# TORREYA

A Monthly Journal of Botanical Notes and News

JOHN TORREY, 1796–1873

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THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

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JOHN TORREY, 1796–1873

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# THE TORREY BOTANICAL CLUB




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NORMAN TAYLOR

Brooklyn Botanic Garden
Brooklyn, N. Y.


* Died 14 September 1913.

# TORREYA

Vol. 14 January, 1914. No. 1



## ADDISON BROWN

Judge Addison Brown, a member of this club since the second year of its existence and for ten years its president, died on the 9th of April, 1913, in the eighty-third year of his life.

Judge Brown's early studies were pursued under the tuition of Benjamin Greenleaf, the mathematician, to whose influence was probably due the fondness for astronomy which he always displayed. His collegiate course was at Amherst, and later at Harvard, where he graduated in 1852. His studies were remarkably well balanced and his life was characterized by an interest in widely separated fields of investigation. He was a competent art critic and a creditable violinist. His legal preparation was at the Harvard Law School, from which he graduated in 1855. He began the practice of law in New York City in the following year. In 1881, he became Judge in the United States District Court which position he held until his retirement, in 1901.

Judge Brown's botanical work, in which we are chiefly interested, began even before he became a member of this club, but was much more active thereafter. His connection with the club was most helpful to it, but it is interesting to consider also to how great an extent his own work in this field, and his great service to botany, were determined by this relation. Almost his first active work in local botany was in connection with our ballast plants. He preserved his specimens and formed a private herbarium, and also accumulated a good working library. Although he could not be regarded as a general collector, yet he made a number of botanical excursions in distant parts of this country and studied portions of the European flora in the field. His American travels extended as far as Alaska.

[No. 12, Vol. 13, of TORREYA, comprising pp. 265–301, was issued 30 December 1913]

It is significant of the character of the man that Judge Brown's later work was the more important. His service, in connection with Judge Charles P. Daly, in drawing the charter of the New York Botanical Garden, was of inestimable value, not only to that institution, but to botanical science. He became the president of the Garden in 1910 and continued in that position until the time of his death.

He was a subscriber to the endowment fund of the garden to the extent of $25,000 and he bequeathed to it property to the value of more than $20,000. This bequest is preserved in The Addison Brown Fund, the income of which is to be devoted to the publication of a magazine with colored illustrations.

The greatest botanical work in which the Judge participated was the writing of Britton and Brown's Illustrated Flora of the Northern United States, Canada and the British Possessions, the second edition of which was completed just before his death. It should never be forgotten that Judge Brown undertook this great work with no expectation that it would ever repay its cost. His only anxiety was as to the probable extent of his loss, which he hoped would not exceed $25,000; and it is exceptionally gratifying, under such circumstances, that the publication proved to be financially, as well as scientifically, successful.

An extended obituary, written by Dr. N. L. Britton, will be found in the *Journal* of the New York Botanical Garden for June, 1913.

H. H. Rusby

## VIOLETS NEW TO SOUTHEASTERN VIRGINIA

By H. D. House

A single day was spent by the writer in the vicinity of Gilmerton, Norfolk county, Virginia, in April of 1912, and again in April, 1913. The only finds of real interest were violets, abundant and easy to find at that season of the year.

### Viola septemloba LeConte

This rare southern species seems well entitled to a position in the flora of the northeastern states, having already been twice reported from southeastern Virginia. Excellent flowering specimens were collected by the writer at Gilmerton (No. 4860, April 20, 1912), concerning a specimen of which Dr. Brainerd writes ". . . is the most satisfactory one that I have seen from Virginia."

Growing abundantly with the species was found *Viola emarginata* (Nutt.) LeConte, and a hybrid between the two, which may be designated as

**Viola emarginata × septemloba** hyb. nov.

Plant glabrous at flowering time, the leaves varying from deltoid to sagittate, the middle lobe of the blade elongated, the

FIG. 1. *Viola emarginata × septemloba* House. (Natural size.)

lateral lobes very narrow, the basal ones nearly at right angles to the middle lobe; summer leaves several-lobed, the middle lobe longest and largest; flowers large, pale blue in color (Gilmerton, No. 4857, April 20, 1912).

This hybrid has some resemblance to the hybrid between *Viola Brittoniana* and *emarginata*, first found in the District of Columbia, and figured in Rhodora (pl. 71) in 1906. It lacks, however, the stoutness of that plant, and in its more slender habit shows its relationship to *Viola septemloba*. The name "*Viola emarginata*×*septemloba*" has been previously used for a hybrid between *Viola emarginata* and *Viola Brittoniana* by Ezra Brainerd (Rhodora 8: 53. 1906). Dr. Brainerd at that time regarded *Viola Brittoniana* as identical with the more southern *Viola septemloba*, a position from which he has since receded.

### Viola villosa Walter

This southern species has not been previously reported from Virginia. It is quite common near Gilmerton on bushy cut-over land used as a pasture, the soil being very sandy (No. 5079, April 19, 1913).

## REVIEWS

#### Two recent works on the marine algae*

The publication, during the past summer, of Professor Bradley Moore Davis's studies of the marine algae of the Woods Hole region marks an important forward step in the study of the American algae. In the first part of this work the marine flora as a whole and the various associations of species are discussed from the biological or ecological point of view. After an introductory chapter, the author discusses some of the factors

* Davis, Bradley Moore. A biological survey of the waters of Woods Hole and vicinity. Part I. Section II. Botanical. General characteristics of the algal vegetation of Buzzards Bay and Vineyard Sound in the vicinity of Woods Hole. Bull. Bur. Fisheries **31**: 443–544. *charts 228–274.* 1913; Part II. Section IV. A catalogue of the marine flora. Bull. Bur. Fisheries **31**: 795–833. 1913.

Weber-van Bosse, A. Liste des algues du Siboga. I. Myxophyceae, Chlorophyceae, Phaeophyceae, avec le concours de M. Th. Reinbold. Siboga Expeditie, Monographie 59a: 1–186. *f. 1–52 + pl. 1–5.* S 1913. E. J. Brill, Leiden. 4to.

affecting the local distribution, such as the nature of the coast and of the bottom in deeper water, the tides and tidal currents, the effects of ice, depth of water, light, temperature and seasonal changes, and salinity of the water. In the third chapter, the characteristic algal associations and formations are described and analyzed. A chapter of remarkable interest and value concerns the algae of Spindle Rocks, a group of ten boulders at one of the entrances to the ship channel at Woods Hole. The flora of these rocks was under a more or less continuous observation during a period of fifteen months and the seasonal variation in their flora is shown with great clearness by a series of eight charts. It is to be hoped, as the author suggests, that this record of interesting results may stimulate others to make similar sustained and intensive studies of the flora of other limited areas. The first part of Professor Davis's paper closes with an account of the distribution of the marine algae in the deeper waters, the flora of certain inshore regions of peculiar interest, and with a series of charts illustrating the distribution of thirty-eight of the more common and characteristic species of the region.

The catalogue of species, which comprises the second part of Davis's work, includes full details as to distribution and seasonal occurrence and cites the specimens and records on which his own records are based. The number of species recognized is 240. The nomenclature of the list is of the current sort. A recent reviewer, Mr. F. S. Collins, has commended it as "conforming to the Vienna Rules,"* which is possibly true of it, to a certain degree. However, as Mr. Collins himself has more recently† hinted, the use of Farlow's specific name *Bornetiana* for our common *Griffithsia* is obviously in violation of the Vienna Rules. It may be added that the specific name of our handsome red alga currently known as *Dasya elegans* is evidently, under the Vienna Rules, *pedicellata*, the type of the species being a specimen from New York sent to the elder Agardh by John Torrey. And *Phyllitis*, under the Vienna Rules and the Brussels

* Rhodora **15**: 152. 11 Au 1913.

† Science II. **38**: 597. 24 O 1913.

Amendments, is the legal name for a genus of ferns and as such is enjoying wide usage. A careful scrutiny would doubtless disclose other less obvious and less well-known violations of the Vienna Rules. But these are minor details and, rules or no rules, the nomenclature adopted by Professor Davis has the great and saving virtue of being readily intelligible.

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Part I of Mme. Dr. A. Weber-van Bosse's "Liste des algues du Siboga," which appeared in September last, includes the Myxophyceae [Cyanophyceae], Chlorophyceae, and Phaeophyceae. It is based chiefly on specimens obtained in the Dutch East Indies in 1899–1900 by the scientific expedition under the leadership of Professor Max Weber, of the University of Amsterdam, the husband of the talented authoress of the "Liste." "Siboga" was the name of the Dutch cruiser used on that voyage of exploration and the present paper is a part of one of the sixty-six memoirs or monographs, for the most part already published, in which the scientific results of this expedition are made known. A part of the ground covered by the present "Liste" has been included in more detail by the general monograph of the genus *Halimeda* by Miss E. S. Barton (Mrs. A. Gepp), constituting monograph 60 of the Siboga series, the general monograph* of the family Codiaceae by A. and E. S. Gepp, constituting monograph 62 of the series, and preliminary papers by Mme. Weber-van Bosse on *Dictyosphaeria*, etc. In addition to the material secured by the Siboga Expedition, the present "Liste" takes into consideration also specimens collected by Mme. Weber-van Bosse in an earlier visit to the Dutch East Indies (in 1888) and certain specimens sent to her by other collectors. The treatment of the genera *Boodlea*, *Cladophora*, *Cladophoropsis*, *Microdictyon*, *Rhizoclonium*, and *Struvea*, among the green algae, and of *Sargassum* among the browns, has been contributed by Major Th. Reinbold. His parts of the work are published in German, while Mme. Weber's are in French.

In the treatment of the Myxophyceae, written by Mme.

* Reviewed in Torreya 11: 133–137. Je 1911.

Weber-van Bosse, one notes the proposal of several new species and of one new genus, *Herpyzonema*, of the family Stigonemataceae.

The points of contrast between the marine flora of the East Indies and that of the West Indies are perhaps nowhere more obvious than in the order Siphonales of the Chlorophyceae. Of the twenty-five species of the genus *Caulerpa*, here attributed to the Dutch East Indies, ten occur also in the seas of tropical and subtropical America. Among the Siphonales of West Indian affinities, one notes that *Acetabularia caraibica* Kützing is maintained as a valid species. Through the courtesy of Mme. Weber-van Bosse, the present reviewer,* about a dozen years ago, examined most of the original materials on which this species was based and he expressed the opinion that they could not be satisfactorily distinguished from *Acetabularia crenulata* Lamour., described forty years earlier, the type of this also coming from the Antilles. This view of *A. caraibica* has since been adopted by Mr. F. S. Collins† and by Dr. Börgesen,‡ both of whom have enjoyed good opportunities for knowing the West Indian plants of this genus. The types of both of the alleged species being West Indian, the question of their validity or identity is essentially a West Indian rather than an East Indian question. Among the Siphonales is a new genus *Bryobesia* Weber-van Bosse, first published, however, two or three years earlier, but now illustrated and described in more detail.

Among the Phaeophyceae, Madame Weber uses "*Ilea* (Fr.) Nordstedt" for the genus currently known as *Phyllitis*, which name, as remarked in the preceding review, legally belongs to a genus of ferns. The name *Ilea* was first used by Fries for a genus of Chlorophyceae and as such is in current usage. Under the prevailing European rules of nomenclature, the taking up of *Ilea* for a genus of brown algae may possibly be justifiable, in spite of the confusion that it would entail, but the earlier use of *Ilea* in an entirely different sense happily forbids any such *boule-*

* Bull. Torrey Club **28**: 331–333. 1901.

† The green algae of North America 378. 1909.

‡ The marine algae of the Danish West Indies 80, 81. 1913.

*versement* under the "rejection of homonyms" principle of the "American Code." It seems to the reviewer that *Petalonia* Derb. & Sol. is the right name for the genus of algae commonly known as *Phyllitis*.

*Mesospora* Weber-van Bosse is a genus of Ralfsiaceae, published in a preliminary way a few years earlier, but now illustrated and more fully described.

Major Reinbold, in his treatment of the genus *Sargassum*, recognizes forty-five species, of which three are proposed as new. In striking contrast to the genus *Caulerpa*, the forty-five East Indian species of *Sargassum* appear to include only one, *S. bacciferum*, that occurs also in the West Indian region. In connection with *S. bacciferum*, the author, by the way, quotes J. Agardh's statement that attached and fructiferous plants of this species occur "in rupibus extra New Foundland"—a statement that, in all probability, rests upon some sort of error.

This first part of the "Liste des algues du Siboga" is illustrated by fifty-two text figures and five handsome plates. The appearance of the second part of this important work, to include the Rhodophyceae, will be awaited with much interest.

Marshall A. Howe

**Wilson's A Naturalist in Western China***

When, in 1859, Asa Gray brought out his now famous paper on the relationship of the Japanese flora to that of eastern North America, it is doubtful if he realized how completely that idea was to be supported by a man who was to explore the interior of China more than fifty years later. As we now know, many of the plants mentioned by Gray as of Japanese origin were only introduced into Japan from China, and his paper must be construed today as an attempt to explain the very close relationship between the flora of eastern North America and eastern Asia.

More than any living botanist, Mr. E. H. Wilson has made it

* Wilson, E. H. A naturalist in western China with vasculum, camera and gun. With an introduction by C. S. Sargent. Vol. 1. pp. i–xxxvii+1–251. Vol. 2. pp. 1–229. 101 illustrations and map. New York. Doubleday, Page & Co. 1913. Price $7.50.

possible for us to know something of the region in the hinterland of China and the Thibetan frontier, his travels and collections extending over a period of eleven years. Some idea of the extent of his work will be gained by remembering that he has collected some 65,000 specimens, comprising about 5,000 species, and sent home seeds of over 1,500 different plants. Thousands of these are now growing in England at Messrs. Veitch and Son's and an equal, or greater number, mostly woody plants, at the Arnold Arboretum in this country. It is difficult to speak with restraint of the importance of these additions to our cultivated plants, and it is no exaggeration to say that Mr. Wilson's plants form the most important collection ever brought out of China. Frequent scattered notices of these plants have appeared in the *Gardener's Chronicle* and the *Botanical Magazine.* Many of the finer species, horticulturally, are already in the trade, mostly in England, but some are to be had here. Of course, the most complete collection of the woody plants is at the Arnold Arboretum, but many private estates have some of them and there is a collection of over 400 species now at the Brooklyn Botanic Garden. The scientific results of these remarkable expeditions have already appeared, in part, as *Plantae Wilsonianae*, published at the Arnold Arboretum. Professor C. S. Sargent has contributed to the present volume a technical introduction on the relationship of the tree flora of China and eastern North America.

It would be extraordinary if a traveller and botanist of such accomplishments could not make an interesting narrative of his journeys in this all but unknown country, and such the present work proves to be. It is an intimate and personal account of the author's travels, especially in the vast province of Szechuan and the Thibetan frontier, and the wealth of botanical information is astounding. Very few of us realize the diversity and richness of this temperate flora in western China (it is the richest in the world) reaching its greatest profusion at, and westward of a point, some thousand miles up the Yangste River (Mr. Wilson says Yangste-*Kiang* is unintelligible to all the Chinese he has ever met, and that the name is simply Yangste). No review could do adequate justice to the botanical features of Mr. Wilson's book, the information is so much a part of the general text and of such varied character. There are, of course, special chapters on the medicinal plants, fruits, general economic products, timber trees, agriculture, gardens and gardening, and the tea industry.

Besides all the interesting data about plants and their products, the author has been very much alive to all that was happening during his travels, and there is a great deal of very interesting narrative in connection with the people of this little known kingdom. Particularly the Chino-Thibetan frontier country with its all but unknown people has claimed considerable attention. Their religions, mode of life and peculiar marriage customs are very interestingly dwelt on. There are four chapters devoted to sport, in which most of the animals and birds seen during the trip are described. A concluding chapter gives, succinctly, the causes and probable tendency of the present political unrest in China, as they appeal to the author. There are over a hundred splendid illustrations accompanying the text, nearly all of which were taken by the author on the spot.

It is not too much to say of these volumes that they should be read by all who are interested in botany, by every traveller or one who hopes to travel in China, and that for the general reader and merchant there is more information in attractive form about western China than in any other work that comes readily to mind.

NORMAN TAYLOR

**The American Breeders' Magazine***

The American Breeders' Magazine for the second quarter, 1913, announces important changes in the organization and administration of the American Breeders' Association. In regard to the character of the magazine published by the association for the benefit of its members, the announcement states in part as follows:

"The desire of the new management is, briefly: to retain the high standard of scientific accuracy which has made the magazine valued in the past, but at the same time to present articles of

* The price of single copies is $.25. Membership is $2.00 a year. Address all communications to American Breeders' Association, Washington, D. C.

such a nature, and so well illustrated, that they will interest not only those working in the particular field of which the article treats, but all who desire to keep informed in an authoritative way of progress made in plant and animal breeding and eugenics."

The magazine will be issued monthly instead of quarterly as hitherto.

This enlargement and improvement of The American Breeders' Magazine is made possible only by a guarantee fund of $3,000 annually for three years pledged by members and friends of the Association to cover possible deficits.

It is to be hoped that the increase in membership which the work and the publications of the association warrant will make the use of the guarantee fund unnecessary.

The number issued for October contains the following articles illustrated by eleven full-page plates and one half-page plate:

Announcement of Reorganization of the Association.

New Citrous Fruits, by *Walter T. Swingle.*

Eugenic Immigration, by *Robert DeC. Ward.*

New Plants for Breeders, by *David Fairchild.*

Color Inheritance in Swine, by *W. W. Smith.*

Publications Received.

Report of Fourth International Conference on Genetics.

Association Matters.

Since the above was written, three further numbers of the publication have appeared of which the first two complete volume IV. The issue for January, 1914, bears the new title "*The Journal of Heredity*," and announces that the *American Breeders' Association* is henceforth to be called the *American Genetic Association.* These three issues under the new management show marked enlargement and improvement, fully meeting the plans announced in the preceding number.

A. B. Stout

## PROCEEDINGS OF THE CLUB

### October 29, 1913

The meeting of October 29, 1913, was held in the laboratory of the New York Botanical Garden at 3:30 P.M., Dr. Marshall A. Howe acting as chairman. Fifteen persons were present.

The minutes of the meeting of October 14 were read and approved.

Dr. E. G. Arzberger, Bureau of Plant Industry, Washington, D. C., was nominated for membership.

Dr. H. H. Rusby on behalf of the committee to prepare a suitable memorial of Judge Addison Brown submitted a biographical sketch which was, on the motion of Professor R. A. Harper, referred to the board of editors for publication.

The *resolutions* relating to the death of Judge Brown and E. L. Morris were ordered engrossed and sent to the families of the deceased.

The first number of the scientific program was a paper on the Ambrosiaceae.

Dr. Rydberg presented some preliminary remarks on the results of his investigations of the family Ambrosiaceae of which he is preparing a monograph for the North American Flora. His work has been confined to the Ambrosiaceae proper. This group is represented in the eastern United States by the genera *Ambrosia* and *Xanthium*. These two genera were the only ones known to Linné when he wrote his Species Plantarum. The characters distinguishing the two are the following:

In *Ambrosia* the bracts of the staminate heads are united. The pistillate head contains usually only one flower and forms a bur with a single beak which is 3- or 4-toothed at the apex and very little oblique. The bur is armed with a single circle of small straight spines. In *Xanthium* the bracts of the staminate heads are distinct. The pistillate head develops into a bur with numerous hooked spines and two beaks which are very oblique at the mouth and have only 2 lobes, of which the outer one is much longer and usually hooked. The younger Linnaeus described in the Supplementum *Xanthium fruticosum*, which disagrees with the whole genus in having the bracts of the staminate heads united as in *Ambrosia*.

Medicus claimed that the older Linnaeus had included this species in *Ambrosia*, which statement has been impossible to verify. Medicus in Act. Acad. Theod. Palat. 3: 247. 1775 discusses this species, still including it in *Ambrosia*, but suggests that it may constitute a distinct genus. In 1889, in Philosophia Botanica he actually proposed it as a genus, *Gaertneria*. Unfortunately there is a *Gaertnera* of Schreber of the same year. In 1793, Cavanilles described the new genus *Franseria*. Most authors have regarded *Gaertneria* of Medicus and *Franseria* of Cavanilles the same. The genus has been known mostly under the latter name. O. Kuntze was the first one in later years who took up the older name *Gaertneria*, but he dates it from 1775 the year when Medicus first discussed the species, but as he did not propose a new name for it, but still retained the species in *Ambrosia*, this cannot be regarded as publication; and *Gaertneria* might be antedated by *Gaertnera* Schreber. However, a new question arises.

The only character separating *Xanthium* and *Franseria* is the distinct bracts of the staminate heads in the former and the united ones in the latter. In one species of *Franseria* the bracts are only united at the base and this character might not be generic. In other respects the original *Franseria* is very closely related to *Xanthium*, having many numerous and hooked prickles and 2–4 beaks on the fruit, of the character of those in *Xanthium*, while the most species that have been included in *Franseria* are closely related to *Ambrosia*. As stated before, *Ambrosia* has only one beak that is scarcely oblique at the apex and usually 3–4-toothed. This character is also found in two North American species of *Franseria*, but all the other species have 2-toothed, very oblique beaks as in *Xanthium*. Some have one beak, some two or even as many as six or seven. The question is whether the number of beaks, the number and structure of the spines are not just as good generic characters as the number of series of spines and the union or non-union of the bracts of the staminate heads. If such combinations are made the genus *Franseria* should be divided into several genera. Such species as *Franseria acanthicarpa*, *tenuifolia* and *bipinnatifida* differ very little from *Ambrosia*, the distinction being in consisting only of 2–4 series of spines instead of single ones and an oblique 2-toothed beak. The general habit is that of *Ambrosia* and the staminate heads essentially identical. Such species as *Franseria discolor* and *tomentosa* are also very close to *Ambrosia*, but the beaks are 2 or more. The number of beaks corresponds also to the number of cavities in the bur. Each cavity and beak contains usually only one pistil but sometimes two. These species are closely related to the original *Gaertneria*. In all these species the spines are rather few, seldom 30, and either short and without any hooks at the end, or else more or less flattened or channeled on the upper side. The original species of *Franseria* on the contrary has numerous spines and numerous series, the number of spines being over 100. They are long and slender and hooked at the end, and the whole fruit in structure agreeing with *Xanthium*.

The only one who has tried to make segregates in the genus is Delpino, who proposed the genera *Xanthidium*, *Hemixanthidium* and *Hemiambrosia*, but his arrangements cannot be followed, because he included in *Xanthidium* the original supposed *Franseria* and *Gaertneria* and applied the name *Franseria* to the 1-beaked species most closely related to *Ambrosia*. Besides the name *Xanthidium* is preoccupied. *Hemixanthidium* was proposed on a species which Delpino claimed had two kinds of pistillate heads, the one kind described as the ordinary one, the other form as found occasionally but as evidently caused by some disease. His *Hemiambrosia* is based on the species which would be included in *Ambrosia*.

There are two species of *Franseria*, however, that are very peculiar in their structure, namely, *F. eriocentra* and *F. Bryanti*. Both have a single beak which is scarcely oblique and with several teeth.

The former has only one pistil, but the spines are in several series and the plant is of quite different habit, otherwise the plants could be included in *Ambrosia*. The most peculiar of all is *F. Bryanti*, which also has a single beak, and the spines are practically in a single series. According to these characters the plant should be included in *Ambrosia*, but the bur contains several pistils and is several-celled, although the beak is single and the spines are enormously elongated, sometimes 2–3 cm. long. If none of the other species of *Franseria* are regarded as generic types, this one should. It is more distinct from *Fran-*

*seria* than from *Ambrosia*, but could not be included in the latter genus.

Where the generic line should be drawn is hard to tell and Dr. Rydberg was not prepared to give his final conclusions. It is evident, however, that the treatment hitherto followed is not satisfactory. Some of the species of *Franseria* could easily be included in *Ambrosia* by modifying the latter genus a little. Other species are on the other hand so closely related to *Xanthium* that it is hard to draw any line, except the united bracts and the staminate heads. It would be better to segregate the genus *Franseria* into several than to leave it as it is, but where and how to draw the generic line is hard to tell.

There is another genus of the same group, namely, *Hymenoclea.* The structure of the pistillate head is essentially that of *Ambrosia*, except that small spines of that genus have been replaced by broad and thin wings. The beak is essentially of the same structure. In one species the wings are in a single series, but in the other species there are some scattered wings below. In this respect, the species stand to each other in the same relationship as the genera *Franseria* and *Ambrosia*, but none of the species have the beak of *Franseria.* There will be no good reason for segregating them into several genera on account of the number of series of appendages.

Why should the number of series be regarded as a good character in separating *Franseria* and *Ambrosia?* And then the question arises, if all four genera in reality could not be regarded as one. There seems to be no reason why they should not if *Franseria* is left as it is.

Dr. Britton announced the approaching completion of Mr. Norman Taylor's studies on the local flora within 100 miles of New York City, which have extended over several years, and also the authorization of the publication of the results of this work by the scientific directors of the New York Botanical Garden. The greater portion of the investigation was accomplished during the period while Mr. Taylor was an officer of the New York Botanical Garden, and has been completed during his association with the Brooklyn Botanic Garden. Dr. Britton remarked on the preceding ctalogues of the local flora, including the list prepared by Dr. Torrey, Dr. Eddy, and Mr. Knevals, published by the Lyceum of Natural History in 1819, the list prepared by Mr. Leggett and his associates, published in Volumes 1–6 of Bulletin, 1870–1876, and the catalogue of 1888, prepared by himself with the aid of Mr. Stearns and Mr. Poggenburg. Mr. Taylor's work is much more elaborate than any of the preceding catalogues, as it contains keys for the rapid determination of species, detailed citations of distribution, and of habitat, together with statements of distribution by geological formations, by altitude, and with relation to temperature and the length of the growing season.

Mr. Otto Kunkel spoke of collecting rusts in the Adirondacks. Dr. R. M. Harper gave a brief description of certain floral features of northern Michigan. An abstract follows:

The biological station of the University of Michigan is located in the wilderness on the shore of Douglas Lake, about 17 miles south of the Straits of Mackinac. The lake covers seven square miles, and has a varied and interesting flora along its shores. The surrounding country is very sandy, and was originally covered mostly with white pine forests, which were cut off about thirty years ago, and have not reproduced themselves to any considerable extent since, on account of too frequent fires. There are small areas of hardwood forest, in nearly primeval condition, and many swamps full of conifers of the traditional or conventional narrow conical form, familiar in all parts of the northern hemisphere where the snowfall is heavy. The abundance of fleshy fruits in that neighborhood, which is near the southern edge of the boreal conifer region, is noteworthy. They occur in many different families, even including the Cyperaceae.

Adjournment followed.

B. O. Dodge,
*Secretary*

NOVEMBER 11, 1913

The meeting of November 11, 1913, was held at the American Museum of Natural History at 8:15. President Burgess presided. Twenty-four persons were present.

The minutes of October 29 were read and approved. Dr. O. E. White, Brooklyn Botanic Garden, Brooklyn, N. Y., was nominated for membership.

The scientific program consisted of an illustrated address on "Spore Formation in the Slime Moulds," by Prof. R. A. Harper.

Adjournment followed.

MICHAEL LEVINE,
*Secretary pro tem.*

NOVEMBER 26, 1913

The meeting of November 26, 1913, was held in the laboratory of the New York Botanical Garden at 3:30 P.M. with Vice-president Barnhart presiding. Twelve persons were present.

The minutes of November 11 were read and approved.

Dr. G. Clyde Fisher, American Museum of Natural History, New York City, was nominated for membership.

On the motion of Dr. Murrill, the secretary was instructed to accept the terms proposed by the De Felice Company in connection with the engrossing of the resolution relating to the death of Judge Addison Brown and E. L. Morris, such engrossing having been authorized at the last meeting.

Dr. E. G. Arzberger, Dr. O. E. White and Dr. G. Clyde Fisher were then elected to membership in the Club.

Dr. Murrill exhibited specimens of a species of *Phellorina* collected near Laredo, Texas, by Dr. J. N. Rose in October, 1913. He pointed out the relationship existing between this genus and *Podaxon* and also spoke briefly of the family Podaxaceae, comprising peculiar, stalked, puffball-like fungi inhabiting desert places.

Mrs. E. G. Britton followed with the announced paper on "Mosses of the Virgin Islands and Central America."

Mrs. Britton showed a collection of mosses made in the Danish West Indies and the Virgin Islands during the month of February, 1913, and also a small collection from St. Kitt's. She read an account of the work done by J. Breutel in 1841 (quoted from Urban's Symbolae) on these islands and exhibited a collection of specimens preserved in the Mitten Herbarium, which included six species from St. Thomas and St. Jan, and six from St. Kitt's, including *Hymenostomum Breutelii* (C. M.) Broth. which is common on St. Thomas. The collections of this year included 75 specimens, representing 26 species and 19 genera of mosses, including 2 new species, one a small *Phascum*, collected on roadside banks, near Charlotte Amalia and an undescribed species of *Hyophila* from the Island of St. Jan collected by Dr. Britton and Dr. Shafer.

Mrs. Britton also read by title, for publication in the *Bulletin*, a report on some collections of Central American mosses sent for determination from the National Museum including specimens from Guatemala and Costa Rica, including also some specimens from Honduras collected for the New York Botanical Garden by Mr. Percy Wilson. These included 54 species representing 34 genera, with descriptions of a new species of *Macromitrium* and a new genus *Isodrepanium* raised from subgeneric rank to include two synonyms, with illustrations and specimens collected in Jamaica, Central America and South America.

Mr. Taylor gave some account of the flowering plants collected by Mr. Robert Cushman Murphy on the island of South Georgia in the Antarctic regions. Specimens were exhibited, and one or two illustrations also, from the work of Dr. Carl Skottsberg.

Adjournment followed.

B. O. Dodge,
*Secretary*

## NEWS ITEMS

At the annual meeting of the New York Academy of Sciences held December fifteenth, the following botanists were elected fellows of the academy: Oakes Ames, R. A. Harper, Wm. Mansfield, W. A. Murrill and Norman Taylor. At the same meeting Dr. N. L. Britton presented the name of Sir David Prain, Lieut.-Col., director of the Royal Botanic Gardens, Kew, for election as an honorary member of the academy. Dr. M. A. Howe was elected a councilor for 1914–1916.

Professor F. L. Stevens, of Mayaguez, Porto Rico, has accepted the position of professor of plant pathology at the University of Illinois. The appointment becomes effective February 1, and thereafter Professor Stevens's address will be Urbana, Ill.

Rev. Reuben Denton Nevius, D.D., died at Tacoma, Washington, December 14, 1913. He was born at Ovid, New York, November 27, 1827, and was a graduate of Union College of the class of 1849. He was a Protestant Episcopal clergyman and missionary, and, it is said, had been instrumental in establishing more than thirty churches and chapels in the Pacific Northwest. As a botanist he was known for his work as a collector in Alabama, Oregon, Washington, and Idaho. Asa Gray dedicated to him the handsome rosaceous shrub *Neviusia alabamensis*, which is known only from two localities in Alabama. *Chenactis Nevii*, *Mnium Nevii*, *Racomitrium Nevii*, *Sedum Nevii*, and perhaps other species commemorate his botanical interests. Dr. Nevius is reputed to have possessed the best collection of diatoms in the Northwest.

P. B. Kennedy, Ph.D., '99, Cornell, professor of botany, horticulture and forestry in University of Nevada College and Experiment Station, has accepted a position with the University of California as assistant professor of agronomy, beginning January 1, 1914.

Mrs. Agnes Chase, assistant in systematic agrostology, U. S. Department of Agriculture, has returned from Porto Rico where she has been collecting and studying grasses for about two months. Of the 123 species of grasses known from the island she obtained all but three, and about 40 additional species. *Arthrostylidium sarmentosum* Pilger, a climbing bamboo, known only in the sterile condition, was obtained in flower.

Dr. Arthur Hollick, curator of paleobotany at the New York Botanical Garden for many years, has resigned to accept the position of curator-in-chief, of the Museum of the Staten Island Association of Arts and Sciences, vacated by the resignation of Mr. C. L. Pollard.

We regret to record the death of Mr. C. B. Robinson at the island of Amboina announced in the daily papers at Christmas. Details are as yet lacking and the date of his death is unknown. He was collecting there for the Philippine Bureau of Science.

According to the *Evening Post*, George W. Hess, of the District of Columbia, has been appointed Superintendent of the National Botanic Garden to succeed C. Leslie Reynolds, who died recently. Mr. Hess is forty-nine years old, and has been growing flowers and trees since he was sixteen. For the last few years he has resided in the South. At a recent civil service examination he got a rating of 100 per cent. on the growing of foreign plants, and 98 per cent. on general gardening.

At the annual meeting of the Club held Tuesday, January 13, the following officers were elected for the coming year: *President*, R. A. Harper; *Vice-Presidents*, J. H. Barnhart and H. M. Richards: *Secretary* and *Treasurer*, B. O. Dodge; *Editor*, A. W. Evans and the following *Associate Editors*, Jean Broadhurst, E. D. Clark, J. A. Harris, M. A. Howe, H. M. Richards, A. B. Stout, and Norman Taylor. Dr. William Mansfield was elected delegate to the council of the New York Academy of Sciences.

# The Torrey Botanical Club

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Delegate to the Council of the New York Academy of Sciences

WILLIAM MANSFIELD

* Died September 14, 1913.
† Died February 1, 1913.

## OTHER PUBLICATIONS

OF THE

# TORREY BOTANICAL CLUB

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## (1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 39 published in 1912, contained 630 pages of text and 45 full-page plates. Price $3.00 per annum. For Europe, 14 shillings. Dulau & Co., 37 Soho Square, London, are, agents for England.

Of former volumes, only 24–37 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Vols. 24–27 are furnished at the published price of two dollar each; Vols. 28–39 three dollars each.

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## (2) MEMOIRS

The MEMOIRS, established 1889, are published at irregulas intervals. Volumes 1–13 are now completed; Nos. 1 and 2 of Vol. 14 have been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

DR. BERNARD O. DODGE
Columbia University
New York City

Vol. 14 February, 1914 No. 2

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BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873

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# TORREYA

February, 1914.

Vol. 14 No. 2

## TWO ADDITIONS TO THE FLORA OF LOUISIANA

By Paul C. Standley*

Recently two plants were sent for determination to the U. S. National Herbarium by Mr. E. C. Wurzlow, of Houma, Louisiana. Upon attempting to name them it was found that neither was included in Small's Flora of the Southeastern United States, although, from what Mr. Wurzlow writes concerning them, both deserve a place in any flora of Louisiana, being well established and so large and showy as to be at once noticed by any botanical collector. One of them, a member of the Acanthaceae, was sent for identification to Dr. G. Lindau, of Berlin, well known as an authority upon this group, who reports that it is the plant described from Mexico by Nees as *Cryphiacanthus angustifolius*. Since both plants received from Mr. Wurzlow are of considerable interest it seems desirable to make some permanent record of them. The data given below concerning distribution and growth in Louisiana are from copious notes kindly furnished by the collector.

### Ruellia spectabilis Britton

*Cryphiacanthus angustifolius* Nees in DC. Prodr. 11: 199. 1847, not *Ruellia angustifolia* Sw. 1788.

*Ruellia Tweediana* Hemsl. Biol. Centr. Amer. Bot. 2: 508. 1882, not Griseb.

*Ruellia spectabilis* Britton, Ann. N. Y. Acad. Sci. 7: 192. 1893.

Nees based his description upon two specimens, the first from Jalapa, Mexico, collected by Galeotti, the second from Entre Rios, Argentina, collected by Tweedie. Grisebach, finding that the two collections represented distinct species, named the

* Published by permission of the Secretary of the Smithsonian Institution

[No. 1, Vol. 14 of Torreya, comprising pp. 1–20, was issued 27 January, 1914.]

Argentina plant *Ruellia Tweediana*.* The specific name *angustifolius* being preoccupied under *Ruellia*, Dr. Britton in 1893 renamed Nees's species *Ruellia spectabilis*, an appropriate name since it is one of the most showy members of the genus.

Hemsley in the Biologia Centrali-Americana reports the plant from Mexico as *Ruellia Tweediana* Griseb.?, citing only the original collection by Galeotti. Dr. Lindau writes that few specimens exist in European herbaria. In the U. S. National Herbarium there is a single collection apparently referable here, gathered by C. G. Pringle (no. 5043) on river ledges near Micos, San Luis Potosí, Mexico, distributed as *Ruellia Tweediana*.

About Houma, Louisiana, this plant appears to be an escape from cultivation. Mr. Wurzlow states that in his early boyhood his father imported a number of plants for cultivation and that this is probably one of them. It is now more or less common in Terre Bonne Parish, growing in cultivated and waste ground, often along ditches, seeming to prefer moist or wet places where it spreads rapidly from seed. It is also found within enclosures but grows without any care, the plants being so attractive with their handsome flowers and showing so little tendency to become troublesome weeds, that they are not looked upon as intruders. They grow to a height of 3 or 4 feet, sending up new stems every year from the rootstocks and flowering from July to October. The stems, branches of the inflorescence, and veins of the leaves are more or less tinged with purple. The corollas are lilac or purple and very showy, being about 5 cm. long. The leaves are narrow for the genus, being only 7 to 10 mm. wide, and 20 cm. long.

The occurrence of *Ruellia spectabilis* in Louisiana is of particular interest because it must be rare in its native region, otherwise so conspicuous a plant could not have been overlooked by collectors. It does not seem to be frequent in cultivation for it is seldom mentioned in literature.

### SIPHONANTHUS INDICA L.

*Siphonanthus indica* L. Sp. Pl. 109. 1753.

*Ovieda mitis* L. Sp. Pl. ed. 2. 889. 1762.

* Symb. Fl. Arg. 259. 1879.

*Clerodendrum Siphonanthus* R. Br. in Ait. Hort. Kew. ed. 2. 4: 65. 1812.
*Clerodendrum indicum* Kuntze, Rev. Gen. Pl. 2: 506. 1891.

This is well known under the name *Clerodendrum Siphonanthus*, but after a study of its synonymy it is evident that the proper designation is *Siphonanthus indica*. In the Species Plantarum Linnaeus published three genera that have usually been combined as one, *Clerodendrum*. These are *Siphonanthus* on page 109, and *Ovieda* and *Clerodendrum** on page 637, *Ovieda* having precedence on the page.

A single species is published under each genus, these being *Siphonanthus indica*, a well known plant of India, *Ovieda spinosa* (*Clerodendrum spinosum* Spreng.), common in the West Indies, and *Clerodendrum infortunata*, also from India. The first two plants are generally placed in the section Siphonanthus Schauer† of the genus *Clerodendrum*. The group of species included in this section has some claim to rank as a genus, because of differences in the form of the corolla from that of typical *Clerodendrum*, but apparently recent authors have not separated it. It is apparent, however, that if all the species commonly referred to *Clerodendrum* are to be combined in a single genus this must bear the name *Siphonanthus*. The writer has not attempted to determine the desirability of separating *Siphonanthus* and *Clerodendrum*, since there can be no question, under the American code of botanical nomenclature, as to the proper name for the plant discussed here.

Linnaeus based his *Siphonanthus indica* upon the name *Siphonanthemum*, applied by the Russian botanist Ammann in 1739 to an Indian plant. The species is said to be common in India and Java. In the U. S. National Herbarium there are Old World specimens from Bengal and Upper Burma. It is common in cultivation, especially in tropical and subtropical regions. Bailey's Cyclopedia of Horticulture gives the common name as "Turks' turban" and states that the plant is "hardy in Florida." In the West Indies it has escaped from cultivation and become

* This name is usually given as *Clerodendron*, but Linnaeus always writes it *Clerodendrum*.

† In DC. Prodr. 11: 670. 1847.

established. Specimens are at hand which show that it occurs in Guadeloupe, Martinique, and St. Croix, while Grisebach* states that it is naturalized in St. Kitts, Trinidad, and Guiana.

Langlois in his Catalogue Provisoire de Plantes de la Basse-Louisiane† mentions a "*Clerodendron sipho*" as introduced at Point a la Hache, on the lower Mississippi. This is doubtless the plant that has now become so well established in southern Louisiana. Mr. Wurzlow writes that he has observed it for many years, not only in Terre Bonne Parish, where it is very common, but in other parishes of the southern part of the state. It grows along roadsides, ditch banks, and fencerows, and in cultivated ground to such an extent that it is regarded as a weed, It is distributed by seed, but after the plants are established they spread rapidly by rootstocks, forming large patches. Repeated cutting or destruction of the tops does not destroy it when it invades cultivated fields. Although frequently seen in neglected places about dwellings it is not known to be in cultivation.

Prof. R. S. Cocks, of Tulane University, writes that so far as he knows the plant was first collected in 1884 by Dr. Joor near Baton Rouge. He further states that it occurs abundantly in the vicinity of New Orleans and occurs more or less commonly throughout southeastern Louisiana, especially in alluvial soils.

U. S. National Museum
Washington, D. C.

## CENTRAL AMERICAN MOSSES

By Elizabeth Gertrude Britton and Robert Statham Williams

1. *Campylopus filifolius* (Hornsch.) Mitt.

Guatemala: Alta Verapaz, 3330a, Maxon and Hay, 1904; Alta Verapaz, 29, Cook and Doyle, 1905.

Costa Rica: Cartago, 506, Maxon, 1906.

2. *Campylopus subleucogaster* (C. Müll.) Jaeger.

Guatemala: Cubilquitz, 6652, H. von Turckheim, 1892.

Costa Rica: Vicinity of Coliblanco, 264, Maxon, 1906.

* Fl. Brit. W. Ind. 500. 1864.

† p. 15. 1887.

3. *Leucobryum antillarum* Sch.

Costa Rica: Coliblanco, 227a, Maxon, 1906.

4. *Syrrhopodon incompletus* Schwgr.

*Syrrhopodon Hobsoni* Hook. & Grev.
*Syrrhopodon decolorans* C. Müll.
*Syrrhopodon Mohrianum* C. Müll.
*Syrrhopodon Sartori* C. Müll.

Mexico: Liebman, Sartorius, etc.

Guatemala: Bernouille and Cario, Rio Pollochico, 3087, Maxon and Hay, 1904.

Honduras: Rio Platano, 690, Wilson, 1903.

5. *Hyophila reflexifolia* C. Müll.

Guatemala: Alta Verapaz, 411, Cook and Griggs, 1902.

6. *Macromitrium Tonduzii* Ren. and Card.

Costa Rica: La Palma, 481, Maxon, 1906.

7. **Macromitrium palmense** R. S. Williams sp. nov.

Pseudoautoicous: growing in deep tufts, the primary stems creeping, bare, the secondary erect, branching, without radicles, 5 or 6 cm. high; leaves densely imbricate, spreading, crispate in upper part; stem leaves 5 mm. long, linear-lanceolate, carinate, serrulate about one half down, smooth throughout or with a few low papillae on upper surface toward the base; excurrent costa slightly denticulate; leaf cells below long and narrow, the median in rows, about 6$\mu$ wide by 10 to 12$\mu$ long, with furrows between, or sometimes scarcely elongate in less distinct rows, the upper elongate, not in rows; perichaetial leaves a little shorter than stem leaves with longer cells above and more abruptly narrowed to the denticulate, excurrent costa; seta smooth, 1.5 to 2.5 cm. high; capsule smooth or nearly so, globose-pyriform, about 1.5 mm. high with stomata in several rows near base; lid not seen; peristome double, the outer of reddish-brown, densely papillose teeth, divided scarcely one half down, the inner of about the same height, a little paler, more or less irregularly divided; calyptra without hairs, slightly rough at apex; spores slightly rough, up to 35$\mu$ in diameter.

In habit much like *M. subcirrhosum* but with median leaf cells very different, leaf base scarcely papillose and costa distinctly excurrent.

Habitat: On tree trunk on open moist slopes.

Type locality: La Palma, Costa Rica, 480, Maxon, May 6, 1906.

8. *Macromitrium cirrhosum* (Hedw.) Brid.
Guatemala: Alta Verapaz, 3125, Maxon and Hay, 1905.
9. *Pohlia falcata* (Besch.) Broth.
Guatemala: Volcan de Agua, 3706, Maxon and Hay, 1905.
10. *Acidodontium megalocarpum* (Hook.) Ren. and Card.
Guatemala: Alta Verapaz, 430, Cook and Griggs, 1902; 3290, Maxon and Hay, 1905.
11. *Rhizogonium spiniforme* (L.) Bruch.
Guatemala: Alta Verapaz, 843, Cook and Griggs, 1902.
Costa Rica: Coliblanco, 263, Cartago, 499, Maxon, 1906.
12. *Philonotis sphaerocarpa* (Sw.) Brid.
Honduras: 487, Percy Wilson, 1903.
13. *Philonotis uncinata gracilenta* (Hpe.) Dismier.
Guatemala: San Felipe, 3550, Maxon and Hay, 1905.
14. *Polytrichum antillarum* Rich.
*Polytrichum vernicosum* Paris.
Guatemala: Baja Verapaz, 6930, von Turckheim, 1906.
Costa Rica: Coliblanco, 231, 337, La Palma, 423, Maxon, 1906.
15. *Orthostichidium pentagonum* (Hpe. & Ltz.) C. Müll.
Costa Rica: San José, 164, Cook and Doyle, 1903.
16. *Squamidium macrocarpum* (Spruce) Broth.
Costa Rica: Santiago, 82, Maxon, 1906.
17. *Papillaria nigrescens* (Sw.) Jaeg.
Guatemala: Chilion, Bernouille, 1867.
Costa Rica: San José, 146, Cook and Doyle, 1903; 146, Maxon, 1906.
18. *Phyllogonium viscosum* (P. Beauv.) Mitt.
Costa Rica: San José, E. S. Hyde, 1888.
Coliblanco, 236, Maxon, 1906.
19. *Phyllogonium fulgens gracile* Ren. & Card.
Costa Rica: San José, E. S. Hyde, 1888; Santiago, Aman Breues, 1901.
20. *Neckera Ehrenbergii* C. Müll.
Guatemala: Volcan de Agua, 3716, Maxon and Hay, 1905.
21. *Porotrichum* sp. ? (young plants too small to name).
Costa Rica: La Palma, 384a, Maxon, 1906.
22. *Entodon stenocarpus* (Br. & Sch.) Jaeg.
Costa Rica: San José, 165, Cook and Doyle, 1903.

23. *Fabronia flavinervis* C. Müll.
Guatemala: San Felipe, 3508, 3510a, Maxon and Hay, 1905.
24. *Fabronia polycarpa* Hook.
Panama: Between Salanca and Chiquin, O. F. Cook, 1905.
25. *Pilotrichum bipinnatum* (Schwgr.) Brid.
Guatemala: Alta Verapaz, 500, Cook and Griggs, 1902.
26. **Isodrepanium** (Mitt.) E. G. Britton gen. nov. Fig. 1.

FIG. 1. *Isodrepanium lentulum* (Wils.) E. G. Britton.

*Lepidopilum* Sect. *Isodrepanium* Mitt. Journ. Linn. Soc. 12: 369. 1869.

Among our Jamaica collections we have fine specimens of a moss which we had difficulty in referring to any genus known to us from the West Indies and this difficulty still remains for according to Brotherus* it cannot be a *Homalia* because the leaves have porose cells and although they are ecostate they are not entire and hence do not fit with *Euhomalia* or *Spathularia.* According to Mitten this has been described as a subgenus of *Lepidopilum* with one species *L. membranaceum* (C. M.) Mitt. characterized by its equally falcate, scythe or scimitar-shaped leaves. There is but one species, but it is listed in three genera in Paris Index, as *Homalia*, *Lepidopilum* and *Neckera.* The identity of these species has been determined by consulting type material of each and as the fruit has not been described we give the following characters:

**Isodrepanium** (Mitt.) E. G. Britton gen. nov.

Plants occasionally a foot long, pendent on trees. Stems slender, regularly pinnate or bipinnate, branches 1–14 cm. long. Leaves glossy, imbricate, falcate, acuminate, serrate, ecostate; cells porose. Dioicous. Seta 4 cm. long, slender, flexuose; capsule nodding-ovoid; peristome double, without cilia.

Type species: *Homalia lentula* Wils.

**Isodrepanium lentulum** (Wils.) E. G. Britton new combination.

*Homalia lentula* Wils. Ann. Mag. Nat. Hist. **20**: 379. 1847.

*Hookeria membranacea* C. M. Syn. Musc. **2**: 200. 1851.

*Lepidopilum membranaceum* Mitt. Journ. Linn. Soc. **12**: 369. 1869.

*Neckera falcifolia* R. & C. Bull. Soc. Roy. Bot. Belg. **32**: 184. 1893.

*Homalia membranacea* C. M. Hedwigia **37**: 266. 1898.

*Neckera lentula* Broth. in E. & P. Pfl. **1**$^{3}$: 842. 1906.

Stems pendent, irregularly branched, reaching a maximum of 30 cm. in length with branches pinnate or bipinnate, often 10–15 cm. long; leaves glossy green, crowded, flexuose, 1.5 mm. long, falcate-acuminate, ecostate; apex recurved; margins unequally and finely serrate; base oblique, unequal, slightly auriculate on one side, basal cells yellow, enlarged, all femur-shaped and porose, with thick walls. Perichaetial leaves longer pointed, almost entire. Dioicous. Seta 4 cm. long, slender, flexuose, red; capsule 2–3 mm. long, ovoid, horizontal; peristome double, yellow; teeth trabeculate, with narrow projecting lamellae,

* E. and P. Pflanzenfam. fasc. 226: 847. 1906.

slender and papillose at apex; endostome paler, smooth, segments carinate and perforate, cilia none; walls thickened, cells small, irregularly hexagonal; spores smooth, 16–18 $\mu$. Lid and calyptra not seen.

TYPE LOCALITY: Port Royal, Jamaica. "Mc Nab."

DISTRIBUTION: High Mountains of Jamaica, Morce's Gap, John Crow Peak, New Haven Gap and Sir John and Summit, St. Catharine's Peak; Cuba, Sierra Maestra and Mt. Torquino; Porto Rico, Luquillo Mts.; St. Vincent, H. H. Smith; Barbadoes, Parker; Trinidad, Crüger. Guatemala, Alta Vera Paz, H. von Turckheim 1149, Cook and Griggs 512, with fruit. Costa Rica, Pittier 9642; New Granada and Mt. Abitana, Andes of Quito, Spruce 740.

Funck and Schlim, 370 from Caracas, Venezuela, is not this species but a true *Homalia*.

*Homalia glabella* (Sw.) Mitt. with which it has been confused by Mitten also has its type locality in Jamaica but that species grows on rocks, in shade, is a smaller plant, with nearly simple branches, obtuse or shortly apiculate leaves which are shortly bicostate and without porose cells. Its distribution is from Jamaica, Porto Rico to Guadeloupe, and from Mexico and Guatemala to Costa Rica.

27. *Callicostella pallida* (Hornsch.) Jaeg.
Guatemala: Alta Verapaz, 388, Cook and Griggs, 1902.

28. *Callicostella Oerstediana* C. Müll.
Guatemala: Rio Pollochico below Panzos, 3086, Maxon and Hay, 1904.

29. *Harpophyllum aureum* (Lam.) Spruce.
Costa Rica: La Palma, 400, Maxon, 1906.

30. *Hypopterygium Tamarisci* (Sw.) Brid.
Costa Rica: Santiago, 116, Coliblanco, 338, Maxon, 1906.

31. *Helicophyllum torquatum* Brid.
Guatemala: 3538, Maxon and Hay, 1905.

32. *Rhacopilum tomentosum* (Sw.) Brid.
*Rhacopilum latistipulatum* Cardot
*Rhacopilum angustatum* Sch.; Besch.
*Rhacopilum tomentosum longe-aristatum* C. Müll.
Nicaragua: Volcan Mombacho, 2367, Baker, 1903.

Guatemala: Alta Verapaz, Cook, 1905; San Felipe, 2536, Maxon and Hay, 1905.

Costa Rica: Santiago, 89, Maxon, 1906.

33. *Thuidium miradoricum* Jaeg.

Costa Rica: Cartago, 499a, Maxon, 1906.

34. *Mittenothamnium Langsdorfii* (Hook.) Cardot

Costa Rica: La Palma, 384, Maxon, 1906.

35. *Mittenothamnium megapalmatum* (C. Müll.) Card.

Guatemala: Alta Verapaz, 325, Maxon and Hay, 1905.

36. *Mittenothamnium nicaraguense* (Broth. ined.) E. G. B. comb. nov.

Nicaragua: Volcan Mombacho, 2501, 2514, Baker, 1903.

37. *Mittenothamnium reptans* (Sw.) Card.

Costa Rica: Coliblanco, 339, 348, La Palma, 372, 374, Maxon, 1906.

38. *Mittenothamnium Salleanum* (Besch.) Card.

Guatemala: Godman and Salvin in Hb. Mitt.

39. *Mittenothamnium substriatum* (Mitt.) Card.

Mexico: (Found without collector or locality in Hb. Mitt.) Det. by Max Fleischer.

40. *Ectropothecium apiculatum* (Hornsch.) Mitt.

Guatemala: Alta Verapaz, 93, 258, 383, Cook and Griggs, 1902.

Costa Rica: Finca Navarro, 619, Maxon, 1906.

41. *Ectropothecium globitheca* (C. Müll.) Mitt.

Nicaragua: Volcan Mombacho, 2368, 2520, C. F. Baker, 1903.

42. *Ectropothecium pseudo-rutilans* (C. Müll.) Paris

Nicaragua: Volcan Mombacho, 2366, C. F. Baker, 1903.

43. *Isopterygium miradoricum* (C. Müll.) Jaeg. (ex descriptio)

Guatemala: Puerto Barrios, 3072, 3076, 3078, Maxon and Hay, 1904.

44. *Isopterygium pusillum* Ren. & Card.

Honduras: Puerto Sierra, 506, P. Wilson, 1903.

Costa Rica: La Palma, 371, Maxon, 1906.

45. *Isopterygium trichopelma* (C. Müll.) Paris

Costa Rica: Coliblanco, 250, Maxon, 1906.

46. *Taxithelium planum* (Brid.) Mitt.

Honduras: Puerto Sierra, 507, 556, P. Wilson, 1903.

Guatemala: Alta Verapaz, 3216, Maxon and Hay, 1905.

47. *Vesicularia amphibola* (Spr.) Broth.
Guatemala: Alta Verapaz, 410, Cook and Griggs, 1902.
48. *Vesicularia vesicularis* (Schwgr.) Broth.
Guatemala: Mazatenango, 3494, Maxon and Hay, 1905.
49. *Pterigonidium pulchellum* (Hook.) Broth.
Honduras: Puerto Sierra, 499, P. Wilson, 1903.
Guatemala: Puerto Barrios, 3066, Maxon and Hay, 1904.
50. *Sematophyllum caespitosum* (Sw.) Mitt.
Costa Rica: Santa Clara, 604, 611, Cook and Doyle, 1903.
51. *Sematophyllum galipense* (C. Müll.) Mitt.
Honduras: near Puerto Sierra, 290, P. Wilson, 1903.
52. *Sematophyllum Lindigii* (Hpe.) Mitt.
Costa Rica: Coliblanco, 244, 265, 336, 346, Maxon, 1906.
53. *Trichosteleum fluviale* (Mitt.) Jaeg.
Guatemala: Puerto Barrios, 3077, Maxon and Hay, 1904.
54. *Trichosteleum microcarpum* Brotherus.
*Sematophyllum microcarpum* Mitt. Jour. Linn. Soc. 12: 493. 1869, in part.
Nicaragua: Volcan Mombacho, 2497, C. F. Baker, 1903.

In Mitten's herbarium we find a specimen labeled *Leskea microcarpa* "fl. Ind. occ. Swartz. Hb. Hooker." This must have been a manuscript name of Swartz, because it does not occur in his *flora Indiae occidentalis*, as stated. It is evidently the type of *Sematophyllum microcarpum* Mitt. which he placed in the section *Trichosteleum* (p. 492), but it does not agree with other species of this genus, because although there are occasional small obscure papillae on a few of the young leaves, most of the leaves are entirely smooth and the specimen agrees with *Sematophyllum xylophilum* Mitt. (l. c. p. 490) to which it must be referred as a synonym.

## SHORTER NOTES

Winter Changes in Weeping Willow.—Since reporting the upward winter movement of the slender branches of the weeping willow tree* in front of the Columbia University Library, I have looked in vain for another tree showing the same curious phe-

* The Weeping Willow in Winter, Torreya 10: 38, 1910.

nomenon. As described then, in December, the drooping twigs (on all but one of the main branches) curl up until each twig reaches a position above its point of origin, and the tree has a round-topped, bristly appearance. The writer will be much indebted to any one contributing observations, photographs, etc., of a willow tree showing similar changes; dates of the observed changes are also desirable.

JEAN BROADHURST

A NEW FORM OF PYROLA BRACTEATA.—*P. bracteata* Hook. var. **Hillii.** var. nov. Stem and flowers as in the species; leaves wanting. Dry woods, Mayne Island, British Columbia.

Mr. Albert J. Hill, M.A., who collected the plant several years ago, says it is not rare in the above locality. It is quite distinct from *P. aphylla* Smith by its long bracts; and from *P. aphylla var. paucifolia* Howell by its calyx lobes, which are half as long as the petals.

J. K. HENRY

VANCOUVER

## CURRENT LITERATURE AND NOTES

HOWARD, C. *Les Zoocécidies des Plantes d' Europe et du Bassin de la Méditerranée.* Tome III, Supplement 1909–1912; pp. 1249–1560. 1567 figures, 3 plates and 8 portraits. Librairie Scientifique, A. Herrmann et Fils: Paris. 10 Fr. This most excellent work, the third and supplementary volume of which has just appeared, is a model for a similar work on our American cecidia. This third volume contains brief, clear descriptions of 1,317 species of galls distributed among 149 genera of gall makers and in 92 families of host plants. The species are grouped with reference to the taxonomic order of the host plants on which they occur but zoological and botanical indices makes the work very valuable for both entomologist and botanist. A very unique system of abbreviation on the margins of the pages indicate the location of the gall on the host plant and its geographical distribution. The illustrations are mostly line drawings but are of such character as to greatly facilitate the determinations of the species. One of the most interesting parts of the work is the treatment of 16 galls on cryptogams. The work closes with a bibliography of 204 titles.

This line of work which has received so much attention in Europe has been greatly neglected in America, but with the increasing interest in evolution, biochemistry, physiology and plant pathology the time is not far distant when it must become one of our most interesting and productive lines of botanical research. It is a field in which our American botanists must soon follow the lead of their European colleagues. However, it is unfortunate that in both Europe and America, the myco-cecidia have received much less attention than the zoö-cecidia.

MEL T. COOK

HAWKINS, L. A. *The influence of calcium, magnesium and potassium nitrates upon the toxicity of certain heavy metals toward fungus spores.* Physiological Researches **2**: 57–92, 1913. Mr. Hawkins has shown that, in certain cases, the effect of a toxic salt on the germination of the conidia of *Glomerella cingulata* may be influenced by the addition to the medium of calcium, magnesium or potassium nitrate. For the combination of $Cu(NO_3)_2$ with $Ca(NO_3)_2$ and of $Zn(NO_3)_2$ with $Ca(NO_3)_2$ and $Mg(NO_3)_2$, he has shown that this effect is not due to the formation of undissociated double salts. He has also shown that it is not due to the depression of the ionization of the toxic salt. The salts which he tested, given in the order of their toxicity, are as follows: $Cu(NO_3)_2$, $CuSO_4$, $Pb(NO_3)_2$, $Al(NO_3)_3$, $HNO_3$, $Zn(NO_3)_2$, $Ni(NO_3)_2$, $Mg(NO_3)_2$, $Ca(NO_3)_2$, and $KNO_3$.

L. O. KUNKEL

HANS KNIEP, *Beitrage zur Kenntnis der Hymenomyceten I, II.* Zeitschrift für Botanik, **5**: 594–637. Au 1913, reports another effort to discover the origin of the binucleated cells in the hymenomycetes. The work, as the title indicates, is divided into two parts. The first is devoted to a study of a new species, *Hypochnus terrestris* Kniep. The author traces the development of this form from spore to spore and shows that there are no sexual organs or their equivalents. The spore prior to germination becomes binucleated. The germ tube and subsequent cells are all binucleated. The nuclei divide conjugately. He holds that these forms of fungi are reduced types rather than primitive ones.

The second part is devoted to a cytological study of the life cycle of *Coprinus nychtemerus* Fr. He studied the germination of spores of this species and found that the cells of the germ tube are uninucleated, binucleated and more rarely multinucleated. He also reports the presence of clamp connections in which he discovered peculiar structures resembling nuclei. As to what the significance of these bodies is Kniep is not clear. He argues that the clamp connections serve no other purpose than to facilitate the transportation of food stuffs. Mycelial cells in later stages are uninucleated and binucleated. He holds however that the binucleated condition does not become fixed until the formation of the carpophore. The nuclear phenomena in the basidium are similar to those reported by other observers. He finds eight chromosones in the first division. Kniep was unable to find secondary nuclei in the basidium.

MICHAEL LEVINE

MOLISCH, H., *Ueber den Einfluss des Tabakrauches auf der Pflanze.* Sitzb. Wien Akad. Mat. Nat. Kl. 120 Abt. 1: 3–30, 813–838, + *2 pls.* 1911, takes up the question of the effect of tobacco smoke on plants grown under greenhouse conditions. Seedlings of *Vicia sativa*, *Pisum*, *Cucurbita Pepo*, etc., were grown in water cultures, covered by a bell jar of 4 L. capacity and 1–3 puffs of cigar or cigarette smoke passed under the jars. Excellent photographs illustrate the striking results. Growth in length is practically stopped in the plants subjected to smoke; they commonly show a greater stem-diameter, however, than the controls. If the seedlings are grown in porous flower pots the results are similar for about the first three days, then the smoked plants begin to grow rapidly—a result attributed to the absorption of the injurious substances by the soil and pot.

Similar effects were obtained with the smoke of paper, wood, straw. Using singly various of the constituents present in tobacco smoke, it was found that nicotine is quite without effect, carbon monoxide leads to results similar to those obtained with tobacco smoke, etc. Molisch considers the data inadequate, however, for determining what constitutes the effective ingredient or ingredients of tobacco smoke.

Older plants generally are much less affected by tobacco smoke than seedlings. A number of specific peculiarities are encountered, however. In *Goldfussia glomerata* lenticel formation is induced; *Syringia vulgaris*, *Rosa*, etc., shed their leaves (spring time) after about two days' exposure to tobacco smoke.

W. G. M.

*Plant Breeding in Scandinavia.* By L. H. Newmann. Published by the Canadian Seed Grower's Association, Canada Building, Ottawa, Canada. Price $1.00 net (cloth $1.50). The plant breeding station of The Swedish Seed Association at Svalöf is now generally recognized as one of the foremost stations in the world for the practical and scientific breeding of the cereals.

Mr. Newmann has recently spent about nine months at Svalöf where he studied the methods of work and examined the various printed and private records of the investigations. This personal experience enables him to perform a distinct service in presenting the work of the station in book form to English reading students.

The main divisions of the volume are as follows: I, Introduction; II, The Swedish Seed Association (general résumé); III, The System of plant improvement at Svalöf and its development; IV, The composition of a race of cereals and its variability; V, Practical application of principles now recognized in cereal breeding at Svalöf; VI, Methods of work in cereal breeding at Svalöf; VII, Summary of work done with different crops and results obtained (wheat, barley, pease, clovers, grasses, and potatoes); VIII, Appendix; IX, Literature cited.

A brief synopsis of the points that are of special interest can be grouped under the following heads:

*Methods and Results*

The method of "*mass selection*" is still used in maintaining purity of sorts, and as preliminary to "line culture" and hybridization.

*Pedigree culture* or *line breeding* on a large scale is a main method. In pure lines there are no *hereditary variations*, and "no correlations between botanical characters and industrial qualities." Value of pure lines determined only by the yielding tests. This sort of line breeding isolates superior biotypes.

*Artificial hybridization.*—An important method in scientific breeding. Importance at Svalöf considered as based on the Mendelian conception of alternative inheritance and the recombination of unit characters. It is followed by careful line breeding of hybrid progeny.

*Variability*

No *progressive* mutations in cereals have appeared at the Svalöf station.

Variations in cereals are largely due to natural hybridization. Aberrant forms in grains are often cases of segregation in the progeny of heterozygotes.

Acclimatization is due to regrouping of factors in a heterozygous population. The stronger combinations survive.

Hereditary variations may be continuous where different combinations of different units are such that gradations in a given character result. Continuous hereditary variations are possible but are considered as based on the chance combination of independent units (or fractions of a unit) which ultimately form a multiple factor.

In regard to the practical and theoretical study of variations, the work with potatoes at Svalöf is proving of special significance as the potato is propagated vegetatively in what is essentially a pure line. In the five years that potato breeding has been in progress "continuous selection of desirable hills and tubers" has resulted in improvement.

In criticism it may be noted that this sort of continuous hereditary variation is not to be explained on the basis mentioned above and suggests that a Mendelian conception of continuous hereditary variations is of doubtful validity. In fact much of the data presented concerning variation not only in the vegetative reproduction of potatoes but in the sexually reproduced cereals suggests that the interpretation in terms of unit factors may be a rather gross analysis.

A. B. S.

Two works have just appeared of interest to taxonomists and some other botanists. The last supplement of *Index Kewensis* brings this indispensable work down to the end of 1910, and includes citations to thousands of species and near species described during the four years that have elapsed since the previous supplement. There are more than two thousand species of *Hieracium* cited, and as to *Crataegus* and other prolific genera an equally astonishing number of new names are listed. A new departure is the failure to italicize what the authors of the work consider untenable names, in the present volume, although they have indicated their preferences in this regard.

A supplement has also been issued by Dr. Carl Christensen, of the *Index Filicum*.

N. T.

## NEWS ITEMS

We quote in part, from the following letter of Dr. E. D. Merrill in regard to the death of Dr. C. B. Robinson, noted in TORREYA for January: "Dr. Robinson was murdered on December 5, 1913, about 8 miles from the town of Amboina by six Mohammedan natives of the island of Boeton. The island of Amboina is entirely pacific, and there has been absolutely nothing to fear from the inhabitants of that island. Dr. Robinson's voluminous progress reports make no mention whatever of any difficulties with the natives, and the idea that harm might result has never been entertained by ourselves in Manila, by Dr. Robinson himself, or by the Dutch officials in Amboina. The coincidence of these six Mohammedans coming from the distant island of Boeton, their meeting with Dr. Robinson on one of his botanical excursions, and his resulting murder were matters that could not be foreseen and could not be guarded against. . . . The results of his work in Amboina will not be lost, for his collections, notes, etc., are intact, and are being forwarded to Buitenzorg, whither I shall probably go to receive and care for them. However, nobody but Dr. Robinson can do justice to the work of correlating the collections with the plants described and figured by Rumph, although his progress reports, very extensive and detailed, probably over 60,000 words, will help to clear up many points." An account of Dr. Robinson's life and work will appear in an early number of the *Bulletin.*

The following new appointments of members of the gardening staff at Kew are quoted in *Nature* from *Kew Bulletin:* Mr. G. S. Crouch, to be assistant director of horticulture in the Egyptian department of agriculture; Mr. T. H. Parsons, to be curator of the Royal Botanic Gardens, Peradeniya, Ceylon, in succession to Mr. H. F. Macmillan, who has been appointed superintendent of horticulture in the department of agriculture, Ceylon; Mr. C. F. Allen, to be curator of the Botanic Garden, Port Darwin, Northern Territory, South Australia, in succession to Mr. N. Holtze, deceased.

At the meeting of the American Phytopathological Society recently held at Atlanta the following officers were elected: *President,* Dr. Haven Metcalf, Washington, D. C.; *Vice-president,* Dr. Frank D. Kern, State College, Pa.; *Counsellor,* Professor H. R. Fulton, West Raleigh, N. C.

Dr. J. C. Arthur and Mr. F. D. Fromme of Purdue University are spending the month of February on a botanical trip to the southwest. They will visit a number of localities in Texas, New Mexico and Arizona where certain species of Uredinales, whose life histories are incompletely known have been previously collected.

Mr. E. H. Wilson, whose recent book on western China was reviewed in TORREYA for January, has gone to Japan for a two years' collecting trip.

# The Torrey Botanical Club

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A monthly journal devoted to general botany, established 1870. Vol. 39 published in 1912, contained 630 pages of text and 45 full-page plates. Price $3.00 per annum. For Europe, 14 shillings. Dulau & Co., 37 Soho Square, London, are, agents for England.

Of former volumes, only 24–37 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–39 three dollars each.

Single copies (30 cents) will be furnished only when not breaking complete volumes.

## (2) MEMOIRS

The MEMOIRS, established 1889, are published at irregulas intervals. Volumes 1–13 are now completed; Nos. 1 and 2 of Vol. 14 have been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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New York City

Vol. 14 March, 1914 No. 3

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BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873

CONTENTS



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NORMAN TAYLOR
Brooklyn Botanic Garden
Brooklyn, N. Y.

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# SOME FOSSIL LEAVES AND THEIR SIGNIFICANCE

By Edwin W. Humphreys

Anything that will shed light, however feeble, upon the life processes of the past in their relation to those of the present is always of interest; hence, when certain abnormal fossil leaves are found which show the same aberrations that living ones of, apparently, the same genus possess, that fact seems to be worthy of record.

In the American Naturalist for 1907,* there are three articles on the development of pinnate leaves as shown by examples of arrested development in mature leaves of living plants. The occurrence of similar forms among fossil leaves and their significance is the subject of this paper.

In Lesquereux's Flora of the Dakota Group† two specimens of fossil *Rhus* leaves (*Rhus Powelliana* Lesq.) are figured, in one of which, reproduced on plate *A*, fig. 1, *a*, the terminal leaflet has reached a stage of development similar to that shown by the terminal leaflet of the living *Rhus glabra* L. (pl. *A*, fig. 1, *b*). The other (pl. *A*, fig. 2, *a*) shows a stage like that of the sumac leaf depicted in pl. *A*, fig. 2, *b*. There is, however, a more advanced stage of development portrayed in the leaf represented in pl. *A*, fig. 1, *a*, for some of the lateral leaflets are lobed; one of them, in fact, showing a distinct leaflet. In this case, the primary leaflets seem to exhibit a tendency to become pinnate, thereby foreshadowing the formation of a bipinnate leaf. Fig. 1, *c* is a drawing of a portion of a leaf of *Rhus glabra* L. showing a similar stage of development.

There is another species of fossil *Rhus*, *R. Uddeni* Lesq. (pl. *A*,

* F. T. Lewis, Am. Nat. **41**: 431, 701, 817. 1907.

† Mon. U. S. Geol. Survey **17**: 155. *pl. 56, figs. 4–5.* 1892.

[No. 2, Vol. 14, of Torreya, comprising pp. 21–38, was issued 9 February, 1914]

fig. 3), from the Dakota Group* which shows a lobed terminal leaflet. This species has a petiole that is partly winged, suggesting *Rhus copallina* L.

Thus, there would seem to be two species of fossil *Rhus* leaves whose method of development was similar to that of the living *Rhus glabra* L. and *Rhus copallina* L. and, therefore, basifugal.

Another species which presents an interesting example of arrested leaf development is *Negundo triloba* Newb.† (pl. *A*, fig. 4, *a*) from the Fort Union Group. This leaf has a lobed terminal leaflet that is almost wholly split off, suggesting a basifugal tendency such as can be found in the living *Acer Negundo* (pl. *A*, fig. 4, *b*).

In the same work (pl. 30, fig. 2) a specimen of the fossil species *Sapindus membranaceus* Newb., is figured, which shows a lateral leaflet completely split from the terminal one (pl. *B*, fig. 1, *a*). An investigation of the specimens of *Sapindus* in the herbarium of the New York Botanical Garden revealed some leaves of *Sapindus saponaria* L. in which the terminal leaflet had split to form a new lateral (pl. *B*, fig. 1, *b*). Here again is a case of a living form and a fossil form of apparently the same genus developing their leaves in the same way.

In Fontaine's Potomac or Younger Mesozoic Flora‡ several leaves are figured whose affinity to *Sapindus* is indicated by the generic name *Sapindopsis*. Certain leaves of this genus, belonging to two different species (*S. variabilis* Font. and *S. magnifolia* Font.) exhibit lobed terminals in various stages of development (see pl. *B*, figs. 2, *a* and 2, *b*). In fact, a short though incomplete series of the figured leaves of *Sapindopsis variabilis* Font. might be arranged to show the successive steps in the formation of the lateral leaflets from the terminal leaflet.

A further search of paleobotanical literature and of duplicate specimens of fossil plants would doubtless disclose many other interesting examples.

* Mon. U. S. Geol. Survey **17**: 154. *pl. 57, fig. 2.* 1892.

† Newberry, Mon. U. S. Geol. Survey **35**: 115. *pl. 31, fig. 5.* 1898.

‡ Mon. U. S. Geol. Survey, **15**: 297, *pl. 151, figs. 2, 3; pl. 152, figs. 2, 3; pl. 153, fig. 2; pl. 154, figs. 1, 5; pl. 155, fig. 6:* 298, *pl. 151, fig. 1; pl. 152, figs. 1–4; pl. 153, fig. 3; pl. 154, figs. 2–4; pl. 155, figs. 2–5.* 1889.

It had been hoped that similarity in development might serve as an aid in the identification of fossil leaves of the forms discussed. That is to say, if the fossil pinnate leaf did not develop in a manner similar to its nearest living relative, it would furnish a warning to review the identification. Goebel,* however, states that ". . . the course of development in nearly allied plants varies, for example, in pinnate leaves it is sometimes acropetal and sometimes basipetal." It is, however, suggestive that in two of the cases here noted, *Negundo* and *Sapindus*, the lobing of the terminal leaflet was first noticed in the fossil species and that this resulted in a successful search for similar examples among the related living forms.

The unsymmetrical outline of certain terminal leaflets from which a lobe has split, such as is well shown in the terminal leaflet on pl. *B*, fig. 1, *a*, does, however, offer a suggestion to those engaged in identifying fossil leaves. Should such a fossil leaflet, minus its lobe, be preserved alone, the tendency would likely be to regard it as a simple leaf, rather than as a leaflet of a compound leaf. Hence, in endeavoring to determine the probable relationship of any such unsymmetrical leaf, it might be advisable to consider whether or not it could be a leaflet of a compound leaf.

Briefly then the leaves under discussion show: (1) that like forms of leaves, of arrested development, occur in certain species of living and fossil plants of the same genus; (2) that these forms indicate that similar methods of leaf development took place in each of them; (3) that if "nearly allied" plants may develop their leaves in different ways, it follows that the mode of development is of questionable value to paleobotanists in identifying forms of arrested development among fossil pinnate leaves; (4) that in identifying simple fossil leaves of the form of the terminal shown on pl. *B*, fig. 1, *a*, if the lobe were not preserved, it might be advisable to view it as a possible leaflet of a pinnate leaf.

* Organography of Plants, authorized English edition, pt. 2, p. 330. 1905.

### Explanation of Plates

*Plate A*

*Fig. 1a.* *Rhus Powelliana* Lesq. showing lobed terminal leaflet, and on the right a lobed lateral. On the left is a lateral from which has split a secondary leaflet.

*Fig. 1b.* *Rhus glabra* L. showing lobed terminal leaflet similar to that shown in fig. *1a.*

*Fig. 1c.* Two lateral leaflets of *Rhus glabra* L. On the left a secondary lateral is shown, on the right a lobed lateral.

*Fig. 2a.* *Rhus Powelliana* Lesq. showing lobed terminal.

*Fig. 2b.* *Rhus glabra* L. showing terminal leaflet like that in *fig. 2a.*

*Fig. 3.* *Rhus Uddeni* Lesq. showing lobed terminal leaflet.

*Fig. 4a.* *Negundo triloba* Newb. showing a terminal leaflet lobed on the left side.

*Fig. 4c.* *Acer Negundo* L. showing lobe similar to that in fig. *4a.*

*Plate B*

*Fig. 1a.* *Sapindus membranaceus* Newb. showing lateral leaflet split from terminal leaflet.

*Fig. 1b.* *Sapindus saponaria* L. showing terminal leaflet from which a lateral leaflet has split.

*Fig. 2a.* *Sapindopsis variabilis* Font. showing lobed terminal leaflet.

*Fig. 2b.* *Sapindopsis magnifolia* Font. showing lateral leaflet split from terminal.

## 1913 NOTES ON THE FLORA OF COPAKE FALLS, N. Y.

By Sereno Stetson

The growing season at Copake during the past year came fully up to expectations. On account of the comparatively little snow that fell during the winter months (1912–13) some concern was felt for the spring flora, but a visit on April 22 allayed all fears in that direction. There was a profusion of young growth and *Tussilago Farfara* L., *Trillium erectum* L., *Sanguinaria canadensis* L. with numerous representatives of *Viola* were flowering in large numbers, and there was no sign of the herbage in general having suffered from the failure of the snow blanket.

The next visit covered May 17 and 18 and furnished several surprises. While working the western slopes of Cedar mountain

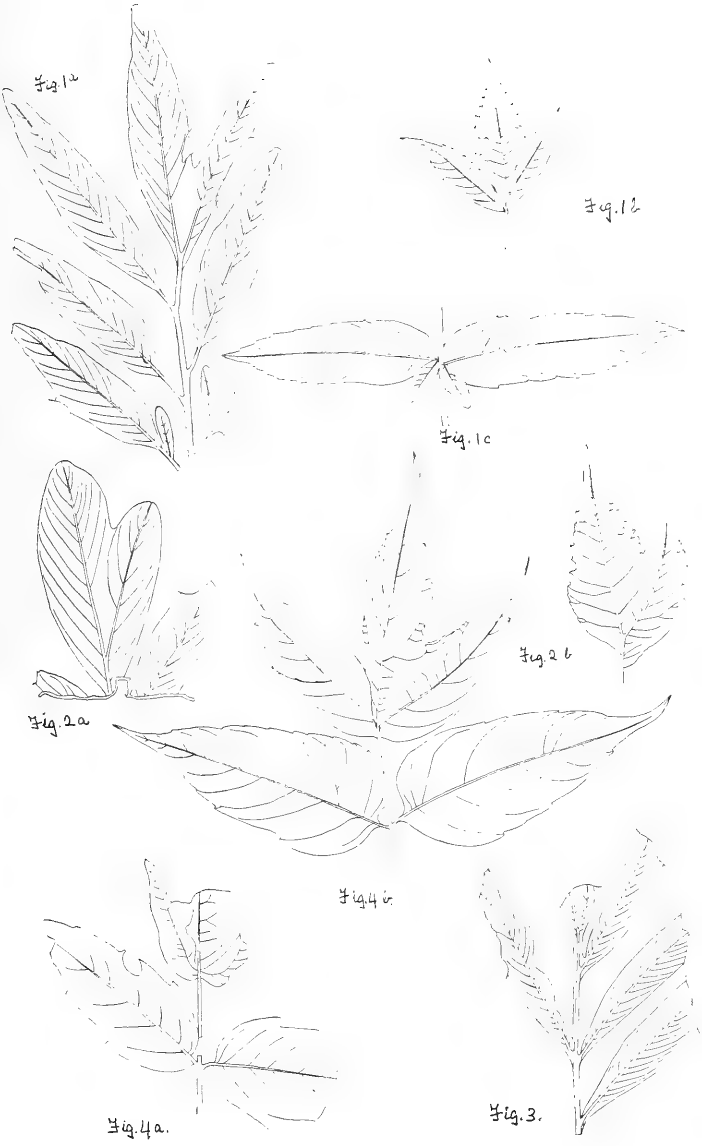


*Plate A.* See explanation, page 42.

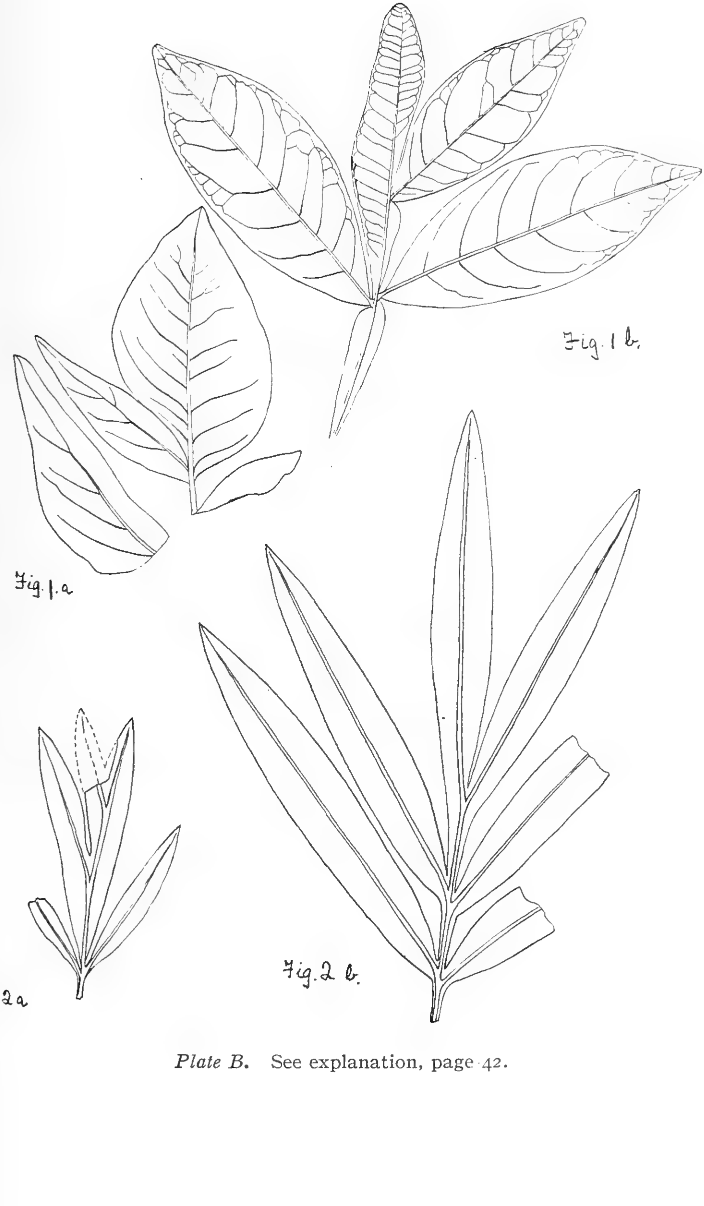


*Plate B.* See explanation, page 42.

at an altitude of 1,300 feet a large colony of *Cypripedium parviflorum* var. *pubescens* (Willd.) Knight was discovered. A rough estimate would place their number at sixty and in the course of scouting the area the surrounding deciduous woods were found to contain numerous scattered plants of *Cypripedium acaule* Ait. These stations are entirely new and are not the ones referred to in Torreya **13**: 126. The inaccessibility of the location nodoubt accounts for their uninterrupted propagation.

Descending by way of the ravine through which runs Cedar brook a search was made for a colony of *Trientalis americana* (Pers.) Pursh which had been noted some years before. It was found growing in profusion, stretching up and down the brook on either side for a considerable distance. *Polygala paucifolia* Willd. was also present in great numbers, and was somewhat of a surprise as it has never been known on this side of Bash-Bish brook.

Dr. B. O. Dodge, of Columbia University, who was present on this occasion, reports having collected numerous interesting specimens of fungi.

The following day was spent in the swamps to the west of the railroad. *Iris versicolor* L. was in full bloom and fairly covered the semi-dry portions, and the remains of *Menyanthes trifoliata* L., long gone to seed, were visible everywhere. Large, beautiful specimens of *Lupinus perennis* L. grew along the railroad and a dry ridge, near by, was literally yellow with dwarfed specimens of *Krigia virginica* (L.) Willd., the tallest measuring only 3 cm. in height.

The final visit for the year commenced on August 19 and continued until September 7. This is undoubtedly the most interesting season of the year at this place and furnishes the greatest number of plants to the botanical student.

The accompanying photograph of *Gentiana quinquefolia* L., was taken September 5 while exploring the wooded slopes of Cedar mountain and attracted the writer's attention on account of its unusual leaf arrangement. It will be noticed that they are borne in whorls of three throughout the plant. There is no mention in any of our manuals of any species of Gentianaceæ growing in this climate whose leaves are anything but opposite and a thorough search of the herbaria of both the New York Botanical Garden and the Brooklyn Botanic Garden failed to

FIG. 1. Unusual leaf arrangement in *Gentiana quinquefolia* L. Copake Falls, N. Y.

reveal another specimen of similar phyllotaxy. The writer would be glad to hear from anyone knowing of another case.

A trip made on the western slopes of Bash-Bish mountain September 3 brought to light four plants which had not been noted in this region before. Soon after the start the red berry-like annular disk of the American yew, *Taxus canadensis* Marsh, was noted. These increased in number at the higher altitudes, occurring in depressions or very damp shaded spots. In a large stand of deciduous trees a number of specimens of *Habenaria hyperborea* (L.) R. Br. were collected. One of these is an especially beautiful specimen, very tall and straight, with about thirty-five blossoms on it. A surprise was furnished in finding *Hypericum punctatum* Lam. in a damp, shady situation. *H. perforatum* L. is very common throughout this region but of the many times in years gone by that a search had been made for *H. punctatum* it has never been located in this vicinity until now. In the descent a number of specimens of *Aster acuminatus* Michx. were picked up, growing among some dense, wet underbrush alongside a "trickle." These are apparently confined to this mountain as a search of the woods north of Bash-Bish brook failed to disclose another specimen.

In closing it would be well to correct an error in Mr. S. H. Burnham's Supplementary List of the Plants of Copake Falls, N. Y., published in TORREYA for September, 1913. The legend attached to my photograph in Torreya **13**: 127 is correct. Lookout Rock is in Massachusetts and next the state line. The view is directly west toward the Hudson River and shows the "Gap" referred to for its entire distance in New York State. Sunset Rock is a very different spot situate on a high promontory directly overlooking the valley shown in the distance and about two miles due northwest of Lookout Rock.

NEW YORK

## TWO BRITISH COLUMBIA NOTES

BY J. K. HENRY

### RHODODENDRON ALBIFLORUM Hook.

The flowers of this beautiful shrub are always described as white. My specimens from the Selkirks and the Coast Range, B. C., and Mt. Ranier, Wash., are white. One day last summer, however, on a mountain side at Roger's Pass in the Selkirks, I found one plant on which the three anterior petals had a few yellow dots towards the base of the segments. On the mountains opposite Vancouver City this form is common, but the spots are orange. I therefore propose—

*R. albiflorum* Hook. forma **poikilon** f. n.

The three anterior petals spotted towards the base with yellow or orange.

SOME COROLLA FORMS OF CAMPANULA ROTUNDIFOLIA L.

At Field in the Rockies, and at Revelstoke in the Selkirks many forms of this species occur. The variations in the corolla at once attract even the casual observer. Forms with funnel-shaped corollas (*C. dubia* A. DC.) grow side by side with the forms characterized by the round base. Ordinarily there is no difficulty in distinguishing the plants. A striking white-flowered form of *C. dubia* was observed at Revelstoke. Miss Farr, in her catalogue for this region, based in part on Macoun's Catalog of Canadian Plants, mentions only *C. petiolata* and *C. rotundifolia*. There is also a form at Field with campanulate corollas broader than long—20–23 mm. broad, 14–16 mm. long; but I have seen too few plants to form an opinion as to the validity of the form. The funnel-form corollas are also sometimes as broad as long, or even broader.

VANCOUVER

## REVIEWS

### Steven's Fungi which Cause Plant Disease *

As stated in the preface, this volume is intended to introduce to the student the more important cryptogamic parasites affecting economic plants in the United States, with sufficient keys and descriptions to enable the student to identify them. The book is in fact rather unique in respect to these keys, and is apparently intended to be supplemented by the author's Diseases of Economic Plants or by other available books on plant pathology, since in the volume before us but little cognizance is taken of the pathological effects on the host or remedial measures.

The readily available keys should undoubtedly prove exceedingly useful to students of plant diseases. Of perhaps even

* F. L. Stevens. The Fungi which Cause Plant Disease. Pp. vii–ix + 1–754 *f. 1–449*. The Macmillan Company. New York. 1913. Price, $4.00.

greater value to plant pathologists are the voluminous citations and bibliographies, together with the abundant illustrations, which include at least one for each genus of importance in the United States.

With the present vigorous prosecution of the study of plant diseases, it is obviously inevitable that a book of this nature should be out of date in some subjects the moment it leaves the hand of the printer. But this hardly excuses the utter disregard in a few places of researches of a number of years' standing, such as those on *Monascus*, and those on *Puccinia graminis* by Pritchard. It is, further, very unfortunate that poor proof-reading should mar the text in other places, such, for instance, as on p. 80, where the past tense is used instead of the present; on p. 112, "Bot. Gaz." for bot. Ges.; on p. 142, "conidial" instead of conical; on p. 143, "unknown on," apparently for known only on; on p. 391, "Key to species," instead of Key to assignment of species. On p. 366 is shown a rare instance of poor selection of illustration. Each cell of the teleutospore should obviously have but one basidium. A few of the illustrations might be made more effective if labelled more clearly; such, for example, as figs. 77, 100, 173, 174, 249, 383 and 662.

These defects fortunately detract but little from the great value and usefulness of the book, and there can be no doubt of its hearty welcome by plant pathologists.

E. W. Olive

**Harper's Report on Forests of Alabama***

This is an exceptionally valuable report since it not only contains a vast amount of information about the forests of Alabama but has it classified and arranged according to geographical divisions of the state. This method has very decided advantages over general descriptions, though it requires an extensive and detailed knowledge of local conditions to be followed satisfactorily.

* Harper, Roland M. Economic Botany of Alabama. Part I: Geographical Report, Including Descriptions of the Natural Divisions of the State, their Forests and Forest Industries, with Quantitative Analyses and Statistical Tables, Monograph 8, Geological Survey of Alabama, University, Alabama. June, 1913. Pp. 228; map and 63 half-tones.

In this report fifteen main divisions are recognized and some of them are subdivided into two or three. The divisions fall naturally into two classes, namely, the hill country or mineral region covering about two fifths of the state, and the coastal plain region. The latter is poor in minerals, water power, and mountain scenery, but rich in agricultural and timber resources. The line between them is called the "fall line," because most of the rivers which cross it have falls there.

The regions comprising the hill country are: (1) Tennessee valley; (2) coal region, northern and southern portions; (3) Coosa Valley; (4) Blue Ridge; (5) Piedmont. Those comprising the coastal plain group are: (6) central pine belt; (7) black belt; (8) Chunnennuggee Ridge; (9) post oak flatwoods; (10) southern red hills; (11) lime hills; (12) limesink region; (13) southwestern pine hills; (14) Mobile delta; (15) coast strip.

In describing each geographical division the same general plan is followed, though the amount of space devoted to each varies with the character of the country. The main headings are: Location, area, and external relations; references to previous literature; geology and soils; topography and hydrography; climate; forest types; fire; list of trees (with relative abundance and habitat of each); economic aspects, such as density of population, relative area of forests and clearings, status of stock laws, changes in relative abundance of certain species, principal forest products and wood-using industries. The location and boundaries of the different divisions and subdivisions are shown on a map. The text is supplemented by sixty-three half-tone illustrations from original photographs. An excellent bibliography of Alabama geography is included.

The author has decided views concerning the effect of fires on longleaf pine, and, as they are somewhat at variance with ideas held by foresters generally (based on experience with other types of forest), it may prove of interest to quote him. Among other things he says:

"In general the effect of fire in a forest is to keep down underbrush and trees with thin bark or low branches, and thus favor the growth of trees with thick bark and clear trunks, such as most of the pines. It also returns quickly to the soil the potash and other mineral substances accumulated in fallen leaves, but drives off the inorganic matter which would otherwise make the soil more nitrogenous. It may destroy some insects which would otherwise injure the trees. . . . (It) does very little harm to the longleaf pine after that reaches the age of four or five years.

"It can be safely asserted that there is not and never has been a longleaf pine forest . . . which did not show evidences of fire, such as charred bark near the bases of the trees; and furthermore, that if it were possible to prevent forest fires absolutely the longleaf pine—our most useful tree—would soon become extinct. For where the herbage has not been burned most of the pine seeds lodge in the grass and fail to germinate, and if the oaks and other hardwoods were allowed to grow densely they would prevent the growth of the pine, which cannot stand much shade, especially when young.

"At the present time most of the fires in the pine woods are set purposely, to burn off the dead grass and improve the grazing. This practice has been repeatedly denounced by persons who have spent most of their lives outside of longleaf pine regions, but really the only just criticism of it that can be made is that it is done too often."

There are two other parts of this report contemplated: "Part II, a catalogue of the trees and shrubs, with their distribution and economic properties; Part III, the medicinal plants, the weeds and useful or noxious plants not included in the preceding parts."

SAMUEL J. RECORD

YALE FOREST SCHOOL

## PROCEEDINGS OF THE CLUB

### DECEMBER 9, 1913

The first regular meeting for the month of December was held on the ninth at the Museum of Natural History at 8:15 P.M. President Burgess presided. Sixteen persons were present. The minutes of November 26 were read and approved.

The announced program for the evening was an illustrated lecture by Dr. M. T. Cook on "Peach Yellows and Methods of their Control." Professor Cook briefly traced the history of the disease from the earliest times to the present. He showed that whereas the problem was formerly considered a trivial matter it is now recognized as one of the most profound subjects which presents itself to the plant pathologist. The peach yellows and a closely related disease, little peach, are of considerable menace to the peach growing industry in the east. This is due to the fact that these diseases cannot be detected in their earlier stages and consequently nurserymen and growers are continually propagating by budding from infected stock.

A most peculiar phenomenon is the appearance of the external morphological symptoms of peach yellows in trees that have been injured, girdled, or neglected. The leaves become leathery, curl, and usually fold at the midrib. The blossoms appear earlier and likewise the fruit. The infected peach is generally speckled and insipid. The one character which enables the horticulturalist to make certain the presence of peach yellows is the witches-broom effect of the twigs in winter. This character is absent from trees suffering from injury or little peach disease.

At present there is no cure for peach yellows or little peach, and the only remedial measures taken to prevent the spread of the diseases are quarantine, and the destruction of infected trees. Dr. Cook hopes that within a short time he will be able to give the nurserymen and growers simple tests for detecting the diseases in their earlier stages.

Meeting adjourned.

MICHAEL LEVINE,
*Secretary pro tem.*

## NEWS ITEMS

Dr. Britton, accompanied by Mrs. Britton, Mr. John F. Cowell, Director of the Buffalo Botanical Garden and Mr. Frank E. Lutz of the American Museum of Natural History, sailed for Porto Rico on February 7 to continue studies of the botany and zoölogy of that island in coöperation with the New York Academy of Sciences. The party will make Mayagüez a base of operations for explorations in western Porto Rico, and the islands of the Mona Passage, planning to return to New York about March 16.

An American Botanical Exchange Bureau has been started by Mr. G. L. Fisher, 901 Pease Avenue, Houston, Texas. It serves a very useful purpose as a medium of exchange for herbarium specimens of American and foreign plants. Further information may be had from Mr. Fisher.

Dr. C. A. Schenck, who founded the Biltmore Forest School in 1898 and has been in charge of it ever since, announces the discontinuance of the school and his appointment to a position in the government forest service in Germany.

Yale University has just completed a new laboratory of botany and zoölogy. The building is an imposing structure of brown sandstone, erected at a cost of about five hundred thousand dollars, and has been named after the donor, Mrs. C. J. Osborn. It is constructed in the shape of an L, one wing being devoted to botany, the other to zoölogy. The botanical wing, three stories in height above the basement, contains eight large laboratories, a smaller laboratory for graduate students, a small lecture hall, numerous private rooms, rooms for mycological and photographic work, and a capacious herbarium and museum room. In the angle between the two wings is a large auditorium with a seating capacity of three hundred. It is expected that in the near future a plant house with facilities for experimental work will be added.

Dr. Lazarus Schöney, for some time a member of the Club, died at Coney Island on February 18. He was a Fellow of the New York Academy of Sciences and a member of numerous other scientific bodies. He was born at Budapest, October 18, 1838.

Professor W. W. Bailey, for many years the head of the department of botany at Brown University, died at Providence, R. I., on February 20. The *Evening Post* writes, in part, as follows: "Professor Bailey was the son of Prof. Jacob Whitman and Maria Slaughter Bailey. He entered Brown University in 1860, and in 1862 became a private in the Tenth Rhode Island Volunteers. He returned to Brown and was graduated in 1864. He received the degree of Ph.B. in 1873, that of A.M. in 1893 from that university. He studied botany at Columbia in 1872 and at Harvard Summer School in 1875, 1876, and 1879. In 1866 he was an assistant in chemistry at the Massachusetts Institute of Technology, and from 1867–68 he was the botanist of the United States geological survey of the fortieth parallel. During the latter year he became Deputy Secretary of the State of Rhode Island, and from 1869–71 he served as assistant librarian of the Providence Athenæum. He taught botany in private schools in Providence, and in 1877 he became an instructor at Brown. From 1881–1906 he served as professor of botany at the same university, and since the latter date he has been professor emeritus. Professor Bailey was a member of the second board of visitors to the United States Military Academy in 1896, and in 1902 a delegate to the centennial of the United States Military Academy. He was a director of the Providence Athenæum, 1900–3; a member of the International Society of Botanists, the New England Botanical Club, the Rhode Island Horticultural Society, the Boston and Newport Societies of Natural History, the Torrey Botanical Club, the New York Microscopical Society, Phi Beta Kappa, having been president of the Rhode Island Alpha, 1903–5, Sigma Xi, president of Brown chapter, 1903–4. He was also a member of the G. A. R., the Sons of the Revolution, the Society of American Wars, the Council of the Agassiz Association, and an honorary member of the Rhode Island Medical Society." Professor Bailey was born at West Point, N. Y., on February 22, 1843. He was the author of many books and articles.

The "second circular" of the Fourth International Botanical Congress, to be held in London in 1915, has appeared. It is taken up by a discussion of the nomenclature questions to be brought up at the Congress. Among these are to fix the starting point for the nomenclature of Schizomycetes, Schizophyceae (excepting Nostocaceae), Flagellatae and Bacillariaceae; and the compilation of lists of "genera conservanda" for fungi, lichens, Bryophyta, and of a double list of such genera for paleobotanists. After bewailing the fact that nomenclature has occupied most of the attention of the congresses since the Paris meeting in 1900, the incorrigibly optimistic committee close their circular thus: "It is highly desirable from all points of view that this work should be completed in London in 1915, and should cease to occupy the International Botanical Congresses. We therefore urgently beg botanists in general, and cryptogamists and palaeobotanists in particular, to examine carefully these points which still require consideration, and to formulate their propositions in such a manner that nothing may be left over for 1920." Further information may be had from Dr. A. B. Rendle, British Museum, Cromwell Road, London, S. W. The Rapporteur Général is Dr. J. Briquet, Director of the Botanical Garden at Geneva.

We learn from *Science* that The Mendelian Society of Vienna has celebrated the thirtieth anniversary of Mendel's death by opening a new institute devoted to research in heredity.

Dr. E. East, of the Bussey Institution, Harvard University, delivered a lecture at the Academy of Music, Brooklyn, on Saturday, February 28, on "The evolution of the modern ear of corn."

According to the *Evening Post* Miss Edna Dwinel Stoddard has been promoted from instructor to assistant professor of botany at Smith College.

We learn from *Science* that Dr. Ludwig Diels, of Marburg, has been appointed associate professor of botany in the University of Berlin, and assistant director of the Botanical Garden and Museum.

# The Torrey Botanical Club

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# OTHER PUBLICATIONS

OF THE

# TORREY BOTANICAL CLUB

## (1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 40 published in 1913, contained 712 pages of text and 26 full-page plates. Price $3.00 per annum. For Europe, 14 shillings. Dulau & Co., 37 Soho Square, London, are, agents for England.

Of former volumes, only 24–40 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–40 three dollars each.

Single copies (30 cents) will be furnished only when not breaking complete volumes.

## (2) MEMOIRS

The MEMOIRS, established 1889, are published at irregulas intervals. Volumes 1–13 are now completed; Nos. 1 and 2 of Vol. 14 have been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

DR. BERNARD O. DODGE
Columbia University
New York City

Vol. 14 April, 1914 No. 4

# TORREYA

A Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873

## CONTENTS



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NORMAN TAYLOR
Brooklyn Botanic Garden
Brooklyn, N. Y.

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April, 1914.

Vol. 14 No. 4



## THE INTERNATIONAL PHYTOGEOGRAPHIC EXCURSION IN AMERICA*

By George E. Nichols

During the summer of 1913 it was the privilege of the writer to participate in the International Phytogeographic Excursion in America. This excursion was organized and conducted by Professor H. C. Cowles, of Chicago, to whom too much credit cannot be given for his careful planning and efficient leadership. The personnel of the party included ten Europeans and seven Americans. The foreign members were Professor Adolf Engler, of Berlin; Professor C. von Tubeuf, of Munich; Professor C. Schröter, Dr. E. Rübel, and Dr. and Mrs. H. Brockmann-Jerosch, of Zurich; Mr. and Mrs. A. G. Tansley, of Cambridge; Dr. O. Paulsen, of Copenhagen; and Professor T. J. Stomps, of Amsterdam. The American members, besides Professor Cowles and the writer, were Professor and Mrs. F. E. Clements, of Minneapolis; Professor and Mrs. A. Dachnowski, of Columbus; and Dr. G. D. Fuller, of Chicago. The excursion was joined by other American botanists in various parts of the country, and some of these accompanied the party for one or two weeks. Altogether the excursion was participated in by nearly two hundred. The expedition left New York, westward bound, on July 30, and the route traveled during the succeeding ten weeks is indicated on the map (fig. 1.) A short account of the trip is here given, together with some reference to the more salient features of the vegetation encountered.† Attention is confined chiefly to the botanical side of the excursion, but it need hardly be remarked that the hospitable reception accorded the party

* Contribution from the Osborn Botanical Laboratory.

† A more detailed account is being published by Tansley in the *New Phytologist.*

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all along the route, and particularly the enthusiastic coöperation of botanists in the various regions visited, contributed very materially to the success and enjoyment of the trip.

Although the excursion was formally organized at Chicago, before leaving the east a number of short trips were taken to localities of botanical interest in the vicinity of New York.

FIG. 1. Map showing route followed by I. P. E. in the United States.

An afternoon was spent near Hempstead, Long Island, where the principal attraction was the peculiar natural prairie described by Harper.* To the Europeans, however, the sandy swamps proved equally entertaining. A two-day jaunt into southern New Jersey afforded an opportunity to study the extensive salt marshes about Barnegat and the pine barren flora in the neighborhood of Warren Grove. In this latter locality the three types of vegetation so characteristic of the barrens are well represented, viz: the forests of *Pinus rigida*, *Quercus marilandica*, etc., the pigmy forests of the' 'plains"—the home of *Corema Conradii*, and and the cedar (*Chamæcyparis thyoides*) swamps with their unique assemblage of rare plants.† A half day each was devoted to the

* Harper, R. M. The Hempstead Plains of Long Island. Torreya **12**: 277–286. *fig.* 1–7. 1912.

† For further description, see Stone, W. The plants of southern New Jersey, with especial reference to the flora of the pine barrens. Ann. Rept. New Jersey State Mus. **1910**: 25–828. *pl.* 1–129 + *fig.* 1–5 + map.

Brooklyn Botanic Garden and the New York Botanical Garden. The beautiful hemlock grove in the Bronx Garden gave the visitors their first glimpse of the climax forest of the east.

Except for a stop at Niagara Falls the journey to Chicago was uneventful. Chicago lies in the transition area between the forested region of the east and the prairie region of the middle west, and the distribution here of forest and prairie is influenced largely by edaphic factors. On the uplands forests occupy the glacial moraines and the beaches of the former Lake Chicago; the rest of the country is grassland.* During the week here visits were made to prairies and oak-hickory (*Quercus* sp., *Hicoria* sp.) forests near the city, to clay bluffs and ravines along the lake north of the city, to a tamarack (*Larix laricina*) swamp in northern Indiana, and to a magnificent tract of virgin beech-maple (*Fagus grandifolia, Acer Saccharum*) forest in southern Michigan—a forest much like those of southern New England in its general aspect, but of a more mesophytic type than those west of Lake Michigan. The real drawing card in this region, however, is the sand-dunes which fringe almost uninterruptedly the eastern margin of Lake Michigan, continuing around the southern end of the lake and along the western shore as far as Chicago. Two entire days were devoted to the study of this fascinating area, whose vegetation has been so graphically portrayed by Cowles.†

The excursionists left Chicago on the evening of August 8, and arrived in Lincoln, Nebraska, on the following morning. The country about Lincoln is one of rolling prairies with tortuous lines of trees fringing the streams. These stream forests, best developed on the flood plains, represent the westernmost extensions of the deciduous forests of the east. Once the eastern botanist, westward-bound, has left these behind, he has severed, so to speak, the last familiar tie. The prairies themselves in their midsummer aspect are depressing. A hasty survey of the region

* For further discussion see Cowles, H. C. The physiographic ecology of Chicago and vicinity. Bot. Gaz. **31**: 78–108, 145–182. 1901.

† Cowles, H. C. The ecological relations of the vegetation on the sand dunes of Lake Michigan. Bot. Gaz. **27**: 95–117; 167–202, 281–308; 361–391. *fig. 1–162.* 1899.

about Lincoln was made in automobiles, but lack of time and intense heat precluded anything resembling careful study.

That evening the party continued the journey, stopping next at Akron, Colorado, 400 miles west of Lincoln. Akron lies in the midst of the Great Plains. North and south, east and west, as far as the eye can reach, stretches a vast, featureless expanse of grassland. Two most interesting days were spent here. The first of these was occupied by an eighty-mile automobile ride across the plains, to and from the sand hills, with frequent stops. The second day was spent about the United States Dry Land Experiment Station. The prevalent type of vegetation on the plains proper, as contrasted with the sand hills, consists largely of various species of *Bouteloua*, *Buchloë*, and *Aristida*, and is commonly spoken of as short-grass. The short-grass associations, together with those characteristic of the sand hills, have been fully discussed by Shantz.*

Two days were next occupied along the eastern border of the Rocky Mountains—at Palmer Lake and near Colorado City—studying the vegetation of the tension zone between forest toward the west and grassland toward the east. In the invasion of grassland by forest the advance guard is usually a thicket in which *Quercus Gunnisonii* commonly is dominant. The thicket stage may be followed by *Pinus edulis* and *Juniperus scopulorum*, but more often, as in the Garden of the Gods, the two stages are telescoped. On the ridges and hills the pinyon and juniper in many places are becoming supplanted by *Pinus ponderosa scopulorum*.

Eight days were devoted to the exploration of the region about Pikes Peak, headquarters during this period being at Minnehaha-on-Ruxton, about halfway up the cog railway to the summit of the peak. Although in certain respects not typical of the area as a whole, this region gives one a very fair conception of the general nature of the forests of the Rocky Mountains, and of the way in which vegetation here is modified as a result of differences in exposure and altitude. The climax forest in the

* Shantz, H. L. Natural vegetation as an indicator of the capabilities of land for crop production in the Great Plains area. U. S. Dept. Agr. Bureau of Plant Industry Bull. 201. 1911.

vicinity of Minnehaha (altitude 8,000 feet) consists principally of *Pseudotsuga taxifolia* and *Picea Engelmanni*. The former predominates at lower, the latter at higher elevations. Such forests may become quite mesophytic and are best developed on

FIG. 2. I. P. E. on dunes at Sawyer, Michigan. From left to right: (standing) Dr. Brockmann-Jerosch, Dr. E. N. Transeau, Professor H. C. Cowles, Professor O. W. Caldwell, Mr. A. G. Tansley, Dr. O. Paulsen, Mrs. A. G. Tansley, Professor C. Schröter, Professor A. Dachnowski, Professor J. M. Coulter, Mrs. H. Brockmann-Jerosch, Professor T. J. Stomps, Professor C. von Tubeuf; (seated) Dr. G. D. Fuller, Dr. E. Rübel. Top branches of dune-buried oaks in background.

north slopes. South slopes, on the other hand, are usually covered with a more xerophytic, open type of forest in which *Pinus ponderosa scopulorum* and *Pinus flexilis* are the characteristic trees. Gravel slides in all stages of forestation are a prominent feature in the neighborhood of Minnehaha.* The day selected for the ascent of Pikes Peak was cold, wet and disagreeable,

* See Schneider, E. C. The distribution of woody plants in the Pikes Peak region. Colorado Coll. Publ., Science Ser. **12**: 137–170. *Map*. 1909. Also the succession of plant life on the gravel slides in the vicinity of Pikes Peak, *loc. cit.*, **12**: 289–311. *fig. 1–6*. 1911.

and the top of the mountain was covered with snow. Much more interesting from a botanical standpoint was the excursion up Mount Garfield (altitude 12,365 feet), for which two days were set aside. Engelmann spruce continues as the dominant tree up to an elevation of about 11,300 feet, where it gives way to *Pinus aristata*, the characteristic timber-line tree. "Krummholz" forms of both these trees are common in certain localities. On Mount Garfield, as on other peaks of sufficient elevation, timber-line as a rule is sharply defined, and the alpine vegetation of the rocky meadows above is in marked contrast to that of the forests below. The alpine gravel-slides with their curious growth of "cushion-plants" are especially unique.

The next stopping-place, after leaving Minnehaha, was Salt Lake City, Utah, where parts of two days were spent examining tracts of vegetation in the proximity of Great Salt Lake. As might be anticipated, the natural vegetation of this desert country is not very diversified. Sage-brush (*Artemisia tridentata*) dominates nearly everywhere on the fresher soils, while alkaline soils are populated by species of *Sarcobatus*, *Kochia*, *Atriplex*, and various herbaceous halophytes.*

The journey from Salt Lake City to Tacoma, Washington, was broken by a brief stop at North Yakima, Washington, to note the marvelous results that have been achieved in this territory by irrigation. Of the six days allowed for western Washington, the five spent in the vicinity of Mount Rainier to the writer represent the most enjoyable part of the entire trip. Two days were devoted to forests in the neighborhood of Kapowsin and the National Park Inn, and two more were spent about Camp of the Clouds. Nowhere in the world is there found a more magnificent display of coniferous forest than here in the Pacific Northwest. The most characteristic tree of the humid forests along the western slopes of Mount Rainier, and of the lowlands of Washington, is *Pseudotsuga taxifolia*, which here attains enormous dimensions. Associated with this as im-

* For detailed description of the region visited see Kearney, T. H., Briggs, J. L., Shantz, H. L., McLane, J. W. and Piemeisel, R. L. Indicate significance of vegetation in Tooele Valley, Utah. Jour. Agr. Research 1: 365–417. *pl. 43–48* + *fig. 1–13* + *map.* 1914.

portant constituents of the forest are *Tsuga heterophylla* and *Thuja plicata.* Among the most conspicuous shrubs in the rank, luxuriant undergrowth are *Echinopanax horridum, Acer circinatum,* and *Gaultheria Shallon.* Seedlings of various trees germinate everywhere on fallen logs; there is a wealth of ferns; while rocks, ground, logs, and trees are covered with mosses.

The ecological resemblance between this forest and certain forests in the east, *e. g.*, those of northwestern Connecticut, is striking. Not only is there a similarity in their general aspect, in the mesophytic nature of the undergrowth, etc., but the likeness is further emphasized when a detailed analysis of the flora of the two is made. To be sure, the Douglas spruce is lacking in the east, beech and chestnut in the west, but hemlock is present in both places. *Betula lutea* is absent from the western forest, but *Alnus oregana* may be considered its ecological equivalent. The eastern *Acer pennsylvanicum* finds its counterpart in the western *A. circinatum; Taxus canadensis* of the east easily corresponds to *T. brevifolia* of the west, *Cornus Florida* to *C. Nuttallii;* and so on. Moreover, many herbaceous species are common to both, *e. g. Lycopodium lucidulum, Cornus canadensis, Linnaea borealis,* and *Chimaphila umbellata,* while the species of *Clintonia, Trillium, Maianthemum, Tiarella, Oxalis,* and other genera characteristic of the eastern forest are closely paralleled by very similar species here in this western forest.

Proceeding upward from National Park Inn there is a gradual change in the composition of the forest, until at an elevation of 4,500 feet it consists largely of *Tsuga heterophylla, Chamæcyparis nootkatensis,* and various species of *Abies.* There is no distinct timber-line on Mount Rainier. Camp of the Clouds, in the Paradise Valley (altitude 5,550 feet), lies in the midst of a lovely mountain park where scattered clumps of trees—mainly *Abies lasiocarpa*—alternate with alpine meadows. The meadows below the camp are a veritable garden, whose brilliant floral display was said by the Swiss members of the party to equal even that of their own Alps.

Returning to Tacoma, some of the party visited the "oak-openings" in the neighborhood of Spanaway Lake, while others took in the kelp-groves near Point Defiance. Further opportunity to study the forests of the northwest was given at Medford, Oregon, where for three days the excursionists were guests of the Medford Commercial and University Clubs. The principal attraction here was Crater Lake, situated eighty miles northeast of Medford at the crest of the Cascade Mountains, and regarded by geologists as one of the wonders of the world. The journey

FIG. 3. From left to right: Professor C. Schröter, Professor A. Engler, Dr. E. Rübel. Photograph taken near Minnehaha by Dr. H. L. Shantz.

from Medford to the lake was made by automobile. En route, there were traversed first the fertile agricultural lands of the Rogue River valley (altitude about 1,400 feet), where the natural vegetation consists mainly of grassland alternating with oak (*Q. Garryana*, *Q. californica*) and chaparral. The foothills are sparsely timbered with *Pinus ponderosa* and oak. With increasing elevation the forest becomes denser, and thirty-five miles from Medford the road enters the Crater Lake National Forest, which is heavily timbered with *Pinus ponderosa*, *P. Lambertiana*, *Pseudotsuga*, and *Libocedrus decurrens*. At still higher levels occur nearly pure growths of *Pinus Murrayana*, while about Crater Lake (altitude 6,000–8,000 feet) are subalpine forests of *Tsuga Mertensiana*, *Abies magnifica*, *A. lasiocarpa*, etc.

Leaving Medford, the party journeyed directly to the Yosemite National Park, via San Francisco. Upon entering the foothills of the Sierras, after crossing the grassy San Joachim Valley, the most striking difference in the vegetation, as compared with that farther north, is seen in the presence of *Pinus Sabiniana*, one of the most distinctive Californian conifers. The first night in the Sierras was spent at El Portal. From here the party traveled by stage to the Yosemite Valley, thence to Wawona and the Mariposa big-tree grove. A stop of a day and a half was made here. On the return trip to El Portal a night was spent at Glacier Point, which commands a splendid view of the Yosemite Valley. The chief features of botanical interest in this region are the Sierran forests and the big-tree (*Sequoia gigantea*) groves. Like practically all forests west of the Great Plains, those characteristic of the high Sierras, and magnificently developed in the vicinity of Wawona, are coniferous. The largest and most conspicuous tree is *Pinus Lambertiana*, with which are associated *Libocedrus decurrens*, *Abies concolor*, *Pinus ponderosa*, and *Pseudotsuga*. The shrubby undergrowth is mainly chaparral. The big-tree occurs in scattered groves, usually intermixed with other trees, and only rarely forms pure stands. The excursionists remained for the better part of a day in the Mariposa grove, wandering about like Lilliputians in the land of Brobdingnag.

In the vicinity of San Francisco a profitable day was spent on Mount Tamalpais with its evergreen-scrub forest of chaparral, and in Muir Woods where the acquaintance was made of *Sequoia sempervirens*.

The objective point of the excursion upon leaving San Francisco was Tucson, Arizona. But the thousand-mile railway journey was interrupted by several stops, notably at Monterey, the home of *Cupressus macrocarpa* and the center of one of the most remarkable communities of endemic plants in existence, and at Mecca, where studies were made of succession along the margin of Salton Sea.

So much has been written regarding the vegetation of the Tucson region* that it is hardly necessary to attempt any account in this connection. During their five days' stay here the members of the party were royally entertained, practically every expense being defrayed by the Carnegie Desert Laboratory. Never had the writer realized that a desert could be such a congenial habitat. The first day was occupied by an examination of the laboratories and their environs. On the second the excursionists were driven in automobiles eighteen miles across the desert to the foot of the Santa Catalina Mountains. That night they encamped in the midst of a grove of oaks and junipers 2,500 feet higher and 30 degrees colder than the distant plain. From this base camp trips were made to higher levels. All of the party climbed to Bear Canyon (altitude 6,000 feet) and several ascended Mount Lemmon (altitude 9,150 feet).

Two days at the Grand Canyon marked the culmination of the I. P. E. From a standpoint of botanical interest the most noteworthy feature here is the zonal distribution of the vegetation on the sides of the canyon. At the top is an open, park-like forest of *Pinus ponderosa*, *P. edulis* and *Juniperus monosperma*. Immediately below the rim occur *Pseudotsuga* and *Abies concolor*, but farther down these are superseded by pinyon and juniper. About halfway to the bottom of the canyon is a plateau covered with an almost pure growth of *Coleogyne ramosissima*, while at the level of the river vegetation is scant and extremely xerophytic, *Ephedra* sp. being the most characteristic plant.

Stops for study in the pine forests of eastern Texas and in the region about New Orleans had been contemplated, but extensive floods made it necessary to abandon this part of the program. At New Orleans the party disbanded, most of the European members returning to New York via Washington.

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* See especially Spalding, V. M. Distribution and movements of desert plants. Carnegie Inst. Publ. No. 113, pp. 1–144. *pl. 1–31.* 1909.

# LIST OF PLANTS COLLECTED ON THE STEFANSON-ANDERSON ARCTIC EXPEDITION, 1908–12

By P. A. Rydberg

A small collection of arctic and subarctic plants was recently turned over to me for naming. They were collected rather incidentally by Professor R. M. Anderson and kindly donated by him to the New York Botanical Garden. One species of *Astragalus* is probably new and several of the plants are very rare. The list is by no means complete as to the vegetation of the region, but may be of some interest.

Smith's Landing, Slave River, Alberta, June 5, 1908:

*Rosa acicularis* Lindl. Small depauperate form.
*Prunus corymbulosa* Rydb. In good flowers.

Bear Rock, mouth of Bear River, Fort Norman, Mackenzie, July 9, 1908:

*Cypripedium passerinum* Richardson (?). Only in leaf, and the species doubtful.

Mouth of Kogaryuak River, 18 miles east of Coppermine River, Coronation Gulf, Arctic coast, Canada, June 18, 1911:

*Salix arctica* Pallas. Rather small specimen.
*Draba hirta* L. Tall specimen.
*Astragalus* sp. An unknown species, somewhat resembling *A. alpinus*, but more slender, with small, narrow, grayish, hirsute leaflets, white flowers, purple only on the tip of the keel, black-hairy calyx shorter than in *A. alpinus*. No fruit was found, which makes it impossible to characterize the plant fully.
*Lupinus arcticus* S. Wats. A form more grayish-pubescent than the Victoria Island specimen.
*Hedysarum Mackenzii* Richards. A low specimen.
*Rhododendron lapponicum* L.
*Cassiope tetragona* D. Don. Luxuriant specimens. Used as fuel by the Esquimeaux.

*Pedicularis lanata* Willd. Fair specimen.
*Pedicularis arctica* R. Br. Good specimen.

Southwest Victoria Island, 15 miles east of Point Williams, Arctic, Canada, July 21, 1911:

*Salix phlebophylla* And. Specimen with rather large leaves.
*Papaver radicatum* Rottb. In fruit.
*Dryas integrifolia* Vahl. Both the typical and the lobed-leaved forms.
*Potentilla pulchella* R. Br. Good specimen with rather narrow leaf-segments.
*Lupinus arcticus* S. Wats. The typical form.
*Mairania alpina* (L.) Desv. In leaves only. It is probably the red-fruited form.
*Androsace Chamaejasme arctica* Kunth. Excellent specimens.
*Statice sibirica* (Turcz.) Ledeb. Good specimens.
*Chrysanthemum integrifolium* Richards. Small specimen.

Cape Bathurst, Arctic coast, northwest Canada, July 6, 1912:

*Salix anglorum* Cham. Typical.
*Oxyria digyna* (L.) Compt. Good specimens.
*Ranunculus nivalis* L. Good typical specimen.
*Draba glacialis* Adams. With young flowers, small-leaved.
*Cochlearia groenlandica* L. In flowers.
*Androsace Chamaejasme arctica* Kunth. Excellent specimens.
*Primula borealis* Duby. Just beginning to bloom, therefore pedicels rather short.
*Phlox Richardsonii* Hook. Best specimens seen of this rare plant.
*Pneumaria maritima* (L.) Hill. Good specimens.

King Point, Yukon Territory, August 27, 1912:

*Polygonum fugax* Small. Out of bloom and spike gone, but probably this species.
*Ledum decumbens* Lodd. Small specimen.
*Vaccinium Vitis-Idaea* L. Only a fragment.
*Valeriana capitata* Pallas. Rather small specimen.

NEW YORK BOTANICAL GARDEN

# A NEW GENUS FROM MISSOURI

By Kenneth K. Mackenzie

It is a novel experience to receive a specimen from the range covered by the Illustrated Flora and by Gray's Manual which cannot be readily referred to well known genera. Not only has Mr. E. J. Palmer succeeded in discovering such a plant in southwestern Missouri, but he has found a plant the family position of which may be open to question. I have not been able to find anything at all like the plant found by him, and therefore propose it as the type of a new genus:

### **Geocarpon** gen. nov.

A low glabrous winter-annual branching from the base. Leaves opposite, equal or nearly so, entire, sessile and connate at base, without stipules, scarcely succulent. Flowers sessile in the axils, one at each node, alternating with the flowers above and below. Calyx free, somewhat turbinate, the lower third or half united into a tube, the segments five, erect, not carinate, unappendaged, ovate, acutish, green with minute white margin, not petaloid, 3-nerved, each lateral nerve united below cleft of calyx with lateral nerve of next sepal. Corolla absent. Stamens five, alternate with calyx lobes, inserted on tube of calyx, the filaments white, somewhat flattened, slender, barely 1 mm. long, not reaching above calyx, the anthers minute, short oblong, bilocular. Capsule ovoid, 1-celled with central placentae, 30–50 ovuled, dehiscent by three valves, the sharp tips slightly exceeding the stigmas. Style none. Stigmas three, stigmatose along inner surface, alternating with tips of capsule. Seeds minute, smoothish, estrophiolate, the slender, straight, ascending funiculi remaining attached to the five central placentae.

**G. minimum** sp. nov. Branches 1–4 cm. long; leaves of branches linear-elliptic to ovate, cucullate, 3–4 mm. long, 1–2 mm. wide, the basal linear, flat, 4–6 mm. long; calyx 4–5 mm. ong, slightly exceeding capsule.

Type collected by E. J. Palmer (No. 3921) in sandy barrens near Alba, Jasper County, Missouri, on April 20, 1913, and sent to me by Mr. B. F. Bush for identification.

This plant is probably to be referred to the family Aizoaceae, or as treated in the Synoptical Flora **1**: 256 the Ficoideae, and to the tribe Aizoideae of that family. In many respects it seems to come closer to the genus *Cypselea* than to any other North American genus. It differs markedly in the absence of stipules and style and in the capsule not being circumscissile. The other genera of the tribe in question, found in this country, are succulent plants with circumscissile capsules and cornute calyx-lobes.

The tribe Mollugineae of the same family characterized by a calyx divided nearly or quite to the base, and represented in the United States by two genera having 3-celled ovaries, is less closely related to our plant. Nor can our plant be considered an apetalous representative of the Alsinaceae, as the sepals in that family are distinct or very nearly so. It seems in fact to represent a well-characterized genus.

NEW YORK

## SHORTER NOTES

BERGSON AND THE BIOMETRICAL METHOD. The controversy over the definiteness (and fixity) of morphological types is no longer of supreme interest to the present-day taxonomists. But the exact status of the biometrical method is still under discussion; in that connection, at least, it may be interesting to note two references from a recent book on philosophy, Bergson's Creative Evolution. They at once support and illumine the biometrical method. The first (P. 13) states that "vital properties are never entirely realized, though always on the way to become so; they are not so much states as tendencies." Because of this we have the second statement (P. 116), "the group must not be defined by the possession of certain characters but by its tendency to emphasize them."

JEAN BROADHURST

# PROCEEDINGS OF THE CLUB

## January 13, 1914

The annual meeting of the Club was held on January 13, 1914, at the American Museum of Natural History at 8:15 P.M. President Burgess presided. Fourteen persons were present. The minutes of December 9 were read and approved.

Mrs. L. N. Keeler, Scarsdale, N. Y. and F. L. Pickett, Indiana University, Bloomington, Indiana, were nominated for membership. The resignations of the following members were read and accepted: Mrs. Pamela Eakins, Mrs. George Such, Mrs. Henry Dinkelspiel, Mrs. Alice Popper, Miss Mary Brackett, Wm. Holmes, and Albert Calman. Mrs. L. M. Keeler and F. L. Pickett were then elected to membership in the Club.

The annual reports of the officers of the Club were next in order. The secretary reported that fifteen meetings had been held during the year with an average attendance of 15 persons. Eleven new members have been elected during the year. Nine resignations have been accepted and five deaths have occurred. The report was accepted and ordered placed on file.

The treasurer's report was presented and upon motion was referred to the auditing committee.

Mr. Norman Taylor, editor of Torreya, presented a special report relating to that journal. This report was accepted.

Mr. Sereno Stetson, chairman of the field committee, then gave his report and upon motion of Dr. Britton this was accepted and a vote of thanks was extended to Mr. Stetson for the work which he did in connection with these field meetings. Remarks were made by Miss Jean Broadhurst, Dr. Mansfield, Professor Harper and others relating to future field meetings.

Dr. Britton, chairman of the local flora committee, announced that the work on the local flora being prepared by Mr. Norman Taylor would be published as a Memoir of the New York Botanical Garden and goes to press some time in February. Professor Harper remarked upon the advisability of continuing the local flora work with a special reference to a study of the Cryptogamic flora.

Election of officers for 1914 resulted as follows: *President*, Robert Almer Harper; *Vice-Presidents*, John Hendley Barnhart, Herbert Maule Richards; *Secretary and Treasurer*, Bernard Ogilvie Dodge; *Editor*, Alexander William Evans; *Associate Editors*, Jean Broadhurst, Ernest Dunbar Clark, J. Arthur Harris, Marshall Avery Howe, Herbert Maule Richards, Arlow Burdette Stout, and Norman Taylor.

Dr. William Mansfield was elected delegate to the council of the New York Academy of Sciences.

Meeting adjourned.

Michael Levine,
*Secretary pro tem.*

## January 28, 1914

The meeting of January 28 was held in the lecture room of the New York Botanical Garden at 3:30 P.M. Vice-president Barnhart presided. Twenty-five persons were present. The minutes of January 13 were read and approved.

Miss Laura Bragg, Charleston, South Carolina, and Mr. Frederick V. Rand, Columbia University, New York City were nominated for membership. The secretary then read an application presented by Mr. Norman Taylor for a grant of two hundred dollars from the Esther Herman fund of the New York Academy of Sciences, to aid him in completing a survey of the Long Island flora. This application was unanimously approved.

Miss Laura Bragg and Frederick V. Rand were then elected to membership.

The announced scientific program consisted of an illustrated lecture "The Coniferous Forests of Eastern North America," by Dr. Roland M. Harper. The following abstract was furnished by the speaker:

In eastern North America about 30 species of conifers make up at least three quarters of the existing forests. Most of the houses in the United States and Canada are built of their wood, most of our paper comes from the same source, and in some states at least, most of the fuel. Most of the conifers grow in pure stands of greater or less extent, so that there are about as many types of coniferous forest as there are species of conifers.

All but a few of the rarer or less important species were discussed from the standpoint of geographical distribution and relations to soil, water, climate, fire, etc. Fire as an environmental factor has hitherto received scant attention, partly because it is commonly regarded as a mere accident, and partly because it is not easy to experiment with. But the different species of conifers differ widely in their relations to fire, and it seems that for almost every type of coniferous forest there is a normal or optimum frequency of fire, varying from perhaps once in two or three years to once or twice in a century. The paper was illustrated by 47 lantern slides.

Meeting adjourned.

B. O. DODGE,
*Secretary*

## NEWS ITEMS

William Ruggles Gerard died suddenly in New York City, February 26, 1914. He was born in Newburgh, N. Y., March 29, 1841, and in boyhood entered the employ of a druggist in Poughkeepsie; he remained in the same business until finally he became proprietor of a drug store in that city. He began the study of fungi at a time when few American botanists had devoted attention to that group of plants, his first descriptions of new species appearing in the *Bulletin* of the Torrey Botanical Club for October, 1873, before the publication of the earliest mycological papers of Burrill, Ellis, Farlow, or Morgan. In the following year he was one of the founders of the Poughkeepsie Society of Natural Science, in whose Proceedings a number of his botanical papers were published. In 1877 he removed to New York City, where he was an active member of the Torrey Botanical Club for some years. Before the death of William H. Leggett, the founder and editor of the *Bulletin*, Mr. Gerard was made assistant editor, and he followed him as editor, filling that office from April, 1882, to December, 1885. In later years he was interested in the derivation of plant names, especially those of

American Indian origin, and contributed papers on this subject to *Garden & Forest* in 1895 and 1896. Otherwise his botanical studies seem to have ended with the year 1885.

Miss Jean Broadhurst has been awarded the degree of Doctor of Philosophy by Cornell University and has been appointed assistant professor of biology at Teachers College.

Dr. and Mrs. N. L. Britton and party have returned from botanical explorations in Porto Rico.

We learn from *Science* that Professor Charles E. Bessey, of the University of Nebraska, is spending the month of March at the Desert Botanical Laboratory of the Carnegie Institution near Tucson, Arizona. Professor Bessey plans to study and collect material of numerous species of the desert flora. While he is away Dr. R. J. Pool is in charge of the department of botany at the University of Nebraska.

Dr. Simon Schwendener, professor of botany at Berlin, has celebrated his eighty-sixth birthday.

It is stated in *Science* that Mr. J. Adams, assistant in botany in the Royal College of Science, Dublin, has been appointed to a position under the Canadian government.

# The Torrey Botanical Club

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Correspondence relating to the above publications should be addressed to

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Columbia University

New York City

Vol. 14 May, 1914 No. 5

# TORREYA

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EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873

CONTENTS



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# THE TORREY BOTANICAL CLUB




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NORMAN TAYLOR
Brooklyn Botanic Garden
Brooklyn, N. Y.

TORREYA

May, 1914.

Vol. 14 No. 5

# A PRELIMINARY LIST OF THE LICHENS FOUND WITHIN A RADIUS OF 100 MILES OF NEW YORK CITY.

By George C. Wood

Some ten years ago the writer pursued the study of lichens with a view to becoming familiar with those forms in the neighborhood of New York City. A partial list was brought together as a result of many excursions and presented to the New York Botanical Garden as part of a work towards an advanced degree in science. The list was lost for some years and but recently found among the effects of Professor Lucien M. Underwood, then in charge of advanced work at the garden.

It was thought advisable to publish the list as a beginning of a possible future complete survey of the district, particularly with a view to its adding some forms to the Long Island biological survey, which is being conducted under the auspices of the Brooklyn Institute of Arts and Sciences. But the nomenclature used in the completion of the list was that of Tuckerman. The Engler and Prantl system has since partially superseded it and it was thought best to arrange it so that it would meet the new requirements.*

* The following order follows largely the classification set forth by the l'Abbé Hue, which is based upon thalline structure. This order does not differ greatly in results from that adapted by Dr. Zahlbruckner in Engler and Prantl, except in a few notable instances, though the latter's is developed upon phylogenetic principles. That lichens are the result of a peculiar parasitic or saprophytic relation between a fungal mycelium and an algal host seems a well established fact, but that the lichen as a distinct organism has undergone a well marked evolutionary development, is also very evident. Therefore to adopt a classification for them as they are, and not because of their origin, is to me the logical course. We have as yet no proof of the synthetic formation of lichens *in nature*. Lichens arise from preëxisting lichens and thus probably reproduce only by soredia and fragmentation. Protophytic characters are not necessarily to be employed if we wish to adopt a natural classification. In rearranging the nomenclature I have had the aid in several instances by Dr. H. E. Hasse.

R. Heber Howe, Jr.

[No. 4, Vol. 14, of Torreya, comprising pp. 55–72, was issued 8 April, 1914.]

The accompanying introductory note by Dr. Howe, curator of the Thoreau Museum of Natural History at Concord, Mass., fully explains the basis upon which the classification followed here is made. The writer wishes to here make public acknowledgment of the tireless work of Dr. Howe in completely transposing this entire list from the one system to the other, under most unfavorable circumstances. Thanks are also due him for reading of the proofs of this article.

Using Dr. Howe's transposed list, the writer thought it best to use Tuckerman's nomenclature of families and genera, in so far as they fitted into the new scheme as a basis of procedure. So far as possible this has been done, the equivalent genus and species being placed under the old name following an equality (=) sign. In some cases the Tuckerman genus name has been dropped entirely in the new scheme. In this case, since there is at present no Tuckerman equivalent, the new nomenclature is placed first, with the old equivalent of Tuckerman following. An asterisk (*) before a genus shows where this plan has been followed. Certain new genera indicated in the equivalents have also been inserted in the scheme in their proper and relative places to give a general idea of the new nomenclature as far as represented in this list, and as a sort of cross reference. Such genera are indicated by reference to the old Tuckerman genus, *i. e.*, *Biatorella* (see *Lecanora*).

## Foreword

Not since the year 1823 has a single attempt been made to catalogue the lichens growing in the vicinity of New York City. It was in that year that Halsey, supplementary to the list prepared by Torrey in the year 1819, succeeded in compiling a list of some 180 species found or reported to be found within a radius of 30 miles of City Hall, New York City.

Whether it is on account of their lowness in the plant kingdom, or of the difficulties attending their study, it is apparent that a field, wide and rich in innumerable forms, and entirely free from competitors, is open and waiting for one who desires to enlarge and enrich the already existing, but meager and scattered data concerning the lichen flora of this region.

After one and one half years of work, including many thorough examinations of the Lichen Herbarium of the New York Botanical Museum; 30 days spent in the field and much time consumed in the identification of species, a list has been prepared comprising over 300 species taken from an area included within the limits of a circle, the center of which is City Hall, New York City, and the radius of which is 100 miles.

This list is by no means complete. Yet I consider it to be a beginning large enough to justify me in presenting it at this time. It is hoped that many new species, hitherto unknown in this locality, together with many new habitats may subsequently be added.

## Boundaries

A circle drawn with its center at City Hall, New York City, and having for its radius a line 100 miles in length, will include the greater part of Long Island; the whole of Staten Island; the greater part of New Jersey; parts of Pennsylvania; New York state as far north as Catskill and more than half of Connecticut.

It has been the custom of the Torrey Botanical Club to include within the 100 mile radius all of Connecticut, all of New Jersey, all of those counties of Pennsylvania which are touched or crossed by the circle, all of Long Island, while the northern boundaries of Green, Delaware, and Columbia counties are taken as the most northern boundaries of the area situated within the borders of New York state.

This list, however, will include no lichens other than those which have been identified as existing strictly within the 100 mile radius.

## Ecology

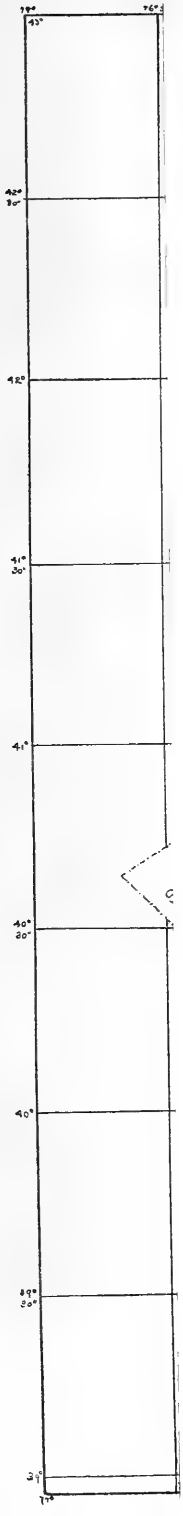
The territory included within the above boundaries is especially well adapted for lichen study. It is perhaps as rich in this flora as any other area of similar size in the United States. District No. 1, including Staten Island, is perhaps most scanty in the lichen flora, while the Hudson region, including District 5, is very rich in all forms.

Two leading facts concerning the habitats of lichens make it comparatively easy to determine why they are found in abundance in one place, while scanty or entirely absent in another locality. (1) They prefer very moist conditions, and in those conditions are almost invariably found upon trees, deadwood, rails, or mossy earth. (2) They naturally resist dry conditions, but if forced to adapt themselves to such environments are almost invariably found on rocks or less frequently upon sterile earth.

It is thus easy to conclude why Staten Island is so scanty in forms. It is high and dry, and affords exceedingly few streams. If swampy ground occurs, in most cases it is open to the effects of the tides, which being saline, preclude any lichen growth. Long Island produces a fairly good growth, but almost exclusively along its northern shore. This can be explained on the ground that (1) its swamps are, in the majority of cases, covered with fresh water, (2) and the shore is rocky. (3) It is comparatively low. The southern shore, until the extreme eastern end of the island is reached, is devoid of varied forms because (1) it is too low; (2) it is sandy; and (3) its swamps are lagoons having connection with the tides.

The Bronx and Westchester county are high, dry and rocky. Forests are comparatively at a premium. Crustaceous forms are the natural result and observation shows that they are practically the only forms found there. New Jersey, next to the Highland region, shows, perhaps, the most varied flora found within the 100 mile limit. Here are found many altitudes and as regards habitat,—pine barrens, rock deserts, cliffs, swamps and streams. Its forms, then, are many and varied, including the crustaceous, fruticose, and foliaceous.

At least one half of the whole number of species enumerated in this list are found at or near Closter, N. J., a village situated about three and one half miles west of the Palisades and the city of Yonkers, N. Y. This village is literally surrounded with swamps, which are veritable jungles. Here the foliaceous and fruticose forms thrive. A gradual rise toward the Hudson river produces varied crustose forms, while the base of the Palisades affords many foliaceous as well as crustose forms. Southern New Jersey produces a lichen flora comparable to that of Long Island as regards its lack of wide range of species.



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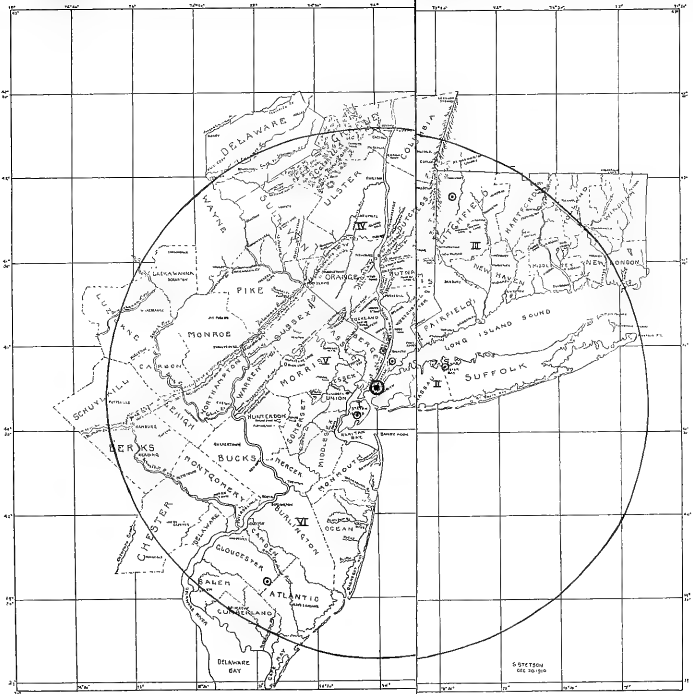


Map of the Local Flora Range. Only the area within the circle is covered by this paper.

The Highland region, comprising District 4, shows the greatest possible range. It includes rocky steeps, mountain brooks, torrents, springs and ponds, as well as swampy low ground and abundant forests. The Hudson river itself, with its mighty evaporation of comparatively fresh water, produces an ideal atmospheric condition for the growth of many species. That part of Pennsylvania included within these limits, produces by far more foliaceous than crustose forks, owing to its peculiar atmospheric condition and abundant forests.

It may be fairly concluded, therefore, that no region could afford greater opportunities for the study of lichens, because of its great differences in altitudes, soils, and atmospheric conditions. It consequently follows, that no region of equal area produces at the same time such ideal and such poor conditions; and so many common and varied forms.

## Stations

The lichens listed are all found in the area composed of the above six districts, and are arranged in the order of their importance and relationships as originally determined by Tuckerman. The authority, station, habitat, follow. It will be noticed that the station of each district is the one most often mentioned in the list. This because all specimens found within a short radius of the station are named as at that station.

It will be noted (see map) that the entire area included within the 100 mile radius, has been divided into six districts, each having a station, around which all lichens found in that district have been grouped.

*District 1.*—This district comprises all of the county of Richmond, N. Y., or Staten Island. Richmond, the county seat, is the station.

*District 2.*—This district comprises all that part of Long Island west of the 100 mile radius. The station is Cold Spring Harbor.

*District 3.*—This district consists of all that part of the state of Connecticut within the 100 mile radius. The station is Ellsworth.

*District 4.* This district consists of all that part of New York state, north of City Hall, New York, and within the 100 mile radius. The station is Bronx Park, New York.

*District 5.*—This district consists of that portion of the state of Pennsylvania within the 100 mile radius and that portion of the state of New Jersey, north of a straight line extending from Perth Amboy southwest to Trenton. The station is Closter.

*District 6.*—This district consists of all that part of the state of New Jersey south of a straight line extending from Perth Amboy southwest to Trenton and north of the 100 mile radius. The station is Newfield.

## Authorities

Tuckerman is held as the authority in compiling this list for various reasons, the most important of which are the following: (1) He was and is our foremost American authority. (2) He was thoroughly conversant with American forms and conditions. (3) His descriptions, though from some standpoints obscure, are much clearer in their application to American lichens than those of European authorities. For purposes of comparison, the specimens in the herbarium of the New York Botanical Garden were accepted as correctly identified, only on such good authority as that of Leighton, Willey, Miss Clara Cummings, and Bruce Fink.

All recent and accepted changes in nomenclature occurring since the death of Tuckerman are included. Several genera (*Acolium*, *Graphis*, *Calicium*, etc.) have been identified under other authorities, principally Nylander and Fries.

## Abbreviations

In preparing a list of this length, many repetitions necessarily occur, as regards stations, habitat, and authority. Consequently, after their first insertion, such are abbreviated.

I. Order: GYMNOCARPI (Schrad.) Fr.

= GYMNOCARPALES (Luyken) Fr.

Sub-order: *CYCLOCARPINEAE* (Wain).

1. Group: RADIATAE Hue

Family 1. **Usneei** = **Usneaceae** Eschew.

Genus 1. *Usnea barbata* (L.) Fr. Closter, N. J. *Common.* trees.
= composite material.

| | | | |
|---|---|---|---|
| | *U. longissima* Ach. | Ocean, N. J. | t. |
| | *U. angulata* Ach. | Palisades, N. J.; C. | t. |
| | *U. barbata ceratina* Schaer. = *plicata* (L.) Web. | Atco, N. J., May's Landing, Closter, N. J. | t. |
| | *U. barbata plicata* Fr. = *plicata* var. *Huei* (Borst.) Howe. | Camden, N. J.; C. | t. |
| | *U. barbata dasypaoga* Fr. = *barbata* (L.) Web. | Camden, N. J.; C. | t. |
| | *U. barbata florida* Fr. = *florida* (L.) Web. | Camden, N. J.; C, C | t. |
| | *U. barbata hirta* Fr. = *florida* f. *hirta* (L.) Ach. | C. | t. |
| | *U. barbata rubiginea* Michx. = *florida* f. *rubiginea* Michx. | Phila., Pa.; C. | t. |
| | *U. trichodea* Ach. | Otter Pond, N. J., Young; Orient, L. I. | t. |
| Genus 2. | *Evernia furfuracea* (L.) Mann. = *Parmelia furfuracea* (L.) Ach. | C.; Catskill, N. Y. | t. |
| | *E. furfuracea Cladonia* Tuck. = *Parmelia furfuracea* var. *Cladonia* (Tuck.) Howe. | C. | t. |
| | *E. prunastri* (L.) Ach. = *Letharia thamnodes* (Flot ) Hue. | Cat.; Ellsworth, Conn. | t. and fences. |
| Genus 3. | *Ramalina calicaris* (L.) Fr. = composite. | C.; Summit Mt., N. Y.; Peach Bottom, Pa. *Common.* | t. and rocks |
| | *R. calicaris canaliculata* Fr. = *canaliculata* (Fr.) Herre. | C.; Summit Mt., N. J. | t. |
| | *R. calicaris farinacea* Schaer. = *farinacea* (L.) Ach. | C. | t. |
| | *R. calicaris fastigata* Fr. = *fastigiata* (Per.) Ach. emend. | C. | t. |
| | *R. calicaris fraxinea* Fr. = *fastigata* var. *subampliata* (Nyl.) Howe. | Phila. | t. |
| | *R. rigida* (Ach.) Pers. = *Urlleyi* Howe. | N. Y. City; Atco, N. J.; Camden, N. J. | t. |
| Genus 4. | *Alectoria jubata* (L.) Ach. = composite | C. | t. |
| | *A. jubata implexa* Fr. = *jubata* var. *implexa* (Hoffm.) Fr. | C. | earth. |

| | | | |
|---|---|---|---|
| | *A. jubata chalybeiformis* Ach. = *chalybeiformis* (L.) S. F. Gray. | C.; Jamaica, L. I. | earth and firs. |
| | *A. jubata bicolor* Fr. = *bicolor* (Ehrh.) Nyl. | Susquehanna, Pa. | earth. |
| | *A. ochroleuca* (Ehrh.) Nyl. | Susquehanna, Pa. | e. |
| Genus 5. | *Telochistes chrysopthalmus* (L.) Norm. | C. Greenpoint, L. I.; Phila.; Vineland; Cam., N. J. *Common.* | r. |

2. Group: Radiati-Stratosi Hue

Family 1. **Cladoniei** = **Cladoniaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Stereocaulon denudatum* Floerk. | C.; Pal. | rocks. |
| | *S. paschale* (L.) Ach. | Pal.; Sus. | e., r. |
| | *S. tomentosum* Fr. | C. | e. |
| Genus 2. | *Cladonia rangiferina alpestris* L. = *alpestris* (L.) Rabenh. | C.; Ja. | logs. |
| | *C. rangiferina sylvatica* L. = *sylvatica* Hoffm. | C.; Staten Id.; Ells. | e. |
| | *C. papillaria* (Ehrh.) Hoffm. | C.; Cat.; Pt. Jefferson, N. Y. | gravelly earth |
| | *C. macilenta* Hoffm. (Ehrh.) | C.; Pal.; Ja.; Ells. *Common.* | logs. |
| | *C. cornucopioides* (L.) Fr. = *coccifera* (L.) Willd. | C.; Phila.; Richmond Hill, L. I.; Pal.; Ells. | e. |
| | *C. coccifera* (Schaer.) Spic. | C. | stumps, e. |
| | *C. bellidiflora* (Ach.) Schaer. | Princess Bay, St. Id. | e. |
| | *C. cristatella* Tuck. | Rich. Hill, Phila.; Todt Hill, St. Id.; Richmond, St. Id.; Princess Bay, St. Id. *Common.* | e., t. |
| | *C. lepidata* Fr. = *C. cristatella* var. *ochrocarpia* Tuck. | C. | e. |
| | *C. uncialis* (L.) Web. | C.; Rich.; Ridgewood; Bridgeton, N. J. | e. |
| | *C. uncialis adunca* Ach. = *uncialis* (L.) Web. | C. | e. |
| | *C. furcata* (Huds.) Schaer. | Ja.; C. | e. |
| | *C. fimbriata adspersa* Tuck. = *C. furcata* var. *scabriuscula* (Del.) Coem. | C. | e. |
| | *C. furcata racemosa* (Hoffm.) Fl. | C.; N. Y. C.; Ells. | e. |
| | *C. furcata subulata* Fl. = *v. palamaea* (Ach.) Nyl. | C.; Pal.; Pt. Jeff. | e. |

| | | | |
|---|---|---|---|
| | *C. furcata crispata* Fl. = *crispata* (Ach.) Flot. | C. C. | e. e. |
| | *C. squamosa* (Scop.) Hoffm. | C.; Flushing, L. I. | decayed logs. |
| | *C. Botryella* Nyl. =? | N. Y. C. | e. |
| | *C. caespiticia* (Pers.) Fl. | Tarrytown, N. Y.; Ja. | e. |
| | *C. squamosa delicata* Fr. = *delicata* (Ehrh.) Fik. | C. | wood. |
| | *C. turgida* (Ehrh.) Hoffm. | C. | e. |
| | *C. mitrula* Tuck. | C.; Pal.; N. Y. C.; Greenwood Cem., Bklyn. *Common.* | e. |
| | *C. gracilis symphiacarpa* Tuck. = *subcariosa* Nyl. | C. | e. |
| | *C. cariosa* (Ach.) Spreng. | C.; P. Jervis, N. Y.; N. Y. City; Todt H. *Common.* | e. |
| | *C. pyxidata symphicarpia* Nyl. = *alpicola* var. *Karelica* Wain. | C.; Cat.; Ells. | e. |
| | *C. decortica* (Floerk.) Spreng. | Ja. | e. |
| | *C. gracilis elongata* (Jacq.) Flk. | C. | e. |
| | *C. gracilis hybrida* Schaer. = var. *chordalis* (Floerk.). | C.; Cats. | r., logs. |
| | *C. cornuta* (L.) Schaer. | C. | e. |
| | *C. degenerans* (Floerk.) Spreng. | C. | e. |
| | *C. verticillata evoluta* Fr. | Ja. | e. |
| | *C. gracilis verticillata* Fr. = *verticillata* Hoffm. | C.; Ells. | e. |
| | *C. pyxidata* (L.) Fr. | C.; Oyster Bay, L. I.; St. Id.; Safe Harbor, St. Id.; Phila.; Fal., *common.* | e. |
| | *C. fimbriata* (L.) Fr. | C.; Ja.; Rich.; Pal. | e., logs. |
| | *C. fimbriata tubaeformis* Fr. = var. *simplex* (Weis.) Flot. | Ja. | e. |
| Genus 3. | *Baeomyces aeruginosus* (Scop.). DC. = *Icmadophila ericetorum* (L.) Zahlbr. | C.; Summit Lake, N. J. | decaying wood. |
| | *B. byssoides* (L.) Schaer. | N. Y. C. | decaying wood |
| | *B. roseus* Pers. | C.; Todt. H.; Valley Stream, L. I.; Lawrence, L. I. *Common.* | e. |
| | *B. icmadophilus* Nyl. = *Icmadophila ericetorum* (L.) Zahlbr. | St. Id.; Shelbourne, N. Y. | e. |

### 3. Group: STRATOSAE Hue.

#### Family 1. **Pseudophysciaceae**

| | | | |
|---|---|---|---|
| *Genus 1. | *Pseudophyscia comosa* (Eschw.) Nyl. = *Anaptychia comosa* (Eschw.) Mass. | Cam. | t. |
| | *P. aquila* (Ach.) Hue = *Physcia aquila* (Ach.) Nyl. | New Lots, L. I. | t., r. |
| | *P. aquila* var. *detonsa* Tuck. = *Physcia aquila detonsa* Tuck. | Pal.; C. | t., r. |
| | *P. aquila detonsa* (Tuck.). = *Physcia detonsa* Fr. | Pal. | t. |
| | *P. speciosa* (Wulf.) Müll. = *Physcia speciosa* (Wulf.) (Ach.) Nyl. | C.; Pal. | t., r. |
| | *P. speciosa* var. *galactophylla* Tuck. = *Physcia speciosa galactophylla* (Tuck.). | C. | t., r. |
| | *P. hypoleuca* (Muhl.) Hue. = *Physcia hypoleuca* (Muhl.) Tuck. | C.; Cam.; Atco; Flushing, L. I. | t. |

#### Family 2. **Physciaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Physcia hispida* (Schreb.) Fr. = *tenella* (Scop.) Nyl. | C. | t., r. |
| | *P. tribacea* (Ach.) Tuck. | R. Hill.; C., common. | t. |
| | *P. stellaris* (L.) Nyl. | St. Id.; C.; Pal. Common. | t. |
| | *P. pulverulenta* (Hoffm.) Nyl. | Cam.; Cat.; C.; Atco. | t., e. |
| | *P. obscura* (Ehrh.) Th. Fr. | C.; Cam.; Rich.; Cold Spring Harbor, L. I. | r. |
| | *P. obscura endochrysea* Nyl. = var. *endococcina* (Koeb.) Th. Fr. | C., Cam. | t. |
| | *P. adglutinata* (Floerk.) Nyl. | C. | t. |
| Genus 2. | *Pyxine cocoes* (Sw.) Nyl. | C.; Pal.; Cen. Park, N. Y.; Cam. | t. |
| | *P. sorediata* (Ach.) Fr. | C. | t., r. |
| Genus 3. | *Xanthoria parietina* (L.) Th. Fr. = *Telochistes parietinus* (L.) Norm. | Flatbush; Flushing; C.; Ridgewood, L. I. | t. |
| | *X. lychnea* (Ach.) Th. Fr. = *Telochistes lychneus* Nyl. | St. Id.; C.; Flatbush, N. Y. | t. |
| | *X. polycarpa* (Hoffm.) Th. Fr. = *Telochistes polycarpus* (Ehrh.) Tuck. | C.; Cam. | t. |

## Family 3. **Buelliaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Buellia stellulata* (Tayl.) Mudd. | C. | r. |
| | *B. spuria* (Schaer) Korb. | C. | t. |
| | *B. dialyta* (Nyl.) Tuck. | C. | pine. |
| | *B. parasema* (Ach.) Koerb. = *Lecidea parasema* Ach. | C. | t. |
| | *B. myriocarpa* (Ach.) Mudd. = *Buellia myriocarpa* (D. C.) Mudd. | C. | t., d. w. |
| | *B. Schraerei* De Not | C. | d. w. |
| | *B. petraea* (Flot. and Koerb.) Tuck. = *Rhizocarpon petraea* (Wulf.) Mass. | C.; Sus. | d. w. |
| | *B. petraea Montagnei* Tuck. | C.; Sus. | r., d. w. |
| | *B. Elizae* Tuck. | New Bedford, Ct. | t. |
| | *B. lactea* Mass. = *Polyblastea lactea* (Mass.) Korb. | C.; Pal. | t. |
| | *B. pullata* Tuck. | Pt. Jeff. | r. |
| | *B. vernicorna* Tuck. | C. | r. |
| Genus 2. | *Rinodina constans* Nyl. = *Maronea constans* Zw. | C. | t. |
| | *R. Ascociscana* Tuck. | Sus. | t., r. |
| | *R. sophodes* (Ach.) Th. Fr. | C. | t., r. |
| | *R. sophodes confragosa* Nyl. = *R. confragosa* (Ach.) Koerb. | C. | r., fence. |

## Family 4. **Caloplacaceae**

| | | | |
|---|---|---|---|
| *Genus 1. | *Blastema ferrugineum* (Huds.) Arn. = *Placodium ferrugineum* (Huds.) Hepp. | C. | t., d. w. |
| | *B. ferrugineum nigrescens* (Tuck.) = *P. ferrugineum nigrescens* (Tuck.) Fr. | C. | t., d. w. |
| | *B. rupestris* (Scop) Zahlbr. = *P. rupestre* (Scop.) Br. and Rostr. | N. Y. C. | r. |
| *Genus 2. | *Caloplaca aurantiaca* (Lightf.) Th. Fr. = *Placodium aurantiacum* (Lightf.) Naeg. and Hepp. | C.; Rich. | d. w. |
| | *P. cerinum* (Ehrh.) Zahlbr. | C. *Common.* | t. |

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|---|---|---|---|
| | *C. aurantiaca erytheilum* (Ach.). = *P. aurantiacum erythellum* Ach. | C. | t. |
| | *C. cinnabarina* (Ach.) Zahlbr. = *P. cinnabarinum* (Ach.) Anz. | C.; Ft. Wadsworth, St. Id. | r. |

Family 5. **Parmeliaceae**

| | | | |
|---|---|---|---|
| *Genus 1. | *Platysma glaucum* (L.) Nyl. = *Cetraria glauca* (L). Ach. | Bergen Co. | r. |
| | *P. lacunosum* var. *Atlanticum* (Tuck.) Nyl. = *C. lacunosa* Ach. | C.; Ja.; Cold Spring Harbor, L. I. | t. |
| | *P. aurescens* (Tuck.) Nyl. = *C. aurescens* Tuck. | Passaic, N. J.; C.; C. S. H. | t. |
| | *P. lepatizon* (Ach.) Wain. = *C. Fahlunensis* (L.) Schaer. | C.; Del. Water Gap, Pa. | r. |
| | *P. juniperina* (L.) Nyl. = *C. juniperina* (L.) Ach. | C. | t., w. |
| | *P. juniperina* var. *Pinastri* (Ach.) Nyl. = *C. juniperina Pinastri* Ach. | Bergen Co. | t. |
| | *P. Fendleri* (Tuck.) Nyl. = *C. Fendleri* Tuck. | C.; Cam.; Atlantic, N. J. | d. w. |
| | *P. Oakesianum* (Tuck.) Nyl. = *C. Oakesiana* Tuck. | Cat. | t., r. |
| | *P. Islandica* (L.) Ach. = *C. Islandica* (L.) Nyl. | Ulster Co., N. Y.; Rich. Hill, Del. Water Gap. *Common.* | t. |
| *Genus 2. | *Nephromopsis ciliaris* (Ach.) Hue. = *C. ciliaris* Ach. | C.; East N. Y.; Brainerd, Ct. *Common.* | fences. |
| *Genus 3. | *Anzia colpodes* (Michx.) Stizb. = *Parmelia colpodes* (Ach.) Nyl. | At., Bergen Co. *Common.* | t. |
| Genus 4. | *Parmelia caesia* Fr. = *Physica caesia* (Hoffm.) Nyl. | C. | r. |
| | *P. crinita* Ach. | C.; Ridg.; Ber. Co. | r. |
| | *P. cetrata* Ach. =? | At. | t., r. |
| | *P. laevigata* (Sm.) Nyl. =? | Ocean, N. J.; Monmouth, N. J. | t., r. |
| | *P. pertusa* (Schrank) Schaer. (Ach.) Nyl. | Ber. Co.; Oc. | t., r. |

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| | *P. olivacea* (L.) Ach. | C., Cam. | t., d. w. |
| | *P. Borreri* Turn. | C.; Bra.; St. Id.; Gowanus; Flatlands, Glen Cove, L. I. *Common.* | t., d. w. |
| | *P. Borreri rudecta* Tuck. | C.; St. Id. | t., d. w. |
| | *P. caperata* (L.) Ach. | C.; Pal. *Common.* | t., d. w. |
| | *P. conspersa* (Ehrh.) Ach. | C.; St. Id.; Prospect Pk., B'klyn; Ridg.; Paterson, N. J. *Common.* | r. |
| | *P. saxitalis* (L.) Fr. | C.; Ridg.; Bra.; Val.; St. | t., d. w., r. |
| | *P. saxitalis sulcata* (Tayl.) Nyl. | C. S. H. | t. |
| | *P. tiliacea* (Hoffm.) Flk. | C.; Val. St. *Common.* | t., r. |
| | *P. perforata* (Jacq.) Ach. | C.; Rich.; Ridg.; Giffords, St. Id. | t. |
| | *P. perlata* (L.) Ach. = *olivaria* (Ach.) Hue | C.; C. S. H.; Ridg.; Val. St. | t. |
| | *P. physodes* (L.) Ach. | At.; C. | t. |
| | *P. centrifuga* (L.) Ach. | N. Y. C.; C. | t. |
| *Genus 5. | *Parmeliopsis aleurites* (Ach.) Nyl. = *Cetraria aleurites* (Ach.) Th. Fr. and *Parmelia aleurites* Nyl. | C. | d. w. |
| | *P. placorodia* Nyl. = *C. placorodia* Nyl. | Oc.; Monmouth, N. J. | d. w. |
| | *P. ambigua* (Wulf.) Ach. = *Parmeliopsis ambigua* | C.; Valley Stream, L. I. | t., r. |
| *Genus 6. | *Candelaria concolor* (Dicks.) Arn. = *Telochistes concolor* (Dicks.). | C.; Cam.; Rich.; St. Id. | t. |

Family 6. **Lecanoraceae**

| | | | |
|---|---|---|---|
| *Genus 1. | *Candelariella vitellinum* (Ehrh.) Muhl. Arg. = *Placodium vitellinum* (Ehrh.) Naeg. and Hepp. | Rich.; Bay Ridge, L. I. | r. |
| *Genus 2. | *Icmadophila ericetorum* (L.) Zahlbr. = *Baeomyces aeruginosus* (Scop.) D. C. | C.; Sum. Lake; N. J. | d. w. |
| | *I. ericetorum* Nyl. (Zahlbr.) = *B. icmadophilus* Nyl. | St. Id.; Shelbourne, N. Y. | e. |
| Genus 3. | *Lecanora fuscata* (Schrad.) Th. Fr. = *Acarospora fuscata* (Schrad.) Arn. | Chester, N. J. | r. |

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|---|---|---|
| *L. tartarea* (L.) Ach. = *Ochrolechia tartarea* (L.) Mass. | C.; Ells.; Pal. | e., r. |
| *L. varia* (Ehrh.) Nyl. | C.; Ridg.; Glen Cove, L. I. | t., r. |
| *L. varia saepincola* Fr. | C.; Ridg. | t., r. |
| *L. atra* (Huds.) Ach. | Poestenkill, N. J. | r. |
| *L. Bockii* (Fr.) Th. Fr. = *L. gibbosa* (Ach.). | C.; Pal. | r. |
| *L. muralis* (Schreb.) Tuck. | C. | r. |
| *L. xanthophana* Nyl. | C.; Pal. | r. |
| *L. pallescens* (L.) Schaer. = *Ochrolechia pallescens* (L.) Mass. | C.; Pal. | t., d. w. |
| *L. pallida* (Schreb.) Schaer. | C.; Ridg.; Flat.; Val. St. | t. |
| *L. rubina* (Vill.) Wain. | Haverstraw, N. Y.; Sus. | r. |
| *L. subfusca* (L.) Ach. | At.; Val. St.; Rich. Hill. | t., r., d. w. |
| *L. pallida cancriformis* Tuck. = *L. albella* v. *cancriformis* (Tuck.) Herre. | C. | tr., rails. |
| *L. allophana* Nyl. | C.; Rich. Hill. | t. |
| *L. subfusca distans* (Ach.) Nyl. | C. | t., r. |
| *L. Hageni* Ach. | C. | t., r. |
| *L. Willeyi* Tuck. | C. | i., fences. |
| *L. Cupressi* Tuck. | C. | t. |
| *L. orosthea* (Sw.) = *Lecanora symmicta* Nyl. | C. | t. |
| *L. athroocarpa* (Dub.) Nyl. = *Lecidea athroocarpa* Ach. | C. | t. |
| *L. cinerea* Ach. | C.; Cat. | sandstone. |
| *L. lacustris* (With.) Nyl. | C. | r. under water |
| *L. cervina* (Pers.) Nyl. = *Acarospora chlorophana* (Walbg.) Mass. or = *A. squamulosa* (Schrad.) Th. Fr. | C. | r. |
| *L. cervina discreta* Nyl. = *A. discreta* (Ach.) Th. Fr. | C. | r. |
| *L. privigna* Nyl. = *Biatorella simplex* (Dav.) Br. and Rostr. | C. | r. |

Family 7. **Pertusariaceae**

| | | |
|---|---|---|
| Genus 1. *Pertusaria multipuncta* (Turn.) Nyl. | C. | t. |
| *P. globularis* Ach. | C.; Cat. | t., r. |

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| | *P. velata* (Turn.) Nyl. | C.; Ridg. | t., r. |
| | *P. communis* DC. | C.; St. Id.; Ridg. | t., r. |
| | *P. leioplaca* (Ach.) Schaer. | C. | t., r. |
| | *P. pustulata* Duby. | C.; Ja.; Flu. | t. |
| | *P. glomerata* (Schleich.) Schaer. | Ja. | e. |
| | *P. Wulfenii* (DC.) Fr. | Cat. | e. |

Family 8. **Acarosporaceae**

Genus 1. *Biatorella* (see *Lecanora*).
Genus 2. *Acarospora* (see *Lecanora*).

Family 9. **Stictaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Sticta crocata* (L.) Ach. | C. | r. in mosses. |
| | *S. quercizans* (Michx.) Ach. = *Lobaria quercizans* Michx. | C.; Pal.; Sus. | r., t. |
| | *S. pulmonaria* (L.) Ach. = *Lobaria pulmonaria* (L.) Hoffm. | C.; Pal. Common. | r., t. |
| | *S. amplissima* (Scop.) Mass. = *Lobaria amplissima* (Scop.) Arn. | Pal.; N. Lots, N. Y. C.; Newfield, N. J.; Matamoras, Pa.; Safe Harbor, Pa. *Common.* | r., t. |
| | *S. aurata* (Sm.) Ach. | Gloucester, N. J. | t., r. |
| | *S. sylvatica* (Huds.) S. F. Gray. | Cat. | t., r. |
| Genus 2. | *Lobaria* (see *Sticta*). | | |

Family 10. **Peltigeraceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Peltigera venosa* (L.) Hoffm. | C. | e. |
| | *P. canina* (L.) Hoffm. | C.; Pal.; Ja.; Bra. | e. |
| | *P. canina spuria* Ach. = *P. spuria* (Ach.) DC. | C., Glou.; Old Fields, N. J. | e., r. |
| | *P. apthosa* (L.) Hoffm. | C.; Phila.; Bra.; Peekskill; Fishkill. | e., r. |
| | *P. horizontalis* (L.) Hoffm. | C.; Pal. | e., r. |
| | *P. polydactyla* (Neck.) Hoffm. | C.; Sus. | e., r. |
| | *P. rufescens* (Sm.) Hoffm. | C.; Newf.; Glou., N. J. | e., r. |
| Genus 2. | *Nephroma tomentosum* (Hoffm.) Koerb. | C. | t., r. |
| | *N. Helveticum* Ach. | C.; Cat. | t., r. |
| | *N. laevigatum* Ach. | C.; Cam.; At. | t., r. |

Family 11. **Pannariaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Pannaria tryptophylla* (Ach.) Mass. = *Parmeliella tryptophylla* Müll. Arg. | Newf. | t., r. |
| | *P. molybdaea* (Pers.) Tuck. = *Collema molybdium* | Newf.; C.; Salem; Hackensack, N. J. | t., r. |

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|---|---|---|---|
| | *P. molybdaea cronia* Nyl. = *Collema molybdium* var. *cronia* (Nyl.). | Sus. | t., r. |
| | *P. languinosa* (Ach.) Koerb. | C.; Pal. | e. |
| | *P. byssina* (Hoffm.) Tuck. = *Dichodium byssinum* (Ach.) Nyl. | C.; Cam.; Hack. | e. |
| | *P. nigra* (Huds.) Nyl. = *Placythium nigrum* (Huds.) S. Gray. | C.; Hack. | r. |
| | *P. rubiginosa* (Thunb.) Delis. | Newf.; Ulster Co., N. Y.; Shadaken, Pa. | t. |
| | *P. leucosticta* Tuck. | C.; Newf.; Weehawken, N. J. | t., r. |
| | *P. microphylla* (Sw.) Delis. | C. | t., r. |
| | *P. lurida* (Mont.) Nyl. = *Physma lurida* Mont. | C.; Pal.; Cam.; At.; N. Y. C.; Newf. | e., d. w. |
| Genus 2. | *Hydotheria venosa* Russ. | C. V. under water. | |
| Genus 3. | *Parmeliella* (see *Pannaria*). | | |
| Genus 4. | *Placyrthium* (see *Pannaria*). | | |

Family 12. **Gyrophoraceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Gyrophora* (see *Umbilicaria*). | | |
| Genus 2. | *Umbilicaria vellea* (L.) Nyl. = *Gyrophora vellea* (L.) Ach. | C. | r. |
| | *U. Dilleni* Tuck. = *G. Dilleni* (Tuck.) Mühl. Arg. | Sus. | r. |
| | *U. Muhlenbergii* (Ach.) Tuck. = *G. Muhlenbergii* (Ach.) Schneid. | C.; Sus. | r. |
| | *U. papulosa* Tuck. = *U. pustulata papulosa* Tuck. | Rockland Co. | r. |
| | *U. pustulata* (L.) Hoffm. | Garrison's; Washington Heights, N. Y. C.; Morris Pond, N. J. | r. |
| | *U. Pennsylvanica* Hoffm. | Sus.; Mat.; Pa. | r. |
| | *U. hirsuta* (Ach.) Stenh. = *G. hirsuta* (L.) Ach. | Cat. | r. |

Family 13. **Lecidiaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Lecidea contigua* Fr. | C.; St. Id.; Ja. *Common.* | r. |
| | *L. enteroleuca* Ach. | C.; Cat. | r. |
| | *L. granosa* Tuck. = *Toninia granosa* (Tuck.). | C. | r., bricks. |
| | *L. tessellina* Tuck. | C. | r. |

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|---|---|---|---|
| | *L. albocoerulescens* (Wulf.) Schaer. | R. Hill, West Graham, Ct. | r. |
| | *L. muscorum* Koerb. = *Bacidia muscorum* (Ach.) Mudd. | C. | r. |
| | *L. alba* (Schl.) Nyl. = ? | St. Id. | r. |
| | *L. elaeochroma* Tuck. = *Lecidea parasema* v. *elaeochroma* (Tayl.) Ach. | C. | r. |
| | *L. spilota* Fr. = *Lecidea tessellata* Fek. | C. | r. |
| | *L. lutea* Schaer. = *Biatorina lutea* (Dicks.) Arn. | Newf. | r. |
| Genus 2. | *Psora* (see *Biatora*). | | |
| Genus 3. | *Catillaria* (see *Biatora*). | | |
| Genus 4. | *Biatorina* (see *Biatora*). | | |
| Genus 5. | *Biatora anthracophila* Nyl. = *Lecidea anthracophila* Nyl. | C. | pine wood. |
| | *B. campestris* Fr. = *Biatorella campestris* (Fr.) Th. Fr. | C.; Pal. | e. |
| | *B. chlorantha* Tuck. = *Bacidia chlorantha* (Tuck.) Fink. | Cat. | pine wood. |
| | *B. chlorosticta* Tuck. = *Bacidia chlorosticta* (Tuck.). | C. | cedar bark. |
| | *B. cuprea* (Sommerf.) Fr. = *Lecidea cuprea* Sommerf. | Pine Is.; N. Y. | cedar bark. |
| | *B. geophana* Nyl. | C. | e. |
| | *B. granulosa* (Ehrh.) Poetsch. = *Lecidea granulosa* (Ehrh.) Schaer. | Todt Hill, St. Id. | sand. |
| | *B. cupreo-rosella* Nyl. = *Bilimbia cupria* Mass. | Orange Co., N. Y. | r. |
| | *B. exigua* (Schrad.) Ach. = *Rinodina exigua* (Ach.) Th. Fr. | C. | r. |
| | *B. hypnophila* Turn. = *Bilimbia hypnophila* (Ach.) Th. Fr. | C. | r., d. w. |
| | *B. icteria* Mont. = *Psora icteria* (Mont.) Fink. | C.; Pal. | e. |

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|---|---|---|
| *B. mixta* Fr. = *Biatorina mixta* (With.) Fink. | Pal. | t. |
| *B. parvifolia* (Pers.) Tuck. = *Lecidea parvifolia* (Pers.) Nyl. | C. | t. |
| *B. rubella* Fr. = *Bacidia rubella* (Hoffm.) Mass. | C.; Pal.; Newf. | |
| *B. Russellii* Tuck. = *Psora Russellii* (Tuck.) Fink. | C.; Sus. | r., e. |
| *B. Resinae* Fr. = *Biatorella resinae* (Fr.) Th. Fr. | C. | white pine. |
| *B. rufo-nigra* Tuck. = *Lecidea rufo-nigra* (Tuck.) Hasse. | Pal. | r. |
| *B. russula* (Ach.). = *Biatorina russula* Ach. | C. | t. |
| *B. sanguineo-atra* (Fr.) Tuck. = *Bacidia atrasanguineo* (Schaer.) Th. Fr. | C. | e. |
| *B. suffusa* Fr. = *Bacidia fuscorubella* v. *suffusa* (Fr.) Fink. | C. | t. |
| *B. uliginosa* (Schrad.) Ach. = *Lecidea uliginosa* (Schrad.) Ach. | C. | rotting log; e. |
| *B. umbrina* Ach. = *Bacidia umbrina* (Ach.) Br. et Rostr. | C. | r., rails. |
| *B. varians* Ach. = *Lecidea varians* Ach. | C.; common. | t., d. w. |
| *B. vernalis* (L.) Fr. = *Lecidea vernalis* (L.) Ach. | C., Cat. | t. |
| *B. viridescens* (Schrad.) Fr. = *Lecidea viridescens* (Schrad.) Ach. | C. | rotting wood. |
| *B. Schweinitzii* Fr. = *Bacidia Schweinitzii* (Tuck.) Fink. | C.; Newf. | rotting wood. |
| *B. inundata* Fr. = *Bacidia inundata* (Fr.) Koerb. | C. | rotting wood. |
| *B. fossarum* (Duff.) Mont. = *Biatorella fossarum* (Duff.) Th. Fr. | C. | t. |

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| | *B. nigra* Tuck. | C. | t. |
| | = ? | | |
| | *B. decolorans* (Hoffm.) Fr. | C. | t. |
| | = *Lecidea decolorans* (Hoffm.) Schaer. | | |
| | *B. tricolor* With. | C. | t. |
| | = *catillaria tricolor* (With). Th. Fr. | | |
| | *B. denigrata* Fr. | C. | t. |
| | = *Biatorina synothea* (Ach.) Koerb. | | |
| | *B. fusco-rubella* Hoffm. | C. | t. |
| | = *Bacidia fusco-rubella* (Hoffm.) Arn. | | |
| Genus 6. | *Bacidia* (see *Biatora*). | | |
| Genus 7. | *Bilimbia* (see *Biatora*). | | |
| Genus 8. | *Toninia* (see *Biatora*). | | |
| Genus 9. | *Rhizocarpon* (see *Buellia*). | | |
| *Genus 10. | *Lopadium vulpinum* (Tuck.). = *Heterothecium vulpinum* Tuck. | Atlantic Co., N. J. | t. |
| | *L. pezizoideum* (Ach.) Koerb. | | |
| | = *H. pezizoideum* (Ach.) Flot. | C. | fir bark. |

Family 14. **Diptochistaceae**

| | | | |
|---|---|---|---|
| *Genus 1. | *Conotrema urceolatum* (Ach.) Tuck. | C.; Val. St. | t. |
| | = *Gyrostomum urceolatum* Fr. | | |
| *Genus 2. | *Diplochistes scruposus* (L.) Norm. | C. | e., r. |
| | = *Urceolaria scruposa* (L.) Nyl. | | |

Family 15. **Graphidaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Graphis scripta* (L.) Ach. | C.; N. Y. C.; Rich.; Giffords, St. Id.; Conewago, Pa. *Common.* | d. w. |
| | *G. scripta graciliens* Nyl. | C. S. Harbor. | d. w. |
| | *G. scripta f. recta* Nyl. | C.; Pal.; St. Id. | d. w. |
| | *G. scripta assimilis* Nyl. | C. | d. w. |
| | *G. erumpens* Nyl. | Giff. | d. w. |
| | *G. elegans* (Sm.) Ach. | C. | d. w. |
| | *G. dendritica* Ach. | C.; Pal. | d. w. |
| | = *Phaeographis dendritica* (Ach.) Müll. Arg. | | |
| | *G. sculpturata* Ach. | C. | d. w. |

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| Genus 2. | *Phaeographis* (see *Graphis*). | | |
| Genus 3. | *Opegrapha varia* Pers. | C. Newf.; St. Id.; Rich. Hill, L. I. | t. |
| | *O. varia rimalis* Fr. | C. | t. |
| | *O. vulgata* Ach. | C. | t. |
| | *O. viridis* Pers. | C. | t. |
| Genus 4. | *Xylogropha parallela* (Ach.) Fr. | Lakewood, N. J. | d. w. |

Family 16. **Arthoniaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Arthothelium* (see *Arthonia*). | | |
| Genus 2. | *Arthonia glaucescens* Nyl. | C.; Newf. | t. |
| | *A. lecidella* Nyl. | C. | t. |
| | *A. astroidea* Ach. = *Arthonia radiata* Ach. | C., Ells. | t. |
| | *A. spectabilis* Ach. = *Arthothelium spectabile* Mass. | N. Y. C. | t. |
| | *A. punctiformis* Ach. | N. Y. C. | t. |
| | *A. glebosa* Tuck. | C. | t. |

4. Group: Collemae Hill.

Family 1. **Collemaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Collema microphyllum* Ach. = *Leptogium microphyllum* (Ach.) Zahlbr. | C. | t. |
| | *C. tenax* (Sw.) Ach. | C. | e., r. |
| | *C. furvum* Ach. | C. | r. |
| | *C. myriococcum* (Ach.) Arn. | C.; Limestone, N. Y. | r. |
| | *C. pycnocarpum* Nyl. = *Synechoblastus pycnocarpum* (Nyl.) Fink. | C.; Pal. | t. |
| | *C. verruciforme* Nyl. | C.; Pal. | t. |
| | *C. cyrtaspis* Tuck. = *Synechoblastus cyrtaspis* (Tuck.) Fink. | C. | t. |
| | *C. leptaleum* Tuck. | C. | t. |
| | *C. floccidum* Ach. = *Synechoblastus flaccidus* (Ach.) Trev. | C.; Ja.; Val. St. | r. |
| | *C. nigrescens* (Leers) Wain. | C. | t. |
| | *C. nigrescens leucopepla* Tuck. = *C. vespertilio* (Lightf.) Wain. | Bats. to N. J. | t. |
| | *C. ryssoleum* Tuck. = *Synechoblastus ryssoleus* (Tuck.) Fink. | C.; Pal. | r. |
| | *C. pulposum* (Bernh.) Nyl. | C.; Pal. | e. |

| | | | |
|---|---|---|---|
| | *C. plicatile* Schaer. = *Leptogium plicatile* (Ach.) Nyl. | Ulster Co., N. Y. | e. |
| Genus 2. | *Leptogium bolacinum* Stizenb. = *Dentriscocaulon bolacinum* Nyl. | C. | r. |
| | *L. tremelloides* (L. fil.) Wain. | C.; Bra.; Cat.; Ja. | r. |
| | *L. myccochorum saturinun* Schaer. | C. | e. |
| | *L. palmatum* (Huds.) Mont. | C. | e. |
| | *L. chloromelum* (Sm.) Nyl. | C.; Pal. | t., r. |
| | *L. dactyinum* Tuck. | Pal.; Poughkeepsie, N. Y. | r. |
| | *L. lacerum* (Sm.) Fr. = *L. scotinum* (Ach.) Fr. | C.; Pal. | r. |
| | *L. pulchellum* (Ach.) Nyl. | C. | t., r. |
| | *L. saturinum* (Dicks.) Nyl. | C. | t. |
| | *L. tenuissimum* (Sm.) Koerb. | C. | sand. |
| Genus 3. | *Synechoblastus* (see *Collema*). | | |
| Genus 4. | *Dendriscocaulon* (see *Leptogium*). | | |

Family 2. **Heppiaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Heppia Despreauxii* (Mont.) Tuck. = *H. virescens* (Despr.) Nyl. | Cam. | e. |

Family 3. **Lichinaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Lichina confinis* Ag. | Pal. | r. |

Family 4. **Pyrenopsidaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Pyrenopsis Schroederi* (Mass.) Nyl. = *Psorotichia Schaereri* (Mass.) Arn. | Sus. | r. |

Family 5. **Ephebaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Ephebe pubescens* Fr. = *E. lanata* (L.) Wain. | C.; Sus. | r. |

Sub-order: *CONIOCARPINEAE* Meyer,

Family 1. **Caliciaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Chaenotheca* (see *Calicium*). | | |
| Genus 2. | *Stenocybe* (see *Calicium*). | | |
| Genus 3. | *Calicium tigillare* (Fee) DC. = *Cyphelium tigillare* Th. Fr. | C.; At. | t. |
| | *C. byssacaum* Fr. = *Stenocybe byssacaum* (Fr.) Nyl. | C. | t. |

| | | | |
|---|---|---|---|
| | *C. Curtisii* Tuck. | C. | t. |
| | *C. curtum* Turn. & Borr. | C. | t. |
| | *C. fuscipes* Tuck. | C. | d. w. |
| | *C. phaeocephalum* (Turn.) Turn and Borr. = *Chaenotheca phaeoceph-ala* (Turn.) Th. Fr. | C. | d. w. |
| | *C. roscidum roscidilum* Nyl. | C. | d. w. |
| | *C. roscidum* (Fl.) Nyl. | Ocean, N. J. | d. w. |
| | *C. subtile* Fr. = *C. parieturnum* Ach. | C. | d. w. |
| | *C. tubaeforme* Tuck. | C. | d. w. |

## II: Order PYRENOCARPALES Wain

### Family 1. **Mycoporaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Mycoporum pycnocarpum* Nyl. | C. | t. |

### Family 2. **Trypetheliaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Trypethelium virens* Tuck. | C.; Pal.; Ogden, Pa. | t. |
| | *T. cruentium* Mont. = *Milanotheca cruenta* (Mont.) Müll. Arg. | Salem, N. J. | t. |

### Family 3. **Pyrenulaceae**

| | | | |
|---|---|---|---|
| Genus 1. | *Pyrenula hylaspora* (Nyl.) Tuck. | C. | t. |
| | *P. lactea* (Mass.) Tuck. | C. | t. |
| | *P. thelaena* (Ach.) Tuck. | C. | t. |
| | *P. pachycheila* Tuck. | Newf. | t. |
| | *P. nitida* (Weig.) Ach. or *P. nitida* (Schrad.) Ach. | C.; Cat. | t. |
| | *P. punctiformis* (Ach.) Naeg. | C.; Cat. | t. |
| | *P. cinchonae* Tuck. | Newf. | t. |
| | *P. leucoplaca* (Walbr.) Koerb. | C. | t. |
| *Genus 2. | *Lepthorapsis derinidis* (Ach.) Th. Fr. = *Sagedia oxespora* (Nyl.) Tuck. | C.; Pal.; At. | t. |
| *Genus 3. | *Porina faginea* (Korb.) Arn. = *Sagedia lactea* (Korb.). | C. | t. |
| *Genus 4. | *Polyblastiopsis lactea* (Korb.) Zahlbr. = *Sagedia lactea* (Kbr.) | C. | t. |

### Family 4. **Dermatocarpaceae**

| | | | |
|---|---|---|---|
| *Genus 1. | *Dermatocarpon arboreus* (Fr.) Fink. = *Endocarpon arboreum* | C.; Newf. | d. w. |

| | | | |
|---|---|---|---|
| | (Schweinitz). | | |
| | *D. hepaticum* (Ach.). = *E. hepaticum* Ach. | C.; Pal. | d. w. |
| | *D. rufescens* (Ach.) Zahlbr. = *E. rufescens* (Ach.). | C. | d. w. |
| | *D. miniatum* (L.) Mann. = *E. miniatum* (L.) Schaer. | Orange Co., N. Y.; Youngs, L. I. | d. w. |
| | *D. fluviatile* (Weis.) Th. Fr. = *E. miniatum aquatium* Schaer. | C. | t. |
| | *D. miniatum complicatum* Sw. = *E. miniatum complicatum* Schaer. | C.; Pal. | t. |
| | Family 5. **Verrucariaceae** | | |
| Genus 1. | *Thrombium* (see *Verrucaria*). | | |
| Genus 2. | *Verrucaria epigaea* (Pers.) Ach. =*Thrombium epigaea* (Pers.) Walbr. | C. | t. |
| | *V. nitida* Schrad. = *Pyrenula nitida* (Ach.) Weig. | C. | t. |

Boys High School,
Brooklyn, N. Y.

## NEWS ITEMS.

Dr. M. A. Brannon, dean of the college of letters and science, and professor of botany, at the University of North Dakota, assumed the duties of president at the University of Idaho on April 1.

Professor Bohumil Shimek, of the department of botany, University of Iowa, sailed for Europe on April 9. He will spend six months abroad studying the work and methods of various European universities, and will devote considerable time to a study of the loess formations of the Old World. Professor Shimek will deliver a series of lectures at the University of Prague during May and June.

We learn from *Science* that the seventieth birthday, on March 25, of Professor Adolf Engler, the director of the Royal Botanic Garden and Museum at Dahlem, near Berlin, was celebrated in the presence of many eminent German and foreign botanists, by several functions. According to the account in *Nature*, on the day itself, Professor Pax, rector of the University of Breslau, with Professors Diels and Gilg, as its editors, presented to Professor Engler a copy of the *Fest-Band* of Engler's "Botanische Jahrbücher." The volume forms a supplement to the fiftieth volume of this publication, and consists of more than forty illustrated contributions, largely from his pupils. Professor Haberlandt presented Professor Engler, on behalf of hundreds of subscribers, with his life-size marble bust, the work of the sculptor, A. Manthe. On March 26 there was a banquet at which the official world was represented; and on March 27 the monthly meeting of the Deutsche Botanische Gesellschaft was converted into an "Engler" meeting, and Professor von Wettstein gave, by special invitation, a lecture on the phylogenetic evolution of the Angiosperm flower.

Mr. G. R. Bisby of the staff of the Brooklyn Botanic Garden, has been given a leave of absence from the garden, in order to accept a position as plant pathologist for the season with a potato grower of northern Maine. He is working under general supervision of Dr. Melhus of the U. S. Department of Agriculture.

The Austrian Zoological and Botanical Society has awarded the Archduke Rainer gold medals to two members of Yale University, Dr. Ross G. Harrison, Bronson professor of comparative anatomy, and Dr. George R. Wieland, lecturer in paleobotany.

We learn from the daily papers of the death on April 28, at Paris, of the botanist Philippe Edouard Leon Van Tieghem. He was born on the 19th of April, 1829, at Bailleul, France. He was an officer of the Legion of Honor, was perpetual secretary of the Academy of Sciences, Paris, and was a professor at the Museum of Natural History and the Institut Agronomique. He was the author of many botanical books and papers, but his most distinguished work in recent years was the editorship of the botanical section of the *Annales des Sciences Naturelles*.

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Correspondence relating to the above publications should be addressed to

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Vol. 14 June, 1914 No. 6

# TORREYA

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BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873

## CONTENTS



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NORMAN TAYLOR
Brooklyn Botanic Garden
Brooklyn, N. Y.

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# SOME MIDWINTER ALGAE OF LONG ISLAND SOUND

By Marshall A. Howe

For reasons that are more or less obvious the marine algae of the coasts of New York and New England have received little attention from collectors during the coldest months of the year. Mr. F. S. Collins once published in Rhodora* a brief paper on "Seaweeds in Winter", with a specific allusion to his experiences "at a point on the shore of Long Island Sound" on an intensely cold first day of January. Professor Bradley Moore Davis has more recently in his important contributions to the "Biological Survey of the Waters of Woods Hole and Vicinity" (p. 474) given a list of fifty-four species of algae "known to be present in the cold-water sublittoral formation of the winter and spring" and he remarks that the water temperatures for this formation probably average under 35° F. for at least two and a half months. Exact dates are not given, but it seems to be implied that any one of the fifty-four may be found during the coldest weeks of the year. A chart illustrating the algal flora of Spindle Rocks at Woods Hole on December 30, 1904, includes eighteen species and another for March 17, 1905, shows ten species. In the detailed list of the species of the Woods Hole region there are remarks on the seasonal distribution of each, such as "summer," "summer, undoubtedly at other seasons," "summer, undoubtedly throughout the year," "at all seasons," etc. In a recent interesting paper† on "The Seasonal Life-Cycle of some Red Algae at Woods Hole" Professor I. F. Lewis outlines the life-history of several

* **2**: 130–132. 1900.

† Plant World **17**: 31–35. 1914.

[No. 5, Vol. 14, of Torreya, comprising pp. 73–96, was issued 14 May 1914.]

common red seaweeds of that region, but makes no specific references to midwinter observations.

The present notes have been suggested by several small collections of marine algae made at and near Orient, New York, by Mr. Roy Latham during the month of February of the present year, a February, by the way, that ranks among the coldest ever recorded by the New York City station of the United States Weather Bureau. Most of the specimens were found washed ashore after heavy storms and may have been passing the winter in the deeper waters, but there seems to be nothing in the list to excite suspicions as to the actual local occurrence of the species found.

The four following species were found "near the shore of Gardiner's Bay" on February 7:

*Scytosiphon lomentarius* (Lyngb.) J. Ag. Plants 14–20 cm. long with well-developed gametangia.

*Cystoclonium purpurascens* (Huds.) Kütz. Plant (or fragment) about 10 cm. high and incipiently tetrasporic. *Cystoclonium* is annotated by Davis as a summer plant at Woods Hole.

*Agardhiella tenera* (Ag.) J. Ag. A battered and weather-worn fragment with immature or somewhat abnormally developed tetrasporangia. Occurring with undoubted *Cystoclonium purpurascens*, the specimen might possibly be suspected of representing a coarse denuded condition of that species, but the mode of branching and the larger cells of the inner cortex as well as the stouter habit indicate that it belongs with *Agardhiella tenera*. Lewis considers this a summer species at Woods Hole, but Davis remarks of it, "summer, undoubtedly at other seasons."

*Ceramium rubrum* (Huds.) Ag. Apparently sterile.

The species of the list immediately following were found on the shores of the Sound on February 14, just after a severe storm:

*Ulva Lactuca* L.

*Desmarestia aculeata* (L.) Lamour. The denuded autumn and winter condition.

*Laminaria Agardhii* Kjellm.

*Laminaria digitata* (L.) Lamour.

*Chondrus crispus* (L.) Stackh. Tetrasporic.

*Gymnogongrus Torreyi* (Ag.) J. Ag. This is probably only a peculiar flattened condition of *Ahnfeltia plicata*, as has been pointed out by Professor Setchell.* The flattening, however, as in Agardh's type specimens, is often pronounced in the upper parts of the plant, the longer transverse axis being sometimes twice as long as the shorter.

*Ahnfeltia plicata* (Huds.) Fr.

*Sterrocolax decipiens* Schmitz. Abundant on "*Gymnogongrus Torreyi*," which fact may be interpreted as strengthening the idea that *G. Torreyi* is only a form of *Ahnfeltia plicata*.

*Cystoclonium purpurascens* (Huds.) Kütz. Apparently sterile.

*Rhodymenia palmata* (L.) Grev. Large tetrasporic specimens attached to *Laminaria* stalks.

*Polysiphonia elongata* (Huds.) Harv. Apparently sterile. The specimens are in part fibrillose and in part represent the coarse denuded autumn and winter condition. Davis ascribes the species to "summer," but Farlow† recognizes its perennial habit.

*Spermothamnium Turneri* (Mert.) Aresch. Attached to the base of *Polysiphonia elongata*.

*Callithamnion Baileyi* Harv. With mature cystocarps.

The following were collected on February 25. Mr. Latham writes that the *Chaetomorpha*, the *Sargassum*, and the *Champia* were taken by cutting a hole "through fifteen inches of ice on the bay":

*Chaetomorpha Linum* (Müll.) Kütz.‡

*Sphacelaria cirrhosa* (Roth) Ag. Attached to *Ascophyllum* (?) and forming tufts 0.5–1.5 cm. high. Davis refers this to the summer species.

*Desmarestia aculeata* (L.) Lamour.

*Sargassum Filipendula* (Ag.) J. Ag. A plant nearly 5 dm. high,

* Rhodora 7: 136–138. 1905.

† Mar. Alg. N. E. 172. 1881.

‡ *Ch. Linum* has been referred to *Ch. aerea* (Dillw.) Kütz. as a form by F. S. Collins (Green Alg. N. Am. 325. 1909). The plant described by Dillwyn may be the *natural* type of the species, but that described by Müller more than thirty years earlier would appear to be the *historical* type, and, if one is to be considered a form of the other, the rules of botanical nomenclature as now almost universally interpreted and applied would seem to demand that Mr. Collins' procedure should be reversed and that *Ch. aerea* should be regarded a form of *Ch. Linum*.

somewhat darkened and with scarcely developed receptacles, but otherwise of about the normal habit.

*Phyllophora membranifolia* (Good. & Woodw.) J. Ag. Tetrasporic.

*Champia parvula* (Ag.) Harv. Plants 3–4 cm. high, apparently sterile. This species is ascribed to summer by Davis.

*Delesseria sinuosa* (Good. & Woodw.) Lamour. A battered tetrasporic plant.

*Polysiphonia elongata* (Huds.) Harv. Plants 10–15 cm. long, fibrillose, apparently sterile.

*Melobesia Lejolisii* Rosan. On leaves of *Zostera*.

*Dermatolithon pustulatum* (Lamour.) Fosl. On leaves of *Zostera*, with the preceding.

Mr. Latham sent in for determination several collections also that were made in the month of March and so are perhaps not properly to be referred to as "midwinter" algae, but two of these collections were so little later than the month of February that they are of some interest in this connection. The first of these March specimens were picked up on the "Sound shore" on March 5, but are believed to have washed in "with the great storm of March 1." Omitting the common Fucaceae and a few others already mentioned, those of March 5 were

*Halothrix lumbricalis* (Kütz.) Reinke. On *Zostera* leaf, fertile.

*Punctaria latifolia* Grev. Sterile.

*Desmarestia viridis* (Müll.) Lamour.

*Chondrus crispus* (L.) Stackh. Tetrasporic and cystocarpic.

*Phyllophora membranifolia* (Good. & Woodw.) J. Ag. Tetrasporic and cystocarpic plants. The "nemathecia" of this species are in structure very suggestive of *Actinococcus subcutaneus* (Lyngb.) Rosenv., parasitic on *Phyllophora Brodiaei*. In form, however, they are strikingly different from the subspherical thalli of *Actinococcus subcutaneus* and a microscopical examination seems to indicate that they are integral parts of the *Phyllophora* thallus rather than parasitic organisms. The recently established facts as to alternation of generations in the Florideae, together with the obvious structural resemblances just alluded to, suggest a further consideration of Reinke's idea*

* In Darbishire, On *Actinococcus* and *Phyllophora*. Ann. Bot. 13: 264. 1899.

that *Actinococcus subcutaneus* may really be "an asexual generation of *Phyllophora Brodiaei*, growing parasitically on the sexual generation." Darbishire (*loc. cit.*) succeeded in showing that the thallus of *Actinococcus subcutaneus* develops from a spore that enters the thallus of the male plant of *Phyllophora Brodiaei* through an antheridial ostiole, but he was not able to discover whence the spore came or whether it was a tetraspore or a carpospore.

*Polysiphonia urceolata formosa* (Suhr) J. Ag. Sterile.

*Rhodomela subfusca* (Woodw.) Ag. Tetrasporic.

*Ceramium rubrum* (Huds.) Ag. Tetrasporic.

*Rhododermis Georgii* (Batt.) Collins. Forming cushions on the margins of *Zostera* leaves, with sporangia.

*Corallina officinalis* L.

On March 7, *Pylaiella littoralis* (L.) Kjellm., *Polysiphonia nigrescens* (Dillw.) Grev., and *Epilithon membranaceum* (Esp.) Heyd. were added to the foregoing lists.

New York Botanical Garden.

## OCCURRENCE OF THE INDIAN PIPE (MONOTROPA UNIFLORA) IN A XEROPHYTIC HABITAT

By Edwin D. Hull

The Indian pipe (*Monotropa uniflora*) is considered one of the most mesophytic of our plants, and the habitat in which it grows is supposed to conform to its nature. The 7th edition of Gray's Manual gives the habitat of this species as, "Rich and dark woods." S. Coulter (1) says, "Indicative of rich soil." I have, however, found it growing sparingly on the oak dunes about Lake Michigan at Miller, Lake Co., Indiana, where it seems to be the only mesophyte in an otherwise distinctly xerophytic flora, at least so far as the vascular plants are concerned. The trees of this association, of which the black oak (*Quercus velutina*) far exceeds all the other species in abundance, stand some distance apart and permit considerable light to penetrate, so that the forest is decidedly open rather than dark. The undergrowth does not form a continuous mat, and there are numerous broad patches of barren sand. Cowles (2) in 1899 described the ecology of these dunes, and showed conclusively that the flora is xerophytic. Coulter (1) listed the vascular plants of these oak dunes, totalling 43 species, all of which are of a xerophytic character. The nature of the situation is best shown by listing some of the most conspicuous and abundant plants contributing to the undergrowth. These are *Pteris aquilina*, *Lupinus perennis*, *Viola pedata lineariloba*, *Opuntia Rafinesquii*, *Vaccinium pennsylvanicum* and *Phlox pilosa*. The Indian pipe, not being abundant, seems to have been entirely overlooked by the numerous investigators of the sand dune flora. Its scarcity, however, may be due to other than edaphic causes. Coulter (1) reports it as widely distributed throughout Indiana, but not abundant, so it may be as common here as in more mesophytic areas in the state. This author listed the counties in which the plant has been found, but it seems not to have been reported from any of the counties bordering the lake, nor from any of the counties adjacent to these, although it doubtless occurs in all. I found at the above mentioned station September 15, 1912 a single clump of this species at the base of a black oak (*Quercus velutina*), consisting of three stalks, evidently of recent appearance, as the summit of the stems showed no tendency to become erect as is the case when the fruit matures. Stalks of the preceding year were also found. Early in October of the same year I found in a similar situation at Dune Park, a few miles east of Miller, another clump of these plants with the seeds nearly all shed. It is seen, therefore, that the aerial life of this species is very brief, doubtless of less than a month in duration, at least in this locality. While the plants found at Miller were somewhat dwarfed, the two dried stems before me measuring 11 and 12.5 cm., they are considerably above the minimum height, .5 dm., given in Gray's Manual.

It should be here noted that Coulter (1) reports the species as occasional on dry wooded hillsides in the southern counties of Indiana, and I have myself found it on the summits of dry oak covered hills in DeWitt Co., Illinois, where the plants are locally abundant. Such habitats, while probably not nearly so xerophytic as the oak dunes of Lake Michigan, are not of an extreme mesophytic character by any means. I have noticed that in these Illinois plants the culmination of the flowering period is not reached until the latter part of August or early September, but the flowers do not come so late as in plants of the sand dunes. That the habitat, in DeWitt Co., at least, is more mesophytic, is indicated by the distribution of the xerophytic fern (*Pteris aquilina*) in that county. Here in the dunes this fern is associated with the oaks, but in the oak woods of DeWitt Co. it is entirely absent, occurring only on barren, exposed hills, the most xerophytic areas in the region. The situation in southern Indiana may be the same.

The late blooming, September 15, is also noteworthy. Coulter (1) gives the blooming period as extending from June to August, which is the exact time given in Gray's Manual. It is interesting that xerophitism, often so potent a factor in early blooming, seems to have a reverse effect on the flowering of this species.

To account for the occurrence of this mesophyte in a xerophytic area, there seems to me two theories which should be considered. One theory would be that some local condition, comparable to the usual mesophytic habitat of this species, exists. A second view would be that the plant is able to endure xerophytic conditions on account of its short aerial life, provided there is sufficient stable humus to enable the underground portion to persist from year to year. An alternative, of course, would be to consider the plant as a xerophyte, but there is no evidence to support such an assumption.

Of the two theories the second seems to be the more valid one. About the only evidence to support the first view is that apparently the plants are here subjected to rather severe conditions, as is shown by the scarcity and semi-dwarfness of the stems, these being also much blackened by the sun. But such evidence may be more apparent than real, for the plant is able to persist and ripen its seed as well here as elsewhere. To support the second view we have the evidence of late blooming, which seems to me very important. If a local condition existed, the plant would be expected to flower in its usual season. Cowles (2) has shown that even in the open shifting sand between the oaks, a very xerophytic situation, such fungi as various species of *Geaster* and *Lycoperdon* occur. Plants like these can hardly be called xerophytes, but on the contrary are extremely mesophytic, the entire aerial life of the plant being of extremely brief duration. Otherwise the plants probably exist only as spores, the delicate mycelium being unable to withstand any severe or prolonged drought. Of similar habit are many desert plants, both annual and perennial, which spring up during wet seasons and persist in dry periods only underground, or as seeds. These plants, as pointed out by Schimper (3) possess no xerophytic structures, and would, therefore, be called mesophytes. Comparable in habit to these desert perennials, it seems to me, is the Indian pipe, although, unlike them, its activity must be confined to a definite period, on account of seasonal changes in temperature. The question might naturally be raised that if the plant is able to live in xerophytic habitats, it should also be found in the more exposed places, as are the fungi. But the peculiar short root system of this species would be exposed quickly by a shifting of the sand, even though slight, and the plant would necessarily perish. As I have stated, the fungi probably exist over severe periods in the form of spores, while the Indian pipe cannot produce fruit in a single season from the seed, in all probability, so that a stable soil is requisite.

It would seem, however, that the plant is confined to woodland habitats, whether mesophytic or otherwise. Sunlight, as is well-known, causes a blackening of the stems, and extreme sunlight would doubtless kill them. It is unlikely, therefore, that the plants could exist in the open. But given a degree of shade, it seems reasonable to suppose that they could exist in some of the most xerophytic places.

The late mid-September blooming, which seems to be the key to the persistence of the plant here, could be accounted for in the following manner. Fuller (4), who investigated the evaporating power of the air in its relation to the vegetation of the sand dunes, has shown that commencing about the first of September there is a decided drop in the rate of evaporation and this drop continues during the greater part of the month, when the rate begins to rise on account of the trees shedding their foliage. By the latter part of September the rate of evaporation is at its lowest expression during the period under observation, namely, from May to October, inclusive. This low rate of September forms a striking contrast to the high rates of much of June and all of July and August, the usual flowering period of this species. It is during this period of low evaporation that the stems of the Indian pipe spring up, flower and mature their fruit.

From the above data it would seem that the Indian pipe is a mesophyte, but so far from being confined to mesophytic woods, is able to persist in decidedly xerophytic areas. It seems, however, to be confined to woods. This persistence is determined by the short aerial life of the plant, and not by the formation of any xerophytic structures.

CHICAGO, ILL.

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## TWO NEW TERTIARY SPECIES OF TRAPA

BY EDWARD W. BERRY

The genus *Trapa*, formerly included in the family Onograceae, is now made the type and only genus of the Hydrocaryaceae (Trapaceae, Dumort, 1827). There are three existing species, all aquatics, and all confined to the Old World except for the naturalization of *Trapa natans* L., in New England and New York. The latter species is found irregularly scattered throughout central and southern Europe, its area of distribution being a contracting one as shown by its occurrence in post-glacial deposits at very many localities beyond its present range in Russia, Finland, Sweden and Denmark. The two other existing species are *Trapa bicornis* L., and *Trapa bispinosa* Roxb., of southeastern and southern Asia and said also to occur in Africa.

The genus has an extended geological history. Rosettes supposed to represent the floating leaves (*Trapa ? microphylla* Lesq., and *Trapa ? cuneata* Knowlt.) are widespread in the Rocky Mountain province in beds of late Cretaceous and early Tertiary age. The oldest recognizable fruits are a large bi-cornute form from the Eocene of Canada and Alaska and *Trapa wilcoxensis* described in the following paragraph. An Oligocene species (*Trapa Credneri* Schenk) has been described from Saxony, and no less than seven species have been described from the Miocene—two occurring in Idaho (Payette formation), one in Japan and the balance in Europe, where two species continue into the Pliocene. A species from the late Pliocene of America is also described in the present note. The existing *Trapa natans* has been recorded from the preglacial beds of England and Saxony and from very many interglacial and postglacial deposits in Portugal, Italy, Netherlands, Germany, Sweden, Russia and Denmark, Gunnar Andersson in a recent paper (1910) mentioning 18 localities in West Prussia, 6 in Denmark, 17 in Sweden and 29 in Finland. With this short prefatory statement the two following species may be briefly characterized.

### **Trapa wilcoxensis** sp. nov.

Fruit relatively small, rhomboidal in outline, wider than high, indehiscent, coriaceous, armed with two more or less extended, laterally directed or ascending (not recurved) horns. Width 1.3 cm. to 1.8 cm. Height 7 mm. to 9 mm. Somewhat compressed (naturally), expanded medianly, broad and extended below, more or less extended and rounded above. Horns stout, conical, more or less extended. Surface more or less tuberculate medianly. Figs. 1–3.

This species comes from the middle Wilcox of the Lower Eocene at Peryear, Henry County, Tennessee. It shows considerable variation in size and relative development of horns and is not particularly close to any previously described form. While much smaller than the existing species it is clearly referable to *Trapa*. It is a curious fact that nearly all of the North American *Trapa* have two horns like the existing Asiatic species instead of four as is normally the case in the existing European species.

**Trapa alabamensis** sp. nov.

Coriaceous nuts, rhomboidal and roughly bilateral in outline, much swollen and tuberculated medianly, with normally two, short, conical, acuminate, slightly recurved horns. The base is rounded and shows a conspicuous scar. The sides are somewhat unsymmetrical and faintly and irregularly ribbed and usually show three large tubercles on each face above the middle. The base is large and full. The apex is but slightly produced or truncated. Length from tip to tip of the horns about 4 cm. Height about 2 cm. Figs. 4, 5.

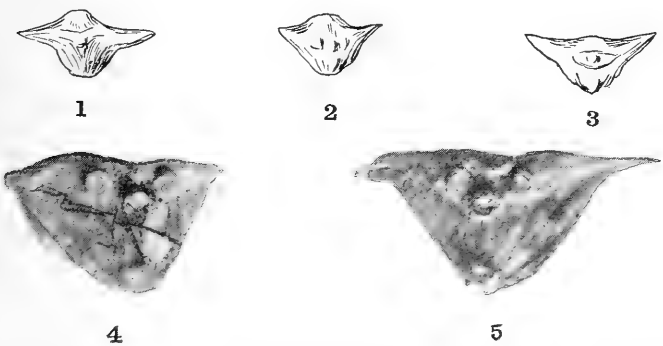


FIG. 1. Fruits of Tertiary *Trapa;* 1–3, *Trapa wilcoxensis* from Lower Eocene of Tennessee; 4, 5, *Trapa alabamensis* from the Pliocene of Alabama.

The present species is very close to the existing *Trapa natans* especially to the two horned variants (the species is normally four horned). The latter is larger and more symmetrical with stouter more recurved horns, and a more extended apex as well as a stouter and more symmetrical body. The present species is common in the late Pliocene clays of Red Bluff, Perdido Bay, Baldwin County, Alabama, and inland from the present Gulf coast to elevations of over 300 feet near Lambert, Mobile County, Alabama.

Both of these new species are of great interest since they are the first recorded indigenous forms from the eastern United States and show that the genus was present in this area throughout the Tertiary. They also throw an interesting light on the conditions of sedimentation at the time of their existence.

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## SHORTER NOTES

WHORLED LEAVES IN *Gentiana*.—In his notes on the flora of Copake Falls, N. Y., Sereno Stetson describes and gives an illustration of an unusual leaf arrangement in *Gentiana quinquefolia* L., where whorls of three are shown instead of the normal opposite phyllotaxis in *Gentiana*. Information is requested from those knowing a similar case. There is one in my herbarium of *G. Andrewsii* Griseb., which I collected by Chautauqua Lake, at Mayville, N. Y., September, 1907. One stem among those taken has four whorls of three leaves, those of the uppermost nodes below the leaves subtending the cluster of flowers at the top. The stem was cut off near the root, and was about 4 dm. high, 2 dm. being occupied by the verticillate leaves. The four lower nodes represented on the stem have the leaves opposite, so that the entire stem does not share in the abnormality. One leaf in the upper whorl has a flower in its axil. The only mention I have seen of a similar case, except that of Mr. Stetson, is by Dr. O. Penzig in his Pflanzen-Teratologie (2: 155. 1894). Under *Gentiana asclepiadea* L., a plant of southern Europe, he says: "Whorls of leaves with three members in place of the pair, not rare."

E. J. HILL.

CHICAGO, ILL.

# REVIEWS

## Gibson's Supplement to Jost's Plant Physiology*

This is an unusual type of book, and difficult to review. Botanists are familiar with Gibson's English translation of the first German edition of Jost's work. A second German edition contains so much new matter, and other extensive alterations as really to call for a new English translation. Scientific books of 971 pages, however, are expensive, and of doubtful financial success, especially when a second edition follows a first within a very short time, and this fact, quite probably, is the explanation of this supplement.

It aims to give all the changes in the second edition as compared with the first. Herein, the reviewer believes, lies its weakness, for much that is unimportant, or not essential, is necessarily included, and this becomes irritating and wasteful of one's time. For example, of what vital importance is it that on page 199, line 41, of the first edition, one should read "leading even to" *vs.* "leading to" (Supp. p. 58); or on page 202, line 55, "If glucose," *vs.* "When glucose" (Supp. p. 59); or that on p. 205, ll. 55–56, "many unending" should be read "an endless number of" (Supp. p. 63); or that on page 405, Lecture XXXII is XXXI in the second German edition (Supp. p. 128), *et cetera*, throughout the Supplement?

In short, it seems to the reviewer that it would have been preferable to have included in the Supplement only the new matter of the second German edition, and important *errata*. It is for the new matter that the Supplement will undoubtedly be valued and consulted, the numerous summaries of recent work, or new summaries and references to older work being especially welcome. These are found in connection with the topics of photosynthesis, protein synthesis, respiration, fermentation, and elsewhere. Many, if not most, students of experimental evolution will no doubt be surprised as well as interested to read (on

* Plant Physiology, by Dr. Ludwig Jost. Authorized English Translation, by R. J. Harvey Gibson. Supplement, Incorporating the Alterations of the Second Edition of the German Original. Pp. 1–168. Oxford, at the Clarendon Press, 1913. Price, 2 s. 6 d. net.

page 125 of the Supplement) Hofmeister's clear statement made in 1868, to the effect that mutation, rather than continuous variation, supplies the material for selection in species making. "New forms," said Hofmeister, "do not come into existence by the summation in successive generations of small differences from the customary form, all tending in the same direction; they appear suddenly, and are widely different from the parent."

If America were as Teutonic in the matter of the publication of scientific books, as it is in the organization of education, and of scientific research, we would not have to rest content with supplements, but would early enjoy an American translation of the second German editions of works important enough to run into a second edition. C. STUART GAGER.

### Schaffner's Field Manual of Trees*

As a field manual to slip in one's pocket, the present volume will unquestionably fill a long felt want, as it condenses the information contained in more complete works. The book is scarcely more than one quarter inch thick, and only 6¾ × 4½ inches long and wide. Brief descriptions are given for the genera and species, but not for the families. Keys are provided throughout and the latter feature has been very thoroughly covered. "Key to the genera of trees in the summer condition," "Key to the genera of trees in winter condition," "General key to the families and genera," and "Key to the fruits" will give some idea of the scope and usefulness of this side of the book. In the appendix is a "General classification of the wood of trees included in the manual" and a glossary of terms. The classification of woods is based on their structure, porusness, and other structural characters.

Of course the main body of the work is taken up with the description of the individual species. All the usual features are covered, tersely and concisely, and for practical field work, these descriptions will be found quite adequate. There are notes on

* Schaffner, J. H. Field Manual of Trees, including southern Canada and the northern United States to the southern boundary of Virginia, Kentucky, and Missouri, westward to the limits of the prairie. Pp. 1–154. R. G. Adams Co., Columbus, Ohio. Price, limp cloth, $1.25; limp leather, $1.75. 1914.

the uses of the different species, and the geographical distribution is given for each kind.

The nomenclature used is that of the second edition of Britton and Brown's "Illustrated Flora," but the sequence of families is that adopted in the work of Clements, Rosendahl and Butters in their "Minnesota Trees and Shrubs," published in 1912. This is the "Besseyan System" which differs from the Engler and Prantl sequence in following the gymnosperms by the orders Ranales, Geraniales, Malvales, Rosales, Celastrales and so on. One criticism that can be justly levelled at a purely popular hand-book such as this are the names *Cassiatae*, *Fabatae* and the like, which are categories readily understandable by the trained botanist, but will be unfamiliar to the greater part of the readers to whom the book is addressed.

As a workable pocket manual of trees, the book is sure to have a wide range of usefulness.

N. T.

Warner, C. H., *Formaldehyde as an Oxidation Product of Chlorophyll Extracts*, Proc. Roy. Soc. B. **87**: 378–385, 1914, reports a series of interesting experiments demonstrating the production of an aldehyde when light acts on a film of chlorophyll (prepared by allowing an alcoholic or ethereal chlorophyll extract to evaporate on glass plates). The production of aldehyde goes on parallel with a bleaching of the chlorophyll, is dependent on the presence of oxygen, but independent of the presence of carbon dioxide. Along with the aldehyde a volatile substance, capable of liberating iodin from a potassium iodide solution, is produced.

In the same number of the Proceedings, Wager, H., *The Action of Light on Chlorophyll*, Proc. Roy. Soc. B. **87**: 386–407, describes a more varied series of experiments covering essentially the same ground. Warner is inclined to consider hydrogen peroxide the active oxidizing agent, produced in the presence of oxygen and light, which attacks the chlorophyll; Wager argues that probably some other peroxide is concerned.

This work again shows that the original experiments with chlorophyll films as performed by Usher and Priestley did not demonstrate, as these authors had concluded, the synthesis of carbon dioxide and water.

Warner and Wager both cautiously raise the question whether in green leaves a photo-decomposition of chlorophyll gives rise to formaldehyde which is then polymerized into sugars, instead of there being a direct synthesis of carbon dioxide and water into formaldehyde.

It is to be noted that a number of the experiments described seem suitable as laboratory exercises and lecture demonstrations.

W. G. M.

## NEWS ITEMS.

The Board of Managers and the Women's Auxiliary of the New York Botanical Garden held a reception and spring inspection of the grounds, buildings and collections on the afternoon of Thursday, May 7, from three until six o'clock. Tea was served in the museum building at 5.20 P.M. About 250 guests motored through the grounds and speeches were made by Dr. W. Gilman Thompson, one of the committee of the board of managers, and by the director, Dr. N. L. Britton.

"After a lapse of over twenty-one years a botanic garden at the Cape is once again an established fact. It is described by the *Kew Bulletin* as 'thoroughly worthy of a United South Africa.' The choice of the Kirstenbosch estate as the site for the National Botanic Garden was a particularly happy one, and there can be no doubt that the selection of this site for the purpose would have met with the approval of Cecil Rhodes himself. The existence of so suitable a site for the garden as is this portion of the Rhodes estate would, however, have been of little value but for the farsightedness of General Botha and his government, in consequence of which the scheme has passed from the region of proposition and discussion into the realm of fact. The control of the garden is to be exercised by a board of five trustees, of whom three are nominated by the Government, one by the Corporation of Capetown, and one by the Botanical Society. The site granted for the garden is a farm about 400 acres in extent on the eastern slopes of Table Mountain, which has been neglected for some years. Though it is largely overgrown with poplars and pines, there still exist on it specimens of nearly every native tree to be found in Southern Cape Colony, west of the Knysna forests. The general situation of the garden is all that could be desired. A feature of very great importance is the presence of permanent water, and there are two constant streams, which will be of the utmost value for irrigation purposes, and will, no doubt, also be capable of effective treatment from the scenic point of view, especially as the gorges are richly wooded with native vegetation. There is also a heavy winter rainfall, and the garden is practically completely sheltered from the drying southeast wind."

Mr. W. W. Eggleston left New York May 8 for a trip, during May and June, to the Manti, Fillmore and Fish Lake Forests, Utah and the Kaibab Forest, northern Arizona. This latter region, north of the Grand Canon, Arizona, is very little known botanically, having been visited by Mr. Ivar Tidestrom in 1909, but perhaps not previously, by botanists.

Dr. N. L. Britton and Mr. Stewardson Brown left New York on May 20 for Bermuda where they will study the vegetation, returning about June 8.

Dr. H. A. Gleason, of the University of Michigan, has returned from a trip around the world begun last September. He will teach the coming summer at the biological laboratory of the University of Michigan. Dr. Gleason expects to spend the month of September at the New York Botanical Garden studying the genus *Vernonia*.

It will be a source of regret to local botanists to hear that within a short time there will be practically no natural vegetation left on the Hempstead Plains. A corporation is now ploughing up the virgin prairie with traction machinery and only that part of the plains south of the Motor Parkway remains in its original state. The corporation intends to plough all the plains as rapidly as possible, leasing the ploughed land for agricultural purposes.

On the afternoon of May 23, a conference was held at the Brooklyn Botanic Garden between the garden staff and some high school teachers of biology of Greater New York, as represented by the New York Association of Biology Teachers. The purpose of the conference was to offer an opportunity for the members of the association to become better acquainted with the aims, equipment, and work of the garden, and to enable the latter to secure from the teachers practical suggestions as to how the garden may render the largest service to the teaching of botany in New York City and vicinity. Following the conference there was an inspection of the first section of the laboratory building and the first two sections of the conservatories. The second section of the conservatories devoted to tropical economic plants, was opened to visitors for the first time on this occasion, and will hereafter be open to the public daily.

# The Torrey Botanical Club

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A monthly journal devoted to general botany, established 1870. Vol. 40 published in 1913, contained 712 pages of text and 26 full-page plates. Price $3.00 per annum. For Europe, 14 shillings. Dulau & Co., 37 Soho Square, London, are, agents for England.

Of former volumes, only 24–40 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–40 three dollars each.

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(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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Vol. 14 July, 1914 No. 7

# TORREYA

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EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873

## CONTENTS



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# TORREYA

July, 1914.

Vol. 14 No. 7


## THE INFLUENCE OF PRECEDING SEASONS ON THE GROWTH OF YELLOW PINE


By J. E. Kirkwood


Many of the mountains of western Montana have no trees on their western and southern slopes, except at altitudes above 4,000 or 5,000 feet. Some support sparse open stands of yellow pine and Douglas fir; in such places the ground cover usually consists of grasses and a few shrubs. The barren aspect of these slopes is due to the desiccating influence of wind and sun, to the full force of which they are exposed throughout the growing season. The annual precipitation in the vicinity of Missoula is 15.84 inches, which represents the mean of over twenty years of observation. May and June are the months of heaviest rainfall, furnishing 4.43 inches of the above mean. By the same reckoning July and August together furnish 1.95 inches of the annual precipitation, and during these months the soil becomes dry to a depth so great that only deeply rooted perennials are able to survive, and these with growth suspended, or at least very much retarded.

Situations on such slopes, locally more favorable, are occupied by incipient forest growth which increases toward the greater altitudes, where, owing to the storage of snow and to other factors, conditions are more favorable for the growth of trees. In this region the yellow pine and Douglas fir are the species most resistent to drouth, encroaching gradually upon the prairie, and eventually occupying it fully or giving way to other species of forest trees. In the margin of the yellow pine type, where the prairie and the forest blend, the conditions for forest growth are


[No. 6, Vol. 14, of Torreya, comprising pp. 97–114, was issued 8 June 1914.]

most severe from the standpoint of moisture requirements as compared with other forested areas. Under such circumstances, therefore, we should expect to see most clearly expressed the

FIG. I. Part of the crown of a young pine (*Pinus ponderosa*), showing the height growths of the years 1910 to 1913 inclusive.

influence of any variation in the moisture supply from time to time, and especially from year to year.

The relation of the water supply to metabolism and assimilative activity is well known. It is equally well known that the rate of height and diameter increase is the expression of the relative abundance of soil moisture, as well as of other elements in the essential conditions of growth and development. It has been shown that there is a close relation between the annual precipitation and diameter growth in the western yellow pine. Douglas,* working on *Pinus ponderosa* near Flagstaff, Arizona, found that for a period of years the relative diameter of each season, as revealed by careful stem analyses, corresponded closely with the relative abundance of moisture in the several years, as shown by the weather records of that locality. The results of this investigation further showed that the variability in increment was in this instance subject to several factors, such as the relative porosity of the subsoil, the unequal distribution of soil moisture in different directions from the tree, etc.; in short, that any differential distribution of moisture, either topographically or from season to season was expressed in a corresponding variation in the size and form of the annual rings. The conclusions in this paper seem to be supported by the facts presented, and will doubtless apply to other regions as well, where the amount of soil moisture varies considerably from year to year during the period of more rapid growth. Relative height and diameter increase, however, are not always the expression of the conditions in the same season in which such increase took place, but sometimes indicate the factors prevailing in the preceding year. Bogue,† as a conclusion from observations at Stillwater, Okla., states that "the month of maximum rainfall is the month of maximum growth." As a result of further studies at Lansing, Mich., he finds that the width of the ring is proportionate to the rainfall within certain limits, but that excessively heavy or light precipitation is evidenced by a corresponding growth of the tree in the following year, and rightly attributes the difference to the difference in the amount of food material stored in the preceding season.

* Douglass, A. E. Weather cycles in the growth of big trees. Monthly Weather Review **37**: 225–237, June, 1909.

† Bogue, E. E. Annual rings of tree growth. Monthly Weather Review **33**: 250–251, June, 1905.

The main growth of trees in height and diameter is accomplished during the first few weeks of the growing season. The opening of the buds in the spring or early summer is followed by the rapid elongation of the shoot of the season, and the early expansion of its leaves. There after-growth in length is very much retarded, and finally ceases with the formation of the terminal bud, which is to be unfolded in the following season. This terminal bud is formed long before the summer is over and into it are crowded the nutritive substances which supply the food for its early expansion the following year. Upon the size and vigor of the buds thus formed depends the length of the shoot of the following season, other things being equal. Likewise the size and vitality of the bud are measures, in the main, of the conditions obtaining in the seasons in which they were formed. The greater the supply of moisture, up to the optimum degree, the more favorable the temperature, sunlight, etc., the greater is the reserve force in the buds and consequently the more vigorous are the shoots issuing from them.

It is improbable that the whole growth of the new leader is at the expense of the food stored in the bud alone. That from other parts also doubtless contributes, but the tendency is to crowd the formative materials toward the extremities of the main shoot and the branch. In the sharing of these materials the main shoot leads and the branches follow in the order of their importance. The principal growth, however is undoubtedly at the expense of the locally stored materials, the substances stored elsewhere having their part to play in the development of the tissues in their immediate proximity.

An examination of the buds reveals the cells of the leaf rudiments and axis densely crowded with a granular material which appears to be proteid, responding to several tests for that substance. This is in line with what is known concerning the nature of reserve materials in trees. The density of the stored substance is greatest in the bud, and much less in the stem outside of the bud.

It is a matter of no difficulty to determine by external markings the limits of annual growth on the younger portions of the stem and branches of most woody plants. Sometimes it is possible to trace the annual growth back through twenty five or thirty years by reference to the branching system. *Pinus ponderosa* is a favorable subject for study in this particular. At the top of the leader a strong bud is formed toward the conclusion of the growing season. Close to the base of this bud are formed several lateral ones, the subsequent development of which produces a whorl of branches. As other lateral buds are usually lacking along the shoot of the season, it follows that each circle of branches marks the limit of a season's upward growth of the main stem. As the internodes, or spaces between successive circles of branches, do not increase in length after they are first formed, the height increment of all the past seasons can be determined, so far as one is able to identify the distinct whorls which mark the conclusion of each year's growth.

That the length of the internode in the western yellow pine growing in dry situations is an expression of conditions affecting growth, not in the present, so much as in the preceding season, is now shown with remarkable clearness by the trees of this region.* Some of the facts here set forth were observed on an island in Flathead Lake during the summer of 1913. Trees were growing at altitudes varying from four or five to one hundred feet above the level of the lake, and in the more open places among the mature trees many younger individuals were present varying from four to fifteen feet in height. Of many of these it was observed that the internode for 1911 was considerably shorter than that for 1910. Reflecting upon the fact that the season of 1910 throughout the whole region was exceptionally dry, and that of 1911 much more favorable, the question arose as to the apparently contradictory evidence of the internodes. Why should the growth be less in a season supposedly more favorable, and greater in a season obviously less advantageous?

It is evident that the growth in length in each season is not directly affected in this region by the lack of rain in July and August, since the elongation of the shoot is practically ended before the dry season sets in and before the moisture from winter

* Pfeffer, W. Plant Physiology, Vol. I, p. 603.

snows and spring rains disappears from the soil, but indirectly by the drouth in the months indicated, as affecting the supply of reserve food in the buds and other parts. The supply of food stands in direct ratio to the condition of several factors, among which the amount of available moisture is very influential, during the middle and later summer of the season next preceding. As a lack of moisture affects adversely assimilative and other activities, a meager store of nutritive materials would be the result of a dry summer, and would find expression the following year in reduced growth in length of all the new shoots. Of course this weakness of the buds would not occur in trees as a result of diminished precipitation in situations providing adequate soil moisture throughout the season, but only where drouth appears early, as is usually the case on southern and western slopes. For this reason those trees in the locality mentioned which grew nearer the water level showed no such inequality in the length of the internodes, and the same was found to be true in more favored situations elsewhere.

It is true, of course that assimilation can take place at all seasons in evergreens, under proper conditions of temperature and illumination. It has been shown that assimilation may proceed in some plants at a temperature as low as $-40°$ C., and that in pines and spruces the process is active at 3° to 5° C. In the northern Rocky Mountain region, however, the temperatures are considerably below 0° C. during most of the winter, and frequently below $-40°$ C. The soil, moreover, is frozen to a depth of several feet, resulting in a reduction of the water supply. In this problem, however, it is chiefly a question of relative activity and not of complete suspension of photosynthesis at any time, while we are dealing with reserve material in the form of proteid, not starch, nevertheless the synthetic activity of the tree, so far as this material is concerned, is closely associated with starch formation, according to the best evidence at present available.

Seeking further evidence on the relation of the growth of yellow pine to the distribution of rainfall, the writer made two series of observations in the vicinity of Missoula, the results of which are given in the accompanying tables. Where the forest borders on the grass land strips of timber afforded convenient material for study. In these cases the stand was a mixture of yellow pine and Douglas fir, varying in height from five to twenty-five or thirty feet. One of these areas occupies one slope of a shallow, narrow valley which traverses in a direction from southeast to northwest, the barren western slope of Mt. Sentinel, southeast of the town of Missoula. The timbered slope of the valley faces the northeast, its opposite slope facing southwest is treeless. Along the edge of this stand, a strip over a quarter of a mile in length and about fifty yards in width provided the 42 young yellow pines whose measurements are here recorded. All the pines up to thirty feet in height were measured, except such as showed evidence of injury in the parts concerned.

In Table I the height growth is shown of each of the five seasons, 1909 to 1913 inclusive. The measurements are in inches. It will be observed that practically every one of the pines growing on this area exhibited a growth during the season of 1911 considerably less than that of either of the two seasons preceding or following, and that, although the difference in a few cases is reduced to zero, in nearly all of the individual cases the difference between the growth of 1911 and that of the other seasons amounted to several inches. The same relation appears conspicuously in the totals and again in the averages, but the most significant fact seems to be in the absence of exceptions to the general rule.

Table II presents the results of similar measurements on another area near Missoula about two miles from the first. Only a few observations were recorded in this case, as practically every tree approached showed the same condition.

If one compares these measurements with the weather data given in Table III he will find that the lengths of the internodes stand in relation to the conditions of the seasons in the manner suggested above. The mean precipitation and temperature

* Miyake, K. On the starch of evergreen leaves, and its relation to photosynthesis during the winter. Bot. Gaz. 33: 321–340, 1902.

† Jumelle, Rev. Gen. de Bot. 4: 263, 1892. Pfeffer's Physiology of Plants, Vol. I, p. 338.

‡ Green, J. R. Vegetable Physiology, p. 174. 1911.

## Table I

Approximate Measurements of the Height Growth of *Pinus ponderosa*, Made on the Upper Portions of the Main Stem, for Each of the Seasons Indicated, in Inches

| No. | 1909 | 1910 | 1911 | 1912 | 1913 |
|---|---|---|---|---|---|
| 1 | 8 | 8 | 5 | 6 | 8 |
| 2 | 6 | 8 | 4 | 5 | 6 |
| 3 | 5 | 5 | 4 | 4 | 6 |
| 4 | 10 | 10 | 6 | 10 | 10 |
| 5 | 6 | 9 | 3 | 6 | 8 |
| 6 | 8 | 8 | 5 | 6 | 9 |
| 7 | 9 | 8 | 8 | 3 | 8 |
| 8 | 8 | 6 | 6 | 5 | 5 |
| 9 | 8 | 6 | 5 | 9 | 9 |
| 10 | 13 | 12 | 8 | 11 | 13 |
| 11 | 12 | 9 | 8 | 12 | 14 |
| 12 | 7 | 7 | 5 | 7 | 11 |
| 13 | 8 | 8 | 7 | 11 | 12 |
| 14 | 12 | 13 | 11 | 14 | 13 |
| 15 | 12 | 12 | 6 | 10 | 12 |
| 16 | 4 | 10 | 6 | 11 | 14 |
| 17 | 11 | 12 | 8 | 12 | 12 |
| 18 | 9 | 10 | 7 | 11 | 12 |
| 19 | 11 | 11 | 7 | 11 | 12 |
| 20 | 12 | 11 | 6 | 8 | 12 |
| 21 | 10 | 12 | 6 | 10 | 10 |
| 22 | 12 | 12 | 6 | 7 | 9 |
| 23 | 14 | 14 | 10 | 15 | 14 |
| 24 | 14 | 14 | 11 | 10 | 12 |
| 25 | 14 | 20 | 6 | 16 | 14 |
| 26 | 14 | 10 | 12 | 14 | 14 |
| 27 | 14 | 10 | 10 | 14 | 13 |
| 28 | 13 | 11 | 5 | 12 | 13 |
| 29 | 14 | 15 | 10 | 13 | 14 |
| 30 | 12 | 13 | 10 | 11 | 12 |
| 31 | 10 | 14 | 11 | 13 | 14 |
| 32 | 11 | 14 | 11 | 14 | 14 |
| 33 | 13 | 8 | 6 | 12 | 12 |
| 34 | 8 | 8 | 9 | 11 | 8 |
| 35 | 10 | 13 | 12 | 13 | 14 |
| 36 | 12 | 13 | 12 | 12 | 12 |
| 37 | 10 | 11 | 4 | 12 | 14 |
| 38 | 12 | 13 | 9 | 13 | 12 |
| 39 | 13 | 13 | 11 | 14 | 15 |
| 40 | 8 | 13 | 9 | 12 | 16 |
| 41 | 12 | 15 | 7 | 13 | 16 |
| 42 | 8 | 8 | 6 | 10 | 12 |
| Total....... | 437 | 457 | 318 | 443 | 490 |
| Average..... | 10.4 | 10.88 | 7.57 | 10.54 | 11.66 |

records are given for the months April to September inclusive for the years represented by the measurements. The temperature is important in this connection as affecting the rate of transpiration of the trees and the rate of evaporation from the soil. The season of 1909 was marked by ample rainfall in June and July, and by temperatures, during the earlier part of the season, lower

TABLE II

MEASUREMENTS ON THE SAME BASIS AS SHOWN IN TABLE I, BUT OF TREES ON A DIFFERENT AREA

| No. | 1909 | 1910 | 1911 | 1912 | 1913 |
|---|---|---|---|---|---|
| 1 | 10 | 10 | 9 | 11 | — |
| 2 | 8 | 10 | 7 | 9 | 12 |
| 3 | 10 | 6 | 4 | 5 | 7 |
| 4 | 7 | 8 | 6 | 9 | 9 |
| 5 | 6 | 7 | 6 | 8 | 11 |
| 6 | 7 | 8 | 7 | 11 | 10 |
| 7 | 7 | 7 | 4 | 8 | 8 |
| 8 | 7 | 7 | 5 | 8 | 8 |
| Total....... | 62 | 63 | 48 | 69 | 65 |
| Average..... | 7.75 | 7.75 | 6 | 8.37 | 9.28 |

than those of any of the other years here recorded. Precipitation was least in 1910, and of the rain of this season over 40 per cent. fell in September, too late to be of much influence in the formative work of the year. The months of June and July were marked by only four fifths of an inch of rain, and by temperature higher than usual, which served to intensify the drouth during

TABLE III

WEATHER DATA FOR MISSOULA, 1909 TO 1913 INCLUSIVE, APRIL TO SEPTEMBER

T. = temperature, F.

| Mo. | 1909 | | 1910 | | 1911 | | 1912 | | 1913 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Rain | T. | Rain | T. | Rain | T. | Rain | T. | Rain | T. |
| Apr.... | 1.19 | 40 | 0.66 | 51 | 0.72 | 43 | 2.02 | 46 | 1.46 | 45 |
| May... | 0.99 | 50 | 1.92 | 56 | 1.00 | 51 | 3.09 | 52 | 1.44 | 52 |
| June... | 2.65 | 60 | 0.67 | 63 | 3.38 | 62 | 1.78 | 62 | 2.39 | 62 |
| July... | 3.52 | 65 | 0.13 | 71 | 0.21 | 66 | 1.94 | 63 | 1.52 | 67 |
| Aug.... | 0.34 | 66 | 0.57 | 62 | 0.43 | 64 | 1.88 | 63 | 1.52 | 67 |
| Sept. .. | 2.38 | 57 | 2.76 | 56 | 1.31 | 54 | 1.58 | 50 | 0.74 | 57 |
| Total.. | 11.07 | | 6.71 | | 7.05 | | 12.29 | | 8.58 | |

the very period in which most of the new tissues were taking form. This period was followed by another month of dry weather, in which the slight amount of rain which fell could have had no appreciable influence, and during which the synthetic activity of the tree must have been greatly retarded. The year 1911 was marked by a more advantageous distribution of the rain, 3.59 inches falling in June and July, as compared with .8 of an inch in the same part of the previous year, and this season's advantages were clearly expressed in the ample growth of the shoots in the following season. Likewise the season of 1912 was an exceedingly favorable one for forest vegetation in this region, as testified by the excellent growth of all shoots in 1913.

A series of observations of a similar nature was conducted also on the Douglas fir, growing with the yellow pine in the same area which furnished the data given in Table I. Twenty-three trees were measured, these trees being of about the same age as the pines. From the figures given it will be apparent that the com-

TABLE IV

APPROXIMATE MEASUREMENTS OF THE HEIGHT GROWTH OF DOUGLAS FIR (*Pseudotsuga taxifolia*), MADE ON THE UPPER PORTIONS OF THE MAIN STEM, FOR EACH OF THE SEASONS INDICATED, IN INCHES

| No. | 1909 | 1910 | 1911 | 1912 | 1913 |
|---|---|---|---|---|---|
| 1 | 12 | 13 | 8 | 14 | 12 |
| 2 | 6 | 9 | 6 | 11 | 11 |
| 3 | 13 | 11 | 10 | 13 | 12 |
| 4 | 13 | 12 | 13 | 12 | 10 |
| 5 | 11 | 10 | 12 | 12 | 12 |
| 6 | 13 | 13 | 10 | 14 | 14 |
| 7 | 14 | 12 | 8 | 14 | 14 |
| 8 | 11 | 12 | 11 | 14 | 12 |
| 9 | 8 | 14 | 13 | 12 | 8 |
| 10 | 8 | 11 | 8 | 13 | 12 |
| 11 | 13 | 13 | 13 | 14 | 13 |
| 12 | 13 | 12 | 12 | 14 | 14 |
| 13 | 10 | 12 | 13 | 14 | 12 |
| 14 | 12 | 10 | 6 | 14 | 13 |
| 15 | 16 | 12 | 6 | 14 | 16 |
| 16 | 12 | 14 | 10 | 12 | 12 |
| 17 | 15 | 14 | 10 | 14 | 14 |
| 18 | 9 | 8 | 10 | 12 | 12 |
| 19 | 5 | 8 | 6 | 10 | 12 |
| 20 | 12 | 11 | 8 | 10 | 10 |
| 21 | 12 | 8 | 6 | 13 | 12 |
| 22 | 14 | 13 | 12 | 15 | 14 |
| 23 | 10 | 11 | 8 | 8 | 12 |
| Total....... | 262 | 263 | 219 | 293 | 283 |
| Average..... | 11.4 | 11.4 | 9.5 | 12.7 | 12.3 |

parative lengths of the internodes are not so uniform as in the case of the pines, there being some instances in which the longer internode falls in the year 1911, instead of the shorter. The reason for these exceptions is not clear; they may possibly be due to local variations in the soil moisture. The totals and the averages, however, show the same relations to one another as in the case of the pines. The figures are given in Table IV.

It is evident of course that the influence of the preceding season is not limited to the retardation of height growth during the year immediately following, but that the shorter twigs must involve the production of a lesser leaf area than usual, which must in turn be reflected in the amount of reserve products accumulated. Here, however, the problem becomes complicated, and the lessened leaf area on the last shoot may in a measure be compensated by the greater illumination of the older leaves, by this fact made possible. The figures for 1912 as compared with those for 1913 in Table I would seem to indicate the holding over effect as here suggested, though the same does not appear to be true of the Douglas fir. It is also evident that trees of different species on the same areas are not equally responsive to the variations of soil moisture in the manner indicated, a fact which probably is due chiefly to a difference in the degree of tolerance though to some extent to other specific peculiarities.

University of Montana

## A NEW SOUTHWESTERN SEDGE

By Kenneth K. MacKenzie

Since writing the article on *Carex* for the Illustrated Flora two species have been found by Mr. E. J. Palmer in southwestern Missouri not included therein. One is *Carex arkansana* Bailey, heretofore known from Arkansas and Oklahoma. The other is an undescribed species bearing a remarkable outward resemblance to the European *Carex vulpina* L., and in technical characters intermediate between that species and our own *Carex stipata* Muhl. It is represented in the collections at the New York Botanical Garden by several specimens, and seems first to have been collected by Bigelow in 1853–4 in the Whipple Expedition from "Fort Smith to the Rio Grande." Elihu Hall secured it on June 6, 1872, in swamps at Hempstead, Texas (No. 734); and B. F. Bush collected excellent specimens (No. 993) at Catale, Indian Territory, now Oklahoma, on May 22, 1895. These specimens in the Columbia University herbarium have been taken as the type. Mr. Palmer's specimens (No. 3405) were collected on May 21, 1911, in wet sandy soil near Jasper, Missouri, and were distributed as *Carex conjuncta* Boott. The other specimens referred to were all distributed as *Carex stipata* Muhl.

A detailed description of this species follows, which may be known as

**Carex Oklahomensis,** sp. nov.

Culms cespitose, 3.5–8 dm. high, 4–6 mm. wide at base, 1.5 mm. beneath head, slender but stiff, sharply triangular, rough above, not wing-angled or strongly flattened in drying, exceeding leaves, aphyllopodic, brownish at base, the rootstocks fibrillose. Leaves with well-developed blades 3–4 to a culm, the blades flat, thickish, 2.5–5 mm. wide, up to 4 dm. long, serrulate on margins towards apex as well as roughened on veins, the sheaths tight, strongly green and white mottled dorsally but not conspicuously septate nodulose, ventrally white-hyaline not red-dotted or cross-rugulose, thin, and soon ruptured, exceeding base of blade. Head 4–7 cm. long, about 15 mm. wide, oblong-cylindric, with numerous spikes, continuous or somewhat interrupted below, the basal branches compound, appressed, sessile or short-peduncled, the upper simple, closely aggregated and scarcely distinguishable; lower one or two bracts prolonged, setaceous, the others scale-like. Spikes androgynous, subglobose, 5–8 mm. long, nearly as wide, with some 6–12 appressed-ascending perigynia and inconspicuous staminate flowers. Scales ovate or lance-ovate, as wide as but shorter than perigynia, chestnut brown tinged with hyaline margins and prominent midvein excurrent as a cusp. Perigynia lance-ovate, 4–5 mm. long, 1.75 mm. wide, plano-convex, thick, the walls thin, spongy and subturgid at base, green or in age greenish-straw-colored but not brownish, dorsally conspicuously 7–10 nerved, ventrally less conspicuously fewer nerved, sharp-edged to the truncate sub-cordate base, stipitate, tapering to a serrulate deeply bidentate beak shorter than body, at apex reddish-brown tinged, and with a suture on the outer side. Achenes lenticular, yellow, stipitate, ovate-orbicular, 1.75 mm. long, 1.5 wide, apiculate, jointed with style, the latter thickened at base. Stigmas two.

From its American allies this species may be distinguished by the combination of wingless culms, erugulose white and green mottled sheaths, and beak of perigynium not exceeding body. It is to be referred to the group STENORHYNCHAE Holm.

NEW YORK

## SHORTER NOTES

TRI- AND TETRACARPELLARY WALNUTS.—In TORREYA, June, 1913, the writer published a short note on "A Tetracarpellary Walnut." Recently he has had an opportunity to examine a series of 106 abnormal walnuts, all from the grove in Santa Ana, California, referred to in the first note. Of these 106 walnuts, 89 were tricarpellary, 45 being symmetrical and 44 unsymmetrical. The remaining 17 were tetracarpellary, 7 being symmetrical and 10 unsymmetrical. The statement as to symmetry is as viewed from the pointed end; a few of these specimens were incomplete, that is, the grooving of the shell did not extend entirely around to the back of the shell. It was not found possible to connect the production of these malformed walnuts with any particular tree or trees in the grove.

If this case be taken as typical, it would appear that the tendency toward the production of the tricarpellary type is greater than that toward the tetracarpellary type, and that approximately one half of the specimens are symmetrical or nearly so, in both types.

I am indebted to Prof. R. C. Shuey, of the University of Pittsburgh, for these specimens.

F. ALEX. MCDERMOTT.

MELLON INSTITUTE,
UNIVERSITY OF PITTSBURGH,
PITTSBURGH, PA.

# REVIEWS

### Selden's Everyman's Garden Every Week*

Mr. Selden has written a very useful little book which is full of information for the amateur gardener. Its introductory chapters are upon cold weather planning and reading; saving the family purse; garden soils, good and bad; tools that are essential; garden eugenics; water whenever needed; garden mistakes of various sorts; and taking planting cues from nature. These are followed by chapters describing work which may be done to advantage during every week from early April until November, and the book concludes with chapters on indoor work and suggestions for the garden calendar. The book is packed full of suggestions, directions and remarks concerning garden crops of all kinds, and cannot fail to be of great service to a large constituency.

N. L. Britton.

Blackman, V. H. and Paine, S. G., *A Recording Transpirometer*, Ann. Bot. **28**: 109–113, 1914, describe an ingenious device for automatically recording the loss of water from a plant. The properly prepared potted plant is placed on the left-hand pan of a balance and counter-poised. Nearby is a water reservoir with a tube placed so as to discharge a uniform series of drops directly over an opening in the cover of a flower pot. When the experiment is started a small vertical funnel, attached to a horizontal metal tube, intercepts the drops and discharges them into a waste vessel. The metal tube passes through two solenoids placed end to end. As water is lost by the plant the left-hand balance pan rises and finally, by means of a mercury cup attached, makes an electric contact, closing the circuit through the further one of the two solenoids. This draws back the metal tube, and water drops now fall into the flower pot. As the left pan descends the circuit is broken, but drops continue to fall into the pot until the rising right pan, by means of an arrangement similar to that on the left pan, closes an electric circuit through the near solenoid, thus moving the tube back into its original position.

* Selden, C. A. Everyman's Garden Every Week, pp. 1–338, small octavo. Dodd, Mead & Company, 1914.

Every time the left pan closes its circuit a portion of the current passes through the magnet of a recording pen, marking on a revolving drum. The wires with which the mercury cups make contact can be raised or lowered, thus varying the interval at which the marks are made. The movement of the balance is steadied by means of a disc fastened beneath one of the pans and moving up and down in a heavy liquid. A number of records can be traced simultaneously on the drum, so that it is possible to set up two or more plants under different conditions, together with an evaporimeter beside every plant and automatically record the water loss from each on the same drum. The apparatus is obtainable from Messrs. Baird & Tatlock, Cross Street, Hatton Garden, London, E.C.

It is perhaps asking too much that the fashioners of a beautiful piece of apparatus should also present a handsome series of results obtained with their invention. Yet it is difficult to repress altogether a feeling of resentment in viewing the one puny record contributed by the authors. W. G. M.

## PROCEEDINGS OF THE CLUB

### February 10, 1914

The first meeting of the Club in February was held February 10, 1914, at the American Museum of Natural History at 8:15 P.M. President Harper presided. Twenty-four persons were present. Mr. Charles Van Loan's resignation was tendered to the Club and accepted.

President Harper asked for permission to appoint a series of special committees to study the Cryptogamic flora of the vicinity of New York. Vice-President Barnhart then took the chair and opened the matter for discussion. Dr. Howe made a motion to grant President Harper the permission requested. The motion was unanimously carried.

The business program was then followed by an illustrated lecture on "The International Phytogeographical Excursion of 1913," by Dr. George E. Nichols. Dr. Nichols will publish a short account of the Expedition in Torreya for April.

Meeting adjourned. Michael Levine,

*Sec. pro tem.*

FEBRUARY 25, 1914

The meeting of February 25, 1914, was held in the Laboratory of the New York Botanical Garden at 3:30 P.M. President Harper presided. Twelve persons were present. The minutes of February 10 were read and approved.

The secretary read a communication from Dr. C. Stuart Gager relating to the death of Dr. L. Schöney who was at one time a member of the Torrey Club.

The treasurer announced a gift of one hundred and eight dollars to the Underwood Fund by Miss Caroline C. Haynes. This gift was the proceeds from the sale of "American Hepaticae" (Exsiccatae) prepared and distributed by Miss Haynes. A vote of thanks was extended to Miss Haynes for this generous contribution.

The first number on the announced scientific program consisted of a lecture on "The Nature and Inheritance of Fasciation," by Dr. O. E. White.

Dr. B. O. Dodge then reported briefly on the use of the stereoscope in connection with binocular microphotographs.

Adjournment followed.

B. O. DODGE,
*Secretary.*

MARCH 10, 1914

The meeting of March 10, 1914, was held at the American Museum of Natural History at 8:15 P.M. President Harper presided. Twenty-four persons were present.

The reading of the minutes of the previous meeting and transaction of other business were dispensed with. The announced scientific program was then in order.

Professor H. M. Richards delivered an illustrated lecture on "Some Aspects of Californian Coastal Vegetation."

Adjournment followed.

MICHAEL LEVINE,
*Sec. pro tem.*

MARCH 26, 1914

The meeting of March 26, 1914, was held in the Laboratory of the New York Botanical Garden at 3:30 P.M. Vice-president Barnhart presided. Eighteen persons were present.

The minutes of the meetings of February 25 and March 10 were read and approved. Edward D. Hull, 6024 Ellis Ave., Chicago, Ill., was nominated for membership.

The death of Rev. J. Henry Watson and confirmation of the report of the death of Dr. C. B. Robinson were announced. On the motion of Norman Taylor a committee consisting of Dr. John H. Barnhart and Dr. Marshall A. Howe was appointed to draw up resolutions on the death of Dr. Robinson.

Edward D. Hull was then elected to membership.

The announced scientific program consisted of a paper on "Notes on the Local Flora," by Mr. Norman Taylor. These consisted chiefly of material taken from the introduction to his forthcoming work on the "Flora of New York and Vicinity."

Meeting adjourned.

B. O. Dodge,
*Secretary.*

## NEWS ITEMS

Dr. Ross Aiken Gortner, who has been in charge of the Biochemical Laboratory of the Station for Experimental Evolution at Cold Spring Harbor, will take up his duties of Associate Professor in the newly established Department of Soil Chemistry at the University of Minnesota, August 1. The work in the Physico-chemical Properties of Vegetable Saps which he has been carrying on with Dr. J. Arthur Harris will be continued by his assistant, Mr. John V. Lawrence, and Dr. Harris.

Miss Susan Minns has given $50,000 to the Botanical Department of Wellesley College, in memory of Susan M. Hallowell, the former Head of the Department.

Members of the Torrey Club are invited to attend a field meeting of the American Fern Society to be held July 16, 17 and 18 in the neighborhood of New York City. A trip to collect fern hybrids is contemplated as well as a visit to the New York Botanical Garden fern conservatories, and probably also a more extended trip for some special fern. Further information may be had by writing Mr. R. C. Benedict, 2303 Newkirk Avenue, Brooklyn, N. Y.

Professor Thomas H. Macbride, who has been head of the Department of Botany in the State University of Iowa for over thirty years, has been elected President of the University. He entered upon his new duties April first.

At a combined excursion of the Torrey Club and several other organizations held on June 7, more than sixty people attended. The locality visited was Cliffwood, N. J., where the hybrid oaks, *Quercus Rudkini* and *Q. heterophylla*, were observed, also the marl banks there which contain many cretaceous plant remains.

Dr. J. W. Harshberger will give two courses in systematic and field botany this summer along ecological lines at Cold Spring Harbor, Long Island, and later on Nantucket.

The Right Honorable Joseph Chamberlin, who for many years maintained one of the best private collections of orchids in existence, died July 3, at Prince's Garden, London.

We learn from *Magazine San Diego* that an official in Mexico was requested by the governor of the state to render a report on the Fauna and Flora of his district. A second more peremptory demand for the delayed report is said to have elicited the following: "*Dear Sir*: Fauna left this locality two weeks ago. Flora is in jail. Awaiting your further instructions, I am,

"Your most obedient servant, etc.

José Gonzales."

# The Torrey Botanical Club

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**The following Committees have been appointed for 1914**

**Finance Committee**

J. H. BARNHART, *Chairman*
MISS C. C. HAYNES

**Field Committee**

SERENO STETSON, *Chairman*

**Budget Committee**

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B. O. DODGE
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**Program Committee**

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MISS JEAN BROADHURST
C. STUART GAGER
F. J. SEAVER

**Local Flora Committee**

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Delegate to the Council of the New York Academy of Sciences
WILLIAM MANSFIELD

OTHER PUBLICATIONS

OF THE

# TORREY BOTANICAL CLUB

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## (1) BULLETIN

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DR. BERNARD O. DODGE

Columbia University

New York City

Vol. 14 August, 1914 No. 8

# TORREYA

A Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873

## CONTENTS



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# THE TORREY BOTANICAL CLUB




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Brooklyn Botanic Garden
Brooklyn, N. Y.

# TORREYA

August, 1914.

Vol. 14 No. 8

## PROPOSED WORK ON THE CRYPTOGAMIC FLORA OF THE REGION ABOUT NEW YORK

May 8, 1914

To the Members of the Torrey Botanical Club:

The following program for work on the cryptogams has been sent to all members of the Torrey Botanical Club and others interested. It is desired to secure the coöperation of as many collectors and field workers as possible.

The Club proposes to undertake special work during the coming year on the cryptogamic flora of the region. The completion and provision for publication of Mr. Taylor's list of the flowering plants and ferns suggest the extension of the Club's activities to this further field as the next large undertaking necessary to complete our knowledge of the plant life of the local flora district.

Notable work on various groups of the cryptogams has already been accomplished and it is hoped to publish at once in the Club's journals preliminary lists, so far as they are available. It is the desire of the Club to enlist the assistance in this undertaking of as many collectors and field workers as possible. It has been decided to create a considerable number of special committees with chairmen, who, as far as possible, are interested in particular groups and to invite the members of the Club and others to enroll themselves on one or more of these committees. The chairmen will organize field excursions either for their special work or in conjunction with other committees and the effort will be made to arrange the dates for trips to the different regions so as to visit each locality at a time most favorable for

[No. 7, Vol. 14, of Torreya, comprising pp. 115–132, was issued 17 July 1914.]

collecting its special flora. It is desired that the data obtained should include records as to abundance, perfection of development, etc., at the various stations for each species and that such records be continued in succeeding years so that in the case of the fleshy fungi and algae, especially, more reliable information as to their occurrence and distribution than is now available may be accumulated.

Facilities for comparing, identifying and preserving material will be provided at the New York Botanical Garden, the Brooklyn Botanic Garden, Columbia University, Barnard College, Yale University and Rutgers College.

The excursions for the study of the flowering plants under Mr. Stetson will also be continued as heretofore and members are asked to enroll themselves for this work as well as for that on the cryptogams.

You are cordially invited to enter your name under the head of one or more of the committees named and to return the enclosed slip to B. O. Dodge, Secretary of the Club. Notices as to special meetings, field trips, etc., will then be sent to you from time to time.

R. A. Harper,
*President*

B. O. Dodge,
*Secretary*

Chairmen of Special Committees on Local Flora,
Torrey Botanical Club

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## TWO NEW PLANTS FROM THE TERTIARY ROCKS OF THE WEST

By T. D. A. Cockerell

### **Smilax labidurommæ** sp. nov.

Leaf 53 mm. long and 35 wide; deltoid, with truncate base, the lateral margins nearly straight, but under a lens showing shallow crenulation; five principal longitudinal veins.

Miocene shales, Florissant, Colorado, Station 14 (*Wilmatte P. Cockerell*). On the same slab, three mm. from the leaf, is an earwig, *Labiduromma bormansi* Scudder. The genus *Smilax* and the family Smilaceæ are new to the Florissant list, but various species of *Smilax* have been found in other American formations. **Smilax carbonensis** n. n. (*S. grandifolia* Lesq., Tertiary Flora, Pl. IX, f. 5, from Carbon, Wyoming) is a larger leaf, with cordate instead of truncate base, and convex lateral margins. It is probably quite distinct from *Smilacites grandifolia* Unger,* which as originally figured by that author, has the basal sinus very deep (over 30 mm.); and in any event *S. grandifolia* Buck-

* Chloris Protogaea, pl. XL, f. 3.

ley* antedates Unger's name by about four years. In the determination of *Smilax* leaves there is indeed a large element of uncertainty, owing to the variation in outline, as Laurent† has beautifully illustrated in the case of *S. aspera*. This should prevent us from multiplying specific names based on different

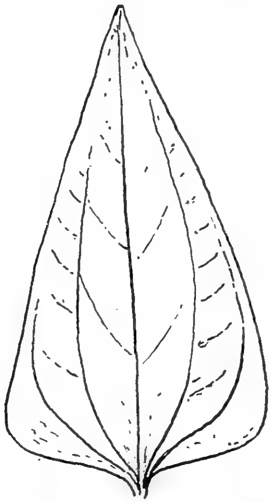

Fig. 1. *Smilax labidurommæ* Cockerell.

looking leaves of the same region and period, but on the other hand, it should not lead us to consider identical plants of quite different parts of the world and different geological horizons. Something must be allowed for the inherent probabilities in each case. Knowlton‡ has described *Smilax lamarensis* from the supposed Miocene of the Yellowstone; it resembles *S. carbonensis* rather than the Florissant species, having the cordate base and rounded sides. Heer,§ from beds supposed to be Miocene at Asakak, Greenland, describes a *Smilax lingulata;* it is a narrow leaf quite unlike the Florissant plant, resembling, in fact, the living *S. laurifolia* L.

A much more ancient plant assigned to this genus is **Smilax**

* Am. Journ. Sci. **45**: 171. 1843.

† Ann. Mus. Marseille, **12**: pl. 1. (1908.)

‡ Geol. Yellowstone Nat. Park, pl. CXXI, f. 3, 4.

§ Kongl. Sv. Vet. Akad. Handl., **13**, no. 2: 15, pl. 1, f. 12 (1874).

**Kansana** n. n. (*S. undulata* Lesq.,* not of Pohl†), from the Dakota group in Kansas.

**Tithymalus phenacodorum** sp. nov.

Seed. Length 4.75, breadth 4.25 mm.; short-pyriform, with four sides slightly flattened; surface coarsely irregularly wrinkled.

Five miles southeast of mouth of Pat O'Hara Creek, Clark's Fork Basin, Wyoming; above red-banded beds, in strata supposed to be older than the Wasatch, though formerly classed

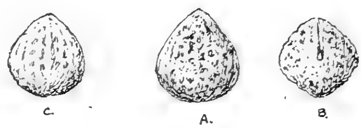


FIG. 2. Seeds of *Tithymalus:* A. *T. phenacodorum*, side view. B. *T. phenacodorum*, from above. C. *T. Willistoni*, side view.

with that group. Type in American Museum of Natural History; collected by Mr. W. Stein, along with numerous remarkable land shells, of the genera *Protoboysia*, *Boysia*, *Vitrea*, *Thysanophora*, *Pyramidula*, *Gastrodonta* and *Oreohelix*.

Compared with the seeds of *T. Willistoni* Cockerell,‡ from the Loup Fork Beds of Long I., Kansas, the new species is distinctly longer, while the depressions between the rugæ are more irregular and less definitely in longitudinal series. A quite similar but still longer seed is that of the living Mexican **Tithymalus campestris** n. n. (*Euphorbia campestris* Cham. & Schl., 1830), the seed of which is well figured by Millspaugh, Botanical Gazette, XXV (1898): 25. In *T. campestris*, however, the rugae are more labyrinthiform than in *T. phenacodorum*.

Extremely hard and dense seeds, such as those of *Tithymalus*, are readily fossilized where ordinary vegetation decays and disappears. It is probable that careful search will reveal them in other Tertiary strata. I add a figure of *T. Willistoni*, as it has not been figured.

* Fl. Dakota Group: 39 (1892).

† Pohl, A. DC. in D. C., Mon. Phan. 1: 135.

‡ Torreya 9: 119. 1909.

# SOME COMPARISONS OF THE LICHEN FLORAS OF EURASIA AND NORTH AMERICA

By R. Heber Howe, Jr.

In studying many of the filamentous and foliose lichen-species of North America I have been struck with the interesting correlation of species-distribution found on the two continents of North America and Eurasia. This correlation is so often overlooked, that new varieties and even species are being described without a sufficient study of the distributional problems that present themselves, though as Dr. Darbishire has pointed out, these species may be "alike only in their external morphology," and "may have been separately derived from some common ancestor." It, nevertheless, should make one wary of describing new species even if excused by any such theoretical probability.

That the lichen flora of western Europe and the western coast of North America is closely allied,—as that of eastern Asia and eastern portions of the United States is, in some striking instances, at least undeniable. I am told that the same analogy is apparent in other groups, *i. e.*, the mosses.*

## Climate, Elevation, Etc.

There are evidently several underlying causes that develop lichen species; just what these are, and their relative importance, is still to be explained. We have climatic conditions, the three most important factors of which for lichens, as for all plants, are moisture and sunlight, and the variability of temperature due to elevation or latitude. The character of the soil (of no concern in the species here discussed) plays, no doubt, an important rôle. The proximity of the sea also, it would seem, has a definite influence. All of these factors, however, fail, it appears, to explain entirely the curious occurrence of a given species on both continents. A combination of them all is more likely the answer.

[* Gray, Hooker and many recent writers have discussed the well-known relationship of the flora of eastern Asia and eastern North America. See Torreya for January 1914, p. 8.—Ed.]

In a recent paper by Dr. Darbishire* on Arctic flora, a most interesting and enlightening comparison of Arctic species with those of Germany is made, showing that the advance and retreat of the ice age explains a remarkable distribution, which results in 72.3 per cent. of Arctic lichens being found in the Tyrol. A conclusion, that the crustose species are of a later evolutionary development than the fruticose, is also brought forward by means of comparison of the two floras.

A few examples taken from the *Usneaceae* show the correlation that I have in mind, and which at a later date I hope to be able to take up in more detail.

### Genus: Usnea

*U. plicata* (L.) Web. I have before me examples of *Usnea plicata* from the Alps which are practically as robust as those from the Californian coast, and are impossible to separate if the labels are withheld. These Californian plants have been described as representing a new species, *i. e.*, *U. californica* Herre. This species was considered by Dr. Zahlbruckner to belong to the series *Pachynae*, but in reality it is a *Mesinae*, a point in which Dr. Zahlbruckner now agrees with the author.† Dr. Herre was perhaps mislead by this belief when he described the species.

*U. articulata* (L.) Hoffm. Though this species is never well developed in our area, it is found only on the Californian coast. It is of course a well marked species in the British Isles.

### Genus: Letharia

*L. vulpina* (L.) Ach. This plant occurs throughout northwestern United States, reaching in California perhaps, a slightly more robust development (*i. e.*, *L. vulpina* var. *californica* Nyl. = *L. columbiana* Nutt.) and is an exactly parallel case with *U. plicata*.

* Rept. 2d Norwegian Arctic Exped. "Fram," 1898–1902, Videns. Sels. I Krist. 51–53. 1909.

† In litt. Sept. 9, 1913, "Die *californica*, deren Originale exemplar bei mir erliegt ist eine echte *Pachyna*." In litt. Feb. 2, 1914, "Darin haben Sie recht, dass *Usnea californica* nicht zu des *Pachynae* gehort."

*L. thamnodes* (Flot.) Hue. This species shows that the eastern Asiatic distribution is in this case parallel with that of eastern United States. *L. thamnodes* is not known from west of the Mississippi and is now considered synonymous with *Evernia mesomorpha* Nyl. from eastern Asia.

### Genus: Ramalina

*Ramalina fraxinea* (L.) Ach. This species (typica) is unknown from our area except on the Pacific coast, and we have small argument to distinguish it from the common *R. Mensiezii* Tuck.,—in fact unlabelled material from the coast of France is in many cases impossible of separation (see Bryologist 17: 20–22. 1914).

*R. Duriaei* (DeNot.) Bagl. This plant occurs only in southern California and appears again on the southeastern Atlantic coast of Europe.

*R. calicaris* (L.) Fr. emend. (= *scopulorum*). The only representative of this species-group is the occurrence in Alaska of *R. subfarinacea* Nyl.

### Genus: Alectoria

*A. Fremontii* Tuck. This species, known only from western North America, is no longer a unique representative of our area, as it is now well known from Scandinavia and even France.

Thoreau Museum of Natural History,
Concord, Mass.

# A POSSIBLE HABIT MUTANT OF THE SUGAR MAPLE (ACER SACCHARUM)*

By A. F. Blakeslee

In the summer of 1911 while on a collecting trip near Binghamton, N. Y., the writer's attention was attracted to a single tree in a distant row of sugar maples. Its strikingly regular outline suggested either that it had become overgrown by a vine or had been artificially trimmed to suit the whim of some topiarian artist. A closer approach and inspection, however,

* Contribution from the Department of Genetics, Connecticut Agricultural College.

showed that neither supposition was correct. Moreover, the owner of the farm upon which the tree was growing, Mrs. Lucy A. Burbank, gave the information that the tree in question had been planted by her husband somewhat over 30 years previously, together with the other trees seen in the row (Fig. 1). The exact source of the young trees could not be given but, when planted, all were supposed to be normal sugar maples. It had early shown its peculiar form and most people who had seen it insisted it had been kept trimmed, but such was not the case. A comparison with the adjacent trees of the same age would indicate that its growth had been relatively slow. At the time the photographs were taken, its height was about 32 ft. and the diameter of the trunk at breast height was 9 inches. For comparison it may be stated that the height of the first tree to the right of the one in question is about 43 ft. and has a trunk diameter of 15 inches.

The limbs are slender and branch profusely to form a close thicket of slender branchlets which end at a nearly uniform distance from the trunk. By the shortness of the petioles of the outer leaves and the progressive elongation of the petioles of those toward the base of the season's growth, the foliage is formed in a dense, even thatch which, in connection with the regularity of the skeleton, produces an appearance similar to that of a symmetrical arbor vitae. So far as can be seen, the habit of growth alone is peculiar, for the individual leaves and winter twigs are like those of normal sugar maples.

Scions have been sent to the New York Botanical Garden and to the Arnold Arboretum. Successful grafts onto normal stock have been obtained at the latter institution as well as in the Botanic Garden of the Connecticut Agricultural College. Without doubt the tree will hold its peculiarity of growth when propagated vegetatively as have other form varieties of maples such as the fastigiate sugar maple (var. *monumentale*) which has the aspect of a Lombardy poplar.

A short note describing this habit variant of the sugar maple was presented at the Washington meeting of the Botanical Society of America, 1911, and an abstract of this note was given in

Science, Jan. 26, 1912. Since then two trees of somewhat similar appearance have been brought to the writer's attention.

Under date of Jan. 29, 1912, Mr. J. N. Prouty of Humboldt, Iowa, writes: "We have in this town what I presume is a dupli-

FIG. 1. Summer and winter view of possible habit nutant of sugar maples.

cate of your tree. . . . The tree is more than 40 years old, the stem about one foot in diameter, and more than 30 feet in height though it has the appearance in the picture of being a shrub. It was transplanted with many others of the same variety to a gravelly ridge where it made a slow growth—slower than the one to the right which is of the same variety and transplanted at the same time." A colored photo postal sent shows a bushy tree of regular outline much broader than the one pictured in the present article. Those "of the same variety" in the row are obviously normal sugar maples.

Mr. L. S. Hopkins, of the Peabody High School, Pittsburg, Pa., after examining photographs sent him, writes concerning a tree discovered in Wayne, Co., Ohio: "Although of a slightly different type, I think my tree is exactly the same. . . . The tree is not an unusually large one but rather undersized. However, the shape is such that every one who sees it for the first time thinks it has been trimmed into its present form but so far as I have been able to find out it has never been touched."

The three trees discussed, in addition to their regularity of outline, show in common a relatively slow growth. The wide separation of the localities where they are found would indicate they had originated independently. It is possible that individual trees of similar habit may be found in other localities. If so, the writer would be glad to have them brought to his attention. The form, however, is so unusual in a deciduous tree and so conspicuous from a distance that it is improbable they could escape notice, even of a layman. Their occurrence therefore must be extremely rare. Moreover, Prof. C. S. Sargent has kindly examined photographs of the tree from Binghamton, N. Y., and informs the writer that no occurrence of a sugar maple with any such habit of growth has been reported or is known in the literature.

Fruit has not been obtained from any of these three trees and the writer has been unable to visit the tree at Binghamton during the flowering season. In consequence no experiments have been undertaken to discover how the peculiar form is inherited in sexual reproduction. That the peculiarity is an inheritable character and not a mere environmental modification is presumable from the association of the abnormal forms with normal trees acting as controls under similar growth conditions. The term mutation may be conveniently applied to the sudden appearance of an inheritable peculiarity, whether due to an immediately preceeding change in the germ plasm or to the rare kaleidoscopic combination of unit characters already present. The form variant of the sugar maple here described therefore, may be provisionally classed as a mutant.

## A CLASSIFICATION OF BOTANICAL SCIENCE IN TWO DIMENSIONS

By Roland M. Harper

The classifications of knowledge relating to the vegetable kingdom which one finds in encyclopedias, text-books, library manuals, etc., usually arrange the ultimate units in a linear sequence (a space of one dimension), and almost necessarily so, for the parts of a written or spoken discourse, such as a lecture course, are consecutive rather than simultaneous. But a classification of science, books, plants, life-zones, or anything else, that has but one dimension can not as a rule place all the units in their proper relation to each other, for in a linear sequence each unit can be adjacent to not more than two others.*

An ideal classification should have several dimensions, but any system represented on a sheet of paper or other plane surface is limited to two. This answers fairly well for classifying sciences, though, for it allows us to classify them by subject matter and by point of view at the same time.

The subjoined table represents a crude attempt to arrange the botanical sciences in two dimensions. The columns represent the objects studied, and the horizontal divisions the points of view or methods of investigation. The columns form a regular series of increasing complexity, from vegetable matter in general to plant associations; but there is no such simple relation between the horizontal rows, and if a third dimension were available the points of view might advantageously be grouped in two dimensions instead of one, so as to bring the study of environment,

* One of the latest and most elaborate linear classifications of pure and applied botany is that of Harshberger in Science, II. **36**: 521–525. Oct. 18, 1912.

## Table of Botanical Sciences

| Points of view / Objects | Vegetable matter | Cells | Tissues | Organs | Plants | Associations |
|---|---|---|---|---|---|---|
| General (functions, classification, etc.) | Botany | Cytology | Histology | Organography | Phytology? | Sociology |
| Composition | Plant chemistry | Pharmac | ology? | | | ? |
| Physical properties | Specific gravity etc. | Osmotic pressure | Strength of wood, etc. | ? | | |
| Structure | | Mo | rph | olo | gy | ? |
| Nutrition, respiration, photosynthesis, etc. | | Ph | ysi | olo | gy | |
| Germination and growth, or life history | | | Phy | siol | ogy | Invasion? |
| Seasonal or other periodic changes | | | Phy | siol<br>Phenol | ogy<br>ogy | ? |
| Movements and responses | | | | Physi | ology | |
| Reproduction | | | | | Physiology | |
| Descent or inheritance | | | | | Genetics | |
| Evolution or history | | | | ? | Phylogeny<br>Paleobotany | Succession |
| Interrelations | | | ? | ? | Competition symbiosis, parasitism, etc. | Zonation, etc. |
| Environment (influence of) | | | Ec | olo | gy | Synecology |
| Areal distribution | | | | | Geogr | aphy |

for example, next to that of seasonal changes and movements and responses, as well as to interrelations and distribution.

The rectangular spaces left blank are those in which no laws can be placed. For example, we can hardly conceive of the nutrition of plant associations, or the geographical distribution of cells. Spaces occupied only by interrogation points are those in which there seem to be a few laws, but not enough to have received a special name as yet.

The last four or five columns should each be regarded as made up of a multitude of smaller ones, corresponding to the different kinds of tissues, plants, etc. Organs can be subdivided twice, first into kinds of organs, and then into different forms of each kind. Plants may be classified either by their supposed phylogenetic relationships, as in taxonomy, or by structure and adaptations (this sometimes called ecological classification), or in various other ways. For the taxonomic subdivisions there are numerous minor "-ologies," such as mycology, bryology, agrostology, and even batology and ionology; and for the structural subdivisions there are a few terms, of which dendrology is probably the most familiar.

Some of the horizontal rows, especially the last two, can be similarly subdivided. The subdivisions of ecology are the various environmental factors, and those of geography the divisions of the earth's surface; and each of these systems may be arranged in more than one way.

In studying any portion of the field we may proceed either by rows or by columns. For example, most ecological treatises use the environmental factors for the primary subdivisions, and consider the effect of each one separately on organs, plants, etc. But the Chicago text-book, published about two years ago, considers the organs first, and then the relation of each to different environmental factors. Each method of course has its advantages.

In a general way this table might be said to indicate the order of historical development of the sciences named. If such a table had been prepared in the time of Linnaeus it would probably have lacked most of the lower half. The last column and the last row but one received very little recognition anywhere until the last decade of the nineteenth century (and even yet very little attention has been paid to them in some of the older states where botanists are most numerous).

The best order for teaching these sciences in a complete botanical course—if such a course is ever given—is not so obvious, principally because a course of instruction cannot very well proceed in two directions simultaneously, but must follow rows, or columns, or first one and then the other. Perhaps the best way around this difficulty would be to subdivide the field along horizontal lines into several parts, and then take a column at a time, transgressing the upper or lower limits occasionally to make certain points clearer. Then too it is customary to teach along with the pure sciences more or less of certain applied sciences or arts which have no place in the table, such as economic botany, forestry, plant breeding, and agriculture.

It will be observed that systematic botany or taxonomy, which was once the largest feature in botanical text-books, is absent from the table. Classification is not peculiar to plants or organisms of any kind, and in itself is not a science at all, but rather an art, a method or a convenience. The earlier classifications of plants were very artificial and not scientific, but the scientific basis of modern taxonomy is phylogeny, which has its proper place in the table.

Some botanists are inclined to regard physiology and ecology as essentially one, while others have difficulty in drawing the line between ecology and geography.* But the above table and explanation should make the relations between these three sciences clear. Although they are more or less interdependent, they consider plants from three fundamentally distinct points of view. Plant sociology, which is sometimes regarded as a part of ecology, is still more distinct.

It is scarcely necessary to remark that the sciences dealing with the animal kingdom in general and those dealing with mankind in particular could be classified in a very similar way.

* Human ecology and human geography have been even more persistently confused than the corresponding botanical sciences, and a great deal of modern so-called geography is nothing but ecology. For additional notes on the scope of geography see Science II. **38**: 816. Dec. 5, 1913.

## NEWS ITEMS

On July 16, the Torrey Club and the Staten Island Association of Arts and Sciences were entertained by Dr. N. L. Britton and his brother, Mr. R. H. Britton, at Great Kills, Staten Island. The party, numbering over sixty, were taken in motor-boats over to Crooke's Point where the flora was observed. Dinner was served at a local hotel at which speeches were made by Dr. Britton, Professor Harper, Dr. Hollick, Messrs. Cleaves and F. D. Tansley, and others. In the afternoon further exploration of the region was enjoyed by the party.

According to a careful census just completed, the Botanic Garden of Grinnell College, Iowa, with the adjacent nursery, reports 494 distinct species and hybrids, mostly of hardy plants, and 115 minor varieties and forms. The uncultivated part of the garden contains probably 50 other native and naturalized species.

Dr. R. M. Harper is at work on a study of the geography and vegetation of northern Florida. His address until September first is Florida State Geological Survey, Talahassee, Fla.

# The Torrey Botanical Club

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A monthly journal devoted to general botany, established 1870. Vol. 40 published in 1913, contained 712 pages of text and 26 full-page plates. Price $3.00 per annum. For Europe, 14 shillings. Dulau & Co., 37 Soho Square, London, are, agents for England.

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Correspondence relating to the above publications should be addressed to

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Vol. 14 September, 1914 No. 9

# TORREYA

A Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873

CONTENTS



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NORMAN TAYLOR
Brooklyn Botanic Garden
Brooklyn, N. Y

# TORREYA

September, 1914.

Vol. 14 No. 9

## THE AQUATIC VEGETATION OF SQUAW SHOALS, TUSCALOOSA COUNTY, ALABAMA

By Roland M. Harper

Most rivers which traverse hilly and rocky regions have rapids or shoals at many places, where they cross strata a little harder than the average. At such places the gradient of the stream-bed is steeper than usual, and consequently the velocity of the water is greater and its depth and seasonal fluctuations less. Most rocky shoals, in the eastern United States at least, seem to be almost devoid of aquatic vegetation. But for some reason not at present obvious, vegetation seems to thrive on the shoals of the Warrior River, which drains most of the coal region of Alabama and parts of some of the neighboring limestone valleys. Shoals were formerly abundant along this river and its tributaries above the fall-line at Tuscaloosa, but in the last two decades all within 25 miles of Tuscaloosa have been obliterated by the building of locks and dams for the purpose of extending navigation to as many coal mines as possible and ultimately to Birmingham ("the Pittsburgh of the South"). The lowest shoal on the river that is still visible is Squaw Shoals, in the extreme northeastern part of Tuscaloosa County (in T. 18 S., R. 8 W.), about 26 miles from Tuscaloosa by water. And at the present writing a 63-foot dam (Lock 17) is being built at its foot, which if no unexpected difficulties arise will completely spoil the shoals for scientific purposes within a year or two.*

* Since the above sentence was written the work has been suspended for lack of further appropriations from Congress, which will be welcome news to phytogeographers.

[No. 8, Vol. 14, of Torreya, comprising pp. 133–148 was issued 12 August 1914.]

On a visit to Squaw Shoals on June 4, 1913, I gathered some facts which may be of interest for comparison with other places, even after the opportunity for verifying some of them is gone forever.

The shoal is about three miles long and a thousand feet wide, with a total fall, at low water, of forty feet. Its foot is about 155 feet above sea-level. As some of the accompanying illustrations show, the river in this part of its course is bordered by rather steep wooded hills, rising two or three hundred feet above the water in a distance of half a mile or so, but the country is not at

FIG. 1. View of Squaw Shoals looking up-stream, showing *Dianthera* in foreground and *Panicum virgatum* farther away. The most conspicuous trees at the brow of the bluff at the right are *Pinus palustris*.

all mountainous. The rock in the neighborhood is all shale and sandstone of the upper Carboniferous, with the strata horizontal or nearly so. In the bed of the river it is pitted with numerous pot-holes a foot or so in diameter. The water averaged only about two feet deep on the shoals at the time of my visit, so that a pedestrian could pick his way across without much difficulty. It probably varies from less than half to more than twice that depth. It is always more or less turbid. The discharge of the river at this point varies from about 100 to 116,000 cubic feet a second, and averages about 6,700. As a rule the maximum occurs in March and the minimum in September.

The rocky bottom projects above the water in many places, and in some of the quieter spots there are deposits of sand and silt; so there is naturally some local diversity in the vegetation. In the following list, however, all the plants found growing in the channel of the river at the shoals are included. They are divided into trees, shrubs and herbs, and those in each group arranged as nearly as possible in order of abundance. The trees are all rather stunted, as might be expected.

TREES

*Platanus occidentalis* L.
*Betula nigra* L.
*Liquidambar Styraciflua* L.
*Salix nigra* Marsh.

SHRUBS

*Alnus rugosa* (DuRoi) Koch
*Cephalanthus occidentalis* L.
*Hypericum galioides* Lam.
*Itea Virginica* L.

HERBS

*Panicum virgatum* L.
*Hymenocallis coronaria* (LeConte) Kunth.
*Dianthera Americana* L.
*Scirpus Americanus* Pers.
*Zizaniopsis miliacea* (Mx.) Doell. & Asch.
*Osmunda regalis* L.
*Triadenum petiolatum* (Walt.) Raf.
*Harperella fluviatilis* Rose.
*Eleocharis mutata* (L.) R. & S.

The occurrence of a *Podostemon* in such a place would not have been at all surprising, but it was not detected.

Most of the species listed are rather common and widely distributed, but three or four of them are here some distance from the localities given for them in Mohr's Plant Life of Alabama, and two or three deserve special mention.

The *Hymenocallis*, although perhaps not quite the most abundant herb, was the most conspicuous element of the vegetation at the time, being in full bloom. From a distance its numerous large white flowers gave somewhat the appearance of a thin layer of snow. Up to 1901 this species seems to have been reported only from rocky shoals in muddy rivers just above the fall-line near Columbia, S. C., and Augusta, Ga. In the year named Dr. Mohr (in his Plant Life of Alabama, p. 447) added a third station, very similar to the others, namely, the Warrior River near Tuscaloosa, where it was found by Dr. Eugene A. Smith. That locality having been drowned out several years ago, Squaw Shoals is now the lowest possible station for the plant on that river. But about the same time that I visited Squaw Shoals Mr. R. S. Hodges of the Geological Survey of Alabama saw what is undoubtedly the same species in similar situations in a creek near Helena, She by County, where it seems to be in no immediate danger of extermination.

Strange to say, this rare and handsome plant is not mentioned

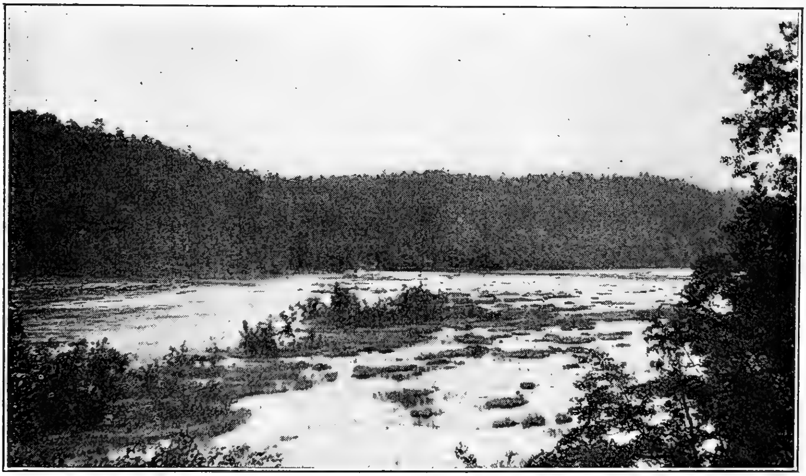

FIG. 2. View of Squaw Shoals looking diagonally up-stream from site of lock on left bank.

in either edition of Small's Flora of the Southeastern States, even as a synonym. Although it might be difficult to distinguish from *H. occidentalis* in the herbarium, it differs greatly from that species in habitat, and blooms about two months earlier; approximately at the same time as an unidentified *Hymenocallis* in South Georgia of which I published a photograph a few years ago.*

It seems rather strange to find a plant with a large bulb and succulent leaves growing in running water, but this probably indicates that the rocks to which it is attached are often exposed to sun and wind for a few weeks in the fall, when the water is lowest.

* Bull. Torrey Club 32: 463–465. *f. 5.* 1905; Ann. N. Y. Acad. Sci. 17: 257. *pl. 24.* 1906.

The *Harperella* is even less known to botanists than the *Hymenocallis*, having been found previously only in rocky beds of streams on Sand and Lookout Mountains in northeastern Alabama, and that only since 1905.* It was not in flower or fruit at the time, and I did not collect specimens, so that this new locality may never be represented by evidence of the kind demanded by some systematists.

*Eleocharis mutata* is another comparatively rare species, pre-

FIG, 3. *Hymenocallis coronaria* at Squaw Shoals, in about a foot of water.

viously reported in the United States only from the glaciated region and coastal plain, where it grows usually in ponds.†

On the loamy banks of the river at this place are found among other things *Alnus rugosa*, *Kalmia latifolia*, and *Batodendron arboreum*, which cannot endure much fluctuation of water, and *Fraxinus caroliniana* and *Breweria humistrata*, which are chiefly confined to the coastal plain.

It is one of the ironies of fate that the shoals, rapids and falls,

* See Torreya **6**: 112–114. 1906; **10**: 237–239. 1910. The plant was then referred to *H. nodosa*, *H. fluviatilis* not having been described until afterward. For description of the latter see Rose, Contr. U. S. Nat. Herb. **13**: 290. 1911; Small, Fl. S. E. U. S., ed. 2, 1355. 1913.

† See Mohr's Plant Life of Ala. 396–397; also Rhodora **7**: 72. 1905.

which are in many ways the most interesting spots on our rivers, are the very places that are doomed to obliteration first by the commercialistic "development" of water-power or navigation, or both—as is planned at Squaw Shoals. The controversy over Niagara Falls is of course familiar to all; and there are other instances of the same sort of work in progress in Alabama. At this very time one of the water-power syndicates is threatening to build a dam across Little River at the lower falls on Lookout Mountain, a spot noted for the occurrence of such rare plants as *Rhododendron catawbiense*, *Chondrophora virgata*, *Harperella*

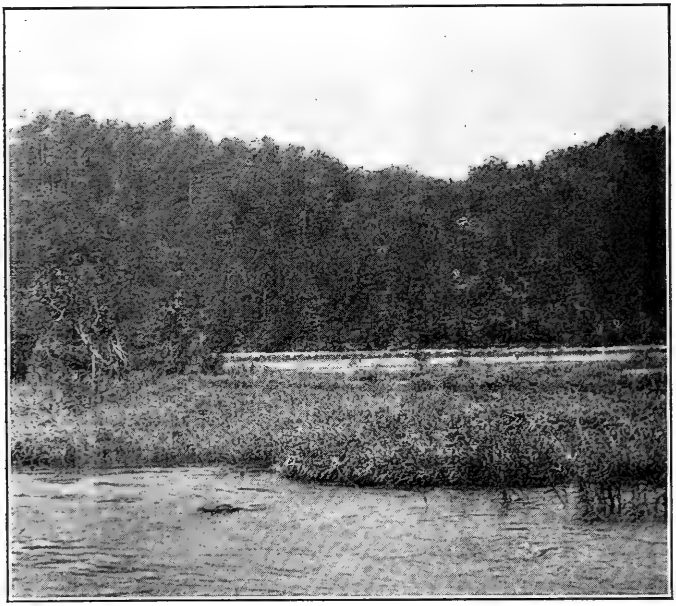

FIG. 4. Patch of *Panicum virgatum* and *Dianthera americana* on Squaw Shoals, with small trees at left.

*fluviatilis*, the mountain form of *Sarracenia flava*, and several species chiefly confined to the coastal plain.*

The greatest loss to science in such cases is not the mutilation of the scenery (the chief contention at Niagara), nor even the destruction of stations for the rare plants, for the same species

* See Torreya 6: 114. 1906.

can still be found elsewhere. It is the termination of the opportunity to study various interesting problems of potamology and phytogeography,* as for example, how so many coastal plain plants managed to establish themselves or persist in these interior localities. As no two shoals are exactly alike, the effacement of any one of them is an irreparable loss. But as it is impossible to measure such a loss in money, there is not much hope that the interests of science will ever be permitted to outweigh those of commercialism.

## A NEW NORTHEASTERN SEDGE

By Kenneth K. Mackenzie

In addition to several species, which are also of wide European distribution, the group of which *Carex flava* L. is best known, is represented in the northeastern part of North America by a widely distributed plant which is unlike anything known from Europe. In all the European species of the group characterized by long beaked perigynia, the perigynia beaks are rough and strongly brownish-red tipped at the apex and the pistillate scales are also strongly brownish-red colored and very conspicuous in the spikes. In the American plant under discussion the perigynia beaks are smooth or obscurely few-toothed, under a microscope, and are whitish at the apex when young or in age are light tawny colored. The brownish-red tint is lacking in the scales, and the scales are very inconspicuous in the spikes, at maturity being concealed by the perigynia. These characters give this plant a markedly different appearance from that presented by the other members of this group, and enable it to be readily recognized in the field.

This plant was long ago recognized as distinct from *Carex flava* L. by Dewey, who treated it as identical with the European *Carex lepidocarpa* Tausch. Olney distributed various specimens

* See Bull. Torrey Club **32**: 161. 1905; **37**: 109. 1910; Geol. Surv. Ala. Monog. 8: 148. 1913. Since the last publication appeared the dam of the Coosa River there referred to has been completed, flooding several square miles of country, including an unrecorded station for *Sabal glabra*, among other things.

of it as *Carex flava* L. and forma *androgyna* and forma *lepidocarpa* and remarked that the forms with a nearly sessile ståminate spike and the forms with a strongly peduncled staminate spike were often found in the same clump (Olney Car. Bor.-Am. 7). Bailey treated the plant as *Carex flava* var. *graminis* Bailey, but probably included other elements in his conception of his variety, especially the plant covered by his reference to the rough beaked perigynia. The plant treated by Prof. Fernald as *Carex flava* var. *rectirostra* Gaudin is almost entirely the present species, as is also a portion of the plant he treats as *Carex flava* var. *elatior* Schlecht. The description of the plant called *Carex lepidocarpa* Tausch by me in Britton & Brown's Illustrated Flora (2d ed.) is also taken from the present species.

When the really distinguishing features of this plant are, however, understood, it is readily told from all its allies and should no longer be confused with any of them.

*Carex flava*, itself, is further distinguished by the noticeably longer perigynia (5–6 mm. long), the leaf-blades averaging wider (2–5 mm. wide), the sharper culms and more yellowish aspect of the whole plant. The tendency of the pistillate spikes to be staminate at the top is also much less developed.

In North America genuine *Carex lepidocarpa* seems to be confined to the extreme northeastern part. I have seen specimens only from the Gaspi region and from St. Pierre. The extremely long-peduncled staminate spike usually serves as an additional means to distinguish this species.

What I take to be the plant described from Maine by Kükenthal (Pflanzenreich $IV^{20}$: 673) as var. *laxior* of *Carex lepidocarpa* Tausch is more closely allied, but in addition to the points already discussed can be distinguished by its sharp-angled culms and green shorter-beaked perigynia. The beaks of the perigynia in this plant are exceptionally rough.

I have seen numerous specimens of this species which show that it ranges from Maine and Quebec as far West as Indiana and Wisconsin. In New Jersey, where I have become well acquainted with it, it is confined to the northwestern counties where it occurs in wet calcareous meadows, in which situation it is often locally common. My number 4645 collected at White Pond, Sussex County, near Andover Junction, on June 26, 1910, may be designated as the type.

The species may be described and known as:

**Carex cryptolepis** sp. nov.

"*Carex lepidocarpa* Tausch," Dewey, Wood's Class Book (2 Ed.). 585. 1847.

*Carex flava* L. var. *graminis* Bailey, Mem. Torr. Club **1**: 30 (in part). 1887.

"*Carex flava* L. var. *rectirostra* Gaud." Fernald Rhodora, **8**: 211 (in part). 1906.

"*Carex flava* L. var. *elatior* Schlecht." Fernald l. c. (in part). 1906.

"*Carex lepidocarpa* Tausch," Mackenzie in Brit. & Brown Ill. Flora (2d ed.): 430 and fig. 1076. 1913.

Densely cespitose, not stoloniferous, the culms erect, slender. 2–6 dm. high, smooth or very nearly so, obtusely triangular below, acutely triangular above, phyllopodic, light brown at base, exceeding culm leaves, but mostly exceeded by leaves of sterile shoots. Leaves 4–6 to a fertile culm, on lower fourth, but not bunched, light green, the blades erect, flat, 1.5–3 mm. wide, usually 0.5–2.5 dm. long, roughened towards apex, not strongly septate, the sheaths conspicuously white-hyaline ventrally, not prolonged upwards at mouth; sterile shoots phyllopodic, conspicuous, the blades averaging longer. Staminate spike subsessile to strongly peduncled, 7–18 mm. long, 2–3 mm. wide, occasionally partly pistillate at base, its scales oblong-lanceolate, greenish-yellow with green midvein, acute. Pistillate spikes 3 or 4, the upper one or two approximate, the next strongly separated and the lowest often very strongly separated, mostly staminate at apex, sessile or lower exsert-peduncled, oblong, 10–20 mm. long, 7–10 mm. wide, closely 15–35 flowered in many ranks, the upper perigynia ascending, the middle spreading and the lower reflexed; bracts leaf-like, sheathing, the lower with erect, the upper with widely spreading blades. Scales lanceolate, acute, greenish-yellow with green midvein, narrower than and about length of body of perigynia, concealed and inconspicuous at maturity. Perigynia light- or yellowish-green, or at maturity yellowish, 4–4.5 mm. long, the body obovoid, 1.75 mm. wide, inflated, suborbicular in cross-section, the upper part empty, coarsely about 10-nerved, round-tapering to a sessile base, abruptly slender beaked, the beak nearly as long as body, straight or the lower bent, smooth or very obscurely few toothed, prominently bidentate, the teeth smooth, closely contiguous to one another, whitish or in age light tawny tinged. Achenes obovoid, triangular, 1.5 mm. long, 1 mm. wide, blackish, slightly silvery shining, prominently pitted, apiculate, jointed with slender, bent, at length deciduous style. Stigmas three.

### Specimens Examined

Quebec. Notre Dame du Lac, *Northrop* 202, Aug. 13, 1887 (C); Lake Edward, *Brainerd*, Aug. 1, 1901, and Aug. 21, 1896 (B).

Maine. Mt. Desert Island, *White*, Sept. 5, 1891 (C); Moosehead Lake, *C. E. Smith* (C); Great Pond, Mt. Desert Island, *Rand*, June 23, 1892 (C).

Vermont. Stratton, *Brainerd* (B) and also *Grout*, July 4, 1895 (C); East Wallingford, *Eggleston* 1684, July 11, 1899 (N. Y.); Newfane, *Howe*, Aug. 1, 1891 (N. Y.); Lake Dunmore, *Brainerd*, July 11 and Aug. 11, 1896 (B); East Middlebury, *Brainerd*, July 12, 1890 (B); Sudbury, *Brainerd*, Aug. 14, 1896 (B); Enosburgh, *Brainerd*, July 17, 1895 (B).

Mass. Essex Co., *Oakes* (N. Y.); Needham, *Forbes*, July 18, 1902 (K. M.).

Rhode Island. Providence, *Olney*, marked "C. lepidocarpa Dewey! Tausch? not of Kunze!" (C); Cumberland and East Providence, *Olney*, July 22 and 26, 1871 (C & N. Y. & K. M.); *Thurber* 1846 (N. Y.).

New York. Lake Mohegan, *Leggett*, July 9, 1868 (C); Pyramid Lake, *Britton*, Sept. 2, 1900 (N. Y.); Whitesboro, *Haberer*, June 1883 in part (N. Y.); Adirondack Mts., *E. C. Howe*, July (N. Y.); Paradox Lake, *Brainerd*, Sept. 9, 1882 (B).

New Jersey. Waterloo, *Britton and Porter*, July 28, 1885 (C); Stanhope, Morris Co., *Mackenzie* 2118, June 24, 1906 (K. M.); White Pond, Sussex Co., *Mackenzie* 826, July 31, 1904 (K. M.); Andover Junction, Sussex Co., *Mackenzie* 4671, July 26, 1910 (K. M.).

Ontario. Sarnia, Lambton Co., *Dodge*, Aug. 1, 1911 (K. M.); e Victoria, *Brainerd*, Sept. 13, 1901 (B).

MICHIGAN. Grand Rapids, *Miss Cole*, June 8, 1892 (K. M.); Harsen's Island, St. Clair County, *Dodge*, July 18, 1911 (K. M.); Port Huron, St. Clair County, *Dodge*, July 17, 1911 (K. M.).

INDIANA. Grass Lake, Steuben Co., *Deam* 1202, July 22, 1906 (N. Y. & K. M.); Wolf Lake, *Mrs. Chase* 1396, July 26, 1900 (K. M.).

WISCONSIN. Milwaukee, *Hasse*, June 25, 1882 (N. Y.).

# ADDITIONS TO THE PLEISTOCENE FLORA OF THE SOUTHERN STATES*

BY EDWARD WILBER BERRY

During the last few years I have collected or received for identification several small collections of fossil plants from various localities and horizons in the Pleistocene of North Carolina, Alabama and Mississippi, and since these should be a matter of published record for the benefit of botanists and others interested in the question of the former distribution of existing species, the following brief compilation has been made.

## NORTH CAROLINA

The first of these collections is from North Carolina. A most interesting deposit containing fossil plants was discovered in 1906 on the right bank of the Neuse River about four and one-half miles above Seven Springs in Wayne County. The section shows at its base a tough blue clay interstratified with layers of leaves, fruits, wood, and other vegetable débris, overlain by sand and gravel, and exposed in the recent cutting of the river.† The manner of occurrence indicates that at the time of deposition the locality was at the head of a Pleistocene estuary, the plant material accumulating exactly as it is at the present time along the coastal plain rivers. The collection from this locality was of such exceptional interest that a short account of it was published in 1907.‡ Thirty-eight species were listed, the locality

* Published with the permission of the Director of the U. S. Geological Survey.

† The deposits are referred to the Chowan formation by Stephenson, N. C. Geol. Surv., 3: 285. 1913.

‡ Berry, E. W., Journ. Geol. 15: 338–349. 1907.

being referred to as Station 850. There remained a mass of fragmentary leaves and seeds. Some of the best preserved of the latter were subsequently submitted to the U. S. Biological Survey and were determined by Mr. W. L. McAtee. The large collection of recent fruits and seeds gathered together by the Biological Survey and the long experience of Mr. McAtee, in identifying the comparable remains found during extensive studies of the stomach contents of birds, renders these identifications particularly authoritative. Following are the additions to this late Pleistocene flora:

1. *Chaetochloa* sp. A caryopsis of a grass of the genus *Chaetochloa* Scribner.

2. *Sparganium* sp. A nutlet of a bur-reed, specifically undeterminable.

3. *Populus* cf. *deltoides* Marsh. The deposits contain abundant bud-scales greatly resembling and probably those of this species, the leaves of which have been found in Pleistocene deposits of very similar age in Alabama.

4. *Polygonum* sp. An achene of an undetermined species of the genus *Polygonum* L.

5. *Viburnum* cf. *molle* Michaux. Two stones, probably representing this species, which is still found in this area. The present range of the species is from Massachusetts to Florida near the coast.

6. *Viburnum* cf. *nudum* L. Two stones, probably representing this species, whose present range is from Long Island to Florida.

7. An achene of a species of Compositae resembling those of the genus *Centaurea* L.

8. A single seeded dry drupe suggesting the family Oleaceae.

## Florida

In the vicinity of Milton, Santa Rosa County, Florida, there is a buried swamp deposit of late Pleistocene age containing trunks of a species of *Pinus*; and stumps, roots, and seeds of *Taxodium distichum*, as well as undeterminable fragments of dicotyledonous leaves.*

* This deposit is mentioned in Harper, R. M., Peat deposits of Florida, pp. 295–297, 1910, and without any warrant is referred to the so-called Grand Gulf formation.

## Alabama

A few miles below Columbus, Georgia, along the west bank of the Chattahoochee River in Russell County and in the vicinity of Abercrombie Landing, the late Pleistocene terrace contains considerable deposits of impure peat which in places carries identifiable plant remains. A collection made here in 1907 by L. W. Stephenson was described by me that same year and twelve species were recorded.* I made additional collections in 1909 and subsequently recorded four additional species.†

In a recent review of this material characteristic seeds of *Phytolacca decandra* L. were recognized, but since care was not taken to exclude recent seeds in the collecting of large specimens containing leaves, it is possible that this is a recent seed, although it has the appearance of being fossil and not recent. In addition to the foregoing the stones of an undetermined species of *Rubus* were identified from this locality.

During 1913 Dr. C. W. Cooke of the U. S. Geological Survey made a collection of leaves from a grey argillaceous sand exposed about three miles west of Monroeville, Monroe County. The elevation is about 470 feet and the material is of a sort which is characteristic of what has hitherto been called Lafayette formation in this region. The collection, while not large, contains the following forms:

*Arundinaria* sp. (probably *macrosperma* Michx.)
*Hicoria aquatica* (Michx. f.) Britton
*Quercus phellos* L.
*Quercus virginiana* Miller
*Platanus* sp. (probably *occidentalis* L.)
*Persea pubescens* (Pursh) Sargent

These six forms are all still existing and all of them have previously been recorded from the Pleistocene of the southern coastal plain so that I have no hesitation in asserting that the deposits are of Pleistocene age.

## Mississippi

In 1910 I collected the following plants from a clay-lens in the Pleistocene terrace materials exposed along the Chickasawhay

* Berry, E. W., Amer. Nat. **41**: 689–697. *pl. 1–2.* 1907.

† Berry, E. W., Amer. Jour. Sci. iv. **29**: 387–398. 1910.

River, one and one-half miles above Chicoria in Wayne County:

*Taxodium distichum* (L.) L. C. Rich. (cone)

*Betula nigra* L. (leaves)

*Quercus phellos* L. (leaves)

About ten or twelve miles up the river from this locality, C. W. Cooke made a small collection of fossil leaves in 1913. The locality is on the Chickasawhay River four miles northwest of Waynesboro in Wayne County. This collection contains identifiable leaves of the following species:

*Hicoria aquatica* (Michx. f.) Britton

*Quercus phellos* L.

*Quercus predigitata* Berry

*Fagus americana* Sweet

All of these are forms that are of widespread occurrence in the late Pleistocene of southeastern North America.

JOHNS HOPKINS UNIVERSITY,
BALTIMORE, MD.

## SHORTER NOTES

OCCURRENCE OF INDIAN PIPE.—The article of Mr. Edwin D. Hull in the June number of TORREYA on the "Occurrence of the Indian Pipe (*Monotropa uniflora*) in a Xerophytic Habitat" reminds me that in 1911 the plant was fairly abundant in a swamp of mingled black spruce and tamarack, the former predominating, in northwestern Wisconsin (Gaslyn, Burnett County). The individuals were somewhat dwarfed and blackened and were mostly concealed by the Sphagnum. They were in flower about the first of August. I had not visited the locality before nor have I since, but it impressed me as being a permanent habitat of these plants which I do not recall having seen elsewhere in the vicinity.

J. J. DAVIS

"MODERN" BOTANY IN 1821

"IV. Curiosa

"Alte Zeit und neue Zeit.

"FRAGER: Was ist Botanik?

"LINNAEUS: Est scientia naturalis, quae vegetabilium cognitionem tradit. (Philos. bot. 1. 1750.)

"Das Jahr 1821: Botanik ist die photoskotochromo?thermokryohydrogeoaërooryktozoophytoanthropobiomorphostoechiogenimetriskopische Phytologie." (From Flora 5: 224. 14 Ap 1822.)

## PROCEEDINGS OF THE CLUB

### April 14, 1914

The meeting of April 14, 1914, was held at the American Museum of Natural History at 8:15 P.M. President Harper presided. Seventy-nine persons were present.

The announced scientific program consisted of an illustrated lecture on "Edible Fungi," by Dr. W. A. Murrill. This lecture will be published in full in the *Journal* of the New York Botanical Garden.

Adjournment followed.

Michael Levine, *Sec. protem*

### April 29, 1914

The meeting of April 29, 1914, was held in the Laboratory of the New York Botanical Garden at 3:30 P.M. President Harper presided. Eighteen persons were present.

The minutes of the meeting of April 14 were read and approved.

The committee appointed to draw up resolutions on the death of Dr. C. B. Robinson presented the following resolutions:

Whereas, The members of the Torrey Botanical Club have learned with the deepest sorrow of the death of their fellow-member, Dr. Charles Budd Robinson, at the hands of certain barbarous residents of Amboina Island in the Dutch East Indies, be it therefore

*Resolved*, That the Torrey Botanical Club desires hereby to place on record its appreciation of the accurate, scholarly character of the scientific work accomplished by Doctor Robinson, its admiration of his boundless industry and of his frank and loyal personality, and its profound regret that a career of such substantial achievement and abundant promise should have been brought to so untimely an end, and

*Resolved*, That these resolutions be entered upon the minutes of the Club and that a copy be transmitted to his family.

These resolutions were adopted.

A communication from Edward F. Bigelow, President of the Agassiz Association, in which the Torrey Club is invited to make a field excursion to Arcadia, Sound Beach, was read and referred to the chairman of the field committee with power.

The resignation of Miss Helen Palliser was read and accepted.

Mr. Edward Nelson, Agricultural Experiment Station, Gainesville, Florida, was elected to membership.

The first number on the announced scientific program consisted of a brief paper on "Observations on *Sphaersoma* and allied genera," by Dr. Fred J. Seaver. This paper will be published in full in *Mycologia* for May.

The second paper was given by Dr. N. L. Britton, on "The vegetation of the smaller islands belonging to Porto Rico." Dr. Britton exhibited a number of specimens and photographs of plants collected on the islands of Desechao and Mona. Lists of the plants found on these islands will be compiled for future publication.

Adjournment followed.

B. O. Dodge,
*Secretary*

May 12, 1914

The meeting for May 12, 1914, was held at the American Museum of Natural History with President Harper presiding. Seventy-five persons were present.

The announced scientific program consisted of an illustrated lecture on "Wild flowers of spring," by Dr. N. L. Britton.

Adjournment followed.

B. O. Dodge,
*Secretary*

May 27, 1914

The meeting of May 27, 1914, was held in the Laboratory of the New York Botanical Garden at 3:30 P.M. with Vice-president Barnhart presiding. Ten persons were present.

The minutes of the meetings of April 29 and May 12 were read and approved.

Mr. G. A. Reichling, Brooklyn, N. Y., was elected to membership.

The first number on the scientific program consisted of a paper on "Some midwinter algae of Long Island Sound," by Dr. Marshall A. Howe. The paper will be published in full in June TORREYA.

The second paper was presented by Dr. Michael Levine on "The origin and development of lamellae in *Coprinus micaceus*."

Adjournment followed.

B. O. DODGE,
*Secretary*

## NEWS ITEMS

The board of trustees and the director of the Missouri Botanical Garden have issued invitations to the celebration of the twenty-fifth anniversary of the organization of the garden, to be held in St. Louis, October fifteenth and sixteenth. Addresses will be made by the director, Dr. G. T. Moore, and by many visiting botanists. Some of the foreign speakers, who include professors Wille, Lipsky, Briquet, Czapek, Fitting and Klebs, may have difficulty in reaching St. Louis on account of the war, but "it is known that all of those on the program will make every effort to come." The celebration will not be postponed. Besides the speeches the celebration includes inspection of the buildings and grounds, a motor trip through the city, and a dinner by the trustees to invited guests at the Liederkranz Club.

Professor Guy West Wilson, who during the past year has been employed by the Federal Government as an agent of the laboratory of forest pathology in the investigation of the chestnut bark disease in cooperation with Dr. Mel T. Cook of the New Jersey Experiment Station, has been appointed to the newly created chair of mycology and plant pathology in the State University of Iowa at Iowa City, Iowa, with the rank of assistant professor.

# The Torrey Botanical Club

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their papers appear, will kindly notify the editor when returning proof.

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# OTHER PUBLICATIONS

OF THE

# TORREY BOTANICAL CLUB

## (1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 40 published in 1913, contained 712 pages of text and 26 full-page plates. Price $3.00 per annum. For Europe, 14 shillings. Dulau & Co., 37 Soho Square, London, are, agents for England.

Of former volumes, only 24–40 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–40 three dollars each.

Single copies (30 cents) will be furnished only when not breaking complete volumes.

## (2) MEMOIRS

The MEMOIRS, established 1889, are published at irregulas intervals. Volumes 1–13 are now completed; Nos. 1 and 2 of Vol. 14 have been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

DR. BERNARD O. DODGE

Columbia University

New York City

Vol. 14 October, 1914 No. 10

# TORREYA

A Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873

## CONTENTS



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NORMAN TAYLOR
Brooklyn Botanic Garden
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# TORREYA

October, 1914.

Vol. 14 No. 10

## THE VEGETATION OF CONNECTICUT

### III. Plant Societies on Uplands*

By George E. Nichols



In the first paper of this series the writer undertook to point out and in a measure to account for certain of the broader features of the vegetation of Connecticut. In the second an account is given of the virgin forests. In the present and subsequent papers attention will be devoted primarily to the study of plant societies and their relationship both to one another and to environment. Numerous writers during the past few years have dealt with this phase of vegetation in other parts of the country, but so far as published records show very little work of this nature seems to have been accomplished in southern New England. Since it is desired that this series of studies may serve as a starting-point for further investigations, both extensive and intensive, it has seemed advisable to treat the subject matter more or less comprehensively, drawing freely upon the observations of other workers in the same field of study.

The scheme of classification which in a general way underlies the writer's treatment of the plant societies of Connecticut is the one originated some years ago by Cowles.† This classification "attempts to relate plant societies not only to water, but also to soil, and more especially to the physiography." The fundamental concept of the scheme is that "each particular

* Contribution from the Osborn Botanical Laboratory.

† Cowles, H. C. The physiographic ecology of Chicago and vicinity. Bot. Gaz. **31**: 73–108, 145–182. *f. 1–35.* 1901. Reprinted with slight modifications as Bull. Geog. Soc. Chicago No. 2. 1901.

[No. 9, Vol. 14, of Torreya, comprising pp. 149–166 was issued 18 September 1914.]

topographic form has its own peculiar vegetation. This is due to the fact that the soil conditions upon which plants depend are determined by the surface geology and topography." And, since the nature of the topography is constantly undergoing modifications as a result of erosion and deposition, it follows that "just as there is an order of succession of topographic forms in the changing landscape," so "there must be an order of succession of plant societies. As the years pass by, one plant society must necessarily be supplanted by another, though the one passes into the other by imperceptible gradations." Such a classification, it will be seen, is at once genetic and dynamic. It aims to "group plant societies according to their relationship and their evolution."

In a more recent contribution Cowles* has defined three types of vegetative succession, regional, topographic, and biotic. Regional successions are due primarily to secular changes in climate and move with extreme slowness. In Connecticut the series of changes in vegetation that have ensued since the retreat of the continental ice sheet serve to illustrate this type of succession. Topographic successions "are associated with the topographic changes which result from the activities of such agencies as running water, wind, ice, gravity, and vulcanism." Such successions in Connecticut are seen principally along rivers and along the coast. Topographic successions take place much more rapidly than regional successions. Biotic successions are instituted by plant and animal agencies. On account of the comparative rapidity with which these agencies operate and their far-reaching influence, this type of succession must be regarded as more important than either of the two preceding. "If, in their operation, regional agencies are matters of eons, and topographic agencies matters of centuries, biotic agencies may be expressed in terms of decades."

In treating the plant societies of Connecticut and their ecological relations, it has been found convenient to group them in the following manner.*

* Cowles, H. C. The causes of vegetative cycles. Bot. Gaz. **51:** 161–183. 1911.

† Compare Cowles, 1901, op. cit.

1. Plant societies on uplands.
2. Plant societies in lowlands.
3. Plant societies along rivers and streams.
4. Plant societies along the coast.

Broadly speaking, the term lowland is here used to designate depressions of all sorts—areas occupied by lakes, swamps, etc. All other types of topography are included under uplands. In the present paper attention is confined to upland successions. By way of introduction a representative upland succession, such as may be studied along the trap ridges in the vicinity of New Haven, will be described. Then, with this as a background, differences between successions on various substrata and in different parts of the state will be considered.

Probably nowhere in this region are the environmental conditions to which vegetation is subjected more severe than on the bare surface of an exposed rock. Insolation during the daytime is intense, temperature changes are extreme, and water is absent for long periods. Add to these the difficulty, where the surface slopes and crevices are absent, of securing a foothold, and it is evident that even among xerophytes comparatively few plants are qualified to exist in such localities. Usually the first living organisms to appear on a freshly exposed trap surface are crustose lichens, *e. g.*, *Buellia petraea* and *Lecanora cinerea*. These form a black or grayish incrustation over the surface and adhere so tightly to the rock as to be practically inseparable from it. Immediately following these, but apparently dependent upon them for a foothold, frequently comes *Physcia tribacea*, a foliaceous lichen whose rosette-shaped thallus for the most part is closely adnate to the substratum. These three plants represent the pioneers of vegetation. Many crustose lichens are said to secrete acids by means of which they effect to a certain extent the disintegration of the rock on whose surface they occur. In this way, as well as by their very presence, they tend to create a substratum upon which it becomes possible for foliose and fruticose lichens and certain mosses to secure a foothold. And not only do the crustose lichens prepare the way for other plants, but by so doing they pave the way for their own destruction; for with the advent of taller, shade-producing forms they are speedily eliminated. There may be three more or less distinct lichen sub-stages, viz., crustose, foliose, and fruticose; but as a rule the last two are more or less completely telescoped into one. Of the foliose lichens the most conspicuous in the trap-rock succession is *Parmelia conspersa*, a form which often is so abundant as to almost obscure the rock surface over considerable areas. But sometimes other foliose species are equally important, notably *Dermatocarpon miniatum*, *Umbilicaria pennsylvanica*, and *Parmelia caperata;* while not infrequently *Stereocaulon paschale*, one of the most characteristic of the fruticose lichens along the trap ridges, usurps the soil prepared by the crustose lichens. Associated with these lichens, and equally capable of thriving wherever they can secure foothold, are a few mosses, *e. g.*, *Grimmia Olneyi* and *Hedwigia ciliata*.

The rapidity with which not only the changes just described, but subsequent changes as well, are brought about is influenced of course to a greater or less extent by the nature of the site—the degree of exposure to sun and wind, steepness of the rock surface, etc. Succession almost invariably proceeds more rapidly along the lower slopes of a hill than near its crest, due to the lesser exposure here. The relative abundance of seepage water as the bottom of a hill is approached, also furthers rapid succession.

Thus far observations have been restricted to the vegetation of the rock face. Attention must now be directed to another phase of the trap rock succession, viz., succession in the crevices. Crevices due to various causes are found in greater or less abundance in practically all exposed rocks. Trap rocks especially, on account of the peculiar manner in which they were formed, are characterized by the presence of numerous fissures. In these fissures, and in hollows of the rock surface, dust and sand collect, thus favoring the conservation of moisture and making it possible for plants to develop whose roots or rhizoids require a soil. The pioneer crevice plants are fruticose lichens and mosses. Of the lichens, the majority belong to the genus *Cladonia*, *e. g.*, *C. rangiferina*, *C. uncialis*, *C. furcata*, *C. sylvatica*, *C. pyxidata*. Of the mosses, *Ceratodon purpureus*, species of *Polytrichum* (*P. commune*, *P. piliferum, P. juniperinum*), *Leucobryum glaucum*, and *Dicranum scoparium* are prominent. Closely following these, and indeed often contemporaneous with them are certain Pteridophytes and the advance guard of the Angiosperms—the group which ultimately is destined to predominate. The appended list includes a few of the more conspicuous herbaceous vascular plants characteristic of crevices in trap.

| | |
|---|---|
| *Selaginella rupestris* | *Danthonia spicata* |
| *Woodsia ilvensis* | *Krigia virginica* |
| *Andropogon scoparius* | *Lechea tenuifolia* |
| *Aquilegia canadensis* | *Opuntia vulgaris* |
| *Aristida dichotoma* | *Poa compressa* |
| *Campanula rotundifolia* | *Potentilla argentea* |
| *Corydalis sempervirens* | *Rumex Acetosella* |

*Saxifraga virginiensis*

It will be noted that most of the species here mentioned are perennial, and necessarily all are xerophytes.

Notwithstanding that crevice plants and rock face forms are contemporaneous, the crevice vegetation, for the sake of convenience, may be regarded as the second stage in the succession on trap (fig. 1). On steep slopes this condition may be protracted indefinitely. But as a rule a third stage is soon inaugurated by the encroachment of the crevice vegetation on neighboring portions of the rock face; and where, as on gentle slopes, the soil collects not only in crevices but in shallow depressions of any sort, the surface of the rock may soon become clothed with a more or less continuous plant cover. The spreading out of the crevice colonies is accelerated by the continued accumulation alongside of windblown particles of inorganic matter and fragments of vegetable debris. It is hardly necessary to more than suggest the improved condition of the rock as a habitat for plants which results from the development of a soil. The usual pioneers on such an area are the lichen and moss species already present in the crevices, and it is a common occurrence to find flat rocks and gentle slopes completely overgrown by loose masses of *Cladonia*, thin mats of *Ceratodon*, or dense colonies of *Polytrichum*. But the prestige of these lower forms is short lived, for as soon as sufficient soil has accumulated they are superseded by grasses and other vascular plants. These, by means of their interlacing roots and rhizomes bind the soil together more firmly, and in this way a sod is gradually developed. Because of their omnipresence and the abundance of their tough, fibrous roots, the bunch grass (*Andropogon scoparius*) and the wire grass (*Poa compressa*) are especially important as sod formers. The wire

FIG. 1. Rock face and crevice vegetation on trap; near summit of West Rock, New Haven. The conspicuous lichen in the foreground is *Parmelia conspersa*. Among the crevice forms are *Leucobryum glaucum* and other mosses, *Cladonia* sp., *Woodsia ilvensis*, *Andropogon scoparius*, and *Rhus typhina*. The tree in the background is *Juniperus virginiana*.

grass possesses an additional advantage in that it develops long rhizomes which facilitate the invasion of new territory. There may thus arise a plant society characterized by the prevalence of tall, perennial grasses. Associated with the two grasses already mentioned may occur many other herbaceous plants, some of which are here noted.

*Antennaria plantaginifolia*
*Aster linariifolius*
*Aster patens*
*Carex pennsylvanica*
*Cerastium arvense*
*Comandra umbellata*
*Helianthus divaricatus*
*Lespedeza capitata*
*Lespedeza Nuttallii*
*Liatris scariosa*
*Poa pratensis*
*Pteris aquilina*
*Pycnanthemum virginianum*
*Sericocarpus asteroides*
*Solidago nemoralis*
*Viola pedata*

Up to this point in the succession herbaceous plants have predominated. But some shrubs usually appear in the crevice stage (fig. 1) and by the time the rock has become sod-covered they may have increased in number to such a degree as to become the controlling element of the vegetation. Very often it is possible to recognize a distinct shrub stage. Of the shrubs present at this time, a number may be cited as about equally characteristic, viz.

*Ceanothus americanus*
*Gaylussacia baccata*
*Myrica asplenifolia*
*Prunus virginiana*
*Quercus ilicifolia*
*Quercus prinoides*
*Rhus copallina*
*Rhus glabra*
*Rhus hirta*
*Rosa humilis*
*Vaccinium pennsylvanicum*
*Vaccinium vacillans*

The next advance toward mesophytism is seen in the advent of trees. Like the shrubs, trees begin to appear early in the series, and their presence often exerts an appreciable effect on the character of the rock face and crevice vegetation. *Polypodium vulgare*, for example, grows in crevices beneath the shelter of these scattered trees, but almost never out in the open. Many mosses are likewise restricted. Succession invariably is more rapid in the shade than in the open sunlight. Foremost in importance among the pioneer trees in the trap ridge succession near New Haven are the red cedar (*Juniperus virginiana*) and the post oak (*Quercus stellata*). The transition from the shrub stage to the pioneer tree stage is not abrupt, and, as a matter of fact, so simultaneously may the shrubs and trees make their appearance that quite as often as not the stages are telescoped into one. Both the red cedar and the post oak require plenty of sunlight, *i. e.*, they are intolerant of shade. They never give rise to dense woodlands, but always form open, almost park-like groves (fig. 2). In the sunny patches between the trees the herbaceous and shrubby vegetation of the two preceding stages persists almost unaltered, but in shaded spots there begin to appear forms which are characteristic of the subsequent stage in the succession.

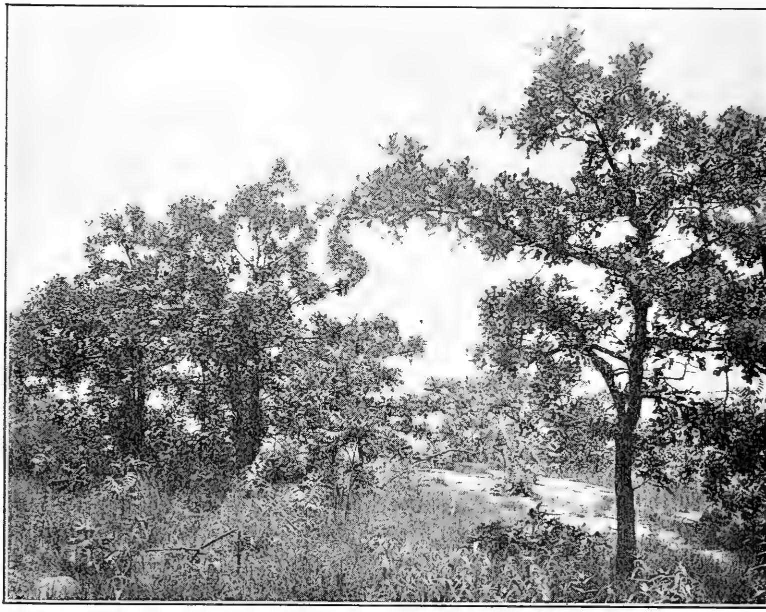

FIG. 2. Pioneer tree stage along crest of West Rock ridge, New Haven. Between the scattered trees (*Quercus stellata*) occur patches of herbaceous vegetation and shrubs. In the foreground is seen *Helianthus divaricatus*. The shrubs shown are *Rhus typhina*.

Further significant changes in the physiognomy of the vegetation are foreshadowed by the advent of such trees as the chestnut oak (*Quercus Prinus*) and the pignut (*Carya glabra*). These species, like the red cedar and post oak, are relatively xerophytic and on some accounts they should perhaps be classed with them as pioneer trees. But they differ in two important respects, viz., they are slightly tolerant of shade, and they attain a much larger size. Red cedars and post oaks more than thirty feet high are seldom encountered, but the pignut and chestnut oak commonly grow to a height of more than fifty feet. While, then, both the chestnut oak and pignut may put in their appearance early in the series, and while often they may be conspicuous members of the pioneer tree stage, their chief importance lies in the fact that as the trees grow larger they overtop the cedar and post oak; and as they become more numerous, their crowns forming a more or less continuous canopy, the red cedar and post oak underneath, unable to endure the changed light relations, gradually succumb. And along with the trees disappear also the majority of the herbaceous and shrubby plants of the pioneer tree stage.

For a time the forest which thus originates may be dominated to so marked a degree by chestnut oak and pignut as to seem to warrant the recognition of a separate chestnut oak or chestnut oak-pignut stage in the succession.* But on the whole it seems simpler to regard this phase as merely a subdivision of a larger association which may be designated the oak-hickory stage. For, during the transition from the open, grove-like type of woodland to the closed type, other species of oak and hickory become increasingly abundant, so that the resultant forest comprises an admixture of a number of species of oak and hickory, together with certain other trees. The more important trees present in such a society are here listed.

| | |
|---|---|
| *Acer rubrum* | *Quercus alba* |
| *Carya alba* | *Quercus coccinea* |
| *Carya glabra* | *Quercus Prinus* |
| *Carya ovata* | *Quercus rubra* |
| *Pinus Strobus* | *Quercus velutina* |

Such a forest approximates closely the type of habitat so commonly referred to in the manuals as "dry woodlands."

The general aspect of these oak-hickory forests at their best

* It should be remarked, however, that the particular species of oak and hickory here mentioned by no means invariably play the important rôle in the inauguration of the oak-hickory stage that is here assigned them. Quite as often other species, *e. g.*, *Carya ovata*, *Carya alba*, *Quercus velutina*, *Quercus coccinea*, are more prominent at the outset.

is well brought out in fig. 3. Underneath the canopy formed by the larger trees there usually develop certain smaller arborescent species, viz., *Cornus florida*, *Ostrya virginiana*, and *Sassafras variifolium*. The rest of the undergrowth, with the exception of some few species like the huckleberry and the blueberries, which

FIG. 3. An oak-hickory forest of a very mesophytic type; Salisbury. The tree in the right foreground is *Quercus alba;* most of the others are *Quercus rubra*. The undergrowth includes many of the shrubs listed on page 177. A majority of the young trees are *Castanea dentata* (i. e., in center foreground) and *Acer saccharum*.

flourish equally well in the open or in diffuse light, is made up largely of plants which heretofore either have not been present at all, or else have been poorly represented in the succession. As representative of the shrubs may be cited:

*Corylus americana*
*Gaylussacia baccata*
*Kalmia latifolia*
*Rhododendron nudiflorum*
*Vaccinium pennsylvanicum*
*Vaccinium vacillans*
*Viburnum acerifolium*

Prominent among the herbaceous plants of this stage are:

*Aspidium marginale*
*Aster divaricatus*
*Carex virescens*
*Chimaphila umbellata*
*Cypripedium acaule*
*Desmodium* sp.
*Epigaea repens*
*Gaultheria procumbens*
*Geranium maculatum*
*Gerardia flava*
*Hepatica triloba*
*Hieracium venosum*
*Lysimachia quadrifolia*
*Maianthemum canadense*
*Melampyrum lineare*
*Mitchella repens*
*Panicum dichotomum*
*Pedicularis canadensis*
*Polystichum acrostichoides*
*Pteris aquilina*
*Pyrola americana*
*Pyrola elliptica*
*Smilacina racemosa*
*Solidago bicolor*
*Solidago caesia*

Oak-hickory forests like the one here depicted constitute the most familiar type of woodland encountered along the trap ridges near New Haven, and in many sites they may represent the ultimate formation. But, under favorable conditions, such a forest is destined to give way to a still more mesophytic type. And here again the light requirement of the various trees involved seems to be an important factor in determining their behavior and in conditioning their presence or absence in the ultimate forest. For it is self evident that trees like the chestnut oak and pignut, whose seedlings are unable to develop in any but the lightest shade will tend to become less and less abundant as the forest floor becomes more deeply shaded by the ever denser foliage overhead. Conversely, it is those trees whose seedlings are best able to develop under these circumstances that will ultimately survive. Thus it comes about that the climax forest of any region is composed very largely of those native trees which are most tolerant of shade. Of course the proximate composition of the forest in any given locality is necessarily influenced by the fortuitous distribution of seeds. Moreover, the advent of the ultimate stage may be hastened or retarded by the abundance or scarcity of water in the superficial layers of the soil. Thus shade conditions in an oak-hickory forest favor the conservation of the soil water, but at the same time the demands of the trees upon the available supply may be so great as to practically exhaust the water near the surface. And where, as along the summits of the trap ridges, water is never very abundant, it is not surprising to find that while the arborescent species in the forest, with their deeply penetrating root systems, may be relatively mesophytic, the shrubs and herbaceous plants, with their shallow root systems, are quite xerophytic. The point to be emphasized in this connection is that, although the mature trees of the climax forest may be able to utilize water at some depth below the surface, their seedlings are dependent on the supply near the surface; so that, unless there is sufficient water in these surface layers to enable the climax trees to tide over the critical seedling stages, they cannot establish themselves and the oak-hickory stage may be of indefinite duration. As will be brought out in a later paragraph, the accumulation of humus may have an important bearing on the phenomena of succession, particularly during these more advanced stages.

Along the trap ridges the climax forest of this region is best developed on the lower slopes, where there is a relatively constant supply of ground water, available throughout the growing season.* By far the most abundant and most characteristic tree here is the chestnut (*Castanea dentata*). With it are commonly associated *Liriodendron Tulipifera* and some of the more mesophytic trees of the preceding stage, *e. g.*, *Quercus rubra*, *Quercus alba*, and *Acer rubrum*, while scattered through the forest, sometimes abundant locally, are other mesophytic trees, such as *Acer saccharum*, *Fagus grandifolia*, *Fraxinus americana*, *Prunus serotina*, *Tilia americana*, and *Tsuga canadensis*. As species of secondary importance may be mentioned *Carpinus caroliniana*,

* It should perhaps be remarked at this point that the slopes of the trap ridges, especially toward the base, are usually covered to a greater or less degree with glacial debris. As will be brought out in a later paragraph, this fact has an important bearing on the rapidity of the succession.

*Cornus florida*, *Ostrya virginiana*, and *Sassafras variifolium*. These are sometimes so abundant as to produce a distinct stratum of vegetation. Many of the shrubs and herbaceous plants of the oak-hickory stage are still prominent, but their number is augmented by numerous new arrivals, among which are many pronounced shade plants. Three species comprise the bulk of the shrubby undergrowth, viz., *Kalmia latifolia*, *Hamamelis virginiana*, and *Viburnum acerifolium*. Some of the characteristic herbaceous plants not heretofore noted are given in the subjoined list.

*Adiantum pedatum*
*Aspidium noveboracense*
*Aspidium spinulosum*
*Botrychium virginianum*
*Lycopodium lucidulum*
*Phegopteris polypodioides*
*Arisaema triphyllum*
*Aster divaricatus*
*Brachyelytrum erectum*
*Collinsonia canadensis*
*Corallorrhiza maculata*
*Epifagus virginiana*
*Epipactis pubescens*
*Medeola virginiana*
*Monotropa uniflora*
*Polygonatum biflorum*
*Sanicula marilandica*
*Solidago latifolia*
*Trientalis americana*
*Trillium cernuum*
*Trillium erectum*

A series of changes in vegetation such as has been described in connection with the succession on the trap ridges is actuated almost entirely by biotic agencies and is therefore termed a biotic succession. The general manner in which biotic agencies institute succession has been admirably summarized by Cowles,* and some of his observations may be briefly stated here. All external factors which affect the plant reside either in the soil or in the air. Of the soil agencies humus is by far the most important in influencing succession. Due to its great capacity for water retention the accumulation of humus on uplands causes an increase in soil moisture; while in depressions, for obvious reasons, it has the opposite result. The change thus brought about in the water content of a soil is without doubt the most important effect of humus, and, in the opinion of Cowles, is perhaps the most significant of all factors influencing succession.

* 1911, op. cit.

Humus accumulation is associated with an increase of saprophytic soil organisms, a fact which may be of vital significance in conditioning the presence or absence of plants which are dependent on root fungi for their nitrogen supply.* The effect of humus on the toxicity of the soil, while as yet inadequately investigated, may prove to be a factor of large significance. Finally, the accumulation of humus modifies the soil temperature and the air content of the soil.

Just as the soil factors that influence succession may be summed up under humus, so the air factors may largely be included under the head of shade. Decrease in light, as already demonstrated, is favorable to species tolerant of shade, but fatal to light-requiring species. Moreover, increased shade favors the more rapid accumulation of humus; it also results in increased atmospheric humidity, and hence in decreased evaporation. This latter effect is important, not only in connection with the conservation of soil moisture, but also as it affects the transpiration of the plants themselves.

Two other biotic agencies are of greater or less importance in their effect on the trend of succession. The first of these is plant invasion. "In the long period of geologic history, plant migrations from one region to another must have played a tremendous part in the changing aspect of vegetation." But, "so imperceptibly do these migrations take place that we know of no profound change that has been wrought by this means in natural floras within historic time."† To this latter statement it may be that the chestnut blight (*Endothia gyrosa* var. *parasitica* (Murr.) Clint.) will furnish an interesting exception. For although much has been written regarding this disease from a pathological and an economic standpoint, it seems to the writer that its possible significance has been overlooked by ecologists. The chestnut is one of the most important trees in the climax forest, not only over a large part of Connecticut, but throughout much of the

* It should be noted in this connection that recent investigations of W. B. McDougall (Amer. Jour. Bot. 1: 51–74. *pl.* *4–7* + *f.* *1.* 1914) would seem to indicate that the benefits accruing to many trees from their association with root fungi may have been greatly overestimated.

† Cowles, 1911. *Op. cit.*, p. 179.

eastern United States. During the ten years that have elapsed since the chestnut disease was first recorded in this country—at New York—it has spread with amazing rapidity. At the present writing practically all the chestnut in southwestern Connecticut has been wiped out, and there is no part of the state which has been immune from its depredations. In the vicinity of New Haven much of the chestnut has already been exterminated and it is difficult to find a group of trees, some of which have not been affected by the ravages of the blight. And whether, as some workers think, the blight fungus is a native species, "which, because of peculiar conditions detrimental to the host, has assumed unusual virulence and widespread prominence,"* or, as others maintain, is an invader from the Old World, certain it is that from the present outlook it is destined to have a profound effect on the nature of the climax forest in the eastern United States.

The influence of man on succession is almost invariably retrogressive. Man destroys the more ultimate societies and causes them to be replaced by more primitive ones. The cutting of the forest, the introduction of grazing animals, and fire—all of these interfere with the mesotrophic trend of succession. Thus in a recently cleared area mesophytic herbaceous plants are largely superseded by the so-called "fire-weeds", e. g., *Epilobium angustifolium*, *Erechtites hieracifolia*, *Erigeron canadensis*, *Phytolacca decandra*, and *Verbascum Thapsus;* while *Betula populifolia*, *Myrica asplenifolia*, *Populus grandidentata*, *Populus tremuloides*, *Prunus virginiana*, *Rubus allegheniensis*, *Rubus idaeus* var. *aculeatissimus*, and other woody plants not represented in the antecedent forest may be abundant here. Fire, perhaps, should be considered a natural agency, but as a rule its frequency becomes much greater with the advent of man into a region.

There is one other phase of succession on trap to which, as yet, no reference has been made, viz. succession on talus slopes. This is of peculiar interest because it differs in certain respects from the type described above. Taken as a whole the trap ranges extend from north to south. As a rule the hills dip gently toward the

* Clinton, G. P. Chestnut bark disease. Report Conn. Agr. Exp. Sta. 1912: 359–453. *pl. 21–28.* 1914.

east, and it is largely from a study of the vegetation on these slopes that the observations thus far recorded have been made. But toward the west the ridges terminate in perpendicular cliffs, at the foot of which are great masses of rocks waste (fig. 4) or talus, derived from the disintegration of the overhanging precipices, and sometimes these are so extensive as to completely bury cliffs several hundred feet in height. The upper part of such a talus slope is steep, and, except at the very foot of the cliff, is composed of large, loose blocks of rock, with practically

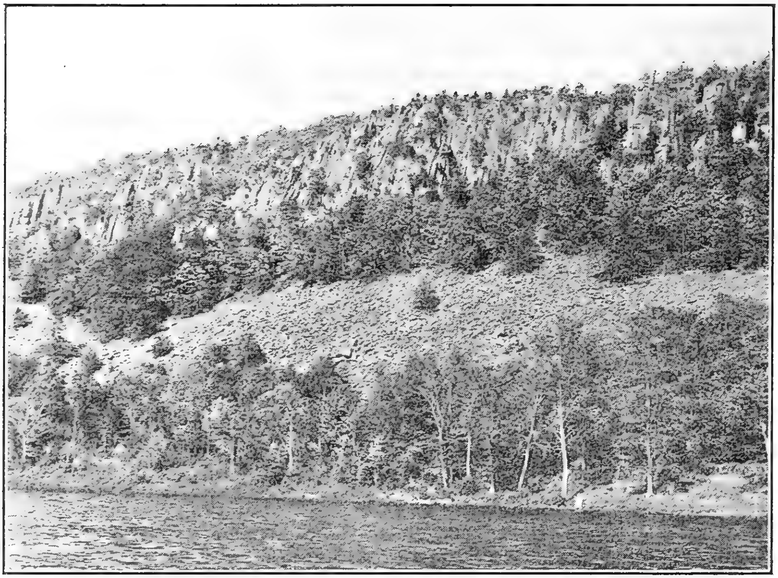

Fig. 4. Talus slope along west face of West Rock ridge, Woodbridge. A short distance to the north of where this picture was taken the talus has become completely covered with forest.

no soil between them. But as the bottom is approached the gradiant becomes gentler, the rock fragments smaller, and a rich soil collects. Here conditions are favorable for plants from the very outset, since seepage water is abundant the year round and a measure of protection from wind is afforded by the neighboring hill. Succession proceeds with great rapidity, and the pioneer associations quickly give way to forest. The mesophytism of the forests which ultimately clothe these lower slopes is attested by the presence of such trees as *Acer saccharum*, *Betula lutea*, *Tilia americana*, and *Tsuga canadensis;* also by the frequency of many mesophytic shrubs and herbaceous plants elsewhere uncommon in upland woods. Such, for example, are *Actaea rubra*, *Asarum canadense*, *Caulophyllum thalictroides*, *Dicentra Cucullaria*, *Geranium Robertianum*, *Sambucus racemosa* and *Staphylea trifolia*. A further step in the reclamation of the talus by vegetation is seen in the appearance of a belt of trees along the upper margin of the slope. Here, under the very shadow of the precipice, is usually a narrow zone where earth and finer rock particles, dislodged from the cliff overhead, collect in sufficient quantity to favor rapid colonization by plants. Moisture relations, however, are poorer than at lower levels, so that a truly mesophytic vegetation is slow to develop. The belt of forest which fringes the upper margin of the talus shown in fig. 4 consists largely of chestnut oak and black oak. But the condition shown in this photograph is by no means permanent. For, as the blocks of rock midway up the talus gradually disintegrate and soil collects, the two belts of forest encroach upon the barren area which separates them, and ultimately the entire slope becomes wooded. The first plants to appear in the talus succession are lichens, but their influence on later stages is negligible, for they are confined principally to the rock face while the transformations that culminate in the formation of forest are brought about almost entirely by crevice plants. Crevice mosses doubtless aid in the accumulation of soil and humus, and many of the crevice plants previously noted are also present here; but the first conspicuous crevice stage on talus slopes is usually dominated by vines and shrubs. The shade produced by trailing vines such as *Celastrus scandens*, *Psedera quinquefolia*, and *Rhus Toxicodendron* may be a factor of considerable significance in hastening the advent of mesophytic conditions. Characteristic pioneer shrubs are *Cornus circinata*, *Rubus odoratus* and various species of *Rhus*. The shrubs and vines are accompanied by trees, but except toward the top of the slope there may never be a xerophytic pioneer tree stage, for among the first trees to appear may be mesophytic species like *Betula lutea*, *Juglans cinerea*, *Tilia americana*, and even *Tsuga canadensis*, most of which are present in the ultimate forest.

The complexity of the surface geology of this state has been referred to in a previous paper.* Most of the underlying rocks are covered with sand, gravel, or clay; but in addition to the trap rocks—basalt and diabase—the surface outcrops include granites, gneisses, schists, quartzite, sandstone and shale, and limestone. To what extent, it may be asked, do the successional phenomena on these other types of rock correspond with, or disagree from, succession on trap? In other words, how is succession influenced by the physical or chemical nature of the substratum. In the opinion of Cowles† the most important feature of a rock, as regards its effect on succession, is its stability, *i. e.*, its degree of resistance to erosion. On stable uplands, where erosion is slow, succession is likewise slow. On unstable uplands, on the other hand, succession is rapid. Thus "in a given region a shale area may be clothed with a mesophytic forest, while a dolomite outcrop is still xerophytic, or a quartzite is scarcely more than a naked hill." The influence of the physiographic state of a region on the character of the vegetation is far more important than either the physical or chemical nature of the underlying rock. "The flora of a youthful topography in limestone more closely resembles the flora of a similar stage in sandstone than [that of] a young limestone topography resembles [that of] an old limestone topography." In other words, "rock as such, or even the soil which comes from it, is of less importance in determining succession than are the aerial conditions, especially exposure. And it is the stage in the topography that determines the exposure."

In view of Cowles's conclusions, which are based on the study of succession in various parts of the eastern United States, it is not surprising to find that in comparing successions on different types of rock in this state the resemblances are much more pro-

* Torreya **13**: 109. 1913.

† Cowles, H. C. The influence of underlying rocks on the character of the vegetation. Bull. Amer. Bur. Geog. **11**: 1–26. *f. 1–10.* 1901; Bot. Gaz. **31**: 89, 90. 1901.

nounced than the differences. Thus a succession on granite, such as may be studied to advantage on the numerous islands that rise out of the salt marshes in the vicinity of New Haven, is strikingly similar, except in minor details, to that observed on trap.*

The effect of the chemical nature of the substratum on vegetation has been the occasion of much debate. A few years since, Fernald† made extensive investigations of arctic and alpine plants in the northern United States and Canada, and found that their distribution is controlled very largely by the preponderance in the soil of potassium, calcium, and magnesium. The plants which he studied grow mainly on the faces of cliffs, in rock crevices, or on talus slopes, localities where the soil is derived primarily from the rock in place, so that his conclusions possess unusual value. So far as the rate of succession is concerned, the chemical nature of the underlying rock would appear to be most important as it affects the rapidity of erosion. But it cannot be doubted that to a certain extent the specific composition, especially of the earlier rock face and crevice stages, is modified directly by the abundance or scarcity of certain chemical elements in the soil. In Connecticut the problem is complicated by the fact that so much of the soil is of glacial or alluvial origin, and except in a superficial way‡ this problem has not been investigated.

In physical structure unconsolidated rocks like gravel, sand, and clay contrast sharply with consolidated rocks like granite and trap. That this dissimilarity in the nature of the substratum should be reflected in the character of the vegetation is naturally to be expected; yet the differences are less marked than one might be led to anticipate. As a concrete illustration of a succession on uncompacted rock the sand plains succession has been selected. W. E. Britton§ has given an interesting account of the vegetation of the North Haven sand plains, devoting special attention to certain desert-like areas and the structural peculiarities of the

* Compare Cowles, Bull. Amer. Bur. Geog. **11**: 14. 1901.

† Fernald, M. L. The soil preferences of certain alpine and subalpine plants. Rhodora **9**: 149–193. 1907.

‡ See Torreya **13**: 109–110. 1913.

§ Bull. Torrey Bot. Club **30**: 571–620. *pl. 23–28.* 1903.

plants inhabiting them, but except in a general way the subject of plant societies was not considered. These sand plains are a conspicuous feature of the central lowland of Connecticut. From a physiographic standpoint they represent outwash plains, developed during the final retreat of the continental glaciers, and now considerably dissected by stream erosion. One series of these plains stretches northward from New Haven, along the

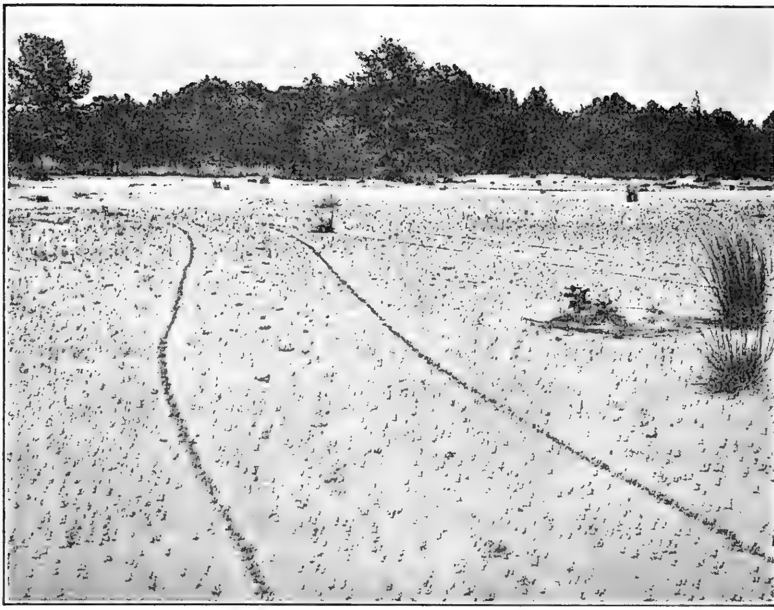

FIG. 5. Vegetation of sand plains in late summer, North Haven. The plant so common on the sand here is the annual, *Trichostema dichotoma*. Note the greater abundance of this plant in the wagon ruts—perhaps due to more favorable moisture relations there. In the right foreground are *Andropogon scoparius* and *Asclepias syriaca*.

east side of the Quinnipiac River, for about sixteen miles. The soil varies in texture from sand of medium fineness to coarse gravel. Moisture is more or less abundant throughout the year at a short distance below the surface, but, except in moist weather, the superficial soil layers are dry. This latter fact, coupled with wind sweep, the burning heat of the sun on the sand, and the high rate of evaporation, hinders the establishment of vegetation.

The greatest divergence in plant succession on such an area from, *e. g.*, succession on trap is seen in the earlier, pioneer stages. Crustose and foliose lichens are never present—a statement which holds true for unconsolidated rocks in general. The first stage in the sand plain series may not inappropriately be termed an edaphic desert. The soil lacks humus and the vegetation is very open, the plants growing scattered about over the otherwise bare, sandy soil (figs. 5, 6); and since the distinctive species are either annuals or rhizome perennials (or biennials), there are seasons of the year when to all appearances these tracts are almost des-

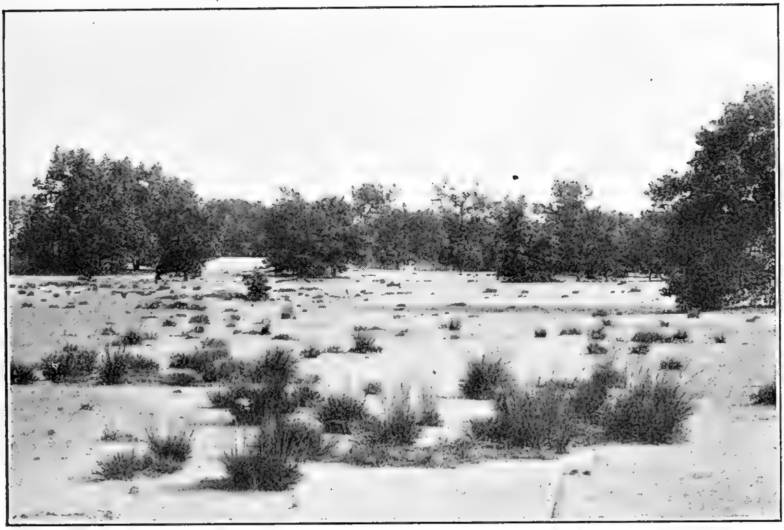

FIG. 6. Sand plains with scattered tufts of *Andropogon scoparius;* North Haven. Most of the trees are black oaks. Photograph after W. E. Britton.

titute of vegetation. Here and there, however, distributed at irregular intervals over the surface of the plain, are trees (most commonly *Quercus velutina*) whose presence may doubtless be attributed to the activities of squirrels since, despite the abundance of seeds with which the ground underneath the trees is strewn every fall, they exhibit no tendency to spread.*

* The acorns "fall upon the sand under the trees, probably germinate and dry up before the radicles can reach a sufficient depth to obtain the necessary water. In some unpublished investigations Prof. J. W. Toumey has found that in hard soil the radicle is not able to work its way into the soil, but on account of the lightness of the acorn it is tumbled about on the sand" (Britton, op. cit., pp. 578, 579).

Two annual species are especially characteristic of such areas, viz. *Hypericum gentianoides* and *Trichostema dichotomum*. Associated with these may grow *Asclepias syriaca*, *Baptisia tinctoria*, *Helianthemum majus*, *Lespedeza capitata*, *Oenothera biennis*, *Polygonella articulata*, *Stenophyllus capillaris* and occasional representatives of the succeeding stage in the succession. These barren tracts are often quite extensive, one area near North Haven, according to Britton, covering from 80 to 90 acres.

Tufts of bunch grass (*Andropogon scoparius*) are always more or less in evidence on these barrens. At first widely scattered,

FIG. 7. Edaphic prairie; North Haven. The predominating plant is *Andropogon scoparius*. The dark patches near the center of the picture are shrubs—*Myrica asplenifolia* and *Myrica carolinensis*. All of the herbaceous species listed on page 189 could probably be found here.

they may gradually become more numerous (fig. 6) so that eventually, as more and more soil is preempted, a permanent plant cover is established. Other plants beside the bunch grass may fulfil an important role in the reclamation process, notably the moss, *Polytrichum piliferum*, and species of *Cladonia* (*e. g.*, *C. sylvatica*, *C. papillaria*). These usually appear in company with the bunch grass, occupying the soil between the tufts; but sometimes mosses or lichens alone may reclaim considerable tracts.* The second stage in the sand plains succession is dominated by the bunch grass, and not infrequently the areas controlled by this grass are so large, and the tenacity with which this control is retained so great, that, in the opinion of the writer, they should be recognized as edaphic prairies (fig. 7). Except for their smaller size they resemble the well known natural prairie of western Long Island.†

Beside the bunch grass and some of the species already mentioned the vegetation of these prairies includes many other herbaceous forms, nearly all of which are perennial. The following species are perhaps as representative as any:

*Artemisia caudata*
*Asclepias verticillata*
*Aster linariifolius*
*Carex Muhlenbergii*
*Cyperus filiculmis* var. *macilentus*
*Desmodium canadense*
*Eragrostis pectinacea*
*Erigeron canadensis*
*Fragaria virginiana*
*Lupinus perennis*
*Lysimachia quadrifolia*
*Panicum depauperatum*
*Poa compressa*
*Potentilla canadensis*
*Pteris aquilina*
*Rumex Acetosella*
*Sericocarpus asteroides*
*Solidago nemoralis*
*Viola fimbriatula*

Also two low shrubs, *Myrica asplenifolia* and *Rubus villosus*, are almost invariably present and seem to form a constituent part of the prairie vegetation.

Sooner or later grassland is destined to be replaced by forest. Sometimes a short-lived shrub stage intervenes, but quite as often shrubs and trees appear at about the same time. Most of the shrubs listed in connection with the shrub stage of the trap rock succession are represented in the corresponding phase of the sand plains succession, while several species not there mentioned may also be prominent, *e. g.*, *Juniperus communis*, *Kalmia angustifolia*, *Myrica carolinensis*, and *Rhus Toxicodendron*. The pioneer trees include *Juniperus virginiana*, *Betula populifolia*, *Pinus rigida*, and *Robinia Pseud-Acacia*. The last named species

* See Britton, op. cit., p. 579.

† See Harper, R. M. The Hempstead Plains of Long Island. Torreya **12**: 277–286. *f. 1–7.* 1912; also Bull. Am. Geog. Soc. **43**: 351–360. *f. 1–5.* 1911.

is native farther south, but in Connecticut has become thoroughly established on the sand plains and elsewhere. It is the only example known to the writer of a recently introduced tree which can be considered of ecological importance. It spreads quickly, largely by means of root suckers, grows rapidly, and frequently forms light forests over considerable areas. As a rule, however, the red cedar, gray birch, and pitch pine are the first arborescent forms to appear. These may come in together, giving rise to a mixed growth; or one or another, according to chance, may predominate.* Red cedar, as along the trap ridges, usually forms rather open groves. Gray birch (*Betula populifolia*) may form dense stands, but the trees never attain a large size. Pitch pine alone, of the three, is capable of developing forests, and where this species predominates, the pioneer tree stage is apt to be of much longer duration than otherwise. Fig. 8 shows a pitch pine stand near Farmington. Some of the trees here are over 18 inches in diameter. The slight shade produced by the foliage overhead here is not sufficient to exclude from the ground underneath many of the herbaceous and frutescent forms characteristic of the preceding stages, but along with these occur some species which attain their optimum development under more mesophytic conditions. The ultimate fate of a forest like this is suggested by the predominance on the forest floor of oak seedlings and the scarcity of pitch pine seedlings. As a matter of fact, owing to the ability of the pitch pine to endure fire, this particular forest, which is situated along the railroad, will probably continue indefinitely in its present condition. But under normal conditions oak and hickory would succeed the pitch pine, and there seems to be no reason to doubt that under favorable circumstances the forest might at some future time become quite as mesophytic as the climax type described in connection with the trap rock succession.

* According to R. C. Hawley and A. F. Hawes (Forestry in New England, p. 352. New York. 1912), "gray birch is a species which requires a bare soil for a seed bed, while red cedar can start well under more adverse conditions, even in a thick sod. This difference in the habits of the two species explains why pure stands now of one species and then of the other are met with on old fields."

The sand plains succession may be regarded as fairly representative of succession on unconsolidated rocks. It differs in some respects from succession on gravel and clay, but so far as the sequence and composition of stages is concerned the resemblances are greater than the differences. Just as was found in the

FIG. 8. Pitch pine forest; Farmington. The undergrowth is largely xerophytic, common shrubs being *Ceanothus americana*, *Corylus americana*, *Myrica asplenifolia*, *Quercus ilicifolia* and *Rhus glabra*.

case of consolidated rocks, the chief difference between various uncompacted rocks in their effect on succession concerns the quickness or slowness with which mesophytic conditions are attained. The presence of clay in a soil increases its ability to retain water and thereby favors the more rapid advent of mesophytism. The most favorable of all soils in Connecticut, from a standpoint of natural vegetation, are the heterogeneous deposits of gravel, sand, and clay known as till. On such soils succession progresses so rapidly that, except where conditions have been modified by human interference, pioneer associations are seldom encountered. It should also be mentioned at this point that frequently, due to the influence of soil structure or ground water relations, swamps may be developed on uplands. But from an ecological standpoint these are better considered in connection with lowlands.

Several allusions have been made to the effect on vegetation of human interference. Unfortunately for the ecologist this is a factor which too often must be reckoned with. There is one type of succession resulting from man's activities which is deserving of special mention because of its widespread occurrence, viz., ruderal succession.* Whenever a plowed field is allowed to lie fallow for a year, a ruderal association arises. At first the plant population of such an area is composed largely of weeds, many of which are annuals. Of these, *Ambrosia artemisifolia* is almost omnipresent, but it is hardly worth while to attempt a representative list of the others. It may be noted in passing, however, that among the mosses some forms like *Funaria hygrometrica* and *Physcomitrium turbinatum* should be classed as weeds. If a field is permanently abandoned perennial herbaceous plants soon form a sod, so that annual species are largely excluded, and woody plants begin to assert themselves. In this way there may originate the type of vegetation known to the forester as the "old field type." This type is a common one in abandoned pastures, constituting one of the most familiar features of a Connecticut landscape. The characteristic trees are usually gray birch and red cedar, with which are associated low juniper and many other pioneer shrubs (fig. 9). If left to themselves such areas, in the course of time, may become clothed with mesophytic forests.

Taken as a whole, the observations recorded in the preceding paragraphs are applicable to upland vegetation in any part of Connecticut, but there are a few noteworthy discrepancies. The earlier stages in the succession are essentially alike everywhere,

* See Clements, F. E. Research methods in ecology, p. 253. Lincoln. 1905.

although there may be some divergence in the shrub stage, due to the local abundance or scarcity of particular species. But the tree stages in different sections exhibit some appreciable dissimilarities. Reference has been made in previous papers* to variations in the composition of the climax forest. The earlier tree stages as well manifest certain differences. Gray birch is a common pioneer tree in all sections, but post oak is confined to

FIG. 9. A typical "old field" society in an abandoned pasture; New Haven. *Juniperus virginiana* and *Juniperus communis* var. *depressa*.

the proximity of the coast, and even here it is quite restricted in its distribution. Red cedar and pitch pine are relatively rare in northwestern Connecticut, but they are common elsewhere. Of the two, red cedar is the more usual pioneer in the southwestern part of the state; in the central lowland and in eastern Connecticut both are locally important. The aspens (*Populus tremuloides*, *P. grandidentata*) are of sporadic occurrence throughout, especially in areas recently burned over, but they

* Torreya 13: 99, 101; 199–215. 1913; Bot. Gaz. 56: 143, 144. 1913.

are perhaps more conspicuous as pioneers in northwestern Connecticut than elsewhere. The paper birch (*Betula alba papyrifera*), also, is not an infrequent pioneer in Litchfield County and along the trap ridges toward the north, but is rare near the coast. The most striking departure, however, from any type of succession heretofore described is seen where the pioneer tree is the white pine (*Pinus Strobus*). The white pine is widely distributed throughout the state, but its ecological importance varies. Over much of southwestern Connecticut it is so uncommon as to be a negligible factor as regards its influence on succession; and while frequent enough in the southern part of the central lowland it usually grows scattered and intermixed with other trees. But in parts of northern and eastern Connecticut the white pine predominates over considerable areas and is a common pioneer in abandoned fields and cut-over tracts. Where white pine comes in strongly—frequently forming, as it does, nearly pure stands—the oak-hickory stage in the succession is often completely eliminated. There may thus be only two tree stages, pine remaining dominant until largely superseded by the more tolerant species of the climax forest. The white pine may even be represented in this ultimate forest, in this respect differing from any other pioneer tree. The undergrowth in evergreen, coniferous forests is much sparser than that of deciduous forests, owing to the dry carpet of needles with which the ground is littered. But practically all the shrubs and herbs characteristic of oak-hickory forests are to be found in many white pine forests. On the whole, therefore, it seems appropriate to regard such forests as ecologically equivalent to the oak-hickory forests developed elsewhere.

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# ALGAL STALACTITES IN BERMUDA

By John W. Harshberger

The hills of Bermuda are formed of a friable limestone, which represents particles of calcareous sand, which in the early geologic history of this group of islands was drifted by the wind into elevated dunes and afterwards by water action was compacted into a harder, or a softer, lime rock. This native rock is sawed out of the hillsides and is used in the construction of house walls (large, thick blocks), or house roofs (large, thin slabs). When exposed to the air, this soft quarried rock hardens into a form of limestone, much like concrete in appearance. As in all limestone formations of any considerable thickness, caverns and underground tunnels are worn into the softer strata by the action of rain, and underground water. Several caverns of this character are visited by tourists in Bermuda and some of them have pools of salt-water replenished by underground supplies from the ocean. There are limestone sinks, which represent caves, the roofs of which have fallen in. A number of these sinks are dry, others are filled with water. One of the most frequently visited of these depressions, filled with saltwater, which comes underground from the ocean, is Devil's Hole in which are kept a number of the characteristic fishes of the Bermuda archipelago, such as, the grouper, the angel-fish, the red-snapper and others equally celebrated. The walls of the Devil's Hole are rather steep, and in places overhanging, so that the fresh water from the rocks above drips into the pool beneath. Here were found stalactites from an inch to two inches in length and coated with a covering of blue-green algae.

Several of these stalactites were broken off from the overhanging wall in Devil's Hole, June, 1905, and kept dry for subsequent study, but the material was overlooked until the present summer (1914), when a study was made of it. Small pieces of stalactite were crushed in water and examined under the microscope. The blue-green algae, which alone were present, were identified with Josephine Tilden's* first volume of Minnesota Algae. The algae

* Tilden, Josephine. Minnesota Algae. Volume I. The Myxophyceae of North America and Adjacent Regions, including Central America, Greenland, Bermuda, the West Indies and Hawaii. Bot. Ser. VIII, 1910.

found on this examination consisted of *Chrootheca Richteriana* Hansg., *Gleocapsa aeruginosa* (Carmichael) Kuetzing, *G. gelatinosa* Kuetzing, *G. quarternata* (Brébisson) Kuetzing and *Gleotheca linearis* Naegeli. Attached to a small red alga (not identifiable) which was fastened to a piece of stalactite was found *Microcystis flos-aqua* (Wittrock) Kirchner. The most abundant blue-green alga was *Chrootheca Richteriana* Hansg., which, according to Josephine Tilden, consists of a somewhat gelatinous plant mass, thick, or more or less expanded of a blue-green, or yellowish color. The cells found in these masses are 18–24 microns in diameter, once to twice as long as wide, single, or in pairs, with thick sheaths up to 6 microns in diameter. This species, figured by Miss Tilden, has been reported from Bermuda by Farlow and from Montego Bay, Jamaica, by Pease and Butler. Of the three species of *Gleocapsa* enumerated above, the following is the distribution recorded in the Minnesota Algæ:

*G. aeruginosa* Greenland, New York, West Indies (Porto Rico).
*G. gelatinosa* United States, West Indies.
*G. quarternata* West Indies, Hawaii.

The note with reference to *G. aeraginosa* in Minnesota Algae is apropos: "West Indies. Forming a dark green layer on stone in cave. 'El Convento,' near Penuelas, Porto Rico (Sintenis)" *Gleocapsa quarternata* is described as forming a gray-green, mucilaginous coating on wet cliffs in Hawaii. The distribution of *Gleotheca linearis* is given in Minnesota Algae, as: "West Indies. On damp walls of dam, Sharp's River, St. Vincent (Elliott)."

That these algae are active in the formation of the stalactites is indicated by their close attachment to the surface of the stalactites in the Devil's Hole, Bermuda. They remove in the case of the carbonated waters, containing calcium bicarbonate $(CaHCO_3)_2$ in solution, the gaseous carbon dioxide, which is used by the blue-green algae in photosynthesis of organic compounds, so that the stalactites are formed by the continual deposit of calcium carbonate $(CaCO_3)$. Josephine Tilden has studied the formation of algal stalactites in the Yellowstone National Park, where such algae as *Gleocapsa violacea*, *Phormidium* (*Leptothrix*) *laminosum*, *Schizothrix calcicola* and *Synecococcus* *aeruginosus* are active. Associated with the older part of the Bermuda stalactites, I found a small gasteropod mollusc, (*Kaliella turbinata* Gulick), hid away in small holes, or irregularities of their surface. In conclusion, we find by the study of the material from Bermuda, that other algae are concerned in the formation of stalactites besides those described from Yellowstone Park, and if a comparative study were made of stalactitic material from all parts of the world, the writer has no doubt that the list of algae concerned would be a respectable one.

## ON ERIGERON PUSILLUS NUTT.

By N. L. Britton

I was much interested in reading Dr. B. L. Robinson's remarks on this species published in *Rhodora* for December, 1913, and, especially, because it was the study of specimens from Bermuda which enabled him to recognize the difference between this species and *E. canadensis* L. During a visit to Bermuda in late May and early June of this year, in company with Mr. Stewardson Brown, we studied these plants in the field, and our observations led us to agree with Dr. Robinson in ability to recognize the two species without any difficulty whatever, Mr. Brown having previously had similar experience in southern New Jersey. From the standpoint of the Bermuda flora, my interest in this plant was again increased because Mr. Oswald A. Reade, in his "Plants of Bermuda," published in 1883, had recorded both *canadensis* and *pusillus* from these islands, although not very well expressing the characters of *pusillus*, which he regarded as a dwarf state of *canadensis;* the purple-tipped involucral bracts, first observed by Dr. Robinson and cited by him as the salient character, are constant in Bermuda and, apparently, throughout the range of the plant in the eastern United States, as also the glabrate feature, entire leaves and smaller size of *E. pusillus*. In Bermuda, the two plants grow side by side in fields and along roadsides, and in some localities, at least, are equally abundant. Intermediate stations between Rhode Island and South Carolina are Bayshore, Long Island (*John McCallum*), Belmar, Monmouth County, New Jersey (*Taylor 1450*) and New Egypt, Ocean County, New Jersey (*Taylor 2650*), several localities in Cape May County, New Jersey, and Milton, Delaware, reported by Mr. Brown. Additional West Indian stations are Great Bahama (*Brace 3685*, *Britton & Millspaugh 2703* and *2445*); Abaco (*Brace 1827* and *1864*); Andros (*Brace 6996* and *7127*); North Caicos (*Millspaugh 9179*); St. Thomas (*Eggers*); Santo Domingo (*Fuertes 90*); Porto Rico (*Heller 1350*); Vieques (*Shafer 2619A*); Montserrat (*Shafer 14*); St. Kitts (*Britton & Cowell 428*). All the above cited specimens are glabrate, with purple-tipped bracts, and essentially entire leaves (the lower leaves of the North Caicos plant have a few sharp teeth).

In studying West Indian collections, I had long ago noticed the glabrate feature as compared with the hirsute *E. canadensis* of the eastern United States, and had sorted the specimens of our collections in accordance with this feature, but I had not noticed the purple-tipped involucral bracts. We have a large number of specimens from the West Indies which are quite as glabrous as those cited by Dr. Robinson as belonging to *pusillus*, and agreeing with them, apparently, in every other character except that of these purple tips; I cite the following as illustrating this series: Inagua (*Nash & Taylor 1408*); Hog Island, New Providence (*Wilson 8253*); Andros (*Brace 4887*); Great Ragged Island (*Wilson 7877*); Eleuthera (*Coker 381*); Grand Turk (*Nash & Taylor 3865*); Cuba (*Wright 1313*, *Wilson 195* and *243*, *Britton & Shafer 726*, *O'Donovan 5251*, *Leon 1325*, *Shafer 2442*, *Van Hermann 789*); Porto Rico (*Britton & Cowell 1547*); Mona (*Stevens 6391*); Martinique (*Duss 1442*); Guadeloupe (*Duss 2505*); Barbados (*Botanic Station 521*); Jamaica (*Fredholm 3317*); Columbia (*H. H. Smith 527*). It is possible that some of these may have shown purple-tipped involucral bracts in life, but I have not been able to see them in the dried specimens.

It would seem to me probable, therefore, that the characters of purple-tipped involucral scales may not be constant, but that the species must rest on its glabrate feature, usually smaller size, and entire leaves. Inasmuch as I regard these plants as generically distinct from *Erigeron*, I here propose the binomial **Leptilon pusillum.**

My study of the specimens, in so far as the collections of the New York Botanical Garden illustrate the two species and Mr. Brown's examination of the Philadelphia collections, exclude *Leptilon canadense* from the West Indies, except Bermuda, and also from the southeastern continental United States, south of North Carolina.

The figure accompanying the description of *L. canadensis* in "Illustrated Flora" was drawn from a specimen of *L. pusillum.*

## NEWS ITEMS.

We learn from the *Evening Post* that Miss Flora Anderson and Miss Margaret DeMerritt have been appointed as instructors in botany at Wellesley, and that Miss Grace L. Clapp has been appointed to a similar position at Smith.

Doctorates in botany were conferred at the close of the summer quarter of the University of Chicago upon Miss Hannah Aase of Washington State College, Professor J. S. Caldwell of Alabama Polytechnic Institute, Professor G. B. Rigg of University of Washington, Professor J. B. Stober, and Miss Eva Schley.

Mr. Adolph Rolloff, director of the State Botanical Garden in Tiflis, Russia, is visiting the botanical gardens of the United States.

We learn from *Science* that Dr. J. J. Tauberhaus has been promoted from assistant to associate research plant pathologist at the Delaware College Agricultural Experiment Station.

From the same source we learn of the death at the age of thirty-seven of Dr. J. E. Gow, who was professor of botany at Coe College.

Mr. Guy R. Bisby who has been conducting investigations on the potato diseases in Maine during the past summer, has returned to the Brooklyn Botanic Garden.

At the same institution Dr. R. R. Gates has registered for a time as an investigator and Mr. Alfred L. Gundersen has been appointed as assistant in the herbarium.

A new edition of the Naturalists' Directory has just been published by S. E. Cassino, Salem, Mass. This directory is useful to naturalists since it is the means of bringing together students and collectors in all parts of the world through correspondence. The directory contains an alphabetical list of English speaking professional and amateur naturalists in all parts of the world, also a list of scientific societies and periodicals. Further information may be had from the publisher.

An announcement has just been issued of a new paleobotanical bimonthly, *Paleobotanischen Zentralblatt*, which is to be published under the auspices of the Internationalen Paleobotanischen Gesellschaft. It is under the management of a committee, which in America is represented by Dr. E. W. Berry, Johns Hopkins University, where additional information may be obtained.

# The Torrey Botanical Club

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## (1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 40 published in 1913, contained 712 pages of text and 26 full-page plates. Price $3.00 per annum. For Europe, 14 shillings. Dulau & Co., 37 Soho Square, London, are, agents for England.

Of former volumes, only 24–40 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–40 three dollars each.

Single copies (30 cents) will be furnished only when not breaking complete volumes.

## (2) MEMOIRS

The MEMOIRS, established 1889, are published at irregulas intervals. Volumes 1–13 are now completed; Nos. 1 and 2 of Vol. 14 have been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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New York City

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BY

NORMAN TAYLOR

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# TORREYA

November, 1914.

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## THE FLORA OF THE TOWN OF SOUTHOLD, LONG ISLAND AND GARDINER'S ISLAND

By Stewart H. Burnham and Roy A. Latham



The town of Southold is at the eastern end of the north shore of Long Island, extending westward for twenty miles through the villages of Orient, East Marion, Greenport, Southold, Peconic, Cutchogue to Mattituck and Laurel. The topography of the town affords a pleasing variation. On the north, paralleled with the coast of Long Island Sound, are rolling plains and hillocks; now forested, now barren, or broken by low-lying necks of sandy beaches and inlets. On the south, facing the bays and harbors, are extensive salt meadows drained by numerous tidal creeks: the marshes bordered, here and there, by a growth of cedar and hardwood. Between the waterways and tidal creeks sandy beaches extend far out: such areas often being covered with sprawling red cedars, pitch pine and beach plum shrubs. On one of these peninsulas at Orient over seventy-five species of lichens have been found, growing either on the low trees or on the ground: and on a single prostrate cedar fourteen species were found. Fertile, low, level farms lie principally through the center of the town of Southold. Among the more common plants found throughout the town but not known to occur at Orient, are: Skunk-cabbage, beech, witch-hazel, trailing arbutus and mountain laurel. These plants are found at Greenport, six miles west of Orient: and the local flora of these two places seem strangely different.

Gardiner's Island is situated ten miles southeast of Orient and three miles north of the Hampton shore. The flora is quite similar to that found about Orient; excepting the abundance of

No. 10, Vol. 14, of Torreya comprising pp. 167–200 was issued 27 October 1914]

seaside knotweed, sea purslane, sea poppy, New England aster and Scotch thistle. The island is still wooded with the magnificent first-growth oak and beech forests: interposed with high rolling plains and rich luxuriant lowlands, side by side.

Roy A. Latham of Orient, from May 25, 1909, until the present time, collected the following plants: and many of the specimens passed through my hands while in the State Botanist's office at Albany, New York. The major part of the species here listed were collected between Orient and Greenport; where much of the region remains in its original state. A few of the best of the specimens are preserved in the New York State Herbarium; some of the poorer ones were saved; "scrappy" ones were consigned to the waste basket; and several fungi were left unnamed or in doubt.

The arrangement of the list accords with Dr. Smith Ely Jelliffe's, The Flora of Long Island, 1899. The nomenclature of the Myxomycetes follows Dr. Thomas H. Macbride's, North American Slime-Moulds; and that of the Algae, Dr. Bradley M. Davis's, A Catalogue of the Marine Flora of Woods Hole and Vicinity. The nomenclature of the Fungi in most instances follows P. A. Saccardo's, Sylloge Fungorum: and the authors are under great obligation to Dr. Charles H. Peck, State Botanist of New York, for helping solve many difficult problems among the Higher Basidiomycetes. The nomenclature of the Lichens conforms with a modification of the Nylander system; that of the Hepaticae, follows Dr. A. W. Evans: and that of the Musci, Dr. A. J. Grout's, Mosses with Hand-lens and Microscope. The nomenclature of the ferns and flowering plants follows the last edition of Dr. N. L. Britton and A. Brown's, An Illustrated Flora of the Northern States and Canada.

It has seemed best not to arrange the long list of cryptogams according to families and increase the length of this article: but to list the species under botanical orders alphabetically. The ferns and phanerogams are arranged according to families: but the species are listed in alphabetical order.

## Insect Galls*

*Acarus Serotinae* Beutm.—Wild Cherry Pouch Gall.
*Acraspis erinacei* Walsh—Oak Hedgehog Gall.
*Amphibolips confluentus* Harr.—Oak Apple.
*Andricus futilis* O. S.—Oak Wart Gall on leaves of *Quercus alba.*
*A. palustris* O. S.—Succulent Oak Gall on leaves of *Quercus palustris.*
*A. petiolicola* Bass.—Oak Petiole Gall on leaves of *Quercus alba* and *Q. velutina.*
*A. punctatus* Bass.—Oak Knot Gall.
*A. seminator* Harr.—Oak Seed Gall.
*Asteromyia rubra* Felt—On leaves of *Solidago bicolor.*
*Aulax tumidus* Bass.—Lettuce Tumor Gall.
*Biorhiza forticornis* Walsh—Oak Fig Gall on twigs of *Quercus alba.*
*Cecidomyia Caryaecola* O. S.—Hickory Seed Gall.
*C. holotricha* O. S.—Hickory Onion Gall.
*C. niveipila* O. S.—Oak Fold Gall.
*C. Nyssaecola* Beutm.—On leaves of *Nyssa sylvatica.*
*C.* (?) *ocellaris* Comstock—Maple Spot Gall on leaves of *Acer rubrum.*
*C. sanguinolenta* O. S.—Hickory Cone Gall.
*C. Serotinae* O. S.—Wild Cherry Bud Gall.
*Cincticornia pilulae* Walsh—Oak Pill Gall on leaves of *Quercus velutina.*
*Cynips Pisum* Fitch—Oak Pea Gall.
*Cystiphora canadensis* Felt—On leaves of *Nabalus.*
*C. viburnifolia* Felt—On leaves of *Viburnum acerifolium* and *V. dentatum.*
*Dasyneura Galii* Felt—On flower buds of *Galium.*
*D. Salicifolia* Felt—On young willow leaves.
*Diastrophus Cuscutaeformis* O. S.—Blackberry Seed Gall.
*D. nebulosus* O. S.—Blackberry Knot Gall.
*D. niger* Bass.—On leaves of *Potentilla canadensis.*
*Dryophanta polita* Bass.—Polished Oak Gall.
*Erineum fagineum* Pers.—Beechleaf Mite Gall.
*Eriophyes abnormis* Garman—A mite gall on leaves of *Tilia americana.*
*E. Nyssae* Trotter—On leaves of *Nyssa sylvatica.*
*E. Querci* Garman—On leaves of *Quercus velutina.*
*Gnorimoschema gallaesolidaginis* Riley—On stems of *Solidago serotina.*
*Holcaspis globulus* Fitch—Oak Bullet Gall.
*Hormaphis Hamamelidis* Fitch—Witch Hazel Cone Gall.
*H. spinosus* Shiner—Spiny Witch Hazel Gall.
*Hormomyia Crataegifolia* Felt—On leaves of *Crataegus.*
*Itonida foliora* Russ. & Hook.—On margin of leaves of *Quercus velutina.*
*Lasioptera farinosa* Beutm.—On leaf veins of *Rubus.*
*L. Lycopi* Felt—On stems of *Lycopus.*
*L. virginica* Felt—On stems of *Triadenum virginicum.*
*L. Vitis* O. S.—Grape-vine Tomato Gall.
*Nematus pomum* Walsh—Willow Apple Gall.
*Neolasioptera Erigerontis* Felt—On stems of *Leptilon canadense.*

* The majority of these galls were named by Dr. E. P. Felt, state entomologist of the state of New York.

*N. vitinea* Felt—On petioles of grape leaves.
*Neuroterus batatus* Fitch—Oak Potato Gall on twigs of *Quercus alba.*
*N. majalis* Bass.—On leaves of *Quercus alba.*
*Obolodiplosis Robiniae* Hald.—On leaves of *Robinia Pseudo-Acacia.*
*Oligotrophus salicifolius* Felt—On leaves of *Salix discolor.*
*Pachypsylla Celtidis-gemma* Riley—Hackberry Nodule Gall.
*P. Celtidis-mamma* Riley—Hackberry Nipple Gall.
*Pemphigus Populicaulis* Fitch—Poplar Stem Gall.
*P. Rhois* Fitch—Sumac Tomato Gall on leaves of *Rhus glabra.*
*Phylloxera Caryaecaulis* Fitch—Hickory Louse Gall.
*P. Caryae-globuli* Walsh
*P. vastatrix* Planch.—Grape Phylloxera.
*P. vitifoliae* Fitch
*Rhabdophaga Salicifolia* Felt—On leaves of *Spirea latifolia.*
*Rhodites bicolor* Harr.—Spiny Rose Gall.
*R. dichlocerus* Harr.—Long Rose Gall.
*R. globosus* Beutm.—Globular Rose Gall.
*R. ignota* O. S.—Mealy Rose Gall.
*R. verna* O. S.—Knotty Rose Gall.
*Rhopalomyia anthophila* O. S.—On leaves of *Solidago.*
*R. capitata* Felt—On stems of *Solidago.*
*R. lateriflora* Felt—On stems of *Aster ericoides.*
*R. racemicola* O. S.—On flowers of *Solidago rugosa.*
*Sackenomyia viburnifolia* Felt—On leaves of *Viburnum dentatum.*
*Solenozopheria Vaccinii* Ashm.—Huckleberry Gall on stems of *Gaylussacia baccata.*
*Trypeta polita* Lw.—Goldenrod Gall.

## Thallophyta

### MYXOTHALLOPHYTA

#### Myxomycetes

*Arcyria cinerea* (Bull.) Pers.—On rotten wood of oak.
*A. denudata* (L.) Sheldon—On hickory and cherry.
*Ceratiomyxa fruticulosa* (Muell.) Macbr.—On rotten wood.
*Fuligo ovata* (Schaeff.) Macbr.—On old oak trunks.
*Hemitrichia serpula* (Scop.) Rost.—On old hickory wood.
*H. vesparium* (Batsch) Macbr.—On old hickory wood.
*Lycogala epidendrum* (Buxb.) Fr.—On pine stumps, hickory and oak.
*Plasmodiophora Brassicae* Woron.—On roots of *Brassica oleracea;* determined at Bureau of Plant Industry, Washington.
*Reticularia Lycoperdon* Bull.—On *Sassafras Sassafras.*
*Stemonites Smithii* Macbr.—On old logs.
*Trichia favoginea* (Batsch) Pers.—On old wood of *Robinia Pseudo-Acacia.*

### EUTHALLOPHYTA

#### Euphyceae*

*Agardhiella tenera* (Ag.) J. Ag.
*Ahnfeltia plicata* (Huds.) Fr.

* The marine algae were mostly determined by Dr. M. A. Howe and are preserved in the Herbarium of the New York Botanical Garden.

*Anabæna torulosa* (Carm.) Lag.
*Antithamnion Pylaisaei* (Mont.) Kjellm.
*Ascophyllum nodosum* (L.) LeJolis
*Callithamnion Baileyi* Harv.
*C. byssoideum* Arn.
*Ceramium fastigiatum* Harv.
*C. rubrum* (Huds.) Ag.
*C. tenuissimum* (Lyngyb.) J. Ag.—Greenport.
*Chaetomorpha Linum* (Müll.) Kütz.
*Champia parvula* (Ag.) Harv.
*Chlorococcum humicola* (Naeg.) Rabenh.—A fresh-water alga on a piece of wood.
*Chondria tenuissima* (Good. & Woodw.) Ag.
*Chondrus crispus* (L.) Stackh.
*Chorda filum* (L.) Stackh.
*Chordaria flagelliformis* (Müll.) Ag.
*Cladophora arcta* (Dillw.) Kütz.
*C. expansa* (Mert.) Kütz.
*C. flexuosa* (Griff.) Harv.
*C. gracilis* (Griff.) Kütz.
*Corallina officinalis* L.
*Cystoclonium purpurascens* (Huds.) Kütz.
*Dasya pedicellata* Ag.
*Delesseria sinuosa* (Good. & Woodw.) Lamour.
*Dermatolithon pustulatum* (Lamour.) Fosl.—On leaves of *Zostera*.
*Desmarestia aculeata* (L.) Lamour.
*D. viridis* (Müll.) Lamour.
*Dictyosiphon foeniculaceus* (Huds.) Grev.
*Ectocarpus confervoides* (Roth) LeJolis
*E. fasciculatus* Harv.
*E. siliculosus* (Dillw.) Ag.
*Enteromorpha compressa* (L.) Grev.
*E. intestinalis* (L.) Grev.
*E. linza* (L.) J. Ag.
*E. percursa* (Ag.) J. Ag.
*E. plumosa* Kütz.
*Epilithon membranaceum* (Esp.) Heyd.
*Fucus evanescens* Ag.
*F. spiralis* L.
*F. vesiculosus* L.
*Gracilaria confervoides* (L.) Grev.
*Gymnogongrus Torreyi* (Ag.) J. Ag.—Dr. Howe says: "probably only a flattened variety of *Ahnfeltia plicata* (Huds.) Fr."
*Halothrix lumbricalis* (Kütz.) Reinke—On leaves of *Zostera*.
*Hildebrandia prototypus* Nardo
*Hypnea musciformis* (Wulf.) Lamour.
*Isactis glauca* Thuret
*Laminaria Agardhii* Kjellm.
*L. digitata* (L.) Lamour.

*Leathesia difformis* (L.) Aresch.—Probably the young thalli on *Zostera*.
*Lithophyllum pustulatum* (Lamour.) Fosl.
*Lomentaria uncinata* Menegh.
*Melobesia Lejolisii* Rosan.—On leaves of *Zostera*.
*Mesogloia divaricata* (Ag.) Kütz.
*Monostroma leptoderma* Kjellm.
*M. undulatum Farlowii* Fosl.
*Petalonia fascia* (Müll.) Kütz.
*Phyllophora membranifolia* (Good. & Woodw.) J. Ag.
*Polyides rotundus* (Gmel.) Grev.
*Polysiphonia elongata* (Huds.) Harv.
*P. Harveyi* Bailey
*P. nigrescens* (Dillw.) Grev.
*P. Olneyi* Harv.
*P. urceolata* (Lightf.) Grev.
*P. urceolata formosa* (Suhr) J. Ag.
*P. variegata* (Ag.) Zanard.
*Punctaria latifolia* Grev.
*Pylaiella littoralis* (L.) Kjellm.
*Rhodermis Georgii* (Batt.) Collins—On leaves of *Zostera*.
*Rhodomela subfusca* (Woodw.) Ag.—Also the red form, approaching *Rhodomela Rochei* Harv.
*Rhodymenia palmata* (L.) Grev.
*Sargassum Filipendula* (Ag.) J. Ag.
*Scytosiphon lomentarius* (Lygyb.) J. Ag.
*S. lomentarius complanatus* Rosev.
*Spermothamnium Turneri* (Mert.) Aresch.—Attached to the base of *Polysiphonia elongata*.
*Sphacelaria cirrhosa* (Roth) Ag.
*Spyridia filamentosa* (Wulf.) Harv.
*Sterrocolax decipiens* Schmitz.—"Abundant on *Gymnogongrus Torreyi*, which fact may be interpreted as strengthening the idea that *G. Torreyi* is only a form of *Ahnfeltia plicata*."*
*Stilophora rhizodes* (Ehrh.) J. Ag.
*Ulothrix flaccida* (Dillw.) Thuret
*Ulva Lactuca* L.
*U. Lactuca latissima* (L.) DC.

## FUNGI

### Schizomycetes

*Bacillus amylovorus* (Burr.) DeToni—On leaves of *Pyrus communis*.

## EUMYCETES

### Phycomycetes

*Bremia Lactucae* Regel—On *Lactuca* leaves.
*Cystopus candidus* (Pers.) Lev.—On *Bursa Bursa-pastoris* and other mustards.

* Some Midwinter Algae of Long Island Sound, by M. A. Howe in Torreya **14**: 97–101. June, 1914 (Contr. N. Y. Botanical Garden No. 169).

*Mucor Mucedo* L.—On beet stored in a cellar; determined at Cornell by Prof. Fitzpatrick.

*Rhizopus nigricans* Ehrenb.—On stale bread.

### Ascomycetes (excluding Pyrenomycetes)

*Belonidium aurelia* (Pers.) DeNot.—On old wood of *Robinia Pseudo-Acacia;* specimens in N. Y. State Herbarium.

*Bulgaria inquinans* (Pers.) Fr.

*Chlorosplenium aeruginosum* (Oeder) DeNot.—On old wood of *Acer rubrum.*

*C. Schweinitzii* Fr.

*Coccomyces Juniperi* Karst.—On bark of *Juniperus virginiana;* specimens in N. Y. State Herbarium. (*Colopoma Juniperinum* C. & P.)

*Dasyscypha calcycina* (Schum.) Fckl.—On bark of *Pinus rigida.*

*D. virginea* (Batsch) Fckl.—On oak.

*Discina orbicularis* Pk.—On old wood of hickory and cherry.

*Durella corrugata* (C. & P.) Sacc.—On oak twigs; specimens in N. Y. State Herbarium.

*Exoascus deformans* (Berk.) Fckl.—On leaves of *Amygdalus persica.*

*E. varius* Atk.—On leaves of *Padus virginiana.*

*Geoglossum velutipes* Pk.—On ground in woods.

*Geopyxis hesperidea* Cke. & Pk.—On logs; specimens in N. Y. State Herbarium.

*Gyromitra esculenta* (Pers.) Fr.—Rare in cedar woods at Orient.

*Helotium citrinum* (Hedw.) Fr.—On old oak and hickory wood.

*Helvella macropus* (Pers.) Karst.

*Humaria granulata* (Bull.) Sacc.—On cow dung and old potato stems; specimens in N. Y. State Herbarium.

*Lachnea scutellata* (L.) Gill.—On old oak wood.

*L. setosa* (Nees) Gill.—East Marion on rotten stumps.

*Lecanidion indigoticum* (C. & P.) Sacc.—Specimens in N. Y. State Herbarium.

*Leotia lubrica* (Scop.) Pers.

*Mollisia melaleuca* (Fr.) Sacc.—On old wood of *Robinia Pseudo-Acacia.*

*Morchella conica* Pers.

*M. deliciosa* Fr.

*M. esculenta* (L.) Pers.—The morels all grow in sandy soil, at Orient.

*Phaeangella deformata* (Pk.) Sacc. & D. Sacc.—Growing in lines on bark of *Juniperus virginiana;* specimens in N. Y. State Herbarium.

*Propolis faginea* (Schrad.) Karst.—On old wood of willow and hickory; specimens in N. Y. State Herbarium.

*Rhytisma acerinum* (Pers.) Fr.—Greenport on leaves of *Acer rubrum.*

*R. decolorans* Fr.—Greenport on leaves of *Xolisma ligustrina* and *Vaccinium.*

*R. Solidaginis* Schw.—On leaves of *Solidago.*

*R. Vitis* Schw.—On leaves of grape; determined by Mrs. F. W. Patterson; specimens in N. Y. State Herbarium.

*Sarcoscypha occidentalis* Schw.

*Sclerotinia fructigena* (Pers.) Schroet.—On fruit of *Amygdalus persica.*

*S. Libertiana* Fckl.—Determined at Bureau of Plant Industry.

*Tapesia fusca* (Pers.) Fckl.—On oak.

ASCOMYCETES (PYRENOMYCETES)

*Botryosphaeria Berengeriana* (DeNot.)—On twigs of *Toxicodendron radicans.*

*Calosphaeria Myricae* (C. &. E) E. & E.—On dead *Myrica carolinensis* branches; reported in N. Y. State Mus. Bull. 167: 24. 1913.

*Coronophora angustata* Fckl.—On dead *Myrica carolinensis* trunks; reported in N. Y. State Mus. Bull. 157: 24. 1912.

*Daldinia concentrica* (Bolt.) Ces. & DeNot.—On oak and hickory.

*D. vernicosa* (Schw.) Ces. & DeNot.—On old wood of *Fagus grandiflora.*

*Diaporthe parasitica* Murrill—On *Castanea dentata.*

*Diatrype albopruinosa* (Schw.) Cke.—On *Fagus grandiflora.*

*D. stigma* (Hoffm.) Fr.—On old wood of oak.

*Diatrypella betulina* (Pk.) Sacc.—Greenport.

*D. prominens* (Howe) E. & E.—On *Platanus occidentalis.*

*D. Rhois* (Schw.) E. & E.—On *Toxicodendron radicans.*

*Dothidea Baccharidis* Cke.—On dead branches of *Baccharis halimifolia;* determined by Mrs. F. W. Patterson; reported in N. Y. State Mus. Bull. 167: 26. 1913.

*Eutypella clavulata* Cke.—On dead branches of *Ailanthus glandulosa.*

*E. longirostris* Pk.—On dead twigs of *Robinia Pseudo-Acacia.*

*E. stellulata* (Fr.) Sacc.—On hickory, oak, *Amelanchier* and *Robinia Pseudo-Acacia.*

*Eutypa spinosa* (Pers.) Tul.—On old wood of oak.

*Gloniopsis australis* (Duby) Sacc.—Old wood of oak, *Betula populifolia, Sassafras Sassafras* and *Vitis;* specimens in N. Y. State Herbarium.

*Glonium parvulum* (Ger.) Sacc.—Decorticated wood; reported in N. Y. State Mus. Bull. 150: 45. 1911.

*Herpotrichia diffusa* (Fckl.) E. & E.—On decaying wood of *Robinia Pseudo-Acacia;* reported in N. Y. State Mus. Bull. 150: 45. 1911.

*Hypoxylon atropunctatum* (Fckl.) Cke.—On old wood of oak.

*H. coccineum* Bull.—On old wood of oak and *Malus Malus.*

*H. fuscopurpureum* (Schw.) Berk.—On old wood of hickory.

*H. fuscum* (Pers.) Fr.—On old wood of *Fagus grandiflora.*

*H. Sassafras* (Schw.) Berk.—On old wood of *Sassafras Sassafras.*

*H. serpens* (Pers.) Fr.—Greenport on hickory and *Quercus alba;* specimens in N. Y. State Herbarium.

*Hysteriographium Mori* (Schw.) Rehm—On old wood of oak, *Platanus occidentalis, Malus Malus, Ligustrum vulgare* and *Baccharis halimifolia.*

*Hysterium Thujarum* Cke. & Pk.—Determined by Dr. F. J. Seaver.

*Hysterium pulicare* Pers.—On old wood of *Robinia Pseudo-Acacia* and *Rhus;* specimens in N. Y. State Herbarium.

*Massaria inquinans* (Tode) Fr.

*M. vomitoria* B. & C.—On *Acer rubrum.*

*Nectria cinnabarina* (Tode) Fr.—Also the conidial form, *Tubercularia vulgaris* Tode on dead wood of many species of trees and shrubs.

*N. episphaeria* (Tode) Fr.—Parasitic on *Diatrype stigma.*

*Nummularia clypeus* (Schw.) Cke.—On oak stump.

*N. discreta* (Schw.) Tul.—On old branches of *Malus Malus.*

*Phyllachora graminis* (Pers.) Fckl.—On leaves of grasses.

*Plowrightia morbosa* (Schw.) Sacc.—Branches of *Prunus maritima* and cultivated quince.

*Rosellinia mutans* (C. & P.) Sacc.—On hickory; specimens in N. Y. State Herbarium.

*R. subiculata* (Schw.) Sacc.—Greenport on *Fraxinus americana.*

*Sphaerella Fragariae* (Tul.) Sacc.—On leaves of *Fragaria virginiana.*

*Ustulina vulgaris* Tul.—On oak stumps.

*Valsa ambiens* (Pers.) Fr.—On dead branches of *Fagus grandiflora.*

*V. Linderae* Pk.—On dead twigs of *Benzoin aestivale;* specimens in N. Y. State Herbarium.

*V. rhoöphila* C. & E.—On dead branches of *Rhus;* specimens in N. Y. State Herbarium.

*Xylaria polymorpha* (Pers.) Grev.—On hickory stump.

## Hypomycetes

*Alternaria Brassicae* (Berk.) Sacc.—On old plants of *Ricinus communis* and *Brassica oleracea;* determined at Cornell University.

*Cercospora leptosperma* Pk.—On leaves of *Aralia nudicaulis;* determined by Dr. H. D. House.

*Illosporium roseum* (Schreb.) Mart.—On *Physcia stellaris.*

*Macrosporium commune* Rabenh.—On leaves of cucumber and watermelon.

*Microstroma Juglandis* (Bereng.) Sacc.—On hickory leaves.

*Monilia Peckiana* S. & V.—On leaves of *Gaylussacia baccata;* specimens in N. Y. State Herbarium.

*Oospora scabes* Thaxt.—Common and very bad on potatoes.

*Ovularia obliqua* (Cke.) Oud.—On leaves of *Rumex.*

*Pilacre faginea* (Fr.) B. & Br.

*Piricularia grisea* (Cke.) Sacc.—On leaves of *Chaetochloa italica.*

*Polythrincium Trifolii* Kze.—On leaves of *Trifolium pratense;* determined by Dr. J. C. Arthur.

*Ramularia Armoraciae* Fckl.—On leaves of *Armoracia Armoracia.*

*R. lineola* Pk.—On leaves of *Leontodon Taraxacum.*

*R. Plantaginis* E. & M.—The var. *nigromaculans* Pk., on leaves of *Plantago major.*

*Rhinotrichum ramosissimum* B. & C.—On cherry limbs.

*Streptothrix fusca* Cda.—On *Juniperus virginiana;* specimens in N. Y. State Herbarium.

## Melanconiales

*Coryneum pulvinatum* K. & S.—On dead branches of *Tilia americana.*

*C. pustulatum* Pk.—On dead branches of *Castanea sativa;* specimens in N. Y. State Herbarium.

*Gloeosporium intermedium brevipes* Sacc.—On leaves of the cultivated rubber-plant. (*Gloeosporium elasticae* Cke. & Mass.)

*Pestalozzia adusta* E. & E.—On leaves of *Padus virginiana.*

*P. funerea* Desm.—On dead twigs of *Juniperus virginiana.*

*P. longiseta* Speg.—On leaves of *Rubus* and *Aronia.* The three species of *Pestalozzia* are reported in N. Y. State Mus. Bull. 157: 30. 1912.

*Steganosporium fenestratum* (E. & E.) Sacc.—On dead branches of *Clethra alnifolia;* reported in N. Y. State Mus. Bull. 157: 34. 1912.

SPHAEROPSIDEAE

*Amerosporium oeconomicum* Ell. & Tracy—On bean leaves; determined by Mrs. F. W. Patterson.

*Ascochyta Rhei* E. & E.—On leaves of *Rheum rhaponticum;* reported in N. Y. State Mus. Bull. 157: 22. 1912.

*Camarosporium abnorme* (Pk.) Sacc.—On stems of *Celastrus scandens.*

*C. Maclurae* Pk.—On dead branches of *Toxylon pomiferum;* Orient is the type station for this species; reported and described in N. Y. State Mus. Bull. 157: 23. 1912.

*Cytospora chrysosperma* (Pers.) Fr.—On dead branches of poplar.

*C. Salicis* (Cda.) Rabenh.—On dead willow branches; reported in N. Y. State Mus. Bull. 157: 25. 1912.

*Dendrophoma Tiliae* Pk.—On *Tilia americana;* specimens in N. Y. State Herbarium.

*Diplodia ruborum* (Schw.) Sacc.—On *Rubus.*

*D. virginiana* Cke. & Rav.—On dead twigs of *Juniperus virginiana.*

*Haplosporella Ribis* Sacc.—On dead stems of *Grossularia;* reported in N. Y. State Mus. Bull. 157: 27. 1912.

*Hendersonia Grossulariae* Oud.—On dead and dying stems of *Grossularia reclinata;* reported in N. Y. State Mus. Bull. 157: 28. 1912.

*H. pubentis* Cke.—On dead stems of *Sambucus canadensis.*

*Macrophoma albifructa* (Pk.) Berl. & Vogl.—On dead maple twigs.

*M. Juniperina* Pk.—On dead *Juniperus virginiana* twigs; Orient is the type station for this species; reported and described in N. Y. State Mus. Bull. 167: 28. 1913.

*Phlyctaena septorioides* Sacc.—On dead stems of *Phytolacca americana.*

*Phoma ampelinum* B. & C.—On grape leaves.

*P. Asclepiadea* E. & E.—On stems of *Asclepias syriaca;* reported in N. Y. State Mus. Bull. 167: 30. 1913.

*P. Baccharidis* Brun.—On dead stems of *Baccharis halimifolia.*

*P. corylina* (Thuem.) Sacc.—On dead stems of *Corylus.*

*P. herbarum* West.—On dead stems of *Lilium, Rheum rhaponticum* and *Solidago.*

*P. moricola* Sacc.—On dead twigs of *Morus.*

*P. sambucina* Sacc.—On dead twigs of *Sambucus canadensis.*

*P. semiimmersa* Sacc.—On dead branches of *Crataegus;* reported in N. Y. State Mus. Bull. 167: 30. 1913.

*Phoma Smilacis* Boy. & Jacz.—On dead stems of *Smilax rotundifolia;* reported in N. Y. State Mus. Bull. 157: 32. 1912.

*Phyllosticta Betae* Oud.—On leaves of beet.

*P. circumscissa* Cke.—On leaves of *Amygdalus persica.*

*P. cruenta* (Fr.) Kx.—On leaves of *Vagnera racemosa;* determined by Mrs. Patterson.

*P. Digitalis* Bell.—On leaves of *Digitalis.*

*P. Iridis* E. & M.—On leaves of *Iris versicolor;* determined by Mrs. Patterson.

*P. Labruscae* Thuem.—On leaves of *Parthenocissus tricuspidata.*

*P. phomiformis* Sacc.—On leaves of *Quercus alba.*

*P. rhoicola* E. & E.—On leaves of *Toxicodendron radicans;* reported in N. Y. State Mus. Bull. 167: 30. 1913.

*P. Smilacis* E. & M.—On leaves of *Smilax rotundifolia;* determined by Mrs. Patterson.

*Septoria Dianthi* Desm.—On leaves of *Dianthus;* reported in N. Y. State Mus. Bull. 157: 33. 1912.

*S. Kalmiaecola* (Schw.) B. & C.—Leaves of *Kalmia latifolia* at Greenport and East Marion.

*S. Oenotherae* West.—On leaves of *Oenothera.*

*S. Polygonina* Thuem.—On leaves of *Persicaria.*

*S. Ribis* Desm.—On leaves of *Ribes vulgare.*

*S. Rubi* West.—On leaves of *Rubus.*

*Sphaeropsis Malorum* Pk.—On dead branches of *Malus Malus.*

*S. Peckii* Sacc.—On dead twigs of *Padus virginiana.* (*Sphaeropsis anomala* Pk.)

*S. Persicae* E. & B.—On dead branches of *Amygdalus persica;* specimens in N. Y. State Herbarium.

*S. Tiliacea* Pk.—On dead branches of *Tilia americana.*

## BASIDIOMYCETES

### Ustilaginaceae

*Cintractia Junci* (Schw.) Trel.—On *Juncus tenuis.*

*Urocystis sorosporioides* Koern.—On *Thalictrum;* determined by Dr. G. P. Clinton.

*Tolyposporium bullatum* (Schroet.) Schroet.—Fruiting panicles of *Echinochloa Crus-galli;* determined at Bureau of Plant Industry.

*Ustilago anomala* Kze.—On *Tiniaria Convolvulus.*

*U. Avenae* (Pers.) Jens.—On panicles of *Avena sativa.*

*U. hypodytes* (Schl.) Fr.—Probably on *Agropyron;* determined by Dr. Clinton, who says, "an uncommon smut for this host."

*U. Maydis* (DC.) Cda.—On Indian corn.

*U. Tritici* (Pers.) Jens.—On *Triticum.*

*U. utriculosa* (Nees) Tul.—On *Polygonum.*

### Melampsoraceae

*Melampsora arctica* Rostr.—On leaves of *Salix discolor;* determined by Dr. J. C. Arthur,* who says, "the most southern collection known for this species." (*Uredo Rostrupiana* Arth.)

*M. Bigelowii* Thuem.—Greenport on willow leaves.

*Melampsoridium Betulae* (Schum.) Arth.—Determined by Dr. Arthur.

### Coleosporiaceae

*Coleosporium Solidaginis* (Schw.) Thuem.—On leaves of *Aster* and *Solidago;* determined in part by Dr. Arthur and Dr. F. D. Fromme.

### Pucciniaceae

*Aecidium Majanthae* Schum.—Orient on leaves of *Vagnera racemosa.*

*A. Uvulariae* Schw.—Orient on leaves of *Uvularia sessilifolia.*

*Gymnoconia interstitialis* (Schlect.) Lagh.—Orient on leaves of cultivated and wild *Rubi.*

*Gymnosporangium germinale* (Schw.) Kern.—The summer stage, *Roestelia auran-*

* Specimens determined by Dr. J. C. Arthur and Dr. F. D. Fromme are preserved in the Herbarium of Dr. Arthur at Purdue University, Lafayette, Indiana. The authors are indebted to Dr. Arthur, who has read the manuscript of the Rusts, and who made valuable suggestions.

*tiaca* Pk., on leaves of *Amelanchier, Crataegus* and quince. (*Gymnosporangium clavipes* C. & P.)

*G. Juniperi-Virginianae* Schw.—The summer stage, *Roestelia pyrata* (Schw.) Thaxt., on *Malus Malus* leaves; and the winter stage on *Juniperus virginiana* at Orient; specimens in N. Y. State Herbarium. (*Gymnosporangium macropus* Link.)

*G. nidus-avis* Thaxt.—The summer stage on leaves of *Amelanchier*, determined by Dr. Arthur; and the winter stage on *Juniperus virginiana* at Orient.

*Kuehneola obtusa* (Strauss) Arth.—On leaves of *Potentilla canadensis;* determined by both Dr. Arthur and Dr. Fromme.

*Puccinia Asparagi* DC.—On *Asparagus officinalis.*

*P. Asteris* Duby—On *Aster novi-belgii;* determined by Dr. Arthur.

*P. Caricis-Asteris* Arth.—Determined by Dr. Fromme.

*P. Caricis-Solidaginis* Arth.—On *Carex;* determined by Dr. Arthur.

*P. Cicutae* Lasch.—On leaves of *Cicuta maculata* at Orient and Greenport; determined by Dr. Arthur, who says this species has been previously collected in "three widely separated localities, Florida, Nova Scotia and Nevada."

*P. coronata* Cda.—On leaves of *Rhamnus cathartica* and *Nothoholcus lanatus;* determined by Dr. Arthur; also on leaves of *Avena sativa.* (*Puccinia Rhamni* (Pers.) Wettst.)

*P. Cyani* (Schleich.) Pass.—On *Centaurea cyanus;* determined by Dr. Arthur.

*Puccinia Eleocharidis* Arth.—On leaves of *Eupatorium;* determined by Dr. Arthur.

*P. graminis* Pers.—On leaves of grasses; the aecia on leaves of *Berberis vulgaris.*

*P. Grossulariae* (Pers.) Lagerh.—On *Carex virescens;* determined by Dr. Arthur.

*P. Helianthi* Schw.—On leaves of *Helianthus.*

*P. Hieracii* (Schum.) Mart.—On leaves of *Hieracium Gronovii;* determined by Dr. Arthur.

*P. Malvacearum* Mont.—Orient on leaves of *Malva rotundifolia* and *Althaea rosea.*

*P. Menthae* Pers.—On leaves of *Koellia;* determined by Dr. Fromme.

*P. obscura* Schroet.—On *Juncoides campestre;* determined by Dr. Arthur.

*P. orbicula* Pk.—On leaves of *Nabalus trifoliatus;* determined by Dr. Arthur.

*P. Peckii* (DeToni) Kellerman—Orient on leaves of *Oenothera;* determined by Mrs. F. W. Patterson.

*P. Pimpinellae* (Strauss) Link—Orient on leaves of *Washingtonia Claytoni.*

*P. Pruni-spinosae* Pers.—On leaves of *Prunus avium* and *Padus virginiana;* determined by Dr. Arthur. (*Tranzschelia punctata* (Pers.) Arth.)

*P. Sambuci* (Schw.) Arth.—On leaves of *Carex crinita* and *C. lurida;* determined by Dr. Arthur; also the aecia on leaves of *Sambucus canadensis* at Orient.

*P. Seymouriana* Arth.—The aecia on leaves of *Asclepias pulchra* and the telia on *Spartina* at Orient; determined by Dr. Arthur who says, "in west-central United States the *aecia* are found also on *Apocynum* and *Cephalanthus.*"

*P. Sorghi* Schw.—On leaves of sweet corn.

*P. Taraxaci* Plowr.—On leaves of *Leontodon Taraxacum;* determined by Dr. Arthur.

*P. triticina* Erikss.—On various species of *Triticum;* determined in part by Dr. Arthur. (*Puccinia Rubigo-vera* (DC.) Wint.)

*P. uniporula* Orton—On *Carex virescens;* determined by Dr. Fromme.

*P. Violae* (Schum.) DC.—On leaves of *Viola primulifolia* at Greenport; determined by Dr. Fromme.

*Uromyces appendiculatus* (Pers.) Fr.—On leaves of *Strophostyles helvola;* determined by Dr. Arthur. (*Nigredo appendiculata* (Pers.) Arth.)

*U. Caladii* (Schw.) Farl.—Greenport on leaves of *Arisaema triphyllum* and *Peltandra virginica.*

*U. Lilii* Clinton—On leaves of *Lilium;* determined by Dr. Arthur. (*Nigredo Lilii* (Clinton) Arth.)

*U. Limonii* (DC.) Lev.—On leaves of *Limonium carolinianum;* determined by Dr. Arthur.

*U. Peckianus* Farl.—Orient on *Distichlis spicata.* Doubtless the *Aecidium atriplicis* Shear, reported in N. Y. State Mus. Bull. 157: 21. 1912, on leaves of *Atriplex hastata* at Orient belongs here. *Aecidium atriplicis* is a rust which has only been reported on shrubby species of *Atriplex* in the arid regions of western United States.

*Uromyces Silphii* (Burrill) Arth.—On *Juncus tenuis;* determined by Dr. Fromme. (*Nigredo Silphii* (Burrill) Arth.)

*U. Spartinae* Farl.—Orient on *Spartina;* determined by Dr. Arthur.

*U. Toxicodendri* B. & R.—Orient on leaves of *Toxicodendron radicans;* determined in part by Dr. Arthur. (*Pileolaria Toxicodendri* (B. & R.) Arth.)

### Tremellaceae

*Exidia glandulosa* (Bull.) Fr.—On old oak and trunks of other trees.

*Tremella aurantia* Schw.—On bark of *Juniperus virginiana.*

*T. frondosa* Fr.—On oak stumps.

### Dacryomycetaceae

*Calocera cornea* Fr.

*Dacryomyces stillatus* Nees—On old pine logs.

*Guepinia spathularia* (Schw.) Fr.—Growing from crevices of an old log.

### Exobasidiaceae

*Exobasidium Vaccinii* (Fckl.) Woron.—On fruit of *Gaylussacia baccata.*

### Thelephoraceae

*Aleurodiscus Oakesii* (B. & C.) Cke.—On the bark of living trunks of *Ostrya virginiana.*

*Corticium effuscatum* C. & E.—On hickory.

*C. lacteum* Fr.—On cherry and *Rhus.*

*C. roseolum* Mass.—On hickory and *Vaccinium.*

*Craterellus cornucopioides* (L.) Pers.—Greenport.

*Hymenochaete corrugata* (Fr.) Lev.—On hickory.

*H. Curtisii* (Berk.)—On *Quercus alba* and *Padus virginiana.* (*Stereum Curtisii* Berk.)

*H. rubiginosa* (Schrad.) Lev.—On oak and *Castanea sativa* logs; specimens in N. Y. State Herbarium.

*H. tabacina* (Sow.) Lev.—On hickory, *Myrica carolinensis* and cherry; specimens often resupinate.

*Peniophora cinerea* (Fr.) Cke.—On dead branches of *Betula populifolia, Padus virginiana* and maple.

*Solenia fasciculata* Pers.—On hickory.

*S. ochracea* Hoffm.—On rotten wood of hickory; specimens in N. Y. State Herbarium.

*Stereum acerinum* Pers.—On hickory and maple.
*S. acerinum nivosum* Rav.—On dead branches of *Juniperus virginiana;* specimens in N. Y. State Herbarium.
*S. complicatum* Fr.—On old limbs.
*S. frustulosum* (Pers.) Fr.—On oak stumps.
*S. hirsutum* (Willd.) Fr.—On hickory and *Nyssa sylvatica.*
*S. ochraceo-flavum* Schw.—On *Amelanchier.*
*S. purpureum* Pers.—On hickory and *Acer rubrum;* sometimes resupinate.
*S. sericeum* Schw.—On oak, *Myrica carolinensis* and *Nyssa sylvatica.*
*S. spadiceum* Fr.—On oak.
*S. versiforme* B. & C.—On *Hamamelis virginiana.*
*S. versicolor* Fr.—On oak.
*Thelephora caryophyllea* (Schaeff.) Pers.—In cedar woods.
*T. intybacea* Pers.—Greenport in woods.
*T. palmata* (Scop.) Fr.—The var. *americana* Pk. in woods.
*T. terrestris* Ehrh.—In sandy soil.

### Clavariaceae

*Clavaria amethystina* Bull.—Greenport and Orient.
*C. aurea* Schaeff.
*C. botrytis* Pers.—Greenport and Orient.
*C. cinerea* Bull.
*C. coralloides* L.—Greenport.
*C. cristata* Pers.—Greenport.
*C. formosa* Pers.
*C. fusiformis* Sow.
*C. mucida* Pers.—Rotten oak logs on Gardiner's Island.
*C. muscoides* L.
*C. pulchra* Pk.
*Sparassis crispa* (Wulf.) Fr.—Greenport in woods.

### Hydnaceae

*Hydnum aurantiacum* (Batsch) A. & S.
*H. chrysocomum* Underw.—On oak.
*H. farinaceum* Pers.—On old hickory wood.
*H. ochraceum* Pers.—On cherry and *Malus Malus;* sometimes resupinate.
*H. scrobiculatum* Fr.—Greenport.
*H. spongiosipes* Pk.—In cedar woods.
*H. subfuscum* Pk.
*H. velatum* B. & C.—On hickory.
*Irpex ambiguus* Pk.—On pine log.
*I. cinnamomeus* Fr.—On oak, *Fagus grandiflora* and *Vaccinium.*
*I. lacteus* Fr.—On dead branches of *Ilex verticillata.*
*I. mollis* B. & C.—On cherry.
*I. paradoxus* (Schrad.) Fr.—On *Padus virginiana.*
*I. sinuosus* Fr.—On dead branches of *Padus virginiana.*
*I. Tulipiferae* Schw.—On hickory, oak, *Malus Malus* and *Baccharis halimifolia.*
*Phlebia radiata* Fr.

POLYPORACEAE

*Boletus affinis* Pk.—Sandy woods.
*B. affinis maculosus* Pk.
*B. auriporus* Pk.
*B. Ballouii* Pk.—Greenport; reported in N. Y. State Mus. Bull. 157: 22. 1912.
*B. castaneus* Bull.
*B. chrysenteron* Fr.
*B. felleus* Bull.
*B. pallidus* Frost
*B. rubropunctus* Pk.
*B. scaber* Fr.—Greenport.
*B. subglabripes* Pk.
*B. subvelutipes* Pk.—Sandy soil.
*Daedalea confragosa rubescens* (A. & S.) Pk.—On willow, *Betula populifolia*, *Nyssa sylvatica* and *Fraxinus americana*. (*Trametes rubescens* (A. & S.) Fr.)
*D. quercina* (L.) Pers.—On oak and *Padus virginiana*.
*Daedalea unicolor* (Bull.) Fr.—On hickory and oak.
*Favolus canadensis* Klotsch.—On dead limbs of *Fagus grandiflora*.
*Fomes annosus* Fr.—On *Juniperus virginiana;* specimens in N. Y. State Herbarium.
*F. applanatus* (Pers.) Fr.—On hickory and cherry.
*F. carneus* Nees—On *Juniperus virginiana*.
*F. rimosus* Berk.—On *Robinia Pseudo-Acacia;* specimens in N. Y. State Herbarium.
*F. salicinus* (Pers.) Fr.—On willow.
*Ganoderma pseudoboletus* (Jacq.) Murrill—On oak.
*Gloeoporus conchoides* Mont.—On hickory and oak.
*Merulius tremellosus* Schrad.—On dead wood of cherry.
*M. Ulmi* Pk.—On dead *Myrica carolinensis;* reported in N. Y. State Mus. Bull. 157: 41. 1912.
*Polyporus betulinus* (Bull.) Fr.—On *Betula populifolia*.
*P. brumalis* (Pers.) Fr.—On oak.
*P. caesius* (Schrad.) Fr.—On *Malus Malus*.
*P. chioneus* Fr.—On oak and *Padus virginiana*.
*P. cupulaeformis* B. & C.—On *Fagus grandiflora*.
*P. epileucus* Fr.—On oak.
*P. fumosus* (Pers.) Fr.
*P. giganteus* (Pers.) Fr.—Specimens in N. Y. State Herbarium.
*P. gilvus* Schw.—On *Fagus grandiflora*, oak, cherry and *Xolisma ligustrina* (abnormal specimens).
*P. hispidus* (Bull.) Fr.—On living oak trees.
*P. Spraguei* B. & C.—On oak.
*P. sulphureus* (Bull.) Fr.—On stumps.
*Polystictus circinatus* Fr.—Greenport.
*P. hirsutus* Fr.—On hickory and oak.
*P. pergamenus* Fr.—On oak, cherry and *Fagus grandiflora*.
*P. velutinus* (Pers.) Fr.—On *Xolisma ligustrina*.
*P. versicolor* (L.) Fr.—On hickory and oak.
*Poria attenuata* Pk.—On hickory.
*P. contigua* (Pers.) Fr.—On *Robinia Pseudo-Acacia*.

*P. ferruginosa* (Schrad.) Fr.—On *Ilex verticillata.*

*P. floccosa* Fr.—On oak, *Sassafras Sassafras, Malus Malus, Padus virginiana* and *Acer rubrum.*

*P. inermis* E. & E.—On *Ilex verticillata* and *Toxicodendron radicans;* specimens in N. Y. State Herbarium.

*P. nitida* (Pers.) Fr.—On cherry.

*P. reticulata* (Pers.) Fr.—On *Juniperus virginiana.*

*P. subacida* Pk.

*P. subacida vesiculosa* (B. & C.) Pk.—Specimens in N. Y. State Herbarium.

*P. vulgaris* Fr.—On *Juniperus virginiana.*

*Strobilomyces strobilaceus* (Scop.) Berk.—Sandy woods.

*Trametes cinnabarina* (Jacq.) Fr.—On cherry.

*T. Pini* (Brot.) Fr.—On pine; specimens in N. Y. State Herbarium.

*T. sepium* Berk.—On willow, hickory and cherry.

*T. suaveolens* (L.) Fr.—On willow.

AGARICACEAE

*Agaricus abruptibulbus* Pk.—In cedar woods.

*A. campester* L.

*A. micromegethus* Pk.—In sandy soil.

*A. Rodmani* Pk.

*Amanita Frostiana* Pk.

*A. Frostiana pallidipes* Pk.

*A. glabriceps* Pk.

*A. muscaria* L.—Cedar woods.

*A. muscaria formosa* (G. & R.) Fr.

*A. phalloides* Fr.—A gray variety.

*A. verna* Fr.

*Amanitopsis strangulata* (Fr.) Roze

*A. vaginata* (Bull.) Roze

*A. vaginata livida* (Pers.) Pk.

*Armillaria mellea* Vahl

*A. nardosmia* Ellis—Greenport.

*Cantharellus infundibuliformis* (Scop.) Fr.

*C. minor* Pk.

*Clitocybe brumalis* Fr.—In cedar woods.

*C. clavipes* (Pers.) Fr.

*C. dealbata* Sow.

*C. odora* (Bull.) Fr.

*C. pithyophila* Fr.—Specimens in N. Y. State Herbarium.

*Clitopilus abortivus* B. & C.

*C. albogriseus* Pk.

*C. orcella* (Bull.) Fr.

*Collybia dryophila* (Bull.) Fr.

*C. platyphylla* Fr.

*C. radicata* (Relh.) Fr.—A form approaching var. *pusilla* Pk.

*C. tuberosa* (Bull.) Fr.—On decaying *Lactarius;* specimens in N. Y. State Herbarium.

*C. velutipes* (Curt.) Fr.
*Coprinus micaceus* (Bull.) Fr.
*C. plicatilis* (Curt.) Fr.
*Cortinarius heliotropicus* Pk.—Greenport.
*Entoloma Grayanum* Pk.
*E. jubatum* Fr.
*Hygrophorus chlorophanus* Fr.
*H. laetus* (Pers.) Fr.—Specimens in N. Y. State Herbarium.
*H. miniatus* Fr.
*H. miniatus subluteus* Pk.—Specimens in N. Y. State Herbarium.
*H. psittacinus* (Schaeff.) Fr.
*H. sordidus* Pk.—Greenport; reported in N. Y. State Mus. Bull. 157: 28. 1912.
*Hypholoma appendiculatum* (Bull.) Fr.
*H. incertum* Pk.
*H. perplexum* Pk.
*H. sublateritium* (Schaeff.) Fr.—Growing in clusters about stumps of hickory and oak.
*Laccaria amethystina* (Bolt.) B. & Br. (in part)—Oak woods.
*L. laccata* (Scop.) B. & Br.
*L. trullisata* (Ellis) Pk.—In clean sand. (*Clitocybe trullisata* Ellis.)
*Lactarius Peckii* Burl.
*L. piperatus* (Scop.) Fr.
*L. serifluus* (DC.) Fr.
*L. subdulcis* (Bull.) Fr.
*L. theiogalus* (Bull.) Fr.
*L. vellereus* Fr.
*L. volemus* Fr.
*Lentinus tigrinus* (Bull.) Fr.—On dead trees; the diseased form which is known as *Lentodium squamulosum* Morg.
*Lenzites betulina* (L.) Fr.—On oak; specimens in N. Y. State Herbarium.
*L. sepiaria* Fr.—On pine (poroid form), *Juniperus virginiana, Picea mariana* and cherry; specimens in N. Y. State Herbarium.
*L. trabea* (Pers.) Fr.—On pine; reported in N. Y. State Mus. Bull. 167: 27. 1913.
*Lepiota americana* Pk.
*L. clypeolaria* (Bull.) Fr.
*L. naucinoides* Pk.—Cultivated fields.
*Marasmius androsaceus* (L.) Fr.
*M. biformis* Pk.—Swampy places.
*M. capillaris* Morg.—On grass stems.
*M. elongatipes* Pk.
*M. epiphyllus* Fr.—On old leaves; reported in N. Y. State Mus. Bull. 157: 28. 1912.
*M. insititius* Fr.—On leaves and twigs.
*M. oreades* Fr.
*M. ramulinus* Pk.—On branches in cedar woods.
*M. salignus* Pk.—On leaves and twigs.
*M. salignus major* Pk.
*M. spongiosus* B. & C.—Specimens in N. Y. State Herbarium.

*M. subnudus* (Ellis) Pk.

*M. velutipes* B. & C.—On leaves.

*Mycena atroalboides* Pk.

*M. corticola* (Schum.) Fr.—On bark of *Robinia Pseudo-Acacia* and grape vines.

*M. epiptergyria* (Scop.) Fr.

*M. galericulata* (Scop.) Fr.—On logs.

*M. sanguinolenta* (A. & S.) Fr.—Specimens in N. Y. State Herbarium.

*Omphalia campanella* (Batsch) Fr.—On decaying coniferous wood and moss.

*Panaeolus papilionaceus* Fr.

*P. retirugis* Fr.—Cultivated fields.

*P. semiglobatus* Murrill—Determined by Dr. W. A. Murrill.

*Panus rudis* Fr.—On old oak wood.

*P. stypticus* (Bull.) Fr.—On oak and *Amygdalus persica* stumps.

*P. torulosus* Fr.—On *Baccharis halimifolia.*

*Pholiota praecox* (Pers.) Fr.

*Pleurotus ostreatus* (Jacq.) Fr.—On old poplar logs.

*P. septicus* Fr.

*Pluteus cervinus* (Schaeff.) Fr.

*Psathyrella disseminata* (Pers.) Fr.

*Russula compacta* Frost

*R. emetica* Fr.

*R. foetens* (Pers.) Fr.—Southold.

*R. foetentula* Pk.—Southold.

*R. Mariae* Pk.

*R. obscura* Rom.—Greenport.

*R. pectinatoides* Pk.

*R. purpurina* Q. & S.—Orient and Greenport; specimens in N. Y. State Herbarium.

*R. virescens* (Schaeff.) Fr.—Greenport and Orient.

*Schizophyllum commune* Fr.—On hickory, cherry, *Castanea sativa* and *Baccharis halimifolia.*

*Stropharia aeruginosa* (Curt.) Fr.—On decaying wood.

*S. semiglobata* (Bastch) Fr.—On horse manure.

*Tricholoma alboflavidum* Pk.

*T. personatum* Fr.—In oak woods.

*T. piperatum* Pk.—Reported in N. Y. State Mus. Bull. 167: 32. 1913.

*T. resplendens* Fr.

*T. Russula* (Schaeff.) Fr.

*T. sejunctum* Sow.

*Trogia crispa* (Pers.) Fr.—On oak.

### Gasteromycetes

*Anthurus borealis* Burt—Orient in corn fields.

*Bovista pila* B. & C.—In woods and fields.

*B. plumbea* Pers.

*Calvatia craniiformis* (Schw.) Morg.—In cedar woods; reported in N. Y. State Mus. Bull. 150: 24. 1911.

*C. cyathiformis* (Bosc) Morg.

*C. rubroflava* (Cragin )Morg.—Sandy soil; reported in N. Y. State Mus. Bull. 167: 24. 1913.

*Crucibulum vulgare* Tul.—On hickory.
*Cyathus stercoreus* (Schw.) DeToni
*C. vernicosus* (Bull.) DC.—Sandy soil.
*Geaster hygrometricus* Pers.
*G. minimus* Schw.—Cedar woods.
*Lycoperdon atropurpureum* Vitt.
*L. cruciatum* Rostk.—In cultivated fields and open woods.
*L. echinatum* Pers.—Greenport.
*L. pusillum* Batsch
*L. pyriforme* Schaeff.—On decayed cherry logs.
*L. Wrightii* B. & C.—Greenport.
*Phallus impudicus* L.
*Polysaccum pisocarpium* Fr.—Southold and Orient on the ground in woods; reported in N. Y. State Mus. Bull. 157: 32. 1912.
*Scleroderma flavidum* E. & E.—In cedar woods; specimens in N. Y. State Herbarium.
*S. Geaster* Fr.—In sandy soil; specimens in N. Y. State Herbarium.
*S. tenerum* B. & C.—In cedar woods.
*S. verrucosum* (Bull.) Pers.—Greenport.
*S. vulgare* Hornem.—In cedar woods; specimens in N. Y. State Herbarium.

## LICHENES

*Arthonia lecideella* Nyl.—On [illegible] of *Tilia americana;* determined by Dr. Bruce Fink.
*A. quintaria* Nyl.—On *A[illegible]nthus glandulosa* and *Rhus* bark; determined by G. K. Merrill; reported in N. Y. State Mus. Bull. 167: 23. 1913.
*A. radiata* (Pers.) Th. Fr.—On hickory, *Fagus grandiflora, Amelanchier, Acer rubrum* and *Tilia americana* bark. (*Arthonia astroidea* Ach.)
*Baeomyces roseus* Pers.—East Marion on earth in woods.
*Biatora flexuosa* Fr.—Dead limbs of *Juniperus virginiana;* determined by Dr. H. E. Hasse.*
*B. varians* (Ach.) Tuck.—Determined by Dr. Hasse.
*B. vernalis* (L.) Fr.—On cedar fence rails; determined by Dr. Hasse.
*Biatora* (§ *Biatorina*) *cyrtella* (Ach., Nyl.) Tuck.—Determined by Dr. Hasse.
*Biatora* (§ *Bacidia*) *rubella* (Ehrh.) Rabenh.—On bark of *Juniperus virginiana* and *Toxicodendron radicans;* determined by Dr. L. W. Riddle.
*B.* (§ *Bacidia*) *Schweinitzii* Fr.—On *Juniperus virginiana;* determined by Dr. Hasse.
*Biatora* (§ *Biatorella*) *simplex* (Dav.)—On rocks; determined by Dr. Hasse.
*Cetraria Islandica* (L.) Ach.—Partly determined by Dr. Hasse.
*Cladonia alpestris* (L.) Rabenh.
*C. bacillaris clavata* (Ach.) Wainio—On pine bark and *Juniperus virginiana* stumps.
*C. Boryi* Tuck., forma *reticulata* (Russell) Merrill—Specimens in N. Y. State Herbarium.
*C. caespiticia* (Pers.) Flk.—Sandy soil at East Marion.
*C. cariosa cribosa* (Wallr.) Wainio—On earth.
*C. cristatella* Tuck.—On old coniferous logs.

* Specimens of the Lichens named by Dr. Hasse are preserved in the Lichen Herbarium of The Sullivant Moss Society.

*C. cristatella ochrocarpia* Tuck.—Determined by Dr. Hasse.

*C. cristatella vestita* Tuck.—Greenport; reported in N. Y. State Mus. Bull. 167: 34. 1913.

*C. digitata* (Ach.) Schaer.—Light soil in open woods at Orient and East Marion; determined by Dr. Hasse.

*C. digitata ceruchoides* Wainio—Determined by Dr. Hasse.

*Cladonia fimbriata radiata* (Schreb.) Fr.—Sandy soil; determined by Dr. Hasse.

*C. furcata* (Huds.) Schrad.—On earth.

*C. furcata pinnata* (Flk.) Wainio, f. *foliolosa* Del.—Determined by Dr. Hasse.

*C. furcata racemosa* (Hoffm.) Flk.—Determined by Dr. Hasse.

*C. gracilis dilatata* (Hoffm.) Wainio—Sandy soil; determined by Dr. Riddle; reported in N. Y. State Mus. Bull. 167: 34. 1913.

*C. macilenta* (Ehrh.) Hoffm.—A composite species on coniferous wood; partly determined by Dr. Hasse.

*C. mitrula* Tuck.

*C. pyxidata chlorophaea* (Spreng.) Flk.—Determined by Dr. Hasse.

*C. pyxidata neglecta* (Flk.) Mass.—On limbs of *Juniperus virginiana* and on earth.

*C. pyxidata neglecta*, m. *lophyra* Ach.—Determined by Dr. Hasse.

*C. rangiferina* (L.) Weber

*C. squamosa* (Scop.) Hoffm.—A variety of this composite species; determined by Dr. Hasse.

*C. sylvatica* (L.) Rabenh.

*C. turgida conspicua* (Schaer.) Nyl.—Determined by Dr. Hasse.

*C. uncialis* (L.) Fr.—A variety of this composite species.

*C. verticillata* Hoffm.

*Collema* (§ *Synechoblastus*) *nigrescens* (Huds.) Ach.—On *Juniperus virginiana* trees; determined by Dr. Hasse.

*Graphis dendritica* Ach., f. *obtusa* Leight.—On bark of *Acer rubrum;* determined by Dr. Hasse.

*G. scripta* (L.) Ach.—On hickory, oak and *Fagus grandiflora* bark.

*G. scripta recta* (Humb.) Koerb.—Determined by Dr. Hasse.

*G. scripta serpentina* (Ach.) Nyl.—Determined by Dr. Hasse.

*Lecanora* (§ *Candelaria*) *laciniosa* (Duf.) Nyl.—On *Juniperus virginiana* and *Nyssa sylvatica;* also old leather. (*Teloschistes concolor* (Dicks.) Tuck.)

*L.* (§ *Candelaria*) *laciniosa effuse* (Tuck.) n. comb.—Reported in N. Y. State Mus. Bull. 150: 49. 1911.

*Lecanora* (§ *Callopisma*) *camptidia* (Tuck.) Nyl.—On oak bark at Orient; determined by Dr. Riddle; reported in N. Y. State Mus. Bull. 167: 30. 1913. (*Placodium camptidium* Tuck.)

*L.* (§ *Callopisma*) *cerina* (Ehrh.) Ach.—On *Juniperus virginiana;* determined by Dr. Fink; specimens in N. Y. State Herbarium.

*Lecanora* (§ *Callopisma*) *ferruginea discolor* (Willey) n. comb.—On *Juniperus virginiana;* determined by Dr. Fink; reported in N. Y. State Mus. Bull. 150: 37. 1911.

*L.* (§ *Callopisma*) *ferruginea nigricans* (Tuck.) Nyl.—Determined by Dr. Hasse.

*Lecanora* (§ *Rinodina*) *ascociscana* (Tuck.) Nyl.—Bark of trees; determined by Dr. Hasse.

*L.* (§ *Rinodina*) *exigua* (Ach.) Th. Fr.—Determined by Dr. Hasse.

*L.* (§ *Rinodina*) *sophodes* (Ach.) Koerb.—On bark of *Baccharis halimifolia;* determined by Dr. Riddle.

*Lecanora Hageni* Ach.—Determined by Dr. Hasse.

*L. pallida* (Schreb.) Tuck.—On bark of *Ilex verticillata.*

*L. pallida cancriformis* (Hoffm.) Tuck.—On bark of oak and *Amelanchier;* determined by both Dr. Fink and Dr. Riddle.

*L. subfusca* (L., Nyl.) Ach.—On bark of oak, *Juniperus virginiana* and *Robinia Pseudo-Acacia;* partly determined by Dr. Fink.

*L. subfusca allophana* Ach.—On limbs of *Juniperus virginiana;* determined by Dr. Riddle; specimens in N. Y. State Herbarium.

*L. subfusca rugosa* (Pers.) Cromb.—Determined by Dr. Hasse.

*L. symmictera* Nyl.—Determined by Dr. Hasse.

*L. varia* (Ehrh.) Ach.—On bark of *Juniperus virginiana* and *Pyrus communis.*

*L. varia saepincola* Fr.—On old chestnut fence post; reported in N. Y. State Mus. Bull. 150: 46. 1911.

*Lecanora* (§ *Aspicilia*) *cinerea* (L.) Sommf.—On rocks.

*Lecanora* (§ *Acarospora*) *cervina squamulosa* Fr.—Determined by Dr. Hasse.

*L.* (§ *Acarospora*) *fuscata* (Schrad.) Fr.—On rocks; determined by Dr. Hasse.

*Lecidea* (§ *Buellia*) *disciformis* (Fr.) Nyl.—On oak, *Amygdalus persica, Robinia Pseudo-Acacia* and *Sambucus canadensis* bark; Greenport on bark of *Fagus grandiflora;* partly determined by Dr. Hasse.

*L.* (§ *Buellia*) *myriocarpa* (DC.) Nyl.—On pine, *Juniperus virginiana* and *Rhus* bark; partly determined by Dr. Fink, also Dr. Hasse; specimens in N. Y. State Herbarium.

*Lecidea albocaerulescens* (Wulf.) Schaer.—Determined by Dr. Hasse.

*Leptogium tremelloides* (L. f.) S. F. Gray—On *Juniperus virginiana.*

*Myriangium Duriaei* (Mont. & Berk.) Tuck.—On bark of *Fraxinus americana* at East Marion; determined by Dr. Hasse.

*Opegrapha herpetica* Ach.—On bark of *Tilia americana;* determined by Mr. Merrill; reported in N. Y. State Mus. Bull. 167: 29. 1913.

*O. varia* Pers.—On bark of hickory, *Ailanthus glandulosa* and *Tilia americana;* in part determined by Dr. Riddle.

*O. varia pulicaris* (Ach.) Nyl.—Determined by Dr. Hasse.

*Opegrapha vulgata* Ach.—Determined by Dr. Hasse.

*Pannaria luridum* (Mont.) Nyl.—Rare at Orient on bark of *Juniperus virginiana;* determined by Dr. Fink; specimens in N. Y. State Herbarium. (*Physma luridum* (Mont.) Tuck.)

*Parmelia caperata* (L.) Ach.—On *Juniperus virginiana.*

*P. colpodes* Ach.—Rare at Orient; specimens in N. Y. State Herbarium.

*P. conspersa* (Ehrh.) Ach.—On rocks.

*P. crinita pilosella* (Hue) Merrill—On *Juniperus virginiana.*

*P. dubia* (Wulf.) Schaer.—On trunks of oak. (*Parmelia Borreri* Tuck.)

*P. dubia hypomela* (Tuck.) n. comb.—On *Juniperus virginiana;* reported in N. Y. State Mus. Bull. 150: 47. 1911.

*P. exasperata* (Ach.) DN.—Determined by Dr. Hasse. (*Parmelia olivacea aspidota* Ach.)

*P. hyperopta* Ach.—Determined by Dr. Hasse.

*P. olivacea* (L.) Ach.—On oak bark.

*P. perforata* (Jacq.) Ach.—On oak; specimens in N. Y. State Herbarium.

*P. perforata hypotropa* (Nyl.) Tuck.—On *Juniperus virginiana;* determined by Dr. Fink; reported in N. Y. State Mus. Bull. 150: 47. 1911.

*P. rudecta* Ach.—On *Juniperus virginiana;* specimens in N. Y. State Herbarium. (*Parmelia Borreri rudecta* (Ach.) Tuck.)

*P. saxatilis* (L.) Fr.—On rocks.

*P. sulcata* Tayl.—Specimens in N. Y. State Herbarium. (*Parmelia saxatilis sulcata* Nyl.)

*P. tiliacea* Ach.—On trunks of *Malus Malus.*

*Peltigera canina* (L.) Hoffm.—On earth; determined by Dr. Hasse.

*Pertusaria communis* Lam. & DC.—On hickory, oak and *Fagus grandiflora;* determined by both Dr. Fink and Mr. Merrill.

*P. leioplaca* (Ach.) Schaer.—On *Quercus velutina;* determined by Mr. Merrill; specimens in N. Y. State Herbarium.

*P. multipuncta* (Turn.) Nyl.—On hickory; in part determined by Dr. Hasse.

*P. pustulata* (Ach.) Nyl.—Orient and Greenport on *Myrica carolinensis;* determined by Mr. Merrill.

*P. velata* (Turn.) Nyl.—Determined by Dr. Fink.

*P. Wulfenii* Lam. & DC.—On oak at East Marion; determined by Dr. Hasse.

*Physcia* (§ *Xanthoria*) *parietina* (L.) DN.—Determined by Dr. Hasse. (*Teloschistes parietinus* (L.) Norm.).

*P.* (§ *Xanthoria* )*parietina aureola* (Ach.) Nyl.—On *Robinia Pseudo-Acacia;* determined by Dr. Hasse.

*P.* (§ *Xanthoria*) *polycarpa* (Ehrh.) Nyl.—Determined by Dr. Hasse.

*Physcia* (§ *Pseudophyscia*) *hypoleuca* (Muhl.) Tuck.—Rare at Orient on *Juniperus virginiana* bark; determined by Miss Mary F. Miller; specimens in N. Y. State Herbarium.

*P.* (§ *Pseudophyscia*) *speciosa* (Wulf.) Nyl.—Determined by Dr. Hasse.

*Physcia hispida* (Schreb.) Tuck.—Orient, very rare on a *Juniperus virginiana* stump; determined by Dr. Fink; reported in N. Y. State Mus. Bull. 150: 36. 1911.

*P. obscura* (Ehrh.) Nyl.—On bark of *Juniperus virginiana;* determined by Dr. Hasse.

*P. obscura endochrysea* (Hampe) Nyl.—On *Juniperus virginiana.*

*P. stellaris* (L.) Nyl.—On *Juniperus virginiana;* specimens in N. Y. State Herbarium.

*P. tribacia* (Ach.) Nyl.—On *Juniperus virginiana* and *Robinia Pseudo-Acacia;* also on rocks.

*Platysma aurescens* (Tuck.) Nyl.—Determined by Dr. Hasse. (*Cetraria aurescens* Tuck.)

*P. ciliare* (Ach.) Nyl.

*P. Fendleri* (Tuck.) Nyl.—Determined by Dr. Hasse.

*P. glaucum* (L.) Nyl.—Determined by Dr. Hasse.

*P. lacunosum* (Ach.) Nyl.

*Pyrenula nitida* Ach.—Greenport on trunks of *Fagus grandiflora.*

*Pyxine sorediata* (Ach.) Fr.—On oak, *Juniperus virginiana* and *Robinia Pseudo-Acacia* bark.

*Ramalina calicaris* (L.) Nyl.—On *Juniperus virginiana;* in part determined by Dr. Hasse.

*R. calicaris subampliata* Nyl.—On *Juniperus virginiana;* reported in N. Y. State Mus. Bull. 150: 47. 1911, as *Ramalina calicaris fraxinea* Fr.

*R. subfastigiata* Nyl.—On oak, *Juniperus virginiana* and *Robinia Pseudo-Acacia;* determined by Dr. Hasse.

*R. tenuis* Tuck., Merrill—On *Juniperus virginiana;* reported in N. Y. State Mus. Bull. 150: 38. 1911, as *Ramalina rigida* (Pers.) Ach.

*Sagedia cestrensis* Tuck.—Orient on bark of hickory and *Tilia americana;* determined by Miss Miller; reported in N. Y. State Mus. Bull. 157: 33. 1912.

*Teloschistes chrysopthalmus* (L.) Th. Fr.—Determined by Dr. Hasse, who says, "an unusual form on account of almost entire absence of fibrillae."

*T. flavicans* (Sw.) Norm.—Orient on *Juniperus virginiana;* determined by Dr. Fink; reported in N. Y. State Mus. Bull. 150: 39. 1911.

*Usnea ceratina* Ach.—Determined by Dr. Hasse, who says, "the color of the thallus is unusually dark."

*U. florida* (L.) Hoffm.—On pine and *Juniperus virginiana;* determined by Dr. Hasse.

*U. florida rubiginea* Mx.—On *Juniperus virginiana.*

*U. hirta* (L.) Hoffm.

*U. trichodea* Ach.—On *Juniperus virginiana;* reported in N. Y. State Mus. Bull. 150: 40. 1911.

*Xylographa parallela* (Ach.) Fr.—Determined by Dr. Hasse.

### Hepaticae

*Anthoceros laevis* L.

*Calypogeia Sullivanti* Aust.—Determined by G. B. Kaiser.

*C. Trichomanis* (L.) Cda.—Determined by Miss Annie Lorenz.

*Cephalozia curvifolia* (Dicks.) Dumort.—On an old log in wet woods at Greenport; determined by Dr. G. B. Conklin.

*Frullania Asagrayana* Mont.—On a rock in swampy woods; determined by both Dr. Conklin and Mr. Kaiser.

*F. eboracensis* Gottsche—On bark of *Juniperus virginiana.*

*Lophocolea heterophylla* (Schrad.) Dumort.—Determined by Dr. Conklin.

*Marchantia polymorpha* L.—Determined by Dr. Conklin.

*Odontoschisma prostratum* (Sw.) Trev.—Determined by Miss Lorenz; specimens in N. Y. State Herbarium.

*Pellia epiphylla* (L.) Cda.—On earth.

*Porella pinnata* L.—Trunks of bushes in swamps; determined by Mr. Kaiser.

*P. platyphylla* (L.) Lindb.—Trunks of trees.

*Ptilidium pulcherrimum* (Web.) Hampe

*Radula complanata* (L.) Dumort.

*Ricciella fluitans* (L.) A. Br.—On mud in a pond; determined by Mr. Kaiser.

*Riccia Sullivantii* (Aüst.) Evans.

*Ricciocarpus natans* (L.) Cda.—Floating in water.

### Musci

*Amblystegium riparium* B. & S.—In swamps.

*A. riparium longifolium* (Schultz) B. & S.—Determined by G. B. Kaiser.*

*A. serpens* (L.) B. & S.

*Anomodon attenuatus* (Schreb.) Hueb.—About base of trees in woods at Greenport; determined by Mr. Kaiser.

*A. rostratus* (Hedw.) Schimp.—Determined by Mr. Kaiser.
*Aulacomnium palustre* (L.) Schwaegr.—In swamps.
*Brachythecium oxycladon* (Brid.) J. & S.—On trunks of trees.
*B. rivulare* B. & S.—Wet places.
*B. rutabulum* (L.) B. & S.—Sandy soil.
*B. velutinum* (L.) B. & S.—On soil at base of trees.
*Bryhnia Novae-Angliae* (S. & L.) Grout—Swamps at Greenport.
*Bryum caespiticium* L.—Greenport; determined by Dr. A. W. Evans.
*Campylium hispidulum* (Brid.) Mitt.—Determined by Mr. Kaiser.
*C. radicale* (Bv.) Grout—Determined by Mr. Kaiser.
*Catharinea angustata* Brid.—Shaded sandy soil.
*C. undulata* (L.) W. & M.
*Ceratodon purpureus* (L.) Brid.—Sandy soil.
*Climacium Kindbergii* (R. & C.) Grout—On roots of trees in wet places; reported in N. Y. State Mus. Bull. 150: 25. 1911.
*Dichelyma capillaceum* B. & S.—On *Cephalanthus occidentalis* in a swamp.
*Dicranella heteromalla* (L.) Schimp.
*Dicranum Drummondii* CM.—Wet woods at Greenport; determined by Mr. Kaiser.
*D. flagellare* Hedw.
*D. fulvum* Hook.—Determined by Mr. Kaiser.
*D. pallidum* B. & S.—Sandy beach in open cedar woods; determined by Mr. Kaiser.
*D. scoparium* (L.) Hedw.
*Ditrichum pallidum* (Schreb.) Hampe—In cedar woods.
*Drepanocladus aduncus gracilescens* (Schimp.)—In swamps.
*D. fluitans* (Dill.) Warnst.—East Marion.
*Entodon seductrix* (Hedw.) CM.—Wet log in a swamp; determined by Mr. Kaiser
*Eurhynchium hians* (Hedw.) J. & S.—Sandy soil.
*E. serrulatum* (Hedw.) Kindb.—Determined by Mr. Kaiser.
*E. strigosum* (Hoffm.) B. & S.
*Fontinalis Sullivantii* Lindb.—Greenport on roots and trunks of bushes in a swamp; determined by Mr. Kaiser.
*Funaria flavicans* Mx.
*F. hygrometrica* (L.) Sibth.—Greenport; determined by Dr. Evans.
*Hedwigia albicans* (Web.) Lindb.—Base of oak trees.
*Hypnum cupressiforme* L.—Determined by Mr. Kaiser.
*H. cupressiforme resupinatum* (Wils.) Schimp.—Determined by Mr. Kaiser.
*H. curvifolium* Hedw.
*H. Haldanianum* Grev.—On old logs and stumps; in part determined by Mr. Kaiser.
*H. imponens* Hedw.—Moist places.
*H. Patientiae* Lindb.—Determined by Mr. Kaiser.
*H. recurvans* (Mx.) Schwaegr.—On moist earth; determined by Mr. Kaiser.
*H. reptile* Mx.—Greenport in moist woods; determined by Mr. Kaiser.
*Leptobryum pyriforme* (L.) Wils.

* Specimens of the Mosses named by G. B. Kaiser are preserved in the Moss Herbarium of The Sullivant Moss Society.

*Leucobryum glaucum* (L.) Schimp.
*Leucodon brachypus* Brid.—On bark of *Juniperus virginiana;* determined by Mr. Kaiser.
*L. julaceus* (Hedw.) Sull.—On *Juniperus virginiana* bark.
*Mniobryum albicans* (Wahl.) Limpr.—Determined by Mr. Kaiser.
*Mnium affine ciliare* (Grev.) CM.—Wet places.
*M. cuspidatum* (L.) Leyss—On rotten logs and moist soil; in part determined by Mr. Kaiser.
*M. hornum* L.—Edge of a swamp.
*M. rostratum* Schrad.
*Orthotrichum strangulatum* Sull.—Greenport on trees; determined by Mr. Kaiser.
*Physcomitrium turbinatum* (Mx.) Brid.—Greenport; determined by Dr. Evans.
*Plagiothecium denticulatum* (L.) B. & S.—Wet places at Greenport.
*P. Ruthei* Limpr.—Determined by Mr. Kaiser.
*P. striatellum* (Brid.) Lindb.—Greenport in moist soil; determined by Mr. Kaiser.
*P. sylvaticum* (Huds.) B. & S.—Sandy soil; determined by Mr. Kaiser.
*P. turfaceum* Lindb.—On stumps of *Juniperus virginiana.*
*Pleuridium subulatum* (L.) Rabenh.—Determined by Mr. Kaiser.
*Pogonatum brachyphyllum* (Mx.) Bv.—Orient; determined by G. B. Nichols.
*Pohlia nutans* (Schreb.) Lindb.—Greenport in light soil in woods; also on sandy beach at Orient; determined by Mr. Kaiser.
*Polytrichum commune* L.—Dry woods.
*P. juniperinum* Willd.—Determined by G. B. Kaiser.
*P. Ohioense* B. & C.—Wet woods at Greenport; determined by Mr. Kaiser.
*P. piliferum* Schreb.
*Pylaisia Schimperi* R. & C.
*Sphagnum acutifolium* Ehrh.—Determined at Bureau of Plant Industry.
*S. cuspidatum* Ehrh.—Wet open meadow; determined by Mr. Kaiser.
*S. cymbifolium* Ehrh.—Determined at Bureau of Plant Industry.
*S. recurvum* Bv.—Determined at Bureau of Plant Industry.
*S. Torreyanum* Sull.—Boggy woods at Greenport; determined by Mr. Kaiser.
*Thelia hirtella* (Hedw.) Sull.—Base of oak and other trees.
*T. Lescurii* Sull.—Sandy soil; determined by Mr. Kaiser.
*Thuidium delicatulum* (L.) Mitt.
*T. paludosum* (Sull.) Rau & Herv.—Wet open soil; determined by Mr. Kaiser.
*T. scitum* (Bv.) Aust.—Base of oak trees; determined by Mr. Kaiser.
*Tortella caespitosa* (Schwaegr.) Limpr.—Sandy beach; determined by Mr. Kaiser.
*Ulota americana* (Bv.) Lindb.—Rocks.
*U. crispa* Brid.—Bark of an old oak; determined by Mr. Kaiser.
*Webera sessilis* (Schmid.) Lindb.—On rich banks at Greenport.
*Weisia viridula* (L.) Hedw.—Sandy soil.

(To be continued.)

## REVIEWS

### The Salton Sea*

The flooding of Salton Sink, in 1907, was the beginning of a problem that offered many attractions to botanists and a history of those investigations is contained in the volume now issued by the Carnegie Institution. The breaking of the banks of the Colorado and the consequent flooding of a region of about 450 square miles, the final control of the river and the gradual recession of the water by evaporation has made a condition that is perhaps unique in the world. Dr. MacDougal was quick to detect the unrivalled opportunity to study the revegetation of the banks of a slowly drying inland sea, and the thoroughness with which the undertaking has been carried on is evidenced by the list of articles in the accompanying footnote.

From the purely ecological and phytogeographical standpoint the contributions of Dr. Parish and Dr. MacDougal are the most interesting, but their work necessarily rests on the foundation erected by the other contributors to the volume. The description of the revegetation of the beaches, caused by the gradual drying up of the sea (nearly 10 square miles annually was thus added), and the discussion of the factors that played their part in the process, are the chief contributions of the volume. There are bound up with such studies great problems of general bearing, dealing with the behavior of plants under new and constantly

* MacDougal, D. T. and collaborators. The Salton Sea, a study of the geography, the geology, the floristics and the ecology of a desert basin. *182 pp. + 32 plates + 4 figures in the text.* Carnegie Institution of Washington Publication No. 193. 30 June, 1914. Containing: The Cahuilla Basin and desert of the Colorado, by W. P. Blake, *pp. 1–12;* Geographical features of the Cahuilla Basin, by G. Sykes, *pp. 13–20;* Sketch of the geology and soils of the Cahuilla Basin, by E. E. Free, *pp. 21–33;* Chemical Composition of the water of Salton Sea and its annual variation in concentration 1906–1911, by W. H. Ross, *pp. 35–46;* Variations in composition and concentration of water of Salton Sea, 1912 and 1913, by A. E. Vinson, *pp. 47–48;* Behavior of certain micro-organisms in brine, by G. J. Pierce, *pp. 49–70;* Action of Salton Sea water on Vegetable Tissue, by M. A. Brannon, *pp. 71–78;* The tufa deposits of the Salton Sink, by J. C. Jones, *pp. 79–84;* Plant ecology and floristics of Salton Sink, by S. B. Parish, *pp. 85–114;* Movements of vegetation due to submersion and desiccation of land areas in Salton Sink, and a General Discussion, both by D. T. MacDougal, *pp. 115–182.*

changing environmental conditions, and the effect of this behavior on the movement and association of species. From this standpoint the book is a notable addition to the literature of botany. Some, perhaps too carping, systematic botanists may quarrel with the publication of a new name for a species of *Chamaesyce*, without description, simply saying ined. n.sp. (p. 110). There has been, too, some carelessness in proof-reading, such as Geranaceae for Geraniaceae (p. 109) and Asclepiaceae for Asclepiadaceae (p. 175). But such trivial matters are lost sight of in the fact that the volume is a really splendid contribution to botanical literature.

The illustrations and maps are very fine, in many cases showing beautiful views of the region. The failure of the publication to contain an index must reduce its usefulness to many.

N. T.

## NEWS ITEMS

Dr. Arthur Harmount Graves has resigned his position as Assistant Professor of Botany in the Sheffield Scientific School of Yale University, and is at present engaged in research at the laboratory of Professor V. H. Blackman, Professor of Plant Physiology and Pathology, Royal College of Science, South Kensington, London, England. Dr. Graves has been a member of the faculty of Yale for the past twelve years.

The Long Island Historical Society has recently deposited with the Brooklyn Botanic Garden the herbarium of the Society. It consists of a general herbarium and a special collection of Long Island plants, many of which are from the collection of E. S. Miller.

# The Torrey Botanical Club

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# TORREYA

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Vol. 14 No. 12

## THE FLORA OF THE TOWN OF SOUTHOLD, LONG ISLAND, AND GARDINER'S ISLAND

By Stewart H. Burnham and Roy A. Latham

(Continued from November Torreya)

### Pteridophyta

#### Ophioglossaceae

*Botrychium dissectum* Spreng.—Rare at Orient and East Marion.

*B. neglectum* Wood—Rare at East Marion in rich woods.

*B. obliquum* Muhl.—Rare.

*B. virginianum* (L.) Sw.

#### Osmundaceae

*Osmunda cinnamomea* L.

*O. Claytoniana* L.

*O. regalis* L.

#### Polypodiaceae

*Adiantum pedatum* L.—Rare at Orient.

*Anchistea virginica* (L.) Presl.—Greenport in swamps. (*Woodwardia virginica* (L.) J. E. Sm.)

*Asplenium platyneuron* (L.) Oakes—Orient in cedar woods; also the var. *serratum* (E. S. Miller) BSP.

*Athyrium Filix-foemina* (L.) Roth—Also the var. *latifolium* Babingt. (*Asplenium Filix-foemina* (L.) Bernh.)

*Dennstaedtia punctilobula* (Mx.) Moore.

*Dryopteris Clintoniana* (D. C. Eaton) Dowell—Rare.

*D. cristata* (L.) A. Gray—Orient.

*D. hexagonoptera* (Mx.) C. Chr.—Rare at Orient; also occurs at Greenport and Southold. (*Phegopteris hexagonoptera* (Mx.) Fee.)

*D. intermedia* (Muhl.) Gray—Orient.

*D. marginalis* (L.) A. Gray—Rare at Orient.

*D. noveboracensis* (L.) A. Gray—Orient.

*D. simulata* Davenp.—Orient.

*D. spinulosa* (Muell.) Ktze.—Orient.

*D. Thelypteris* (L.) A. Gray.

*Lorinseria areolata* (L.) Presl.—Greenport in swamps. (*Woodwardia areolata* (L.) Moore.)

[No. 11, Vol. 14 of Torreya, comprising pp. 201–228, was issued 27 November 1914]

*Onoclea sensibilis* L.
*Polypodium vulgare* L.—Mattituck.
*Polystichum acrostichoides* (Mx.) Schott.—Orient.
*Pteridium aquilinum* (L.) Kuhn.

### Equisetaceae

*Equisetum arvense* L.

### Lycopodiaceae

*Lycopodium complanatum* L.—Rare at Greenport.
*L. inundatum* L.—Rare at Southold, the var. *Bigelovii* Tuck.
*L. lucidulum* Mx.—Rare at Greenport.
*L. obscurum* L.—Rare at Greenport, the var. *dendrodeum* (Mx.) D. C. Eaton.

### Selaginellaceae

*Selaginella rupestris* (L.) Spring.—Rare at Orient in sandy soil, Nov., 1910 and 1911.

## Spermatophyta

## GYMNOSPERMAE

### Pinaceae

*Juniperus sibirica* Burgsd.—Rare at Southold on sandy hills. (*Juniperus nana* Willd.)
*J. virginiana* L.—Prostrate forms also occur.
*Picea rubens* Sargent.—Rare at Orient.
*Pinus rigida* Mill.

## ANGIOSPERMAE

## *MONOCOTYLEDONES*

### Typhaceae

*Typha angustifolia* L.
*T. latifolia* L.

### Sparganiaceae

*Sparganium americanum* Nutt.—Rare at Greenport in a stream.
*S. androcladon* (Engelm.) Morong—Greenport.
*S. diversifolium* Graeb.—Rare at Southold, 8 Aug., 1910.
*S. eurycarpum* Engelm.—Rare on Gardiner's Island.

### Zannichelliaceae

*Potamogeton Oakesianus* Robbins—Greenport and Southold in ponds.
*P. pusillus* L.—Greenport in a shallow pond.
*Ruppia maritima* L.—Salt-water ponds and creeks.

### Zosteraceae

*Zostera marina* L.

### Scheuchzeriaceae

*Triglochin maritima* L.—Salt marshes.

### Alismaceae

*Alisma subcordatum* Raf.—(Formerly confused with *Alisma Plantago-aquatica* L.)
*Sagittaria latifolia* Willd.—Rare and variable.

### Gramineae

*Agropyron repens* (L.) Bv.—Meadows and cultivated soil.

*Agrostis alba* L.—Also the var. *vulgaris* (With.) Thurb.

*A. canina* L.—Orient.

*A. hyemalis* (Walt.) BSP.—Wooded swamps and brackish meadows; determined in part by Mrs. Agnes Chase.

*A. maritima* Lam.—Salt marshes; determined in part by Mrs. Chase.

*Alopecurus pratensis* L.—Rare at Orient in a low field; determined at the New York Botanical Garden.

*Ammophila arenaria* (L.) Link—Orient.

*Andropogon furcatus* Muhl.—Orient in shaded places.

*A. glomeratus* (Walt.) BSP.—Rare at Orient.

*Anthoxanthum odoratum* L.

*Aristida dichotoma* Mx.

*A. gracilis* Ell.—Orient in meadows; specimens in N. Y. State Herbarium.

*A. purpurascens* Poir—Rare at Gardiner's Island; specimens in N. Y. State Herbarium.

*Arrhenatherum elatius* (L.) Bv.—Determined in part by Mrs. Chase.

*Aspris caryophyllea* (L.) Nash—Greenport. (*Aira caryophyllea* L.)

*Bromus hordeaceus* L.—Orient in sandy soil.

*B. purgans* L.—Rare at Orient.

*B. racemosus* L.—Rare at Orient.

*B. secalinus* L.—Cultivated grounds; determined in part by Mrs. Chase.

*B. tectorum* L.—Rare at Orient in sandy soil.

*Calamagrostis canadensis* (Mx.) Bv.—Low grounds.

*Cenchrus tribuloides* L.—Rare at Orient and Gardiner's Island.

*Chaetochloa glauca* (L.) Scribn.—Orient in cultivated soil.

*C. imberbis* (Poir.) Scribn.—Salt marshes.

*C. italica* (L.) (Scribn.)—Escaped from cultivation at Orient.

*C. viridis* (L.) Scribn.

*Cinna arundinacea* L.—Greenport.

*C. latifolia* (Trev.) Griseb.—Greenport; specimens in N. Y. State Herbarium.

*Cynosorus cristatus* L.—Rare at Orient in waste places.

*Dactylis glomerata* L.—Meadows.

*D. anthonia spicata* (L.) Bv.—Determined in part by Mrs. Chase.

*Deschampsia flexuosa* (L.) Trin.

*Distichlis spicata* (L.) Greene

*Echinochloa Crus-galli* (L.) Bv.

*E. Walteri* (Pursh) Nash.

*Eleusine indica* (L.) Gaertn.

*Elymus canadensis* L.—Beaches.

*E. virginicus* L.—Salt marshes.

*Eragrostis Eragrostis* (L.) Karst.

*E. major* Host.—Rare at Orient.

*E. pectinacea* (Mx.) Steud.—Orient on hillsides.

*E. pilosa* (L.) Bv.—Rare at Orient along roads.

*Festuca capillata* Lam.—Orient in meadows; determined by Mr. P. L. Ricker.

*F. elatior* L.

*F. nutans* Willd.—Orient.

*F. octoflora* Walt.—Orient in light soil.

*F. ovina* L.—Orient; also the var. *pseudovina* Hack., on sandy beaches, determined by Mrs. Chase.

*Homalocenchrus oryzoides* (L.) Poll.—About swamps and ponds.

*H. virginicus* (Willd.) Britton—Greenport.

*Hordeum jubatum* L.—Rare at Orient.

*Lolium perenne* L.—Orient in a meadow.

*Muhlenbergia mexicana* (L.) Trin.

*M. Schreberi* Gmeln.—Orient in cedar woods.

*M. umbrosa* Scribn.—Low woods. (*Muhlenbergia sylvatica* Torr.)

*Nothoholcus lanatus* (L.) Nash—(*Holcus lanatus* L.)

*Panicularia acutiflora* (Torr.) Ktze.—Orient about ponds.

*P. grandis* (Wats.) Nash—Determined by Mrs. Chase.

*P. nervata* (Willd.) Ktze.—Greenport in wooded swamps; also the var. *parviflora* (Vasey) in moist woods.

*Panicularia pallida* (Torr.) Ktze.—Greenport.

*P. septentrionalis* (Hitchc.) Bicknell—Greenport in wet woods, specimens with very long panicles.

*Panicum agrostoides* Spreng.—Orient; specimens in N. Y. State Herbarium.

*P. amarum* Ell.—Southold on sandy beaches; specimens in N. Y. State Herbarium.

*P. Ashei* Pearson—Orient; determined by Mrs. Chase.

*P. Bicknellii* Nash.

*P. Boscii* Poir.

*P. capillare* L.—A weed in cultivated soil.

*P. cladestinum* L.

*P. columbianum* Scribn.—Determined by Mrs. Chase.

*P. Commonsianum* Ashe—Determined by Mrs. Chase.

*P. depauperatum* Muhl.—Sandy soil; determined by Mrs. Chase.

*P. dichotomiflorum* Mx.—Cultivated soil. (Formerly confused with *Panicum proliferum* Lam.)

*P. dichotomum* L.—Determined by Mrs. Chase.

*P. huachucae* Ashe—Sandy soil; also the var. *silvicola* Hitchc. & Chase, determined by Mrs. Chase.

*P. implicatum* Scribn.

*P. meridionale* Ashe—Determined by Mrs. Chase. (*Panicum oricola* Hitchc. & Chase.)

*P. microcarpon* Muhl.—Rare at Greenport, also "a rare form with pubescent spikelets" in cedar woods at Orient; determined by Mrs. Chase. (*Panicum barbulatum* Nash.)

*P. polyanthes* Schultes—Determined by Mrs. Chase.

*P. Scribnerianum* Nash—Hilly pastures at East Marion.

*P. sphaerocarpon* Ell.—Greenport; determined by Mrs. Chase.

*P. spretum* Schultes—Orient in wet meadows; reported in N. Y. State Mus. Bull. 139: 27. 1910.

*P. verrucosum* Muhl.—Rare at Orient.

*P. virgatum* L.—Margins of salt marshes; determined in part by Mrs. Chase.

*Paspalum circulare* Nash—Greenport and East Marion; specimens in N. Y. State Herbarium.

*P. Muhlenbergii* Nash.
*P. psammophilum* Nash.
*P. setaceum* Mx.—Specimens in N. Y. State Herbarium.
*Phleum pratense* L.
*Phragmites Phragmites* (L.) Karst.—Orient in swamps.
*Poa annua* L.
*P. compressa* L.—Sandy soil.
*P. pratensis* L.—Meadows.
*P. triflora* Gilib.—Orient about ponds; determined in part by Mrs. Chase. (Formerly confused with *Poa flava* L.)
*Savastana odorata* (L.) Scribn.—Wet meadows.
*Schizachyrium scoparium* (Mx.) Nash—(*Andropogon scoparius* Mx.)
*Sorghastrum nutans* (L.) Nash—Orient in moist woods.
*Spartina Michauxiana* Hitchc.
*S. patens* (Ait.) Muhl.—Also var. *juncea* (Mx.) Hitchc.; specimens in N. Y. State Herbarium.
*S. stricta* (Ait.) Roth—The var. *alterniflora* (Lois.) A. Gray.
*Sphenopolis pallens* (Spreng.) Scribn.—Rare at Orient. (*Eatonia pennsylvanica* (DC.) Gray.)
*Sporobolus asper* (Mx.) Kunth—Orient.
*S. cryptandrus* (Torr.) A. Gray—Sandy beaches; reported in N. Y. State Mus. Bull. 150: 49. 1911.
*Sporobolus uniflorus* Muhl.—Greenport. (*Sporobolus serotinus* (Torr.) A. Gray.)
*S. vaginaeflorus* Torr.—Orient.
*Stipa avenacea* L.—Rare at East Marion and Southold; specimens in N. Y. State Herbarium.
*Syntherisma Ischaemum* (Schreb.) Nash—(*Syntherisma linearis* (Krock.) Nash.)
*Tridens flava* (L.) Hitchc.—Dry soil.
*Triplasis purpurea* (Walt.) Chapm.—Sandy hills.
*Tripsacum dactyloides* L.—Upper edge of salt marsh at Orient, 19 July, 1909; specimens in N. Y. State Herbarium.

### Cyperaceae

*Carex albolutescens* Schwein.
*C. albursina* Sheldon—Greenport.
*C. blanda* Dew.—Orient.
*C. canescens* L.—Also the var. *disjuncta* Fernald; specimens of the variety in N. Y. State Herbarium.
*C. cephalophora* Muhl.—Shaded places.
*C. comosa* Boott.—Margins of swamps.
*C. complanata* Torr.—(*Carex triceps*, var. *hirsuta* (Willd.) Bailey.)
*C. crinita* Lam.—Swampy places.
*C. digitalis* Willd.—Dry open woods.
*C. festucacea* Schkuhr.—The var. *brevior* (Dew.) Fernald; determined at Bureau of Plant Industry.
*C. flexuosa* Muhl.—Greenport. (*Carex tenuis* Rudge.)
*C. foenea* Willd.
*C. folliculata* L.—Greenport in swampy woods; also a slender form.
*C. grisea* Wahl.—Determined at Bureau of Plant Industry.

*C. hormathodes* Fernald—Wet places.
*C. intumescens* Rudge—Greenport.
*C. lasiocarpa* Ehrh.—Greenport. (*Carex filiformis* L.)
*C. Leersii* Willd.—Orient in swamps; also *Carex stellulata*, var. *excelsior* (Bailey) Fernald.
*C. lupulina* Muhl.—Wet woods; also the var. *pedunculata* Dew.
*C. lurida* Wahl.—Wet places; also the var. *parvula* (Paine) Bailey.
*C. Muhlenbergii* Schkr.—Dry open woods; in part determined at Bureau of Plant Industry.
*C. pallescens* L.—Orient in moist soil; plants with spikes on longer stalks than usual.
*C. pennsylvanica* Lam.—Orient and East Marion in dry woods.
*C. rosea* Schkr.—Hilly woods.
*C. rosaeoides* E. C. Howe—Orient. (*Carex seorsa* E. C. Howe.)
*C. rostrata* Stokes—Wet places. (*Carex utriculata* Boott.)
*C. scoparia* Schkr.—Low grounds.
*C. silacea* Olney—Salt marshes.
*C. squarrosa* L.—Greenport.
*C. stipata* Muhl.—Greenport in wet woods.
*C. straminea* Willd.—Orient.
*C. stricta* Lam.
*C. typhina* Mx.—Greenport. (*Carex typhinoides* Schwein.)
*C. varia* Muhl.—Greenport.
*C. vestita* Willd.—Orient in open woods and moist soil.
*C. virescens* Muhl.—Dry open woods; in part determined at Bureau of Plant Industry.
*C. vulpinoidea* Mx.—Sandy hillsides and low woods.
*C. Willdenowii* Schukr.—Determined at Bureau of Plant Industry.
*C. dentatus* Torr.—Rare at Orient.
*C. diandrus* Torr.—Wet places and near the beach.
*C. esculentus* L.—Greenport.
*C. ferax* L. C. Richard.—Rare near the beach; specimens in N. Y. State Herbarium.
*C. filiculmis* Vahl—Sandy hillsides and beaches.
*C. filicinus* Vahl—Low grounds and beaches; specimens in N. Y. State Herbarium. (*Cyperus Nuttallii* Eddy.)
*C. Grayi* Torr.—Southold; specimens in N. Y. State Herbarium.
*C. Houghtoni* Torr.—Orient.
*C. strigosus* L.—Low grounds; also the var. *capitatus* Boeckl.
*Dulichium arundinaceum* (L.) Britton—Swamps.
*Eleocharis acicularis* (L.) R. & S.
*E. acuminata* (Muhl.) Nees—Greenport.
*E. intermedia* (Muhl.) Schultes—Greenport.
*E. olivacea* Torr.—Greenport in a cat-tail swamp; also Orient.
*E. obtusa* (Willd.) Schultes—In part determined at Bureau of Plant Industry.
*E. palustris* (L.) R. & S.—Greenport in wet places.
*E. tenuis* (Willd.) Schultes—Swampy places.
*Eriophorum virginicum* L.—Rare at Orient in wet places.

*Fimbristylis autumnalis* (L.) R. & S.—Wet places.

*F. castanea* (Mx.) Vahl—Rare at Orient on salt marshes; plants with shining(!) scales were collected 14 July 1913; specimens in N. Y. State Herbarium.

*Mariscus mariscoides* (Muhl.) Ktze.—(*Cladium mariscoides* (Muhl.) Torr.)

*Rynchospora corniculata* (Lam.) A. Gray—Rare at Orient, the var. *macrostachya* (Torr.) Britton.

*R. glomerata* (L.) Vahl—Low grounds.

*Scirpus americanus* Pers.—Salt marshes and beaches.

*S. atrovirens* Muhl.—Orient.

*S. cyperinus* (L.) Kunth—Wet places in open woods; also *Scirpus pedicellatus* Fernald.

*S. Olneyi* A. Gray—Southold; specimens in N. Y. State Herbarium.

*S. paludosus* A. Nels.—Orient on salt marshes.

*S. robustus* Pursh.

*S. validus* Vahl.

*Stenophyllus capillaris* (L.) Britton—Sandy hillsides.

### Araceae

*Acorus calamus* L.

*Arisaema triphyllum* (L.) Torr.

*Peltandra virginica* (L.) Kunth—Greenport in wet woods.

*Spathyema foetida* (L.) Raf.—Greenport.

### Lemnaceae

*Lemna minor* L.—Greenport, floating on pools.

### Xyridaceae

*Xyris caroliniana* Walt.—Southold.

### Eriocaulaceae

*Eriocaulon septangulare* With.—Southold.

### Commelinaceae

*Commelina communis* L.—Roadsides and waste places.

### Pontederiaceae

*Pontederia cordata* L.—Greenport and Southold.

### Juncaceae

*Juncoides campestre* (L.) Ktze.

*Juncus acuminatus* Mx.

*J. articulatus* L.—Greenport.

*J. balticus* Willd.—Brackish meadow at Orient, 30 May, 1910, and 3 June, 1914.

*J. bufonius* L.—Margin of salt marshes; specimens in N. Y. State Herbarium.

*J. canadensis* J. Gay.

*J. dichotomus* Ell.—Orient in cultivated field and in swamps, the var. *platyphyllus* Wieg.; in part determined at Bureau of Plant Industry.

*J. effusus* L.

*J. Gerardi* Lois.—Salt marshes; used for hay.

*J. Greenei* Oakes & Tuck.—Orient on hills.

*J. marginatus* Rostk.—Rare.

*J. pelocarpus* E. Meyer—Wet places.

*J. scirpoides* Lam.—Orient.

*J. secundus* Bv.—Orient about wet places.

*J. tenuis* Willd.—Also a few-flowered form; and the var. *anthelatus* Wieg., determined at Bureau of Plant Industry.

### Melanthaceae

*Veratrum viride* Ait.—Greenport and Gardiner's Island.

### Liliaceae

*Allium canadense* L.—Rare at Orient in dry woods.

*A. vineale* L.—Orient.

*Hemerocallis fulva* L.—Orient, escaped along roads.

*Lilium canadense* L.

*L. superbum* L.—Orient.

*L. tigrinum* Andr.—Escaped to roadsides and meadows.

*Ornithogalum umbellatum* L.—Escaped at Orient.

### Convallariaceae

*Asparagus officinalis* L.

*Polygonatum biflorum* (Walt.) Ell.

*P. commutatum* (R. & S.) Dietr.

*Unifolium canadense* (Desf.) Greene.

*Uvularia perfoliata* L.

*U. sessilifolia* L.

*Vagnera racemosa* (L.) Morong—Some of the plants unusually pubescent (!); specimens in N. Y. State Herbarium.

*V. stellata* (L.) Morong.

### Trilliaceae

*Medeola virginiana* L.

*Trillium cernuum* L.—Rare at Greenport.

### Smilaceae

*Smilax glauca* Walt.

*S. herbacea* L.

*S. rotundifolia* L.

### Amaryllidaceae

*Hypoxis hirsuta* (L.) Coville.

### Dioscoreaceae

*Dioscorea villosa* L.—Rare on Gardiner's Island and at Southold in moist woods.

### Iridaceae

*Iris prismatica* Pursh—Orient; specimens in N. Y. State Herbarium.

*I. versicolor* L.

*Sisyrinchium angustifolium* Mill.

*S. atlanticum* Bicknell—Orient.

*S. graminoides* Bicknell—Rare at Greenport in moist woods; determined at Bureau of Plant Industry.

### Orchidaceae

*Blephariglottis blephariglottis* (Willd.) Rydb.—Orient in bogs; determined at the New York Botanical Garden.

*B. lacera* (Mx.) Farwell.

*Fissipes acaulis* (Ait.) Small—Rare at East Marion and Southold. (*Cypripedium acaule* Ait.)

*Ibidium cernuum* (L.) House—Orient. (*Spiranthes cernua* (L.) Richard.)

*I. gracile* (Bigel.) House.

*I. praecox* (Walt.) House—Specimens in N. Y. State Herbarium.

*Limodorum tuberosum* L.—Rare at Orient.

*Peramium pubescens* (Willd.) MacM.

*Perularia flava* (L.) Farwell—Rare at Orient; determined at New York Botanical Garden.

*Tipularia uniflora* (Muhl.) BSP.—Rare at Greenport, 21 Aug. (flowers) and 30 Oct. (fruit), 1911; "a colony of about 30 plants"; reported in N. Y. State Mus. Bull. 157: 42. 1912. The 19 July, 1914, Mr. Latham spent fully two hours hunting for *Tipularia* before he was successful; so perfectly does the little dark-colored stem blend with the surrounding dead laurel twigs that one almost loses it when they remove the eye from it. The 24 Aug. 1914, it was decided that a forest fire had destroyed the colony of 30 plants; for the corms were exposed more than one-half out of the ground.

## *DICOTYLEDONES*

### Juglandaceae

*Hicoria alba* (L.) Britton—Rare; specimens in N. Y. State Herbarium.

*H. cordiformis* (Wang.) Britton—(*Hicoria minima* (Marsh.) Britton.)

*H. glabra* (Mill.) Britton.

*H. ovata* (Mill.) Britton.

### Myricaceae

*Comptonia peregrina* (I..) Coult.—East Marion.

*Myrica carolinensis* Mill.

### Salicaceae

*Populus alba* L.—Roadsides and in woods.

*P. candicans* Ait.—Rarely escaped at Orient.

*P. deltoides* Marsh.—Roadsides and open woods.

*P. heterophylla* L.—Greenport in a swamp.

*P. grandidentata* Mx.—Moist woods.

*P. italica* Moench.—Rarely escaped at Orient.

*P. tremuloides* Mx.

*Salis alba* L.

*S. Bebbiana* Sarg.—Wet meadows and swamps.

*S. cordata* Muhl.—Rare at Orient in swamps.

*S. discolor* Muhl.—Rare at Orient.

*S. fragilis* L.

*S. humilis* Marsh.—Dry soil.

*S. interior* Rowlee—Rare at Orient in wet places. (*Salix longifolia* Muhl.)

*S. lucida* Muhl.—Rare at Orient.

*S. nigra* Marsh.—Rare in low grounds.

*S. purpurea* L.—Escaped at Orient; specimens in N. Y. State Herbarium.

*S. sericea* Marsh.—East Marion.

### Betulaceae

*Alnus incana* (L.) Willd.—Greenport.
*A. rugosa* (DuRoi) Spreng.—Rare at Orient.
*Betula lenta* L.—Greenport.
*B. populifolia* Marsh.
*Corylus americana* Walt.—Rare at Orient.
*C. rostrata* Ait.—Orient.
*Ostrya virginiana* (Mill.) Willd.

### Fagaceae

*Castanea dentata* (Marsh.) Borkh.
*Fagus grandiflora* Ehrh.—Greenport, East Marion and Southold; unknown at Orient. (*Fagus americana* Sweet.)
*Quercus alba* L.—More common at Greenport than at Orient.
*Q. bicolor* Willd.—Greenport.
*Q. coccinea* Wang.
*Q. Muhlenbergii* Engelm.—Rare at Greenport.
*Q. palustris* DuRoi—Rare.
*Q. Prinus* L.—More common at Greenport than at Orient.
*Q. rubra* L.—Rare.
*Q. stellata* Wang.—Sandy soil.
*Q. velutina* Lam.

### Ulmaceae

*Celtis occidentalis* L.

### Moraceae

*Toxylon pomiferum* Raf.—Escaped from cultivation.

### Cannabinaceae

*Humulus Lupulus* L.—Rare at Orient in open woods.

### Urticaceae

*Boehmeria cylindrica* (L.) Sw.
*Pilea pumila* (L.) A. Gray.

### Santalaceae

*Comandra umbellata* (L.) Nutt.—Light sandy soil.

### Aristolochiaceae

*Asarum canadense* L.—Determined at New York Botanical Garden.

### Polygonaceae

*Persicaria Hydropiper* (L.) Opiz—Cultivated fields and about yards. (*Polygonum Hydropiper* L.)
*P. hydropiperoides* (Mx.) Small—About ponds and wet places.
*P. lapathifolia* (L.) S. F. Gray—Rare at Orient.
*P. pennsylvanica* (L.) Small.
*P. Persicaria* (L.) Small.
*P. punctata* (Ell.) Small—Fields, waste places and about swamps.
*Polygonella articulata* (L.) Meisn.—Orient.
*Polygonum aviculare* L.—Yards and roadsides; sometimes on sandy beaches far from dwellings.

*P. buxiforme* Small—Beaches; specimens in N. Y. State Herbarium. (Formerly confused with *Polygonum littorale* Link.)
*P. erectum* L.—Orient in yards and on beaches.
*P. maritimum* L.—Beaches on Gardiner's Island; specimens in N. Y. State Herbarium.
*P. prolificum* (Small) Robins.—Orient; specimens in N. Y. State Herbarium.
*P. tenue* Mx.—Rare at Orient.
*Tiniaria Convolvulus* (L.) Webb & Moq.—Plants with the achene more shining than usual (!). (*Polygonum Convolvulus* L.)
*T. dumetorum* (L.) Opiz—Rare at Orient.
*T. scandens* (L.) Small.
*Tovara virginiana* (L.) Raf.—Gardiner's Island and rare at Greenport. (*Polygonum virginianum* L.)
*Tracaulon arifolium* (L.) Raf.—Swampy woods. (*Polygonum arifolium* L.)
*T. sagittatum* (L.) Small—Gardiner's Island.
*Rumex Acetosella* L.
*R. Brittanica* L.—Rare at Greenport in a swamp.
*R. crispus* L.
*R. hastatulus* Muhl.
*R. obtusifolius* L.
*R. pallidus* Bigel.—Rare at Orient; reported in N. Y. State Mus. Bull. 139: 29. 1910.
*R. persicarioides* L.—Rare at Orient.
*R. verticillatus* L.—Rare at Greenport.

## AMARANTHACEAE

*Acnida tuberculata* Moq.—Rare at Greenport, margin of marshes.
*Amaranthus blitoides* S. Wats.—Rare at Orient in waste places.
*A. graecizans* L.
*A. hybridus* L.
*A. retroflexus* L.

## CHENOPODIACEAE

*Atriplex arenaria* Nutt.—Orient on beaches and salt marshes.
*A. hastata* L.—Beaches and salt marshes; also *Atriplex littoralis* L., specimens in N. Y. State Herbarium.
*Chenopodium album* L.
*C. ambrosioides* L.
*C. glaucum* L.—Orient, 10 Oct. 1910, a recent introduction from New York City in stable manure.
*C. hybridum* L.—Orient on sandy beaches and salt marshes.
*C. leptophyllum* (Moq.) Nutt.—Orient on sandy beaches.
*C. urbicum* L.—Orient.
*Dondia maritima* (L.) Druce.
*Salicornia ambigua* Mx.
*S. Bigelovii* Torr.
*S. europaea* L.—The *Salicornias* determined by Dr. C. H. Peck.
*Salsola Kali* L.—Specimens in N. Y. State Herbarium.

PHYTOLACCACEAE

*Phytolacca americana* L.—(*Phytolacca decandra* L.)

AIZOACEAE

*Mollugo verticillata* L.

*Sesuvium maritimum* (Walt.) BSP.—Gardiner's Island; specimens in N. Y. State Herbarium.

PORTULACACEAE

*Claytonia virginica* L.—Rare at East Marion.

*Portulaca oleracea* L.

ALSINACEAE

*Alsine graminea* (L.) Britton—Rare at Orient.

*A. media* L.

*Arenaria serpyllifolia* L.—Orient.

*Cerastium viscosum* L.—Reported in N. Y. State Mus. Bull. 139: 33. 1910.

*C. vulgatum* L.

*Honkenya peploides* (L.) Ehrh.—Orient on beaches; specimens in N. Y. State Herbarium. (*Arenaria peploides* L.)

*Moehringia lateriflora* (L.) Fenzl.

*Sagina decumbens* (Ell.) T. & G.—Rare at East Marion; reported in N. Y. State Mus. Bull. 150: 48. 1911.

*S. procumbens* L.

*Spergula arvensis* L.

*Tissa marina* (L.) Britton—Specimens in N. Y. State Herbarium.

*T. rubra* (L.) Britton—Rare at Orient.

CARYOPHYLLACEAE

*Agrostemma Githago* L.

*Dianthus Armeria* L.

*Lychnis alba* Mill.—Roadsides.

*L. Coronaria* (L.) Desr.—Rare at Orient.

*L. dioica* L. —Rare at Orient.

*Saponaria officinalis* L.

*Silene antrirhina* L.

*S. caroliniana* Walt.—Orient and Southold in sandy soil.

*S. latifolia* (Mill.) Biitten & Rendle—Rare.

*S. noctiflora* L.—Rare at Orient.

*S. stellata* (L.) Ait.—Rare at Orient.

*Vaccaria Vaccaria* (L.) Britton—Rare at Orient.

NYMPHAEACEAE

*Castalia odorata* (Dryand.) Woodv. & Wood.

MAGNOLIACEAE

*Liriodendron Tulipifera* L.—Rare at Greenport.

RANUNCULACEAE

*Anemone quinquefolia* L.

*A. virginiana* L.

*Aquilegia canadensis* L.—Rare at Orient.

*Caltha palustris* L.—Rare at Southold in wet places.
*Clematis virginiana* L.
*Halerpestes Cymbalaria* (Pursh) Greene—Waste places at Orient; determined at Bureau of Plant Industry. (*Ranunculus Cymbalaria* Pursh.)
*Ranunculus abortivus* L.—Rare at Orient.
*R. acris* L.—Rare at Greenport and Southold.
*R. bulbosus* L.
*R. delphinifolius* Torr.—Rare at Orient.
*R. recurvatus* Poir.—Greenport; plants with a bulbous base (!).
*R. sceleratus* L.—Rare at Greenport and Southold in muddy places.
*Thalictrum polygamum* Muhl.
*T. revolutum* DC.—Orient. (*Thalictrum purpurascens* Am. auth.)

### Berberidaceae

*Berberis vulgaris* L.

### Lauraceae

*Benzoin aestivale* (L.) Nees—Greenport and Gardiner's Island in wet woods.
*Sassafras Sassafras* (L.) Karst.

### Papaveraceae

*Glaucium Glaucium* (L.) Karst.—Rare at Orient; but frequent on Gardiner's Island.
*Papaver Rhoeas* L.—Rare at Orient.
*P. somniferum* L.—Rare at Orient.

### Cruciferae

*Alyssum alyssoides* L.—Rare at Orient; determined at Bureau of Plant Industry.
*Arabis glabra* (L.) Bernh.—Sandy soil (purplish plants).
*Armoracia Armoracia* (L.) Britton—Rare at Orient. (*Roripa Armoriacia* (L.) A. S. Hitchc.)
*Barbarea Barbarea* (L.) MacM.
*B. verna* (Mill.) Aschers—Rare at Orient; determined at Bureau of Plant Industry.
*Berteroa incana* (L.) DC.—Rare at Orient in meadows.
*Brassica campestris* L.—Cultivated fields.
*B. juncea* (L.) Cosson—Rare at Orient.
*B. Napus* L.
*B. nigra* (L.) Koch—Rare in waste ground.
*Bursa Bursa-pastoris* (L.) Britton.
*Cakile edentula* (Bigel.) Hook.—Upper edge of salt marshes.
*Camelina sativa* (L.) Crantz—Orient in grain fields; reported in N. Y. State Mus. Bull. 150: 24. 1911.
*Cardamine arenicola* Britton—Greenport; specimens in N. Y. State Herbarium.
*C. pennsylvanica* Muhl.—Orient in muddy places.
*Draba verna* L.—Dry hilly shaded places.
*Erysimum officinale* L.—(*Sisymbrium officinale* (L.) Scop.)
*Koniga maritima* (L.) R. Br.—Rare at Orient.
*Lepidium campestre* (L.) R. Br.—Meadows.
*L. densiflorum* Schrad.—Rare at Orient. (Formerly confused with *Lepidium apetalum* Willd.)
*L. sativum* L.—Meadows.

*L. virginicum* L.
*Norta altissima* (L.) Britton—Rare at Orient in meadows. (*Sisymbrium altissimum* L.)
*Radicula palustris* (L.) Moench—(*Roripa palustris* (L.) Bess.)
*Raphanus Raphanistrum* L.
*R. sativus* L.—Grain fields.
*Sinapis arvensis* L.—(*Brassica arvensis* (L.) BSP.)
*Sisymbrium Nasturtium-aquaticum* L.—Rare at Orient. (*Roripa Nasturtium* (L.) Rusby.)
*Sophia Sophia* (L.) Britton—Rare at Orient.

DROSERACEAE

*Drosera intermedia* Hayne
*D. rotundifolia* L.—Rare at Southold.

CRASSULACEAE

*Sedum triphyllum* (Haw.) S. F. Gray—Rare. (*Sedum telephium* Am. auth.)

SAXIFRAGACEAE

*Micranthes virginiensis* (Mx.) Small—Rare at Orient. (*Saxifraga virginiensis* Mx.)

HAMAMELIDACEAE

*Hamamelis nivirgiana* L.—Greenport, Southold and Gardiner's Island in moist woods; no Orient records.

GROSSULARIACEAE

*Grossularia Cynosbati* (L.) Mill.—Orient in woods. (*Ribes Cynosbati* L.)
*G. oxyacanthoides* (L.) Mill.
*Ribes vulgare* Lam.—Orient. (Formerly confused with *Ribes rubrum* L.)

PLATANACEAE

*Platanus occidentalis* L.

ROSACEAE

*Agrimonia gryposepala* Wallr.
*Argentina Anserina* (L.) Rydb.—Orient and Gardiner's Island on beaches and salt marshes.
*Fragaria vesca* L.—Woods.
*F. virginiana* Duchesne—Hills and swamps (variable).
*Geum canadense* Jacq.
*Geum flavum* (Porter) Bicknell—Greenport.
*G. virginianum* L.
*Potentilla argentea* L.—Orient.
*P. canadensis* L.
*P. monspeliensis* L.
*P. pumila* Poir.—Orient and East Marion.
*P. simplex* Mx.—Orient.
*Rosa carolina* L.—Sometimes the bushes are almost wholly unarmed.
*R. cinnamomea* L.—Rarely escaped at Orient.
*R. rubiginosa* L.—Sandy soil and shaded places.
*R. rugosa* Thunb.—Rarely escaped at Orient on sandy beaches; determined at Bureau of Plant Industry.

*R. virginiana* Mill.—Both forms occur, *Rosa humilis* Marsh. and *Rosa lucida* Ehrh.
*Rubus alleghaniensis* Porter.
*R. hispidus* L.—Sandy bogs.
*R. occidentalis* L.
*R. phoenicolasius* Maxim.—Orient, established in woods.
*R. procumbens* Muhl.
*R. strigosus* Mx.
*Sanguisorba canadensis* L.—Greenport in wet woods.
*Spirea latifolia* (Ait.) Borkh.—Wet places.
*S. tomentosa* L.—Orient.

MALACEAE

*Amelanchier canadensis* (L.) Medic.
*Aronia arbutifolia* (L.) Ell.—Orient.
*A. atropurpurea* Britton.
*A. melanocarpa* (Mx.) Britton.—Orient.
*Crataegus chrysocarpa* Ashe—Rare at Orient. (*Crataegus rotundifolia* (Ehrh.) Borkh.)
*C. Crus-Galli* L.
*C. monogyna* Jacq.—Rare at Greenport. (Formerly confused with *Crataegus Oxyacantha* L.)
*Malus Malus* (L.) Britton.

AMYGDALACEAE

*Padus virginiana* (L.) Mill.—(*Prunus serotina* Ehrh.)
*Prunus americana* Marsh.—Rare at Orient.
*P. Avium* L.—Roadsides.
*P. Cerasus* L.—Wood margins.
*P. domestica* L.—Rare, a degenerate form.
*P. maritima* Wang.—Rare at Greenport; but more abundant at Orient, Southold and Gardiner's Island.

CAESALPINIACEAE

*Chamaecrista fasciculata* (Mx.) Greene.
*Gleditschia triacanthos* L.—Rare at Orient.

FABACEAE

*Baptisia tinctoria* (L.) R. Br.
*Coronilla varia* L.—Rare at Greenport; specimens in N. Y. State Herbarium.
*Cracca virginiana* L.—Mattituck.
*Falcata comosa* (L.) Ktze.—Rare at Orient in rich woods.
*Glycine Apios* L.—Swamps; plants sometimes with 3 leaflets. (*Apios Apios* (L.) MacM.)
*Lathyrus maritimus* (L.) Bigel.
*Lespedeza capitata* Mx.
*L. frutescens* (L.) Britton—Southold.
*L. hirta* (L.) Hornem.
*L. procumbens* Mx.—East Marion.
*L. Stuvei* Nutt.—Southold.
*L. violacea* (L.) Pers.—Greenport and Southold.
*L. virginica* (L.) Britton—Southold.
*Lupinus perennis* L.—Southold in sandy soil.

*Medicago hispida* Gaertn.—Rare at Greenport.
*M. lupulina* L.—Greenport.
*M. sativa* L.—Rare in meadows.
*Meibomia canadensis* (L.) Ktze.—Rich woods.
*M. Dillenii* (Darl.) Ktze.—Greenport and Southold in rich woods.
*M. grandiflora* (Walt.) Ktze.
*M. nudiflora* (L.) Ktze.—Southold.
*M. viridiflora* (L.) Ktze.—Rare at Greenport; determined at Bureau of Plant Industry.
*Melilotus alba* Desv.—Greenport.
*Phaseolus polystachyus* (L.) BSP.—Orient in woods.
*Robinia Pseudo-Acacia* L.
*R. viscosa* Vent.
*Strophostyles helvola* (L.) Britton—Near beaches; specimens in N. Y. State Herbarium.
*Trifolium agrarium* L.
*T. arvense* L.
*T. hybridum* L.—Meadows.
*T. incarnatum* L.—Rare.
*T. pratense* L.
*T. procumbens* L.—Rare.
*T. repens* L.
*Vicia angustifolia* L.—Orient; also the var. *segetalis* (Thuill.) Koch; reported in N. Y. State Mus. Bull. 150: 49. 1911.
*V. hirsuta* (L.) Koch—Rare at Orient; determined at Bureau of Plant Industry.

### Geraniaceae

*Erodium cicutarium* (L.) L'Her.—Mattituck.
*Geranium maculatum* L.
*Robertiella Robertiana* (L.) Hanks—(*Geranium Robertianum* L.)

### Oxalidaceae

*Xanthoxalis Brittoniae* Small
*X. stricta* (L.) Small.

### Linaceae

*Cathartolinum striatum* (Walt.) Small—Brackish meadows and wet woods. (*Linum striatum* Walt.)
*C. virginianum* (L.) Reichenb.
*Linum usitatissimum* L.—Rare in grain fields.

### Balsaminaceae

*Impatiens biflora* Walt.—Greenport, Southold and Gardiner's Island in wet places.

### Simaroubaceae

*Ailanthus glandulosa* Desf.—Rare at Greenport.

### Polygalaceae

*Polygala cruciata* L.—Orient.
*P. lutea* L.—Rare at Greenport.

*P. paucifolia* Willd.—Orient, the station destroyed by cultivation; determined at New York Botanical Garden.

*P. polygama* Walt.—Dry open woods.

*P. verticillata* L.—Dry hilly soil.

*P. viridescens* L.—Moist woods.

EUPHORBIACEAE

*Acalypha gracilens* A. Gray.

*A. virginica* L.

*Chamaesyce maculata* (L.) Small—Cultivated fields. (*Euphorbia maculata* L.)

*C. polygonifolia* (L.) Small.

*Tithymalus Cyparissias* (L.) Hill—Roadsides. (*Euphorbia Cyparissias* L.)

*T. Lathyrus* (L.) Hill—Rare at Orient in waste places; determined at Bureau of Plant Industry.

CALLITRICHACEAE

*Callitriche heterophylla* Pursh—Edge of a pond in woods at Greenport; determined at Bureau of Plant Industry.

*C. palustris* L.—Rare at Orient in a pond, 1908; determined at New York Botanical Garden. Not found since and perhaps the many years of drought have killed the roots.

ANACARDIACEAE

*Rhus copallina* L.

*R. glabra* L.

*Toxicodendron radicans* (L.) Ktze.—Plants may be either low or high climbing; the leaves sometimes toothed. (*Rhus radicans* L.)

*T. vernix* (L.) Ktze.—Rare.

ILICACEAE

*Ilex bronxensis* Britton—Rare at Orient; specimens in N. Y. State Herbarium.

*I. glabra* (L.) A. Gray—Rare at East Marion.

*I. verticillata* (L.) A. Gray.

CELASTRACEAE

*Celastrus scandens* L.

ACERACEAE

*Acer carolinianum* Walt.—Rare on Gardiner's Island. (*Acer rubrum tridens* Wood.)

*A. Negundo* L.—Escaped at Orient.

*A. rubrum* L.

*A. saccharinum* L.

RHAMNACEAE

*Ceanothus americanus* L.—Rare at Southold.

*Rhamnus cathartica* L.—Orient.

VITACEAE

*Parthenocissus quinquefolia* (L.) Planch.

*Vitis aestivalis* Mx.

*V. bicolor* LeConte.

*V. Labrusca* L.—Moist thickets.

TILIACEAE

*Tilia americana* L.

MALVACEAE

*Abutilon Abutilon* (L.) Rusby—Orient in cultivated fields.

*Hibiscus Moscheutos* L.

*H. Trionum* L.—Rare at Greenport.

*Malva rotundifolia* L.

HYPERICACEAE

*Hypericum canadense* L.—Wet meadows; specimens in N. Y. State Herbarium.

*H. majus* (A. Gray) Britton—Moist places.

*H. mutilum* L.—Moist places.

*H. perforatum* L.

*H. punctatum* Lam.—(*Hypericum maculatum* Walt.)

*Sarothra gentianoides* L.

*Triadenum virginicum* (L.) Raf.

CISTACEAE

*Crocanthemum canadense* (L.) Britton—East Marion. (*Helianthemum canadense* (L.) Mx.)

*C. majus* (L.) Britton—East Marion.

*Hudsonia tomentosa* Nutt.—Orient, Southold and Gardiner's Island on sandy beaches.

*Lechea intermedia* Leggett—Orient.

*L. Leggettii* Britt. & Holl.—Orient.

*L. maritima* Leggett.

*L. racemulosa* Lam.—Orient and Greenport; specimens in N. Y. State Herbarium.

*L. villosa* Ell.—Dry woods.

VIOLACEAE

*Viola cucullata* Ait.—Swamps.

*V. fimbriatula* J. E. Sm.

*V. lanceolata* L.

*V. pallens* (Banks) Brainerd.

*V. papilionacea* Pursh—The var. *domestica* Bicknell in old lawns.

*V. pedata* L.—East Marion and Greenport.

*V. primulifolia* L.—Greenport.

CACTACEAE

*Opuntia Opuntia* (L.) Coult.—Rare at Orient in sandy soil.

LYTHRACEAE

*Decodon verticillatus* (L.) Ell.

MELASTOMACEAE

*Rhexia virginica* L.—Rare at Orient.

ONAGRACEAE

*Chamaenerion angustifolium* (L.) Scop.—Rare at Orient.

*Circaea lutetiana* L.

*Epilobium adenocaulon* Haussk.

*E. coloratum* Muhl.—Orient.

*E. lineare* Muhl.—Rare at Orient.

*E. palustre* L.—Rare at Orient.

*E. strictum* Muhl.—Rare at Orient.

*Isnardia palustris* L.—Wet places.

*Kneiffia Alleni* (Britton) Small—Orient.

*K. fruticosa* (L.) Raimann—Also the var. *pilosella* Britton.

*K. linearis* (Mx.) Spach—Orient.

*K. longipedicellata* Small—Orient.

*K. pumila* (L.) Spach.
*Ludwigia alternifolia* L.—Swampy places.
*Oenothera biennis* L.
*O. Oakesiana* Robbins—Orient.

### Haloragidaceae

*Myriophyllum humile* (Raf.) Morong—Rare at East Marion.
*M. pinnatum* (Walt.) BSP.—Greenport in a pond; determined by P. L. Ricker.
*Proserpinaca palustris* L.—Orient.

### Araliaceae

*Aralia nudicaulis* L.
*A. racemosa* L.—Rare at Greenport.

### Ammiaceae

*Angelica atropurpurea* L.—Rare at East Marion; specimens in N. Y. State Herbarium.
*Cicuta maculata* L.
*Daucus Carota* L.
*Foeniculum Foeniculum* (L.) Karst.—Escaped at Orient.
*Heracleum lanatum* Mx.
*Ligusticum scoticum* L.—Orient, edge of woods bordering salt marshes; reported in N. Y. State Mus. Bull. 139: 25. 1910.
*Pastinaca sativa* L.—Rare.
*Ptilimnium capillaceum* (Mx.) Raf.
*Sanicula canadensis* L.
*S. marylandica* L.
*Sium cicutaefolium* Schrank—Swampy woods.
*Washingtonia Claytoni* (Mx.) Britton—Orient; specimens in N. Y. State Herbarium.
*W. longistylis* (Torr.) Britton—Rare.

### Cornaceae

*Cornus femina* Mill.—Rare at Orient but more abundant at East Marion and Southold. (*Cornus candidissima* Marsh.)
*C. stolonifera* Mx.—Rare at Orient, edge of a swamp.
*Cynoxylon floridum* (L.) Raf.—(*Cornus florida* L.)
*Nyssa sylvatica* Marsh.

### Clethraceae

*Clethra alnifolia* L.

### Pyrolaceae

*Chimaphila maculata* (L.) Pursh.
*C. umbellata* (L.) Nutt.—Rare at Orient but more common at East Marion.
*Pyrola americana* Sweet.
*P. elliptica* Nutt.

### Monotropaceae

*Hypopitys lanuginosa* (Mx.) Nutt.—In oak woods; the plants crimson.
*Monotropa uniflora* L.

### Ericaceae

*Azalea nudiflora* L.—Rare at Greenport in swamps.
*A. viscosa* L.—Greenport and Orient in sandy swamps.

*Epigaea repens* L.—East Marion.

*Eubotrys racemosa* (L.) Nutt.—Rare at Greenport in swamps. (*Leucothoë racemosa* (L.) A. Gray.)

*Gaulthera procumbens* L.—Rare at Southold.

*Kalmia angustifolia* L.—Mattituck.

*K. latifolia* L.—East Marion and Southold.

*Uva-Ursi Uva-Ursi* (L.) Britton—Orient. (*Arctostaphylos Uva-Ursi* (L.) Spreng.)

*Xolisma ligustrina* (L.) Britton.

### Vacciniaceae

*Gaylussacia baccata* (Wang.) K. Koch—In woods.

*Oxycoccus macrocarpus* (Ait.) Pursh—Plants bearing two forms of fruit occur; taller plants bear oblong fruit and are rarer.

*Vaccinium angustifolium* Ait.—(*Vaccinium pennsylvanicum* Lam.)

*V. atrococcum* (A. Gray) Heller—In swamps.

*V. corymbosum* L.

*V. vacillans* Kalm—In woods.

### Primulaceae

*Anagallis arvensis* L.

*Lysimachia Nummularia* L.—Rare at Orient.

*L. quadrifolia* L.

*L. terrestris* (L.) BSP.

*Samolus floribundus* HBK.—Orient.

*Steironema ciliatum* (L.) Raf.—Gardiner's Island in low woods; determined by Norman Taylor.

*Trientalis americana* Pursh.

### Plumbaginaceae

*Limonium carolinianum* (Walt.) Britton.

### Oleaceae

*Fraxinus americana* L.—Greenport.

*Ligustrum vulgare* L.

*Syringa vulgaris* L.

### Gentianaceae

*Bartonia virginica* (L.) BSP.—Rare.

*Sabbatia stellaris* Pursh—Orient on salt marshes; specimens in N. Y. State Herbarium.

### Apocynaceae

*Apocynum androsaemifolium* L.

*A. cannabinum* L.—Rare at Orient; plants with the leaves lightly pubescent beneath.

*A. medium* Greene—Rare at Orient.

*A. pubescens* R. Br.—Rare at Orient; specimens in N. Y. State Herbarium.

*A. sibiricum* Jacq.—(*Apocynum album* Greene.)

*Vinca minor* L.—Roadsides at Greenport.

### Asclepiadaceae

*Asclepias amplexicaulis* J. E. Smith—Rare at Orient.

*A. purpurascens* L.—Orient.

*A. pulchra* Ehrh.—Orient in low ground.
*A. syriaca* L.—Specimens in N. Y. State Herbarium.
*A. tuberosa* L.—Rare at East Marion, Greenport and Southold.
*A. verticillata* L.—Rare at Orient.

### Convolvulaceae

*Convolvulus repens* L.—Orient.
*C. sepium* L.—Orient; the flowers white or pinkish.
*Ipomoea purpurea* (L.) Lam.—Escaped.

### Cuscutaceae

*Cuscuta arvensis* Beyrich—Orient and Southold.
*C. compacta* Juss.—Greenport on *Clethra* and *Cephalanthus*.
*C. Gronovii* Willd.

### Polemoniaceae

*Phlox paniculata* L.—Rarely escaped at Orient.
*P. subulata* L.—The two stations at Orient have recently been destroyed by cultivation.

### Boraginaceae

*Cynoglossum officinale* L.—Rare at Orient.
*Myosotis arvensis* (L.) Hill—Rare at Orient in cultivated grounds; determined at Bureau of Plant Industry.
*M. virginica* (L.) BSP.—Rare at Orient; specimens in N. Y. State Herbarium.
*Onosmodium virginianum* (L.) DC.—Rare at Orient on sandy beaches.

### Verbenaceae

*Verbena hastata* L.
*V. urticifolia* L.—Shaded places.

### Labiatae

*Agastache nepetoides* (L.) Ktze.—Gardiner's Island in rich woods.
*Clinopodium vulgare* L.—Gardiner's Island in rocky woods.
*Collinsonia canadensis* L.—Gardiner's Island in rich woods.
*Glecoma hederacea* L.—Rare at Orient.
*Hedeoma pulegioides* (L.) Pers.—Rare in shaded places.
*Koellia flexuosa* (Walt.) MacM.—Orient.
*K. mutica* (Mx.) Britton—Rare at Orient.
*K. virginiana* (L.) MacM.—Rare at Orient.
*Lamium amplexicaule* L.—Orient in cultivated fields.
*Leonurus Cardiaca* L.—Rare.
*Lycopus americanus* Muhl.
*L. membranaceus* Bicknell.
*L. sessilifolius* A. Gray—Southold.
*L. uniflorus* Mx.
*L. virginicus* L.
*Marrubium vulgare* L.—Orient.
*Melissa officinalis* L.—Rare at Greenport.
*Mentha gentilis* L.—Rare at Orient along roads.
*M. piperita* L.—Rare at Orient.
*M. spicata* L.
*Nepeta Cataria* L.

*Prunella vulgaris* L.

*Scutellaria galericulata* L.—Swamps.

*S. lateriflora* L.—Orient and Greenport in low woods.

*Teucrium canadense* L.—Sandy beaches and rocky woods; specimens in N. Y. State Herbarium.

*Trichostema dichotomum* L.—Plants with pink flowers (!); reported in N. Y. State Mus. Bull. 157: 43. 1912.

SOLANACEAE

*Datura Stramonium* L.—Gardiner's Island and elsewhere.

*Lycium halimifolium* Mill.—Rare.

*Lycopersicon Lycopersicon* (L.) Karst.—Escaped.

*Physalis peruviana* L.—Escaped at Orient in waste places and in gardens.

*Physalodes physalodes* (L.) Britton—Escaped at Orient.

*Solanum Dulcamara* L.—Rare.

*S. nigrum* L.—Rare on sandy beaches.

SCROPHULARIACEAE

*Agalinis maritima* Raf.—Orient on salt marshes; specimens in N. Y. State Herbarium. (*Gerardia maritima* Raf.)

*A. purpurea* (L.) Britton—Orient; specimens in N. Y. State Herbarium.

*A. tenuifolia* (Vahl) Raf.—Dry hills.

*Chelone glabra* L.—Rare at Greenport.

*Dasystoma flava* (L.) Wood—Greenport.

*D. pedicularia* (L.) Benth.—East Marion.

*D. virginica* (L.) Britton.

*Gratiola aurea* Muhl.—Rare at Orient.

*Ilysanthes attenuata* (Muhl.) Small—Orient.

*I. dubia* (L.) Barnh.—Orient.

*Linaria canadensis* (L.) Dum.

*L. Linaria* (L.) Karst.

*Melampyrum lineare* Lam.—The leaves are variable in outline.

*Mimulus ringens* L.—Greenport.

*Pedicularis canadensis* L.—Orient.

*Scrophularia leporella* Bicknell—Rare at Orient.

*Verbascum Blattaria* L.

*V. Thapsus* L.

*Veronica arvensis* L.—Orient.

*V. officinalis* L.—East Marion.

*V. peregrina* L.—Orient.

*V. serpyllifolia* L.

LENTIBULARIACEAE

*Setiscapella cleistogama* (A. Gray) Barnhart—Southold; determined at Bureau of Plant Industry. (*Utricularia cleistogama* (A. Gray) Britton.)

*Stomoisia cornuta* (Mx.) Raf.—Southold. (*Utricularia cornuta* Mx.)

OROBANCHACEAE

*Leptamnium virginianum* (L.) Raf.—Greenport.

*Thalesia uniflora* (L.) Britton—Rare at Orient.

### Bignoniaceae

*Bignonia radicans* L.—Rarely escaped at Orient. (*Tecoma radicans* (L.) DC.)

### Phrymaceae

*Phryma Leptostachya* L.—Gardiner's Island and Greenport in woods.

### Plantaginaceae

*Plantago aristata* Mx.

*P. halophila* Bicknell—Orient on salt marshes; plants earlier to flower and more downy than *Plantage major* L.

*P. lanceolata* L.

*P. major* L.

*P. maritima* L.—Orient; specimens in N. Y. State Herbarium.

*P. media* L.

*P. pusilla* Pursh—Rare on dry hilltops; specimens in N. Y. State Herbarium.

*P. Rugelii* Dcne.—East Marion, shores of a pond.

*P. virginica* L.—East Marion in sandy soil.

### Rubiaceae

*Cephalanthus occidentalis* L.

*Galium Aparine* L.—Orient in low rich shaded places.

*G. circaezans* Mx.—Rich woods.

*G. Claytoni* Mx.—Low grounds.

*G. lanceolatum* Torr.—Rare at Orient; determined at N. Y. Botanical Garden.

*G. palustre* L.—Greenport.

*G. pilosum* Ait.—Rare at Orient; the flowers purple.

*G. tinctorium* L.—Greenport in swampy woods.

*G. triflorum* Mx.—Greenport.

*Mitchella repens* L.—Plants sometimes having unusually large leaves.

### Caprifoliaceae

*Diervilla Diervilla* (L.) MacM.

*Lonicera japonica* Thunb.—Orient and East Marion in woods.

*L. sempervirens* L.—East Marion.

*Sambucus canadensis* L.

*S. racemosa* L.—Rare at Orient, the station now destroyed; determined at Bureau of Plant Industry.

*Triosteum aurantiacum* Bicknell.

*T. perfoliatum* L.—Rare at Orient.

*Viburnum acerifolium* L.—More abundant at Greenport than at Orient.

*V. dentatum* L.—"A form with leaves decidedly acuminate"; reported in N. Y. State Mus. Bull. 150: 49. 1911.

*V. Lentago* L.—Rare at Orient.

*V. venosum* Britton—Rare at East Marion in swamps; reported in N. Y. State Mus. Bull. 150: 41. 1911.

### Valerianaceae

*Valeriana officinalis* L.—Orient.

### Campanulaceae

*Campanula rapunculoides* L.—Rarely escaped at Orient.

*Specularia perfoliata* (L.) A. DC.—Rare in hilly woods.

### Lobeliaceae

*Lobelia cardinalis* L.—Rare from Greenport to Southold.

*L. inflata* L.

*L. syphilitica* L.—Rare at Orient in low ground.

### Cichoriaceae

*Apargia nudicaulis* (L.) Britton—Specimens in N. Y. State Herbarium. (*Leontodon nudicaule* (L.) Banks.)

*Cichorium Intybus* L.—Orient.

*Crepis capillaris* (L.) Wallr.—Orient. (*Crepis virens* L.)

*C. setosa* Hall. f.—Reported in N. Y. State Mus. Bull. 150: 29. 1911.

*C. tectorum* L.—Rare at Orient; determined by Dr. C. H. Peck.

*Hieracium aurantiacum* L.—Rare at Orient.

*H. Gronovii* L.—Orient; specimens in N. Y. State Herbarium.

*H. paniculatum* L.—Greenport.

*H. scabrum* Mx.—Plants with more naked stems than usual; specimens in N. Y. State Herbarium.

*H. venosum* L.

*Hypochaeris radicata* L.—Orient; specimens in N. Y. State Herbarium.

*Krigia virginica* (L.) Willd.—Orient in light soil.

*Lactuca canadensis* L.—Cedar woods and elsewhere; also the var. *montana* Britton.

*L. sagittifolia* Ell.—Orient.

*L. spicata* (Lam.) Hitchc.

*Lapsana communis* L.—Rare at Orient; determined by P. L. Ricker.

*Leontodon erythrospermum* (Andrz.) Britton—Light soil and on sandy beaches at Orient. (*Taraxicum erythrospermum* Andrz.)

*L. Taraxicum* L.

*Nabalus serpentarius* (Pursh) Hook.—Greenport.

*N. trifoliolatus* Cass.

*Picris echioides* L.—Reported in N. Y. State Mus. Bull. 139: 28. 1910.

*P. hieracioides* L.—Rare at Orient; determined by Dr. C. H. Peck; reported in N. Y. State Mus. Bull. 150: 37. 1911.

*Sonchus arvensis* L.—Rare at Orient.

*S. asper* (L.) Hill.—Orient.

*S. oleraceus* L.

### Ambrosiaceae

*Ambrosia elatior* L.—(*Ambrosia artemisiaefolia* L.)

*A. trifida* L.—Rare at Orient in cultivated fields.

*Xanthium commune* Britton—Orient on beaches.

*X. spinosum* L.—Rare on Gardiner's Island.

### Compositae

*Achillea Millefolium* L.—Also the *forma rosea.*

*Anaphallis margaritacea* (L.) Benth. & Hook.—Rare.

*Antennaria neglecta* Greene.
*A. plantaginifolia* (L.) Richards.
*Anthemis arvensis* L.—Rare at Orient in meadows and waste places.
*A. Cotula* L.
*A. tinctoria* L.—Rare at Orient in meadows; specimens in N. Y. State Herbarium.
*Arctium minus* Schkr.
*Artemisia caudata* Mx.—Determined by Dr. C. H. Peck.
*A. Stellariana* Bess.—Orient on beaches.
*Aster cordifolius* L.—Greenport.
*A. divaricatus* L.—Woods.
*A. dumosus* L.—Orient in sandy soil.
*A. ericoides* L.—Southold.
*A. laevis* L.—Low woods; also the long-leaved form.
*A. lateriflorus* (L.) Britton—Orient in woods.
*A. macrophyllus* L.—The plants are variable.
*A. multiflorus* Ait.
*A. novae-angliae* L.—More common on Gardiner's Island than at Orient.
*A. novi-belgii* L.—Low grounds.
*A. paniculatus* Lam.
*A. patens* Ait.—Dry hills.
*A. puniceus* L.
*A. salicifolius* Lam.—Orient in low places.
*A. spectabilis* Ait.—Orient; also a form with white flowers.
*A. subulatus* Mx.
*A. tenuifolius* L.
*A. Tradescanti* L.
*A. undulatus* L.
*A. vimineus* Lam.
*Baccharis halimifolia* L.—Orient about salt marshes.
*Bidens cernua* L.
*B. comosa* (A. Gray) Wiegand—Low grounds.
*B. connata* Muhl.—Low grounds; also a form with entire leaves.
*B. discoidea* (T. & G.) Britton.
*B. frondosa* L.
*B. laevis* (L.) BSP.
*Centaurea Cyanus* L.—Rare at Orient.
*C. Jacea* L.—Rare at Orient in a dry pasture.
*Chrysanthemum Leucanthemum* L.
*Chrysopsis falcata* (Pursh) Ell.—Orient and Southold.
*C. mariana* (L.) Ell.
*Cirsium arvense* (L.) Scop.
*C. discolor* (Muhl.) Spreng.
*C. horridulum* Mx.—Specimens in N. Y. State Herbarium. (*Cirsium spinosissimum* (Walt.) Scop.)
*C. lanceolatum* (L.) Hill.—Moist places.
*C. muticum* Mx.—Rare at Orient.
*C. odoratum* (Muhl.) Britton.
*Doellingeria umbellata* (Mill.) Nees.

*Erechtites hieracifolia* (L.) Raf.—Two forms occur, hairy and smooth plants; specimens in N. Y. State Herbarium.
*Erigeron annuus* (L.) Pers.
*E. philadelphicus* L.
*E. pulchellus* Mx.
*E. ramosus* (Walt.) BSP.
*Eupatorium aromaticum* L.—Southold.
*E. hyssopifolium* L.—Southold.
*E. maculatum* L.—Orient in low grounds.
*E. perfoliatum* L.
*E. purpureum* L.
*E. verbenaefolium* Mx.
*Euthamia graminifolia* (L.) Nutt.
*E. tenuifolia* (Pursh) Greene—Southold.
*Galinsoga parviflora* Cav.—Orient along roads; the var. *hispida* DC.
*Gnaphalium obtusifolium* L.
*G. uliginosum* L.
*Helianthus annuus* L.—Rarely escaped at Orient.
*H. divaricatus* L.
*H. giganteus* L.
*H. strumosus* L.
*H. tuberosus* L.
*Lacinaria spicata* (L.) Ktze.—Orient, a colony of 50 or more plants; specimens in N. Y. State Herbarium.
*Leptilon canadense* (L.) Britton.
*Mariana mariana* (L.) Hill—Orient in a garden; specimens in N. Y. State Herbarium.
*Onopordum Acanthium* L.—More common on Gardiner's Island than at Orient and East Marion; specimens in N. Y. State Herbarium.
*Pulchea camphorata* (L.) DC.
*Rudbeckia hirta* L.
*Senecio aureus* L.—Rare at Orient.
*S. vulgaris* L.—Rare in cultivated fields.
*Seriocarpus asteroides* (L.) BSP.
*Solidago altissima* L.
*S. aspera* Ait.—Reported in N. Y. State Mus. Bull. 139: 30. 1910.
*S. bicolor* L.
*S. caesia* L.
*S. juncea* Ait.—Plants variable.
*S. nemoralis* Ait.
*S. odora* Ait.
*S. rugosa* Mill.—The broad-leaved form and the form with small leaves.
*S. sempervirens* L.
*S. serotina* Ait.—Orient in swamps.
*S. ulmifolia* Muhl.
*Tanacetum vulgare* L.
*Vernonia noveboracensis* (L.) Willd.—Orient.

## NEWS ITEMS

Among the botanical societies that will hold meetings in Philadelphia during the Christmas holidays are: Botanical Society of America, Society of American Bacteriologists, American Phytopathological Society, American Fern Society and the Sullivant Moss Society.

On Monday evening, December 14, at the meeting of the New York Academy of Sciences, a symposium on Porto Rico was held at which reports on the Academy's exploration of that island were heard. Dr. N. L. Britton, Dr. Marshall A. Howe, and Dr. N. Wille spoke on the botanical features. The latter left for Porto Rico on December 19 to study the fresh-water algae.

We learn from *Science* that Professor J. C. Bose, of Calcutta, known for his work in plant physiology, is in this country. He is to be in the east until January 11, on which date he addresses the New York Academy of Sciences, and before which time he will speak at various universities and to scientific bodies. During the latter part of January he is arranging a trip to several middle western universities. On Monday, December 7, Dr. Bose spoke at Columbia University on "Physiological Response in *Mimosa*."

Dr. Hally D. M. Jolivette, formerly instructor of botany in the State College, Pullman, Washington, has recently been appointed a scientific assistant in the office of pathological collections and inspection work, department of agriculture.

A *Joint Committee on Standards for Graphic Presentation* has been formed by the appointment of members from a number of learned societies. Botanists who have suggestions to offer should communicate with Dr. J. Arthur Harris, Station for Experimental Evolution, Cold Spring Harbor, Long Island, N.Y.

The flora of Southhold and Gardiner's Island which has occupied most of the November and December issues of TORREYA has been reprinted in pamphlet form. Copies may be procured from Mr. S. H. Burnham, R. F. D. No. 2, Hudson Falls, N. Y., at twenty-five cents each.

# INDEX*



* New names and final members of new combinations in bold face type. In the Flora of Southold and Gardiner's Island, occupying most of the November and December issues, only family names are indexed.—Ed.

# The Torrey Botanical Club

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their papers appear, will kindly notify the editor when returning proof.

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# OTHER PUBLICATIONS

OF THE

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## (1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 40 published in 1913, contained 712 pages of text and 26 full-page plates. Price $3.00 per annum. For Europe, 14 shillings. Dulau & Co., 37 Soho Square, London, are agents for England.

Of former volumes, only 24–40 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–40 three dollars each.

Single copies (30 cents) will be furnished only when not breaking complete volumes.

## (2) MEMOIRS

The Memoirs, established 1889, are published at irregulas intervals. Volumes 1–13 are now completed; Nos. 1 and 2 of Vol. 14 have been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

**(3) The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

DR. BERNARD O. DODGE
Columbia University
New York City