Egypt, Delaire, Hartford, Birmingham, Lindenwold (S), Medford (S), Albion, Willow Grove, Mickleton.

*Coast Strip.*—Waretown, Forked River, Manahawkin, Coxe's, Crowleytown.

*Cape May.*—Cold Spring.

**Polygonum arifolium L. Halberd-leaved Tear-thumb.**

*Polygonum arifolium* Linnæus, Sp. Pl. 364. 1753 [Virginia and Florida].—

Michaux, Fl. Bor. Am. I. 241. 1803.—Knieskern 26.—Britton 210.

Common in swamps of the Northern and Middle districts and less commonly in the Coast Strip and Cape May peninsula.

*Fr.*—Late August to late September.

*Middle District.*—New Egypt, Birmingham, Kinkora (NY), Hartford, Pensauken (S), Fish House, Delair, Medford (S), Springdale (S), Oaklyn, Kaighns Pt., Lindenwold (S), Center Square.

*Coast.*—Cox's, May Landing (T).

*Cape May.*—Court House (OHB), Green Creek (S).

POLYGONELLA Michaux.

*Polygonella articulata* (L.). Jointweed.

*Polygonum articulatum* Linnæus, Sp. Pl. 363. 1753 [Canada].—Muhlenberg Cat. 40. 1813.—Pursh, Fl. Am. Sept. I. 272. 1814.—Barton, Fl. Phila. 189. 1818.—Knieskern 26.—Willis 52.—Britton 210.

*Polygonella articulata* Keller and Brown 132.

Frequent in dry sandy soil throughout our area and only occurring north of it at one locality in Middlesex Co.

This is a striking plant of autumn in dry ground, especially along the coast and in the Pines. The leaves are so inconspicuous that the plant seems to consist entirely of slender racemes of little white flowers supported on wiry stems.

*Fl.*—Early September well through October. *Fr.*—Develops almost immediately.

*Middle District.*—New Egypt, Hainesport, Medford, Locust Grove (S), Springdale (S), Lindenwold, Ashland, Camden, Center Square, below Washington Park (S), Woodbury, Mickleton, Swedesboro.

*Pine Barrens.*—Whitings (S), Chatsworth, Clementon, Taunton (S), Kenilworth (S), Cedar Brook, Jones Mill (S), Batsto, Pleasant Mills, north of Batsto, Berlin (S), Albion, Buena Vista, May's Landing.

*Coast Strip.*—Sandy Hook, Island Heights, Seaside Park (S), Forked River, Manahawkin, Surf City (L), Spray Beach (L), Atlantic City, Ocean City (S), Anglesea (UP).

*Cape May.*—Cape May.

Order CHENOPODIALES.

Family CHENOPODIACEÆ. Goosefoot, etc.

*Key to the Species.*

- a. Embryo coiled in a ring about the albumen, leaves flat, not spiny.
- b. Stem not jointed.
- c. Flowers perfect or some pistillate.
- d. Fruiting calyx not winged, flowers in paniced spikes.
- e. Leaves whitish, mealy on the under surface.
- f. Some at least sinuate-toothed or lobed.
- ff. Entire, linear or oblong. [*Chenopodium album*]\*
- gg. Leaves green on both sides. *C. leptophyllum*, p. 428
- f. Not glandular or aromatic.
- g. Stamens 5, calyx not fleshy. *C. boscianum*, p. 429
- gg. Stamens 1-2, calyx somewhat fleshy, red. *C. rubrum*, p. 429

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\* *C. album*, Pigweed, and *C. ambrosioides*, are common about barnyards and other waste places.

- ff. Glandular and aromatic. [C. ambrosioides]  
 dd. Fruiting calyx winged all around. [Cycloloma atriplicifolium]\*  
 cc. Flowers monoecious or dioecious, calyx wanting on pistillate flowers, fruit enclosed by two bractlets.  
   d. Leaves green, triangular hastate. *Atriplex hastata*, p. 429  
   dd. Leaves densely silvery, oblong. *A. arenaria*, p. 430  
 aa. Embryo narrowly horseshoe-shaped or conduplicate, no albumen stems, cylindrical, fleshy jointed with opposite branches, leaves practically none, flowers sunk in hollows of the spike.  
   b. Annuals, no woody rootstalk.  
     c. Scales mucronate pointed, stems thick. *Salicornia bigelovii*, p. 431  
     cc. Scales blunt, stems more slender. *S. europæa*, p. 430  
   bb. Perennial, stems rising from a woody root stalk. *S. ambigua*, p. 431  
 aaa. Embryo coiled in a spiral, albumen scarcely any, leaves fleshy.  
   b. Leaves very spiny. *Salsola kali*, p. 433  
   bb. Leaves not spiny.  
     c. Branchlets, etc., hairy. *Bassia hirsuta*, p. 432  
     cc. Branchlets glabrous.  
       d. Seeds 2 mm. broad. *Dondia maritima*, p. 432  
       dd. Seeds 1.2-1.5 mm. broad. *D. linearis*, p. 432

#### CHENOPODIUM L.

##### *Chenopodium leptophyllum* (Moq.). Narrow-leaved Goosefoot.

*Chenopodium album* var. *leptophyllum* Moquin in D. C. Prod. XIII., pt. 2. 71. 1849 [New California].

*Chenopodium leptophyllum* Britton 206.—Keller and Brown 133.

Found only on the coast from Sandy Hook to Wildwood. Originally discovered on "Absecon Beach" [= Atlantic City] by D. C. Eaton in 1860, and by E. Diffenbaugh at about the same time or earlier. Their station was no doubt in the wooded tract near Ventnor, as the other stations farther south are both on wooded islands.

This is a boreal species extending down the coast from Maine, and is one of several northern species which are found in southern New Jersey only on the coast islands. Dr. Britton's statement that this and the following are adventive form farther west does not seem to be correct in light of our present knowledge.

*Coast Strip*.—Sandy Hook (NB), Barnegat City (L), Barrel Island (L), Absecon Beach (NB), Atlantic City (C), Avalon (KB), Five-Mile Beach.

\* *Cycloloma*. Winged Pigweed, has been introduced at Holly Beach and Ocean City.

**Chenopodium boscianum** Moq. **Bosc's Goosefoot.**

*Chenopodium Boscianum* Moquin-Tandon, Enum. Chenopod. 21. 1840 [Carolina].—Britton 206.—Keller and Brown 133 (in part equals the preceding).

Banks of the upper Delaware; apparently rare and known only from Milford, Hunterdon Co., and Florence Heights, Burlington Co.

The records for Five Mile Beach (Leeds) and Ventnor (Githens), given in Keller and Brown's list, refer to *C. album* or the preceding.

Flowers and immature fruit in August.

*Middle District*.—Florence Heights.

**Chenopodium rubrum** L. **Red Goosefoot.**

*Chenopodium rubrum* Linnæus, Sp. Pl. 218. 1753 [Europe].—Britton 207.—Keller and Brown 134.

*Blitum maritimum* Knieskern 26.—Willis 51.

Salt meadows on the coast; rare.

This plant reaches the southern limit of its range on the New Jersey coast, where it seems to be very rare or very local, as only one station is known. It is true that it has been mentioned in all the lists,\* but apparently without any definite knowledge of its occurrence, and I have been unable to find any specimens in the herbaria that I have examined except those collected by Mr. Bayard Long on Barrel Island, near Tuckerton, September 11, 1908.

*Maritime*.—Barrel Isl. (L).

**ATRIPLEX** L.**Atriplex hastata** L. **Halberd-leaved Orache.**

Pl. LVII., Fig. 1.

*Atriplex hastata* Linnæus, Sp. Pl. 1053. 1753 [Europe].—Knieskern 26.—Keller and Brown 134.

*Atriplex patula* var. *hastata* Willis 51.—Britton 207.

*Atriplex patula* Barton Fl. Phila. I. 148. 1818.

Common along the coast and Delaware river shore. Elsewhere as a weed on waste ground.

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\* Anglesea (Lippincott) and Cape May (Tenbrook) are given by Keller and Brown, but the former and perhaps the latter also proves to be *Atriplex hastata*.

*Fl.*—Late July to early September. *Fr.*—Early September to late October.

*Middle District.*—Salem (S).

*Coast Strip.*—Barnegat Pier, Surf City (L), Beach Haven (L), Spray Beach (L), Ocean City (S), Cold Spring (S), Cape May (S).

***Atriplex arenaria* Nutt. Sea Beach Orache.**

*Atriplex arenaria* Nuttall, Gen. I. 198. 1818 [Coast of New Jersey].—Britton 207.—Keller and Brown 135.

Sandy beaches along the coast; frequent.

One of the characteristic plants of the upper part of the beach, and found throughout the entire length of the coast. Nuttall's original specimen was collected by Zaccheus Collins, who must have been one of the best informed botanists of any time upon the region here considered.

*Fl.*—Late July to late August. *Fr.*—Late August to early October.

*Maritime.*—Sandy Hook, Asbury Park, Long Branch, Island Beach, Surf City (L), St. Albans (L), Spray Beach (L), Tuckers (L), Atlantic City, Ocean City, Stone Harbor, Anglesca, Cape May, Cape May Pt. (S).

**SALICORNIA L.**

***Salicornia europæa* L. Slender Glasswort.**

Pl. LV., Fig. 1.

*Salicornia europæa* var. *herbacea* Linnæus, Sp. Pl. 3. 1753 [Europe].

*Salicornia herbacea* Knieskern 26.—Willis 51.—Britton 207.—Keller and Brown 135.

Abundant on the salt marshes of the coast.

The upright succulent stems of this little plant cover many acres of the salt meadows, which stretch away like a green plain between the pine clad mainland and the shining sand spits which mark the location of the barrier islands along the coast, some surmounted by strips of woodland and most of them with the varied buildings of summer resorts, whose electric lights sparkle at night like myriads of stars when seen from far out on the meadows. These meadows are not as uniform as they at first sight appear. There are tracts where tall marsh grasses grow, where the mud-hen makes her nest, and lower grassy patches made up mostly of *Spartina* and *Juncus gerardi*, and these pass gradually into the still lower growth of the *Salicornia*, which

crunches under foot like crumbling glass when one walks over it, while hundreds of fiddler crabs sidle away in rank upon rank among the still upright stalks.

In autumn, when the plants reach maturity and frost is in the air, they turn a bright red, which rivals that of the autumn leaves in the upland forest, and gives to the meadows a brief period of brilliancy before all is wrapped in the brown carpet of late winter and early spring.

*Fr.*—Late October into November.

*Maritime.*—Sandy Hook, Long Branch, Barnegat Pier, N. Beach Haven (L), Surf City (S), Spray Beach (L), Holgate's (L), Absecon, Brigantine, Atlantic City, Ocean City (S), Sea Isle, Cape May (S).

**Salicornia bigelovii Torr. Bigelow's Glasswort.**

Pl. LV., Fig. 2.

*Salicornia Bigelovii* Torrey, Bot. Mex. Bound. Survey. 184. 1859 [Salt marshes, Boston, Mass.].—Keller and Brown 135.

*Salicornia Virginica* Willis 51.

*Salicornia mucronata* Britton 208.

Coast marshes; associated with the preceding; plentiful, turning red in the autumn in the same way.

*Fr.*—Late October into November.

*Maritime.*—N. Beach Haven (L), St. Albans (L), Absecon, Atlantic City, Ocean City (S), Stone Harbor, Wildwood, Cape May.

**Salicornia ambigua Michx. Woody Glasswort.**

*Salicornia ambigua* Michaux, Fl. Bor. Am. I. 2. 1803 [Coast of South Carolina].—Muhlenberg Cat. 2. 1813.—Pursh, Fl. Am. Sept. I. 3. 1814.—Knieskern 26.—Britton 208.—Keller and Brown 135.

*Salicornia fruticosa* var. *ambigua* Willis 51.

Wet sandy patches on the coast marshes; common. This species differs from the two preceding, not only in its woody root stock, but in the fact that it turns a leaden hue in autumn instead of bright red.

*Fr.*—Late October into November.

*Maritime.*—Sandy Hook (NB), N. Beach Haven (L), Holgate's (L), Halfway House south of Bond's (L), Atlantic City, Ocean City (S), Anglesea, Piermont, Cape May.

**DONDIA Adanson.****Dondia maritima (L.). Sea Blight.**

Pl. LVI., Fig. 2.

*Chenopodium maritima* Linnaeus, Sp. Pl. 221. 1753 [Sea coast of Europe].

Common on the coast marshes.

*Fr.*—Early September into November.*Maritime.*—Long Branch, Beach Haven Terrace (L.), N. Beach Haven (L.), Halfway House south of Bond's (L.), Atlantic City, Ocean City, Anglesea, Cape May.**Dondia linearis (Ell.). Tall Sea Blight.***Salsola linearis* Elliot, Bot. S. C. and Ga. I. 332 [Coast of South Carolina and Georgia].*Salsola salsa* Nuttall Gen. I. 199. 1818.*Suaeda maritima* Willis 51.*Suaeda linearis* var. *salsa* Britton 208.*Dondia americana* Keller and Brown 135.

Common on the coast marshes; apparently not so plentiful as the preceding.

*Fr.*—Early September into November.*Maritime.*—Sandy Hood, Halfway House south of Bond's (L.), Atlantic City, Sea Isle City, Five-Mile Beach, Cape May.**BASSIA L.****Bassia hirsuta (Linn.). Hairy Sea Blight.***Chenopodium hirsuta* L., Syst. Nat. 221. 1753 [Coast of Europe].*Bassia hirsuta* Bartram, Bartonica II. 21. 1910.

Apparently frequent along the edge of the salt marshes.

This plant, identified as *Bassia hirsuta* by Prof. M. L. Fernald, and first recorded as such by Mr. E. B. Bartram in 1909, has been familiar to me for many years, but was always supposed to be a form of *Dondia*.It certainly does not seem like an introduction, and occurs associated with *Dondia* apparently all along the New Jersey coast marshes, although more extensive collections will be required to ascertain the relative abundance of these plants, which have not appealed very strongly to collectors in the past.*Fr.*—Early September to late October.*Maritime.*—Seaside Park, Ocean City, St. Albans (L.), N. Beach Haven (L.), Barnegat City (L.), Waretown, Sea Isle City, Anglesea, Wildwood.



SALSOLA L.

*Salsola kali* L. Saltwort.

Pl. LVII., Fig. 2.

*Salsola kali* Linnæus, Sp. Pl. 222. 1753 [Europe].—Muhlenberg Cat. 29, 1813.  
—Barton Fl. Phila. I. 150. 1818. Knieskern 26.—Willis 51.—Britton  
208.—Keller and Brown 135.

Common in sands of the sea beaches. Reported "up the Delaware to Camden" in Britton's Catalogue, but this statement is incorrect, as the occurrence at Camden was an introduction, no doubt, on ballast; the Atsion record in Willis' list, if at all correct, is to be similarly explained. Some of our specimens are glabrous and may represent the so-called variety *caroliniana*, but the form does not seem to be worthy of recognition.

*Fr.*—Late September into November.

*Maritime.*—Sandy Hook, Long Branch, Waretown, Surf City (L), Holgate's, (L), Absecon, Atlantic City, Brigantine, Cape May.

Family AMARANTHACEÆ. Amaranths.

*Key to the Species.*

- a. Flowers monoecious or polygamous, all with a calyx.
  - b. Flowers in dense terminal spikes. [*A. retroflexus*]\*
  - bb. Flowers in small axillary clusters, shorter than the leaves.
    - c. Low, fleshy seacoast plant, leaves often purplish.
      - A. pumilus*, p. 433
    - cc. Bushy branched plants of field, and waste ground.
      - [*A. graecizans*.]†
  - aa. Flowers dioecious. Calyx wanting in the fertile flowers.
    - Acnida cannabina*, p. 434

AMARANTHUS L.

*Amaranthus pumilus* Raf. Coast Amaranth.

*Amaranthus pumilus* Rafinesque, Med. Rep. (II.) 5. 360. 1808 [Island near Egg Harbor, N. J.].—Nuttall, Gen. II. 201. 1818.—Britton 205.—Keller and Brown 136.

\* *A. retroflexus* Green Amaranth or Pigweed, is frequent about barn-yards and waste places, as is the closely allied *A. hybridus*.

† *A. graecizans* Tumbleweed, is a low plant of cultivated and waste ground; becoming detached in autumn it tumbles about over the ground before the wind like the panicles of old Witch Grass.

Sands of the sea beaches; apparently local and not common. Not reported from south of Sea Isle City in New Jersey.

*Fr.*—Early August into September.

*Maritime.*—Long Branch, Barnegat City (L), Long Beach Island on New Inlet (L), Tucker's (L), Brigantine, Atlantic City, Sea Isle City (P), Cape May Ct. House.

#### ACNIDA L.

##### *Acnida cannabina* L. Water Hemp.

*Acnida cannabina* Linnaeus, Sp. Pl. 1027. 1753 [Virginia].—Barton Fl. Phila. II. 193. 1818.—Britton 205.—Keller and Brown 136.

Common along the coast marshes and up the Delaware at least as far as our limits.

*Fl.*—Mid-August to late September. *Fr.*—Late August to early October.

*Middle District.*—Kinkora (NY), Fish House, Kaighn's Pt., Camden, Washington Park, Salem (S), Millville.

*Coast Strip.*—Forked River, Barnegat Pier, Manahawkin, Harvey Cedars (L), Anglesea, Cold Spring (S), Cape May, Tuckahoe (S).

*Cape May.*—Dennisville (S).

#### Family PHYTOLACCACEÆ. Poke.

##### PHYTOLACCA L.

##### *Phytolacca decandra* L. Poke.

*Phytolacca decandra* Linnaeus, Sp. Pl. Ed. 2. 631. 1762 [Virginia].—Knieskern 25.—Britton 208.

River shores and waste ground, especially in the Middle and Cape May districts; common also on the coastal islands. The Poke, while supposedly native of this region, has become such a thorough weed that all trace of its original habitat has been lost.

*Fl.*—Mid-June into autumn. *Fr.*—Mid-August into autumn. Flowering and fruiting continuously until cut down by frost.

#### Family AIZOACEÆ. Carpet weed, etc.

##### *Key to the Species.*

a. Fleshy seacoast herbs, leaves spatulate, opposite.

aa. Not fleshy, leaves mostly linear, verticillate. *Sesuvium maritimum*, p. 435  
[*Mollugo verticillata*]\*

\* Carpetweed, a common prostrate weed of cultivated grounds.

## SESUVIUM L.

*Sesuvium maritimum* (Walt.). Sea Purslane.

*Pharnacium maritimum* Walter, Fl. Car. 117. 1788 [South Carolina].

*Sesuvium sessile* Nuttall Gen. I. 306. 1818.

*Sesuvium portulacastrum* Knieskern 9.—Willis 13.

*Sesuvium maritimum* Britton 112.—Keller and Brown 137.

Occasional on the sea beaches; not nearly as abundant in New Jersey as most statements would lead one to suppose.

*Fl.*—Early July into September. *Fr.*—Mid-July into October.

*Maritime.*—Deal, Halfway House south of Bond's (L), Sherburn's (L), Ocean City, Wildwood, Cape May (S).

Family PORTULACACEÆ. Purslane, etc.

*Key to the Species.*

- a. Plant prostrate, flowers yellow. [*Portulaca oleracea*]\*  
 aa. Plant erect, flowers white striped with pink. *Claytonia*, p. 435

## CLAYTONIA L.

*Claytonia virginica* L. Spring Beauty.

Pl. LXXXIV., Fig. 2.

*Claytonia virginica* Linnæus, Sp. Pl. 204. 1753 [Virginia].—Knieskern 9.—Britton 66.

Common in moist woodland in the northern counties and less abundant and local southward in the Middle district.

*Fl.*—Early April to mid-May. *Fr.*—Early May to mid-June.

*Middle District.*—Keyport (C), New Egypt, Bordentown, Burlington (C), Kinkora, Fish House, Pensauken (S), Camden, Pemberton (NB), Moorestown (C), Haddonfield (C), Gloucester, Woodbury, Mickleton (NB), Marlboro (C), Alloway, Quinton, Salem (C), Swedesboro, Stoe Creek.

Family CARYOPHYLLACEÆ. Pinks, etc.

*Key to the Species.*

- a. Sepals united into a cup-like or tubular calyx.  
 b. Calyx with two or more lance, awl-form bracts at its base, flowers pink. [*Dianthus armeria*]<sup>1</sup>  
 bb. Calyx without bracts.  
 c. Five-toothed and ten-nerved.  
 d. Styles 5, flowers red-purple, 20–80 mm. broad. [*Agrostemma githago*]<sup>2</sup>

\* Purslane, an abundant and familiar fleshy weed.

<sup>1</sup> Deptford Pink. Frequent weed in fields.

<sup>2</sup> Corn Cockle. A grain-field weed.

- dd. Styles 3, flowers white or pink.
- c. Calyx not inflated at flowering time.
- f. Plant pubescent and viscid; flowers large, white, blooming at night. [*Silene noctiflora*]<sup>3</sup>
- ff. Stem with a portion of each joint glutinous, otherwise nearly glabrous, flowers small, pink, blooming transiently in sunshine. *S. antirrhina*, p. 438
- fff. Plant more or less viscid—pubescent, flowers 20–30 mm. broad.
- g. 3–6 dm. high, flowers crimson. *S. virginica*, p. 437
- gg. 1–2.5 dm. high, flowers pink. *S. caroliniana*, p. 437
- cc. Calyx bladderly-inflated, flowers white.
- d. Petals fringed. *S. stellata*, p. 437
- dd. Petals, two-cleft. [*S. latifolia*]<sup>4</sup>
- cc. Obscurely-nerved, terete or five-angled, flowers white, tinged with pink. [*Saponaria officinalis*]<sup>5</sup>
- aa. Sepals distinct or nearly so, low herbs with white or red petals or none.
- b. Fruit a dehiscing capsule.
- c. Stipules present, flowers pink-red.
- d. Plants fleshy, stipules ovate or deltoid. *Tissa marina*, p. 442
- dd. Plants not fleshy, stipules lanceolate. [*Tissa rubra*]<sup>6</sup>
- cc. Stipules none.
- d. Plants fleshy, forming dense mats on the seashore. *Ammodenia*, p. 441
- dd. Plants not fleshy.
- c. Petals two-cleft.
- f. Cleft nearly to the base, styles 3.
- g. Stems and flower stalks glabrous.
- h. Petals shorter than the sepals. *Alsine uliginosa*, p. 438
- hh. Petals longer than the sepals. *A. longifolia*, p. 438
- gg. Stems and flower stalks pubescent. [*A. media*]<sup>7</sup>
- ff. Petals cut half-way, styles 5 or 4.
- g. Petals much longer than the sepals. *Cerastium arvense*, p. 439
- gg. Petals about equalling the sepals.
- h. Pedicels not longer than the sepals, flowers glomerate. [*C. viscosum*]<sup>8</sup>
- hh. Pedicels at length longer than the sepals, flowers cymose.
- i. Perennial, tufted. [*C. vulgatum*]<sup>9</sup>

<sup>3</sup> Night-flowering Catchfly, occasional in waste ground.<sup>4</sup> Bladder Champion, occasional in waste ground.<sup>5</sup> Bouncing Bet. Very common roadside weed.<sup>6</sup> Purple Sand Spurry, a weed especially on the coast.<sup>7</sup> Common Chickweed. This and the next two familiar garden weeds.<sup>8</sup> Mouse-ear chickweed.<sup>9</sup> Larger Mouse-ear Chickweed.

- ii. Annual, weak and reclining. *C. nutans*, p. 439
- ec. Petals entire.
- f. Styles as many as the sepals.
- g. Ascending, seeds orange brown when mature, dotted with resinous atoms. *Sagina decumbens*, p. 439
- gg. Depressed or spreading, seeds dark or grayish brown, not resinous. *S. procumbens*, p. 440
- ff. Styles fewer than the sepals.
- g. Leaves broad, 10-20 mm. long.  
*Mochringia lateriflora*, p. 441
- gg. Leaves ovate, very small, acute.  
[*Arenaria serpyllifolia*]<sup>10</sup>
- ggg. Leaves awl-shaped, closely imbricated.  
*A. caroliniana*, p. 440
- bb. Fruit an indehiscant or irregularly bursting utricle.
- c. Stipules present.
- d. Plant somewhat pubescent, short-jointed, low and spreading.  
*Anychia polygonoides*, p. 442
- dd. Smooth, longer jointed, slender and erect. *A. canadensis*, p. 442
- cc. Stipules none, leaves awl-shaped, plant prostrate, spreading.  
[*Scleranthus annuus*]<sup>11</sup>

## SILENE L.

*Silene stellata* (L.). Starry Campion.\*

*Cucubalus stellatus* Linnæus, Sp. Pl. 414. 1753 [Virginia and Canada].

*Silene stellata* Knieskern 9.—Willis 12.—Britton 60.

Common in woods of the northern counties and locally southward in the Middle districts and on the coast islands.

*Fl.*—Early July to early August.

*Middle District.*—Shark River (Kn), New Egypt, Birmingham, Pemberton Jnc. (S), Moorestown (C), Medford (S), Bordentown (C), Fish House, Camden (CP), bel. Washington Park (S), Swedesboro, Mickleton (H).

*Coast Strip.*—Anglesea, Wildwood (UP), Cold Spring.

*Silene caroliniana* Walt. Sticky Catchfly. Wild Pink.

*Silene Caroliniana* Walter Fl. Car. 142. 1788 [South Carolina].

*Silene Pennsylvanica* Barton, Fl. Phila. I. 211. 1818.—Knieskern 9.—Britton 61.

<sup>10</sup> Thyme-leaved Sandwort. Frequent especially about yards and gardens.

<sup>11</sup> Knawel. Abundant in sandy waste ground.

\* *Silene virginica* Linnæus, Sp. Pl. 419. 1753 [Virginia].—Willis 12.—Britton 61.—Keller and Brown 139.

This species is exceedingly rare in the State, if indeed it occurs at all. Willis publishes a record for Warren County on authority of F. Knighton, and one for "near Camden" on authority of W. M. Canby. I can find no trace of either specimen. Githens' record for Woodbury, published in Keller and Brown's list, is the following species.

Frequent in dry sandy soil in the upper part of the Middle district and on some of the coast islands. North of our limit in the State it occurs only in the Middle district, but grows locally beyond the fall line in Pennsylvania. This is a beautiful and characteristic West Jersey plant, easily recognized by its bright pink flowers, sticky pedicels and general rosette-like habit.

*Fl.*—Early May to mid-June.

*Middle District.*—New Egypt, Browns Mills, Birmingham, Pemberton (C), Evansville (C), Medford (S), Locust Grove (S), Beverly, Washington Park, Fancy Hill, Mantua (H), Camden (CP).

*Coast Strip.*—Piermont, Five-Mile Beach.

***Silene antirrhina* L. Sleepy Catchfly.**

*Silene antirrhina* Linnæus, Sp. Pl. 419. 1753 [Virginia and Carolina].—Barton Fl. Phila. I. 211. 1818.—Knieskern 9.—Britton 61.

Frequent in the Northern and Middle districts and occasional in the Pine Barrens.

It has become so much of a weed that its true distribution cannot now be determined.

*Fl.*—Late May to late June.

*Middle District.*—New Egypt, Beverly, Burlington, Red Bank, Sewell (S), Pitman, Swedesboro.

*Pine Barrens.*—Landisville (T), Mays Landing (NB), introduced, probably.

*Coast Strip.*—Cedar Bonnet (L).

**ALSINE L.**

***Alsine uliginosa* (Murr.). Marsh Chickweed.**

*Stellaria uliginosa* Murray, Prodr. Goett. 55. 1770 [Vicin. Goettengen].—Britton 63.

In springs and small brooks at several stations in the northern counties and rarely southward, entering our area along the Delaware River.

*Fl.*—Early May to early September.

*Middle District.*—Delanco, Riverton (C), [Dr. Jos. Stokes, 1882].

***Alsine longifolia* (Muhl.). Long-leaved Chickweed.**

*Stellaria longifolia* Muhlenberg, in Willd. Enum. Hort. Ber. 479. 1809 [Pennsylvania].—Britton 63.

Common in swamps and meadows of the northern counties, and south locally in the Middle district.

*Fl.*—Mid-May to mid-June.

*Middle District*.—New Egypt, Delair, Pemberton (C), Medford (S), Lindenwold (S), Atco (C), Pitman, Grenloch, Mickleton (H), Swedesboro.

**CERASTIUM L.\***

*Cerastium arvense* L. Field Chickweed.

*Cerastium arvense* Linnaeus, Sp. Pl. 438. 1753 [Scania and So. Europe].—Britton 62.

Frequent in rocky places in the northern counties and occasional on sandy banks in the upper part of the Middle district. It was also collected once at Cape May Court House, but it was probably introduced there.

*Fl.*—Late April to early June.

*Middle District*.—Bordentown (C), Fancy Hill, Kaighns Pt., Camden, Gloucester, Westfield, Red Bank (C).

**SAGINA L.**

*Sagina decumbens* (Ell.). Decumbent Pearlwort.

*Spergula decumbens* Elliott, Bot. S. C. and Ga. I. 523. 1817 [South Carolina].

*Sagina decumbens* Britton 65.—Keller and Brown 142.

*Spergula saginoides* Barton, Fl. Phila. I. 214. 1818.—Nuttall Gen. I. 290. 1818.

*Sagina subulata* var. *Smithii* Gray, Man. Ed. V. 95. 1867 [Somers Pt. N. J.].—Willis 12.

*Sagina decumbens* var. *Smithii* Britton 65.—Keller and Brown 142.

Damp sandy places in the Coast strip, frequent: less common in the Middle district, also at one station in Passaic Co.

The plant known as *Sagina decumbens* var. *smithii* seems to be nothing more than an apetalous form of this and not worthy of even varietal recognition, as similar apetalous forms occur in several other genera of the *Caryophyllaceæ*. It was originally discovered at Somers Point, N. J., by Mr. Charles E. Smith, of Philadelphia, after whom it was named.

*Fl.*—Late April to late June.

*Middle District*.—Delair, Haddonfield, Westville (KB), Gloucester (NB), Game Creek, Salem Co.

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\* *Cerastium nutans* Rafinesque, Préc. Découv. 36. 1814 [Pennsylvania].—Knieskern 9.—Britton 63.

Frequent in woods of the northern counties, but very rare within our limits, if it occurs at all. Knieskern stated that it occurred in Monmouth County and in Britton's Catalogue, it is reported from Camden on authority of Miss C. A. Boice. I have seen no specimens from our region.

*Coast Strip.* Deal, Pt. Pleasant, Surf City (L), Beach Haven (L), Spray Beach (L), Atlantic City, Somers Pt., Mays Landing (NB), Wildwood, Cape May (S), Avalon, Pleasant Mills, Stone Harbor.\*

*Pine Barrens?*—Egg Harbor City (H).

**Sagina procumbens L. Procumbent Pearlwort.**

*Sagina procumbens* Linnaeus, Sp. Pl. 128. 1753 [Europe].—Britton 65.—Keller and Brown 142.

Occasional in the northern counties and on the upper Coast strip. Also as an introduced weed in city streets.

*Fl.*—Early May to late June.

*Coast Strip.*—Pt. Pleasant, Deal, Beach Haven Terrace (L).

**ARENARIA L.**

***Arenaria caroliniana* Walt. Pine Barren Sandwort.**

Pl. LVIII., Fig. 1.

*Arenaria caroliniana* Walter, Fl. Car. 141. 1788 [South Carolina].—Britton 64.—Keller and Brown 142.

*Arenaria squarrosa* Pursh Fl. Am. Sept. I. 318. 1814.—Willis 12.

*Alsine squarrosa*, Knieskern 9.

Frequent in white sand in the Pine Barrens, but not found elsewhere in the State nor anywhere farther north, except on Staten or Long Islands.

This little plant, the "Longroot" of the natives, is characteristic of the barest patches of white sand, of which, except for a few grasses, it is often the sole occupant. At other times it is associated with *Linaria canadensis* and *Chysopsis falcata* and species of *Lechca*. The little awl-shaped leaves form dense tufted rosettes, resembling some species of moss, and from these the slender branching flower stalks stand up to a height of two or three inches. The white flowers, with their greenish centers, are very delicate and attractive, but difficult to distinguish against the white sand. The stalks are somewhat glandular and sand grains and the ever-present mosquitoes are sometimes found adhering to them.

*Fl.*—Early June to late July, and occasionally through the summer.

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\* Also reported in Keller and Brown's list from Hammonton, but I have been unable to verify the record.



*Pine Barrens*.—Toms River, Browns Mills, Hanover, Brindletown, Double Trouble, Jones Mill (S), Speedwell, White Horse (S), Atsion, Ballenger's Mills, Taunton, Quaker Bridge, Head of Batsto (S), Pleasant Mills, Batsto, Williamstown Juc., Winslow, Inskip, Folsom, Mays Landing.

#### MOEHRINGIA L.

##### *Moehringia lateriflora* (L.). Blunt-leaved Sandwort.

*Arenaria lateriflora* Linnæus, Sp. Pl. 423. 1753 [Siberia].—Britton 64.  
*Moehringia lateriflora* Keller and Brown 142.

In low woods and meadows: occasional in the northern counties and along the Coastal strip, also rarely in the Middle district. First detected within our limits by Mr. C. F. Parker in the woods below Atlantic City.

*Fl.*—Late May to late June.

*Middle District*.—Farmingdale, Lindenwold.

*Coast Strip*.—Atlantic City, Longport (S), Anglesea.

#### AMMODENIA J. G. Gmelin.

##### *Ammodenia peploides maritima* Raf. Sea-beach Sandwort.

Pl. V., Fig. 1. Pl. LV., Fig. 2.

*Adenarium maritimum* Rafinesque, New Flora Pt. I. 62. 1836 [New England to New Jersey].

*Arenaria peploides*.—Willis 12.—Britton 64.

*Honkenya peploides*.—Knieskern 9.

*Ammodenia peploides* Keller and Brown 143.

Sea beaches above high tide all along the coast. Apparently much less common than formerly, and extinct in the vicinity of many of the most populous resorts. The large tufts or cushions, and the sand which they collect, form conspicuous objects along the beach. Prof. Fernald has shown that our plant is different from the more northern form, but if we recognize the genus *Ammodenia* as separable from *Arenaria*, which he does not do, we must use Rafinesque's name, *maritima*, for the southern form.

*Fl.*—Early May to early June.

*Maritime*.—Sandy Hook, Asbury Park, Deal, Mantoloking (McK), Pt. Pleasant, Manasquan, Barnegat City (L), Tucker's (L), Spray Beach (L), St. Albans (L), Ship Bottom (L), Atlantic City, Ocean City, Stone Harbor, Anglesea, Cape May (S).

## TISSA Adanson.

*Tissa marina* (L.). Salt Marsh Sand Spurry.

*Arenaria rubra* var. *marina* Linnæus, Sp. Pl. 423. 1753 [Shores of the ocean].  
*Spergularia rubra* var. *marina* Knieskern 9.—Willis 13.  
*Tissa marina* Britton 65.—Keller and Brown 143.

Sandy spots in the salt marshes of the coast; frequent.

Prof. Fernald and Mr. K. M. Wiegand propose to reject Linnæus' name *marina* as non-identifiable and to substitute *leiosperma*. Every effort, however, should be made to fix the older name, admittedly composite, to one of its components, in preference to rejecting it. (cf. *Rhodora*, 1910, p. 157.)

*Fl.*—Early June into September. *Fr.*—Late June into autumn.

*Maritime.*—Sandy Hook, Sea Girt, Long Branch, St. Albans (L), Brigantine, Atlantic City, Ocean City, Sea Isle City, Anglesea, Holly Beach, Cold Spring, Cape May.

## ANYCHIA Michaux.

*Anychia canadensis* (L.). Slender Forked Chickweed.

*Anychia canadensis* Linnæus, Sp. Pl. 90. 1753 [Canada and Virginia].—  
 Britton 204.—Keller and Brown 143.

Frequent in open woods in the northern counties, and less common southward in the Middle district.

*Fl.*—Mid-June into September.

*Middle District.*—Pemberton Jnc., Medford (S), Oaklyn (S), Red Bank, Swedesboro.

*Pine Barrens?*—Mays Landing (NB).

*Anychia polygonoides* Raf. Forked Chickweed.

*Anychia polygonoides* Rafinesque, Atl. Jour. 1832. 16 [Alleghany Mts.].

*Anychia dichotoma* Knieskern 9.—Britton 204.—Keller and Brown 143.

Frequent in the northern counties in shady localities, rare in our region, but occurs both in the Pine Barrens and Middle district.

*Fl.*—Late June into October.

*Middle District.*—Marlboro (NB).

*Pine Barrens.*—Ancora, Waterford.

## Order RANALES.

Family NYMPHÆACEÆ. Water-Lilies.

*Key to the Species.*

- a. Leaves peltate.  
 b. Flowers purple, 10-16 mm. in diameter, sepals and petals three.  
*Brasenia purpurea*, p. 443  
 bb. Flowers yellow, 120-250 mm. in diameter, sepals 4-5, petals numerous.  
*Nelumbo lutea*, p. 446
- aa. Leaves orbicular to oblong.  
 b. Flowers white or tinged with pink, stamens yellow.  
*Castalia odorata*, p. 445  
 bb. Flowers yellow.  
 c. Leaves smaller, floating, sinus closed, petiole flattened.  
*Nymphaea variegata*, p. 444  
 cc. Leaves larger, erect, sinus open, petiole nearly terete.  
*Nymphaea advena*, p. 444

## BRASENIA Schreber.

*Brasenia purpurea* (Michx.). Water Shield.*Hydropeltis purpurea* Michaux, Fl. Bor. Am. I. 324, pl. 29. 1803 [Lower Carolina and Tennessee].*Brasenia peltata* Pursh, Fl. Am. Sept. II. 389. 1814 [New Jersey to Carolina].—Knieskern 6.—Willis 5.—Britton 43.

Rather frequent in lakes and ponds of the northern counties and in ponds and dammed streams in the Pine Barrens and Cape May district; apparently rare in the Middle district.

A very characteristic species of the old milldams in the Pine Barrens, though its smaller peltate leaves and little maroon colored flowers are not nearly so conspicuous as the showy blooms and large leaves of the true Water Lilies. The petioles and buds are encased in a thick coating of jelly-like mucilage.

*Fl.*—Early June to early August. *Fr.*—Early July to early September, probably.

*Middle District.*—Delanco (S), Shark River (Kn), Meteticunk River (NY), Barrsville (Kn), Spring Garden (Willis).

*Pine Barrens.*—Toms River, Forked River, Jackson, Atco, Atsion, Pan-coast, Hammonton (Bassett.).

*Cape May.*—Nummeytown (S), Cold Spring (OHB).

## NYMPHÆA L.

*Nymphæa advena* Soland. Upright Spatter-dock.

*Nymphæa advena* Solander, in Ait. Hort. Kew. II. 226. 1789 [North America].—Knieskern 6.—Britton 44.—Keller and Brown 144.  
*Nuphar advena* Barton Fl. Phila. II. 10. 1818.

Common along the lower Delaware River and adjacent ditches and tidewater streams of West Jersey.

This is the large-leaved erect Spatterdock so common along the Delaware meadows, where it grows in association with *Sagittaria latifolia*, *Peltandra virginica*, *Zizania*, etc.

*Fl.*—Mid-May to mid-September.

*Middle District.*—Riverside, Pensauken, Washington Park, Haddonfield (S).

*Nymphæa variegata* Engelm. Floating Spatter-dock.\*

*Nymphæa variegata* Engelmann, Gray's Man. Ed. V., p. 57. 1867 [Probably Michigan].—Keller and Brown 145.  
*Nymphæa microphylla* Britton 44 (in part).

Ponds and slow streams in the northern counties and the Pine Barrens, apparently scarce in the Middle district.

This is the Floating Spatterdock with smaller leaves and rounder lobes, and weaker petioles.

It seems to be the only species in the higher Alleghenies of Pennsylvania and reappears as a characteristic plant of the New Jersey Pine Barrens. Specimens from this region that have been referred to *N. rubrodiscum* are apparently all referable to this species, and so far as I can see those referred to *N. microphylla* Pers. fall into the same category. Specimens from Pensauken Creek have thin submerged leaves and small flowers, but they are connected with *N. variegata* by a full series of intermediates. Whatever true *N. microphylla* may be I can see no more difference in the extremes of these floating Spatterdocks in southern New Jersey than exists in the White Water Lilies.

*Fl.*—Probably similar to the last.

\* Cf. G. S. Miller, Jr., Proc. Biol. Soc. Wash. 1902, pp. 11-13.

*Middle District*.—Pensauken (S), Burlington.

*Pine Barrens*.—Farmingdale (S), Allaire (S), Forked River, Ballinger's Mill, Sicklerville, Clementon, Folsom, Hammonton, Batsto, Mays Landing, Dennisville.

### CASTALIA Salisbury.

*Castalia odorata* (Dryand). Water Lily.

#### PL. LIX.

*Nymphaea odorata* Dryand. in Ait. Hort. Kew II. 227. 1789 [North America].—Barton Pl. Phila. I. 12. 1818.—Knieskern 6.

*Castalia odorata* Britton 43.—Keller and Brown 145.

*Nymphaea odorata* var. *minor* Willis 5.

*Castalia odorata* var. *minor* and forma *rosea* Britton 43.

*Castalia odorata rosea* Keller and Brown 145.

Common throughout the State in ponds and dams. Especially plentiful in the Pine Barrens, where the majority of the plants have smaller leaves and often smaller flowers representing the so-called variety *minor*. Sometimes the pink color, which is usually apparent on the back of the petals, suffuses the whole flower to a greater or less degree, and this represents the form *rosea*, which is recognized by some authors. Fine examples of these pink flowers were observed by I. H. Hall, July 4, 1865, near Atsion,\* and the late Mr. Albrecht Jahn collected some at Hanover, Burlington Co., which are in the herbarium of the Philadelphia Academy. The original water lily that formed the basis of Dryand's description was received from Mr. William Hamilton of the "Woodlands," Philadelphia, and quite likely came from the New Jersey side of the Delaware, as the plant was always more common there than on the Pennsylvania side.

*Fl.*—Early June to late September.

*Middle District*.—New Egypt, Florence, Burlington, Delanco, Paulsboro, Mickleton, Swedesboro, Centerton (S), Woodstown (C).

*Pine Barrens*.—Asbury Park, Allaire, Toms River (S), Forked River, Manchester, Hanover (C), Bamber, Dover Forge, Island Heights, Speedwell, Cedar Brook, Winslow (S), Folsom, Pancoast, Hammonton, Pleasant Mills (NB), Mays Landing (T).

*Cape May*.—Nummerytown, Cold Spring, Cape May (NB).

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\* cf. Bull. Torrey Bot. Club, IV. 8: 1873.

## NELUMBO Adanson.

*Nelumbo lutea* (Willd.). American Lotus.

*Nelumbium luteum* Willdenow, Sp. Pl. II. 1259. 1799 [Virginia, Carolina and Florida].—Willis 5.—Britton 43.—Keller and Brown 145.

Very local, but abundant where found, *i. e.*, at Swartsword Lake, Sussex Co., and in pounds at Woodstown and Sharptown, Salem Co.\*

*Fl.*—Late July to late August or into September.

*Middle District.*—Woodstown, Sharptown.

Family CERATOPHYLLACEÆ. Hornwort.

## CERATOPHYLLUM L.

*Ceratophyllum demersum* L. Hornwort.

*Ceratophyllum demersum* Linnæus, Sp. Pl. 992. 1753 [Europe].—Britton 228.—Keller and Brown 145.

Ponds and slow streams in the Middle and Cape May districts, and at several stations north of our limits, but apparently all in the Coastal plain.

Mr. Bayard Long tells me that he thinks our local material represents two forms, probably *C. demersum* and *C. echinatum*, but that the character of foliage and spines on the fruit do not seem sufficiently constant to warrant recognition.

*Fr.*—August 12, 1910, Cape May, mature.

*Middle District.*—Fish House, Cooper's Creek, Camden (P), Repaupo (H), Mickleton (H), Swedesboro, Mullica Hill (H).

*Cape May.*—Bayside (OHB), Cape May.

Family MAGNOLIACEÆ. Magnolias.

*Key to the Species.*

*a.* Flowers white. Leaves entire. *Magnolia virginiana*, p. 446

*aa.* Flowers green and orange. Leaves truncate, lobed.

*Liriodendron tulipifera*, p. 448

## MAGNOLIA L.

*Magnolia virginiana* L. Sweet Bay, Swamp Magnolia.

Pl. LX.

*Magnolia virginiana* Linnæus, Sp. Pl. 535. 1753 [Virginia and Carolina].—Keller and Brown 146.

*Magnolia glauca* Michaux, Fl. Bor. Am. I. 327. 1803.—Pursh, Fl. Am. Sept. II. 380. 1814.—Barton Fl. Phila. II. 18. 1818.—Knieskern 6.—Willis 4.—Britton 41.

\* cf. Heritage Bull. Torr. Bot. Club, XXII., pp. 266-271, for a study of the plant at Sharptown.

Common in swampy thickets throughout our region and at a number of stations north of our limits, but south of the fall line.

This is a characteristic tree of the coastal plain most abundant and uniformly distributed in the Pine Barrens, but frequent in the other districts also. Unlike most of the cultivated magnolias, it is a late bloomer, the flowers appearing in June when the leaves are fully developed. At that season the atmosphere of the Pine Barren swamps is heavy with the perfume of the Magnolia, and we recognize its presence long before we detect the creamy cup-shaped flowers nestling among the shining green leaves. As the wind stirs the foliage, the glaucous under surfaces are turned up and show conspicuously against the general green tone of the swamp vegetation, and later on the bright red seeds bursting forth from the cone-like receptacle, or hanging from it by slender threads, make the Magnolia equally conspicuous.

Unfortunately Magnolia flowers have a market value, and the curbstone flower-venders of Philadelphia ruthlessly strip them from the trees, often breaking the latter to such an extent as to permanently ruin them. To become saleable it seems that the leaves must be plucked off and the flowers tied closely together in a compact mass, some of the leaves being then fastened around the outside in a sort of a halo, this "artistic" arrangement proving more satisfactory to both buyer and seller than that which nature found desirable. A similar arrangement is seen in the bunches of *Arbutus* offered for sale earlier in the season, some of which are further embellished with a head of *Helonias* as a centerpiece.\*

*Fl.*—Late May to early July. *Fr.*—Early August into October.

*Middle District.*—Shark River, Farmingdale, Bordentown, Medford (S), Washington Park, Dividing Creek.

*Pine Barrens.*—Allaire, Forked River, Browns Mills, Bamber, Speedwell, Bear Swamp (S), Clementon, Penbryn (S), Albion, Williamstown, Cedar Brook, Andrews, Landisville, Hammonton, Egg Harbor.

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\* Mr. Samuel N. Rhoads informs me that some years ago he found two trees of *Magnolia tripetala* about eight feet in height, one in thick woods north of Orchard Sta., the other near Audubon. Mr. Bayard Long found another near Bordentown in 1910. If these trees are native, as seems probable, they furnish another instance of a southern species, common to the Susquehanna and Delaware valleys.

*Coast Strip.* Surf City (L.), Beesley's Pt. (S), Palermo (S), Piermont (S), Angelsea (UP).

*Cape May.* Court House.

LIRIODENDRON L.

*Liriodendron tulipifera* L. Tulip-tree. Tulip Poplar.

Pl. LXI., Fig. 1.

*Liriodendron tulipifera* Linnaeus, Sp. Pl. 535. 1753 [North America].—Kniekers 6.—Willis 4.—Britton 41.

A common tree in rich woodland of the Northern and Middle districts and occasional in the Cape May peninsula and Coast strip.

The term "poplar," for this tree is one of those unfortunate misnomers which it seems impossible to dispose of. It, of course, has nothing to do with the true Poplars. (*Populus*, p. 391.)

*Fl.*—Late May to early June. *Fr.*—Early September, through autumn. The axes of the cones, often with numerous carpels attached, commonly persist over winter.

*Middle District.*—New Egypt, Birmingham, Medford (S), Haddonfield, Lawnside (S), Glassboro, Sewell (S), Sicklerville (S), Albion.

*Coast Strip.*—Manahawkin, Barnegat.

*Cape May.*—Goshen (S), Shicee Creek (S), Court House, Cold Spring.

Family ANNONACEÆ. Pawpaws.

ASIMINA Adanson.

*Asimina triloba* (L.). Papaw.

*Annona triloba* Linnaeus, Sp. Pl. 537. 1753 [Carolina].

*Asimina triloba* Britton 41.—Keller and Brown 146.

A southern species, apparently very rare in the State. The only records are those given in Britton's Catalogue: "Abundant along Crosswicks Creek, Mercer Co. (C. C. Abbott); Ridge's Island, Delaware River, Hunterdon Co. (Best); Thompsettown, near Mays Landing, Atlantic Co. (Bassett)."

I have been unable to find any specimens from the State or to see the tree growing.

Family RANUNCULACEÆ. Buttercups, etc.

*Key to the Species.*

a. Fruit consisting of heads of dry follicles.

b. Leaves reniform, basal, flowers of yellow, petal-like sepals.

*Callitha palustris*, p. 450

bb. Leaves large, ternately compound; flowers white in a slender, erect raceme.

*Cimicifuga racemosa*, p. 451



- bbb.* Leaves ternately compound, flowers red and yellow pendant, with long spurs. *Aquilegia canadensis*, p. 452
- aa.* Fruit consisting of berries, leaves ternately compound, flowers white, in an erect raceme.
- b.* Berries white, pedicels red. *Actæa alba*, p. 451
- bb.* Berries red. *Actæa rubra*, p. 451
- aaa.* Fruit consisting of cluster of achenes.
- b.* Stem-leaves forming an involucre below the calyx: as the sepals are blue or white, they could easily be taken for petals (which are lacking) and the green bracts for sepals.
- c.* Involucre remote from the white flower (tinged with pink or green externally).
- d.* Achenes densely wooly, flowers white, plant 6-10 dm. high. *A. virginiana*, p. 452
- dd.* Achenes pubescent or nearly glabrous.
- e.* Plant 3-6 dm. high, involucre leaves sessile. *A. canadensis*, p. 452
- ee.* Plant 1-2 dm. high, involucre leaves, lobed, petioled. *A. quinquefolia*, p. 453
- cc.* Involucre of three simple leaves close to the flower. *Hepatica hepatica*, p. 453
- ccc.* Involucre of three compound sessile leaves. *Synedemon thalictroides*, p. 454
- bb.* No involucre leaves.
- c.* Leaves opposite, plant a climbing vine, flowers white, sepals petal-like, petals wanting. *Clematis virginiana*, p. 454
- cc.* Leaves alternate or basal, not climbing vines.
- d.* Petals present.
- e.* Achenes compressed, flowers yellow.
- f.* Aquatic plant with finely divided floating leaves. *R. delphinifolius*, p. 454
- ff.* Plants of swamps or muddy shores, leaves entire or denticulate.
- g.* Plant low, 1.5-3 dm. high, petals barely exceeding the sepals, stamens 1-10. *R. pusillus*, p. 455
- gg.* Plant taller, 3-10 dm. high, petals longer than sepals, stamens numerous. *R. obtusiusculus*, p. 455
- fff.* Leaves, some or all, lobed or divided, terrestrial species or growing upright in shallow water.
- g.* Some of the basal leaves merely crenate. *R. abortivus*, p. 455
- gg.* Leaves all lobed or divided.
- h.* Flowers small, pale, less than 12 mm. broad, petals rarely exceeding the sepals.
- i.* Plant glabrous. *R. sceleratus*, p. 456
- ii.* Plants hirsute.
- j.* Head of fruit globose, beak of achene hooked. *R. recurvatus*, p. 456

- jj.* Head of fruit elongate, beak of achene straight. *R. pennsylvanicus*, p. 456  
*hh.* Flowers large and showy, 15-30 mm. broad.  
*i.* Beak of achene short, plants of fields, roadsides and waste ground.  
*j.* Root fibrous, calyx spreading.  
[*R. acris*]\*  
*jj.* Stem bulbous at base, calyx reflexed.  
[*R. bulbosus*]†  
*ii.* Beak of achene long, plants of woods or swamps.  
*j.* Beak stout, later branches prostrate, rooting at the nodes, shaded damp ground. *R. septentrionalis*, p. 456  
*jj.* Beak slender, plants upright, in woodlands. *R. hispidus*, p. 457  
*ee.* Achenes transversely wrinkled, flowers white, plants floating in water, leaves finely divided.  
*Batrachium trichophyllum*, p. 457  
*eee.* Achenes compressed and longitudinally ribbed, plants low, glabrous (4-20 cm.) spreading by runners, flowers small yellow.  
*Oxygraphis cymbalaria*, p. 457  
*dd.* Petals none, flowers forming large, feathery, open panicles, greenish or white.  
*c.* Filaments of the stamens club-shaped, plant not glandular.  
*ee.* Filaments capillary. *T. polygamum*, p. 458  
*f.* Plants low, 3-6 dm., flowers dioecious greenish, leaves thin. *T. dioicum*, p. 458  
*ff.* Plants tall, 10-20 dm., flowers polygamous, white, leaves thick and glandular or waxy.  
*T. revolutum*, p. 458

#### CALTHA L.

*Caltha palustris* L. Marsh Marigold.

*Caltha palustris* Linnæus, Sp. Pl. 558. 1753 [Europe].—Barton, Fl. Phila. II. 216. 1818.—Willis 3.—Britton 38.—Keller and Brown 147.

Common in swamps in the northern counties and less abundant locally southward in the Middle district.

*Fl.*—Early April to early May. *Fr.*—Late May to late June.

*Middle District.*—Freehold (C), Keyport, Perrineville (C), Farmingdale, New Egypt, Bordentown (C), Pensauken, Medford (S), Cooper's Creek, Camden (Bassett), Kaighus Pt., Lindenwold, Mantua, Mickleton, Mannington (C), Swedesboro.

\* Tall Buttercup. The common roadside species in the northern part of the State, not common in our region.

† Bulbous Buttercup. The common Buttercup of fields and meadows, an abundant weed.

## ACTÆA L.

*Actæa rubra* (Ait.). Red Baneberry.

*Actæa spicata* var. *rubra* Aiton, Hort. Kew. II. 221. 1789 [North America].  
—Britton 40.—Willis 3.

*Actæa rubra* Keller and Brown 148.

Occasional in woods of the northern counties, its occurrence within our limits resting entirely upon two records published in Britton's Catalogue for Keyport and Cream Ridge, Monmouth County.

*Actæa alba* (L.). White Baneberry.

*Actæa spicata* var. *alba* Linnæus, Sp. Pl. 504. 1753 [America].

*Actæa alba* Britton 40.

Frequent in woods of the northern counties, but rare within our limits and confined to the Middle district.

*Fl.*—Mid-May to early June. *Fr.*—Late July into September.

*Middle District.*—New Egypt, Two miles west Mullica Hill (NB) [= 5 mi. S. Mickleton in A. N. S.], Blackwood, Clarksboro (C), Swedesboro.

## CIMICIFUGA L.

*Cimicifuga racemosa* (L.). Black Snakeroot.

*Actæa racemosa* Linnæus, Sp. Pl. 504. 1753 [Florida, Virginia and Canada].

Frequent in rich woods of the Northern district, but rare within our limits and confined to the Middle district, except one station on the Cape May peninsula.

This is one of the familiar species in Pennsylvania just beyond the fall line, and in New Jersey just north of our boundary, but it is almost unknown within our limits. Martindale's statement, quoted by Britton, that it is "frequent in Camden County" is surely incorrect. If it occurs at all, it is very rare. There is no specimen in his herbarium. In view of its great rarity, its occurrence in the lower Cape May peninsula, along with other species of similar distribution, is particularly interesting.

*Fl.*—Late June to mid-July. *Fr.*—September into October.

*Middle District.*—Bordentown (C), Camden Co. (C), Swedesboro.

*Cape May.*—Cold Spring (OHB).

## AQUILEGIA L.

*Aquilegia canadensis* L. Wild Columbine.

Pl. I.XII., Fig. 2.

*Aquilegia canadensis* Linnæus, Sp. Pl. 533. 1753 [Virginia and Canada].—

Knieskern 6.—Willis 4.—Britton 39.

*Aquilegia canadensis* forma *flaviflora* Britton 39.

Frequent on rocky banks throughout the northern counties and southward locally through the Middle and Coast districts to the Cape May peninsula.

The Columbine in our region, failing to find its accustomed rocky banks, often grows out in flat sandy ground, especially on the coast islands, and becomes a larger, much more robust plant, sometimes three feet in height; quite different in appearance from the delicate plant of the northern counties.

At Sea Bright (Britton) and Cold Spring (O.H.B.) a form with pure yellow flowers occurs.

*Fl.*—Late April to early June. *Fr.*—Early June to mid-July.

*Middle District.*—Freehold (C), Keyport (C), Sea Bright (NB), Squan (Kn), Pemberton (NB), Birmingham, Vincentown (C), Bordentown, Medford (S), Little Timber Creek (CP), Mantua, Bridgeport (C), Raccoon Creek (H), Swedesboro, Courses Landing.

*Coast Strip.*—Atlantic City (P), Stone Harbor, Five-Mile Beach, Cold Spring.

## ANEMONE L.

*Anemone virginiana* L. Tall Anemone.*Anemone virginiana* Linnæus, Sp. Pl. 540. 1753 [Virginia].—Knieskern, 5.—

Willis 1.—Britton 33.

Common in open woods of the northern counties; rare and local southward in the Middle district, recurring in the southern part of the Cape May peninsula.

*Fl.*—Early June to early August. *Fr.*—Late July to early September.

*Middle District.*—New Egypt, Middletown (Kn), Pemberton Inc. (S), Camden Co. (P), Mickleton, Mullica Hill (P).

*Cape May.*—Cold Spring, Bennett (S).

*Anemone canadensis* L. Canada Anemone.*Anemone canadensis* Linnæus, Syst. Nat. Ed. XIII. 3, App. 231. 1768 [Pennsylvania].—Keller and Brown 149.*Anemone dichotoma* Britton 34.

Very rare and local. Known from several stations north of our limits and from Red Bank, Gloucester County, where it was collected by Charles F. Parker. Mr. Parker's specimens at Princeton and New Brunswick have been examined.

*Middle District*.—Red Bank (NB and P).

**Anemone quinquefolia L. Wind Flower, Wood Anemone.**

*Anemone quinquefolia* Linnæus, Sp. Pl. 541. 1753 [Virginia and Canada].

*Anemone nemorosa* Knieskern 5.—Britton 34.

Common in woods of the northern counties and not infrequent in the Middle district and along the Coast strip, though rather local; recurs in the lower part of the Cape May peninsula.

One feature in the flora of southern New Jersey which is particularly noticeable to one who is familiar with the country above the fall line is the almost total absence of the familiar spring flowers. When our upland woods are gay with Hepaticas, Bloodroots, Rue Anemones, Wood Anemones, Erythroniums and Spring Beauties, we find only one species—the Wood Anemone—at all generally distributed on the coastal plain, and it is not abundant, and practically absent from the Pine Barrens. The others rarely enter the region and are everywhere rare, and are mainly restricted to the vicinity of the Delaware River in Burlington County.

*Fl.*—Early April to mid-May. *Fr.*—Early May to mid-June.

*Middle District*.—Shark River, Farmingdale, New Egypt, Merchantville, Camden (P), Bordentown, Kinkora, Medford, Edge of Bear Swamp (S), Chairville, Browns Mills, Mantua, Sewell (S), Gloucester, Glassboro, Mickleton, Swedesboro, Yorktown, Quinton, Bridgeton.

*Pine Barrens?*—Landisville, Hammonton (Bassett) [both probably from edge of region].

*Coast Strip*.—Staffordsville (S), Palermo.

*Cape May*.—Cold Spring (OHB).

**HEPATICIA Scopoli.**

**Hepatica hepatica (L.). Liverwort.**

*Anemone Hepatica* Linnæus, Sp. Pl. 538. 1753 [Europe].—Britton 34.

Common in woods of the northern counties; rare and local southward in the upper Middle district, many of the records being single plants or small colonies.

*Fl.*—Late March to late April. *Fr.*—Early May to early June.

*Middle District*.—Pt. Pleasant (C), New Egypt, Bordentown, Birmingham, Pemberton (NB), Pensauken (S), Haddonfield (C), Woodbury (C), Little Timber Creek (P), five mi. S. Mickleton, Mannington.

**SYNDESMON Hoffmansegg.**

***Syndesmon thalictroides* (L.). Rue Anemone.**

*Anemone Thalictroides* Linnæus, Sp. Pl. 542. 1753 [Virginia and Canada].

*Thalictrum anemonoides* Knieskern 5.

*Anemonella thalictroides* Britton 34.

Common in woods of the northern counties, becoming scarce and local southward in the Middle district.

*Fl.*—Mid-April to mid-May. *Fr.*—Mid-May to mid-June.

*Middle District*.—New Egypt, Kinkora, Camden (CP), Moorestown (C), Gloucester, Sewell (S), Swedesboro, Quinton, Marlboro (C), Bridgeton (NB). Also a record for "Mays Landing, Dr. Peters," quoted in Britton's catalogue, probably from the edge of the river below the dam in the inward extension of the coast strip. Several other Middle District plants occur here which are not known on the coast strip proper, and are completely cut off from their range to the west by the Pine Barrens (c. f. *Pinus virginiana*).

**CLEMATIS L.\***

***Clematis virginiana* L. Virgin's Bower.**

*Clematis virginiana* Linnæus, Amoen. Acad. IV. 275. 1759 [Pennsylvania].  
—Knieskern 5. Britton 33.

Thickets along streams; common in the northern counties and less commonly southward in the Middle district to Cape May.

*Fl.*—Late July to late August. *Fr.*—Early September to early October.

*Middle District*.—Shark River (Kn), Squan (Kn), Pt. Pleasant (S), New Egypt, Birmingham, Pemberton (C), Cookstown (C), Wrightstown (C), Medford (S), Camden (P), Mantua, Mullica Hill (C), Mickleton (NY), Washington Park, Kirkwood (C), Swedesboro, Salem (C).

*Cape May*.—New England (OHB).

**RANUNCULUS L.**

***Ranunculus delphinifolius* Torr. Yellow Water Crowfoot.**

*Ranunculus delphinifolius* Torrey, in Eaton's Man. Ed. II. 395. 1818 [Upper Louisiana].—Keller and Brown 151.

*Ranunculus multifidus* Britton 36.

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\* *Atragene* is reported in Keller and Brown's list from "Pt. Pleasant," on authority of Dr. J. Stokes. Dr. Stokes, however, informs me that Pt. Pleasant, Pa., was intended, the plant growing on the New Jersey side of the Delaware.

Lakes or ponds at several stations in the northern counties, and reported from Freehold, Monmouth County, by Rev. Samuel Lockwood in Britton's Catalogue.

**Ranunculus pusillus Poir. Low Crowfoot.**

*Ranunculus pusillus* Poir, in Lam. Encycl. VI. 99. 1804 [Carolina].—Britton 36.—Keller and Brown 151.

Moist ground, rare. Several stations north of our limits, mostly in the Middle district, and several others in West Jersey.

*Middle District*.—Moorestown (NB), Taunton (C), Camden (P).

**Ranunculus obtusiusculus Raf. Water-plantain Crowfoot.**

*Ranunculus obtusiusculus* Rafinesque, Med. Rep. II. 5. 359. 1808 [New Jersey].—Keller and Brown 151.

*Ranunculus ambiguus* Britton 36.

Muddy banks of streams, etc.; at several stations in the northern counties and along the Delaware River from Trenton to Salem County. Mainly on the coastal plain.

*Fl.*—Late June to late July. *Fr.*—Early July to mid-August.

*Middle District*.—Florence (S), Camden, Washington Park (KB), Westville, Berkeley (NB), Repaupo (KB), Mantua Creek (KB), Gloucester (KB), Mickleton, Swedesboro.

**Ranunculus abortivus L. Kidney-leaved Crowfoot.**

Pl. LXII., Fig. 1.

*Ranunculus abortivus* Linnæus, Sp. Pl. 551. 1753 [Virginia and Canada].—Knieskern 5.—Britton 36.

Common in woods of the Northern and upper Middle districts; less abundant southward.

The crowfoots are not characteristic plants of the coastal plain and are mainly confined to the northern and western parts of the Middle district. The present species, *R. recurvatus* and *R. hispidus* are the most generally distributed.

*Fl.*—Mid-April to late May. *Fr.*—Early May to mid-June.

*Middle District*.—Farmingdale, New Egypt, Bordentown, Kinkora, Delaire, Delanco, Pensauken (S), Medford (S), Haddonfield, Camden (Bassett), Washington Park, Westville, Woodbury, Mickleton, Swedesboro, Marlboro (C), Riddleton, Quinton, Alloway.

**Ranunculus sceleratus** L. **Celery Crowfoot.**

*Ranunculus sceleratus* Linnæus, Sp. Pl. 551. 1753 [Europe].—Knieskern 5.—Britton 37.

Ditches and muddy banks of streams and marshes. Reported from Essex and Bergen Counties, and frequent in West Jersey and on the coastal strip to Cape May. Tends to become a weed.

*Fl.*—Mid-April to late June. *Fr.*—Early May to mid-July.

*Middle District.*—New Egypt, Pemberton (NB), Medford (S), Washington Park, Mickleton.

*Coast Strip.*—Beach Haven Terrace (L), Piermont (S), Five-Mile Beach, Cold Spring (OHB), Cape May.

**Ranunculus recurvatus** Poir. **Wood Crowfoot.**

*Ranunculus recurvatus* Poir. in Lam. Encycl. VI. 125. 1804 [Environs of New York].—Knieskern 5.—Britton 37.

Common in moist woods of the northern counties; less abundant southward in the Middle district.

*Fl.*—Late April to early June. *Fr.*—Early May to mid-June.

*Middle District.*—Farmingdale, New Egypt, Pemberton (C), Kinkora, Medford (S), Lindenwold, Sewell (S), Mullica Hill (NB), Mickleton, Swedesboro, Marlboro (NB), Elsinboro (C), Bridgeton (S).

**Ranunculus pennsylvanicus** L. f. **Bristly Buttercup.**

*Ranunculus pennsylvanicus* Linnæus, f. Suppl. 272. 1781 [Pennsylvania].—Willis 3.—Britton 37.—Keller and Brown 152.

Frequent in the swamps of the northern counties; rare southward, especially within our limits, where it occurs only in the upper Middle and Coast districts; possibly introduced, at some stations at least.

*Fl.*—Late June to early August. *Fr.*—Mid-July to late August.

*Middle District.*—Freehold (C), Long Branch, Pemberton, Camden (NB), Repaupo (NB).

*Coast Strip.*—Spray Beach (L).

**Ranunculus septentrionalis** Poir. **Swamp Buttercup.**

*Ranunculus septentrionalis* Poir. in Lam. Encycl. VI. 125. 1804 [North America].—Britton 37.

Swamps, borders of streams, etc. Common in the northern counties and frequent or occasional southward in the Middle and Cape May districts.



*Fl.*—Early May to early June. *Fr.*—Mid-May to late June.

*Middle District.*—Beverly, Delaire, Fish House, Camden, Kaighns Pt., Westville, Washington Park, Center Square, Mickleton, Swedesboro, Hancock's Bridge (S).

*Cape May.*—Cold Spring (OHB).

**Ranunculus hispidus Michx. Hispid Buttercup.**

*Ranunculus hispidus* Michaux, Fl. Bor. Am. I. 321. 1803 [Lower Carolina].

*Ranunculus fascicularis* Knieskern 6.—Willis 3.—Britton 37.

Woodlands of the Northern and Upper Middle districts; rather frequent, also rare in the lower Cape May peninsula.

*Fl.*—Late April to late May. *Fr.*—Early May to mid-June.

*Middle District.*—Freehold (Kn), Sea Bright (NB), Squan (Kn), New Egypt, Hightstown (C), Merchantville (C), Medford (S), Taunton (C), Mullica Hill (H), Mickleton.

*Cape May.*—Cold Spring.

**BATRACHIUM S. F. Gray.**

***Batrachium trichophyllum* (Chaix.). White Water Crowfoot.**

*Ranunculus trichophyllum* Chaix in Vill. Hist. Pl. Dauph. I. 335. 1786 [Valgandemar, France].

*Ranunculus fluciatilis* Barton, Fl. Phila. II. 26. 1818.

*Ranunculus aquatilis* var. *trichophyllum* Britton 35.

*Batrachium trichophyllum* Keller and Brown 152.

*Ranunculus aquatilis* var. *divaricatus* Knieskern 5.—Willis 2.

*Batrachium divaricatum* Keller and Brown 152.

Ponds and streams; not common. Occurs at a number of stations north of limits and at several points southward in West Jersey. I think there is no question but that Knieskern's record of *divaricatus* belongs to this species.

*Fl.*—Late May to late August.

*Middle District.*—Camden, Repaupo (H), Medford (KB), Salem, Squan and Shark River (Kn).

**OXYGRAPHIS Bunge.**

***Oxygraphis cymbalaria* (Pursh.). Seaside Crowfoot.**

*Ranunculus cymbalaria* Pursh, Fl. Am. Sept. I. 392. 1814 [Saline Marshes, Onondago Co., N. Y.].—Knieskern 5.—Willis 3.—Britton 36.

*Oxygraphis cymbalaria* Keller and Brown 153.

Edges of the salt marshes from Shark River to Brigantine; rare and local.

*Coast Strip.*—Shark River (NB), Ocean Grove (C), Manasquan (C), Pt. Pleasant (S), Brielle (NY), Ortlely (NY), Brigantine, Atlantic City (NB and P), Ventnor.

## THALICTRUM L.

*Thalictrum dioicum* L. Early Meadow Rue.

*Thalictrum dioicum* Linnæus, Sp. Pl. 545. 1753 [Canada].—Britton 35.

Common in rocky woods of the northern counties; very rare within our limits and confined to the Middle district.

*Fl.*—Late April to early May. *Fr.*—Early May to mid-May.

*Middle District.*—Pemberton (NB), Swedesboro.

*Thalictrum revolutum* DC. Purplish Meadow Rue.

*Thalictrum revolutum* Decandolle, Prodr. I. 12. 1824 [North America].

*Thalictrum purpurascens* Barton, II. 21. 1818.—Britton 35.

Frequent or occasional in woods of the northern counties; very rare and local southward in the Middle and Cape May districts.

*Fl.*—Late May to early July. *Fr.*—Late July to early September.

*Middle District.*—Farmingdale, Pt. Pleasant, Cooper's Creek (C), Swedesboro.

*Coast Strip.*—Mays Landing (NB).

*Cape May.*—Cold Spring (OHB).

*Thalictrum polygamum* Muhl. Tall Meadow Rue.

*Thalictrum polygamum* Muhlenberg, Cat. 54. 1813 [Pa.].\*—Britton 35.

*Thalictrum cornuti* Knieskern 5.—Willis 2.

Common in swamps and moist thickets of the Northern and Middle districts, also on the coast strip south to Cape May.

The Meadow Rue is one of the familiar swamp plants of mid-summer in North and West Jersey, and after crossing the Pine Barrens it is one of the old friends that we find again in those rich swamps, where the interior country meets the edge of the great salt meadows of the coast.

The coast plant seems to be constantly shorter than the typical Pennsylvania form, with thicker leaves, but in time of flower and general structural characters they seem to be identical.

*Fl.*—Late June to early August. *Fr.*—Late August to early October.

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\* Cf. Gray Am. Jour. Sci., Ser. 3, XXXI. 236. 1886. Strictly speaking, this name has no status from Muhlenberg's catalogue, but I follow others in retaining it for the present.

*Middle District*.—Farmingdale (S), New Egypt, Hartford, Riverside, Springdale (S), Washington Park, Swedesboro, Yorktown.

*Coast Strip*.—Toms River (S), Ct. House, Cape May, Cold Spring.

Family BERBERIDACEÆ. May Apple, etc.

**PODOPHYLLUM L.**

*Podophyllum peltatum* L. May Apple.

*Podophyllum peltatum* Linnæus, Sp. Pl. 505. 1753 [N. America].—Willis 5.  
—Britton 42.

Common in moist woods in the northern counties; rare and local southward in the Middle district and southern Cape May peninsula.

*Fl.*—Late April to mid-May. *Fr.*—Mature during August, commonly after the foliage has perished.

*Middle District*.—Holmdel (C), Pt. Pleasant (C), Cream Ridge (Willis), New Egypt, Bordentown, Kinkora, Camden Co. (C), Gloucester (H), Yorktown, Swedesboro, Quinton, Elsinboro (C), Shilo (C).

*Cape May*.—Cold Spring (OHB).

Family MENISPERMACEÆ. Moonseed.

**MENISPERMUM L.**

*Menispermum canadense* L. Canada Moonseed.

*Menispermum canadense* Linnæus, Sp. Pl. 340. 1753 [Virginia and Canada].  
—Barton, Fl. Phila. II. 199. 1818.—Britton 42.

Common in moist woods and thickets in the northern counties and frequent in the Middle district and Cape May peninsula.

Its fruit is conspicuous in September, bearing a striking resemblance to chicken grapes.

*Fl.*—Early June to early July. *Fr.*—Late August to late September.

*Middle District*.—Sandy Hook (NB), Farmingdale, New Egypt, Holmdel (C), Medford (S), Camden (O), Gloucester (P), Red Bank, Swedesboro, Woodstown (NB).

*Cape May*.—Cape May (OHB).

Family LAURACEÆ. Sassafras.

**SASSAFRAS** Nees and Ebermaier.

*Sassafras sassafras* L. Sassafras.

*Laurus Sassafras* Linnæus Sp. Pl. 371. 1753 [Virginia, Carolina and Florida].  
*Sassafras officinale* Knieskern 27.—Britton 213.

Common in woods and thickets throughout the State.

A characteristic tree of the Pine Barrens, occurring in a dwarfed condition, even on the "Plains."

*Fl.*—Mid-April to early May. *Fr.*—Late July to late August.

*Middle District.*—Farmingdale, New Egypt, Arney's Mt. (S), Merchantville, Medford, Springdale (S), Kaighns Pt., Woodbury, Salem (S), Bridgeton (NB), Dividing Creek.

*Pine Barrens.*—W. Plains (S), Bear Swamp (S), Landisville (T), Albion.

*Coast Strip.*—Manahawkin, Barnegat, Cox's, Surf City (L), Barnegat City Inc. (L), Spray Beach (L), Atlantic City (S), Ocean City (S), Piermont (S), Anglesea (UP).

*Cape May.*—Cold Spring (S).

#### BENZOIN Fabricius.

*Benzoin æstivale* (L.). Spicewood.

*Laurus æstivale* Linnæus Sp. Pl. 369. 1753 [Virginia].

*Benzoin odoriferum* Knieskern 27.

*Lindera Benzoin* Britton 213.

Common in swamps throughout the State, except in the Pine Barrens, though it follows the edge of tide water streams for some distance inland.

*Fl.*—Late March to late April. *Fr.*—Early September to early October, persisting into winter.

*Middle District.*—Shark River, Pt. Pleasant (S), New Egypt, Bordentown, Birmingham, Moorestown, Merchantville, Medford (S), Delair, Sicklerville, (S), Clementon (S), Albion, Oaklyn, Washington Park, Glassboro, Swedesboro, Quinton, Salem (S), Marlboro (NB), Yorktown, Landisville (Pine Barrens?).

*Coast Strip.*—Waretown, Barnegat, Manahawkin, Coxe's, Absecon (S), Mays Landing (C).

*Cape May.*—Goshen, Ct. House, three mi. W. Court House (S), Sluice Creek (S).

### Order PAPAVERALES.

Family PAPAVERACEÆ. Poppies, etc.

*Key to the Species.*

- a. Plants with a milky juice, flowers red. [*Papaver dubium*]\*  
 aa. Plants with a yellow or orange juice.  
   b. Erect branching herbs with yellow flowers. [*Chelidonium majus*]†  
   bb. Low; leaves and white flowers rising directly from the root.

*Sanguinaria canadensis*, p. 461

\* Wild Poppy. A weed in field and waste places, not common in our range.

† Celandine. A frequent weed about houses and cultivated grounds in shady spots.

## SANGUINARIA L.

*Sanguinaria canadensis* L. Bloodroot.

Pl. XLI., Fig. 2.

*Sanguinaria canadensis* Linnæus Sp. Pl. 505. 1753 [North America].—Knieskern 6.—Willis 6.—Britton 45.

Common in woods of the northern counties; south to upper Monmouth and northwestern Burlington Counties, and rare and local farther south in the Middle district, growing, according to Mr. Benj. Heritage, only on northern exposures. Very rare and local in the Cape May peninsula.

*Fl.*—Early April to late April. *Fr.*—Early June to late June.

*Middle District.*—Holmdel (C), Keyport (C), New Egypt, Bordentown (C), Kinkora, Little Timber Creek (P), Woodbury (C), five mi. S. Mickleton, Cumberland Co. (C).

*Cape May.*—Cold Spring - (OHB).

## FAMILY FUMARIACEÆ. Fumatory, etc.

*Key to the Species.*

- a. Flowers white, with yellow at the tip. *Bicuculla cucullaria*, p. 461  
 aa. Flowers pale yellow. *Capnoides flavulum*, p. 461

## BICUCULLA Adanson.

*Bicuculla cucullaria* (L.). Dutchman's Breeches.*Fumaria Cucullaria* Linnæus, Sp. Pl. 699. 1753 [Virginia and Canada].*Diclytra Cucullaria* Britton 45.

Frequent in woods of the northern counties; very rare within our limits and confined to the Middle district.

*Fl.*—Early April to late April. *Fr.*—Early May to late May.

*Middle District.*—Keyport (C) [R. W. Brown], Sharptown [C. D. Lippincott].

## CAPNOIDES Adanson.

*Capnoides flavulum* (Raf.). Pale Corydalis.

*Corydalis flavula* Rafinisque, in Desv. Jour. Bot. 1808 I., p. 224, acc. to D. C. Prodr. I. 129. 1824 [Philadelphia].

Frequent or occasional in woods of the northern counties; rare within our limits in the Middle and Cape May districts; close along the Delaware River.

*Fl.*—Early April to early May. *Fr.*—Early May to early June.

*Middle District*.—Kinkora, Gloucester.

*Cape May*.—On Delaware Bay (NB).

Family CRUCIFERÆ. Mustard, etc.

*Key to the Species.*

- a. Petals yellow.
- b. Fruit short, not more than three times as long as broad.
- c. Pods obovoid, leaves lanceolate. [Camelina sativa]<sup>1</sup>
- cc. Pods ovoid or globose, leaves pinnately parted.
- d. Plant glabrous. *Radicula palustris*, p. 464
- dd. Plant hirsute. *R. hispida*, p. 463
- bb. Fruit much more than three times as long as broad.
- c. Petals 7-15 mm. long. [Brassica nigra]<sup>2</sup>
- cc. Petals smaller.
- d. Pods 7-9 cm. long. [Sisymbrium officinale]<sup>3</sup>
- dd. Pods 2-5 cm. long. [Barbarea barbarea]<sup>4</sup>
- aa. Petals white.
- b. Pods divided into two cells transversely, fleshy sea coast plants.
- Cakile edentula*, p. 463
- bb. Pods divided into two cells longitudinally; short, rarely three times as long as wide.
- c. Pods compressed at right angles to the plane of the partition, making it very narrow.
- d. Pods cordate triangular, wedge-shaped at the base, hairs or some of them branched. [Bursa bursa-pastoris]<sup>5</sup>
- dd. Pods oval or nearly circular. *Lepidium virginicum*, p. 465
- cc. Pods compressed parallel with the plane of the partition, leaving it broad.
- d. Petals 2 cleft. [Draba verna]<sup>6</sup>
- dd. Petals entire. *Draba caroliniana*, p. 465
- bbb. Pods divided into two cells longitudinally; four to many times as long as wide.
- c. Hairs simple or none.
- d. Leaves palmate. *Dentaria laciniata*, p. 465
- dd. Leaves oblong or cordate.
- e. Tuberos roots. *Cardamine bulbosa*, p. 464
- ee. Fibrous roots. *Cardamine rotundifolia*, p. 465

We have but few native *Cruciferae* in southern New Jersey, but a number of our common weeds belong to this family, of which the following are of most frequent occurrence:

<sup>1</sup> False Flax, occasional in fields.

<sup>2</sup> Black Mustard, common in waste ground.

<sup>3</sup> Hedge Mustard, common about houses, roadsides, etc.

<sup>4</sup> Winter Cress, fields, meadows, etc., common.

<sup>5</sup> Shepherd's Purse, a common field and garden weed.

<sup>6</sup> Whitlow Grass, one of the earliest plants to appear in flower, very common in sandy fields.

- ddd.* Leaves pinnate.  
*e.* Plant 2-9 dm. tall, segments of basal leaves 4-25 mm. wide. *C. pennsylvanica*, p. 464  
*ee.* Plant 1-3 dm. tall, segments of basal leaves 1-3 mm. wide. *C. parviflora*, p. 464  
*cc.* Hairs or some of them branched.  
*d.* Plants small, less than 30 cm.  
*e.* Leaves entire or barely toothed, 2-30 cm. high. [*Stenophragma thaliana*]<sup>†</sup>  
*cc.* Leaves basal, pinnatifid, 10-30 cm. high. *Arabis lyrata*, p. 466  
*dd.* Plants tall, 30-120 cm.  
*e.* Pods erect. [*Arabis glabra*]<sup>†</sup>  
*ee.* Pods recurved or spreading.  
*f.* Plant glabrous. *A. laevigata*, p. 466  
*ff.* Lower part of stem hairy. *A. canadensis*, p. 466

**CAKILE Gaertner.**

***Cakile edentula* (Bigel.). Sea Rocket.**

Pl. LVI., Fig. 1.

*Bunias edentula* Bigelow, Fl. Bost. 157. 1814 [Cape Ann. and So. Boston].

*Cakile americana* Knieskern 7.—Willis 7.—Britton 52.

*Cakile edentula* Keller and Brown 160.

Sea beaches along the entire coast and for some distance up the Bay shore.

One of the most generally and regularly distributed species of the upper beach.

*Fl.*—Late June into November. *Fr.*—Late July through autumn.

*Maritime Strip.*—Sandy Hook (NB), Long Branch, N. Spring Lake (NB), Waretown, Surf City (L), St. Albans (L), Barrel Island (L), Spray Beach (L), Brigantine, Ocean City (S), Sea Isle City, Stone Harbor, Anglesea, Cape May.

**RADICULA Hill.**

***Radicula hispida* (Desv.). Hispid Yellow Cress.**

*Brachylobus hispidus* Desv. Jour. Bot. II. 3: 183. 1814 [Pennsylvania].

Frequent in moist ground in the northern counties; occasional southward along the Delaware River.

*Fl.*—Early May into September. *Fr.*—Early July into autumn.

*Middle District.*—Delair, Kaighns Pt., Penns Grove (NB).

<sup>†</sup> Mouse-ear Cress, a common weed.

<sup>‡</sup> Tower Mustard, introduced about Cape May.

**Radicula palustris (L.). Marsh Yellow Cress.**

*Sisymbrium amphibium* var. *palustre* Linnæus, Sp. Pl. 657. 1753 [N. Europe].

Distribution as in the last.

*Fl.*—Early May into September. *Fr.*—Early July into autumn.

*Middle District.*—New Egypt, mouth of Cooper's Creek, Swedesboro, Salem (NB).

**CARDAMINE L.****Cardamine pennsylvanica Muhl. Pennsylvania Bitter Cress.**

*Cardamine pennsylvanica* Muhlenberg in Willd. Sp. Pl. III. 486 1800 [Pennsylvania].

*Cardamine hirsuta* Britton 49.

Common in damp woods and swamps in the northern counties and southward in the Middle district.

*Fl.*—Late April to mid-June. *Fr.*—Late May to late July.

*Middle District.*—Pemberton (NB), Delano, Delair, Medford (S), Taunton (C), Wenonah, Mantua, Camden (P), Washington Park, Mickleton, Mullica Hill (H), Ateo (P), Elsinboro (C).

**Cardamine parviflora L. Sand Bitter Cress.**

*Cardamine parviflora* Linnæus, Sp. Pl. Ed. 2. 914. 1763 [Europe].

*Cardamine arenicola* Britton.

Damp sandy soil along the Coast strip. Rare.

*Fl.*—Mid-April to mid-June. *Fr.*—Mid-May to mid-July.

*Middle District.*—Bay Head, Piermont.

**Cardamine bulbosa (Schreb.). Bulbous Cress.**

*Arabis bulbosa* "Schreber," Muhlenberg, Trans. Am. Phil. Soc. 3: 174. 1793 [Virginia].

*Cardamine rhomboidea* Knieskern 7.

*Cardamine bulbosa* Britton 49.

Frequent in swamps and moist woodland in the Northern and Middle districts.

*Fl.*—Late April to early June. *Fr.*—No fruiting material seen, apparently uncommon.

*Middle District.*—New Egypt, Kinkora, Delair, Pensauken (S), Medford (S), Taunton (C), Washington Park, Mickleton, Swedesboro, Penns Neck (C).



**Cardamine rotundifolia Michx. Round-leaved Cress.**

*Cardamine rotundifolia* Michaux, Fl. Bor. Am. II. 30. 1803 [High Mts. of Carolina].—Knieskern 7.—Willis 6.—Britton 50.

Reported from near the Delaware Water Gap (Britton), Freehold (Willis), Middletown, Mon. Co., cool shaded springs, very rare (Knieskern).

**DENTARIA L.****Dentaria laciniata Muhl. Cut-leaved Pepper-root.**

*Dentaria laciniata* Muhlenberg, in Willdenow Sp. Pl. III. 479. 1800 [Pennsylvania].—Willis 6.

*Cardamine laciniata* Britton 49.

Frequent in moist woods of the northern counties, rare southward within our limits, entirely in the Middle district.

*Fl.*—Mid-April to early May. *Fr.*—Late May to mid-June.

*Middle District.*—New Egypt, Freehold (Willis), Bordentown, Camden Co. (C), Mullica Hill (H), Swedesboro, Acton.

**LEPIDIUM L.****Lepidium virginicum Linn. Wild Pepper-grass.**

*Lepidium virginicum* Linnæus, Sp. Pl. 645. 1753 [Virginia and Jamaica].—Britton 52.

Frequent throughout in cultivated ground. Whether it ever occurred native in New Jersey is a difficult matter to determine.

*Fl.*—Mid-May into November. *Fr.*—Late July through autumn.

**DRABA L.****Draba caroliniana Walt. Carolina Whitlow Grass.**

*Draba caroliniana* Walter, Fl. Car. 174. 1788 [South Carolina].—Willis 7.—Britton 50.

Reported from Bulls Island, Hunterdon Co., and South Amboy, Middlesex Co., and occasional in open sandy ground in West Jersey. Not collected recently.

April 14, immature fruit.

*Middle District.*—Burlington, Starr's on Cooper's Creek, Woodbury, Swedesboro (CDL), Clementon (KB), Vineland (KB).

## ARABIS L.

*Arabis lyrata* L. Lyre-leaved Rock Cress.

*Arabis lyrata* Linnaeus, Sp. Pl. 665. 1753 [Canada].—Barton, Fl. Phila. II. 56 1818.—Knieskern 7.—Britton 48.

Sandy or rocky soil of the Northern and Middle districts, and occasional on the Coast strip.

*Fl.*—Mid-April to early June, and sporadically into July.  
*Fr.*—Late May to mid-July.

*Middle District.*—Bordentown, Medford, Westville, Washington Park, Woodbury, 3 miles south Mickleton, Bridgeton (NB).

*Coast Strip.*—Sea Bright (NB), Avalon, Mays Landing (NB).

*Arabis laevigata* (Muhl.). Smooth Rock Cress.

*Arabis laevigata* "Muhlenberg," Willdenow, Sp. Pl. 3:543. 1801 [Pennsylvania].—Britton 48.

Frequent in rocky woods of the northern counties, rare southward in the Middle district.

*Fl.*—Mid-April to late May. *Fr.*—July to August.

*Middle District.*—New Egypt.

*Arabis canadensis* L. Sickle-pod.

*Arabis canadensis* Linnaeus, Sp. Pl. 665. 1753 [Virginia].—Britton 48.

Frequent in rocky woods of the northern counties, occasional southward in the Middle district.

*Fl.*—Late May to early July. *Fr.*—August to September.

*Middle District.*—Two miles north Mullica Hill (C), Swedesboro.\*

## Family CAPPARIDACEÆ. Capers.

## POLANISIA Rafinesque.

*Polanisia graveolens* Raf. Clammy-weed.

*Polanisia graveolens* Rafinesque, Am. Journ. Sci. I. 378. 1819.—Willis 8 [Newburgh on the Hudson, Harrisburg on the Susquehanna].

*Polanisia dodecandra* Britton 53.

Sandy shores, Bergen Co., and at Long Branch, Monmouth Co., according to Willis' Catalogue; rare.

Possibly not a native, though other species with the same general range find their northernmost records in sporadic occurrences in New Jersey.

\*The record for *Arabis hirsuta* Swedesboro, Lippincott (KB), proves to be this species.

**Order SARRACENIALES.**

Family SARRACENIACEÆ. Pitcher-Plants.

**SARRACENIA L.*****Sarracenia purpurea* L. Pitcher Plant.**

Plates LXIII. and LXIV., Fig. 2.

*Sarracenia purpurea* Linnæus, Sp. Pl. 510. 1753 [N. America].—Barton, Fl. Phila. II. 10. 1818.—Knieskern 6.—Willis 5.—Britton 44.—Keller and Brown 166.

Occasional or local in bogs of the northern, Middle and Cape May districts. Common in bogs and cedar swamps of the Pine Barrens.

This is one of the plants which makes the bogs of the Pine Barrens so attractive. Mingled with the button-capped stems of *Eriocaulon*, and accompanied by its close allies, the *Droseras*, it always attracts interest—its water filled cups sunk well down in the sphagnum and its flower scape standing aloft.

The pitchers are usually well formed and handsomely veined with crimson on a yellowish green ground color in plants which grow in the open bogs, but in the deep shade of the cedar swamps they are greener and narrower, with a greater development of flat keel on top.

*Fl.*—Late May to mid-June.

*Middle District.*—Freehold (Willis), Shark River, Five miles west of Swedesboro.

*Pine Barrens.*—Allaire, Farmingdale, Lakehurst (NY), Toms River, Forked River, Tuckerton (UP), Bamber, Pemberton, Brindletown, Speedwell, Berlin, Atco (UP), Malaga (UP), Pleasant Mill, Mouth of Batsto, Eighth St. (T), Hamonton (Bassett), Egg Harbor City, Petersburg (S).

*Cape May.*—Goshen (OHB), Cape May (OHB).

Family DROSERACEÆ. Sundews.

*Key to the Species.*

- a. Blade of the leaf orbicular, flowers white. *Drosera rotundifolia*, p. 468  
 aa. Blade of the leaf spatulate, flowers white. *D. longifolia*, p. 468  
 aaa. Leaf filiform, not divided into blade and petiole, flowers large, pink. *D. filiformis*, p. 469

## DROSERA L.

*Drosera rotundifolia* L. Round-leaved Sundew.

*Drosera rotundifolia* Linnaeus, Sp. Pl. 281. 1753 [Europe, Asia and America].  
—Barton Fl. Phila. I. 116. 1818.—Nuttall Gen. I. 141. 1818.—Knieskern  
8.—Britton 104.

Locally common in bogs throughout the State.

In the Pine Barrens this species seems to be the least abundant of the three Sundews, but it is the characteristic species of the cedar swamps where the others do not seem to occur. Here it grows deep down in the soft wet billowy masses of sphagnum moss, its slender flower stalk rising sometimes to a height of eight or ten inches. In open places it is much more stunted.

*Fl.*—Early July to late August, apparently slightly earlier than the next.

*Middle District.*—Shark River, New Egypt, Florence, Kaighns Pt., Lawnside (C), Swedesboro, Dividing Creek.

*Pine Barrens.*—Farmingdale, Allaire, Pt. Pleasant, Coxe's, Speedwell (S), Bear Swamp (S), Winslow (S), Mouth of Batsto, Hammonton (Bassett), Egg Harbor City, Mays Landing (S).

*Coast Strip.*—Spray Beach (L), N. Beach Haven (L).

*Cape May.*—Cold Spring (OHB).

*Drosera longifolia* L. Oblong-leaved Sundew.

## Pl. LXV.

*Drosera longifolia* Linnaeus, Sp. Pl. 282. 1753 [Europe].—Barton Fl. Phila. I. 116. 1818.—Nuttall Gen. I. 141.—Knieskern 8.

*Drosera intermedia* var. *Americana* Britton 104.

*Drosera intermedia* Keller and Brown 166.

Occasional or locally common in bogs of the Northern and Middle districts and common throughout the Pine Barrens and Cape May peninsula in damp situations.

This seems to be the most abundant and most generally distributed species of Sundew in South Jersey. There is considerable variation in the size and appearance of plants. Those of drier situations have a dense rosette-like cluster of small leaves from which the flower scape arises, while those growing in water or wet sphagnum develop a leafy stem often six to seven inches long; the uppermost leaves, from the midst of which the scape springs, being always the largest and freshest.

*Fl.*—Early July to late August.

*Middle District*.—Shark River, Florence, Delanco, Camden (UP), Medford, Griffith's Swamp, Kaighns Swamp, Dividing Creek.

*Pine Barrens*.—Belmar (NY), Toms River (S), Brindletown, Manchester (NY), Hanover, Speedwell (S), Bear Swamp (S), Ancora (UP), Atsion (S), White Horse (S), Atco (S), Landisville, Hammonton (Bassett), Batso (S), Egg Harbor City, Pancoast (S), Absecon (S), Woodbine (S), Tuckahoe (S), Sea Isle Jnc.

*Coast Strip*.—Seaside Park (UP), Holgate's (L), N. Beach Haven (L), Anglesea.

*Cape May*.—Whitesboro (S), Bennett, Cold Spring (S), Court House (UP).

***Drosera filiformis* Raf. Thread-leaved Sundew.**

Pl. LXVI., Fig. 2, and Pl. LXXXVIII., Fig. 3.

*Drosera filiformis* Rafinesque, Med. Rep. II. (5), 360. 1808 [County of Gloucester, N. J., and Sussex, Del.].—Pursh. Fl. Am. Sept. I. 211. 1814 [Tuckerton, N. J., 1805].—Knieskern 8.—Britton 104.—Keller and Brown 167.

*Drosera tenuifolia* Muhlenberg Cat. 23. 1813.

Common in wet sand throughout the Pine Barrens, and rarely in outlying pine barren islands in West Jersey and on the coast.

This is a far handsomer species than either of the preceding, and from the nature of its growth far more conspicuous. The large crimson-pink flowers are open only during part of the morning on sunny days, closing up at other times like the *Portulaca* of our gardens. The plants prefer open damp sand, where they are not shaded or crowded by other vegetation. Sometimes they grow very abundantly in such spots, and I have seen their erect filiform leaves in rank upon rank, the glutinous secretion on the glands glistening in the sunlight and making the whole patch look like dew covered spider webs, such as we frequently see on an early autumn morning. When examined closely the leaves will always be found to have small flies, mosquitoes and other insects attached to their thread-like glands.

*Fl.*—Late June to late August.

*Middle District*.—Lindenwold.

*Pine Barrens*.—Pt. Pleasant, N. Spring Lake (NY), 3 mi. S. New Egypt, Hanover, Browns Mills, Toms River, Forked River, Manchester (NY), Mayetta, Manahawkin, West Creek, Speedwell, Chatsworth, High Bridge, Atsion, Bear Swamp (S), Atco (UP), Ballinger's Mill, Pleasant Mills, Batsto, Mouth of Batsto, Quaker Bridge, Eighth St., Hammonton, Egg Harbor City, Absecon, Mays Landing (UP).

*Coast Strip*.—N. Beach Haven (L), Seaside Park (S).

## Order ROSALES.

## Family CRASSULACEÆ.\*

## PENTHORUM L.

*Penthorum sedoides* L. Ditch Stonecrop.

*Penthorum sedoides* Linnaeus, Sp. Pl. 432. 1753 [Virginia].—Knieskern 15.—Britton 104.

Common in swamps and ditches of the northern counties and less frequently southward in the Middle district.

*Fl.*—Apparently June into September. *Fr.*—August into autumn.

*Middle District.*—Spring Lake, New Egypt, Medford (S), Kaighns Pt., Washington Park, Repaupo (C).

## Family PARNASSIACEÆ. Grass of Parnassus.

## PARNASSIA L.

*Parnassia caroliniana* Michx. Grass-of-Parnassus.

*Parnassia Caroliniana* Michaux, Fl. Bor. Am. I. 184. 1803 [Carolina].—Knieskern 8.—Willis 22.—Britton 102.—Keller and Brown 169.

Frequent or locally common in the northern counties in swamps or wet meadows; known from within our limits only from New Egypt, where it was found by Dr. P. D. Knieskern.

## Family SAXIFRAGACEÆ. Saxifrages.

*Key to the Species.*

- a. Leaves all basal.
  - b. Flowers white, plant 1-3 dm. high. *Saxifraga virginensis*, p. 471
  - bb. Flowers greenish, plant 3-9 dm. high.
    - c. Stamens 10, anthers yellowish green. *Saxifraga pennsylvanica*, p. 471
    - cc. Stamens 5, anthers bright orange. *Heuchera americana*, p. 471
- aa. A single pair of leaves about the middle of the scape, in addition to the basal ones, flowers white. *Mitella diphylla*, p. 472
- aaa. Small, creeping, semi-aquatic plants, with crenate leaves; no petals, anthers bright orange. *Chrysosplenium americanum*, p. 472

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\* The minute *Tillæa aquatica* was found by Nuttall on tidal mud along the Delaware above Philadelphia, but only on the Pennsylvania side, so far as I can ascertain. It has not been collected there recently.

## SAXIFRAGA L.

*Saxifraga pensylvanica* L. Swamp Saxifrage.

*Saxifraga pensylvanica* Linnæus, Sp. Pl. 399. 1753 [Virginia, Penna. and Canada].—Britton 101.

Swamps; common in the northern counties and less abundant southward in the Middle district and southern Cape May peninsula.

*Fl.*—Early May to late May. *Fr.*—Early June to early July.

*Middle District.*—Farmingdale, Middletown (C), New Egypt, Birmingham (C), Medford (S), Lindenwold, Mullica Hill (H), Swedesboro.

*Cape May.*—Cold Spring (OHB), Cape May.

*Saxifraga virginicensis* Michx. Early Saxifrage.

*Saxifraga virginicensis* Michaux, Fl. Bor. Am. I. 269. 1803 [Pennsylvania, Virginia and Carolina Mts.].—Knieskern 15.—Britton 100.

Common on dry banks in the northern counties, becoming less plentiful southward in the Middle district; rare in the lower Cape May peninsula.

*Fl.*—Early April to early May. *Fr.*—Mid-May to mid-June.

*Middle District.*—New Egypt, Pemberton, Bordentown, Kinkora, Medford (S), Sewell, Mickleton, Swedesboro, Mannington (C), Darctown (C), Bridgeton (C).

*Cape May.*—Cold Spring (OHB), very rare.

## HEUCHERA L.

*Heuchera americana* L. Alum-root.

*Heuchera americana* Linnæus, Sp. Pl. 226. 1753 [Virginia].—Knieskern 15.—Britton 101.

Frequent in woods of the Northern counties, less plentiful southward in the Middle district, and rare in the lower Cape May peninsula.

*Fl.*—Late May to late June. *Fr.*—Mid-June to mid-July.

*Middle District.*—Farmingdale, Vincentown (C), Medford (S), Sewell (S), Camden (P), Mullica Hill (H), Blackwood (H), Woodbury, Swedesboro, Auburn (H).

*Cape May.*—Cape May (OHB).

## MITELLA L.

*Mitella diphylla* L. Two-leaved Bishop's Cap.*Mitella diphylla* Linneus, Sp. Pl. 406. 1753 [North America].

Moist woods; occasional through the northern counties. Unknown within our limits until collected by Mr. J. H. Grove at New Egypt.

*Fl.*—Late April to mid-May. *Fr.*—Late May to mid-June.

*Middle District.*—New Egypt.

## CHRYSOSPLENIUM L.

*Chrysosplenium americanum* Schw. Golden Saxifrage.

*Chrysosplenium Americanum* Schweinitz, in Hooker Fl. Bor. Am. I. 242. 1832 [Canada].—Knieskern 15.—Britton 101.

Common in shaded swampy spots in the northern counties, becoming rare and local southward in the Middle district.

*Fl.*—Early April to Mid-May. *Fr.*—Late May to early July.

*Middle District.*—Farmingdale, Hartford (P), Audubon (S), Mickleton, Swedesboro, Marlboro (C).

Family HYDRANGEACEÆ. Hydrangeas.

## HYDRANGEA L.

*Hydrangea arborescens* L. Wild Hydrangea.

Pl. XCIV., Fig. 2.

*Hydrangea arborescens* Linnæus, Sp. Pl. 397. 1753 [Virginia].

Banks of the Delaware River as far as Florence. Certainly very rare within our limits.

*Fl.*—Early June to mid-July. *Fr.*—About September, persisting over winter.

*Middle District.*—Bordentown (C), Florence.

Family ITEACEÆ. Virginia Willow.

## ITEA L.

*Itea virginica* L. Virginia Willow.

*Itea virginica* Linnæus, Sp. Pl. 199. 1753 [Virginia].—Barton Fl. Phila. I. 118. 1818.—Knieskern 15.—Willis 22.—Britton 102.—Keller and Brown 170.

Frequent in Pine Barren swamps and locally in West Jersey and the Cape May peninsula.



This shrub, which ranges no farther north than New Jersey, resembles *Leucothoe* to some extent in general appearance, but the petals are separate and the racemes terminal and not secund.

*Fl.*—Early June to late June. *Fr.*—About September, persisting over winter.

*Middle District.*—Pemberton (C), Medford, Kaighns Pt., Repaupo, Bridgeport (H), Glassboro (S), Salem (S), Elmer (P), Dividing Creek.

*Pine Barrens.*—Manchester (Kn), Toms River (Bassett), Two miles south New Egypt, Middletown, Speedwell, White Horse, Atsion, Quaker Bridge, Clementon, Berlin, Williamstown Jnc., Sicklerville, Andrews, Cedar Brook, Inskip, Pleasant Mills, Folsom, Hammonton, Malaga (UP), Mays Landing, Egg Harbor City (P), Dennisville (P).

*Cape May.*—Goshen (OHB), Dias Creek.

Family GROSSULARIACEÆ. Gooseberries and Currants.

#### RIBES L.

*Ribes rotundifolium* Michx. Wild Gooseberry.

*Ribes rotundifolium* Michaux, Fl. Bor. Am. I. 110. 1803 [High Mountains of Carolina].—Britton 103.

Frequent or common in rocky woods of the northern counties; reported once within our limits at Seabright (Britton), perhaps an escape.

Family HAMAMELIDACEÆ. Witch Hazel, etc.

#### Key to the Species.

- a. Leaves oval or obovate, repand dentate, flowers with long, twisted, yellow petals, blooming in autumn. *Hamamelis virginiana*, p. 473
- aa. Leaves star-like, with five acute lobes, flowers inconspicuous in a cluster, blooming in spring, fruit a prickly, long pedicelled ball. *Liquidambar styraciflua*, p. 474

#### HAMAMELIS L.

*Hamamelis virginiana* L. Witch Hazel.

Pl. XCIII., Fig. 1.

*Hamamelis virginiana* Linnæus, Sp. Pl. 124. 1753 [Virginia].—Knieskern 15.—Britton 104.

Frequent in damp woods of the northern counties and less abundant southward in the Middle and Coast districts.

*Fl.*—Early October to late November or into December, as the leaves are falling. *Fr.*—Early autumn of the second season.

*Middle District*.—Freehold (C), Farmingdale, New Egypt, Birmingham, Kinkora, Camden (CP), Springdale (S), Westville, Glassboro, Albion, Raccoon Creek, Dividing Creek.

*Coast Strip*.—Manahawkin.

#### LIQUIDAMBAR L.

*Liquidambar styraciflua* L. Sweet Gum.

*Liquidambar styraciflua* Linnæus, Sp. Pl. 999. 1753 [Virginia].—Knieskern 15.  
—Willis 28.—Britton 105.

Common in woods throughout our region, except in the Pine Barrens and in those parts of the coastal plain which extend north of our limits. Also at Lake Hopatcong, Morris Co., and for a short distance up the Delaware and Hudson Rivers in Hunterdon and Bergen Counties.

The Sweet Gum and Willow Oak are probably the best trees by which to trace the line separating the Pine Barrens from the Middle district, while to the westward their range stops short at the fall line along the Delaware.

On the coast I have found both species occupying little dry ground islets in the salt marshes, a mile from the mainland, while all along the Coast strip proper the Sweet Gum occurs, even running up the Egg Harbor River to Mays Landing along with other coastal species.

*Fl.*—Late April to late May apparently, when the leaves are partly expanded. *Fr.*—Early autumn, persistent in part through the winter.

*Middle District*.—Farmingdale, Belmar (UP), Pt. Pleasant (S), New Egypt, Crosswick's Creek, Delanco (S), Arney's Mt. (S), Birmingham, Medford, Chairville (S), Oaklyn (S), Lawnside (S), Sicklerville, Glassboro, W. Deptford, Mickleton, Swedesboro, Yorktown, Salem (S), Dividing Creek, Beaver Dam (S), below Millville.

*Coast Strip*.—Manahawkin, Beesley's Pt. (S), Petersburg, Mays Landing (S), Anglesea.

*Cape May*.—Seaville (S), Dias Creek (S), Bennett, Cold Spring (S), Court House.

#### Family PLATANACEÆ. Buttonwoods.

##### PLATANUS L.

*Platanus occidentalis* L. Buttonwood.

*Platanus occidentalis* Linnæus, Sp. Pl. 999. 1753 [North America].—Knieskern 28.—Britton 219.

Along streams in the Northern and Middle districts. The only Pine Barren stations we have seen are obviously of introduced trees.

Normally a tree of open river valleys, the Buttonwood finds congenial conditions only in the Delaware Valley.

*Fl.*—Early May to mid-May, when the leaves are partly grown. *Fr.*—Autumn, persistent, in part, through the winter.

*Middle District.*—New Egypt, Swedesboro, Medford (S), introduced about houses at numerous stations in the Pine Barrens and elsewhere, Toms River, Speedwell, etc.

Family ROSACEÆ. Roses, etc.

*Key to the Species.*

- a. Flowers yellow.
  - b. Leaves digitate, 3-5 foliate.
    - c. Flowers cymose, leaflets 3. [*Potentilla monspeliensis*]<sup>1</sup>
    - cc. Flowers solitary on axillary peduncles.
      - d. Earliest flower from node above the first well developed internode. *P. punila*, p. 482
      - dd. Earliest flower from node above the second or third well developed internode. *P. canadensis*, p. 482
  - bb. Leaves pinnate.
    - c. Flowers 12 mm. broad, in dense cymose inflorescence. *Dryocallis arguta*, p. 481
    - cc. Flowers 3 or 4, remote in a branched inflorescence.
      - d. Root leaves, at least some of them, lobed or entire, flowers pale greenish yellow. *Geum flavum*, p. 483
      - dd. Root leaves all pinnate, flowers golden yellow. *G. strictum*, p. 483
    - ccc. Flowers scattered in a long, slender, spike-like raceme.
      - d. Leaflets, exclusive of the small intermediate ones, 5-9 ovate or obovate.
        - e. Root not thickened, leaflets resin-dotted below. *Agrimonia rostellata*, p. 483
        - cc. Root thickened toward the end, leaflets velvety tomentose. *A. mollis*, p. 484
      - dd. Leaflets 11-13, lanceolate. *A. parviflora*, p. 484
- aa. Flowers pink.
  - b. Large, 1.5 in broad or more, leaves pinnate, stem prickly.
    - c. Leaf rachis glabrous or puberulent.
      - d. Leaves serrulate, infra-stipular prickles short, 2-4 mm. long, broad-based and decidedly curved, stipules narrowly linear. *Rosa carolina*, p. 485

<sup>1</sup> Rough Cinquefoil, apparently an introduced weed.

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- dd.* Leaves more coarsely and deeply serrate, infra-stipular, prickles longer, stipules more dilated.
- e.* Prickles decidedly curved, leaves somewhat shining above. *R. virginiana*, p. 485
- ee.* Prickles straight, leaves dull above. *R. humilis*, p. 485
- cc.* Leaf rachis very glandular, leaflets doubly serrate, densely resinous beneath. [*R. rubiginosa*]\*
- bb.* Small, in dense racemous panicles, leaves simple, stem not prickly.
- c.* Leaves densely tomentose beneath. *Spiraea tomentosa*, p. 477
- cc.* Leaves glabrous beneath, flowers whitish. *S. latifolia*, p. 477
- aaa.* Flowers white.
- b.* Woody shrubs.
- c.* Flowers small, in dense corymbs or racemous panicles, leaves simple, stems not prickly.
- d.* Flowers in umbel-like corymbs, pods membranaceous purplish, leaves palmately lobed. *Opulaster opulifolius*, p. 477
- dd.* Flowers in racemous panicles. *Spiraea latifolia*, p. 477
- cc.* Flowers large. (Blackberries and Raspberries.)
- d.* Fruit cap-shaped, fitting over the receptacle from which it separates when ripe, leaves white beneath. *Rubus occidentalis*, p. 478
- dd.* Fruit not separating from the receptacle, forming a solid berry of numerous segments.
- e.* Leaves white tomentose, beneath. *R. cuneifolius*, p. 479
- ee.* Leaves smooth or velvety beneath, not white.
- f.* Branches of the inflorescence prickly and glandular. *R. argutus*, p. 479
- ff.* Branches of the inflorescence pubescent, but nearly or quite devoid of prickles or glands. *R. frondosus*, p. 480
- bb.* Trailing vines.
- c.* Leaves 3-5 foliate, stems prickly.
- d.* Fruit black, leaves membranaceous, not shining.
- e.* Flowers several on each raceme. *R. villosus*, p. 480
- ee.* Flowers solitary. *R. v. ensenii*, p. 480
- dd.* Fruit reddish, leaves subcoriaceous, shining. *R. hispidus*, p. 480
- cc.* Leaves round—heart-shaped, crenate. *Dalibarda repens*, p. 481
- ccc.* Leaves 3 foliate, running only by stolons. *Fragaria virginica*, p. 481
- bbb.* Herbs, not trailing.
- c.* No stem, flower peduncles arising from root, leaves 3-foliate, plant stoloniferous. *Fragaria virginica*, p. 481
- cc.* A common stem present.
- d.* Leaves regularly 3-foliate, almost sessile, petals linear lanceolate. *Porteranthus trifoliatus*, p. 478
- dd.* Leaves pinnate, 3-foliate or entire, petals not linear lanceolate.

\* Sweetbriar, well established along the coast strip, in thickets.

- e. Leaves regularly many-pinnate, flowers in a long, slender cylindrical spike. *Sanguisorba canadensis*, p. 484
- ce. Leaves various, lower often 3-5 pinnate or entire, upper generally 3-parted.
- f. Receptacle of the fruit densely hairy. *Geum canadense*, p. 482
- ff. Receptacle of the fruit glabrous or nearly so. *G. virginianum*, p. 483

## OPULASTER Medicus.

**Opulaster opulifolius (L.). Ninebark.**

*Spiræa opulifolia* Linnæus, Sp. Pl. 489. 1753 [Virginia and Canada].—Barton I. 230. 1818.

*Physocarpa opulifolia* Britton 92.

River banks of the northern counties, following down the Delaware as far as Camden.

*Fl.*—Late May to early June. *Fr.*—Mid-June to late June or July, persisting into autumn.

*Middle District.*—Bordentown (NB), Crosswicks Creek (C), Riverton, Camden (P), Cooper's Creek (C), National Park.

## SPIRÆA L.

**Spiræa latifolia "Aiton" Borkh. Meadow Sweet.**

*Spiræa latifolia* "Aiton," Borkhausen, Handbk. Forst. Bot. II. 1871. 1800 [North America].—Knieskern 13.—Britton 93.

*Spiræa alba* Barton, Fl. Phila. I. 229. 1818.

Edges of swamps or wet meadows; rather frequent in the northern counties, but rare southward mainly in the Middle district and apparently entering the Pine Barrens only on the borders and along streams.

*Fl.*—Early July to late August. *Fr.*—Early September into October.

*Middle District.*—Farmingdale, Brindletown, Florence, Center Square.

*Pine Barrens.*—Hanover, Above Atsion, Egg Harbor City, Mays Landing (NB).

**Spiræa tomentosa L. Hardhack.**

*Spiræa tomentosa* Linnæus, Sp. Pl. 489. 1753 [Philadelphia].—Knieskern 13.—Willis 20.—Britton 93.

Frequent in low grounds nearly throughout the State, but apparently occurring in the Pine Barrens much as does the preceding.

*Fl.*—Early July to early September. *Fr.*—Early September into October.

*Middle District.*—Farmingdale (S), Avon, Pt. Pleasant, New Egypt, Burlington (UP), Hartford, Fish House, Paulsboro, Repaupo (UP), Center Square, Westville, Bellevue, Mickleton (UP), Woodbury (UP).

*Pine Barrrens.*—Hammonton (Basset), Batsto (S), Crowleytown, Weekstown, Speedwell (S), Belleplaine (S), Mays Landing (NB). [In part, at least, incursions from coast?]

*Cape May.*—Cape May, W. Cape May (OHB).

#### PORTERANTHUS Britton.

*Porteranthus trifolius* (L.). Indian Physic.

*Spiraea trifoliata* Linnæus, Sp. Pl. 490. 1753 [Virginia and Canada].

Rather frequent in rich woods of the northern counties, but very rare within our limits and known only from Prospertown, near New Egypt, Ocean Co., where it was discovered by Mr. J. H. Grove.

The generic name of the plant is in honor of Dr. Thos. C. Porter, formerly professor of botany at Lafayette College, Easton, Pa., the leading authority of his time on the flora of Pennsylvania, as well as of the New Jersey side of the Delaware near Easton.

*Fl.*—Late May to mid-June. *Fr.*—Late June to mid-July.

*Middle District.*—New Egypt.

#### RUBUS L.

*Rubus occidentalis* L.\* Blackcap Raspberry.

*Rubus occidentalis* Linnæus, Sp. Pl. 493. 1753 [Canada].—Willis 21.—Britton 94.

Common in thickets in the northern counties and occasional southward in the Middle and Cape May districts. Possibly some of the southern records may be based upon escapes from gardens.

*Fl.*—Early May to late May. *Fr.*—Late June to mid-July.

*Middle District.*—Freehold (NB), Farmingdale, Birmingham, Medford (S), Fish House, Delair, Lawnside (S), Riddleton.

*Coast Strip.*—Beach Haven (L), probably introduced.

*Cape May.*—Fishing Creek (OHB), Cold Spring (OHB).

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\* *Rubus americanus* is cited by Willis on Dr. Torrey's authority as occurring in Monmouth Co., but no more exact data are available and no specimens extant. *Rubus strigosus* grew at Woodbury, according to Dr. Barton (1818), but it was no doubt an escape. The species does grow native as far south as Phillipsburg, however.

**Rubus cuneifolius Pursh. Sand Blackberry.**

*Rubus cuneifolius* Pursh, Fl. Am. Sept. 347. 1814 [New Jersey to Carolina].  
—Barton, Fl. Phila. I. 232. 1818.—Knieskern 14.—Willis 21.—Britton  
94.—Keller and Brown 174.

Common in sandy ground throughout our region and recorded at but two points farther north in the State—South Amboy and Rosemont.

This is the characteristic blackberry of southern New Jersey. It does not grow high, usually not over three feet, but frequently covers a considerable area of ground. The fruit is seedy and too sweet and is not picked to any extent.

*Fl.*—Late May to early July. *Fr.*—Mid-July to late August

*Middle District.*—New Egypt, Medford (S), Lindenwold.

*Pine Barrens.*—Bear Swamp (S), Speedwell (S), Landisville (T), Egg Harbor City, Quaker Bridge (UP).

*Coast Strip.*—Holgate's (L), Sherburn's (L), Atlantic City (S), Five-Mile Beach.

*Cape May.*—Cape May (OHB).

**Rubus argutus Link. Tall Blackberry.**

*Rubus argutus* Link, Enum. Hort. Berol. 11. 60 [North America].—Keller and Brown 174.

*Rubus villosus* Britton 94 (in part).—Knieskern 13 (in part.).

*Rubus nigrobaccus* Keller and Brown 174 (in part.).

Fields and thickets of the Middle and Coast districts and Cape May peninsula; common. Probably also in the northern counties.

So variable are the Blackberries and so unsatisfactory the character of most of the supposed species, that it is difficult to decide whether we really have more than one species besides *R. cuneifolius*. According to Mr. Bicknell's views, which seem to be the most logical so far advanced, *R. argutus* should be the name of the most abundant species of our coastal plain region.

*Fl.*—Mid-May to mid-June. *Fr.*—Mid-July to mid-August.

*Middle District.*—New Egypt, Crosswicks, Delanco, Medford (S).

*Pine Barrens.*—Speedwell.

*Coast Strip.*—Pt. Pleasant, Beach Haven (L), Peahala (L), Tucker's (L), Barnegat City (L), Holgate's (L), Ocean City (S), Piermont, Anglesea.

*Cape May.*—Cape May (S).

**Rubus frondosus** Bigel. **Bush Blackberry.**

*Rubus frondosus* Bigelow, Plants of Boston, Ed. II., 199. 1824 [Boston, Mass.]

Frequent in the northern counties and occasional in the Middle district, especially along the Delaware river. Distinguished from the last by having the branches of the inflorescence pubescent, but nearly or quite glandless, and with few or no prickles.

*Fl.*—Mid-May to mid-June. *Fr.*—Mid-July to mid-August.

*Middle District.*—Delanco, Moorestown.

**Rubus villosus** Ait. **Dewberry.**

*Rubus villosus* Aiton, Hort. Kew. 2: 210. 1789 [North America].

*Rubus canadensis* Knieskern 13, Britton 94.

Frequent throughout, but decidedly less common in the Pine Barrens.

The same uncertainty prevails here as in the high blackberries, as to just how many species we have.

*Fl.*—Mid-May to mid-June. *Fr.*—Early July to early August. Probably slightly earlier than *R. argutus*.

*Middle District.*—Washington Park, Medford (S), Lindenwold (S), Sicklerville.

*Pine Barrens.*—Berlin (S), Head of Batsto (S), Landisville (T), Albion.

*Coast Strip.*—Beach Haven (L), Tucker's (L), Spray Beach (L), Atlantic City (S), Stone Harbor (S).

**Rubus villosus enslenii** Tratt. **Single-flowered Dewberry.**

*Rubus enslenii* Trattennink, Ros. III. 63. 1823 [North America].

Rather frequent. Distribution and flowering probably similar to the last.

*Fl.*—Mid-May to mid-June. *Fr.*—Mid-July to mid-August.

*Middle District.*—Farmingdale.

*Pine Barrens.*—Cedar Brook.

*Coast Strip.*—Pt. Pleasant, Spray Beach, Stone Harbor.

**Rubus hispidus** L. **Hispid Swamp Blackberry.**

*Rubus hispidus* Linnæus, Sp. Pl. 493. 1753 [Canada].—Knieskern 14.—Britton 94.

*Rubus flagellaris* Barton, Fl. Phila. I. 234, II. 216. 1818.

Plentiful in shaded swampy ground throughout the State. A common species of the cedar swamps and shady moist ground in the Middle district.

*Fl.*—Early June to early July. *Fr.*—Late July to late August.



*Middle District*.—Freehold (NB), Farmingdale (S), Burlington, Medford (S), Sicklerville, Washington Park, Glassboro, Swedesboro, Yorktown.

*Pine Barrens*.—Forked River, Manahawkin, Cox's Speedwell (S), Bear Swamp (S), Albion, Jackson, Winslow Jnc., Mouth of Batsto.

#### DALIBARDA L.

*Dalibarda repens* L. **Dalibarda.**

*Dalibarda repens* Linnæus, Sp. Pl. 491. 1753 [Canada].—Keller and Brown 175.

Very rare and known from but one station in the State—two miles northwest of Swedesboro—where it was detected by Mr. Charles D. Lippincott. The occurrence of such a distinctly boreal plant in this locality is extremely interesting.

*Fl.*—July 8, 1894, petals dropping.

*Middle District*.—Two miles northwest of Swedesboro.

#### FRAGARIA L.

*Fragaria virginiana* Duchesne. **Virginia Strawberry.**

*Fragaria virginiana* Duchesne, Hist. Nat. Frs. 204. 1766 [America].—Knieskern 13.—Britton 95.

Common in the northern counties in fields; less common southward in the Middle and Coast districts. This is the common wild strawberry of the New Jersey lowlands. Another species has been recorded as *F. vesca* in Ocean and Monmouth Counties (Knieskern) and about Camden (Martindale). If these records refer to true *F. vesca* they are, of course, based upon introduced plants, as the species is not native here. The allied native species, *F. americana*, is a mountain plant, and its occurrence on the coastal plain does not seem probable. There are no New Jersey specimens in the Martindale Herbarium.

*Fl.*—Late April to late May. *Fr.*—Late May to late June.

*Middle District*.—Medford (S), Lindenwold (S), Blackwood, Washington Park.

*Coast Strip*.—Toms River (NB), Forked River, Beach Haven (L), Atlantic City (S), Piermont (S).

#### DRYMOCALLIS Fourr.

*Drymocallis arguta* (Pursh.). **Tall Cinquefoil.**

*Potentilla arguta* Pursh, Fl. Am. Sept. 736. 1814 [Upper Louisiana].—Britton 96.

*Drymocallis arguta* Keller and Brown 175.

Frequent in rocky places in the northern counties. Local in our region and in part, at least, introduced. Stations close to the Delaware River shores might well be established by plants washed down from farther up stream, as it grows naturally at Lambertville and Phillipsburg.

*Middle District*.—Riverton (KB).

*Pine Barrens*.—Winslow Jnc. (introduced).

#### POTENTILLA L.\*

##### *Potentilla canadensis* L. Cinquefoil.

*Potentilla canadensis* Linnæus, Sp. Pl. 498. 1753 [Canada].—Barton Fl. Phila.

I. 236. 1818.—Knieskern 13.—Britton 96.

*Potentilla canadensis* var. *simplex* Britton 96.

Common in dry fields and woods in the northern counties and southward in the Middle district, and very rare on the coast to Cape May.

The specimens from Farmingdale and Yorktown are referable to variety *simplex*, a form of little or no taxonomic value.\*

*Fl.*—Early May to mid-June.

*Middle District*.—Farmingdale, New Egypt, Bordentown, Burlington, Kin-kora, Delair, Fish House, Medford (S), Lindenwold (S), Washington Park, Swedesboro, Yorktown.

*Pine Barrens*.—Waretown, Landisville (introduced).

*Coast Strip*.—Barnegat City (L), Cold Spring (OHB).

##### *Potentilla pumila* Poir. Dwarf Cinquefoil.

*Potentilla pumila* Poir in Lamarck, Encycl. Meth. V. 594. 1804 [North America].

Distribution the same as the preceding, but occurs more abundantly on the coast strip.

*Fl.*—Late April to late May.

*Middle District*.—Bordentown, Camden, Clementon, Quinton.

*Coast Strip*.—Surf City (L), N. Beach Haven (L), Harvey Cedars (L), Palermo, Five-Mile Beach.

#### GEUM L.

##### *Geum canadense* Jacq. White Avens.

*Geum Canadense* Jacquet, Hort. Vind. II. 82, pl. 175. 1772 [Canada].

*Geum album* Britton 94.

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\* *P. argentea* L., Silvery Cinquefoil, must be regarded as a weed so far as our region is concerned.

Common in woods and thickets of the northern counties, and southward in the Middle and Coast districts to the Cape May peninsula. Only once reported from the Pine Barrens, at Winslow (Bassett) probably an introduction.

*Fl.*—Early June to late July.

*Middle District.*—Pt. Pleasant (S), New Egypt, Pemberton (C), Arney's Mt. (S), Moorestown (C), Medford (S), Kirkwood (C), Oaklyn (S), Mickleton, Swedesboro.

*Coast Strip.*—Sandy Hook, Longport, Beesley's Pt. (S), Palermo, Piermont (S).

*Cape May.*—Cold Spring.

***Geum flavum* (Porter). Cream-colored Avens.**

*Geum album* var. *flavum* Porter, Bull. Torr. Bot. Club XVI. 21. 1889 [Eastern Penna. and N. J.].

Occasional in the northern counties and south into the Middle district; in woods and thickets.

*Fl.*—Late June to mid-August.

*Middle District.*—Pt. Pleasant (S), Medford (S), Clementon.

***Geum virginianum* L. Rough Avens.**

*Geum virginianum* Linnæus Sp. Pl. 500. 1753 [Virginia].—Willis 20.—Britton 94.

Woods and thickets of the northern counties, not rare; and occasional in the Middle district.

*Fl.*—Mid-May to early July.

*Middle District.*—Farmingdale, Mickleton (S), Swedesboro.

***Geum strictum* Ait. Yellow Avens.**

*Geum strictum* Aiton, Hort. Kew. II. 217. 1789 [North America].—Knieskern 13.—Britton 94.—Keller and Brown 177.

Frequent in low ground in the northern counties; very rare southward to our limits in the upper Middle district.

*Fl.*—Early June to late July.

*Middle District.*—New Egypt, also reported in Britton's Catalogue from Freehold, Mickleton and Camden, some or all probably *G. virginianum*.

**AGRIMONIA L.**

***Agrimonia rostellata* Wallr. Woodland Agrimony.**

*Agrimonia rostellata* Wallroth, Beitr. I: 42. 1842 [Pennsylvania].

Woods and thickets; probably frequent northward; rare within our limits and confined to the Middle district. Supposed specimens of *A. gryposepala* all prove to be this.

*Fl.*—Late July to early September. *Fr.*—Mid-August to late September.

*Middle District.*—Haddonfield, Oaklyn (S), Swedesboro.

***Agrimonia mollis* (Torr. and Gray). Soft Agrimony.**

*Agrimonia eupatoria* var. *mollis* Torrey and Gray, Fl. N. A. I. 431. 1840 [Red River, Ark.].

Habitat and distribution like the above, but occurs also on the Cape May peninsula.

*Fl.*—Mid-July to mid-September. *Fr.*—Early August to early October.

*Middle District.*—Mt. Holly, Oaklyn (S).

*Cape May.*—Court House, Cold Spring (OHB).

***Agrimonia parviflora* Soland. Many-flowered Agrimony.**

*Agrimonia parviflora* Solander, in Aiton Hort. Kew. II. 130. 1789 [N. America].—Britton 97.

Woods and thickets; not very common northward, occasional or frequent in the Middle and Coast districts southward.

*Fl.*—Mid-July to early September. *Fr.*—Mid-August to late September.

*Middle District.*—New Egypt, Riverton, Washington Park.

*Coast Strip.*—Waretown, Manahawkin.

**SANGUISORBA L.**

***Sanguisorba canadensis* L. Burnet.**

Pl. LXVII., Fig. 2.

*Sanguisorba canadensis* Linnæus, Sp. Pl. 117. 1753 [Canada].—Knieskern 13.—Kellar and Brown 178.

*Poterium canadense* Britton 97.—Willis 20.

Open swamps; frequent in the northern counties and locally in the Middle district and down the Coast strip to Cape May County.

*Fl.*—Early August to early October.

*Middle District.*—Freehold (Kn), New Egypt, Hartford, Moorestown, Burlington, Delanco, Camden, Haddonfield, Mullica Hill (H), Mickleton (NB), Swedesboro, Auburn.

*Coast Strip.*—Palermo, Cape May Ct. House.

## ROSA L.

*Rosa carolina* L. Swamp Rose.

*Rosa carolina* Linnæus, Sp. Pl. 492. 1753 [Carolina].—Knieskern 14.—Britton 98.

*Rosa corymbosa* Barton, Fl. Phila. I. 231. 1818.

Common in swamps throughout the State, except in the Pine Barrens. The common tall rose of the swamps.

The occurrence of the plant at Weymouth is of interest, as it may indicate a remnant of early coastal intrusion, for before the dam was constructed at Mays Landing the head of tidewater must have been higher up, and it is quite likely that some plants of the coast strip penetrated farther than is now possible.

*Fl.*—Late June to late July. *Fr.*—Late summer and autumn, persisting into winter.

*Middle District.*—Farmingdale, Pt. Pleasant (S), Haddonfield (S), Camden, Washington Park, Albion, Tomlin, Sicklerville (S).

*Coast Strip.*—Barnegat City (L), Harvey Cedars (L), Ship Bottom (L), Peahala (L), Surf City (L), Cox's, Beesley's Pt. (S), Ocean City (S), Cold Spring (S), Cape May (S) and apparently by way of the Egg Harbor River to Weymouth.

*Rosa humilis* Marsh. Low Rose.

*Rosa humilis* Marshall Arb. Am. 136. 1785 [Pennsylvania].—Britton 98.

Common in dry soil in the Northern and Middle districts. This is the common dwarf rose of old fields and wood edges, usually about two feet high, with straight slender prickles, and with the flowers frequently solitary.

*Fl.*—Mid-June to mid-July. *Fr.*—Late summer and autumn, persisting into winter.

*Middle District.*—Farmingdale, Pt. Pleasant (S), New Egypt, Haddonfield (S), Medford (S), Albion, Sicklerville, Swedesboro, Yorktown.

*Pine Barrens.*—Landisville (introduced?).

*Rosa virginiana* Mill.\* Glossy Rose.

*Rosa virginiana* Miller, Gard. Dict. Ed. 8. 1768 [Virginia].

*Rosa lucida* Knieskern 14.

*Rosa humilis* var. *lucida* Britton 98.

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\* A record for *R. blanda* is given by Willis for Freehold. It has never been verified and the occurrence is extremely improbable. Therefore it seems safe to reject it.

Northern and Coast districts, frequent, and occasional in the Middle district. This rose is taller than the preceding, with heavier more or less curved prickles and the flowers usually in corymbs. Normally, it seems to grow in moister spots, but on the coast islands, where *R. humilis* is absent, it grows in various situations, those bushes which grow in the driest ground being dwarfed, but obviously the same stock as the others. In the Middle district this species is absent, *R. humilis* being the common form, while in the Pine Barrens no roses occur.

*Fl.*—Mid-June to mid-July. *Fr.*—Late summer and autumn, persisting into winter.

*Coast District.*—Sandy Hook, Seaside Park, Barnegat City (L), Beach Haven (L), Beach Haven Terrace (L), Surf City (L), Atlantic City (S), Ocean City (S), Five-Mile Beach, Cape May (S).

## Family POMACEÆ. Apples, etc.

### Key to the Species.

- a. Mature carpels soft, cartilaginous; limbs and branches not spiny.
  - b. Leaves rather coarsely more or less irregularly serrate, those on sterile shoots sometimes lobed. Fruit greenish. *Malus angustifolia*, p. 486
  - bb. Leaves finely and regularly serrate.
    - c. Serrations somewhat curved inward at the tip, leaves all distinctly narrowed toward the base, blade on fully developed leaves 65 mm. long.
      - d. Fruit black.
        - e. Leaves glabrous beneath. *Aronia nigra*, p. 487
        - ee. Leaves pubescent beneath. *A. atropurpurea*, p. 487
        - dd. Fruit red, leaves pubescent beneath. *A. arbutifolia*, p. 487
      - cc. Serrations very sharp, not curved at tip, some of the leaves, at least, rounded at base; blade not over 50 mm. long.
        - d. Leaves not cordate at base. *Amelanchier intermedia*, p. 488
        - dd. Leaves cordate at base. *A. canadensis*, p. 488
- aa. Mature carpels very hard and bony, branches armed with stout spines.
  - b. Leaves not lobed.
    - c. Calyx lobes entire, leaves thick shining obovate, spines 3-18 cm. long. *Cratagus crusgalli*, p. 489
    - cc. Calyx lobes serrate, corymbs 1-7 flowered. *C. tomentosa*, p. 489
  - bb. Leaves lobed. *C. pruinosa*, p. 489

## MALUS Hill.

*Malus angustifolia* (Ait.). Narrow-leaved Crab Apple.

*Pyrus angustifolia* Aiton, Hort. Kew. II. 176. 1789 [N. America].—Britton 99.

*Malus angustifolia* Keller and Brown 179.—VanPelt, Bartonica I. 26. 1909.

Thickets and wood edges of lower Cape May County frequent, also southwest of Landisville. First detected in the State by Mr. Albert Commons at Cape May, July 18, 1882. This is the only Crab-apple that grows in our district, the larger *M. coronaria* does not occur south of Trenton.

*Fl.*—Early May to late May. *Fr.*—Early autumn until frost.

*Cape May.*—One mile west Court House, Cold Spring, Cape May.

*Pine Barrens?*—Landisville, probably by way of Manantick Creek, from the Bay Shore.

#### ARONIA Medicus.

##### *Aronia arbutifolia* (L.). Red Chokeberry.

*Mespilus arbutifolia* Linnæus, Sp. Pl. 478. 1753 [Virginia].

*Pyrus arbutifolia* var. *erythrocarpa* Willis 22.

*Pyrus arbutifolia* Knieskern 14.—Britton 99.

*Aronia arbutifolia* Barton, Fl. Phila. I. 227. 1818.

Swamps and damp thickets; frequent throughout the State.

*Fl.*—Late April to late May. *Fr.*—Early September to early October, persisting through autumn.

*Middle District.*—Farmingdale (S), New Egypt, Fish House, Kaighns Pt., Center Square, Washington Park, Tomlin, Mickleton, Medford (S), Wenonah, Clementon, West of Bridgeton (S), Dividing Creek.

*Pine Barrens.*—Bear Swamp (S), Atco, Pancoast (S), Hammonton (S), Tuckahoe (S).

*Coast Strip.*—Toms River, Seaside Park (S), Forked River, Waretown, Coxe's, Surf City (L), Palermo (S), Manahawkin.

*Cape May.*—Goshen (S), Bennett, Dias Creek (S), Green Creek (S), Cape May (S).

##### *Aronia atropurpurea* Britton. Purple-fruited Chokeberry.

*Aronia atropurpurea* Britton, Man. 517. 1901 [Arlington, Staten Isl.].

Rather less frequent than the preceding, occurring in the Middle, Coast and Cape May districts, but not yet detected elsewhere.

*Fl.*—Late April to late May. *Fr.*—Early August to early September, persisting through the autumn.

*Middle District.*—New Egypt, Westmont (S), Washington Park (S). Tomlin, Millville.

*Coast Strip.*—Pt. Pleasant, Surf City (L), Holly Beach.

*Cape May.*—Court House (S), Bennett.

##### *Aronia nigra* (Willd.). Black Chokeberry.

Pl. LXVII., Fig. 1.

*Pyrus arbutifolia* var. *nigra* Willdenow, Sp. Pl. II. 1013. 1800 [Virginia].

*Pyrus arbutifolia* var. *melanocarpa* Knieskern 14.—Willis 22.

*Aronia melanocarpa* Barton Fl. Phila. I. 227. 1818.

Swamps and damp thickets; frequent throughout the State. While often quite equal to *A. arbutifolia* in size, this species is sometimes quite low, not larger than the Hog Huckleberry bushes, with which it often mingles, its black fruit resembling enormous huckleberries. Always distinguished from the two preceding by the smooth, not wooly, undersurface of the leaves.

*Fl.*—Late April to late May. *Fr.*—Early July to early August.

*Middle District.*—Shark River, New Egypt. Fish House, Kaighns Pt., W. Deptford, Springdale (S), Alloway.

*Pine Barrens.*—Toms River (S), Whittings, Browns Mills, Pleasant Mills, Egg Harbor City, Tuckahoe (S).

*Coast Strip.*—Peahala (L.), Holly Beach (UP).

#### AMELANCHIER Medicus.

##### *Amelanchier canadensis* (L.). Service-berry.

*Mespilus canadensis* Linnæus, Sp. Pl. 478. 1753 [Virginia and Canada].

*Amelanchier canadensis* Knieskern 14.—Britton 100.

Frequent in dry open woods of the northern counties, but rare within our limits, occurring in the upper part of the Middle district along the Delaware.

*Fl.*—Early April to early May, appearing with the leaves.

*Fr.*—Mid-June to mid-July.

*Middle District.*—Bordentown.

##### *Amelanchier intermedia* Spach. Shad-bush.

*Amelanchier intermedia* Spach, Hist. Nat. Veget. II. 83. 1834 [North America].

*Amelanchier canadensis* var. *oblongifolia* Willis 22.

*Amelanchier canadensis* var. *obovalis* Britton 100.

*Amelanchier botryapium* Keller and Brown 180.

Frequent throughout the State in thickets and low damp woods. The shad-bushes give the first touch of bloom to the swamps of the coastal plain. Their spikes of white flowers and whitish leaf buds stand out in strong contrast to the somber brown tints that prevail until the general bursting of buds clothes everything with the misty gray-green of early spring, and by that time these pioneer flowers are ready to scatter their white petals like a belated flurry of snow. The bushes then become inconspicuous among the other green shrubbery.

*Fl.*—Early April to early May, appearing with the leaves.

*Fr.*—Mid-June to mid-July.



*Middle District*.—Farmingdale, Pt. Pleasant, Pemberton (NB), Merchantville, Lindenwold (S), Washington Park, Westville, Tomlin, Woodbury, Yorktown.

Pine Barrens.—Forked River, Woodmansie, Speedwell, Chatsworth, W. Plains, Browns Mills, Bear Swamp (S), Clementon (S), Cedar Brook, Landisville, Hammonton.

*Coast Strip*.—Cox's, Surf City (L), Ship Bottom (L), Beach Haven Crest (L), Barnegat City (L), Atlantic City (S), Ocean City, Palermo; Piermont (S), Stone Harbor, Cold Spring (OHB).

#### CRATÆGUS L.

##### *Cratægus crus-galli* L. Cocksbur Thorn.

*Cratægus crus-galli* Linnæus, Sp. Pl. 476. 1753 [Virginia].—Barton Fl. Phila. I. 225. 1818.—Knieskern 14.—Britton 100.

Frequent in thickets of the northern counties and southward casually along the Delaware, also quite plentiful along the whole Coastal strip and up the larger rivers.

*Fl.*—Mid-May to early June. *Fr.*—October into November.

*Middle District*.—Bordentown (C), Pennsgrove (C), Salem (HB).

*Coast Strip*.—Holgate's (L), Coxe's, Barnegat (C), Absecon (S), Pleasant Mills, Mo. of Batsto, Ocean City (S), Court House.

##### *Cratægus pruinosa* Wendl. Scarlet Thorn.

*Mespilus pruinosa* Wendl., Flora V: 701. 1823 [North America].—Knieskern 14.—Britton 99.

Frequent in thickets of the northern counties and in the upper part of the Middle district, also reported from Mays Landing in Britton's Catalogue under the specific name *coccinea*. Such specimens as have been examined from our district seem nearest to *pruinosa*.

*Fl.*—Mid-May to early June. *Fr.*—October into November.

*Middle District*.—Matawan (C), Arneytown (C), Farmingdale, Mullica Hill (H), Mantua (H), New Egypt.

##### *Cratægus tomentosa* L.\* Dwarf Thorn.

*Cratægus tomentosa* Linnæus, Sp. Pl. 476. 1753 [Virginia].

*Cratægus uniflora* Knieskern 14.—Keller and Brown 191.

*Cratægus parviflora* Pursh Fl. Am. Sept. I. 338. 1814.—Willis 22. Britton 100.

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\* Another species is given by Britton as occurring at Pemberton and Keyport which is called *C. tomentosus*, using the name in its former significance. Just what these are I cannot say, as no specimens are extant.

Common in the Middle, Pine Barren and Cape May districts and at a few stations in the northern part of the State, but mainly within the coastal plain.

This is the common thorn-bush of the coastal plain region.

*Fl.*—Mid-May to early June. *Fr.*—September into October.

*Middle District.*—Pt. Pleasant, New Egypt, Florence Hts., Moorestown, Medford (S), Locust Grove (S), Washington Park, National Park, Red Bank, Griffith's Swamp, Fairton (S), Newfield, Centerton (S).

*Pine Barrens.*—Atco, Berlin, Cedar Brook, Forked River, Speedwell, Quaker Bridge, Forked River, Toms River, Hammonton, Folsom.

*Cape May.*—Cold Spring, Bennett, N. England Creek.

***Cratægus pausiaca* Ashe. Pennsylvania Thorn.**

*Cratægus pausiaca* Ashe, Ann. Carnegie Mus. I: 390. 1902. [Alleghany Co., Pa.].

Probably common northward, but known from our range only at Red Bank, Gloucester County.

*Fl.*—Mid-May to early June. *Fr.*—October into November.

*Middle District.*—Red Bank.

Family DRUPACEÆ. Peaches, Plums and Cherries.

*Key to the Species.*

- a. Outer covering of fruit velvety. [*Amygdalus persica*]\*
- aa. Outer covering of fruit glabrous.
  - b. Flowers in umbels or fascicles expanding with or before the leaves.
    - c. Fruit, large, stone flattened.
      - d. Leaves abruptly acuminate. *Prunus americana*, p. 491
      - dd. Leaves gradually acuminate.
        - c. Leaves glabrous when mature. *P. angustifolia*, p. 491
        - cc. Leaves pubescent below when mature. *P. maritima*, p. 491
    - cc. Fruit smaller, stone globose.
      - d. Leaves glabrous, pedicels short, fruit sour. [*P. cerasus*]†
      - dd. Leaves pubescent beneath, pedicels long, fruit sweet. [*P. avium*]‡
  - bb. Flowers in racemes terminating branches of the season, stones globose. *P. serotina*, p. 492

\* Peach Tree, occasionally escaping from cultivation.

† Sour Cherry, occasionally escaping.

‡ Sweet Cherry, frequently escaping.

## PRUNUS L.

*Prunus americana* Marsh. Wild Plum.

*Prunus americana* Marshall, Arb. Am. III. 1785 [Eastern U. S.].—Knieskern 13.—Willis 19.—Britton 91.

Thickets, usually along streams; frequent in the northern counties; occasional southward in the Middle district.

*Fl.*—Late April to mid-May, before or with the leaves.

*Middle District.*—New Egypt, Pensauken (S), Kaighns Pt., Albion, Mullica Hill, Mickleton, Swedesboro, Yorktown, Bridgeton.

*Prunus angustifolia* Marsh. Chickasaw Plum.

*Prunus angustifolia* Marshall, Arb. Am. III. 1785 [Southern States].—Keller and Brown 192.

*Prunus Chicasa* Britton 91.

This southern species was discovered by Mr. Albert Commons on the banks of the Delaware River in loose drifting sands, three miles south of Pennsgrove, in Salem County. Dr. Britton regards it as "adventive from the southwest" in his Catalogue, but as the species is now known to occur native from Delaware to Florida and Texas, its presence here would seem to be quite natural and in line with the distribution of several other Austro-riparian species.

*Middle District.*—Penns Grove (NB).

*Prunus maritima* Wang. Beach Plum.

*Prunus maritima* Wangenheim, Am. 103. 1781 [Long Island, N. Y.].—Pursh, Fl. Am. Sept. I. 332. 1814.—Knieskern 13.—Willis 19.—Britton 91.—Keller and Brown 192.

Most plentiful along the dunes and sands of the Coastal strip; occasional in the Pine Barrens, usually along the tide water streams, and locally on sandy ground in the Middle district. Not recorded in New Jersey north of our limits.

This is the most common wild plum of southern New Jersey, and its fruit, though not as fine as the larger *P. americana*, is well flavored. The bushes average about three feet in height, and sometimes form thickets of considerable size, as about Cape May Point. In early spring the feathery white blossoms appear before the leaves, but the spikes are not so showy as the purer white blossoms of the Chokeberry and Shad-bush.

*Fl.*—Late April to early May, before or with the leaves. *Fr.*  
—Early September to early October.

*Middle District.*—New Egypt, Brown's Mills, Pemberton Jnc. (S), Medford, Clementon, Cains Mill.

*Pine Barrens.*—Deal (UP), Pleasant Mills, Hammonton (C), Folsom (T).

*Coast Strip.*—Sandy Hook, Pt. Pleasant (S), Toms River (S), Seaside Park, Waretown, Barnegat City (L), Beach Haven Terrace (L), Surf City (L), Atlantic City, Wildwood, Cape May Pt. (S).

#### *Prunus serotina* Ehrh. Wild Cherry.

*Prunus serotina* Ehrhart, Beitr. III. 20. 1788 [North America].—Barton, Fl. Phila. I. 222. 1818.—Knieskern 13.—Britton 91.

Common in woods and thickets and along fence rows in the Northern, Middle, Coast and Cape May districts. In the Pine Barrens it occurs only as an occasional introduction in localities long cleared and cultivated.

The Wild Cherry is one of the most characteristic trees of the coastal strip, and both it and the Red Cedar are sure to appear wherever we leave the Pine Barrens.

*Fl.*—Mid-May to early June, when the leaves are well expanded. *Fr.*—Late July to late August.

*Middle District.*—Navesink Highlands (UP), Pt. Pleasant, New Egypt, Fish House, Delaire, Medford (S), Albion, Washington Park, Mickleton, Glassboro, Centerton (S).

*Pine Barrens.*—Landisville (probably introduced).

*Coast Strip.*—Sandy Hook, Toms River (UP), Surf City (L), Beach Haven Terrace (L), Barnegat City (L), Absecon (Bassett), Atlantic City (S), Ocean City (S), Five-Mile Beach, Stone Harbor.

*Cape May.*—Bennett, Cape May Ct. House.

#### Family CAESALPINIACEÆ. Senna, etc.

##### *Key to the Species.*

- a. Tree with cordate orbicular leaves and pink papilionaceous flowers, sessile on the branches, appearing before the leaves. *Cercis canadensis*, p. 493
- aa. Herbs with pinnate leaves and yellow papilionaceous flowers.
  - b. Leaflets linear, 6–20 mm. long.
    - c. Flowers 4–8 mm. broad, anthers 5. *Cassia nictitans*, p. 493
    - cc. Flowers 25–40 mm. broad, anthers 10. *C. chamæcrista*, p. 493
  - bb. Leaflets ovate, 20–50 mm. long. *C. marilandica*, p. 494

**CERCIS L.*****Cercis canadensis* L. Red-bud. Judas Tree.***Cercis canadensis* Linnæus, Sp. Pl. 374. 1753 [Virginia].—Britton 90.

Rich woods, usually on hills bordering rivers. Locally on the upper Delaware, and at Rocky Hill on the upper Raritan, according to Britton's Catalogue. Known within our limits only from records at Bordentown (H. C. Stokes), and between Camden and Gloucester (C. F. Parker). These New Jersey stations constitute the northern limit of the species east of the Alleghanies.

*Fl.*—Late April to mid-May.*Middle District.*—Bordentown (C), Between Camden and Gloucester (P).**CASSIA L.*****Cassia nictitans* L. Sensitive Pea.***Cassia nictitans* Linnæus, Sp. Pl. 380. 1753 [Virginia].—Knieskern 13.—Britton 90.

Open sandy ground; locally in the northern part of the State and common throughout the southern portion, except in the Pine Barrens, where it seems to have intruded from West Jersey.

This is a characteristic plant of the Middle district, but with a strong tendency to become a weed, spreading over railroad embankments and in cultivated ground.

*Fl.*—Late July to mid-September. *Fr.*—Early September to late October.*Middle District.*—New Egypt, Medford (S), Blackwood, Fish House, Washington Park, Mickleton.*Pine Barrens.*—Landisville (probably as weed), Malaga (P).*Coast Strip.*—Barnegat City Inc. (L), Ocean City (S), Cold Spring.***Cassia chamæcrista* L. Large-flowered Sensitive Pea.***Cassia Chamæcrista* Linnæus, Sp. Pl. 379. 1753 [Jamaica, Barbadoes and Virginia].—Knieskern 13.—Britton 90.

Distribution and abundance as in the last, of which it is essentially a larger edition.

The foliage is similar, but the very much larger flowers make it a much more conspicuous plant.

*Fl.*—Late July to mid-September. *Fr.*—Early September to late October.

*Middle District.*—New Egypt, Medford (S), Birmingham, Mickleton, Bridgeport, Paulsboro.

*Coast Strip.*—Asbury Park (P), Atlantic City (S), Absecon, Piermont, Anglesea, Holly Beach, Mays Landing (T).

*Cape May.*—Court House, Cold Spring (S), Bennett, Cape May.

***Cassia marilandica* L. Wild Senna.**

*Cassia Marilandica* Linnaeus, Sp. Pl. 378. 1753 [Virginia and Maryland].—Knieskern 13.—Willis 19.—Britton 90.

Frequent in open swamps in the northern counties and southward locally in the Middle and Coast districts to Cape May.

*Fl.*—Early July to late August. *Fr.*—Late September to late October.

*Middle District.*—Freehold (C), Cookstown, Florence, Bordentown, Delair, Lindenwold (S), Cooper's Creek, Camden, Bridgeport, Bridgeboro (C).

*Coast Strip.*—Tuckerton, Beesley's Pt. (S).

*Cape May.*—Cold Spring (OHB).

Family PAPILIONACEÆ. Peas, Beans, etc.

*Key to the Species.*

- a. Climbing or trailing vines.
  - b. Leaves pinnate, with 5-7 leaflets, flowers brownish purple. *Apios apios*, p. 512
  - bb. Leaves 3-foliolate.
    - c. Flowers large, 25-50 mm. long.
      - d. Corolla violet, plant finely rough-pubescent. *Bradburya virginica*, p. 510
      - dd. Corolla very pale blue, plant glabrous. *Clitoria mariana*, p. 511
    - cc. Flowers less than 20 mm. long.
      - d. Few on the end of a very long peduncle.
        - e. Leaflets mainly lobed, 20-50 mm. long. Pod 5-8 cm. long. *Strophostyles helvula*, p. 513
        - ee. Leaflets mainly entire, 10-40 mm. long. Pod 2-5 cm. long. *S. umbellata*, p. 514
      - dd. Numerous, not clustered at the end of a long peduncle.
        - e. Leaves broadly ovate, or rhombic ovate.
          - f. Flowers white or violet tinted, in short axillary racemes or clusters.
            - g. Leaflets 25-80 mm. long, plant glabrous or slightly pubescent. *Falcata comosa*, p. 511
            - gg. Leaflets often 100 mm. long, plant villose, brown-pubescent. *F. pitcheri*, p. 512

*ff.* Flowers purple in long, slender axillary racemes.  
leaves 50-100 mm. long, plant finely pubescent.

*Phaseolus*, p. 513

*ee.* Leaves elliptic or oval, 20-40 mm. long, flowers purplish.

*f.* Nearly glabrous. *Galactia regularis*, p. 512

*ff.* Finely downy pubescent. *G. volubilis*, p. 513

*aa.* Herbs with pinnate leaves terminating in a tendril.

*b.* Flowers 10-50 mm. long.

*c.* Stipules foliaceous, seashore plant. *Lathyrus maritimus*, p. 510

*cc.* Stipules half sagittate, inland plants. *L. myrtifolius*, p. 510

*bb.* Flowers 8-13 mm., stipules linear, long auriculate.

[*Vicia tetrasperma*]<sup>4</sup>

*aaa.* Herbs or trees, leaves without terminal tendrils.

*b.* Leaves digitate, usually 8-10 leaflets, flowers in erect spikes, blue.

*Lupinus perennis*, p. 497

*bb.* Leaves pinnate, leaflets numerous.

*c.* Leaflets less than 12 mm. long, about 4 mm. wide, flowers yellow.

*Aeschynomene*, p. 498

*cc.* Leaflets 25 mm. or more long.

*d.* Plant an herb, villose, with silky white hairs, flowers pink and white.

*Cracca virginiana*, p. 498

*dd.* Plant a shrub, with bristly stems, flowers red purple.

[*Robinia hispida*]<sup>5</sup>

*ddd.* Plant a tree, with glabrous twigs and white flowers.

[*R. pseudacacia*]<sup>6</sup>

*bbb.* Leaves 3-foliolate. Herbs, erect or trailing.

*c.* Leaflets entire.

*d.* Flowers yellow.

*e.* Leaflets obovate, plant glabrous, succulent, 6-12 dm. high, in round masses, flowers pale yellow.

*Baptisia tinctoria*, p. 496

*ee.* Leaflets linear lanceolate, plant usually pubescent, 1.5-6 dm. high, flowers deep orange.

*Stylosanthes biflora*, p. 499

*dd.* Flowers pink or pink and white.

*e.* Pod 1-2 jointed, not covered by minute hooked hairs.

*Lespedeza*, p. 505

*ee.* Pod several to many jointed, covered by minute hooked hairs.

*Meibomia*, p. 499

*cc.* Leaflets minutely toothed (entire in *Trifolium pratense*).

*d.* Flowers in slender spike-like racemes.

*e.* Flowers yellow. [*Melilotus officinalis*]<sup>7</sup>

*ee.* Flowers white. [*M. alba*]<sup>8</sup>

<sup>1</sup> Wild Vetch. Fields and roadsides, an occasional weed.

<sup>2</sup> Clammy Locust. Established in sandy ground at several localities.

<sup>3</sup> Locust Tree. Apparently not native in our region, but frequently introduced about houses and occasionally escaped.

<sup>4</sup> Yellow Melilot. Waste ground.

<sup>5</sup> White Melilot. Waste ground.

- dd.* Flowers in dense heads or very short racemes.  
*c.* Flowers bluish purple. [*Medicago sativa*]<sup>7</sup>  
*ee.* Flowers yellow.  
*f.* Calyx densely pubescent. [*M. lupulina*]<sup>8</sup>  
*ff.* Calyx glabrous.  
*g.* Corolla striate, sulcate in age.  
*h.* Leaflets all sessile. [*Trifolium aureum*]<sup>9</sup>  
*hh.* Terminal leaflet stalked. [*T. procumbens*]<sup>10</sup>  
*gg.* Corolla not striate. [*T. dubium*]<sup>11</sup>  
*eee.* Flowers white or tinged with pink.  
*f.* Creeping, stoloniferous. [*T. repens*]<sup>12</sup>  
*ff.* Erect or procumbent, not stoloniferous. [*T. hybridum*]<sup>13</sup>  
*ceeee.* Flowers pink, leaves with light spots above. [*T. pratense*]<sup>14</sup>  
*ceeee.* Flowers covered by the gray silky plumes of the calyx, forming a dense silky head. [*T. arvense*]<sup>15</sup>  
*bbbb.* Leaves simple, lanceolate, flowers yellow. *Crotolaria sagittalis*, p. 497

#### BAPTISIA Ventenat.

#### *Baptisia tinctoria* (L.). Wild Indigo.

Pl. LXVIII., Fig. 1.

*Sophora tinctoria* Linnæus, Sp. Pl. 373. 1753 [Barbadoes and Virginia].

*Baptisia tinctoria* Knieskern 13.—Britton 80.

Dry sandy soil throughout the State, especially in open woods and clearings; most plentiful in the Middle district.

The Wild Indigo is a characteristic plant over most of the coastal plain region, forming large, round pillow-like tufts, two or three feet high and of equal diameter; conspicuous with its yellow flowers and glaucous-green foliage, the latter turning black when dried.

<sup>7</sup> Alfalfa. Escaped from cultivation or along railroad banks.

<sup>8</sup> Nonesuch. Waste ground, resembling yellow clover.

<sup>9</sup> Yellow Clover, Hop Clover. The clovers are entirely weeds except the white, red and the crimson flowered *T. incarnatum*, which are cultivated, the first two escaping everywhere.

<sup>10</sup> Low Hop Clover.

<sup>11</sup> Least Hop Clover.

<sup>12</sup> White Clover.

<sup>13</sup> Alsatian Clover.

<sup>14</sup> Red Clover. Pl. LXXI.

<sup>15</sup> Rabbit-foot Clover.



*Fl.*—Late June to late July. *Fr.*—Early August to early September.

*Middle District.*—Shark River, Farmingdale, Pt. Pleasant (S), New Egypt, Arney's Mt. (S), Camden (P), Locust Grove (S), Lawnside, Albion, Sicklerville (S), Dividing Creek.

*Pine Barrens.*—Forked River, Landisville, Winslow, Folsom, Hammonton.

*Cape May.*—Bennett (S), Cape May (P).

**CROTALARIA L.**

*Crotalaria sagittalis* L. Rattle-box.

*Crotalaria sagittalis* Linnæus, Sp. Pl. 714. 1753 [Brazil and Virginia].—Barton, Fl. Phila. II. 71. 1818.—Knieskern 12.—Britton 80.

Locally in sandy fields in the northern counties and frequent in the Middle and Cape May districts. Also becoming a good deal of a weed and spreading into the Pine Barrens along railroads, etc.

*F.*—Late June to late August. *Fr.*—Late July to late September.

*Middle District.*—Marlboro, Hornerstown, Camden, Medford (S), Mickleton, Tomlin, Fairton.

*Pine Barrens.*—Winslow (S), Richland (T), Malaga (P).

*Cape May.*—Cold Spring (OHB).

**LUPINUS L.**

*Lupinus perennis* L. Wild Lupine.

Pl. XXXVII., Fig. 2.

Pl. LXIX.

*Lupinus perennis* Linnæus, Sp. Pl. 721. 1753 [Virginia].—Barton, Fl. Phila. II. 71. 1818.—Britton 80.—Keller and Brown 195.

Open sandy ground and along the edges of woods; occurs at a few stations in the northern counties, but mainly a plant of the coastal plain and most plentiful in the Middle district, though it is found also in the Pine Barren and Cape May districts.

The Lupine is one of the most conspicuous spring flowers of West Jersey. It sometimes grows in large beds, its "wheel-shaped" leaves closely intermingled, and forming a fine setting for the brilliant spikes of purplish-blue flowers, the whole color scheme being almost a duplicate of the beds of birdfoot violets that flourish in similar locations a little earlier in the season.

As in the violet, too, we sometimes find flowers of a lilac hue. the form "*rosea*" of Britton's Catalogue.

*Fl.*—Early May to early June. *Fr.*—Early June to early July.

*Middle District.*—Farmingdale, New Egypt, Bordentown, Burlington, Browns Mills, Birmingham, Camden, Washington Park, Mickleton, Glassboro (S), Millville (S).

*Pine Barrens.*—Clementon, Cedar Brook, Inskip, Landisville, Folsom, Mays Landing (NB), Tuckahoe.

*Cape May.*—Seaville (S).

#### CRACCA L.

*Cracca virginiana* L. Goat's Rue. Cat-gut.

*Cracca virginiana*, Linnaeus, Sp. Pl. 752. 1753 [Virginia and Canada].

*Tephrosia virginiana* Barton, Fl. Phila. II. 84. 1818.—Knieskern 12.—Britton 82.

Open sandy ground and edges of woods; apparently more widely distributed in the northern counties, but within our limits an exact counterpart of the Lupine in distribution and abundance, often growing in close association with it. Its pink and yellow flowers are quite as handsome individually, but are not so conspicuous as the blue standards of the Lupine.

*Fl.*—Early June to early July. *Fr.*—Early August to early September.

*Middle District.*—Shark River, New Egypt, Locust Grove, Lindenwold, Clementon (S), Albion, Sicklerville (S), Lawnside (S), Gloucester Pt., Sewell (S), Glassboro (S), Mickleton, Swedesboro.

*Pine Barrens.*—Allaire (S), Forked River, E. and W. Plains, Whitings, Lakehurst, Tabernacle, Cedar Brook, Williamstown Jnc., Winslow Jnc., Landisville, Egg Harbor City.

*Cape May.*—Court House (OHB), Cape May (OHB).

#### AESCHYNOMENE L.

*Aeschynomene virginica* (L.). Sensitive Joint Vetch.

*Hedysarum Virginicum* Linnaeus, Sp. Pl. 750. 1753 [Virginia].

*Aeschynomene hispida* Barton, Fl. Phila. II. 80. 1818.

*Aeschynomene Virginica* Britton 83.—Keller and Brown 199.

A southern plant which follows up the shore of the lower Delaware River, occurring locally as far as Bridgeport, formerly to Kaighns Pt., Camden, according to Barton.

*Fl.* and *Fr.*—August and September at least.

*Middle District*.—Kaighns Pt. (C), Center Square (KB), Bridgeport (H), Swedesboro, Salem (NB).

**STYLOSANTHES Swartz.**

*Stylosanthes biflora* (L.). Pencil-flower.

Pl. LXVIII., Fig. 2.

*Trifolium biflora* Linnæus Sp. Pl. 773. 1753 [Virginia and Canada].

*Stylosanthes elatior* Barton Fl. Phila. II. 75. 1818.—Britton 84.

Open sandy ground, edges of woods, etc.; occasional in the northern counties, but most common on the coastal plain, especially in the Middle district, though it occurs also in the Pine Barrens and Cape May peninsula.

*Fl.*—Mid-June to mid-September. *Fr.*—Early August to early October.

*Middle District*.—Farmingdale, Prospertown, Burlington, Florence Heights, Riverton, Poke Hill (NB), Camden, Woodbury, Lindenwold, Swedesboro, Mickleton (NB), Husted (S), Fairton (S).

*Pine Barrens*.—Berlin, Quaker Bridge (S), Newtonville, Egg Harbor City, Mays Landing (S), Tuckahoe (S).

*Cape May*.—Cold Spring.

**MEIBOMIA Adanson.**

a. Pod not indented along the upper edge, but deeply constricted or notched from the lower edge; raised on a slender pedicel from the calyx.

b. Flower panicle arising independently from the base of the plant.

*Meibomia nudiflora*, p. 500

bb. Flower panicle terminal.

c. Leaves crowded at its base.

*M. grandiflora*, p. 500

cc. Leaves scattered along the stem.

*M. pauciflora*, p. 501

aa. Pod constricted on both margins, more deeply below.

b. Plant trailing, leaflets orbicular.

*M. michauxii*, p. 501

bb. Plant not trailing.

c. Leaves sessile or nearly so, leaflets linear or lanceolate, 20–80 mm. long.

*M. sessilifolia*, p. 501

cc. Leaves petioled.

d. Leaflets narrowly linear.

*M. stricta*, p. 501

dd. Leaflets broader.

e. Joints of the pods decidedly longer than broad.

f. Leaflets obtuse, rough, yellowish green.

*M. canescens*, p. 502

ff. Leaflets acuminate, glabrous, glaucous beneath.

*M. bracteosa*, p. 502

ee. Joints but little longer than broad.

f. Pod distinctly raised in the calyx on a short stalk.

- g. Plants glabrous.  
*h.* Leaflets lanceolate. *M. paniculata*, p. 502  
*hh.* Leaflets ovate or oval, glaucous beneath. *M. laevigata*, p. 503
- gg. Plants pubescent.  
*h.* Leaflets velvety-pubescent beneath. *M. viridiflora*, p. 503  
*hh.* Leaflets appressed-pubescent beneath. *M. dillenii*, p. 503
- ff. Pod sessile in the calyx or practically so, segments short and rounded.  
*g.* Segments 4-7, flowers showy. *M. canadensis*, p. 504  
*gg.* Segments 1-3, flowers small.  
*h.* Leaflets scabrous, 20-50 mm. long. *M. rigida*, p. 504  
*hh.* Leaflets not scabrous, 10-20 mm. long.  
*i.* Plant nearly glabrous. *M. marilandica*, p. 505  
*ii.* Plant with stem pubescent. *M. obtusa*, p. 505

#### MEIBOMIA Heister.

##### *Meibomia nudiflora* (L.). Naked-flowered Tick-trefoil.

*Hedysarum nudiflorum* Linnæus, Sp. Pl. 749. 1753 [Virginia].

*Desmodium nudiflorum* Knieskern 12.—Britton 84.

Common in dry woods of the northern counties and less frequent southward in the Middle district and on the Cape May peninsula.

*Fl.*—Early July to late September. *Fr.*—Mid-August to early October.

*Middle District.*—New Egypt, Arney's Mt. (S), Middletown (Kn), Locust Grove (S), Haddonfield (S), Oaklyn (S), Camden (P), Tomlin (S), Mickleton (H), Swedesboro, Bridgeton.

*Cape May.*—Court House (S), Bennett, Cape May (OHB).

##### *Meibomia grandiflora* (Walt.). Pointed-leaved Tick-trefoil.

*Hedysarum grandiflora* Walter Fl. Car. 185. 1788 [S. Carolina].

*Desmodium grandiflorum* Britton 84.

Dry woods; common in the northern counties, less common in the Middle district, becoming rare within our limits.

*Fl.*—Early July to late July. *Fr.*—Early August to late September.

*Middle District.*—Farmingdale, New Egypt, Swedesboro.

**Meibomia pauciflora** (Nutt.). Few-flowered Tick-trefoil.

*Hedysarum pauciflorum* Nuttall, Gen. 2: 109. 1818 [Ohio and Kentucky].

Rare in the Middle district, only known from New Egypt, where it was collected by Mr. J. H. Grove, July 24, 1906.

Flowers and immature fruit July 24.

*Middle District*.—New Egypt.

**Meibomia michauxii** Vail. Trailing Tick-trefoil.

*Meibomia Michauxii* Vail, Bull. Torr. Bot. Club XXIII. 140. 1896, n. n. for

*Hedysarum rotundifolium* Mich. (nee Vahl) [Carolina].

*Desmodium rotundifolium* Knieskern 12.—Willis 18.—Britton 84.

Frequent in the dry woods of the northern counties, occasional southward in the Middle, Pine Barren and Cape May districts. Our only trailing species.

*Fl.*—Late July to early September. *Fr.*—Late August to early October.

*Middle District*.—New Egypt, Sicklerville, Mickleton (C), Swedesboro.

*Pine Barrens*.—Pen Bryn (S), Ancora, Absecon, Landisville.

*Cape May*.—Goshen (S).

**Meibomia sessilifolia** (Torr.). Sessile-leaved Tick-trefoil.

*Hedysarum sessilifolium* Torrey in Curtis Bost. Jour. N. H. I. 122, 1834 [Wilmington, N. C.].

Sandy, open ground at Hammonton, where it was first collected by the writer on September 13, 1903. The only known locality in the State and the northern limit of the species, except the lower Susquehanna Valley in Pennsylvania.

*Pine Barrens*.—Hammonton.

**Meibomia stricta** (Pursh.). Stiff Tick-trefoil.

*Hedysarum strictum* Pursh, Fl. Am. Sept. 483, 1814 [Pine woods, N. J.].—Nuttall Gen. II. 109. 1818.—Barton Fl. Phila. II. 79. 1818.

*Desmodium strictum* Knieskern 12.—Willis 18.—Britton 85.

*Meibomia stricta* Keller and Brown 200.

Dry sandy woods: rather rare and local and mainly confined to the Pine Barrens, although it occurs sporadically in West Jersey. This region constitutes its northern limit. This is one of the most distinctive Pine Barren species of *Meibomia*, easily recognized by its very slender leaves, small flowers and few segments to the pods. It grows in abundance along the roads, running parallel to the Egg Harbor River, below Mays Landing.

*Fl.*—Late July to early September. *Fr.*—Late August and early October (both approximate).

*Middle District.*—Ashland, Mullica Hill, Woodbury (C), Bridgeton (NB).

*Pine Barrens.*—Malaga (S), Hospitality Branch (T), Quaker Bridge (S), Mays Landing (S), Manumuskin (S).

***Meibomia canescens* (L.). Hoary Tick-trefoil.**

*Hedysarum canescens* Linnæus, Sp. Pl. 748. 1753 [Virginia and Jamaica].

*Desmodium canescens* Britton 84.

Dry ground; not very common. A few stations in the northern counties, and within our limits confined to the Middle district and lower part of the Cape May peninsula.

*Fl.*—Late July to early September. *Fr.*—Late August to early October.

*Middle District.*—Pemberton Inc., Medford (S), Fish House, Delair, Gloucester (P), Swedesboro, Salem (S).

*Cape May.*—Cold Spring (OHB).

***Meibomia bracteosa* (Michx.). Large-bracted Tick-trefoil.**

*Hedysarum bracteosa* Michaux, Fl. Bor. Am. II. 73. 1803 [Virginia and Carolina Mts.].

*Desmodium cuspidatum* Britton 85.

*Meibomia bracteosa* Keller and Brown, 200.

Thickets and wood edges; rather common in the northern counties, but very rare within our limits.

*Fl.*—Late July to early September. *Fr.*—Late August to early October.

*Middle District.*—Mickleton (C), Swedesboro.

***Meibomia paniculata* (L.). Panicled Tick-trefoil.**

*Hedysarum paniculata* Linnæus, Sp. Pl. 749. 1753 [Virginia].

*Desmodium paniculatum* Knieskern 12.—Britton 85.

*Meibomia paniculata* Keller and Brown 200.

Common in dry woods throughout the State, except in the Pine Barrens, where it occurs only in the vicinity of the larger streams which it has followed up in company with other species of the Coastal strip.

*Fl.*—Late July to early September. *Fr.*—Late August to early October.

*Middle District*.—New Egypt, Vincentown (NB), Hartford, Camden (P), Medford, Springdale (S), Locust Grove (S), Tomlin, Swedesboro, Dividing Creek.

*Coast Strip*.—Ocean Grove (P), Atlantic City (S), Ocean City, Mays Landing (S), Five-Mile Beach.

*Cape May*.—Bennett, Cold Spring (S).

*Meibomia lævigata* (Nutt.). Smooth Tick-trefoil.

*Hedysarum lævigatum* Nuttall Gen. II. 109. 1818 [Forest of N. J.].

*Desmodium lævigatum* Knieskern 12.—Willis 18.—Britton 85.

*Meibomia lævigata* Keller and Brown 200.

Dry sandy woods; confined to the Middle and Cape May districts, not very common, does not seem to occur north of the coastal plain to any extent.

*Fl.*—Early August to early September. *Fr.*—Early September to early October.

*Middle District*.—Ocean Co. (Kn), Crosswicks, Medford (S), Tomlin, Mickleton, Swedesboro.

*Cape May*.—Dennisville (S).

*Meibomia viridiflora* (L.). Velvet-leaved Tick-trefoil.

*Hedysarum viridiflorum* Linnæus, Sp. Pl. 748. 1753 [Virginia].—Pursh, Fl. Am. Sept. II. 482.

*Desmodium viridiflorum* Britton 85.

*Meibomia viridiflora* Keller and Brown 200.

Dry sandy thickets and edges of woods; practically restricted to the Middle district, and apparently does not range north of the coastal plain in New Jersey. Nowhere common. Easily recognized by its large leaves, densely velvety pubescent beneath.

*Fl.*—Late July to early September. *Fr.*—Late August to early October.

*Middle District*.—Hainesport, Vincentown (NB), Spring Garden (C), Medford (S), Locust Grove (S), Tomlinson's (NB), Mickleton (H), Yorktown, Millville.\*

*Pine Barrens*.—Landisville,

*Meibomia dillenii* Darl. Dillen's Tick-trefoil.

*Desmodium Dillenii* Darlington, Fl. Cestr. 414. 1837 [Chester Co., Pa.].—Knieskern 12.—Willis 18.—Britton 85.

\* The record for Swedesboro (KB) proves to be *M. dillenii*.

Open woods and thickets; more or less common throughout the State, least abundant in the Pine Barrens, where it may be a recent intrusion. Not yet reported from Cape May.

*Fl.*—Late July to early September. *Fr.*—Late August to early October.

*Middle District.*—New Egypt, Fish House (S), Riverton, Medford (S), Swedesboro.

*Pine Barrens.*—Four miles east Hammonton (S), Landisville.

*Coast Strip.*—Five-Mile Beach (OHB).

***Meibomia canadensis* (L.). Showy Tick-trefoil.**

*Hedysarum canadense* Linnæus, Sp. Pl. 748. 1753 [Virginia and Canada].

*Desmodium Canadense* Knieskern 12.—Britton 85.

Common along the borders of swamps and streams in the northern counties, but largely a weed in our limits. If native at all, only in the upper part of the Middle district, especially along the Delaware River, elsewhere generally found along railroad embankments.

*Fl.*—Mid-June to late August, and occasionally during autumn. *Fr.*—Mid-July to late September.

*Middle District.*—Bordentown (P), New Egypt, Pemberton Jnc. (S), Ashland, Washington Park.

*Pine Barrens.*—Landisville (T), Woodbine (both apparently introduced along railroads).

*Coast Strip.*—Manahawkin.

***Meibomia rigida* (Ell.). Rigid Tick-trefoil.**

*Hedysarum rigidum* Elliot, Bot. S. C. and Ga. II. 215. 1824 [S. Carolina].

*Desmodium rigidum* Britton 86.

*Meibomia rigida* Keller and Brown 201.

Dry sandy woods; a few stations in the northern counties, but most plentiful in the southern part of the State, especially in the Pine Barrens.

*Fl.*—Late July to early September. *Fr.*—Late August to early October.

*Middle District.*—Springdale (S), Lawnside (S), Woodbury.

*Pine Barrens.*—Manahawkin, Quaker Bridge (S), Pen Bryn (S), Albion, Hammonton, Mays Landing (S), Weymouth (T), Egg Harbor City, Woodbine, Trelahoe (S).

*Cape May.*—Dias Creek (S), Bennett, Cape May (OHB).



**Meibomia marylandica (L.). Smooth Small-leaved Tick-trefoil.**

*Hedysarum marilandicum* Linnæus, Sp. Pl. 748. 1753 [Carolina and Virginia].

*Desmodium marylandicum* Knieskern 12.—Britton 86.

Dry sandy woods throughout our region and at a few stations in the northern counties.

*Fl.*—Early August to early September. *Fr.*—Early September to early October.

*Middle District.*—Lawnside (S), Washington Park (S), Swedesboro.

*Pine Barrens.*—Manahawkin, Landisville, Egg Harbor City.

*Cape May.*—Dennisville (S), Cold Spring (OHB), Bennett.

**Meibomia obtusa (Muhl.). Hairy Small-leaved Tick-trefoil.**

*Hedysarum obtusum* Muhlenberg in Willdenow, Sp. Pl. III. 1190. 1803 [Pennsylvania].

*Hedysarum ciliare* Nuttall, Gen. II. 109. 1818.—Barton, Fl. Phila. II. 79. 1818.

*Desmodium ciliare* Knieskern 12.—Willis 18.—Britton 86.

Distribution exactly as in the last, but apparently the more common of the two. They really seem to be little more than glabrous and pubescent forms of the same thing. These two small, round, leaved *Meibomias*, with *M. rigida*, are the most generally distributed species in the Pine Barrens.

*Fl.*—Late July to early September. *Fr.*—Late August to early October.

*Middle District.*—New Egypt, Medford, Griffith's Swamp, Clementon, Tomlin (S), Mickleton, Dividing Creek (S).

*Pine Barrens.*—Albion, Landisville (T), Eighth St. (T), E. of Hammonton (S), Quaker Bridge (S), Mays Landing (S), Woodbine, Tuckahoe (S).

*Cape May.*—Bennett (S), Cape May, Cape May Pt.

**LESPEDEZA Michaux.**

a. Stipules subulate, calyx lobes narrow.

b. Small, apetalous, pistillate flowers, in addition to the usual larger violet purple blossoms, the former in small sessile clusters, or the two kinds intermingled.

c. Petaliferous flowers 1-6, on filiform peduncles, usually 2-4 times as long as the subtending leaves.

d. Stem trailing, downy, with short, spreading hairs.

*Lespedeza procumbens*, p. 506

dd. Stem glabrate or slightly appressed—pubescent.

e. Stems trailing, stipules 2-4.5 mm.

*L. repens*, p. 506

ee. Stems upright, stipules 5-8 mm.

*L. violacea*, p. 507

cc. Petaliferous flowers few or many, peduncles stouter, some of them shorter than the leaves.

- d. Many of the peduncles elongated. *L. nuttallii*, p. 507  
 dd. Few, if any of them, exceeding the leaves.  
 e. Leaflets densely downy, pubescent. *L. stuvei*, p. 507  
 cc. Leaflets glabrate.  
 f. Leaflets linear or linear oblong. *L. virginica*, p. 508  
 ff. Leaflets oval or oblong. *L. frutescens*, p. 508  
 bb. Flowers all alike, in close heads, petals white or cream color, with a purple spot.  
 c. Leaflets oblong to orbicular.  
 d. Peduncles exceeding the leaves.  
 e. Leaflets oval or sub-orbicular. *L. hirta*, p. 508  
 cc. Leaflets narrowly oblong. *L. oblongifolia*, p. 509  
 dd. Peduncles shorter than the leaves. *L. capitata*, p. 509  
 cc. Leaflets linear or linear oblong. *L. angustifolia*, p. 509  
 aa. Stipules ovate, calyx lobes broad, a low annual. [*L. striata*]\*

***Lespedeza repens* (L.). Creeping Bush-clover.**

*Hedysarum repens* Linnæus, Sp. Pl. 749. 1753 [Virginia].

*Lespedeza repens* Barton Fl. Phila. II. 77. 1818.—Knieskern 12.—Britton 86.

Dry sandy woods and banks; more or less common throughout the State, least so in the Pine Barrens.

*Fl.*—Early August to late September; sporadically during June and July. *Fr.*—Early September to mid-October.

*Middle District.*—New Egypt, Florence, Griffith's Swamp, Sicklerville, Mullica Hill, Swedesboro, Bridgeton.

*Pine Barrens.*—Whitings (S), Tuckahoe (S), Landisville.

*Coast Strip.*—Manahawkin, Somers Pt., Palermo, Ocean City (S).

*Cape May.*—Dennisville (S), Court House (S), Anglesea Jnc. (S), Bennett, Cold Spring (OHB), Cape May (S).

***Lespedeza procumbens* Michx. Trailing Bush-clover.**

*Lespedeza procumbens* Michaux, Fl. Bor. Am. II. 70. 1803 [Virginia and Carolina].—Barton Fl. Phila. II. 77. 1818.—Knieskern 12.—Britton 86.

Dry sandy woods and banks, not nearly so common as the preceding; apparently restricted to the Middle, Coast and Cape May districts.

These two trailing *Lespedezas* differ only in matter of pubescence, just as do the two *Mcibomias* referred to above. Whether in these genera a difference of this sort is of specific value may be open to question.

*Fl.*—Early August to late September. *Fr.*—Early September to mid-October.

\* Asiatic Bush-clover. Introduced at Wildwood, etc.

*Middle District*.—Tomlin.

*Coast Strip*.—Manahawkin.

*Cape May*.—Seaville (S), Bennett, Town Bank (OHB).

***Lespedeza nuttallii* Darl. Nuttall's Bush-clover.**

*Lespedeza Nuttallii* Darlington, Fl. Cestr. 420. 1837 [Mica Hills of Chester Co., Pa.].

Rather common in dry sandy ground in the Middle, Cape May and Coast districts, and possibly in the northern counties.

*Fl.*—Mid-August to mid-September. *Fr.*—Probably early September into October. Fruit apparently infrequent.

*Middle District*.—Lindenwold, Clementon.

*Coast Strip*.—Newtonville, Landisville, Mays Landing (S).

*Cape May*.—Dennisville (S), Seaville (S), Bennett (S), Cold Spring.

***Lespedeza violacea* (L.). Stalked Bush-clover.**

*Hedysarum violacea* Linnæus, Sp. Pl. 749. 1753 [Virginia].

*Lespedeza violacea* Britton 86.

A very scarce plant within our limits, if it occurs at all; possibly more abundant northward. Many of the references are based upon the preceding, and one specimen from Riddleton, although said to be upright, is so close to *L. repens* that I cannot satisfactorily separate it.

***Lespedeza stuvei* Nutt. Downy Bush-clover.**

*Lespedeza Stuvei* Nuttall, Gen. II. 107. 1818 [Sandy fields N. J.].—Willis 18.—Britton 86.

Sandy ground along the edges of woods and thickets; not very common, occurring in the Middle and Pine Barren districts. Reported also at several stations in the northern counties.

Full flower August 28, 1892, at Egg Harbor City.

*Middle District*.—Asbury Park (NB), Sea Girt (C).

Lawnside (S), Springdale (S).

*Pine Barrens*.—Forked River (McKenzie), Egg Harbor City, Tuckahoe (S), Spring Garden (C).

*Cape May*.—Bennett (S).

***Lespedeza stuvei neglecta* Britton. Narrow-leaved Downy Bush-clover.**

*Lespedeza Stuvei neglecta* Britton, Mem. Torr. Bot. Club V. 206. 1894. n. n. for *L. St. angustifolia* Britt. (nec Elliott) [New Jersey].—Keller and Brown 201.

Dry sandy ground in the lower Cape May peninsula. The plant might be quite as correctly regarded as a hairy form of *L. virginica*, so far as I can see.

*Cape May*.—Court House (S), Bennett.

***Lespedeza frutescens* (L.). Wand-like Bush-clover.**

Pl. LXX., Fig. 1.

*Hedysarum frutescens* Linnæus, Sp. Pl. 748. 1753 [Virginia].

*Lespedeza reticulata* Nutt. Gen. II. 107. 1818.—Britton 86.

*Lespedeza sessiliflora* Barton, Fl. Phila. II. 75. 1818.

Dry sandy ground of the coastal plain, common throughout our region and at a few stations just north of our limits.

*Fl.*—Mid-August to mid-September. *Fr.*—Early September to early October.

*Middle District*.—New Egypt, Locust Grove (S), Springdale (S), Orchard (S), Lindenwold (S), Washington Park (S), Swedesboro, Bridgeton.

*Pine Barrens*.—Jones Mill (S), Whiting's (S), Albion, Williamstown Jnc. (S), Cedar Brook, Malaga (S), Landisville, Pleasant Mills (S), Egg Harbor City, Mays Landing (S).

*Coast Strip*.—Manahawkin, Atlantic City (S).

*Cape May*.—Dennisville (S), Anglesea Jnc. (S), Bennett (S), Cape May (OHB).

***Lespedeza virginica* (L.). Slender Bush-clover.**

*Medicago virginica* Linnæus, Sp. Pl. 778. 1753 [Virginia].

*Lespedeza reticulata* var. *angustifolia* Britton 86.

*Lespedeza virginica* Keller and Brown 202.

Common throughout the State, except in the Pine Barrens, where it seems to be rare or lately introduced.

*Fl.*—Mid-August to mid-September. *Fr.*—Early September to early October.

*Middle District*.—Burlington, Birmingham (NB), Medford (S), Springdale (S), Oaklyn (S), Griffith's Swamp, Blackwood, Mullica Hill, Swedesboro, Dividing Creek.

*Pine Barrens*.—Newfield, Landisville, Tuckahoe (S).

*Cape May*.—Dennisville (S), Bennett, Cold Spring (S), Cape May Pt.

***Lespedeza hirta* (L.). Hairy Bush-clover.**

Pl. LXX., Fig. 2.

*Hedysarum hirta* Linnæus, Sp. Pl. 748. 1753 [Virginia].

*Lespedeza hirta* Knieskern 12.—Britton 87.

Dry sandy woods; several localities in the northern counties and common throughout our region.

*Fl.*—Mid-August to mid-September. *Fr.*—Early September to early October.

*Middle District.*—Medford (S), Griffith's Swamp, Washington Park (S), Tomlin.

*Pine Barrens.*—Forked River, Manchester (NB), Whitings, Clementon (S), Albion, Penbryn (S), Cedar Brook, Landisville, Hammonton, Egg Harbor City, Tuckahoe (S).

*Coast Strip.*—Waretown, Manahawkin, Atlantic City (S).

*Cape May.*—Bennett (S), Cape May (OHB).

***Lespedeza oblongifolia* (Britton). Brinton's Bush-clover.**

*Lespedeza hirta oblongifolia* Britton, Trans. N. Y. Acad. Sci. XII. 66. 1893 [Egg Harbor City, N. J.].

Restricted to the Pine Barren region; not common. The type specimen was collected by Dr. J. Bernard Brinton,\* at Egg Harbor City, but there is a specimen in the herbarium of the Philadelphia Academy obtained in the Pines, September 4, 1832, by Torrey.

*Fl.*—Mid-August to mid-September. *Fr.*—Early September to early October.

*Pine Barrens.*—Jones Mill (S), Quaker Bridge, Bear Swamp (S), Egg Harbor City.

***Lespedeza capitata* Michx. Round-headed Bush-clover.**

*Lespedeza capitata* Michaux, Fl. Bor. Am. II. 71. 1803 [Virginia and Carolina].—Barton, Fl. Phila. II. 76. 1818.—Knieskern 12.—Keller and Brown 202.

*Lespedeza frutescens* Britton 87.

Dry soil; common throughout the State.

*Fl.*—Mid-August to mid-September. *Fr.*—Early September to early October.

*Middle District.*—Farmingdale (NB), New Egypt, Burlington (NB), Fish House (S), Delaire, Springdale (S), Orchard (S), Blackwood, Lawnside (S), Swedesboro.

*Pine Barrens.*—Buena Vista, Mays Landing (S), Tuckahoe (S).

*Coast Strip.*—Waretown, Manahawkin, Harvey Cedars (L), N. Beach Haven (L), Tucker's (L), Barrel Island (L), Ocean City (S), Palermo, Sea Isle Inc. (S), Piermont, Five-Mile Beach.

*Cape May.*—Cold Spring (S), Bennett, Cape May (OHB).

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\* 1835-1894. For a number of years the leader of the active field botanists of Philadelphia. Founder and president of the Philadelphia Botanical Club. cf. Bull. Torrey Bot. Club XXII, pp. 93-97.

**Lespedeza angustifolia** (Pursh.). **Narrow-leaved Bush-clover.**

*Lespedeza capitata* var. *angustifolia* Pursh, Fl. Am. Sept. 480. 1814 [N. Y. to Carolina].—Willis 18.

*Lespedeza angustifolia* Britton 87.—Keller and Brown 202.

Frequent in dry sandy soil in the Pine Barrens and Cape May region and at several stations in the Middle district, but not known in the State to the north of our limits.

*Fl.*—Early August to early September. *Fr.*—Late August to late September.

*Middle District.*—Lawnside (S), Woodbury (KB), Mickleton (NB).

*Pine Barrens.*—Forked River (NB), Chatsworth, Bear Swamp (S), Williamstown Jnc., Winslow Jnc., Landisville, Hammonton, Egg Harbor City, Mays Landing (NB), Tuckahoe (S).

*Coast Strip.*—Ocean City (S).

*Cape May.*—Dennisville, Cold Spring (S), Bennett.

**LATHYRUS L.****Lathyrus maritimus** (L.). **Beach Pea.**

*Pisum maritimum* Linnæus, Sp. Pl. 727. 1753 [Europe].

*Lathyrus maritimus* Willis 19.—Britton 88.—Keller and Brown 203.

Sea beaches on the northern half of the coast, but not recorded south of New Inlet, Great Bay.

*Fl.*—Late May to late June, sporadically into July.

*Maritime.*—Sandy Hook, Belmar, Sea Bright (C), Ocean Beach (NB), Pt. Pleasant (Mackenzie), Toms River (KB), Seaside Park (C), Beach Haven (L), Beach Haven Terrace (L), Spray Beach (L), West Creek.

**Lathyrus myrtifolius** Muhl. **Myrtle-leaved Marsh Vetch.**

*Lathyrus myrtifolius* Muhlenberg in Willdenow, Sp. Pl. III. 1091. 1803 [Pennsylvania].—Keller and Brown 204.

*Lathyrus palustris* var. *myrtifolius* Britton 88.

Very rare within our range. The records of *L. palustris* from within our limits are doubtless this.

*Fl.*—Mid-June to mid-July, probably.

*Middle District.*—Kaighns Pt., Mantua Creek (KB), Camden Co. on the Delaware (NB), Merchantville (KB), Swedesboro (KB).

**BRADBURYA Rafinesque.****Bradburya virginiana** (L.). **Spurred Butterfly Pea.**

*Clitoria virginiana* Linnæus, Sp. Pl. 753. 1753 [Virginia].

*Bradburya virginiana* Keller and Brown 204.

Sandy ground; rare, discovered at Anglesea by Dr. J. Bernard Brinton about 1889, and at Swedesboro by Mr. Charles D. Lippincott, July 31, 1892.

*Fl.*—Early July to mid-August. *Fr.*—Early September to mid-October.

*Middle District.*—Swedesboro.

*Coast Strip.*—Anglesea.

#### CLITORIA L.

*Clitoria mariana* L. Butterfly Pea.

*Clitoria mariana* Linnæus, Sp. Pl. 753. 1753 [N. America].—Knieskern 13.  
—Willis 19.—Britton 89.—Keller and Brown 204.

Dry sandy ground; confined to the Pine Barrens and Cape May districts, except for one station in Hudson Co. Rare and local.

The earliest record is a specimen in the Torrey Herbarium collected by Gray in 1833 (Britton's Catalogue). In 1888 Dr. Britton stated that it had not recently been collected, there being but two definite localities, Toms River, where Dr. Knieskern had collected it prior to 1856, and Little Snake Hill, Hudson Co., where Mr. W. H. Leggett obtained it in 1871. Since then Mr. Jos. Crawford found it at Hammonton, August 17, 1892. Mr. C. A. Gross collected it near Landisville. Mr. O. H. Brown discovered it north of Cape May, and Dr. J. W. Eckfeldt and a party of the Philadelphia Botanical Club collected it above Cape May Court House.

*Fl.*—Mid-July to mid-August. *Fr.*—Mid-August to mid-September.

*Pine Barrens.*—Toms River (Kn), Hammonton, Landisville (T).

*Cape May.*—Court House, Cape May (OHB).

#### FALCATA Gmelin.

*Falcata comosa* (L.). Wild Pea-nut.

*Glycine comosa* Linnæus, Sp. Pl. 754. 1753 [Virginia].

*Amphicarpæa comosa* Britton 89.

Common throughout the northern counties and down the Coast strip, occasional in the Middle district.

*Fl.*—Late July to early September. *Fr.*—Mid-September to mid-October.

*Middle District.*—Lindenwold.

*Coast Strip.*—Manahawkin, North Wildwood (OHB), Anglesea Inc., Cape May (OHB).

**Falcata pitcheri** (Torrey and Gray). **Pitcher's Wild Pea-nut.**

*Amphicarpæa Pitcheri* Torrey and Gray, Fl. N. A. I. 292. 1838 [Red River, Arkansas].

Frequent in the Middle and Cape May districts.

The hairy form of this plant, with much larger leaves, which I take to be *F. pitcheri*, is apparently more common than the glabrous one within our limits, but I have not material to determine their relative abundance in the northern part of the State.

*Fl.*—Late July to early September. *Fr.*—Mid-September to mid-October.

*Middle District.*—New Egypt, Delair, Medford (S), Swedesboro.

*Cape May.*—Cold Spring.

**APIOS Moench.****Apios apios** (L.). **Ground Nut.**

Pl. LXXII., Fig. 2.

*Glycine Apios* Linnæus, Sp. Pl. 753. 1753 [Virginia].

*Apios tuberosus* Barton, Fl. Phila. II. 82. 1818.—Knieskern 12.—Britton 89.

Common in swamps and moist thickets throughout the State.

*Fl.*—Early July to late August. *Fr.*—Early September, probably into October.

*Middle District.*—New Egypt, Pemberton Jnc. (S), Vincentown (NB), Medford (S), Hartford, Delair, Cooper's Creek, Tomlin, Mickleton, Sharps-town, Swedesboro, Beaver Dam, Dividing Creek.

*Pine Barrens.*—Bear Swamp (S), Albion, Williamstown Jnc., Atco, Winslow (S), Landisville (T), Buena Vista (T), Hammonton, Weymouth (NB).

*Coast Strip.*—Toms River (S), Manahawkin, Surf City (L), Atlantic City (S), Anglesea, Wildwood (UP).

*Cape May.*—Sluice Creek (S), Goshen, Court House, Cold Spring.

**GALACTIA P. Browne.****Galactia regularis** (L.). **Milk Pea.**

*Dolichos regularis* Linnæus, Sp. Pl. 726. 1753 [Virginia].

*Galactia glabella* Pursh, Fl. Am. Sept. II. 487.—Nuttall Gen. II. 117. 1818.

—Barton, Fl. Phila. II. 83. 1818.—Knieskern 13.—Willis 19.

*Galactia regularis* Britton 89.—Keller and Brown 204.

Frequent in open sandy ground throughout our region, but not farther north in the State.

*Fl.*—Early July to mid-August. *Fr.*—Mid-August to late September (or into October).



*Middle District*.—Florence Hts., Ewansville (NB), Prospertown, Lindenwold, Atco (C), Kaighns Pt., Gloucester Pt., Berkeley (NB), Mickleton, Williamstown, Iona (S), Millville.

*Pine Barrens*.—Toms River, Waretown, Whitings, Chatsworth, Atsion, Bear Swamp (S), Chairville, Berlin, Albion, Sumner, Landisville, Pleasant Mills (NB), Mays Landing.

*Cape May*.—Town Bank (OHB).

**Galactia volubilis (L.). Downy Milk Pea.**

*Hedysarum volubile* Linnæus, Sp. 750. 1753 [N. America].

Lower Cape May region in similar situations to the last, differing from it in pubescence much as the two *Meibomias* and *Lespedezas* discussed above.

Flowering and fruiting apparently somewhat later than the last.

*Cape May District*.—Bennett, Cold Spring (OHB), Cape May.

**PHASEOLUS L.**

**Phaseolus polystachios (L.). Wild Bean.**

*Dolichos polystachios* Linnæus, Sp. Pl. 726. 1753 [Virginia].

*Phaseolus polystachios* Britton 89.—Keller and Brown 205.

In thickets; rare and local in West Jersey and at three stations just north of our region, also on the lower coastal islands. Mr. C. S. Williamson informs me that it formerly grew at Asbury Park.

*Fl.*—Early July to early September. *Fr.*—Early August to early October.

*Middle District*.—Swedesboro (CDL), Mullica Hill (NB).

*Coast Strip*.—Piermont (S), Wildwood.

**STROPHOSTYLES Elliott.**

**Strophostyles helvula (L.). Trailing Wild Bean.**

*Phaseolus helvulus* Linnæus, Sp. Pl. 724. 1753 [Carolina].—Knieskern 12. Willis 19.—Britton 90.

*Strophostyles helvula* Keller and Brown 205.

*Phaseolus trilobus* Barton, Fl. Phila. II. 82. 1818.

Open sandy ground; common in the Middle and Coastal districts, occurring at a few stations in the coastal plain north of our boundary.

*Fl.*—Late July to late September. *Fr.*—Late August to late October.

*Middle District*.—Cookstown, Delaire, Fish House (S), Kaighns Pt., Camden, Medford (S), Haddonfield, Oaklyn (S), Glassboro, Pennsgrove, Swedesboro.

*Coast Strip*.—Spray Beach (L), Atlantic City (S), Ocean City (S), Sea Isle City (S), Sea Isle Inc. (S), Tuckahoe (S).

***Strophostyles umbellata* (Muhl.). Pink Wild Bean.**

Pl. LXXII., Fig. 1.

*Glycine umbellata* Muhlenberg in Willdenow, Sp. Pl. III. 1058. 1803 [Pennsylvania].

*Phaseolus peduncularis* Barton, Fl. Phila. II. 81. 1818.

*Phaseolus diversifolius* Knieskern 12.—Willis 19.—Britton 90.—Keller and Brown 205.

Frequent in the Middle and Coastal districts, with only one record north of our region. Casually introduced in the Pine Barrens.

*Fl.*—Late July to mid-September. *Fr.*—Late August to mid-October.

*Middle District*.—Farmingdale (NB), Blackwood, Cedar Lake, Landisville, Woodstown (NB), Bridgeton.

*Coast Strip*.—St. Albans (L), Ship Bottom (L), Spray Beach (L), Palermo, Sea Isle Inc. (S), Five-Mile Beach.

*Cape May*.—Cape May Ct. House (S), Cape May (S).

## Order GERANIALES.

### Family GERANIACEÆ. Geraniums.

#### *Key to the Species.*

- |  |                                       |
|--|---------------------------------------|
| a. Leaves pinnate, flowers purple.                                     | [ <i>Erodium cicutarium</i> ]*        |
| aa. Leaves 1 palmately divided.  |                                       |
| b. Flowers white.  | <i>Geranium carolinianum</i> , p. 515 |
| bb. Flowers rose purple.   |                                       |
| c. Petals over 10 mm. long.  | <i>G. maculatum</i> , p. 515          |
| cc. Petals about 10 mm. long, twice as long as the sepals.             | <i>G. robertianum</i> , p. 515        |
| ccc. Petals less than 10 mm. long, not twice the length of the sepals. |                                       |
| d. Pedicels 30–60 mm. long.  | [ <i>G. columbinum</i> ]†             |
| dd. Pedicels 8–15 mm. long.  |                                       |
| e. Fertile part of carpel pubescent.                                   | [ <i>G. pusillum</i> ]‡               |
| ee. Fertile part of carpel glabrous.                                   | [ <i>G. molle</i> ]§                  |

\* Stork's Bill, an occasional weed in waste places, etc.

† Long-stalked Geranium; this and the two following are more or less frequent weeds in lawns, sandy fields and waste ground.

‡ Small-flowered Geranium.

§ Dovesfoot Geranium.

## GERANIUM L.

*Geranium maculatum* L. Wild Geranium.

*Geranium maculatum* Linnæus, Sp. Pl. 681. 1753 [Carolina and Virginia].—Knieskern 10.—Britton 72.

Common in woods of the northern counties and frequent in the Middle district and the southern part of the Cape May peninsula.

*Fl.*—Late April to early June. *Fr.*—Late May to early July.

*Middle District.*—Farmingdale, New Egypt, Pemberton (C), Vincentown (C), Birmingham, Bordentown, Kinkora, Medford (S), Lindenwold (S), Sewell (S), Glassboro, Woodbury, Gloucester, Mickleton (H), Swedesboro.  
*Cape May.*—Cold Spring.

*Geranium robertianum* L. Herb Robert.

*Geranium robertianum* Linnæus, Sp. Pl. 681. 1753 [Europe].—Britton 72.—Keller and Brown 206.

Frequent in wet rocky places in the northern counties and southward on the coast from Sandy Hook to Wildwood, wherever there are woods close to the beach.

The occurrence of this delicate little plant, which recalls the moist rocks and dells of the mountains, on the wooded island beaches of our southern coast is one of the curiosities of distribution, especially since it occurs nowhere else in southern New Jersey. As evidence that it is not mere chance, we have associated with it *Aquilegia canadensis*, *Vagnera stellata* and other species of like range.

*Fl.*—Late May to late October. *Fr.*—Late June to late November.

*Coast Strip.*—Sandy Hook (NB), Ventnor (H), Piermont, Wildwood.

*Geranium carolinianum* L. Carolina Geranium.

*Geranium carolinianum* Linnæus, Sp. Pl. 682. 1753 [Carolina and Virginia].—Barton, Fl. Phila. II. 63. 1818.—Knieskern 10.—Britton 72.

Open sandy ground throughout the State, but most common in the Middle district, which seems to be the true home of the species. Its tendency to become a weed certainly accounts for

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\* The record for Vineland, published by Keller and Brown, on authority of Miss Millie Abbott, is almost certainly one of the introduced species common in that vicinity.

the few Pine Barren records, and possibly for those north of the coastal plain.

*Fl.*—Early May to early June. *Fr.*—Early June to late June.

*Middle District.*—New Egypt, Beverly, Medford (S), Camden, Washington Park, Gloucester.

*Pine Barrens.*—Landisville (T), Pleasant Mills.

*Coast Strip.*—Beach Haven (L).

## Family OXALIDACEÆ. Wood Sorrels.

### *Key to the Species.*

- a. Flowers violet. *Oxalis violacea*, p. 516  
 aa. Flowers yellow.  
   b. Peduncles mostly 2-flowered, pedicels appressed-pubescent, depressed in fruit.  
     c. Stem with closely appressed short hairs. *O. stricta*, p. 516  
     cc. Stem with loose spreading wooly pubescence. *O. filipes*, p. 516  
 bb. Peduncles mostly several flowered, pedicels ascending, their pubescence sparse, spreading. *O. cymosa*, p. 517

### OXALIS L.

#### *Oxalis violacea* L. Violet Wood Sorrel.

*Oxalis violacea* Linnæus, Sp. Pl. 434. 1753 [Virginia and Canada].—Knieskern 10.—Britton 73.

Frequent in moist woods of the northern counties; rare and local southward in the Middle district.

*Fl.*—Early May to early June. *Fr.*—Not seen, apparently rare.

*Middle District.*—Shark River (Kn), Squan (Kn), Pemberton (NB), Swedesboro, Bridgeton (S).

*Cape May.*—Cape May.

#### *Oxalis stricta* L. Yellow Wood Sorrel.

*Oxalis stricta* Linnæus, Sp. Pl. 435. 1753 [Virginia].

*Oxalis corniculata* var. *stricta* Britton 73.

Common throughout the State, except in the Pine Barrens.

*Fl.*—Late April apparently into September. *Fr.*—Late May apparently into October.

*Middle District.*—Medford (S), Woodbury, Lindenwold, Millville.

*Coast Strip.*—Beach Haven (L), Barnegat City Jnc. (L), Tuckahoe, Stone Harbor.

*Cape May.*—Bennett, Cold Spring.

#### *Oxalis filipes* Small. Slender Yellow Wood Sorrel.

*Oxalis filipes* Small, Britton and Brown, Ill. Flora. II. 346 [Virginia to Georgia].

Common in the Middle district. *O. brittonæ*, to which our plant is referable, does not seem distinct.

*Fl.*—Early May to early July. *Fr.*—Early June to early August (apparently).

*Middle District.*—New Egypt, Kinkora, Delaire.

***Oxalis cymosa* Small. Tall Yellow Wood Sorrel.**

*Oxalis cymosa* Small, Bull. Torr. Club XXIII. 267. 1896 [Ontario to Gulf of Mexico].

Frequent in the Middle and Coast districts.

*Fl.*—Late May to late September. *Fr.*—Late June well into autumn.

*Middle District.*—Farmingdale, Albion, Oaklyn (S), Riddleton.

*Coast Strip.*—Surf City (L).

Family LINACEÆ. Flax.

*Key to the Species.*

- a. Flowers blue, 12-16 mm. broad. [*Linum usitatissimum*]\*
- aa. Flowers yellow, 6-8 mm. broad.
  - b. Stem nearly terete, corymbosely branched, only the lowest leaves opposite.
    - c. Leaves thin, oblong or lanceolate, spreading. *L. virginianum*, p. 517
    - cc. Leaves firm, appressed, ascending.
      - d. Capsule depressed globose, 2 mm. high. *L. medium*, p. 518
      - dd. Capsule ovoid, 3 mm. high. *L. floridanum*, p. 518
  - bb. Stem angled, racemosely branched, leaves below the branches mostly opposite. *L. striatum*, p. 518

**LINUM L.**

***Linum virginianum* L. Wild Flax.**

*Linum virginianum* Linnæus, Sp. Pl. 279. 1753 [Virginia and Pennsylvania].  
—Knieskern 10.—Britton 71.

Dry sandy woods of the northern counties, and rarely southward in the Middle district.

*Fl.*—Mid-June to early August. *Fr.*—Mid-July to late August.

*Middle District.*—New Egypt, Mickleton.

*Pine Barrens.*—Pasadena (in cultivated ground, probably introduced).

*Cape May.*—Cold Spring (OHB).

\* Flax, an occasional weed in fields and waste places.

**Linum medium** (Planch.). **Stiff Yellow Flax.**

*Linum virginianum* var. *medium* Planchon, Lond. Jour. Bot. VII. 480. 1848  
[Canada, lacus Huron, prob. S. E. Ontario].

*Linum medium* Keller and Brown 208.

Common in sandy woods throughout our region, but probably not north of the Coastal plain, especially abundant along the Coastal district.

*Fl.*—Late June to late August. *Fr.*—Mid-July to mid-September.

*Middle District.*—New Egypt, Swedesboro, Yorktown.

*Pine Barrens.*—Hammonton, Egg Harbor City.

*Coast Strip.*—Pt. Pleasant, Manahawkin, West Creek (S), Barnegat City (L), Spray Beach (L), Absecon (Bassett), Longport, Ocean City (S), Palermo (S), Piermont (S), Stone Harbor, Anglesea, Wildwood (UP), Cold Spring, Cape May (S).

**Linum floridanum** (Planch.). **Florida Yellow Flax.**

*Linum Virginianum* var. *floridanum* Planchon, Lond. Jour. Bot. VII. 480. 1848 [Florida].

Dry ground in the Pine Barrens and coast strip; rather frequent.

*Fl.*—Late June to late August. *Fr.*—Mid-July to mid-September.

*Pine Barrens.*—Winslow Inc. (S), Hammonton, Egg Harbor City, Tuckahoe (S).

*Coast Strip.*—West Creek (S), Cape May Ct. House (S), Cold Spring (S).

**Linum striatum** Walt. **Ridged Yellow Flax.**

*Linum striatum* Walter, Fl. Cor. 118. 1788 [So. Carolina].—Willis 14.—Britton 71.—Keller and Brown 208.

Frequent in swampy ground throughout the State.

*Fl.*—Late June to mid-August. *Fr.*—Late July to early September.

*Middle District.*—New Egypt, Lindenwold, Camden, Swedesboro.

*Pine Barrens.*—Chatsworth (S), Atsion (S), Braddocks Mill (S).

*Coast Strip.*—Manahawkin, Tuckerton, West Creek, Petersburg (S), Wildwood.

*Cape May.*—Cape May Ct. House (S), Cape May.

## Family RUTACEÆ. Prickly Ash, etc.

*Key to the Species.*

- a. Branches prickly, leaves 5-11 pinnate.  
aa. Branches not prickly, leaves 3-foliolate.

*Zanthoxylum*, p. 519

*Ptelea*, p. 519

## ZANTHOXYLUM L.

*Zanthoxylum americanum* Mill. Prickly Ash.*Zanthoxylum americanum* Miller, Gard. Dict. Ed. 8. No. 2. 1768 [South Carolina].*Xanthoxylon Americanum* Britton 74.—Keller and Brown 209.

Locally common in the northern counties, but very rare in our region; reported but once within our limits—Freehold, on authority of Willis.

## PTELEA L.

*Ptelea trifoliata* L. Three-leaved Hop Tree.*Ptelea trifoliata* Linnæus, Sp. Pl. 118. 1753 [Virginia].—Britton 74.

Woodlands in the Delaware Valley; rare. Found on Ridge's Island, Hunterdon County, and on the banks of Crosswick's Creek, both in Mercer County, by C. C. Abbott (Britton's Catalogue) and Burlington by A. C. Apgar, who collected a specimen near Bordentown, which is now in the N. J. Geological Survey herbarium at New Brunswick. This tree has almost precisely the same distribution as the Judas, both of them southern species, which find their northern limit in these river valleys, but which cannot establish themselves below the head of tide-water, probably on account of the lack of steep, wooded banks.

*Fl.*—Late May to mid-June. *Fr.*—September to October.

*Middle District.*—Bordentown (NB).

## Family POLYGALACEÆ. Milkworts.

*Key to the Species.*

- a. Flowers in spikes or spike-like racemes at the summit of the stem or its branches.
  - b. Basal leaves spatulate, flowers orange yellow. *Polygala lutea*, p. 520
  - bb. Basal leaves inconspicuous or wanting, flowers not yellow.
    - c. Leaves, some at least verticillate.
      - d. Spikes 4-6 mm. thick.
        - e. Most of the leaves in whorls, flowers greenish white. *P. verticillata*, p. 522
        - ee. Most of the leaves alternate, only the lowest in whorls, flowers usually slightly pink tinted. *P. ambigua*, p. 522
      - dd. Spikes 8-18 mm. thick.
        - e. Spikes sessile or nearly so, wings deltoid, flowers purple or greenish white. *P. cruciata*, p. 521
        - ee. Spikes peduncled, leaves less regularly verticillate, wings lanceolate ovate, flowers purple. *P. brevifolia*, p. 521
    - cc. Leaves all alternate.

- d. Petals united into a cleft tube 6-8 mm. long, pinkish.  
*P. incarnata*, p. 522
- dd. Petals not united into a tube.
- c. Spikes ovoid or globose.
- f. Bracts persistent, after the falling of the rose purple or greenish flowers. *P. viridescens*, p. 523
- ff. Bracts deciduous, flowers rose pink. *P. mariana*, p. 523
- cc. Spikes narrow, cylindrical.
- f. Leaves oblanceolate to linear, 4-12 mm. long, flowers greenish, more or less tinged with purple.  
*P. nuttallii*, p. 523
- ff. Leaves lanceolate, 25-50 mm. long, flowers white or tinged with green.  
*P. senega*, p. 524
- aa. Flowers rose pink, in a slender raceme, pedicels distinct, numerous cleistogamous flowers on root-like subterranean branches.  
*P. polygama*, p. 524
- aaa. Flowers 1-4, large purple (14-20 mm. long), apparently terminal, leaves ovate or oblong (20-40 mm).  
*P. paucifolia*, p. 525

## POLYGALA L.

*Polygala lutea* L. Orange Milkwort.

Pl. LXXVII.

*Polygala lutea* Linnæus, Sp. Pl. 705. 1753 [Virginia].—Nuttall Gen. II. 88. 1818.—Pursh Fl. Am. Sept. 465. 1814.—Barton Fl. Phila. II. 69. 1818.—Knieskern II.—Willis 17.—Britton 58.—Keller and Brown 210.

Common in moist sandy places in the Pine Barrens, and locally in swamps in the Middle and Cape May districts. Not recorded in the State north of our region.

This is one of the showiest plants of the Pine Barrens, one of those that render the region so strikingly different from the uplands beyond the fall line. I well remember my first visit to the Pines, when the low moist spots were all dotted with the brilliant heads of the *Polygala*, with here and there stalks of white fringed orchis, and the small orange fringed orchis, so like the *Polygala* in color, with *Xyris* and *Eriocaulon*, and a host of other things hitherto unknown. The mosquitos and heat were nothing, when such a natural flower garden lay before one's eyes, and the poor flora of my upland pastures seemed to sink into insignificance beside such riches.

When cut off by the scythe, as they frequently are on the broad strips that are cleared away on each side of the railroad as a protection against fire, they send up new shoots or branches, which bloom late in the autumn.

*Fl.*—Mid-June to mid-October.



*Middle District*.—Shark River, New Egypt, Burlington, Pemberton (C), New Lisbon (C), Lindenwold, Lawnside (S), Tomlin, Mickleton, Swedesboro, Elmer (P), Dividing Creek, Haleyville (P).

*Pine Barrens*.—Long Branch, Forked River, Toms River, Allaire, Island Hts. (NY), Manchester (NY), Tuckerton, Jones Mill (S), Speedwell (S), Chatsworth, Atco, Jackson, Clementon, Bear Swamp, Braddocks Mill, Kenilworth (S), Albion, Andrews, Folsam, Landisville, Vineland (S), Hammonton, Batsto, Pleasant Mills, Egg Harbor City, Mays Landing (NJ).

*Cape May*.—Court House (S), Dias Creek (S), Whitesboro (S), Cold Spring (S), Cape May (P).

***Polygala cruciata* L. Cross-leaved Milkwort.**

Pl. LXXIII.

*Polygala cruciata* Linnæus Sp. Pl. 706. 1753 [Virginia].—Knieskern II.—Willis 17.—Britton 59.—Keller and Brown 210.

Common in damp ground in the Pine Barrens and locally in the Middle, Coast and Cape May districts, occurring at a few stations north of our limits, but all within the coastal plain.

This, and the smaller *P. nuttalli*, are the most widely and uniformly distributed species of *Polygala*; occurring everywhere throughout the New Jersey coastal plain, where conditions are favorable, even down to the very edge of the salt meadows.

While usually about the color of red clover, which it somewhat resembles as we see it scattered about among the grass and sedges, *Polygala cruciata* is sometimes entirely greenish, a condition that is more familiar in *P. viridescens*, in which the two color phases were originally described as different species.

*Fl.*—Late July to early October.

*Middle District*.—Long Branch, Ocean Beach (NJ), New Egypt, Orchard (S), Griffith's Swamps, Mickleton (NB), Swedesboro, Dividing Creek.

*Pine Barrens*.—Toms River, Island Hts. Inc., Forked River, Waretown, West Creek, Coxe's, Plains, Woodmansie, Speedwell, Parkdale, Bear Swamp, Williamstown Inc., Winslow Inc., Winslow (S), Twelfth St., Folsom, Hammonton, Batsto, Egg Harbor City, Absecon, Palermo (S), Petersburg (S), Tuckahoe (S), Ocean City Inc., Woodbine.

*Coast Strip*.—Seaside Park, Barnegat City (L).

*Cape May*.—Green Creek, Cold Spring (S), Bennett (S).

***Polygala brevifolia* Nutt. Short-leaved Milkwort.**

Pl. LXXVI. Fig. 1.

*Polygala brevifolia* Nuttall Gen. II. 89. 1818 [Sandy swamps of New Jersey].—Willis 17.—Britton 59.—Keller and Brown 210.

Common in moist ground in the Pine Barren district, but found elsewhere only in Secaucus Swamp, Hudson County, and

one or two stations in West Jersey, all of them outlying "Pine Barren islands."

*Fl.*—Mid-July to mid-October.

*Middle District.*—New Egypt, Ashland.

*Pine Barrens.*—Toms River, Forked River, Waretown, Pasadena, Barnegat (S), West Creek (S), Lakehurst, Plains, Bamber, Cedar Bridge, Chatsworth, Jones Mill (S), Speedwell, Whitings, Hanover, Woodmansie, Pemberton (KB), Bear Swamp, Winslow (P), Atsion, Parkdale, Sumner (S), Williamstown Inc., Mouth of Batsto, Absecon, Pancoast (S), Egg Harbor City, Lucaston, Batsto, Quaker Bridge, Pleasant Mills, Hammonton, Weymouth, Mays Landing (NB).

***Polygala verticillata* L. Whorled Milkwort.**

Pl. LXXIV. Fig. 3.

*Polygala verticillata* Linnæus, Sp. Pl. 706. 1753 [Virginia].—Knieskern 11.—Britton 59.

Dr. Britton gives this species as common in dry soil throughout the State. In the southern half, however, it seems to be mainly restricted to the Coastal strip and the coast of Delaware Bay, where it occurs close to the edge of the salt marshes in damp sandy ground.

Two records from the Pine Barrens are from cultivated ground and apparently introduced.

*Fl.*—Late June to mid-October.

*Middle District.*—Camden (P), Clementon.

*Pine Barrens.*—Winslow Inc., Landisville (T).

*Coast Strip.*—Pt. Pleasant, Ship Bottom (L), Surf City (L), St. Albans (L), Atlantic City, Longport, Piermont (S), Stone Harbor, Anglesea, Cape May, Cape May Ct. House, Cold Spring (S), Cape May, Dias Creek, Halesville (NB).

***Polygala ambigua* Nutt. Loose-spiked Milkwort.**

Pl. LXXIV. Fig. 1.

*Polygala ambigua* Nuttall Gen. II. 89. 1818 [New Jersey and Virginia].—Knieskern 12. 1856.

Rare and local in the Middle district and Pine Barrens; apparently introduced in the latter.

*Fl.*—Late June to mid-October.

*Middle District.*—Kinkora (NY).

*Pine Barrens.*—Williamstown Inc. (A), Hammonton (A).

***Polygala incarnata* L. Pink Milkwort.**

Pl. LXXV. Fig. 1.

*Polygala incarnata* Linnæus, Sp. Pl. 701. 1753 [Virginia and Canada].—Pursh Fl. Am. Sept. II. 464.—Willis 17.—Britton 58.—Keller and Brown 210.

Sandy ground; restricted to the lower part of the Middle district; not common.

*Fl.*—Late June to mid-September.

*Middle District.*—Haddonfield, Griffith's Swp. (P), Clarksboro, Mickleton (H), Swedesboro, Bridgeton.

***Polygala viridescens* L. Purple Milkwort.**

Pl. LXXVIII. Fig. 2.

*Polygala viridescens* Linnæus, Sp. Pl. 705. 1753 [Virginia].

*Polygala purpurea* Barton, Fl. Phila. II, 69. 1818.

*Polygala sanguinea* Knieskern 11.—Britton 59.

Moist sandy ground; at two stations in the northern counties; common in the upper part of the Middle district, becoming less frequent southward, and occasional in the Coastal and Cape May districts.

Flowers sometimes quite green, with scarcely a trace of pink.

*Fl.*—Mid-June to mid-October.

*Middle District.*—Allaire (S), Farmingdale, Deal, Brindletown, Pemberton, (NB), Hartford, Haddonfield, Lawnside (S), Lindenwold, Mickleton, Swedesboro, Riddleton.

*Pine Barrens.*—Oak Road Station near Landisville.

*Coast Strip.*—Pt. Pleasant, Bayhead (NB), Manahawkin.

*Cape May.*—Green Creek.

***Polygala mariana* Mill. Maryland Milkwort.**

Pl. LXXVIII. Fig. 1.

*Polygala Mariana* Miller, Gard. Dict. Ed. VIII. No. 6. 1768 [Maryland].—Keller and Brown 210.

*Polygala fastigiata* Nuttall, Gen. II. 89. 1818 [New Jersey].—Knieskern 11.—Britton 59.

Sandy ground, rare and local; confined to the Pine Barren and Cape May districts.

*Fl.*—Late June to early October.

*Pine Barrens.*—Allaire, Berlin, Woodbine.

*Cape May.*—Below Court House, Green Creek, Bennett.\*

***Polygala nuttallii* Torr. & Gray. Nuttall's Milkwort.**

Pl. LXXIV. Fig. 2.

*Polygala Nuttallii* Torrey and Gray, Fl. N. A. I. 670. 1840. n. n. for *P. sanguinea* Nuttall (nec L.) [Pine Barrens of N. J.].—Britton 59.

\* The record for Swedesboro in Keller and Brown's list proves to be *P. viridescens*, that for Hammonton cannot be verified.

*Polygala sanguinea* Nuttall Gen. II. 88. 1818.—Barton Fl. Phila. II. 70.—Willis 17.

Open swampy ground or wet sandy places; common throughout our district and in that portion of the country to the north that lies in the Middle district. Apparently does not extend north of the coastal plain. Most plentiful in the Pine Barrens.

This is our commonest small *Polygala*, and as universally distributed through the Pine Barrens as *P. lutea*. Nuttall, who discovered it and was clearly aware of its distinctness, mistook it for the *P. sanguinea* of Linnæus, which was merely the pink form of *P. viridescens*, so Torrey and Gray fittingly honored the memory of the discoverer by naming it after him. Few botanists were better acquainted with the Pine Barren flora than Thomas Nuttall, and it is well to have his name associated with it in this plant, *Lobelia Nuttallii*, etc. His type specimens, with their small, closely-written labels, and all new species marked with a star, are still preserved in the herbarium of the Philadelphia Academy, where he worked for many years.

*Fl.*—Early July to mid-October.

*Middle District.*—Shark River, Farmingdale, Medford, Lindenwold, Sickler-ville (S), Mickleton, Swedesboro, Dividing Creek.

*Pine Barrens.*—Allaire, Forked River, Whittings, Bear Swamp (S), Brad-docks Mill, Taunton, Speedwell (S), Clementon, Williamstown Jnc., Landis-ville, Hammonton (S), Pleasant Mills, Pancoast, Absecon (S), Egg Harbor City, Woodbine, Belleplaine (S), "Pine Cottage."

*Coast Strip.*—Long Branch (C), Spring Lake (NB), Pt. Pleasant, Beach Haven (L), Anglesea.

*Cape May.*—Court House, Green Creek (S), Dias Creek (S), Whitesboro.

***Polygala senega* L. Seneca Snake-root.**

*Polygala Senega* Linnæus, Sp. Pl. 704. 1753 [Virginia, Pennsylvania and Maryland].—Britton 59.

Probably extinct. Formerly occurred in New Jersey in the vicinity of New York City, according to Torrey, and at Griffith's Swamp, [=Lawnside] Camden County, according to Charles E. Smith (Britton's Catalogue).

***Polygala polygama* Walt. Racemed Milkwort.**

Pl. LXXV., Fig. 2.

*Polygala polygama* Walter, Fl. Car. 179. 1788 [S. Carolina].—Knieskern 12.—Britton 60.—Keller and Brown 211.

Dry sandy ground at several stations in the northern counties and locally common in the upper part of the Middle district; rare in the Pine Barrens.

*Fl.*—Early June to late July, or occasionally later.

*Pine Barrens.*—Williamstown Jnc., Cedar Brook, Winslow Jnc., Folsom, Hammonton.

*Middle District.*—Deal, Sea Bright (NB), Manasquan, Pt. Pleasant, Bay Head (NY), Sicklerville (S), Williamstown, Newfield, Franklinville (P), Clementon, Centerton (S), Forest Grove (S), Riddleton.

***Polygala paucifolia* Willd. Flowering Wintergreen. Gay-Wings.**

Pl. LXXVI, Fig. 2.

*Polygala paucifolia* Willdenow, Sp. Pl. III. 880. 1800 [Pennsylvania].—Willis 17.—Britton 59.—Keller and Brown 211.

Rich woods of the northern counties; very rare within our limits and reported from but one station—at Freehold, Monmouth County—on authority of Mr. O. R. Willis (Britton's Catalogue).

*Fl.*—Early May to mid-May, probably.

Family EUPHORBIACEÆ. Spurges, etc.

*Key to the Species.*

- a. Flowers not surrounded by a corolla-like involucre, but with a true calyx.
  - b. Plants wiry (1-5 dm. high), silvery-scurfy, leaves mostly linear lanceolate, flowers minute in clusters, staminate with petals, pistillate without, calyx 5-parted. *Crotonopsis linearis*, p. 526
  - bb. Plants green, branching, leaves ovate to lanceolate, flowers minute in spikes or clusters, which are nearly equalled or exceeded by a leaf-like lobed bract.
    - c. Leaves ovate, spikes mostly shorter than the bract. *Acalypha virginica*, p. 526
    - cc. Leaves lanceolate or linear, spikes longer than the bract. *Acalypha gracilens*, p. 527
- aa. Flowers minute, fertile one in the center, consisting of three styles; sterile ones around it, consisting of a single stamen each, involucre resembling a calyx or corolla, with glands at the sinuses, which are sometimes provided with petal-like appendages; fertile flowers exerted in fruit.
  - b. Glands with petal-like appendages.
    - c. Leaves opposite.
      - d. Leaves entire, glabrous, prostrate. *E. polygonifolia*, p. 527
    - dd. Leaves serrate or dentate.
      - e. Plant prostrate, pubescent or puberulent. *E. maculata*, p. 527
      - ee. Plant upright glabrous. *E. preslii*, p. 527

- cc. Leaves alternate, flowers in a terminal umbel, appendages showy, white. *E. corollata*, p. 528
- bb. Glands without petal-like appendages.
- c. Leaves mostly opposite, plant prostrate, flowers appearing before the leaves.
- d. Segments of involucre small, green; plant low. *E. ipecacuanha*, p. 528
- dd. Segments of involucre enlarged, white; plant erect. *E. arundelana*, p. 529
- cc. Leaves alternate or scattered, plant 4-15 decimeters tall, flowers in a terminal umbel. *E. darlingtonii*, p. 529

#### CROTONOPSIS Michaux.

##### *Crotonopsis linearis* Michx. *Crotonopsis*.

*Crotonopsis linearis* Michaux, Fl. Bor. Am. II. 186. pl. 46. 1803.—[Long Bay, Carolina and Illinois].—Nuttall, Gen. II. 209. 1818.—Knieskern 27.—Willis 54.—Britton 215.—Keller and Brown 211.

In dry sandy woods; rather rare and local. Restricted to the Pine Barrens and a few localities in West Jersey.

A curious little plant, which in its slender wiry leaves and branches remind one somewhat of *Anychia*, but it is grayish all over with a peculiar silvery sheen, which distinguishes it at once.

*Fl.* and *Fr.*—August and September, apparently.

*Middle District.*—Kirkwood, Ashland, Lindenwold, Taunton, Woodbury (P).

*Pine Barrens.*—Manchester (C), Southwark (S), Atsion (Leeds), Hammonon (KB), Pleasant Mills, Batsto.

#### ACALYPHA L.

##### *Acalypha virginica* L. Three-seeded Mercury.\*

*Acalypha virginica* Linnæus, Sp. Pl. 1003. 1753 [Virginia].—Knieskern 27.

Fields and woods, usually in damp situations; common in the northern counties and less common southward in the Middle, Coast and Cape May districts. Distinctly a weed in many places.

*Fl.*—Probably early July into September. *Fr.*—August into October (apparently).

*Middle District.*—New Egypt, Birmingham, Hartford, Oaklyn, Lawnside, Swedesboro, Salem (S), Beaver Dam.

*Coast Strip.*—Cox's.

*Cape May.*—Cape May (OHB).

\*The southern *A. ostryaefolia* is reported from Princeton, Trenton and Closter (Britton's Catalogue), but has not been collected within our limits.

*Acalypha gracilens* A. Gray. Slender Three-seeded Mercury.

*Acalypha gracilens* A. Gray, Man. 408. 1848 [New Jersey].—Knieskern 27.  
*Acalypha virginica* var. *gracilens* Britton 215.

Fields and woods in dryer ground; occasional northward, but frequent in the Middle, Coast and Cape May districts. A weed in most places, and as such sparingly introduced into the Pine Barrens.

*Fl.* and *Fr.*.—Apparently as in the last.

*Middle District.*—Springdale (S), Clarksboro, Mickleton (H), Salem (S).

*Pine Barrens.*—Newtonville, Landisville (T), Pleasant Mills.

*Coast Strip.*—Waretown, Surf City (L).

*Cape May.*—Cape May (OHB).

EUPHORBIA L.

*Euphorbia polygonifolia* L. Seaside Spurge.

*Euphorbia polygonifolia* Linnæus, Sp. Pl. 455. 1753 [Canada and Virginia].—Knieskern 27.—Willis 54.—Britton 214.—Keller and Brown 212.

Sea beaches; common along the entire coast and for some distance along the bay side of Cape May. The Camden record, given on Martindale's authority, is probably a ballast plant.

*Fr.*.—Early August into October.

*Maritime.*—Sandy Hook, Long Branch, Pt. Pleasant, Waretown, St. Alban's (L), Spray Beach (L), Island Hts. Inc., Brigantine, Atlantic City (S), Ocean City (S), Stone Harbor (S), Wildwood, Cape May, Cape May Pt. (S).

*Euphorbia maculata* L. Spotted Spurge.

*Euphorbia maculata* Linnæus, Sp. Pl. 455. 1753 [N. Amer.].—Britton 214.

Dry ground in the Northern, Middle and Coast districts, apparently everywhere a weed.

*Fr.*.—Late July into October.

*Middle District.*—Bloomsbury, Lawnside (S), Clementon (S), Swedesboro.

*Coast Strip.*—N. Beach Haven (L), Peahala (L), St. Alban's (L), Ship Bottom (L).

*Euphorbia preslii* Guss. Upright Spurge.

*Euphorbia preslii* Gussone, Fl. Sic. Prodr. I. 539. 1827 [ ].\*

*Euphorbia hypericifolia* Barton, Fl. Phila. II. 185. 1818.—Knieskern 27.—Britton 214.

Frequent in fields, etc., in the Northern and Middle districts; everywhere a weed.

*Fr.*.—Late July into October.

*Middle District.*—Swedesboro, New Egypt.

\* This is the only reference that I have been unable to verify.

***Euphorbia corollata* L. Flowering Spurge.**

*Euphorbia corollata* Linnaeus, Sp. Pl. 459. 1753 [Virginia and Canada].—  
Knieskern 27.—Willis 54.—Britton 214.

Dry ground; occasional just north of our limits and southward in the Middle and Coastal districts. Apparently in part a weed.

*Fl.*—Early June to early September.

*Middle District.*—Blue Ball (NB), Red Bank (NB), Cooper's Creek, Tomlin. Mickleton, Swedesboro.

*Coast Strip.*—Pt. Pleasant (S), Petersburg (OHB).

*Cape May.*—Rio Grande (OHB).

***Euphorbia ipecacuanhae* L. Wild Ipecac.**

*Euphorbia ipecacuanhae* Linnaeus, Sp. Pl. 455. 1753 [Virginia and Canada].  
—Barton, Fl. Phila. II. 185. 1818.—Knieskern 27.—Willis 54.

Common in sand in the Pine Barrens and occasional in sandy spots of the Middle district including its extension north of our boundary and in the Cape May peninsula.

This is another of the characteristic plants of the Pine Barrens, delighting in the most arid stretches of white sand. Its tufts of yellow blossoms, which appear before the foliage, and later its rosettes of somewhat fleshy leaves, will be found to spring from a cluster of slender stems, which unite as we dig downward until they finally coalesce into one stout root. How far it descends I have never been able to ascertain, though I have followed several for three feet into the sand, at which point they showed no sign of diminishing in thickness. Both leaves and stems are full of the milky juice characteristic of the genus. The leaves vary greatly in both size and color, some are linear and others broadly oval 5.5 x 3 cm. with all possible intermediates, while all styles occur either green or deep crimson. The variations are not correlated with any conditions of environment, so far as one can see, extremes growing side by side in perfectly uniform surroundings.

*Fl.*—Late April to late May. *Fr.*—Late May to late June.

*Middle District.*—New Egypt (NB), Medford (S), Locust Grove (S), Lindenwold (S), Camden, Washington Park, Westville, Woodbury, Mantua, East of Sewell (S), Sicklerville (S), Mickleton, Swedesboro, Yorktown, Two miles west Bridgeton (S).



*Pine Barrcus*.—Farmingdale, Toms River, Forked River, Waretown, Davenport, East and west Plains, Head of Batsto (S), Browns Mills, Folsom, Hammon-ton (Bassett), Pancoast (NB) Mays Landing (NB), Newfield (S), Ocean City Inc., Palermo.

*Cape May*.—Cold Spring (OHB).

**Euphorbia arundelana** Bartlett. **Bartlett's Spurge.**

*Euphorbia arundelana* Bartlett, Rhodora XIII. 164. 1911 [Laurel, Ann Arundel Co., Md.].

A specimen collected by Mr. Chas. D. Lippincott at Swedesboro, N. J., May 27th, 1894, is obviously referable to this recently described species.

*Middle District*.—Swedesboro.

**Euphorbia darlingtonii** Gray. **Darlington's Spurge.\***

*Euphorbia Darlingtonii* Gray, Man. 404. 1848 [Chester Co., Pa.].—Keller and Brown 213.

Very rare in woods in the lower Middle district. Unknown in the State until collected near Woodstown, June 15, 1895, by Mr. Charles D. Lippincott.

Mature fruit June 15.

*Middle District*.—Woodstown.

Family CALLITRICHACEÆ. Water-starworts.

*Key to the Species.*

- a. Fruit short-peduncled, bracts wanting, terrestrial. *C. austini*, p. 529
- aa. Fruit sessile, aquatic or with terrestrial forms growing on mud, bracts present.
  - b. Fruit oval, longer than the styles. *C. palustris*
  - bb. Fruit obovate, shorter than the styles. *C. heterophylla*, p. 530

The flowers are very small and inconspicuous, consisting of a single stamen or pistil. They begin to bloom in late spring. Taxonomic characters are based on the fruit.

**CALLITRICHE L.**

**Callitriche austini** Engelm. **Austin's Water Starwort.**

*Callitriche Austini* Engelmann, Gray's Man. Ed. V. 428. 1867 [New Jersey].—Britton 106.

Damp shady soil at several stations in the northern counties and Middle district; rare and local.

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\* Named for its discoverer, William Darlington (1782-1863), of West Chester, Pa., author of the classic *Flora Cestrica*.

*Fruit*—Well developed June 15, 1895—Riddleton.

*Middle District*.—Riddleton.

*Callitriche heterophylla* Pursh. **Larger Water Starwort.**

*Callitriche heterophylla* Pursh, Fl. Am. Sept. 3. 1814 [N. America].—Barton, Fl. Phila. I. 2. 1818.—Britton 106.

In streams and ponds; frequent in the Northern and Middle districts.

Variable in form and habit. Specimens from our range that have been referred to *C. palustris* prove to be this, so far as I have been able to examine them.

*Fruit*—Well developed, but not necessarily mature; late May into October.

*Middle District*.—Farmingdale, New Egypt, Delanco, Swedesboro, Clementon (S), Pitman, Riddleton.

## Order SAPINDALES.

Family EMPETRACEÆ. Crowberries.

**COREMA** Don.

*Corema conradii* (Torr.). **Conrad's Crowberry.**

Pl. LXXIX.

*Empetrum Conradii* Torrey, Ann. Lyc. N. Y. IV. 83. 1837 [Pine Barrens, near Cedar Bridge, Monmouth Co., N. J., also Pemberton Mills, 10 miles from Burlington, N. J.].

*Corema Conradii* Willis 54.—Britton 228.—Keller and Brown 214.—Redfield, Proc. A. N. S. Phila. 1869, 91-92.—do.—Redfield, Bull. Torr. Bot Club, 1884, 97.—do. 1889, 193-195.—Britton, Bull. Torr. Club, 1884, 117.—do. 1889, 195.—Saunders, Proc. A. N. S. Phila. 1900, 544.—Stone, Bartonica 1910, 26.

At several stations on the Plains or their borders in Ocean and Burlington Counties, also formerly at Pemberton, where it is now apparently extinct.

This interesting plant, which here reaches the southern limit of its range,\* has attracted more attention among botanists than any other member of the Pine Barren flora, unless it be *Schizæa pusilla*. It is an inhabitant of those desolate stretches of white sand barrens which cover the most elevated portion of the Pine

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\* Prof. Fernald (Rhodora, 1911, p. 139) regards it as a Coastal Plain plant, pushing north to Newfoundland. I have always looked upon it as a northern species ranging south to New Jersey!

Barren region, stretching away for some thirty square miles, for the most part devoid of trees higher than one's knees. But trees there are in abundance, round boles of pitch pine trunks, which send out prostrate branches, or short upright ones, bearing an abundance of cones; and scrub oaks of several species—*Q. ilicifolia* and *marilandica*—everywhere stunted. Here and there the Bearberry *Arctostaphylos* trails about over the coarse white sand and gravel, and then at favored spots are great round cushions of the *Corema*, one to three feet in diameter, the basal portion a tangle of brown stems and dead branches, but the surface of the mass, covered with fresh green leaves—little slender green needles recalling those of some conifer—and at the tip of each spray a blossom or fruit, according to season; neither of them very conspicuous, although the purple anthers do stand out rather brightly when the plant is in full bloom.

The history of the discovery and re-discovery of the plant in New Jersey is interesting, and I quote in full that portion of an article of Mr. J. H. Redfield, which refers to the plant in our State.\* Mr. Redfield says:

"It is said to have been first discovered by Prof. Solomon W. Conrad† as early as 1831 near Pemberton Mills, about ten miles from Burlington, N. J., and a fragment so ticketed (with a ?) is in the herbarium of the Philadelphia Academy. Soon after Rafinesque collected it at Cedar Bridge, Monmouth County, about twenty-two miles southeast of Pemberton. This locality was visited about 1833 by Dr. Torrey, who published the first description of the plant under the name of *Empetrum Conradii*, in Annals of N. Y. Lyceum of Nat. Hist., iv., 83. In April, 1869, in company with the late Charles F. Parker, I made some examination of the vicinity of Pemberton, and also visited Cedar Bridge in search of the plant. The encroachment of cultivation near the former place discouraged search, but at Cedar Bridge the localities which Dr. Torrey in his paper has so carefully indicated, were readily identified. But no trace of the plant was seen either at these points or elsewhere

\* Bull. Torr. Bot. Club, 1884, p. 97.

† 1779-1831. A botanist of note, professor at the University of Pennsylvania, 1829-1831, and an authority on the flora of Southern New Jersey.

during a search of some hours. Dr. Torrey described it as growing in a few patches "in the pure white sand of that region." These places, as I now remember them, were quite bare of vegetation at that early spring season, but the prevailing tree growth of all that region is a very stunted form of *Pinus rigida*. At the time of Rafinesque's and Torrey's visits, Cedar Bridge was an inn for the accommodation of the limited summer travel of that period by stage-coach between Philadelphia and Barnegat Bay. Now, alas! an occasional clam-wagon is the only visitant, and as I remember the house in 1869, it was as rough a hostelry as it has been my lot to encounter. I have some doubt whether Conrad's and Rafinesque's localities were not the same.\*

Dr. Knieskern is said to have found the plant at other points in Monmouth County, but this has not been confirmed, nor is the *Corema* enumerated in his Catalogue of the Plants of Monmouth and Ocean Counties, published in 1856. There is, however, a large tract of absolute wilderness lying between the New Jersey Southern Railroad and Barnegat Bay which may reward exploration."

The next reference to the species in New Jersey is not very satisfactory, being a brief note of Prof. O. R. Willis to Dr. Britton.† It probably refers in part, at least, to Dr. Knieskern's discovery of the plant, as he lived at Manchester. He writes: "We found *Corema west* of Toms River and *north* of Manchester; also west of *Squam*, south of the river. It was not rare in those neighborhoods. It is, though, at least thirty years since I visited them, and the localities have perhaps been exhausted."

The only specimen which may be cited to substantiate these records is one in the Philadelphia Academy, received from Dr. Gray, labeled "Monmouth Co., N. J., Coll. H. Mann." I should strongly suspect that Prof. Willis, after this lapse of time, might

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\* In the Torrey Bulletin for October, 1884, p. 117, Dr. N. L. Britton states that there seems to be no doubt that Mr. S. W. Conrad did collect the plant at Pemberton's Mills about twelve miles from Burlington, N. J., for a specimen so ticketed is in the Torrey Herbarium.

It seems to me that it could easily have been sent to Conrad by a resident of Pemberton who actually collected it much farther east.

† Torrey Bulletin XVI., 1889, p. 195.

have been mistaken in the occurrence of the plant, especially since Dr. Knieskern does not include it in his list. Several other important New Jersey records which originate in Prof. Willis' Catalogue have never been substantiated.

At any rate, from this time, say 1854 until 1886, the plant was completely lost, so far as New Jersey was concerned. In that year it was rediscovered by Mr. F. J. H. Merrill, of Columbia College, in the barren plains west of Cedar Bridge, exactly where Mr. Redfield suggested in 1869,\* that it might be found when reporting to the Philadelphia Academy the failure of the efforts of Mr. Charles F. Parker and himself to rediscover it.

The discovery was communicated to Dr. Britton, who visited the spot with Messrs. Thomas Hogg and J. I. Northrup, in May, 1887. On April 3, 1889, Dr. Britton, Mr. Redfield, Mr. Arthur Hollick and Dr. J. Bernard Brinton, visited the locality, and I quote from Mr. Redfield's second paper on the subject: †  
 "The locality is about two and one-half miles due west from Cedar Bridge, and about ten miles west of the railroad station at Barnegat. It lies on both sides of the county line dividing Ocean and Burlington Counties. It is easiest reached from Barnegat by taking the straight road from that place to Cedar Bridge (about eight miles), then taking the straight road running west-northwest from Cedar Bridge toward Buddstown for about two and one-half miles to where that road is crossed by a north and south road, and following this for half or two-thirds of a mile south.

"The region is a most remarkable one, which cannot fail to impress every visitor with a sense of loneliness and sterility. It forms part of the watershed, or divide, between the streams flowing into the Atlantic and those discharging into the Delaware River. Locally it is known as the "West Plains," but these so-called "plains" are long, undulating swells of sand, sometimes rising to a height commanding extensive views in every direction over a desert of sand so sterile that even the trees of *Pinus rigida*, which sparsely clothe it, can attain only to the height of three or four feet. No sign of human life is

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\* Proc. Acad. Nat. Sci., Phila., 1869, 91, 92.

† Bull. Torrey Bot. Club XVI., 1889, p. 193-195.

visible and one could readily imagine himself in the midst of a vast wilderness. Its height above the ocean is between 150 and 200 feet, according to the Geological Survey. The region is bisected by the north and south road I have mentioned, by the side of which the usual low matted patches of *Corema* appear. But on leaving the road to examine the extent of its distribution we become amazed at the expanse of territory more or less covered by it. We followed over the rising swells of ground already alluded to, both to the east and west of the road, to the extent of at least half a mile each way, and for a like distance in the opposite direction without entirely losing sight of the *Corema*, and we probably did not reach its limits. To say that there are hundreds of acres of it is a statement which my companions thought to be far short of the truth. In some places the patches were separated by intervals of some rods, but often scores of them were seen at once, and in many places they became confluent in large masses, reminding one of the appearance of the plant at Plymouth, Mass. Besides the thick, scattered, stunted pines, little shrubbery was seen, other than occasional very small specimens of *Quercus ilicifolia*, but the sandy spaces were often partially covered with *Arctostaphylos Uva-ursi*, and the whole region reminded one of the downs of the interior of Nantucket, where the *Arctostaphylos* is so very abundant. Occasional carpets of *Pyridanthera* were near, but rarely with the *Corema*.

“Though our visit was made before April had expired, the unusually advanced season had carried the *Corema* beyond its flowering stage, and its stamens were mostly withered, though not fallen. Staminate and pistillate plants seemed equally abundant.

“When Mr. Merrill first discovered this locality it was, I believe, unscathed by fire, but at the time of Dr. Britton’s first visit the region had been burned over, so far as it was possible to burn so sparse a growth, and the low pines had been singed and mostly killed. Now, among the blackened trunks fresh sprouts of these pines are appearing. But what most excited our surprise was to see myriads of young seedling plants of *Corema* springing out of the sand in the intervals between the

patches, and it would seem as if the seeds, carried by the winds, had availed themselves of every spot of bare sand, there to lodge and germinate. None of these seedlings were more than two years old, many not more than one.

"In illustration of the apparently capricious manner in which this plant appears, I may mention that on our return to Barnegat we saw two or three patches of it on the south side of the road, about three miles west of Barnegat, within half a yard of the wheel track. Search for more of it in this vicinity was unsuccessful, so also was a re-examination of the original locality near the old western hotel at Cedar Bridge."

As I had become connected with the Academy of Natural Sciences but a short time before Mr. Redfield's account was published, I heard a good deal of the re-discovery of *Corema*, and was anxious to see it for myself. Consequently, on March 31, 1893, in company with Messrs. Stewardson Brown, Amos P. Brown and Joseph Crawford, I visited this locality. We were, I think, the first to approach it from the west, leaving Woodmansie station on the New Jersey Southern Railroad and walking seven miles through the loose sand and back again in time for the afternoon train.

The plant was at this time in full bloom, and its weird surroundings and the forced march of fourteen miles made a lasting impression on my mind.

On July 3, 1899, Mess. C. F. Saunders and W. N. Clute, on a wagon trip across the lower or East Plains, found the *Corema* west of Munyon Field in exactly similar environment to that prevailing on the West Plains; and also sparingly west of the east branch of the Wading River, in pine woods at least four miles from the Plains. These localities are some eleven miles south of the Cedar Bridge station.\*

In June, 1901, accompanied by Messrs. H. L. Coggins and J. A. G. Rehn, I crossed by wagon from Medford nearly to Munyon Field and found the plant abundant at Mr. Saunders' locality.

The next year, on a tramp across this section from Cedar Grove to Chatsworth, Mr. J. A. G. Rehn and I found it just

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\* Proc. Acad. Nat. Sci., Phila., 1900, p. 544.

east of Cedar Grove, within sight of the houses; and on May 8, 1911, I found an isolated colony in the pine woods at Eagleswood, on West Creek, three miles from the town of West Creek.

From the variation, in abundance of the species at different times, and its apparent disappearance from some stations, it seems to me that it probably dies out or is exterminated by fire in certain spots, while the seed blown freely over this wind-swept waste is constantly starting new colonies, so that its actual stations are continually shifting.

*Fl.*—Late March to mid-April, stamens drying and persisting through the spring. *Fr.*—Late June to early July, apparently.

*Pine Barrens.*—Pemberton Mills 12 miles from Burlington, Monmouth Co., Cedar Bridge, 3 miles west of Cedar Bridge, 4 miles east of Woodmansie, 6 miles each of Woodmansie, 3 miles west of Barnegat, Between Allen's Bridge (High Bridge) and Martha, East Plains near Munyon Field, Three miles northwest of West Creek.

## Family ANACARDIACEÆ. Sumacs.

### *Key to the Species.*

- a. Leaves 9-31 foliate, fruit clothed with crimson hairs.
  - b. Rachis of the leaf wing margined. *Rhus copallina*, p. 536
  - bb. Rachis of the leaf nearly terete.
    - c. Foliage and twigs velvety pubescent. *R. hirta*, p. 537
    - cc. Foliage and twigs glabrous and glaucous. *R. glabra*, p. 537
- aa. Leaves not more than 13 foliate, fruit whitish or dun-colored.
  - b. Leaflets 7-13 glabrous. *R. vernix*, p. 537
  - bb. Leaflets always 3.
    - c. Vine climbing by aerial rootlets or trailing, leaves glabrate entire or sparingly sinuate or toothed. *R. radicans*, p. 538
    - cc. Low, erect shrub, mostly without aerial rootlets, leaves very pubescent and deeply lobed. *R. toxicodendron*, p. 538

### RHUS L.

#### *Rhus copallinum* L.\* Dwarf Sumac.

*Rhus Copallinum* Linnæus, Sp. Pl. 266. 1753 [N. America].—Pursh, *Fl. Amer.* Sept. I. 205. 1814.—Knieskern 11.—Britton 79.

Frequent in sandy soil throughout the Northern, Middle and Coast districts. Occasional in the Pine Barrens, where it is introduced.

*Fl.*—Late July to early September. *Fr.*—About late August into October.

\* Linnæus seems to use this name in the genitive plural; if so we have no right to alter it to *copallina*.



*Middle District*.—New Egypt, Pemberton Jnc. (S), Chairville (S), Blackwood, Mickleton, Swedesboro, Beaver Dam.

*Pine Barrens?*—Landisville.

*Coast Strip*.—Sandy Hook, Forked River, Beach Haven (L), Beach Haven Terrace (L), Cedar Bonnet (L), Atlantic City (S), Ocean City (S), Piermont (S), Wildwood (UP).

*Cape May*.—Bennett, Cape May.

***Rhus hirta* (L.). Stag-horn Sumac.**

*Datisca hirta* Linnæus, Sp. Pl. 1037. 1753 [Philadelphia].

*Rhus typhina* Britton 79.

Frequent in rocky woods of the northern counties, extending down the Delaware River, within our limits, where it is very rare. Mr. Long has noted it at Florence Heights and Washington Park.

*Fl.*—Early June to early July. *Fr.*—About late July into September.

*Middle District*.—Bordentown, 1 mile south Mickleton.

***Rhus glabra* L. Smooth or Scarlet Sumac.**

*Rhus glabra* Linnæus, Sp. Pl. 265. 1753 [North America].—Britton 79.

Frequent in dry soil in the northern counties; much less common southward in the Middle district. Very rare in the southern part of the Cape May peninsula and on the coast.

*Fl.*—Mid-June to mid-July. *Fr.*—About late July into September.

*Middle District*.—New Egypt, Williamstown, Tomlin, Haddonfield (P).

*Coast Strip*.—Peahala (L).

*Cape May*.—New England (OHB).

***Rhus vernix* L. Poison Sumac.**

*Rhus Vernix* Linnæus, Sp. Pl. 265. 1753 [North America].—Barton, Fl. Phila. I. 154. 1818.

*Rhus venenata* Knieskern 11.—Britton 79.

Swamps throughout the coastal plain, most abundant in the Pine Barrens, also at three localities in Sussex and Morris Counties.

*Fl.*—Late May to late June. *Fr.*—About early August into September or October.

*Middle District*.—Hartford, Lindenwold.

*Pine Barrens*.—Forked River, Lakehurst, Chatsworth, Bear Swamp, Albion, Andrews, Malaga (P), Cedar Brook, Landisville.

*Coast Strip*.—Seaside Park (S), Surf City (L), Holgate's (L), Wildwood (UP).

*Cape May*.—Cape May (S).

***Rhus radicans* L. Poison Ivy.**

Pl. LXXX., Fig. 1.

*Rhus radicans* Linnaeus, Sp. Pl. 266. 1753 [Virginia].—Britton 79.

*Rhus toxicodendron* Knieskern II.

Common in low woods and along fence rows; in the Northern, Middle and Coast districts; absent from the Pine Barrens, except as an incursion.

*Fl.*—Mid-May to mid-June. *Fr.*—About mid-August into September; often persisting after the perishing of the external fleshy coats, over winter into the next season.

*Middle District*.—Farmingdale, New Egypt, Fish House, Delair.

*Pine Barrens*.—Folsom (probably an incursion).

*Coast Strip*.—Peahala (L), Beach Haven Terrace (L), Anglesea (UP).

*Cape May*.—Cape May Ct. House.

***Rhus toxicodendron* L. Poison Oak.**

*Rhus Toxicodendron* Linnaeus, Sp. Pl. 266. 1753 [Virginia and Carolina].

Sandy ground in the lower part of the Middle district and Cape May peninsula, spreading into the Pine Barrens as a rare straggler.

I am using the Linnaean names for this and the preceding in the sense in which they are employed in Britton's Manual; whether this application will be final or whether we may have more than these two forms I cannot say. This group is one which I am personally unable to study at close quarters. Dr. Mearns' paper (Pr. Biol. Soc., Wash. xv., 148, 1902) should be studied in this connection.

*Fl.*—Mid-May to mid-June, probably. *Fr.*—About mid-August into September, not long persistent.

*Middle District*.—Washington Park, Lawnside, Tomlin, Westville, Bridgeton, Fairton.

*Pine Barrens*.—Folsom, Woodbine (S).

*Cape May*.—Court House, Bennett.

## Family ILICACEÆ. Hollies.

*Key to the Species.*

- a. Petals oblong or obovate, slightly united, stamens attached to them at their base.
- b. Leaves thick, evergreen, persistent.
- c. Leaves spiny-toothed, berries red. *Ilex opaca*, p. 539
- cc. Leaves not spiny-toothed, oblanceolate, dotted beneath, berries black. *I. glabra*, p. 540
- bb. Leaves thin, deciduous, berries red.
- c. Calyx lobes distinctly fringed on the margin even in fruit, all flowers short pedicelled. *I. verticillata*, p. 540
- cc. Calyx lobes not fringed, sterile flowers on long pedicels. *I. lævigata*, p. 541
- aa. Petals linear, distinct from each other and from the stamens, leaves elliptic, glabrous, sparsely-toothed, mucronate at tip, berries red. *Ilicoides mucronata*, p. 541

## ILEX L.

*Ilex opaca* Ait. Holly.

*Ilex opaca* Aiton, Hort. Kew. I. 169. 1789 [Carolina].—Pursh, Fl. Am. Sept. I. 117. 1814.—Willis 40.—Britton 75.—Keller and Brown 215.

Common in woods of the Middle and Coast districts, following the course of the rivers for some distance up into the Pine Barrens with other coastal plants. Reported from only three stations in the State north of our limits, in Warren, Mercer and Middlesex Counties.

The Holly is especially characteristic of the Coastal strip, and there it is that we find it rising to the full dignity of a tree, with trunk nearly or quite a foot in diameter, and its grayish-white bark gleaming through the masses of shining green leaves. Here, too, it produces berries most abundantly, and trees on protected ground are a gorgeous show during the autumn and winter.

The vandalism of the Christmas peddlers, mainly negroes, is largely responsible for the dwarfed, barren condition of most of the Holly of West Jersey, but the importation of vast quantities of Holly and Mistletoe from the south to Philadelphia has largely done away with this, as it is easier for venders to secure a supply from the wholesalers on the river front than to bring their own Holly from New Jersey. On the coast many of the

finest trees are cut down every year in effecting so-called improvements incident to the opening or enlarging of a seaside resort, but certain cottagers have carefully preserved the Hollies and enclosed them in their grounds.

*Fl.*—Late May to late June. *Fr.*—Late October into November, persisting over winter often into the following spring.

*Middle District.*—Farmingdale, New Egypt, Medford (S), Clementon, Camden (P), Red Bank, Washington Park, Woodbury, Swedesboro, Salem, Fairton.

*Pine Barrens.*—Landisville (T).

*Coast Strip.*—Sandy Hook, Seaside Park, Surf City (L), Barnegat City (L), Spray Beach (L), Beach Haven Terrace (L), Holgate's (L), Cox's Absecon, Atlantic City, Beesley's Pt. (S), Mays Landing (S), Palermo (S), Ocean City (S), Piermont (S), Holly Beach, Cape May, Cape May Pt. (S).

***Ilex glabra* (L.). Inkberry.**

*Prinos glaber* Linnæus, Suppl. 330. 1753 [Canada].

*Ilex glabra* Willis, 40.—Britton 75.

Common in moist sandy ground in the Pine Barrens, and locally elsewhere in our region. North of our limits it occurs only in Hudson County.

*Fl.*—Mid-June to early July. *Fr.*—Mid-September into October, persisting over winter into the following spring.

*Middle District.*—Shark River, New Egypt, Kaighns Pt. Albion, Kirkwood, Mickleton, Swedesboro, Millville.

*Pine Barrens.*—Allaire, Forked River, Pasadena, E. and W. Plains, Speedwell, Chatsworth, Browns Mills, Head of Batsto (S), Atsion (NB), Jackson, Cedar Brook, Landisville, Folsom, Hammonton, Egg Harbor City, Mouth of Batsto, Vineland, Somers Pt. (NB), Palermo.

*Coast Strip.*—Seaside Park, Harvey Cedars (L), N. Beach Haven (L), Spray Beach (L), Cox's, Beesley's Pt. (S), Anglesea (UP).

*Cape May.*—Dennisville (S), Bennett.

***Ilex verticillata* (L.). Black Alder. Winter-Berry.**

*Prinos verticillata* Linnæus, Sp. Pl. 330. 1753 [Virginia].

*Ilex verticillata* Willis 40.—Britton 75.

Swampy thickets throughout the State.

*Fl.*—Mid-June to early July. *Fr.*—Mid-September into October, persisting into winter.

*Middle District*.—Farmingdale, New Egypt, Birmingham, Pensauken (S), Medford (S), Asbury, Washington Park, Yorktown, Millville, Bridgeton (NB), Beaver Dam.

*Pine Barrens*.—Andrews, Cedar Brook, Landisville (T), Victoria (T).

*Coast Strip*.—Bayhead, Barnegat, Cox's, Ship Bottom (L), Surf City (L), Beach Haven Terrace (L), Holgate's (L), Beesley's Pt. (S), Court House (S), Bennett.

*Ilex lævigata* (Pursh.). **Smooth Winter-Berry.**

*Prinos lævigatus* Pursh, Fl. Am. Sept. 220. 1814 [Alleghany Mts., N. Y. —Va.].

*Ilex lævigatus* Willis 40.—Britton 75.—Keller and Brown 216.

Common in swamps of the Pine Barren, Middle, Coast, and Cape May districts, extending north of our limits in Bergen, Hudson, Morris and Mercer Counties. Occasional on the coast.

*Fl.*—Late May to mid-June. *Fr.*—Early September to October, persisting into winter.

*Middle District*.—Keyport (C), Bordentown, Fish House, Kaighns Pt., Lindenwold, Westville (KB), Washington Park (S), Kirkwood (KB), Mickleton (H), Swedesboro (CDL), Glassboro, Millville, Beaver Dam, Dividing Creek.

*Pine Barrens*.—Toms River, Forked River, Dover Forge, Double Trouble, Pasadena, Lakehurst, Bamber, Jones Mill (S), Landisville, Pancoast, Egg Harbor City, Tuckahoe (S), Sea Isle Jnc.

*Coast Strip*.—Cox's Barnegat, Spray Beach (L).

*Cape May*.—Cape May (S).

**ILICIOIDES Dumont.**

*Ilicioides mucronata* (L.). **Mountain Holly.**

*Vaccinium mucronatum* Linnæus, Sp. Pl. 350. 1753 [North America].

*Nemopanthes mucronata* Willis 40.—Britton 75.

*Ilicioides mucronata* Keller and Brown 216.

Reported from several localities in the northern counties, and locally southward in deep swamps in the Middle district and along the western edge of the Pine Barrens.

An associate of the *Rhododendron* at one, and probably all, of its stations in the cedar swamps of southern New Jersey, and originally driven southward, no doubt, by the same influence. Collected by Parker in the old Kaighn's Swamp May 5, 1866.

*Fl.*—Late April to early May. *Fr.*—Late July into August.

*Middle District*.—Kaighns Swp., Sicklerville, Glassboro, Ocean Co. (Kn).

*Pine Barrens*.—Williamstown Jnc., Atco, New Germany, Hammonton (C).

## Family CELASTRACEÆ. Staff-trees.

*Key to the Species,*

- a. Leaves opposite, erect or decumbent shrubs.  
 b. Pods tuberculate, flowers greenish pink, twigs greenish, shrub 6-24 dm. high. *Evonymus americanus*, p. 542  
 bb. Pods smooth, flowers purple, 20-40 dm. high, often a small tree. *E. atropurpureus*, p. 542  
 aa. Leaves alternate, a climbing, woody vine. *Celastrus scandens*, p. 543

## EVONYMUS L.

*Evonymus americanus* L. Strawberry Bush.

*Evonymus Americanus* Linnæus, Sp. Pl. 197. 1753 [Virginia].—Willis 16.  
 —Britton 76.

Found at a number of localities in the northern half of the State, mainly on the coastal plain, and frequent southward in damp woodlands of the Middle and Cape May districts. Rare on the coast islands.

Few shrubs are more characteristic of low, dark woodlands of West Jersey. Although the blossoms are inconspicuous, the peculiar green coloration of the branches and stems, and the glossy leaves, make the plant easily recognizable, while in the autumn the bright red seeds and their crimson pod-like covering make bright spots of color in the leafless woods.

The variety *obovatus* is reported from Mickleton in Keller and Brown's List, but I have seen the specimens, and they do not differ from the typical form.

*Fl.*—Late May to mid-June. *Fr.*—Late September to late October.

*Middle District.*—Freehold (Willis), Keyport (C), Farmingdale, Pember-ton (NB), Birmingham, Medford (S), Moorestown (NB), Washington Park, Wodbury, Sewell (S), Gloucester (P), Mickleton (NB), Swedesboro, Riddleton, Yorktown.

*Coast Strip.*—Anglesea (UP).

*Cape May.*—West of Anglesea Inc. (S), Cold Spring.

*Evonymus atropurpureus* Jacq. Burning Bush.

*Evonymus atropurpureus* Jacques, Hort. Vind. II. 55. Pl. 120. 1772 [N. America].—Britton 75.

Occasional through woods of the northern counties, mainly along the Delaware, and rare and local southward in the same vicinity to Salem County.

*Middle District*.—Moorestown (NB), Mullica Hill (H), Mannington (C), Elsinboro (C).

**CELASTRUS L.**

***Celastrus scandens* L. Climbing Bittersweet.**

*Celastrus scandens* Linnæus, Sp. Pl. 196. 1753 [Cadada].—Britton 76.

Frequent in thickets in the northern counties and southward along the coastal island to Cape May; occasional in the Middle district.

*Fl.*—Late May to early June. *Fr.*—October, persisting through winter.

*Middle District*.—Camden (Bassett), Washington Park, Swedesboro.

*Coast Strip*.—Sandy Hook, Spring Lake (C), Atlantic City, Ocean City (S), Piermont (S), Holly Beach, Anglesea, Cold Spring (S).

Family STAPHYLEACEÆ. Bladder-nuts.

**STAPHYLEA L.**

***Staphylea trifolia* L. Bladder-nut.**

*Staphylea trifolia* Linnæus, Sp. Pl. 270. 1753 [Virginia].—Knieskern II.—Willis 16.—Britton 78.

Frequent in rocky woods of the northern counties; rare within our limits and only in the Middle district.

*Fl.*—Early May to late May. *Fr.*—July to August, persisting into October.

*Middle District*.—Squan (Kn), Camden Co., along the Delaware below Kaighns Pt. (P), Woodstown, Sharptown.

Family ACERACEÆ. Maples.

*Key to the Species.*

- a. Leaves 3- or 5-foliolate. *Acer negundo*, p. 545
- aa. Leaves simple, flowers in dense clusters, appearing before the leaves.
  - b. Petals none, flowers greenish, leaves deeply 5-lobed, samaras divergent, 5-7 mm. long. *A. saccharinum*, p. 544
  - bb. Petals present, flowers (and often ripe samaras) crimson, leaves 3-lobed or with two additional shorter basal lobes, samaras incurved, 1.5-2.5 cm. long.
    - c. Leaves small, with three short lobes, sparingly toothed and usually very pubescent below. *A. rubrum carolinianum*, p. 544
    - cc. Leaves larger, with 3-5 lobes, sharply toothed, usually nearly glabrous. *A. rubrum*, p. 544

## ACER L.

**Acer saccharinum L. White Maple.**

*Acer saccharinum* Linnæus, Sp. Pl. 1055. 1753 [Pennsylvania].—Britton 78.

Common along the upper Delaware River, and sparingly southward within our limits. Frequently introduced as a shade tree.

*Fl.*—Mid-March to early April. *Fr.*—Early May to late May.

*Middle District.*—Delair.

**Acer rubrum L. Red Maple.**

*Acer rubrum* Linnæus, Sp. Pl. 1055. 1753 [Virginia and Pennsylvania].—Knieskern 11.—Britton 78.

Moist woodland; common in the Northern and parts of the Middle districts.

The Red Maples of our region are puzzling in their variability. We have a form with very small, three-lobed leaves, usually tomentous beneath, which is common in the Pine Barrens, which I have referred to *carolinianum*, while through the Middle district there is a tree with rather larger leaves, rarely tomentose, which may be referable to true *rubrum*. Some trees in the uplands of Pennsylvania are similar, but others, with large, five-lobed leaves, very white and glabrous below, are quite different. The division of specimens given below is arbitrary, but the difference between the extremes is striking.

*Fl.*—Late March to mid-April. *Fr.*—Early May to late May.

*Middle District.*—New Egypt, Medford (S), Springdale (S), Salem (S).

**Acer rubrum carolinianum (Walt.). Carolina Red Maple.**

*Acer carolinianum* Walter, Fl. Cor. 251 [S. Carolina].

Common throughout the Pine Barrens and on the Coast strip.

*Fl.*—Late March to mid-April. *Fr.*—Early May to late May.

*Middle District.*—Farmingdale, Birmingham, Pemberton Inc. (S), Bordentown, Haddonfield (S), Merchantville, Yorktown.

*Pine Barrens.*—Toms River, Bear Swamp, Speedwell, Pleasant Mills (S).

*Coast Strip.*—Pt. Pleasant, Seaside Park (S), Surf City (L), Sherburn's (L), Ocean City (S), Piermont (S).



**Acer negundo** L. Ash-leaved Maple. Box Elder.

*Acer negundo* Linnæus, Sp. Pl. 1056. 1753 [Virginia].—Willis 17.  
*Negundo aceroides* Britton 78.

Banks of streams at a number of stations in the northern part of the State, mainly on the Delaware and Hackensack; occasional within our limits on tributaries of the Delaware, also often escaped from cultivation.

*Fl.*—Mid April to early May. *Fr.*—Apparently late August into September.

*Middle District.*—Crosswicks, Red Bank (Willis), New Egypt, Pemberton (C), Mantua (H), Mullica Hill (NB), Swedesboro.

## Family BALSAMINACEÆ. Jewel-weeds.

*Key to the Species.*

- a. Flowers orange, mottled with darker spots, spur incurved. *Impatiens biflora*, p. 545  
 aa. Flowers pale yellow, spur short, spreading. *I. pallida*, p. 545

## IMPATIENS L.

**Impatiens biflora** Walt. Spotted Touch-me-not.

*Impatiens biflora* Walter, Fl. Car. 219. 1788 [S. Carolina].—Knieskern 10.  
 —Willis 15.—Britton 74.

Common or frequent in swampy ground throughout the State, except in the Pine Barrens.

*Fl.*—Late July into October.

*Middle District.*—New Egypt, Hartford, Springdale, Fish House, Medford (S), Haddonfield (S), East of Clementon (S), Salem (S).

*Coast Strip.*—Pt. Pleasant (S), Toms River (Kn), Forked River, Manahawkin, Barnegat City (L), Surf City (L), Palermo (S), Mays Landing (S), Seaville (S), Holly Beach (UP).

*Cape May.*—Cold Spring (S).

**Impatiens pallida** Nuttall. Pale Touch-me-Not.

*Impatiens pallida* Nuttall. Gen. II. 145. 1818 [vicinity of Philadelphia].  
*Impatiens aurea* Britton 73.

Swampy ground in the northern counties; not common. Reported within our limits at Moorestown, where it was found by Miss A. M. Kaighn.

*Middle District.*—Moorestown (NB).

## Order RHAMNALES.

Family RHAMNACEÆ. Buck-thorns.

*Key to the Species.*

- a. Fruit a berry, flowers greenish, in clusters. [*Rhamnus cathartica* L.]\*  
 aa. Fruit dry, splitting into three nutlets, flowers white in terminal, umbel-like clusters, forming a showy panicle. *Ceanothus americanus*, p. 546

## CEANOTHUS L.

*Ceanothus americanus* L. New Jersey Tea.

*Ceanothus americanus* Linnæus, Sp. Pl. 195. 1753 [Virginia and Carolina].  
 —Barton, Fl. Phila. I. 126. 1818.—Knieskern II.—Britton 77.

In open woods; common in the northern counties and occasional southward in the Middle and Cape May districts.

*Fl.*—Early June to early July. *Fr.*—Mid-July to late August.

*Middle District.*—New Egypt, Pemberton (Bassett), Medford (S), Had-donfield (S), Westville, Lawnside (S), Woodbury (NB), Yorktown.

*Cape May.*—Cold Spring.

Family VITACEÆ. Grapes.

*Key to the Species.*

- a. Leaves digitate, 5-7 foliate. *Pseodera quinquefolia*, p. 548  
 aa. Leaves not compound, entire or deeply lobed.  
 b. Leaves velvety-tomentose on the under surface.  
 c. A tendril or branch of inflorescence opposite each of several suc-cessive leaves. *Vitis labrusca*, p. 546  
 cc. Tendrils intermittent, none opposite each third leaf. *V. æstivalis*, p. 547  
 bb. Leaves glabrous, or short-hairy on the veins beneath.  
 c. Teeth of leaves narrowly deltoid or even lanceolate, sharply acumi-nate, often falcate; berries blue with a bloom, stipules over 4 mm. long. *V. vulpina*, p. 547  
 cc. Teeth of leaves broadly deltoid, cuspidate; berries black and shin-ing, stipules 4 mm. long or less. *V. cordifolia*, p. 547

## VITIS L.

*Vitis labrusca* L. Fox Grape.

*Vitis Labrusca* Linnæus, Sp. Pl. 203. 1753 [North America].—Knieskern II.  
 —Britton 77.

\* Buckthorn, escaped from cultivation in some places.

Swampy thickets; common in the northern counties and less common southward in the Middle and Coast districts. A form with green instead of purplish fruit occurs occasionally in West Jersey.

*Fl.*—Late May to mid-June. *Fr.*—Early September into October.

*Middle District.*—Shark River, Farmingdale (S), New Egypt, Medford (S), Lindenwold (S), Camden, Washington Park.

*Coast Strip.*—Pt. Pleasant (S), Forked River, Manahawkin, Beach Haven Terrace (L), Holgate's (L), Wildwood (UP), Cape May Court House (S).

***Vitis aestivalis* Michx. Summer Grape.**

*Vitis aestivalis* Michaux, Fl. Bor. Am. II. 230. 1803 [Virginia and Carolina].—Knieskern II.—Britton 77.

Common in thickets throughout the State, except in the Pine Barrens, where it is only occasional, and probably of recent introduction.

*Fl.*—Mid-June to early July. *Fr.*—Early September into October.

*Middle District.*—Holmdel (NB), Fish House (S), Medford (S), Locust Grove (S), Tomlin (S), Sicklerville, Eight miles east Mickleton, Swedesboro, Washington Park, Berlin (S), Yorktown.

*Pine Barrens.*—Lakehurst, Speedwell, Sumner, Landisville (T), Mays Landing (S).

*Coast Strip.*—Waretown, Surf City (L), Staffordville, Atlantic City, Pleasantville (NB), Ocean City (S), Palermo (S), Anglesea, Piermont, Bennett, Cold Spring (S).

***Vitis cordifolia* Michx. Chicken Grape, Frost Grape.**

*Vitis cordifolia* Michaux, Fl. Bor. Am. II. 231. 1803 [Penna. to Fla.]—Knieskern II.—Britton 77.

Frequent in the northern counties, less common southward in the Middle district, rarely on the coast.

*Fl.*—Early June to late June. *Fr.*—Late September into October.

*Middle District.*—Holmdel (NB), Keyport (C), New Egypt, Fish House, Swedesboro.

*Coast Strip.*—Forked River.

***Vitis vulpina* L. River-bank Grape.**

*Vitis vulpina* Linnæus, Sp. Pl. 203. 1753 [Virginia].

*Vitis riparia* Britton 77.

Gravelly shores of the upper Delaware river associated with *Salix interior*, a plant of similar habitat; very rare within our limits.

*Fl.*—Late May to mid-June, probably. *Fr.*—Mid-August into September.

*Middle District.*—Fish House.\*

**PSEDERA Hecker.†**

*Psedera quinquefolia* (L.). Virginia Creeper.

Pl. LXXX., Fig. 2.

*Hedera quinquefolia* Linnæus, Sp. Pl. 202. 1753 [Canada].

*Cissus Hederacea* Barton Fl. Phila. I. 118. 1818.

*Ampelopsis quinquefolia* Knieskern 11.

*Vitis quinquefolia* Britton 77.

Common in woods and thickets throughout the State, except in the Pine Barrens, where it is rare and apparently of recent introduction. On the coast islands it flourishes on the edge of Bay Berry thickets, directly back of the dunes.

*Fl.*—Late June to late July. *Fr.*—Late September into October.

*Middle District.*—Farmingdale, New Egypt, Washington Park, Medford (S).

*Pine Barrens.*—Pancoast (S), Pleasant Mills (apparently introduced).

*Coast Strip.*—Sandy Hook (NB), Pt. Pleasant (S), Forked River, Peahala (L), Ship Bottom (L), St. Albans (L), Beach Haven Terrace (L), Beach Haven (L), Barnegat City (L), Longport (S), Ocean City (S), Piermont (S).

*Cape May.*—Bennett, Cold Spring (S), Cape May (S).

**Order MALVALES.**

Family TILIACEÆ. Lindens.

**TILIA L.**

*Tilia americana* L. Linden, Basswood.

*Tilia americana* Linnæus, Sp. Pl. 514. 1753 [Virginia and Canada].—Knieskern 10.—Willis 14.

Common in woods of the northern counties, and occasional southward in the Middle district.

\* The record for Westville (KB) was an error.

† Cf. Rehder *Rhodora* 1908, p. 24, for discussion of the generic name of this plant.

*Fl.*—Late June to early July. *Fr.*—About August, persisting into autumn.

*Middle District.*—Squan (Kn), Cliffwood (NB), Farmingdale, New Egypt, Washington Park, Salem Co. on the Delaware (NB).

Family MALVACEÆ. Mallows.

*Key to the Species.*

- a. Stamen column, bearing anthers at the summit.
  - b. Style branches with stigmas on their inner side, leaves orbicular reniform, flowers bluish white. [*Malva rotundifolia* L.]\*
  - bb. Style branches with stigmas at their apex, flowers yellow.
    - c. Leaves ovate or oblong lanceolate, with a small tubercle at the base of many of the petioles; 3–6 dm. high. [*Sida spinosa*]†
    - cc. Leaves cordate, ovate-orbicular densely velvety pubescent, plant 10–20 dm. high. [*Abutilon abutilon* L.]‡
- aa. Stamen column bearing anthers below the entire or five-toothed summit.
  - b. Flowers rose colored, 5 cm. broad. *Kosteletzkya virginica*, p. 549
  - bb. Flowers pink or white, with or without a crimson center, 10–20 cm. broad. *Hibiscus moscheutos*, p. 550

KOSTELETZKYA Presl.

*Kosteletzkya virginica* (L.). *Kosteletzky's Mallow.*

*Hibiscus virginica* Linnæus, Sp. Pl. 697. 1753 [Virginia].—Pursh, Fl. Am. Sept. II. 456. 1814.

*Kosteletzkya virginica* Knieskern 10.—Willis 14.—Britton 70.—Keller and Brown 221.

Edge of the salt marshes on the coast and bay shore; common in Cape May County; local and less common farther north.

This mallow is a conspicuous feature of the mid-summer coast marshes, its broadly branching stems with their numerous pink flowers adding quite a touch of color, although not nearly so conspicuous as the following species. Unlike it, the *Kosteletzkya* never strays from the vicinity of the salt marshes.

*Fl.*—Early August to early September. *Fr.*—Late August to late September.

*Maritime.*—Avon (KB), Mantoloking (NY), Lavalette (KB), Forked River, Seaside Park, Island Hts. (NB), Waretown (C), Beach Haven Terrace (L), Surf City (L), Holgate's (L), Barrel Isl. (L), Manahawkin, Brigantine Beach (NB), Atlantic City, Ventnor (KB), Beesley's Pt. (S), Palermo, Ocean City (S), Avalon, Piermont, Wildwood, Anglesea (S),

\* Dwarf Mallow, a common weed in cultivated and waste ground.

† Prickly Sida, a weed in waste ground.

‡ Velvet-leaf Mallow, a weed in waste ground.

Holly Beach, Clermont, Cape May Court House, Cape May, Cape May Pt. (S), Dennisville (S).\*

### HIBISCUS L.

*Hibiscus moscheutos* L. Rose Mallow, Swamp Mallow.

Pl. LXXXI.

*Hibiscus Moscheutos* Linnæus, Sp. Pl. 693. 1753 [Canada and Virginia].—Knieskern 10.—Willis 14.—Britton—70.

Several stations in the northern counties; along streams and marshes, but apparently never encroaching beyond the fall line for any distance. Very common southward along the Delaware River and the coast marshes.

The flowering of the Mallows on the coast and river marshes is perhaps the most extensive display of color that the flora of our region presents. Throughout the month of August they form great masses of pink and white bloom, which can be seen at a long distance, and seem to be laid out over the swamps like flower beds in a garden.

The flowers are either pink or white, with or without a crimson eye. Only one style occurs on any given plant, but the plants are usually mixed together indiscriminately, and show, besides differently colored flowers, considerable difference in the shape of the leaves, pods and calyx-lobes. Dr. N. L. Britton has described as distinct *H. oculiroseus* (c. f. Jour. N. Y. Bot. Garden, iv. 220, 1903) from a plant of the "Crimson-Eye," cultivated and introduced into the nursery trade by Mr. William Bassett, of Hammonton, N. J., from an original plant obtained at Absecon. The wild plants now growing there, however, are normal *H. moscheutos*, and I regard Dr. Britton's species as a sport due to cultivation, not a native member of the New Jersey flora.

*Fl.*—Late July to early September. *Fr.*—Late September through autumn.

*Middle District.*—Fish House, Kaighns Pt., W. Deptford, Medford, Pennsgrove, Swedesboro, Salem (S), Beaver Dam.

*Coast Strip.*—Barnegat Pier, Barnegat City (L), Brant Beach (L), Surf City (L), Beach Haven Terrace (L), Absecon, Atlantic City (S), Ocean City (S), Sea Isle City, Avalon, Piermont (S), Wildwood, Holly Beach, Clermont, Tuckahoe (T), Cape May Court House, Cold Spring (S), Cape May (S), Cape May Pt. (S).

\*The record for Hancock's Bridge (KB), on authority of Miss Cora A. Ware, has not been verified and seems unlikely.







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