TORREYA

A BI-MONTHLY JOURNAL OF BOTANICAL NOTES AND NEWS

John Torrey 1796–1873

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

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THE TORREY BOTANICAL CLUB

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2587 Sedgwick Ave.
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TORREYA

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Dr. John Torrey in the Catskills

Raymond H. Torrey

An acquaintance established by correspondence, between the writer and Mr. Franklin Benner, of the Franklin Benner Land Company, of Minneapolis, Minn., who wrote to inquire if I were related to Dr. John Torrey (which I am not, or at least only very distantly, by way of Captain William Torrey, our progenitor in America, who settled in Weymouth, Mass., in 1640) has brought to me from Mr. Benner, an autograph letter, written by Dr. Torrey, from Princeton, N. J., July 22, 1844. This letter was to Robert Benner, 33 John Street, New York, regarding a trip which they and others proposed to make to the Catskills, for botanical collecting.

Mr. Benner, whose father Robert Benner married a niece of Dr. Torrey, writes as follows concerning the letter:

"In looking over some old correspondence I came across some old letters to my father, and I thought perhaps you or the Society would like to have an autographed letter from him. The subject matter of these letters was the trip to the Catskill Mountains, for the study of the botany of that region, as Dr. Torrey was then preparing a monograph of the flora of that region published in the geological survey of the state. They spent some time in the Catskills and my father joined them. While on that expedition they found a huge boulder some ten or fifteen feet in diameter on the top of 'Round Top' and they spent nearly a week digging away the ground underneath, and finally, when they had it loose enough, they started it down the mountain with levers and it did not stop until it got to the bottom cutting a swathe through all the forest in its way. Whether this item pertains to the study of Botany, I do not know, but evidently it amused the botanists. On this trip my father met for the first time Dr. Torrey's niece, whom he later married, and who was my mother."

Round Top is presumably the summit now called by that name, about 3500 feet above sea, south of Haines Falls, and northwest of the slightly higher elevation known as High Peak, which the Torrey Botanical Club visited in October 1930 on a field trip.

Dr. Torrey's letter is as follows:

"Princeton, July 22nd, 1844.

My Dear Sir:

I thank you for your letter of the 19th inst. and for the kind offer it contains, of conducting me through the more interesting regions of the Catskill range. If I go, (and I shall endeavor to do so) it must be the first week or two in August, as I have engaged to give some lectures here, to commence about the 10th or 12th of that month. I think that Prof. Bailey of West Point would be glad to go, though I fear he will not be able to clamber about the hills as well as we. I have long promised one of my daughters (a young girl of 15) a trip to the Catskills. Do you think she would be able to reach the Round Top? We might be able to engage a stout man to carry luggage, provisions, etc. Prof. Bailey talked of camping out, and he could bring with him a very good tent. What say you to this? I will write to him immediately and if you and he can go about the beginning of August, we might as well make our arrangements at once. If it would be impracticable to take my daughter, please let me know soon.

Yours very cordially,
John Torrey

Robert Benner, Esq.

Plants recently established in the San Francisco bay region

Ira L. Wiggins

In the truck gardening district of the Santa Cruz Peninsula a few miles south of San Francisco, California, the representatives of the introduced flora outnumber the native plants, at least in number of specimens if not in species. Most of these aliens are weeds that add nothing to the beauty of the region and cause the farmers considerable trouble at planting and cultivating time. Not one of these farmers intentionally introduces a plant which he knows will increase the difficulty of keeping his fields clean, nor does he welcome news of such an introduction. Unfortunately the farmer seldom knows when some insignificant seedling, appearing at the edge of the compost pile or along a drive where hay from outside the state has been hauled, may be the forerunner of a troublesome crop of weeds. Thus many undesirable plant aliens become established before anyone recognizes their potentialities for harm.

But occasionally some particularly vigorous garden plant escapes and becomes established along roadsides, streams and irrigation ditches or in uncultivated fields. This sort of plant seldom becomes a serious menace to the farmer's peace of mind, and frequently adds enough to the beauty of the country side to warrant putting up with some inconvenience incurred with its presence.

A plant of each type has recently gained a foothold in the rich soil of the peninsula and both bid fair to become permanent members of our naturalized flora. Along the Skyline Boulevard, between Colma and the ocean, *Oxalis cernua* has established itself in several fields so thoroughly that the masses of yellow flowers brighten the whole hillside and attract the attention of motorists who stop to pick huge bouquets. Sometimes a Japanese florist may be seen picking the flowers to sell in his roadside booth.

Oxalis cernua Thunb. is a native of South Africa, but is used extensively in California as a garden ornamental. Although it escapes at a number of places throughout the state it does not seem to do as well at any of these localities as it does near Colma. It is not at all likely that it will become a bothersome weed as the taproot is fleshy, penetrating the soil to a depth of a few inches only, and an ordinary plowing would kill most of the plants disturbed. It is lamentable that more of our introduced plants do not add to the beauty of the country instead of increasing the farmer's woes.

In Pedro Valley, a few miles south of Colma, *Mercurialis annua* L. is well established in an artichoke field thirty or forty acres in extent. The entire field is pretty well infested and the pistillate plants set an abundance of seed. It is difficult to foretell how troublesome this weed may become, but the history of other European weeds transplanted to America and the prolific seeding propensities of *Mercurialis* bode ill for the truck farmers of the district.

This weed was reported in the United States for the first time, so far as I am aware, in 1856, when Dr. Gray[1] listed it from Boston, and Charleston, South Carolina. It may have been present in other parts of the south also for in 1901 Mohr wrote of its presence in Alabama, "Mobile, ballast weed, observed for over 30 years, common about the shipping."[2] A few years later Britton and Brown gave its range as, "In waste places, Nova Scotia to Florida, Ohio and Texas."[3] It seems to have been making steady progress westward and has finally reached the Pacific Coast. That it did not reach California much earlier can probably be accounted for by recalling that the plant must depend almost entirely upon human agencies to distribute the seed.

It is to be hoped that *Mercurialis* will prove less troublesome to the farming areas of California than has the introduction of such weeds as *Lepidium draba*, *Tribulus terrestris*, *Hordeum murinum*, and *Centaurea solstitialis*.

DUDLEY HERBARIUM,
STANFORD UNIVERSITY,
CALIFORNIA.

[1] Gray, Asa, Man Bot. 393. 1856.

[2] Mohr, Charles, Plant Life of Alabama 594. 1901.

[3] Britton, N. L. & Addison Brown, Ill. Fl. N. U. S. & Can. ed. 2. 2: 460. 1913.

The distribution of Potamogeton crispus in North America

Leo A. Hanna

A short time ago an article in Torreya by Professor Leo R. Tehon, Illinois State Natural History Survey, was read with great interest by the writer. The article dealt with the range of *Potamogeton crispus* in North America and presented a theory that accounted for the extension of its range through the activities of certain aquatic birds. The evidence advanced seems plausible indeed. That aquatic plants are transferred from one situation to another by birds is unchallenged.

It is also true that various pond weeds, of which *Potamogeton crispus* is but an example, are often found far out of the range of the ordinary routes of migration followed by birds. As an example of such a case Mr. Tehon cites a station in Oregon from which *Potamogeton crispus* has been reported. No doubt he can add others. Dr. R. J. Gilmore of Colorado College and the writer have collected it at stations in the Medicine Bow mountains of Wyoming, viz. lakes Swastika and Irene near the University Camp. The writer is certain that he has observed it in other situations on the Laramie Plains as well as in the mountains.

The general presence of *Poa pratensis* and many other "naturalized" plants in all parts of the Medicine Bow mountains as well as in other mountainous regions of the West leads the writer to follow Dr. Aven Nelson of the University of Wyoming and others who maintain that it is probable that some of the species that are supposed to have been introduced into this country are in reality indigenous to the Rocky Mountain region.

It is possible that *Potamogeton crispus* has a much broader range than many of us at first assumed. In fact, it may actually be indigenous to parts of North America.

University Camp,
University of Wyoming

A new Hydrocotyle from Western New York

EDITH FETHERSTON

The word *Hydrocotyle* is from the Greek, meaning water and cup. Plants of this genus thrive in moist places and the roundish leaves have a cup-like depression in the middle: they are creeping perennials.

While exploring in July, 1926, I found an unusual *Hydrocotyle* along a small stream in a virgin forest, one mile north of Washington Hunt in Wyoming County, New York, and just a few miles east of Letchworth Park.

My *Hydrocotyle* was prostrate, rooting at the nodes. The peduncle was short, about 1 cm. long, the flowers minute. The petioles were slightly hairy and varied from 1 to 9 cm. in length. This was also the height of the plant above the ground. The leaves were peltate and there seemed to be some proliferation of the flowering stalk. The leaf was centrally attached and shining, about 2 cm. across, in appearance like a small umbrella, 7 to 9 lobes very slightly indented.

There were scale-like stipules at the base of the petioles: the flowers were very small, cream colored in umbel-like clusters opposite the leaves; sometimes one umbel appearing above another; calyx-teeth minute; petals entire, concave. The fruit was strongly compressed about 2.5 mm. high and 3 mm. wide, slightly notched or subcordate at both ends, intermediate ribs were quite evident and often slightly corky, the dorsal one was acute.

In the Summer of 1930 I gave a living plant of the *Hydrocotyle* to Mr. M. S. Baxter upon the advice of Professor Guy A. Bailey of the Geneseo Normal School, Geneseo, N. Y. Mr. Baxter was unable to identify my *Hydrocotyle.* At the same time I gave several living specimens to Mrs. W. Austin Wadsworth, Geneseo, Livingston County, N. Y. and in June 1931 in visiting the gardens of Mr. Baxter and Mrs. Wadsworth, I found my *Hydrocotyle* not only living but increasing in number, and, especially in Mrs. Wadsworth's garden, spreading in quite a remarkable way.

On September 15th, 1930, I brought all my remaining specimens to Pittsburgh and learned from Dr. O E. Jennings, (Professor of Botany of the University of Pittsburgh and Editor-in-Chief of the Bryologist), that my plant was not *Hydrocotyle americana*, although the flower resembles it and that it was not *H. interrupta* or *H. verticillata*. Comparisons were made also with specimens from various countries in the herbarium of the Carnegie Museum, and no corresponding type was discovered.

Upon the advice of Miss Hilda Loines in July, 1931, I sent a living flowering specimen of this *Hydrocotyle* to Mr. Montague Free, Horticulturist of the Brooklyn Botanic Garden. Mr. Free and Dr. H. K. Svenson, Assistant Curator of Plants of the Brooklyn Garden, were unable to identify it.

On September 2, 1931, I gave a pressed *Hydrocotyle* in flower and a living one in fruit to Dr. O. E. Jennings for the Herbarium of the Carnegie Museum, Pittsburgh, Pennsylvania.

From the original plant found in 1926, Mr. Baxter has several plants, Mrs. Wadsworth many, there is one plant in the Brooklyn Botanic Garden, and two pressed specimens in the Herbarium of Carnegie Museum, Pittsburgh, one of these in flower, and one in fruit, and I still possess eight living plants in my garden in Pittsburgh.

The plant has been much admired and is greatly prized by those who have specimens. It is easy of culture if planted in a naturally wet situation or where the ground is kept constantly moist and the plant and ground around it left undisturbed. I use peat moss as an aid in keeping constant moisture, and always plant in the shade.

After having tried for five years to identify the plant and after having consulted books and authorities, I believed I had discovered a new species of *Hydrocotyle*. Dr. Jennings has confirmed my conclusion that the plant is a new species and has furnished the following technical description of the plant:

Hydrocotyle Fetherstoniana Jennings, sp. nov.

Planta herbacea; petiolis sparse et minute hirsutis; fructu basi et apice plus minusve emarginato, costis intermediis saepe leviter suberosis.

Small perennial herb. Stem creeping, rooting at the nodes, sparsely branching. Petioles erect, slender, 1.5–9 cm. long, sparsely and minutely hirsute; leaf-blades peltate, suborbicular to oval, up to 2 cm. in diameter, shallowly and crenately about 8- to 10-lobed, glabrous. Peduncles about 1 cm. long, usually bearing an apical cluster of 2–4 flowers with often 1 or 2 others at an imperfect whorl 1–2 mm. below the apex. Pedicels about 0.5 mm. long. Fruit 2.5 mm. high, 3 mm. wide, more or less distinctly emarginate or subcordate at both ends; intermediate ribs evident, often slightly corky, the dorsal rib acute.

Differs from the Coastal Plain species (*H. verticillata* Thunb.), to which it is most closely related, by having petioles minutely hirsute instead of glabrous, by fruit more or less emarginate at both ends, and by having the intermediate ribs often somewhat corky.

Named in commemoration of the garden of Mrs. John T. Fetherston, to which the plant has been transplanted.

Type: From plants growing in the Fetherston garden, Pittsburgh, Pennsylvania, September 2, 1931, originally collected in moist woods along a stream in virgin forest, one mile north of Washington Hunt, Wyoming Co., N. Y., and a few miles east of Letchworth Park, by Edith Fetherston, July, 1926.

The type specimen has been placed in the herbarium of the Carnegie Museum.

PITTSBURGH, PA.

BRIEFER NOTES

Potentilla tridentata on Schunemunk Mountain

A small, and not very thrifty looking stand of *Potentilla tridentata*, on the south end of Schunemunk Mountain, in Orange County, N. Y., was called to the attention of the writer, by Mr. Louis W. Anderson, of Elizabeth, N. J., while we were on a walk of the New York Section of the Green Mountain Club led by Mr. H. W. Gorham. There were scarcely a dozen plants, in all. They grew in crevices in the conglomerate ledges on the summit of Schunemunk, The elevation of the small colony was about 1380 feet.

I had never seen *Potentilla tridentata* on Schunemunk before, although its highest point, 1695 feet, is higher than the stand of the plant on Mount Beacon, 1640 feet, east of the Hudson, and about seven miles east of Schunemunk. After noting the occurence on the south end of the mountain, we searched other likely points, up to the highest, but found no more. The higher points on the north end have been severely burned over many times, and probably original growth has been destroyed, and the open coarse conglomerate ledges now bear little but a great variety of interesting lichens, including the boreal lichens *Cetraria islandica*, var. *crispa* and *Stereocaulon paschale*, other glacial relicts probably.

This adds another station for this interesting northern plant, extending the number of boreal islands sustaining it from the Taconics and Catskills along the higher Appalachians to northern Georgia. The Schunemunk *Potentilla* stand is very scanty but may persist if it escapes intense burning, and it may survive destruction by fire as there is little else on its location to burn but short grass.

R. H. T.

Marchantia polymorpha after forest fires

An interesting botanical phenomenon observed by the writer, during the past autumn, on the south end of Kittatiny Mountain, in Warren County, N. J., is the appearance there of large, widely spreading mats of the liverwort, *Marchantia polymorpha*, upon thin soil, barely covering the ledges, after an almost complete destruction of the previous vegetation by an extensive forest fire in the preceding autumn. About 3,000 acres of the top of the mountain was burned over in windy, dry weather, after a long drought and about every living thing was destroyed. Trees and shrubs with a few exceptions, were wiped out over considerable patches of thin soil. Soon after the fire, in October, 1930, the writer noted that seedlings of *Corydalis sempervirens* and *Geranium carolinianum* were coming up and a year later they were well re-established. Dense stands of a tall withered herb resembling an *Amaranthus* or an *Acnida*, not determined; *Epilobium angustifolium*, several asters, a goldenrod or two and the bracken fern, appeared over the burning this year. But where there were still open spaces of burned humus, and even in spots somewhat shaded by the tall thick herbaceous growth, the ground was covered with mats of the strongly lobate thalli of *Marchantia polymorpha*. In October, the dense tiny forests of the archegonial stalks, like umbrella ribs without a cover, and the less conspicuous but equally numerous antheridial stalks, made a pretty sight. I have seen *Marchantia* following a forest fire on another site, on Long Mountain in the Harriman State Park, where it persisted in a large area for two or three years but has lessened in numbers since taller herbaceous and shrubby vegetation and tree sprouts have come back. What is the reason why *Marchantia* likes such burned over areas? It probably helps to renew the humus and prepare the soil again for other plants.

RAYMOND H. TORREY

The local herbarium, New York Botanical Garden

This local herbarium, maintained as a special one, covers the "field" of the Torrey Botanical Club, that is the region within a radius of 150 miles of New York City. Within the past year it has been entirely reorganized, and the very extensive collections are now available for study and reference. Fortunately through the munificence of the late W. C. Ferguson of Brooklyn it has been possible to arrange this collection in modern insect proof and dust proof steel cases; these have been installed in the north wing, main floor, of the Museum Building.

The local herbarium has been more than doubled in size during the past year through the accessioning and mounting of the very large E. P. Bicknell herbarium, presented by Mrs. Bicknell several years ago; the W. C. Ferguson herbarium of Long Island plants, estimated to contain about 10,000 specimens, bequeathed to the Garden in 1930; the K. K. Mackenzie herbarium, presented, 1931, particularly rich in material from northern New Jersey; the herbarium of the late Waldron de Witt Miller, presented, 1931, and extensive recent collections presented by Mr. H. M. Moldenke. This collection, particularly important to those interested in the study of our local flora, now contains approximately 50,000 mounted specimens. It is available to any qualified individual who is interested in field work in botany, or in identifying specimens collected from within the area covered by it. To make the local herbarium more usable, two copies of Taylor's "The Flora of the vicinity of New York: A Contribution to Plant Geography" were clipped and the individual entries were pasted on the specimen covers, the keys to species being pasted on the inside of the genus covers. Members of the Torrey Botanical Club, of the Biology Teachers Association, and others interested in this field are invited to make use of the excellent facilities that are now available at the Garden through the existence of this important assemblage of material.

BOOK REVIEWS

Cope: Master Naturalist[1]

The late Professor Cope was not a ranking botanist, although in early life he taught botany along with zoology at Haverford College. He was brought up on a country estate and worked summers on a farm; where, as at school, he early took to botany and became an enthusiastic and well informed amateur.

[1] *Cope: Master Naturalist.* The Life and Letters of Edward Drinker Cope With a Bibliography of his Writings Classified by Subject. A Study of the Pioneer and Foundation Periods of Vertebrate Paleontology in America. Henry Fairfield Osborn, with the co-operation of Helen Ann Warren and others. Illustrated with Drawings and Restorations by Charles R. Knight. 1931. Princeton University Press, Princeton, New Jersey. 740 pp. $5.00.

This love of plant life as a part of natural scenery, of trees and flowers, and an eager interest in systematic botany persisted and, later on, developed toward paleobotany, for Cope became one of the greatest paleontologists of the world. While primarily interested in paleozoology he was widely and exactly informed concerning fossil plants, and utilized the evidence of paleobotany in checking his comparisons and identifications of geological horizons. Many allusions to wild flowers occur in his delightful letters (the names often misspelled by him or the editors); and especially to trees and forest growths, in themselves, and as a part of the ecological environment of living animals. Some of Cope's descriptions of vegetable life and growth amount to "literature". Incidentally botanists and nature lovers generally will be interested in the education, explorations, discoveries, achievements, and interpretations, of one of America's leading field, systematic, and philosophical biologists. One who lived much on the plains and prairie deserts, in the mountains, in swamps, or the tropical Mexican jungles. He was an original evolutionary thinker, and a keen observer and reporter of plant life as he found it. Incidentally, the reviewer recalls Cope most characteristically with a floral boutonniere in his coat lapel. Professor Osborn has given us a delightful and dependable biography of this great master.

William Harper Davis

The International Address Book of Botanists.[2]

This has been referred to several times in Torreya as in course of preparation. The book was prepared in accordance with a resolution passed by the Fifth International Botanical Congress at Cambridge, England, in 1930. The work was done by a committee consisting of Dr. L. Diels, Direktor, Botanischer Garten und Botanisches Museum, Berlin-Dahlem, Germany, Dr. E. D. Merrill, Director-in-Chief, New York Botanical Garden, New York, and Dr. T. F. Chipp, Royal Botanic Gardens, Kew, England. The short preface, which is printed in English, French, and German gives the scope of the book. "The arrange-

[2] International Address Book of Botanists. Published for the Bentham Trustees by Bailliere, Tindall and Cox, London. 1931. XV+605 pages. 12 s. 6d.

ment is by countries alphabetically. The entries under each country are, as far as practicable, in the language of the country. At the beginning an index gives page reference to each country. At the end there is an index with a page reference to each personal entry.

The entries under each country include:

(a) Societies with their postal addresses.

(b) Institutions wholly or chiefly botanical, their addresses and departments; educational institutions having separate departments dealing with botanical teaching and research.

(c) The surname and initials of Botanists, both professional and amateur, with information as to their offices and professional qualifications, their postal addresses, and their special botanical interests."

In the index to countries some 130 countries are listed, in some there is only one name mentioned, lonely places for botanists, as in Angola, Liberia, and Zanzibar. The list of institutions and botanists in the United States requires 148 pages. Probably the list of amateur botanists is more complete for the United States than for many other countries. Some 22,000 names of individuals are listed in the book.

George T. Hastings

Types of Humus Layer in the Forests of Northeastern United States. By L. G. Romell and S. O. Heiberg. Ecology *12*:567–608, 1931.

The paper represents a first systematic effort of applying outside Europe the principles and method laid down by P. E. Müller in his classical studies on natural types of humus layer. It is also a contribution to the question of classification and nomenclature of forest humus layers in general. After a critical review of the different proposals of classification, the authors conclude that Müller's system fits the natural conditions best. That this holds true for American conditions is indicated especially by the flora characteristic of different types of humus layer. A fundamental point of Müllers system is that the classification applies to the entire humus layer (i.e., the top layer of soil, owing its characteristic features largely to its humus content; no matter whether this content is high or low and whether the humus is "incorporated" or not). The authors strongly oppose the tendency inaugurated by Ramann to classify the humus alone, which is only one constituent of the biological unit. Müller's two main types or groups are retained. They are characterized morphologically, as the Scandinavian school has always done, contrary to the tendencies in Germany, and some types with unincorporated humus are included in the mull group. Specific types listed are crumb mull, grain m., twin m., detritus m., root duff, leaf d., greasy d., and fibrous d. This list is not supposed to cover every variation possible, but is just an enumeration of conditions found to occur within the region studied sufficiently regularly and characteristically enough developed to warrant their being recognized as types. The crumb mull is the classical prototype of the mull group, inhabited by large earth worms. The types greasy and fibrous duff have been taken over from the Danish forester Juncker.

The distribution of the types within the region is discussed. Ground-water conditions seem to be a particularly important factor locally. Some plants are listed as indicators of mull and of duff. The most valuable hardwood species of the region seem to be among the mull preferring plants.

Data are presented on nitrification, pH and lime content of the different types. Contrary to European experience, nitrification was found in the laboratory within all types, even pronounced duffs, and down to a pH of 2.9 which was close to the lowest pH value encountered in any sample, whether nitrifying or not. Still, a great difference was found between the types, the mull samples being practically all nitrifying, whereas the majority of samples of pronounced duffs did not nitrify. Storage tests yielded surprisingly high values for root duff and other intermediate forms, as compared to the crumb mull, while inoculation tests gave results agreeing better with the expectations from previous experience and with the indications furnished by the vegetation. The puzzling results of the storage tests are ascribed to a "sampling effect" to be discussed in a later paper.

The main data are given in concentrated table form on eight pages. A mimeographed Appendix of 29 pages, distributed by the authors, gives descriptions of 17 chosen localities including vegetation and soil notes, Bouyoucos analyses, etc.

L. G. Romell

FIELD TRIPS OF THE CLUB

Sunday December 13, Tomkins Cove to Bear Mountain

A party of twelve members and guests made the field trip on Sunday, December 13, from Tomkins Cove to Bear Mountain, part of the time in heavy rain, but found many objects of botanical interest which made the weather of no consequence. Perhaps the most notable discovery was a large colony of the Purple Cliff Brake, *Pellaea atro-purpurea*, growing on a stone wall, on the path from Tomkins Cove station up to the state highway. The wall was built of blocks of granite and gneiss, and the fern did not grow on the blocks, but on the mortar joining them. The mortar, containing lime, supplied the calcium which is usually required by this species. Although it is said to grow on gneiss and trap rock, the writer has never seen it in this territory except on limestone in western New Jersey, the Wallkill Valley and the Harlem Valley in New York. It does not occur on the granites and gneisses in the Hudson Highlands. How it was established on the mortar of this wall, which is perhaps fifty years old, is an interesting speculation. Some such chance as established the colony of Walking Fern, *Camptosorus rhizophyllus* on a limestone boulder, transported by the glacial ice from the Wallkill Valley to the shore of Upper Cohasset Lake, in the Harriman State Park, possibly transportation of spores on the feet of birds, may have started the Purple Cliff Brake colony at Tomkins Cove. There are at least fifty plants on a length of 100 feet of wall, most of them on the inside, facing the east, but probably those on the outside have been plucked out by passersby.

Lichens, which were the particular objective of this trip, were numerous and in fine condition, plump and fresh looking by absorption of moisture from the rain. One of the most striking was the flesh pink *Baeomyces roseus*, of which colonies covering several square yards were seen, one of the largest being on the dump of the long abandoned Doodletown iron mine, another on a loamy bank beside the Seven Lakes Drive in Bear Mountain Park. This lichen, looking like a timy pink mushroom, is a lovely thing.

Cladonias were numerous. The scarlet fruited *Cladonia cristatella*, in the forms *Beauvoisii*, with naked podetia; *vestita*, with densely squamulose podetia, and *ramosa*, with extremely branched podetia, were common. These "British soldiers," so-called because their scarlet apothecia suggested the bright uniforms of the redcoats in the American Revolution, were to be seen along the route followed in October, 1777, by the British force which climbed over Dunderberg Mountain to storm Forts Clinton and Montgomery. The brown-fruited *C. mitrula* was occasional. The Reindeer Mosses, *Cladonia rangiferina* and *alpestris*, were numerous, also the somewhat similar *C. furcata*. Among the cup bearing Cladonias, *C. chlorophaea* and *C. pyxidata* were common and on the Doodletown mine dump was found a rarer form, *C. multiformis*, with greatly variegated smaller cups with fantastic proliferations. The horned forms, *C. bacillaris* and *macilenta*, were everywhere.

The Rock Tripes, *Umbilicaria pustulata* and *Gyrophora Dillenii*, were conspicuous on the higher ledges on West Mountain and the Timp. *Parmelia conspersa*, our most common lichen, was everywhere, also *P. saxatilis* and *P. tiliacea*, all on rocks; and *P. caperata*, on trees. The crustose rock lichens, especially *Lecidea albo-caerulescens*, *Biatorella clavus*, Rhizocarpons and Verrucarias were numerous; and in Doodletown Brook, the aquatic *Dermatocarpon miniatum aquaticum*.

RAYMOND H. TORREY

SUNDAY, NOVEMBER 29

A dozen members of the Club and friends met at the Nepperhan station of the Putnam Division in Yonkers to study twigs and the remains of fall flowers. The ground was still covered with snow from the preceding Friday, but the temperature was mild. Following Tuckahoe Road to the Yonkers Nursery, little was found but the common roadside weeds. One vine of *Rhus toxicodendron*, however, so completely clothes a dead tree that the vine itself appears to be a tree. Opposite the nursery is a fine stand of *Acer Negundo*, some of which were in fruit. In the growth under these trees one plant of *Lepidium virginicum* was found which still had white flowers at the top of the raceme. From this point our route followed the road to Grassy Sprain Reservoir, ascending a steep bank into the wood just south of the dam. On the top of this hill is a station for *Silene pennsyl-*

vanica but no trace of the plant could be found at this late date. This site also furnishes a splendid picnic place, overlooking the lake and valley, but the view this time was dull with haze. The wood extending north from here is rich in a variety of woodland plants, but little remained besides the woody things, mosses, and Christmas ferns. With the kind permission of the Boyce Thompson Institute we continued through their arboretum. Here three more plants were observed in bloom: in a low spot near the reservoir a low-growing form of *Bidens*; then following one of the paths through a little ravine, a few plants of *Lobelia inflata* still bearing half opened flowers at the top; and later *Hamamelis virginiana* on the bank above Sprain Road. This concluded the botanical part of the trip. The route is pleasant to follow at any time of year, and in late November it was interesting to see how much of the fall flora could be recognized in the dry and withered state. The unusually late blooming of the four species mentioned was a real surprise.

HAROLD H. CLUM

PROCEEDINGS OF THE CLUB

Special Luncheon October 26, 1931

The special luncheon for Doctor Jakob Lange of Copenhagen, at the American Museum of Natural History, was attended by about forty members of the Torrey Botanical Club and the New York Micological Society.

During the luncheon Doctor Lange gave an entertaining address telling of the confusion in the naming of species of mushrooms, common to both the new and the old world, and gave particular emphasis to the importance of accurate color plates showing the different species as they are in life. He strongly advocated that a set of colored pictures, both the American and European forms, be prepared and published as rapidly as possible as neither herbarium material nor descriptions have proven entirely adequate.

There were a large number of special exhibits of fungi and of pictures of mushrooms. Mrs. Eliza E. Blackford made a very fine exhibit of her own paintings of mushrooms and Doctor Lange had a remarkably comprehensive collection of colored pictures of European fungi. Miss Margaret McKenny showed some interesting photographs and a number of members brought in fresh specimens of a large number of species which Doctor Lange examined and identified.

Respectfully submitted,
Forman T. McLean
Secretary

Meeting of October 30, 1931

The meeting was called to order by President Sinnott at 8:15 P.M. in the lecture room of Schermerhorn Hall, Columbia University. The hall was practically filled with visitors, the estimated number exceeding two hundred. All official business of the club was dispensed with.

Professor Georg Tischler of Kiel University talked on "The Role of Hormones, Growth-Promoting Substances and Mitogenetic Radiations in Plant Development". He gave an interesting and comprehensive talk emphasizing the importance of some component of dead or dying cells in promoting cell division. He drew comparisons from a wide field of research for his discussion and showed that such a great variety of stimula could act as growth promoters, that his listeners were led to question at the end of his talk the use of the term hormones for the factor or factors responsible. However, whatever ones feelings might be concerning the conclusions drawn, the observed facts concerning these phenomena were eloquently and vividly presented by Doctor Tischler, and the members of the Torrey Botanical Club are deeply indebted to Columbia University and the Institute of Arts and Sciences for their cooperation in making this lecture such a decided success.

Forman T. McLean
Secretary

Meeting of November 18,1931

The meeting was called to order by President Sinnott at 3:30 P.M. at The New York Botanical Garden with thirty-two members present. Minutes of meetings of May 20, October 6, October 26 (special luncheon), and October 30 were read by the Secretary.

The deaths of Dr. P. A. Rydberg and of Professor C. H. Kauffman were announced and the regret of the club expressed.

The following were unanimously elected to membership in the Club: Professor Vernon H. Brooks, School of Parmacy, St. Johns College, Brooklyn, New York; Miss Dolores J. Fay, Newark, New Jersey; Mrs. John T. Fetherston, Pittsburgh, Pa.; Mr. Charles Greenberg, Bronx, New York City; Miss Anna Hecht, Brooklyn, New York; Mr. Samuel Kaiser, Brooklyn, New York; Mr. Robertson Pratt, Columbia University, New York City; Miss Ethel S. Schwartz, New York, N. Y.; and Miss Gertrude R. Twomey, Whitestone, Long Island, N. Y.

The meeting last year on Exhibits and Demonstrations was so successful for biology teachers and others that it was suggested that we have a similar one this year. Dr. Merrill very kindly offered the facilities of The New York Botanical Garden for such a meeting and members of the Association of Biology Teachers accepted this invitation with enthusiasm. This meeting will be held on the 19th of December with exhibitions by the New York Botanical Garden, Columbia University, and others and demonstrations of new ideas by teachers. Each high school is urged to bring in at least one demonstration. A motion was made and seconded that the time of our second meeting in December be changed to December 19.

Dr. Karling announced that there was no money in the fund for refreshments and said he would be willing to accept contributions after the meeting.

Mr. Harold C. Bold of Columbia University gave a very interesting talk on "Cytological Studies in Chlorophyceae."

Mr. R. S. Williams, Administrative Assistant, at The New York Botanical Garden gave an interesting talk on "Some Common Mosses and How to Collect Them."

"The word common, as here used, might apply to those mosses growing abundantly and widely scattered over the earth, or only to those growing in the vicinity of one's home. Some of the latter will be considered first. Mrs. Britton and I began collecting mosses in The New York Botanical Garden early in November, 1899 and in the next few years obtained some seventy-eight species, mostly common and well known over temperate North America. Today, owing to grading, tramping over and raking the ground and to the cutting out and burning of underbrush, it probably would be difficult to find half that number and a few species have certainly totally disappeared. Two of the most persistent species, and two of the most widely distributed of the world, for they grow abundantly in both hemispheres from near the arctic to the antarctic circles, were found this morning, existing between the bricks on the walk about the fountain in front of the Botanical Garden Museum. They were *Bryum argenteum* and *Ceratodon purpureus*, but often so depauperate as scarcely to be recognized as mosses. A few other species still surviving near by are *Polytrichum commune*, *Mnium hornum*, *Dicranella heteromalla*, *Bryum caespiticum*, *Webera nutans* and a few hypnaceous, mostly sterile species. Of species that seem to have vanished, I may mention two Sphagnums, *S. palustre* and *S. fimbriatum* and *Buxbaumia aphylla*. Many other species common twenty-five years ago are not to be found at present where they were then abundant, yet may exist in some out-of-the-way nooks."

As to some common mosses of the world, a collection of about thirty species, growing at 10,000 to 14,000 feet altitude in the Himalaya Mountains, included twenty species common in the United States. The recent Robert Bartlett collection of mosses from Greenland, seven packets only, consisted mostly of common mosses of the northern United States. One packet was of especial interest, containing in a compact tuft, nearly three inches square, no less than ten genera of mosses, each represented by a single species, as well as fragments of an hepatic.

In collecting mosses, even an experienced collector frequently does not know just what he is getting. Often a collection is made scarcely large enough to properly represent one species, that is found on closer examination to contain quite a number, but each in such small quantities as to be quite insignificant for future use. It is certainly best to look about a little and not only get the best available specimens but also in sufficient quantity for a few duplicates as well.

In one sense the collecting of mosses is easy because they may usually be found within reach and are mostly readily removed from the substance they are growing on, also they to not need to be pressed out at once for placing in packets. They can be rolled up in paper, carried till one has leisure to sort them over, then moistened if dry, and made up into specimens just as well as if done at once in the field. Various specimens illustrating the species mentioned were shown.

Meeting adjourned at 5:00 P.M.

FORMAN T. MCLEAN
Secretary

MEETING OF DECEMBER 1, 1931

The meeting was called to order by President Sinnott at 8:15 P.M. at Schermerhorn Hall, Columbia University with forty-eight members present.

Miss Alice Aronescu, The New York Botanical Garden, Bronx Park, New York, N. Y. and Miss Katherine Breunich, Bronxville, N. Y., were unanimously elected to membership in the club.

The resignation of Dr. E. W. Olive was accepted with regret.

The committee appointed at the last meeting reported as follows:

WHEREAS, Dr. Rydberg's record as a scientific worker was one of indefatigable industry, marked efficiency, and perfect fidelity to truth, in matters small as well as great, we deplore his death as a great loss to botanical science, while at the same time we contemplate with satisfaction the extent and character of the contributions made to botanical science during his lifetime.

WHEREAS, in his personal life, Dr. Rydberg's attitude and conduct in all matters pertaining to political, social, and religious questions was determined by a fine loyalty to conscience, we mourn the loss of his personal influence in the community in which he lived.

RESOLVED, that we extend our deepest sympathy to the members of his family in their loss of so devoted a husband and father.

E. D. MERRILL
H. H. RUSBY
J. K. SMALL

Dr. Elmer D. Merrill, Director-in-Chief of The New York Botanical Garden gave an interesting talk on "Crops and Civilizations."

The thesis developed was that there is a remarkable correlation between the centers of origin of ancient civilizations and the centers of origin of domesticated animals and cultivated plants, not fully appreciated by many individuals who theorize on the origins of ancient American civilizations, and who insist that the latter were derived from the Old World. The fact was emphasized that every important basic food plant was already in cultivation, and every domesticated animal was already in domestication at the dawn of recorded history; and that the dawn of recorded history long antedates any very high type of civilization. While modern man has greatly improved both his cultivated plants and domesticated animals by breeding in reference to quality, yield, disease resistance, etc. he has done this solely on the basis of the species brought in from the wild and adapted to domestication by his very remote, uncultured ancestors. Outside of the ornamental plants, modern man has domesticated very few economic species chiefly those producing rubber, fibers, and medicines, such as Hevea rubber, Manila hemp, and cinchona; he has greatly extended the culture of others such as coffee, tea, cacao, to meet the demands of modern commerce. He has not, however, added a single species to the list of cultivated basic food plants.

Data were presented from the fields of systematic botany, economic botany, ethnobotany, comparative philology, archaeology, exploration, and history as illustrations of the types of source material on which more or less definite conclusions could be drawn. Thus from pre-Columbian graves in Peru we have very definite information as to the foods used by the Incas and basic to their civilization; from the Egyptian pyramids we gain similar information regarding the foods of the ancient Egyptians; even from charred remains preserved in the lake bottoms in proximity to ancient villages of lake dwellers in Switzerland we gain information regarding the food of this people. The use of comparative philology was illustrated by certain Sanskritic, Chinese, and Aztec names currently used for introduced and cultivated plants in the Philippines, with an explanation based on historic evidence as to when and how these names reached the Philippines. The speaker stressed the point that in investigating this field the worker had constantly to be on guard in reference to certain types of published papers based on preconceived theories, in which only the data supporting the theory were given, while all evidence contrary to the theory were overlooked or ignored; and cited a number of typical cases from the literature, of ethnology and ethnobotany, where the conclusions reached had been definitely shown to be erroneous in reference to the origin and dissemination of important cultivated food plants. The point was made that in no field impinging on the domain of systematic botany were there more pitfalls to be avoided than in this complex one of ethnobotany, particularly the problems associated with early man and the beginnings of agriculture, and hence of civilizations.

The point was emphasized that previous to 1492 not a single basic cultivated food plant, or a single domesticated animal except the dog was common to the two hemispheres; that when European explorers reached America they found here civilizations based on agriculture as in the Old World, but on an agriculture based wholly on plants and animals different from those of the Old World, so different that in practically every case the genera represented in America were unrepresented among the cultivated plants of the Old World. Lists of plants and animals of Eurasian and American origin were given. The botanical and agricultural evidence is that the early American civilizations were developed in America on the basis of a strictly American agriculture, uninfluenced by Old World contacts, a view diametrically opposed to that held by certain ethnologists.

Meeting adjourned about ten o'clock, after which refreshments were served.

FORMAN T. MCLEAN
Secretary

MINUTES OF THE TORREY BOTANICAL CLUB

MEETING OF DECEMBER 19, 1931

The meeting of December 19 in conjunction with the New York Biology Teachers was called for ten o'clock, although members and visitors came individually throughout the day.

An informal gathering was called together by President Sinnott at the Exhibition in the east wing of the Museum Building of The New York Botanical Garden at half past ten and Director E. D. Merrill of The New York Botanical Garden gave a short address stressing advantages and opportunities for biological studies at The New York Botanical Garden, particularly the advantages of the library, of the herbarium and of the living plant collections.

Exhibits were staged by seven of the high schools and other institutions as follows:

Evander Childs High School, under the direction of Mr. Paul B. Mann, staged an exhibit on plant nutrition by Gertrude Twomey, mutations of the Boston fern by L. Eisman, illustrative material useful in teaching biology to blind students by Miss Maude L. Repath, and six demonstrations of microscopic objects prepared and set up by members of Evander's Microscopy Club.

Theodore Roosevelt High School, under the direction of Mr. George T. Hastings, set up flower pollination models.

James Monroe High School set up two exhibits, one by Mr. Joseph Singerman on safety in boiling alcohol and another by John Arvonio on a new cure for rickets.

Thomas Jefferson High School set up an exhibit on growing plants and Japanese gardens.

DeWitt Clinton High School exhibited thirty photomicrographs made by the students.

Haaren High School exhibited cactus gardens.

George Washington High School exhibited twigs of trees and microscopic preparations.

A number of exhibits were set up by Columbia University. Mr. Robertson Pratt showed capillitia of Myxomycetes and the spirospores of a rare group of fungi. Mr. Edwin B. Matzke showed cell shapes and their relation to soap films. Mr. Harold C. Bold showed the fusion of the gametes of Botrydium. Mr. Watkins showed paired chromosomes of Yucca.

Professor William Bonisteel exhibited cinchona bark and terrariums.

The New York Botanical Garden put up some exhibits on evolution and leaflessness in cacti; development of phyllocladia from the combined leaves of Acacia; adaptations to an epiphytic habitat; development of ferns from spores; some odd methods of vegetative propagation; and some valuable plants for school and class work such as *Rhoeo discolor* which was particularly suitable for studies of stomatal movements; the Date Palm which is readily grown from seed, etc.

The Boyce Thompson Institute for Plant Research, under the direction of Dr. William Crocker, showed injury due to ethylene gas on tomatoes and sunflowers, and demonstrated a method for showing transmission of gas through plant tissues; the stimulating effects of ethylene chloral-hydrate on dormant gladiolus corms; the effects of the low temperature stratification on the germination of a number of kinds of seeds of trees and shrubs; the dependence of many kinds of plants on the proper length of daylight for flowering and fruiting; and photographs of Dr. P. W. Zimmerman's work on vegetative propagation, particularly emphasizing the importance of making cuttings of the size and degree of maturity which are best for each kind of shrub.

Dr. R. P. Wodehouse of the Arlington Chemical Company showed examples of his work on pollen grains and pollen grain development.

Dr. A. B. Stout of The New York Botanical Garden showed some interesting types of plant variegation and particularly featured the work of one of his students, Professor Keur of Long Island University, on the Transmissible Virus Mosaic of Abutilons. He also showed microscopical slides of pollen germination, the influence of the pistil on these and some of the peculiarities of the pollen growth in incompatible crosses.

Mr. Max A. Elwert of the Torrey Botanical Club exhibited a very handsome and comprehensive collection of herbarium specimens of plants from the New Jersey Pine Barrens assembled last summer.

Dr. Fred J. Seaver of The New York Botanical Garden showed the mycological publications of the Garden and models of fungi. The New York Botanical Garden also staged an exhibit of rare books in the exhibition hall supplemented by exhibits of interesting historical books in the library. Also a study of miscellaneous publications such as the Journal of The New York Botanical Garden, the Bulletin, Brittonia, Addisonia, etc.

Dr. Ralph C. Benedict of Brooklyn College showed by living plants the remarkable evolution of the Boston fern. Also demonstrations of the variations in the cultivated cabbage, and showed the great value of stems of Kleinia for use in making stem sections for class demonstrations. The living material of Boston ferns, of Hartstongue Fern and of Kleinia were sent by the Brooklyn Botanic Garden.

Mr. Carl Ramsey staged a very beautiful exhibit of his paintings and drawings of the native and exotic orchids, illustrating particularly the highly specialized structures of these plants for insect pollination.

Dr. Forman L. McLean set up a number of paintings of his Sweetglads. Also a number of outlines of the courses offered at the Botanical Garden.

Respectfully submitted,
Forman T. McLean

ENDOWMENT FUNDS OF THE TORREY CLUB

The Committee on the permanent endowment funds of the Torrey Botanical Club presented the following report at the annual meeting of the Club.

1. Isaac Buchanan Fund.

Established in 1893 by a bequest of $500, by Isaac Buchanan, one of the founders, for purposes of the Club (Bulletin **20:** 448; **21:** 530). Principal and interest now aggregate $859.58.

2. Lucien Marcus Underwood Memorial Fund.

Established in 1911 by an initial contribution of $100 by Miss Caroline Coventry Haynes (Torreya **11**: 131–132; **12**: 227) and subsequently increased by her through additional contributions, and by contributions of other members. Interest on this fund was designated for the illustration of papers in publications of the Club. Principal (Treasurer's Report for 1924) $1974.82. Additional contributions since that date, together with accumulated interest, bring this fund to an aggregate of $2895.86.

3. Mary S. Andrews Fund.

Established by a bequest of Miss Andrews, a member, in 1921, $978.88, "for such research work as from time to time shall seem advisable." (Torreya **21**: 35; **22**: 107). Interest has since been added, this fund now aggregating $1441.38.

4. Life Membership Fund.

Initiated in 1929, by provision for life memberships on payment of $100, the interest to be available for purposes of the Club. Six life memberships have now been received, the principal and interest aggregating $636.28.

The total of these four funds, as of Jan. 1, 1932, is thus $5833.10. It is recommended that the policy of adding interest to principal of the funds, pursued since 1924, be continued, until otherwise ordered; that the increase of endowment by gift, by life membership, or by bequest be suggested, and that publicity be given to this report by printing it in the next issue of Torreya.

The funds are at present in two savings banks, as ordered. It is recommended that $5000 be now withdrawn and invested.

N. L. Britton
Helen M. Trelease
Caroline C. Haynes

NEWS NOTES

The newly elected officers of the Botanical Society of America are: President, Dr. George J. Peirce of Stanford University; Vice-president, Dr. Arthur J. Eames of Cornell University; Secretary, Dr. Sam F. Trelease of Columbia University; Editors of the American Journal of Botany, Dr. Lester W. Sharp of Cornell University and Dr. B. M. Duggar of the University of Wisconsin.

At the meeting of the Botanical Society of America in New Orleans the Mycological Section voted to establish an independent society. Dr. William H. Weston of Harvard University was elected president and Dr. H. M. Fitzpatrick of Cornell University, secretary. It was planned to arrange, if possible, with the New York Botanical Garden to have *Mycologia* adopted as the official organ of the newly-formed Mycological Society of America.

Dr. Paul Weatherwax, of the department of botany of Indiana University, left in February on a three months' collecting trip in southern Mexico and Central America. A general collection of grasses will be made and special emphasis will be placed on material having any bearing on the question of the ancestry of Indian corn. (Science)

Mr. George Forrest, one of the greatest plant collectors of the world, died at Tengyueh, Yunnan Province, China early in January.

Compton, 170-acre estate of the late John T. Morris, regarded as one of the country's finest arboretums, is to become the Morris Botanical Garden, School and Museum. An endowment for the arboretum is provided for in the will of Mr. Morris. The estate is close to Philadelphia.

At a meeting of the president and fellows of Harvard College on January 11, it was voted to establish the Botanical Garden in Soledad, Cuba, as a branch of the Arnold Arboretum, to be called the Atkins Institute of the Arnold Arboretum. (Science)

THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their paper appears, will kindly notify the editor, when returning proof.

Reprints should be ordered when galley proof is returned to the editor. George Banta Pub. Co., Menasha, Wisc. have furnished the following rates:

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100 "	2.47	4.18	5.88	6.98	9.07	10.78	12.60	13.69	19.30	24.25
150 "	2.97	5.06	7.15	8.36	11.22	13.31	15.62	16.72	23.48	29.48
200 "	3.85	5.55	7.86	9.18	12.44	14.85	17.38	18.53	25.90	32.56
300 "	4.23	6.82	10.12	11.77	16.33	19.30	22.55	23.15	33.22	41.14

Covers similar to that of Torreya. First 50 copies, $2.25. Additional covers, 1½ cents each. Plates: 100 for $1.00

OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

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(1) BULLETIN

A journal devoted to general botany, established in 1870 and published monthly, except during July, August, and September. Vol. 58, published in 1931, contained 562 pages of text and 45 full page plates. Price $6.00 per annum. For Europe, $6.25.

In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE —a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24–58 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–18 are now completed. The subscription price is fixed at $3.00 per volume in advance; Vol. 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00. Certain numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **Index to American Botanical Literature,** reprinted monthly on cards, and furnished to subscribers at three cents a card.

Correspondence relating to the above publications should be addressed to

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New York, N. Y.

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A Bi-Monthly Journal of Botanical Notes and News

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BY
GEORGE T. HASTINGS

John Torrey, 1796-1873

CONTENTS

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THE TORREY BOTANICAL CLUB

OFFICERS FOR 1932

MEMBERSHIP

All persons interested in botany are invited to join the Club. There are three classes of membership: *Sustaining,* at $15.00 a year; *Life,* at $100.; and *Annual,* at $5.00 a year. The privileges of members are: (a) To attend all meetings of the Club and to take part in its business, and, (b) to receive all its publications.

Meetings of the Club are held on the first Tuesday of each month at the American Museum of Natural History, New York City, and on the third Wednesday at the New York Botanical Garden.

TORREYA IS THE OFFICIAL ORGAN OF THE
WILD FLOWER PRESERVATION SOCIETY OF AMERICA

TORREYA is furnished to subscribers in the United States and Canada for one dollar per annum; single copies, thirty cents. To subscribers elsewhere, twenty-five cents extra, or the equivalent thereof. Postal or express money orders and drafts or personal checks on banks are accepted in payment. Subscriptions are received only for full volumes, beginning with the January issue. Reprints will be furnished at cost prices. All subscriptions and other communications relating to the business of the club should be addressed to 450 Ahnaip Street, Menasha, Wisconsin, or to the Treasurer, Mrs. Helen M. Trelease (Mail address—Box 42, Schermerhorn Hall, Columbia University, New York City).

Matter for publication, and books and papers for review, should be addressed to

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TORREYA

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The pollination of the palm *Archontophoenix Cunninghamii*

Alexander F. Skutch

Bordering the path which led up from the tramline to the front steps of the house in which I lived near Almirante, in the province of Bocas del Toro in western Panama, stood six stately palm trees of the species *Archontophoenix Cunninghamii*, Wendl and Drude. Unfortunately for the effect they produced, all were not of the same age. The largest was a magnificent specimen which measured 64 feet to the top of the leafy crown, and was 11 inches in circumference at breast height. The straight, clean, columnar trunk was prominently ringed by the crowded scars of the fallen leaves, and the closely encrusting lichens which covered much of its surface gave it a light gray color. At the upper extremity of the trunk three or four richly branched spadices stood out almost horizontally, with the slender, flexuous branches pendent beneath the thicker main axis. Above the spadices the trunk appeared to be continued by a smooth, green extension, about six feet long, thicker than the older portion below. This apparent prolongation of the trunk was in reality a false-stem made up of the tubular, concentric sheaths of the leaves. From the apices of their sheaths sprang the gracefully plumed fronds, which measured about 11 feet long by 6 feet broad (Plate I).

Many palms, including *Archontophoenix*, the royal palm, and the stilt-palm *Attalea*, resemble the banana in the possession of a prominent false-stem, but there are a number of important differences between the two types of plants. While the false-stem of the banana at any age springs from near or below the surface of the ground, at the apex of a bulbously swollen rhizome, that of the palm is raised on its woody caudex, in old plants, many feet above the ground. In the former the leaf-sheaths which form this false-stem are open, crescentic in cross-section and closely overlapping, in the latter they are closed, tubular and concentric. In both cases the new leaves are formed at the center of this false-stem, completely hidden from view, and only push out from the top when they are practically mature. In respect to the position of their inflorescences, the two types of plants differ fundamentally. The single inflorescence which culminates the growth of each banana "tree" is formed in the center of the false-stem and, after performing a long upward journey, emerges at the top, while in *Archontophoenix*, once the tree has reached reproductive maturity, an inflorescence is generally formed in the axil of each leaf, and they are exposed successively as the leaf-sheaths split open and fall away.

While the youngest leaf stands almost erect, the older ones gradually droop, and finally the oldest, hanging vertically downward, begins to die and turn brown. The increasing pressure of the young leaves and inflorescences, continually being formed within, finally causes the thick, leathery sheath, over 4 feet long, to split from top to bottom down the side opposite to the attachment of the lamina. Meanwhile the base of the sheath is becoming detached from the stem so as to leave a circular scar. As the dying leaf falls away the elongated spathes which enclose the inflorescence are revealed standing upright in the axil of the sheath. The first spathe may split down either the inner or outer side, and falls away, according to my observations in Panama, from 8 to 16 days after the frond has dropped. The spadix is still enclosed in a second, similar spathe, which generally bursts and falls a day or two after the first. These spathes are green, thick and leathery, and completely closed, and the inflorescence is so crowded within that there is not the slightest waste space. The flower buds are sharply angular as a result of the pressure to which they have been subjected during their development (Fig. 1). The spathes are burst simply by the swelling of the spadix within them, and there is no preformed line of dehiscence.

Only one of the five fruiting palms was low enough for me to reach the inflorescences when standing on top of an eighteen foot stepladder, and this tree was kept under observation from January until June, 1929. Once they had escaped from their spathes, the numerous, slender, whip-like branches of the inflorescence hung beneath the short, thick, horizontal main axis.

Archontophoenix Cunninghamii, from a cultivated tree growing near Almirante, Panama. January 31, 1929.

Along the length of these woody, flexuous branches the flowers were arranged in groups of three. These clusters were arranged spirally; the divergence was probably either 2/5 or 3/8 of the circle, but because of the flexuosity of the axis it was not possible to determine with certainty which was the actual value.

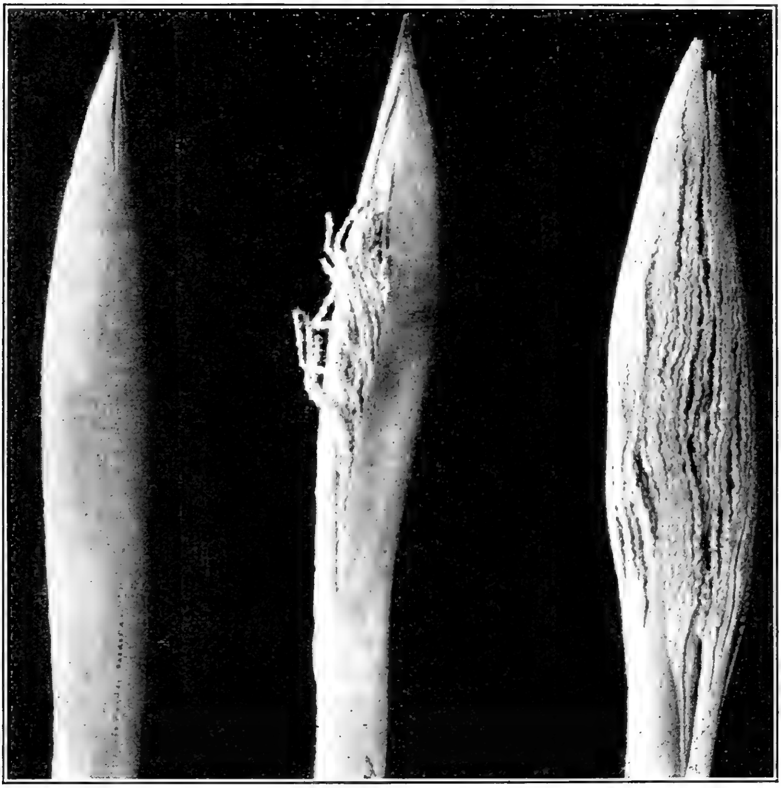

Fig. 1. The spathe and spadix of *Archontophoenix*. At left the inner spathe after removal from the outer. In center, the spathe splitting and exposing the spadix, several branches of which have escaped. At right, the spadix after removal from the spathe, showing the tight packing of the flower buds. x about 1/9.

The triad of flowers, representing a principal and two lateral accessory buds, stood in the axil of a small and inconspicuous white bract. Each group consisted of a central pistillate flower with a staminate flower on either side of it. Occasionally there occurred clusters of four, with two staminate flowers on one side or the other. The staminate flowers were invariably the first to open. Starting at the base of the pendent branch, and following the spiral which includes the flower groups downward to the apex, I found that in each triad the staminate flower

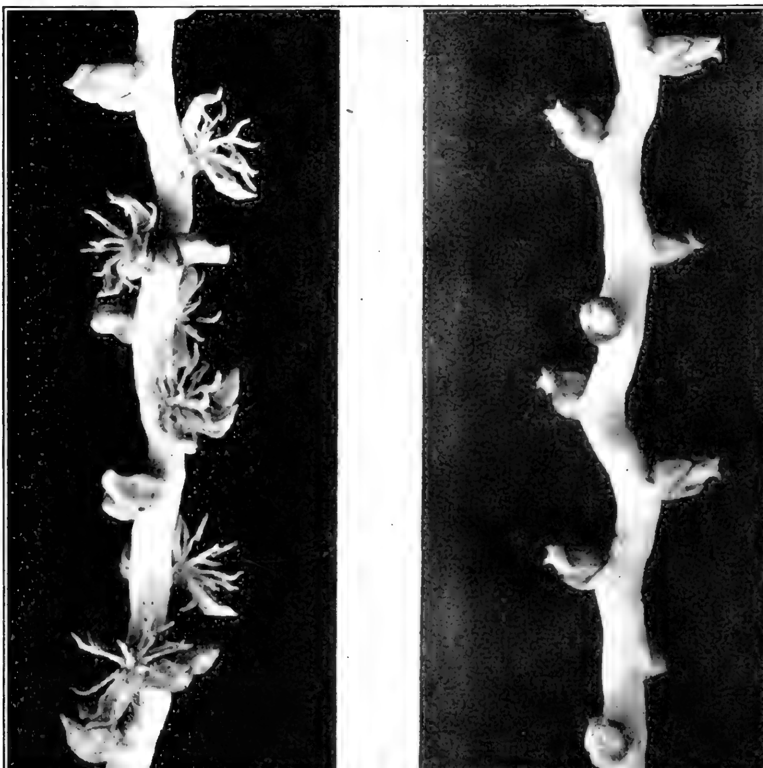

Fig. 2. The flowers of *Archontophoenix*. At left, a portion of a branch of the inflorescence showing the first staminate flower of several triads fully open. The second staminate flower and the pistillate flower in each of these triads are still in the bud, while in some triads no flower has yet expanded February 13, 1929. At right, a portion of a branch of the same inflorescence after all staminate flowers have fallen, showing the pistillate flowers with receptive stigmas February 28. Slightly enlarged.

which was first encountered on this descending course was always the first to expand. The staminate flower on the side from which the spiral leaves the group never opened until the other had fallen, and the pistillate not until both had dropped, and so in each group, there was never more than a single open flower at any one time. The staminate flower consisted of from 12 to 16 stamens arising from a mound of tissue at its center, surrounded by three rather conspicuous woody, white, deltoid petals 5 mm. long, beneath which were hidden three additional scale-like perianth segments.

The first staminate flowers were generally found to be open as soon as the inflorescence had escaped from the enclosing spathes. Thereafter a new set opened every morning, following the sequence set forth above, and by evening there was a rain of spent flowers with withered anthers beneath each flowering tree. The opening of new staminate flowers continued for from 12 to 14 days after the escape of the inflorescence, when the buds of this kind were practically exhausted, and the pistillate flowers now began to function. These did not become receptive until most of the staminate flowers of the inflorescence had fallen. Perhaps it is not quite accurate to speak of the "opening" of the pistillate flowers, (unless one means their stigmas), for the six white, scale-like divisions of the perianth did not actually expand, but the ovoid ovary closely embraced by them swelled until it spread them apart a bit, and the three sessile stigmas peeped forth from between them. They were stigmatic along their inner faces, and a drop of fluid collected in the angle between them. The inflorescence bore receptive pistillate flowers for a period of 5 or 6 days after the majority of the staminate had fallen. Thus the period of anthesis of the inflorescence considered as a whole was 18 or 19 days, and the time during which it bore functional staminate flowers about double that for the pistillate flowers.

The course of events which has just been described was rendered somewhat irregular by the behavior of those flowers at the extremities, especially at the apex, of each branch of the inflorescence. After all of the staminate flowers had fallen from the main portion of the branch, and the pistillate flowers had begun to become receptive, there were generally a few lingering staminate flowers at these extremities. Different branches did not always enter the pistillate stage on the same day, so there was a certain amount of overlapping between the staminate stage of one branch and the pistillate stage of its neighbors.

Nevertheless, each spadix was for a period of two weeks, or a little less, exclusively staminate, then followed a few days when it was preponderately pistillate, but bore a few belated male flowers, and finally, after these had fallen, it became exclusively pistillate. Since each tree bore only a single flowering spadix at the time, cross pollination between neighboring trees must have been the rule. The different trees were generally in different phases of flowering, so those inflorescences which had most recently escaped could furnish pollen to the pistillate flowers of spadices on other trees which had burst their spathes a week or two earlier.

The following table will serve to recapitulate the behavior of this tree:

January 31, 1929. Leaf fell exposing inflorescence enclosed in its spathes.

February 8. Outer spathe fell.
10. Inner spathe fell, staminate flowers open and visited by bees.
22. Staminate flowers mostly fallen, the first pistillate flowers receptive.
25. Staminate flowers all spent.
28. Pistillate flowers practically all expanded.

March 21. Second leaf fell exposing inflorescence (Details of the anthesis of this spadix were not followed).

April 16. The fruits of the inflorescence which came into bloom about January 1 are now ripe (after 3 1/2 months).
24. Third leaf fell exposing inflorescence.

May 2. Outer spathe burst.
3. Both spathes fell and the first staminate flowers opened.
17. A few pistillate flowers, on branches from which all staminate flowers had fallen, were receptive.
19. All but a few straggling staminate flowers have fallen.
22. Pistillate flowers practically all expanded.
31. Fourth leaf fell exposing inflorescence.

June 6. I left Almirante and discontinued observations.

Whatever may be the principal agent of pollination in the palm's native habitat in Queensland and New South Wales, at Almirante the little black, stingless bee, *Trigona amalthea* (Olivier) plays the chief rôle. Other visitants to the flowers are flies, mosquitoes and small wasps, but the bees far outnumber all of the others together, and by their systematic harvest of both pollen and nectar are apparently the only ones fitted to play an important part in cross-pollination. This bee (and related species) is so important as a pollinating agent of many plants in Central America, and so interesting in its habits, that it deserves a few words devoted to itself. A colony of them inhabited an enormous "nigger-head" termites' nest, the work of a species of *Nasutitermes* (voluntarily or involuntarily abandoned by the latter), situated in a large cacao tree not more than fifty yards from the nearest palm. It was one of the largest nests of this type I remember having seen, ellipsoidal in shape, and measured 3.5 feet in height by half as thick. The bees had provided an entrance on one side in the form of a large, funnel-shaped aperture. Although stingless and apparently harmless, even when disturbed, away from their hive, when their home is molested they sally forth in numbers and, attaching themselves to the hair or skin or clothing of the intruder, attempt a bite which is more annoying than painful, at the same time advertising their anger by a persistent, high-pitched buzz. Desiring to clear some branches from the vicinity of this nest, for the purpose of a photograph, I was advised to do the work at night, but even then was not immune from an angry sortie by its inhabitants.

The staminate flowers in mass have a faint but agreeable fragrance which is difficult to describe. Perhaps attracted by this, the bees swarm over them in large numbers, collecting the pollen into great swollen masses on their hind legs. The pollen grains possess a perfectly smooth exine and are dry and dusty rather than cohesive. They do not appear particularly well adapted for either insect or wind pollination. When examined dry, each has the form of a grain of wheat, a resemblance which is further heightened by a deep furrow down the inner face. Placed in water the grain swells out and the furrow is represented by a very faint line. Bees bearing enormous loads of this pollen, which they secure from neighboring trees, in their pollen baskets, crawl over the pistillate flowers to sip at the drop of nectar which is secreted in the angle between their stigmas. The secretion tastes slightly sweet, and glitters like a dew-drop in the morning sunlight. So by the combined pollen and nectar-seeking propensities of these bees the flowers are cross-pollinated. Whether wind pollination would be effected in the absence of bees, and how much transfer of pollen by the wind actually does take place, was not determined, but judging from the exposed position of both anthers and stigmas, this form of pollination seems not unlikely.

The fruit is set freely at Almirante, and ripens in about three months from the time of pollination. The mature drupe is ellipsoidal, about 15 mm. long, shining, bright red, and subtended by the withered perianth segments. The thin, fleshy external pericarp is much sought by birds, especially by the Blue Tanager (*Thraupis cana diaconus* Ridgw. and Nutt.) and the Black-winged Palm Tanager (*T. palmarum atripennis* Todd). These peck away the edible portion of the fruit while it is still attached to the tree, finally letting the hard seeds, surrounded by the fibrous internal portion of the pericarp, fall to the ground, where they germinate in large numbers. A larger bird, such as a toucan or large dove, might swallow the fruits whole, later rejecting the indigestible seed, and so disseminate the species.

Observations on the pollination of palms are apparently not numerous. According to Knuth (1), who devotes a scant page to the family, the nectar-secreting, proterogynous flowers of *Sabal adansoni* are pollinated by hymenoptera. Species of *Chamaedorea* are also entomophilous. *Cocos*, *Syagrus*, *Phoenix dactylifera* and *Chamaerops humilis*, according to the same authority, are wind-pollinated. Spruce (2) records the following interesting observations regarding the fragrance of palm flowers: "The flowers of palms are, it is true, comparatively small, and being usually of a pale yellow color, are conspicuous only when massed on the large spadices of the taller-growing species; but in their exquisite odor they often yield to no flowers whatever. In many cases the odor is that of mignonette, but I think a whole acre of that *darling* weed would not exhale as much perfume as a single male spadix of the Caraná palm (*Mauritia carana*) of the Rio Negro. The flowers of the slender Sangapilla palm of the Peruvian Andes preserve their fine scent for months, even in the dry state; whence the Indian Girls wear them in their hair, put them in their beds, and adorn therewith the altars of their household saints."

Literature cited

1. Knuth, Paul. Handbook of Flower Pollination. Trans. by J. R. Ainsworth Davis, III pp. 486–87. Oxford, 1909.
2. Spruce, Richard. A Botanist on the Amazon and Andes. I p. 46. London, 1908.

Baltimore, Maryland

A study of the number of pistils in the Colorado Blue Columbine, *Aquilegia caerulea*

C. R. Walker
and
Daisy Greene

In the classes in the taxonomy of the flowering plants it was noted that the Colorado Blue Columbine was not constant in the number of pistils, and the following investigation was undertaken to formulate some conclusions concerning this point. Inspection of the keys shows agreement on the number of pistils given for the genus *Aquilegia*, but our findings do not agree, except in part as noted below, with the number as recorded for this genus. Gray (1887), Wood (1889), Dana (1895), Britton (1901), Stevens (1902), Nelson (1903), Coulter and Nelson (1909), Nelson (1912), Clements and Clements (1917), Bailey (1920), Rydberg (1922), and Blanchan (1926) all give "pistils five" for the genus.

Two regions quite widely separated were chosen for this study in order to determine if the environmental influences played any part in the lack of constancy in the number of pistils. The majority of flowers examined were found in the Uncompahgre Forest Reserve, southwest from Delta, Colo., and the others were examined from Pinion Mesa near the Fruita Reserve, southwest of Grand Junction, Colo. In the Uncompahgre Forest a variety of locations as to soil and moisture was chosen, such as head of Cushman canyon, upper Cushman canyon, various places in the canyon, along the Nucla road, and by Blue Creek. The counts on Pinion Mesa were made from the typical mountain hillside conditions.

The blue columbine may have as many as three or four main stems. In the counts each stem was listed separately and the lower blossoms and unopened buds were counted first and the the number of pistils recorded for each as they appeared in an ascending order. On Pinion Mesa a total of thirty-five plants with one hundred forty-six flowers were examined and counted, and in the Uncompahgre Forest one hundred fifty-seven plants with seven hundred thirty-seven flowers.

The number of pistils as counted in the eight hundred eighty-three flowers appears below.

Number of flowers with three pistils.............1;	per cent 0.12
Number of flowers with four pistils.............11;	per cent 1.25
Number of flowers with five pistils............197;	per cent 22.3
Number of flowers with six pistils.............422;	per cent 47.78
Number of flowers with seven pistils...........214;	per cent 24.23
Number of flowers with eight pistils............36;	per cent 4.08
Number of flowers with nine pistils..............1;	per cent 0.12
Number of flowers with ten pistils...............1;	per cent 0.12

It will be noted above that only one hundred ninety-seven of the flowers examined have five pistils as listed for the genus *Aquilegia*. The larger portion, four hundred twenty-two, have six pistils and one had as many as ten pistils.

Of the one hundred ninety-two plants examined six had a constant number of five pistils for every flower on the plant; nine had a constant number of six pistils; and one had a constant number of seven. The remaining one hundred seventy-six had flowers with a varying number of pistils; for example, a plant from Cushman canyon had eleven flowers with pistil numbers of six, five, seven, six, on one main stem; five, seven, five, five, on another, and six, five, five, on another.

As far as could be determined by this study, the location, such as rocky hillside, aspen grove, swampy island, did not have any effect in the number of pistils, nor could any differences as to pistil number be noted between smaller and larger plants.

Attempt has been made through the study of sections of anthers and ovaries to determine if there are cytological differences between a flower having five and one having seven pistils; but so far the work has not been successful. Seed was collected from a plant having a constant number of six pistils and pollination will be controlled when the seedlings mature to try to determine if the difference in pistil number is heritable.

Western State College of Colorado,
Gunnison, Colorado

A new Celtis from the western Miocene

Edward W. Berry

During the study of Miocene plants from Washington and Idaho I happened upon a small collection of beautifully preserved Miocene plants which were presented to the U. S. National Museum (Accession 66310. U. S. Geological Survey Locality 7475) in 1921 by Mr.Sam Ballantyne, and coming from the Ballantyne ranch in Section 27, Township 23 south, Range 45 east, Willamette meridian, Malheur County, Oregon.

The matrix is a fine grained lithified tuff with ferruginized bedding surfaces on which the impressions occur. Eleven species of plants are represented, as well as the incomplete skeleton of the small fish—Leuciscus—whose scales, spines and bones are widely distributed in Washington, Idaho and Nevada in the Latah and Esmeralda formations.

The plants are the following:

Acer chaneyi Knowlton
Amelanchier typica Lesquereux
Castanea orientalis Chaney
Celtis, n. sp.
Odostemon simplex (Newberry) Cockerell
Pinus sp., Knowlton (3 needle fascicles)
Platanus dissecta Lesquereux
Quercus idahoensis Knowlton
Quercus simulata Knowlton
Quercus treleasii Berry
Typha lesquereuxi Cockerell

The most abundant forms are *Platanus dissecta* and *Quercus simulata*. All of the eleven except the new species of Celtis, which it is the purpose of this note to describe, are found at numerous other Miocene outcrops in Oregon or surrounding states. Two occur at Florissant, Colorado; two in the Esmeralda formation of Nevada, one in the Eagle Creek formation; three in the Bridge Creek beds; one in the Mascall beds, three in the Payette formation of Idaho; and seven of the 11 species in the Latah formation of Washington.

The available evidence indicates that the age is definitely younger than the Bridge Creek horizon which Chaney has found to be so extensively developed in Oregon, northeastern California and northwestern Nevada. I regard it as late Miocene.

The new species of Celtis may be described as follows:

Celtis hesperius Berry, n. sp. (Figure 1) Leaf cordate-ovate in form, with an extended acuminate tip and a cordate nearly equilateral base. Leaf substance thin. Margins entire at base, above with prominent aquiline-serrate teeth, somewhat variable in size and irregularly spaced, becoming reduced in size and finally disappearing distad. Length about 11 centimeters. Maximum width about 6 centimeters. Petiole stout, expanded, 1.75 centimeters long. Midvein stout, prominent, curved. Lateral primaries diverging from the extreme base at wide angles $-90°$ on one side, curving upward and camptodrome, stout and prominent. Secondaries stout, prominent, 8 or 9 pairs, straighter on one side and more ascending and curved on the other. The lateral primaries give off four or five camptodrome secondaries on

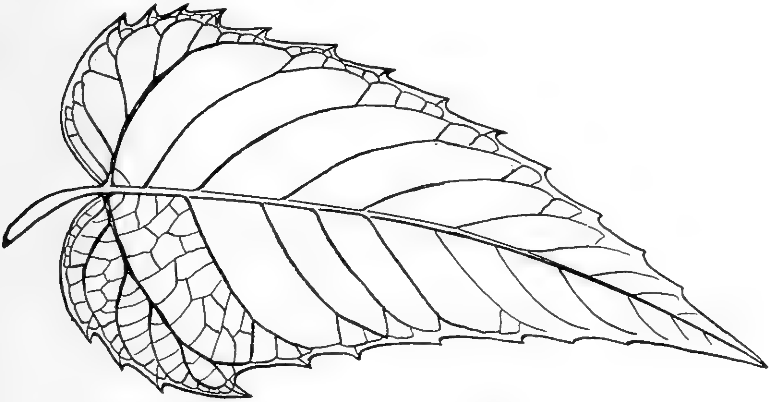

Fig. 1. Celtis hesperius, Berry (four-fifths natural size)

the outside. Tertiaries mostly inosculating internally to form a coarse isodiametric mesh; externally they extend into the marginal teeth.

The character of the base and the enlargement of a marginal tooth on one side give a somewhat deltoid form to this fine leaf. It is a highly characteristic form, markedly distinct from previously described species, both fossil and recent. This is emphasized by its cordate, subequilateral base and its less ascending lateral primaries. In form it is not unlike various fossil and recent species of *Betula* but differs from any of the Betulaceae—*Fagus*, *Ulmus*, *Carpinus*, *Planera*, *Ostrya*, etc., in having camptodrome instead of craspedodrome venation.

Three species of *Celtis* leaves have been described from our western Miocene. These are *Celtis mccoshii* Lesquereux[1] from

[1] Lesquereux, Leo, The Cretaceous and Tertiary floras: U. S. Geol. Survey Terr. Rept., vol. 8, p. 163, pl. 38, figs. 7, 8, 1883.

Florissant, which is smaller, with more closely spaced teeth, longer petiole, more ascending primaries, and ovate form; *Celtis besseyi* Barbour[2] from supposed Miocene beds in Nebraska; and *Celtis obliquifolia* Chaney[3] from the Bridge Creek beds of the Crooked River basin in Oregon. The last is smaller, only subcordate, less produced distad, with more ascending primaries and the margins entire or sparingly toothed.

The present fossil species is not very different from the existing *Celtis occidentalis* Linné which is found in southeastern North America and in southern Idaho, eastern Washington and Oregon, and the Puget region of Washington. Its range suggests a formerly more continuous distribution which has become partially segregated by post-Tertiary dessication in parts of its former area of distribution.

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[2] Barbour, E. H., Hackberry conglomerate, a new Nebraska rock: Nebraska State Bull. 8, vol. 1, p. 88, figs. 47, 48, 50, 51, 1925.

[3] Chaney, R. W., Notes on two fossil hackberries from the Tertiary of the western United States: Carnegie Inst. Washington, Pub. No. 349, p. 52, pl. 1, figs. 1, 3, 5, 1925.

BOOK REVIEWS

The Cactus and its Home[1]

There is scarcely a book in English on the home life of the cacti. In fact most books on the family have been altogether taxonomic, which to the general public is the least interesting thing about them.

Doctor Shreve, who for years has studied the ecology and cultivation of these curious plants in their home, has written a small book on just those phases of them that the average succulent fancier will most appreciate.

How they live and how to grow them, may sound like pretty meagre material to fill even a small book. But it involves a long familiarity with the physiology of desert plants and the ability to translate that information into practical cultural directions. You will find them in this book, also specific hints on propagation,—always a ticklish business with succulents.

Some of the fascinating Indian customs which Standley records about Mexican cacti, Shreve does not mention, but there are notes in the book on the curious relation between some cacti and birds, notably in the giant cactus.

There are many illustrations and a very useful compilation of the cactus flora of the chief desert states. The book loses by having no index, no list of its 43 illustrations, no explanation of its very good distribution map. The lack of all of these puts a quite unnecessary burden on the user. The book, in spite if this, will have to be in the library of most cacti lovers, because its authority and scholarship are unquestioned.

Norman Taylor

Suksdorf on the genus Amsinckia[2]

There have been several interesting episodes in species-making in the United States. As two examples, I may cite the work of Greene, who revised the western species of *Ptelea* in

[1] Shreve, F. The Cactus And Its Home. Pp. 1–195, Figs. 1–43, a frontispiece and a distribution map. Williams and Wilkins Co. Baltimore, Md. 1931. Price $3.00.

[2] Suksdorf, Wilhelm. Untersuchungen in der Gattung Amsinckia. Werdenda **1:** 47–113. Dec. 31, 1931.

1906, publishing as new 55 species out of a total of 59, and that of Small and Alexander, who recognize 96 species of *Iris* in the southern States, of which 88 are accredited to one or the other of the two authors. Now we have Suksdorf's contribution, which scarcely equals these two cases in proportion of new species but far exceeds them in mass. Asa Gray recognized six species from North America in 1878; Howell knew two from the Northwest in 1901; Piper had three from Washington in 1906; Wooton and Standley had none from New Mexico; Tidestrom reported four from Utah and Nevada, and Jepson recognized seven from California. Suksdorf has examined the same material to which Jepson had access and reports ten from Washington, eleven from Oregon, six from Nevada, one from New Mexico, and no less than 199 from California. Of his total bulk of 233 species, no less than 198 are described as new!

I do not intend to criticize Suksdorf. On the contrary, I believe that no taxonomist ever makes new species just to gratify his personal vanity and that every new description represents the author's sincere and considered opinion. Suksdorf says in his introduction (my translation): "The richness of *Amsinckia* surpassed all my expectations. My work will scarcely satisfy any botanist; I am not satisfied with it myself, but believe that it will lead to a better understanding of the genus. The great number of new species does not speak well for my work and will produce a lack of confidence. But in my opinion it could not be handled otherwise."

Fashions change in species-making as in everything else. Suksdorf may or may not be justified in making so many species, and only a specialist can affirm one view or the other and then only after long and patient study. The one important principle which appears from such studies as Suksdorf's is this, that no one has as yet discovered any rule by which the scope of a species may be measured or determined. The taxonomist can catalog the morphological characters of a group, the ecologist can study the relation of these characters to environment, and the geneticist can count chromosomes and determine the course of evolution within the group, but none of them can finally decide an the scope of a species, either in time, as measured by its evolution, or in structure, as measured by its morphology. We are all governed primarily by usage in taxonomy. We accept the statements in the manual on our bookshelf about the species of *Quercus* or *Eupatorium*, having confidence in its author, but we would probably arrive at a different conclusion if we gave these groups long and patient study ourselves. That is how Brainerd was able to improve our knowledge of *Viola*, how Sargent gave us new ideas on *Crataegus;* how Bicknell increased the southern species of *Sisyrinchium* to 53; how Small reduced them to fifteen. Whether all these new species of *Amsinckia* will be maintained is a different question, but if they are reduced, their reduction will again be an expression of opinion based on careful study.

In conclusion, let me give a definition which may make one more lenient in criticizing Suksdorf's work or any other similar study. A species is a group of one or more individuals which in *your* opinion deserves a binomial name.

H. A. Gleason

FIELD TRIPS OF THE CLUB

Lichen Observations on Winter Walks of the Club

Winter field meetings of the Torrey Botanical Club, in February and March, brought out a good attendance in spite of weather varying from moderate and sunny to snow and sleet. On these trips the study of lichens proved interesting not only for themselves, but because the usual subjects for observation in the flowering season were absent. Most members and guests showed keen interest in these plants, which might take a place in outdoor nature study on a par with higher organisms if there was a popular guide for them, which, the chairman hopes, the Club may be able to publish.

On Sunday, Feb. 12, a party of 28, led by the chairman of the field committee, rambled in the Bear Mountain State Park, including the granite knobs in the meadow at Iona Island, where the prickly pear cactus colonies were seen; Doodletown Brook and Valley, and the west end of Dunderberg Mountain. In the brook, objects of interest were the aquatic lichen, *Dermatocarpon miniatum aquaticum*, growing on the stones among liverworts (*Conocephallum* and *Pellia*) and three plants of the Maidenhair Spleenwort, *Asplenium Trichomanes*, growing on a band of Grenville limestone within the gneiss.

In the woods along the south side of Doodletown Valley, several *Cladonias* were found, *C. cristatella*, formae *Beauvoisii*, *squamosissima* and *vestita; C. coniocraea, C. chlorophaea*, formae *simplex, pterygota, carpophora* and *homodactyla*, and *C. strepsilis*, forma *coralloides. Peltigera canina* was found in a large colony near the foot of Dunderberg. On the summit *Cladonia alpestris* and *Parmelia conspersa* were common. Returning to Bear Mountain, in an old field on the northern edge of Doodletown valley, a rich collection of lichens was found, including *Baeomyces roseus, Cladonia verticillata*, forma *apoticta; C. subcariosa*, and unusually large cups of *C. chlorophaea*, formae *simplex* and *carpophora*.

On Feb. 29, the party led by Dr. Arthur H. Graves, of the Brooklyn Botanic Garden, numbering 20, first visited the remarkable colony of Southern Bald Cypress, *Taxodium distichum*, in the cattail meadow, at Manitou station. A closer search revealed a larger number of specimens than have been reported before, the total, large and small being sixteen, from about ten to fifty years old. Their location seemed to make any explanation as to artificial planting improbable, except possibly the three oldest ones, and if they were planted, no one in the village seems to know anything about it. The colony is obviously increasing naturally, and nearly every individual is thrifty, although 200 miles north of the nearest large natural occurrence, in the Chesapeake Bay region.

Lichens found on this trip, which included the old iron pyrite mine on the back of Anthony's Nose, and the valley of Broccy Kill in the National Guard camp area, were *Baeomyces roseus*, in very pretty densely fruited masses, several common Cladonias, and two rarer ones, which seemed to be *Cladonia coccifera*, and the form *asotea*, with central, red-fruited proliferations.

On March 7 the trip was led by Miss Margaret A. Griffin, of the Eastside High School, Paterson, N. J. The fifteen members started from the city in a light rain, which by the time they reached the beginning of the walk, at Franklin Lake, had turned to snow. Before they finished it was a northeast sleet and rain storm. Before the snow covered everything, a few lichens were found, including many fine large thalli of *Lecidea albo-caerulensis*, with numerous apothecia, on the small columns of basalt at the north end of Franklin Clove; the silvery-gray thalli appearing very conspicuously against the dark rock. An unusual *Cladonia* was *C. clavulifera*, forma *subfastigiata*.

But the principal objectives of Miss Griffin's trip were: a stand of about thirty persimmons, *Diospyros virginiana*, on the edge of a swamp south of the Clove, which must be about the most northern stand of the species; unusual forms of *Lycopodium complanataum*, varieties *flabelliforme*, and *chamaecyparissus*, as well as *L. lucidulum*, *L. obscurum*, var. *dendroideum* and *L. clavatum;* and, most interesting of all, several thriving colonies of *Camptosorus rhizophyllus*, growing on a talus of broken small columns of the basalt rock of the Preakness-Packanack Mountains area. This was the first time the writer has seen the Walking Fern growing elsewhere than on limestone or sandstone with a high lime content. But there is considerable calcium in the Watchung basalts, as is evidenced by the formation of the numerous zeolites, including secondary crystals, of calcite, crevices in this rock. It may be that enough calcium leaches out of the ledges of small-columned basalt, above this talus, to produce a soil condition to encourage the establishment of *Camptosorus*. The fern seems to be as large and as well fruited as on its more usual limestone haunts.

The stand of southern white cedar, *Chamacyparis thyoides* at the southwest corner of Franklin Lake, is interesting as one of the inland stands of the species in northern New Jersey, and would repay further study for possible associated plants of interest, on another day when it is not so wintry.

Raymond H. Torrey

PROCEEDINGS OF THE CLUB

Meeting of January 5, 1932

The meeting was called to order at the American Museum of Natural History at 8:30 P.M. by President Sinnott with twenty-six members present. Minutes of meetings of November 18, December 1 and 19 were read and approved.

The following were unanimously elected to membership in the club: Mr. George F. Dillman, 346 East 87th Street, New York, N. Y.; Dr. Christoph U. Linder, 105 East 38th Street, New York, N. Y.; Miss D. Elizabeth Marcy, Brooklyn Botanic Garden, Brooklyn, New York; Miss Sara F. Passmore, Barnard College, Columbia University, New York, N. Y.; Mr. John W. Thomson, 478 Central Park West, New York, N. Y.; Miss Josefa Velazquez, The New York Botanical Garden, Bronx Park, New York, N. Y.

The resignations of Miss Helen E. Greenwood and Mr. William Birrell were accepted with regret.

The report of the Secretary was deferred until a later meeting. The report of the Treasurer was read and accepted. The report of the Editor was read by Dr. Tracy Hazen in which he stated that the BULLETIN is now published up to date. The report accordingly covered the numbers for the greater part of 1930 and 1931. The papers giving the report of the botanical results of the Tyler Duida Expedition by Dr. H. A. Gleason filled the greater part of the last volume.

Dr. Hazen requested that he be not elected for the ensuing year. The Editor's report was accepted.

Mr. George T. Hastings reported on his activities as Editor of TORREYA, stating that six numbers were published with a total of 187 pages. This report was also ordered accepted.

Dr. John H. Barnhart spoke for Dr. Marshall Howe as representative on the Council of the New York Academy of Sciences, stating that as Dr. Howe is now elected a member of that council it would be appropriate to have someone else represent the Torrey Botanical Club on the council.

The committee on Finance, through Dr. R. A. Harper, reported that there had been very few receipts from gifts or donations during the year.

Dr. John H. Barnhart, speaking for the Budget Committee stated that a report had already been made and should be published.

Dr. John S. Karling, reporting for the Entertainment Committee stated that expenses for the year were forty dollars with a deficit of twelve dollars and suggested that he be continued as Chairman of that committee until the books could be satisfactorily balanced.

Dr. Tracy Hazen acting for Dr. N. L. Britton on the Endowment Committee submitted a revised report for publication. He also brought up the question of the interest from the life memberships, strongly recommending that these be used as current funds, this being the purpose of that type of membership.

Officers for the ensuing year were elected.

Dr. Graves moved a vote of thanks be given to Dr. Tracy Hazen for his long service as Editor of the Society, and it was seconded by Dr. Harper and applauded by the members.

Meeting adjourned at 9:45 for refreshments in the Bird Hall.

Respectfully submitted,

FORMAN T. MCLEAN
Secretary

MEETING OF JANUARY 20, 1932

The meeting was called to order at The New York Botanical Garden at 3:30 P.M. by President Sinnott with thirty-three members present. Minutes of the meeting of January 5th were read and approved.

The following were unanimously elected to membership in the club: Mrs. Gladys Gordon Fry, 145 West 77th Street, New York, and Miss Anna Harvey, 2105 Linden Street, Brooklyn, New York.

The resignations of Mrs. John Ross Delafield, Mr. Samuel S. Shouse, and Miss Antoinette Wilson were accepted with regret.

It was announced that Professor Seward is to give a lecture at Columbia University, before the University and the Torrey Botanical Club. The meeting night of the club will have to be changed from Tuesday evening April 5 to Friday evening April 1 as that is the only date suitable.

Dr. Tracy E. Hazen gave an interesting lecture on "Tetrasporopsis, a genus new to American algology, and its phylogentic significance."

Dr. Edmund W. Sinnott gave a talk on "Factors determining the size and shape of the vascular system in fern petioles."

In certain ferns the leaf trace as it leaves the stele is relatively small but increases markedly in size, sometimes as much as ten times, in its course through the base of the petiole. Transpiration can hardly be a factor in determining this difference since the transpiration stream seems to be accommodated equally well by the small leaf trace and the large petiolar bundle. The difference is most marked in types like Osmunda, where the petiole is encased for some distance in a mass of firm leaf bases. The petiole is much constricted at the base and reaches its maximum size as it becomes free. The size of the vascular system of the petiole roughly parallels that of the petiole itself. In types where the rhizome is superficial and the petiole springs directly from it, as in Polypodium, there is no constriction either of the petiole or of its vascular system. It is suggested that size differences in the petiolar vascular system are not primarily due to functional stimuli but are correlated with the general development of the petiole, which seems to depend both upon its freedom to expand and upon the necessity for considerable mechanical rigidity at the point where it becomes free.

Respectfully submitted,
Forman T. McLean
Secretary

Meeting of February 2, 1932

The meeting was called to order at the American Museum of Natural History at 8:15 p.m. by President Sinnott with sixty-nine members present.

The following were unanimously elected to membership in the club: Mr. Sidney Charles Bausor, 18 Crescent Road, Larchmont, New York; Mr. Robert I. Rashby, 2144 Bronx Park, East, Bronx, New York City; Dr. M. A. Raines, Dept. Botany, Howard University, Washington, D. C.

The resignations of Miss Trotman C. Barrow, Mr. Roland Jackson Hunter, Mr. Nazzareno Palleri, Mr. Alexander F.

Skutch, Miss Elin Wikander, and Miss Coila B. Wright were accepted with regret.

We have lost Dr. Alfred Cuthbert through death.

Dr. Michael Levine of Montefiore Hospital, New York, gave an interesting and instructive illustrated talk on "Tumors on Plants and Animals."

Meeting adjourned at 9:45 for refreshments in the Bird Hall.

Respectfully submitted,

FORMAN T. MCLEAN

Secretary

REPORT OF THE SECRETARY FOR 1931

During the year 1931 46 new members were elected to membership in the club. Nine members have resigned and two have been lost to the club by death. The enrollment of the club now totals 405. During the year fifteen regular meetings were held and one special luncheon. At most of the meetings illustrated lectures or addresses were given. The total attendance at the meetings was 944, an average of 59 at each meeting, as against an average of 35 last year. (The lists of members elected and resigned the dates of the meetings and the programs omitted by the editor.)

FORMAN T. MCLEAN

Secretary

NEWS NOTES

PROFESSOR GEORGE TISCHLER, director of the Botanical Institute at Kiel, delivered some 30 lectures on karyology of plants at the Johns Hopkins University in November, December, and January. During February he gave lectures at several mid-western universities and at the University of California. During March he visited the Desert Laboratory at Tucson and did some collecting on the east coast of Florida. (Science).

DR. MERRITT L. FERNALD of Harvard University delivered a series of lectures on "Geographic Isolation and the Evolution of Plants" at the Ropes Memorial, Salem, Massachusetts.

THE BIOLOGICAL Laboratory at Cold Spring Harbor will offer a course on plant sociology instead of the course in field botany this summer. The course will be given by Dr. Henry S. Conard of Grinnell College, and will be devoted to a study of plant associations.

THE FIELD MUSEUM of Natural History has received a large collection of plants from Peten, Guatemala, and British Honduras, made by Professor H. H. Bartlett, of the University of Michigan. The plants are being identified by Paul C. Standley, associate curator of the museum's herbarium. (Science)

DR. C. STUART GAGER, Director of the Brooklyn Botanic Garden, has been elected president of the National Institute of Social Sciences. This organization has members in all parts of the United States and operates under a Congressional charter to promote study of the social sciences and to reward distinguished services performed for the benefit of mankind.

THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their paper appears, will kindly notify the editor, when returning proof.

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A journal devoted to general botany, established in 1870 and published monthly, except during July, August, and September. Vol. 58, published in 1931, contained 562 pages of text and 45 full page plates. Price $6.00 per annum. For Europe, $6.25.

In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE—a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24–58 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

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(3) **Index to American Botanical Literature**, reprinted monthly on cards, and furnished to subscribers at three cents a card.

Correspondence relating to the above publications should be addressed to

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BY
GEORGE T. HASTINGS

John Torrey, 1796-1873

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THE TORREY BOTANICAL CLUB

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All persons interested in botany are invited to join the Club. There are three classes of membership: *Sustaining,* at $15.00 a year; *Life,* at $100.; and *Annual,* at $5.00 a year. The privileges of members are: (a) To attend all meetings of the Club and to take part in its business, and, (b) to receive all its publications.

Meetings of the Club are held on the first Tuesday of each month at the American Museum of Natural History, New York City, and on the third Wednesday at the New York Botanical Garden.

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2587 Sedgwick Ave.
New York, New York

TORREYA

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The pronunciation of botanical names

H. A. Gleason

Since the beginning of modern botanical science, names of Latin derivation or latinized form have been given to plants. A few botanists have attempted to ridicule the custom by using names of a different form, such as the meaningless combinations of letters used by Adanson, but these attempts are mostly forgotten. Throughout the world botanists are now accustomed to Latin names, under modern codes of nomenclature such form is obligatory, and the usage may now be considered one of the basic features of scientific terminology.

One of the chief difficulties in the oral use of such names lies in the diverse manners of pronunciation. At every gathering of botanists variations in pronunciation are heard. In most cases these cause no confusion among professional botanists, although they sometimes produce a ripple of laughter, but they may be and frequently are confusing to the younger botanist or amateur, and they certainly indicate a lack of uniformity among botanists.

Our only present means of readily ascertaining a pronunciation acceptable at least to some botanists is to consult current manuals, in which the accented vowel and its quantity are indicated by a grave or acute mark. I have an idea that most botanists do not follow these recommendations in every case. If the reader is interested, he might pronounce the following common generic names, to assure himself of his own methods, and then consult the seventh edition of Gray's Manual to see if he is really orthodox: Althaea, Anemone, Conium, Empetrum, Erigenia, Hypericum, Itea, Lechea, Picea, Pilea, Reseda, Urtica. Then if he wishes a greater surprise, he can try Physostegia and Pycnanthemum.

It is hazardous for a botanist to attempt to discuss the matter of pronunciation in the face of possible criticism from classicists and almost certain criticism from those botanists with whom he does not agree, yet a few lines on the subject may not be out of place.

No matter what system of pronunciation may be followed, the American botanist is always affected by certain peculiarities of the English language, and these must be mentioned first. In our language, in every word of more than one syllable, with the possible exception of some compound words, one or more syllables receive the peculiar explosive stress known as accent. The usage of our language also demands that not more than two unaccented syllables be adjoining. This leads to the development of secondary accents in most polysyllabic words and makes words without such accents difficult to pronounce, as *anonymously* and *inexplicable*. Secondly, the stress of accent is in most words begun and ended by a consonant sound, even though these sounds must often be borrowed from the adjacent syllables and in some cases even from the next word. The accented syllable then consists, in actual usage, of two consonants and a vowel sound, no matter whether this agrees with the rules of syllabification or not. Thus we regularly say e-*con'*-omy and an-*tip'*-athy. Thirdly, a definite quantity is given to the accented vowels, while the unaccented ones are wholly or partially slurred into a general sound of short *u* or short *i*. Thus *American* is ordinarily pronounced *u-mer'-ucun* (not *u-murr-ucun*, as some of our English cousins believe). These three tendencies are so firmly implanted in the English language, both in England and America, that they affect the pronunciation of botanical names.

With these peculiarities of our language in mind, it is seen that the pronunciation of such names depends chiefly upon the proper location of the accented syllables, upon the quantity given to the vowels in them, and upon the sounds given to the consonants.

In general, there are two methods of procedure open to us. We may follow the classical pronunciation according to the rules taught in our schools, or we may regard the names as merely technical English words, on a par with molecule, carburetor, microtome, or endosperm, and apply English pronunciation accordingly.

There are several reasons why classical pronunciation should not be followed. While almost all scientific names are of latinized form, they are not all of Latin or even of classical origin. Actual census of the generic names in Gray's Manual shows that 48 per cent of them are of Greek origin, 21 per cent of Latin origin, 18 per cent are commemorative names, and 12 per cent are miscellaneous in character. Practically four-fifths of them are not of Latin derivation, and there is little reason why one-fifth of the names should determine the pronunciation for all the rest. Of course, a much greater proportion of specific names are actually Latin adjectives.

If classical pronunciation is to be followed, it should be followed consistently, and this involves a number of difficulties in execution. It requires, in the first place, a classical education of an extent which few of us receive in these days of specialization. And if we possess this education and follow classical pronunciation exactly, we may again have some difficulties and meet with some apparent inconsistencies. Thus we must say *kee-koo-ta* for *Cicuta*, not *sy-cue-ta;* for *Dicentra* we must say *dee-ken-tra* instead of *dye-sen-tra*, in direct contravention of the general rule in our language governing the pronunciation of the letter *c*. We should say *nutañs*, not *nutans*, although the spelling carries no indication of the nasal *n; P'hiladelphus*, not *Philadelphus; Rossa*, not *Rōsa*, and one hesitates to guess how *Zizia* should be pronounced. Then the final *m* of Latin words, according to certain classicists, receives different pronunciations depending on the initial letter of the following word, and instead of *Lilium* we must say *Liliun tigrinum*, *Liliung canadense*, and *Liliu longiflorum*. Also we have to dispose of certain sounds which did not exist in the Latin at all, such as the *sh* of *Shortia* and the *th* of *Erythronium*. Besides the difficulty of achievement, this method of pronunciation sometimes destroys all oral resemblance of a scientific name to its English equivalent and thereby conceals the meaning of the name from all except those with a classical education. Thus a common specific name pronounced *keeliahta* bears little audible resemblance to the cognate English word *ciliate*.

The location of the accented syllables is also a matter of difficulty. Half of our generic and a few of our specific names are taken from the Greek, in which the accent was probably musical in nature. In the Latin language, the nature of the accent is somewhat problematical, but it very likely was not an accent of stress as in English.

The chief difficulty encountered through accentuation is the concealment of the derived meaning of the term. In many generic names, and in some specific ones also, the connecting syllable between two roots carries the accent, as indicated in our current manuals. Since the English custom joins the two adjacent consonants with the accented vowel and slurs the remaining vowels in pronunciation, the actual meaning of the two roots is completely hidden. Thus *Ammo-phila* (sand-loving) becomes *Am-moph'-ila; Echino-chloa* (hedgehog-grass) becomes *Eck'-inock'-loa; Dryo-pteris* (wood-fern) is *Dry-op'-teris* or even *Dri-yop'-teris*, introducing a sound of *p* which is silent in *Pteris*. Numerous other similar cases will occur at once to the reader. In each of these the significant syllables of the roots, which by separate accents make plain and prominent the derived meaning of the name, are slighted or slurred in favor of the meaningless connecting syllable. Would it not be more expressive to a student, who has learned the word *xylem* and the root *xanth* in plant anatomy and physiology, to say *Zan'-tho-xy'-lum* instead of the meaningless *Zan-thox'-ylum?* One of my own students, hearing the name of a tree pronounced *Quercus bi'-color*, said "Now I know what that name means, two colors. I always heard it pronounced *bickeler* before."

There are of course numerous instances of similar words in ordinary speech, such as *thermometer*, *barometer*, and *kilometer*. Such words are now beyond possibility of change, except through the slow evolution of the language, but how much more expressive are *thermo-meter*, *baro-meter*, and *kilo-meter*. The Germans certainly understand the classics as well as we do, and probably much better on the average, yet they seem to get along well with *thermo-meter* and *kilo-meter*.

Another and particularly unfortunate result of the classical system in determining accent is seen in its application to various commemorative names. Oakes and Hales, with monosyllabic names of good English origin, are commemorated in genera which we are asked to pronounce *O-kees'-ia* and *Ha-lees'-ia*. *Harper'-ia* and *Nel-sōn'-i* are not so bad, but *Rosy-eye* (*Rosei*) reminds one of a certain disease and *Jesupi* is almost intolerable, either as *Je-sŭp'-i* or *Je-soop'-i*. By the way, was there a *j* in Latin? If so, how was it pronounced? Poor Jesup is certainly ineffectively commemorated in *Yes-soop'-i.*

It is also unfortunate that words of similar structure are frequently required to carry the accent in different places, depending on the quantity of the vowel in the second root. Thus we are asked to say *Po-lyg'-onum* and *Pol'-ypog'-on; Cal-lit'-riche* and *Cal'-opog'-on*, the former in each cases meaningless as pronounced, the latter expressive. We are even advised to say *Lobelia lep-tos'-tachys* and *Phryma lep'-tostach'-ya.* In many cases the classical accent also causes some difficulty in pronunciation, as in *Leu-coc'-rinum*, *acamp-toc'-lados*, and *bra-chys'-tachys.* How much easier these tongue-twisters become when pronounced *Leuc'-o-crin'-um*, *a-camp'-to-clad'-os*, and *brach'-y-stach'-ys.*

Now scientific names represent, in a way, a universal language among botanists, but in that sense they are used as written terms instead of spoken. It is the rare exception that they are used as common oral terms between persons speaking different languages. There is accordingly no reason why these terms, written always the same, should not be pronounced differently in different languages, depending on the custom and usage of the language employed. We have abundant precedent already for variable pronunciation in geographical terms: we say Paris, not Paree, the English say Pŏt'-omac, not Po-tom'-ac, and the Germans may even say Yova instead of Iowa, yet no confusion results. American tourists succeed in visiting Versailles, but how they do pronounce it!

I wonder whom we are imitating, whose rules we are following, when we call the spruce either *Pìcea* or*Pícea*, pronouncing the *c* soft? According to Latin rules as I learned them we should say *Pe-kay-a*, but our European friends say *Pe-tsay'-a* and still seem quite content. And if we can modify Rosaceae from the Latin *Ro-sock'-ā-ī* into the current English *Ro-zāce'-ē-ē* and the German *Ro-za-tsay'-e*, why should we not feel equally at liberty to disregard classical principles in other cases as well?

Would you have appreciated, understood, or visualized botanical names better when you first learned them, would your students grasp them better now, if they were pronounced according to the general principles outlined below?

Commemorative names based on words of English origin or use to be pronounced to conform as nearly as practicable with the root, as *Oak'-esia* (silent *e*), *Nel'-soni*, *List'-era*, *Har-per'-ia*.

Commemorative names based on foreign words to receive English pronunciation similar to that given other English words of like character, as *Thā'-lia*, not *Tŏll'-ia; Michauxii* with the *x* sounded like *z*, not like *ks* or silent.

Names derived from a single classical root to have the accent, vowels, and consonants as nearly as practicable like the cognate English word, as *ōvā'-ta* (ovate), *cĭliā'-ta* (ciliate).

Names from a single root without cognate English words, whether classical or not in origin, to be accented according to classical rules, with vowel and consonant sounds as in common English usage for similar words, as *Tĕ'-coma* (or *Te-cōm'-a*), *Căr'-ya*, *Āc'-er*, *Quĕrc'-us*, *Lăr'-ix*.

Names from two roots to be accented to preserve the sound of both and when possible given vowel sounds in accordance with cognate English words or syllables, as *Mŏn'-o-trōp'-a*, *Zănth'-o-xyl'-um*.

Changes in the gender or form of a root or the addition of a prefix or suffix, not to change the vowel-quantity or accent, except when required by the peculiarities of our language, as *Crīn'-um* and *Leūc'-o-crīn'-um*, *Pŏl'-y-pōg'-on* and *Pŏl'-y-gōn'-um*, *lĕp'-to-stăch'-ys* and *lĕp'-to-stăch'-ya*.

New York Botanical Garden
New York, N. Y.

A puzzling discovery of a capsule of Martynia louisiana

HELEN BANCROFT

The first figure accompanying this note is of a "fruit" of *Martynia louisiana* Mill., the "unicorn plant," "elephant's trunk" or "proboscis flower." This plant is a native of the United States, its distribution extending from Iowa, Illinois and Kansas southward. It is also found as an escape from gardens in Texas, New Mexico and other parts of the country.

The interest of the fruit here described lies in the fact that it was found recently at the village of Wolvercote, near Oxford, England, during the digging of a drain, at a point about 2 miles from the River Thames and about 70 feet above its level, near the garden hedge of a comparatively new house.[1]

It has not been possible to elicit any definite information with regard to the *depth* at which the fruit was buried, but the soil adhering to it when it came into the writer's possession, consisted of Thames alluvium, a material which covers a considerable area, the Thames Valley being very wide at this point; most probably the fruit had lain buried only just beneath the surface.

It is in good condition, its sharply-pointed hooked spines not being worn to any extent; so that it is unlikely that it had been buried for very long. On the other hand, attempts to germinate seeds which were extracted from the capsule were unsuccessful; evidently the period of viability of the seed had been outrun.

No records could be discovered of *Martynia louisiana* ever having been grown in the neighbourhood of Wolvercote. The Curator of the Royal Botanic Gardens on the Surrey bank of the Thames at Kew, on the outskirts of London, informs the writer that the plant was formerly grown there, but owing to the difficulty of obtaining seeds, its cultivation has been discontinued. Had the specimen under consideration been found

[1] The writer of this note is indebted to Major G. D. Amery, of the School of Rural Economy, Oxford, for the specimen here described; to Mr. G. R. Clarke, also of the School of Rural Economy, for the analysis of the soil adhering to the specimen; and to Dr. J. Burtt Davy, of the Imperial Institute of Forestry, Oxford, for much useful help and information.

actually at, or even near, the river-margin, and at a point *below* Kew, it is possible that it might have been thrown out from the Gardens, and have been river-borne, ultimately being deposited by some high-tide, or back-wash from a river-steamer. Wolvercote, however, is more than 100 miles *up* the river from Kew, and out of the reach of tidal influences; and in any case, the

Fig. 1. A mature capsule of *M. louisiana* lying upon the ground in its natural position. Note the upwardly and backwardly curving horns, and the hooked spines, especially those forming a prominent line directed towards the opening of the capsule. Nat. size. (Adapted from a drawing of a South African specimen by Mrs. Burtt Davy.)

fruit was found too far from the river to allow of the idea of water-transport, except at some very distant date in the past; as mentioned above, however, its condition indicates that it is not a very old specimen.

The peculiar structure of this fruit, and the complete lack of local information suggesting a possible explanation of its occurrence at Wolvercote, led the writer to make inquiries into the natural and artificial distribution of *Martynia louisiana* and its allies; the following points may be of interest to American readers.

M. louisiana is a member of a small family of flowering plants—the Martyniaceae—consisting of coarse, low-growing, annual and perennial herbs, which occur naturally in tropical and sub-tropical America, in dry, or coastal regions.[1] The special interest of the family lies in the structure of the fruit, which is

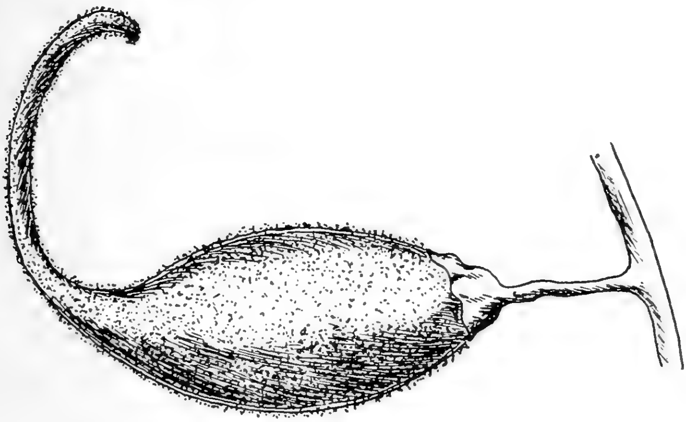

Fig. 2. A young fruit of *M. louisiana* to show the glandular, hairy external covering, and the long, curved beak. (After Fig. 2328 in Bailey's "Standard Cyclopedia," p. 2005.)

admirably adapted to dispersal of the seed by animal agencies. This is characteristically shown in *M. louisiana*, the species here figured. The fruit, in its immature condition (Fig. 2), is pod-like, and is terminated by a curved beak equalling or exceeding the pod itself in length; it is this beak which has given rise to the common American names of the plant—"unicorn plant," "elephant's trunk" and "proboscis flower." The pod at first has a fleshy covering, with glandular hairs, as the fruit ripens, however, this fleshy exterior rots away, leaving a woody

[1] Bailey, L. H. "The Standard Cyclopedia of Horticulture." New York, 1925. Vol. II, p. 2005.

"capsule" covered with hooked spines; the woody tissues extending into the beak split on the drying and hardening of the capsule, forming two long horns. As the fruit lies upon the ground in its natural position, these horns curve upwards and backwards over the pod-like body of the capsule (Fig. 1); they have become somewhat distorted in the "Wolvercote specimen" and one of them is evidently broken, being shorter than the other. (The length of the body of the capsule in this case is 3 inches, and of the longer horn, 5 inches; it appears to be an average-sized specimen.) On the upper surface of the capsule, there is a prominent line of hooked spines, directed towards the horns; these spines are well-shown in the drawing. The seeds escape by the median longitudinal splitting of the capsule, beginning at the top end, as indicated in the Wolvercote specimen and in Fig. 1.

Various members of the Martyniaceae are cultivated as ornamental plants on account of their large showy flowers; those of *M. lutea* Lindl., a Brazilian species, are yellowish-green externally and orange-yellow within the corolla-tube; *M. fragrans* Lindl., a native of Texas, New Mexico, Arizona and N. Mexico, has reddish-purple or violet-purple flowers; while *M. louisiana* Mill. has dull white or yellowish corollas flecked internally with yellow or purple. Some species of *Martynia* are also grown in the vegetable garden, their young fruits, before hardening has taken place, being used as a pickle, in the same way as young cucumbers; *M. fragrans*, for example, was introduced into England for this purpose in 1731,[1] though it is rarely, if ever, met with now, the cool, damp English climate—very different from that of its native habitat—being unsuitable for its cultivation.

M. louisiana, as mentioned above, is a native of certain western and southern States; Bailey notes that it has become naturalized farther to the east and north. It is a plant, however which has travelled far beyond the States, for it may now be found in a naturalized condition in South Africa. The writer is indebted to Dr Burtt Davy for an explanation of its occurrence so far from its native area.

[1] Sanders, T. W. "The Encyclopædia of Gardening." London, Collingridge (n. d.). Pp. 262, 263.

During Great Britain's South African War (1899–1901), a large number of mules was brought over from Texas and South America to Africa for transport purposes for the troops, and for repatriation work; subsequently, in the neighbourhood of the artillery and repatriation camps, plants of *M. louisiana* were occasionally found, having grown, apparently, from seed which had fallen from capsules included in the hay brought with the mules; or, it may be, from capsules still entangled, by means of their tenacious hooked spines and curved horns, in the tails of the animals.

Knight and Step, in a semi-popular work on "The Living Plant,"[1] quote Frank Buckland as saying that the fruits of *Martynia louisiana* must have been created "for the express purpose of sticking to the tails of the wild horses which roam the plains of South America." Dr. Burtt Davy's observations in South Africa, however, suggest that the structure of the fruit provides a seed-distribution mechanism much more perfect and less fortuitous than that brought about by the mere transport of the capsules in the tails of animals, in which they might, or might not, hang in a position suitable for the scattering of the seeds.

It will be noted in Fig. 1, how the mature fruit lies upon the ground, with its two curved horns directed upwards and backwards. The horns are springy and resilient, and should an animal tread upon the fruit as it lies in its natural position, its fetlock is immediately gripped by the horns. As the animal lifts its foot, the horns cause the body of the capsule to spring backwards, so that the prominent ridge of hooked spines or bristles comes into sharp contact with the fetlock, to which the capsule thus becomes firmly attached, in such a position that its opening is directed downwards. The retrorse bristles, of course, prevent the capsules from falling off; in fact, they tend to cause it to work *up* the animal's leg. As the animal walks away, carrying the fruit thus attached, the seeds are gradually scattered.

Observations of this seed-dispersal mechanism have endowed the plant with still another common name, peculiar to South Africa, namely, "mule-grab."

[1] Knight, A. E., and Step, E. "The Living Plant in Leaf, Flower and Fruit." London, Hutchinson, 1905. P. 363.

Dr. Burtt Davy's account of the introduction of mule-grab into South Africa has suggested to the writer a possible explanation of how a seed-capsule of the plant came to be discovered at Wolvercote, so remote from either its original or its adopted habitat. After the South African War, it was common to see in English cottages carefully-treasured specimens of African plants, brought home by the soldiers; the silvery leaves of *Leucadendron*, in particular, were great favourites as "souvenirs." It is quite possible that some native of Wolvercote, finding the mule-grab capsule near a repatriation camp, was attracted by its curious, somewhat hedgehog-like appearance, and carried it home on his return from the war. In course of time, its interest and its associations having been forgotten, it may have been thrown out, after the manner of cottage refuse, into some garden or waste land, to await its re-discovery during the opening-up and extension of the village as a residential suburb of Oxford. The writer has not been able to confirm this idea; no one can be discovered who remembers having seen the "mule-grab" before, so that how it found its way to Wolvercote must remain a mystery. The suggested explanation is, however, possible, and it is at any rate interesting to speculate concerning the adventures of this odd "fruit."

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Some aspects of the phytogeography of West Virginia

Earl L. Core

West Virginia has one of the most irregular outlines of any state in the Union. Various "panhandles" and lobes extend its territory to distances relatively far removed from the main body of the state, which fact is significant in any consideration of the phytogeography, as carrying its territory into latitudes and longitudes remarkably distant from one another, in view of the comparatively small area of the entire state. It is variously regarded as one of the northern, southern, eastern, or western states. Its northern "panhandle" extends into the latitude of Staten Island; to the south it extends 60 miles below the latitude of Richmond; its eastern "panhandle" extends 50 miles east of the longitude of Buffalo; and its westernmost tip is 40 miles farther west than Cleveland.

Even more noteworthy from the phytogeographical standpoint are the variations in altitude, ranging from 272 feet at Harper's Ferry to 4860 feet above sea-level on Spruce Knob, Pendleton County. This range in altitude to a large degree overshadows the latitudinal range, so that the coldest temperatures are often reported from the central or southern counties. The accompanying table (Table I) gives the average temperature and precipitation for the state as a whole since 1891, when the official recordations were begun (9).

Table I. Average Temperature and Precipitation for West Virginia, 1890–1930

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Ann.
Temper.	32.1	32.2	42.6	51.6	62.0	70.1	73.1	71.8	65.8	54.7	42.5	33.3	52.7
Prec.	2.82	3.09	3.94	3.52	3.91	4.47	4.49	4.15	3.03	3.12	2.80	3.51	43.57

The lowest temperature recorded in the state since 1891 was −37° at Lewisburg in 1917. The highest in the same period was 112° at Moorefield in 1930. Some indication of the variations of temperature between various regions of the state may be had by comparing the maxima and minima at Bayard, one of the coldest places in the state, with those at Huntington, one of the warmest. The figures for Moorefield well illustrate the great range in temperature that may occur in a given locality (Table II).

Table II. Maximum and Minimum Temperatures, 1930

	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Bayard:												
High	65	68	67	88	88	88	94	95	90	77	73	50
Low	−7	−10	5	23	27	27	34	30	32	8	−14	−12
Huntington:												
High	72	80	76	92	92	105	108	107	98	85	78	59
Low	1	6	15	30	40	42	53	48	44	24	8	14
Moorefield:												
High	80	81	74	98	96	99	109	112	106	86	74	57
Low	−11	−4	15	23	34	29	41	39	39	13	−1	−5

Rainfall is not so evenly distributed over the state as might be expected. It reaches its greatest amount in the high mountains in the central part of the state, where the most luxuriant forests occur, and its lowest point just east of the Alleghenies, where semi-arid conditions are suggestive of the southwestern deserts. At Pickens, in Randolph County, the normal precipitation is 64 inches annually; at Upper Tract, in Pendleton County, hardly 50 miles to the northeast, it is only 29 inches. In the "great drought year" of 1930, while Pickens was receiving ample rainfall, 44 inches, the quantity received at Upper Tract dwindled to 9 inches. In one month of that year (March), Pickens received 6 inches of rainfall, 2/3 of the amount Upper Tract received in the entire 12 months.

The flora of West Virginia has been studied by many of the best known botanists of the country (5). Among these may be mentioned Michaux, who travelled down the Ohio and down the Shenandoah, collecting along the West Virginia shores; Pursh, who collected in Jefferson, Greenbrier, and Monroe Counties; Rafinesque, who collected along the Ohio, South Branch, and Shenandoah; Asa Gray, who travelled through Tygart's Valley, Shaver's Fork, and the headwaters of the Kanawha; Canby, who collected around Grafton; John Merle Coulter, who collected in the Kanawha Valley; and John Donnell Smith, who collected near Grafton and Mannington. The most exhaustive and systematic studies of the flora of the state were carried on independently by C. F. Millspaugh and by John L. Sheldon, the former the author of the latest check-list, dated 1913. Other prominent botanists who have made collections in West Virginia include John K. Small, N. L. Britton, Kenneth K. Mackenzie, P. A. Rydberg, J. M. Greenman, A. S.

Hitchcock, E. S. Steele, Edw. L. Greene, Edgar T. Wherry, and F. W. Pennell. Among amateurs should be noted L. W. Nuttall, a coal operator of Fayette County, who spent most of his spare time from 1890 to 1898 building up a large collection of plants of that county, largely fungi; and Fred W. Gray, a Presbyterian minister of Pocahontas County, who has made an intensive study of the mountain flora, chiefly lichens, bryophytes, and pteridophytes. The list could be greatly extended, if it were made to include all those whose piecemeal contributions have resulted in the accumulation of the present body of our knowledge concerning the flora as a whole. The present staff of the University Botany Department (8) has added the names of hundreds of species new to the state in the course of botanical expeditions that tour the state every summer.

Plant Formations

West Virginia was in its primitive condition practically entirely covered by forests, principally of deciduous trees, but also including a valuable belt of evergreens along the high ridges of the Alleghenies. Classified according to the Life Zones of Merriam (4), the principal species belong to the Upper Austral, Alleghenian, and Canadian Zones, with a sprinkling of species from the Lower Austral and the Hudsonian.

The Deciduous Forests, composed of species of the Upper Austral and Alleghenian Zones, are so well-known as to require no description. Along the river valleys, the forest is composed of *Populus deltoides*, *Betula nigra*, *Castanea pumila*, *Ulmus americana*, *U. fulva*, *Celtis occidentalis*, *Morus rubra*, *Sassafras officinale*, *Liquidambar styraciflua*, *Platanus occidentalis*, *Cercis canadensis*, *Tilia heterophylla*, *Nyssa sylvatica*, *Oxydendrum arboreum*, *Diospyros virginiana*, *Fraxinus americana*, *F. pennsylvanica* and a whole host of herbaceous species. On drier uplands with poorer soils, the following Alleghenian types are dominant: *Carya ovata*, *C. glabra*, *Castanea dentata*, *Quercus alba*, *Q. prinus*. On richer uplands the following are the principal woody species: *Juglans nigra*, *Fagus grandifolia*, *Magnolia acuminata*, *M. Fraseri*, *Liriodendron Tulipifera*, *Hamamelis virginiana*, *Acer saccharum*, and *Rhododendron maximum*.

On the high, cold ridges of the Appalachians the deciduous forests give place to the Coniferous Forests characteristic of the Canadian Life Zone. The chief components of the Canadian forest found here are: *Tsuga canadensis*, *Pinus resinosa*, *Picea rubra*, *Abies balsamea*, *Betula lutea*, *Amelanchier oligocarpa*, *Pyrus americana*, *Prunus pennsylvanica*, *Acer spicatum*, *A. pennsylvanicum*, *Viburnum alnifolium*, and *Sambucus racemosa;* while on the forest floor may be found *Clintonia borealis*, *Streptopus roseus*, *Maianthemum canadense*, *Trillium undulatum*, *Chrysosplenium americanum*, *Oxalis acetosella*, *Cornus canadensis*, *Chiogenes hispidula*, *Linnaea borealis americana*, and many others. Even the following Hudsonian species occur on exposed, wind-swept summits: *Betula papyrifera*, *Ribes prostratum*, *Rubus strigosus*, *Potentilla tridentata*, *Aralia hispida*, etc.

Here and there throughout the higher mountains, where the drainage is impeded due to resistant masses of conglomerate or other sandstone, are formed topographic features known locally as "glades," which resemble in a striking manner the bogs of farther north. In these glades may be found species of *Sphagnum*, *Cladonia*, etc., as well as such vascular plants as *Aspidium simulatum*, *Larix laricina*, *Carex trisperma*, *Pogonia ophioglossoides*, *Calopogon pulchellum*, *Alnus incana*, *Coptis trifolia*, *Drosera rotundifolia*, *Geum rivale*, *Vaccinium oxycoccos*, *V. macrocarpon*, and *Menyanthes trifoliata*.

A number of species have apparently first appeared in the southern Appalachians as a result of evolution from some other types, and persist in the higher elevations, not as portions of the Canadian flora surrounding them, but as peculiar Appalachian forms. Among such are *Carex Fraseri*, *Melanthium parviflorum*, *Stenanthium gramineum*, *Listera Smallii*, *Thalictrum clavatum*, *Cimicifuga americana*, *Aconitum vaccarum*, *A. uncinatum*, *Trautvetteria carolinensis*, *Magnolia Fraseri*, *Dicentra eximia*, *Parnassia grandifolia*, *P. asarifolia*, *Boykinia aconitifolia*, *Saxifraga micranthidifolia*, *Pachistima Canbyi*, *Euphorbia Darlingtonii*, *Menziesia pilosa*, *Rhododendron catawbiense*, *Vaccinium erythrocarpon*, and *Phlox stolonifera*.

In addition to the above-mentioned deciduous and evergreen forest types, there occurs a third type of plant association, covering many square miles in a narrow strip along the eastern border, to which Steele (7) has given the name SHALE-BARRENS. This is characterized (10) by a sparse, scrubby growth of *Pinus virginiana*, *P. pungens*, *Quercus ilicifolia*, *Kalmia lati-*

folia, and other woody plants, with scattered herbaceous species, including a considerable number of remarkable endemics, among which may be mentioned *Allium oxyphilum*, *Paronychia argyrocoma*, *Eriogonum Alleni*, *Clematis albicoma*, *Arabis serotina*, *Trifolium virginicum*, *Oenothera argillicola*, *Pseudotaenidia montana*, *Phlox Buckleyi*, and *Senecio antennariifolius*. Other plants found on the shale barrens, but not endemic there, include *Woodsia scopulina*, *Cheilanthes lanosa*, *Selaginella rupestris*, *Polygonum tenue*, *Anychia canadensis*, *Silene pennsylvanica*, *Sedum nevii*, *Astragalus distortus*, *Opuntia vulgaris*, *Viola pedata lineariloba*, *Asclepias tuberosa*, *Convolvulus stans*, *Pentstemon canescens*, and *Houstonia tenuifolia*.

Plant Migrations

West Virginia has been constantly above water since the close of the Permian and parts of the state from the Pennsylvanian or even earlier periods. Hence the present flora is the result of plant migrations that have been going on for an enormously long period of time. The Pennsylvanian and Permian floras were extraordinarily rich in species of Pteridophytes and Pteridosperms (11). At the close of the Permian, the Appalachian Revolution (16), culminating in the elevation of the Appalachian Mountains, produced conditions extremely unfavorable to the ancient marsh-loving flora and resulted in the extinction of innumerable types. During the long ages of Triassic and Jurassic times, the region was again base-leveled and the Coastal Plain, as known today, entirely submerged. Into this peneplained region came the advance hosts of the newly evolved angiosperms, representatives of prevailingly tropical groups, ranging far to the north as a response to the mild climate of the time. Then, at the close of the Mesozoic or early in the Cenozoic, the peneplained Appalachian region was again uplifted, resulting in "its inevitable conversion from a low Cretaceous plain with retarded drainage into a vast mesophytic area" (1), into which, Fernald believes, the abundant mesophytic flora of northern Asia, Europe and North America (then connected by land-bridges) was enabled to migrate, forcing the members of the old tropical and sub-tropical groups to abandon their haunts in the Appalachian upland "and to move out to the newly available xerophytic and hydrophytic habitats of the rising Coastal

Plain, where the acid savannahs, bogs, shallow pools and dry sands" supplied the environment in which they could still survive. In favorable habitats on the now uplifted peneplain, however, Kearney (3) thinks some Cretaceous species were able to maintain themselves and so have survived as relict colonies, the most ancient elements of the present Appalachian flora. In a list of such species, common to both the Coastal Plain and the mid-Appalachian region of West Virginia, there should be mentioned *Kyllinga pumila*, *Orontium aquaticum*, *Xyris arenicola*, *Xerophyllum asphodeloides*, *Amianthium muscaetoxicum*, *Melanthium latifolium*, *Agave virginica*, *Phoradendron flavescens* *Clitoria mariana*, *Stylosanthes biflora*, *Passiflora incarnata*, *Rhexia virginica*, *Bartonia virginica*, and *Coreopsis major*. The great majority of the present species may be regarded as the more or less modified descendants of this invading mesophytic flora of late Mesozoic or early Cenozoic times. Many of the genera, then widespread throughout the northern hemisphere, have since been reduced by various exigencies to geographically segregated remnants, persisting in widely separated places. Among such ancient genera may be noted *Arisaema*, *Symplocarpus*, *Chamaelirium*, *Aletris*, *Saururus*, *Menispermum*, *Zanthoxylum* *Podophyllum*, *Caulophyllum*, *Phytolacca*, *Maclura*, *Laportea*, *Magnolia*, *Penthorum*, *Hamamelis*, *Liquidambar*, *Hydrangea*, *Phryma* and *Triosteum*.

The Pleistocene glaciation did not reach West Virginia, the terminal moraine being 25 miles or more from the northern boundaries, yet it is probable that at that time at least the northern part of the state must have presented the aspect of an Arctic tundra, while many Canadian species were forced hundreds of miles farther south. Upon the retreat of the ice sheet and the consequent northward migration of biota, some of these species were left behind on the cold mountain tops throughout the Appalachians. Relict colonies of tundra, persisting in mountain glades, were surrounded by the migrating forests and are still in process of being replaced by succession (2).

Probably reaching West Virginia since the last glaciation, there are a few species which have wandered eastward from the prairie province, such as *Astragalus distortus*, *Silphium perfoliatum*, *Pentstemon canescens*, and *Asclepias verticillata*.

There should also be included in the flora a few species apparently of Rocky Mountain derivation, such as *Woodsia scopulina*, *Eriogonum Alleni*, and *Senecio antennariifolius*, whose ancestors, Wherry (10) suggests, may have migrated eastward across northern North America and made their way southward along the Appalachians in pre-glacial times.

Finally, there should be mentioned, of course, the hundreds of weeds, introduced from Europe and elsewhere in the last three centuries, which have come to be the dominant species of clearings and waste grounds.

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New York Botanical Garden.

A second record for Listera Smallii Wiegand in West Virginia

Jane Smith Netting

Strausbaugh and Core[1] (p. 43), recently added *Listera Smallii* Wiegand to the flora of West Virginia, recording it from Droop Mountain Glades in Pocahontas County at an altitude of 3000 feet. On June 24th, 1931, I visited this area with a small party under the guidance of Rev. Fred Gray, who is an acknowledged authority on ferns and the flora of West Virginia, and collected specimens of this tway-blade orchid which he pointed out to me.

Two days later, June 26th, while collecting in Cranberry Glades, Pocahontas County, at an altitude of 3400 feet in a sphagnum bog similar to that of Droop Mountain Glades, I found about twelve plants of *Listera Smallii* growing in thick mats of sphagnum with *Drosera rotundifolia* and *Habenaria psycodes* nearby. In this instance the plants were in full bloom and it was possible for me to determine the species from its characteristic glabrous ovary and pedicels as well as from its reniform leaves.

This is the first record of *Listera Smallii* in Cranberry Glades and, Droop Mountain Glades being the first station, is the second locality in West Virginia for this orchid. Specimens from each place have been deposited in the Herbarium of the Carnegie Museum.

Pittsburg, Pa.

[1] Strausbaugh, P. D. and Core, Earl L. 1930. Some Additions to the Millsbaugh Check List of West Virginia Spermatophytes. Proc. W. Va. Acad. Science, Vol. 4, pp. 38–48.

Newton's A Handbook of the British Seaweeds[1]

Previously to the appearance of the attractive volume with the above title late in 1931, the last professedly complete descriptive account of the British marine algae was about sixty years old and thus failed to register the modern advances in the knowledge of the subject. The gap was bridged, however, by papers on the algae of restricted areas and of special groups and, in a more general way, by E. A. L. Batters' scholarly "A Catalogue of the British Marine Algae," published in 1902. It is stated in the preface of the present handbook that "about 260 genera and 750 species are described." Many of the species and apparently all of the genera are illustrated by excellent text-figures, mostly original.

There are full keys to the genera and species, the keys to the genera being directly under the four large groups, Myxophyceae, Chlorophyceae, Phaeophyceae, and Rhodophyceae, without the intervention of family names, which, however, appear in their proper places in the text. Kylin's segregations in the Delesseriaceae are recognized but not Kuckuck's in the Chordariaceae of Kjellman in the Engler & Prantl arrangement. Perhaps Kuckuck's posthumous work appeared too late (1929) for consideration. The nomenclature is, generally speaking, in accordance with the "International Rules." An exception would appear to be the use of Kützing's *Phyllitis*, a homonym of the generic name used by Underwood, Christensen, and others for the fern genus more commonly known as *Scolopendrium*. *Petalonia* of Derbes & Solier seems to be the legal name for Kützing's *Phyllitis*. The reviewer is pleased to see the original spelling *Elachistea* in place of "*Elachista*" of Engler & Prantl and De-Toni. He would have been equally pleased to see the original spelling *Lithothamnium*, now adopted by Mme. Lemoine and others, in place of the perhaps more familiar "*Lithothamnion*." It is of interest to note the suppression of *Actinococcus* Kütz. and *Sterrocolax* Schmitz, currently considered to be parasites

[1] Newton, Lily. A Handbook of the British Seaweeds. 8 vo. pp. i–xiii, 1–478. *f. 1–270*. 1931. The Trustees of the British Museum (Natural History), Cromwell Road, S. W. 7, London. 15 shillings.

on other red algae, but now apparently proven to be parts of the life-cycle of the supposed hosts, as was assumed to be the case by the fathers of phycology. These discoveries the author attributes to Miss B. D. Gregory, but Dr. Kolderup-Rosenvinge had independently, and apparently at about the same time, reached similar conclusions. The author, by the way, is perhaps more widely known to phycologists as Dr. Lily Batten than as Professor Newton, but the passing of time is doubtless destined to popularize her later name. Most of the genera and probably most of the species of the British marine algae occur also on the northeastern coast of North America and Newton's Handbook will prove almost as useful to students of the marine algae in the eastern United States and Canada as in the British Isles. MARSHALL A. HOWE

Deam's Trees of Indiana

Eleven years ago I had the pleasure of reviewing in this journal Deam's authoritative and attractive book on this subject. Now the fourth edition[1] has appeared, which speaks well for the esteem in which it is held by the people of Indiana. The new edition is but little changed. The whole form of presentation is similar and the text in most cases identical; the plates are the same. A valuable new feature is the inclusion of maps showing the local distribution of almost every species. Four species and one minor form are newly admitted to the list of trees, and *Viburnum prunifolium* is excluded, apparently because it does not reach the form or stature of a tree. Nine changes in nomenclature were detected, some of which may cause confusion. *Quercus Michauxii* now becomes *Q. Prinus*, while the original *Q. Prinus* becomes *Q. montana*, *Quercus falcata* becomes *Q. rubra*, and the old *Q. rubra* is presented as *Q. borealis* var. *maxima*. More serious in my opinion are some of the changes in the common names, which are probably the ones actually used by nine tenths of the readers of the book. Hill's oak is changed to jack oak, but in my own western experience I have always heard that name applied to *Q. imbricaria*. *Carya cordiformis*, called pignut in the older edition, is now called bitternut hickory, and the name pignut is given to *Carya glabra*. H. A. GLEASON

[1] Deam, Charles C. Trees of Indiana. 326 pages, 140 plates, 118 maps. Published by the Department of Conservation, State of Indiana, 1932.

FIELD TRIPS OF THE CLUB

Trip of Sunday, March 13, 1932, to the Palisades

Twenty-seven members and guests appeared for the seven mile walk under the cliffs and the trek to and from the Kelders —the depression atop the Palisades and our objective at the end of the trail. The coltsfoot, *Tussilago Farfara*, and common chickweed, *Stellaria media*, were in full bloom and many of the winter buds were showing signs of spring, among others *Amelanchier canadensis*, *Sassafras variifolium*, *Acer rubrum*, *Sambucus racemosa*, *Staphylea trifolia*, *Ulmus americana* and *U. fulva*, *Benzoin aestivale* and many others. Halfway up the trail we came upon a young yellow birch, *Betula lutea*, still wearing many of its last year's leaves. Sheltered in the ravine it had withstood the winter's winds and was an object of considerable interest. Upon reaching the Kelders we found *Corylus americana* with the pistillate flowers just beginning to show, and in the swamp a fair-sized specimen of the somewhat rare red birch, *Betula nigra*.

Armed with a permit from the Park commission, the earnest students of winter botany were enabled to collect specimens, many of which found their way into classrooms on the following morning. In spite of the drastic "improvements" in the immediate vicinity of New York City, this stretch of wild woodland still invites the botanist.

Helene Lunt

Field Trip, March 27, 1932

Ripe catkins of *Alnus rugosa* and *Alnus incana*, and of *Corylus rostrata*, and the well advanced flowers of *Symplocarpus foetidus*, were the only flowering plants in bloom, on the field trip of Sunday, March 27, in the Highlands of the Hudson, from Bear Mountain, via Fort Montgomery to Torne Pond, Hawk Hill and return via Popolopen Creek. A few mosses, *Ceratodon purpureum*, *Polytrichum piliferum*, *Mnium hornum* and *cuspidatum* and *Bartramia pomiformis*, showed well developed capsules.

But lichens were in fine condition and, in the absence of other plants in advanced stages, were made the chief object for study. The ledges and old wood roads, on Hawk Hill, rising to 1200 feet, west of Torne Pond, proved rich in ground species, although tree forms are scarce, probably owing to numerous fires and frequent cutting.

The most unusual form was *Cladonia coccifera*, with red apothecia, on proliferations on sea-green cups. *Cladonia chlorophaea*, forma *carpophora*, was numerous along the Owl Trail over Hawk Hill, and displayed a great variety of proliferations, some approaching the form *homodactyla*, in which the sinuses between the stipes bearing the brown apothecia were so deep as almost to obliterate the cups. *Cladonia mitrula*, forma *imbricatula*, was common, with its large brown apothecia. Three of the "Reindeer Mosses," *Cladonia rangiferina*, *tenuis* and *impexa*, were found growing together on the borders of flat ledges.

Among the crustose lichens, several colonies of *Lecanora tartarea* were seen, on glacial erratics, mostly. A brown thallus, with conspicuous black hypothallus, seemed to be *Rhizocarpon ignobile*. Two species of what appeared to be *Buellias*,—*B. spuria*, and *B. parasema*, were found on smoothly polished quartzite cobbles in a brook bed.

The red fruited *Cladonia cristatella*, in the forms *Beauvoisii*, *ramosa*, *squamosissima* and *vestita*, as described by Professor A. W. Evans, in his "Cladoniae of Connecticut," was common and in fine condition and color. *Peltigera canina* also occurred. *Cladonia chlorophaea*, formae *simplex* and *prolifera*, were seen, the former being the most common cup bearing lichen in this region. *Baeomyces roseus* was not in as good condition as in early winter, the November crop of stipes being withered, but a new set was starting. A small colony of *Cladonia verticillata*, forma *apoticta* was found.

An interesting lichen was the Woolly Crocynia, *Crocynia lanuginosa*. This species, Crocynia of Annie Lorain Smith's "British Lichens," and *Amphiloma lanuginosa* of Fink's "Lichens of Minnesota," is, as Fink says, in the process of becoming a lichen, but is not quite settled yet as to what its apothecia, if, when and as developed, are going to be like. Its algal symbiont is probably Protococcus, but its fungal symbiont is yet uncertain, for it has not produced any apothecia to give a clue. It takes various forms according to the substratum, felt-like white or yellowish masses on mosses, or bases of trees; thinner and lighter colored thalli as small orbicular colonies advance out upon open ledges. It is often found as an epiphyte on the thalli of *Gyrophora dillenii*. Once identified, it is seen to be one of the commonest lichens in our region, and it adapts itself to various conditions and reproduces, by soredia only, with obvious efficiency and success.

RAYMOND H. TORREY

FIELD TRIP OF APRIL 2 TO SILVER LAKE PARK, WHITE PLAINS

A light rain and black clouds in the morning evidently discouraged some members of the club as only seven met at the station of the New York, Westchester and Boston Rail Road. The announced object of the trip was for spring flowering trees and shrubs. Evidently the trees among the hills of the region are later in opening their buds than elsewhere, as only a few red maples, *Acer rubrum*, and elms, *Ulmus americana*, were found in bloom. Under one slender maple were scattered many twigs with opened flowers, the stems all showing the tooth marks of squirrels. The staminate catkins of the smooth alder, *Alnus rugosa*, were shedding pollen on some plants, on others all the pollen had been shed and the catkins were drying. The stigmas of the pistillate catkins all showed pollen when examined with a lens. On the hazelnut, *Corylus rostrata*, the staminate catkins were fully expanded and some shedding pollen, but none of the pistillate flowers could be seen.

Beside the swamp the skunk cabbage, *Symplocarpus foetidus*, was nearly through flowering, with some of the leaves fully unrolled, the fluted spikes of the white hellebore, *Veratrum viride*, were six or more inches high, and a patch of golden saxifrage, *Chrysosplenium americanum*, was growing vigorously though it had no blossoms. Several plants of hepatica, *Hepatica acutiloba*, had the little hairy buds showing, but only one flower was found fully expanded. A small colony of walking fern, *Camptosorus rhizophyllus*, was found on a boulder of Fordham gneiss. As this fern is usually associated with limestone, Mr. Elwert tested the soil about the roots of the plants and found it to be strongly acid. In several places *Botrychium obliquum* var. *dissectum* was found, twenty or thirty of the sterile leaves of last year being found in one small area.

GEORGE T. HASTINGS

Bus Trip to Fahnestock State Park, April 17

Members of the Torrey Botanical Club joined with several other outdoor organizations in a trip by bus and automobile to Fahnestock State Park, in Putnam County, on Sunday, April 17. New York members of the various groups made the trip in two large busses, which proved a comfortable and speedy method of travel, one which our club might adopt more frequently, if a leader organizing such an excursion could be sure of filling a bus sufficiently to bring the cost down to a moderate figure. In this case, invitations to other clubs, resulted in filling two busses which made the round trip cost only $2. Probably this could be done again, if other clubs were invited. These busses hold 29 and the cost for a 12 hour day is $49. The method is recommended to the club, members of the field committee and field leaders, for further consideration.

When joined by members of the Westchester Trails Association, in private cars, the party numbered 99. The other groups represented were the Adirondack Mountain Club, Tramp and Trail Club, Inkowa Outdoor Club, Green Mountain Club, and some unattached individuals.

The party followed the Appalachian Trail north from the park, to a high viewpoint overlooking the lower country of Dutchess County, and beyond to the Shawangunks and Catskills. Spring flowers were few, the only ones in bloom being arbutus, and spicebush, but the leaves of skunk cabbage and poison poke showed some greenery along the brooks. However the open ledges on the summit of Mount Sekunna, disclosed some interesting lichens. One of them, *Stereocaulon paschale,* with beautiful silver-gray, closely packed cushions of feathery podetia, is a distinctly northern species, common at low levels in sub-Arctic latitudes, but found with us only on high bleak summits,—vanishing boreal islands. The writer has found it hereabouts only on Schunemunk Mountain, in Orange County, N. Y., and on Sky Top and Camelback Mountains, in the Poconos of Pennsylvania. It was very abundant on Mount Sekunna, several colonies occupying some square yards each being found.

Other lichens in considerable quantity and good development on the ledges were *Lecanora tartarea*, *Rinodina oreina*, and *Caloplaca aurantiaca*, the last making a conspicuous orange band across a boulder, with its brightly colored disk apothecia and thalli. Several other crustose species were seen. Three of the Rock Tripes, *Gyrophora dilleuii* and *muhlenbergii* and *Umbilicaria pustulata* were common.

On the descent from the mountain one large spreading plant of *Juniperus communis* var *depressa* a plant much more common in the northern part of the state than in our region was found.

Another interesting botanical feature was the swamp filled with red spruce, *Picea rubra*, (rare in this latitude) in Fahnestock Park, south of the county highway. It was mixed with *Rhododendron maximum*, which is much less common east of the Hudson than west of it. Pitcher plants were also found in this swamp.

This is a very interesting region, and would reward study at other times of the year, especially the spruce swamp, which might yield other unusual species if explored in summer. The Park can only be reached conveniently by automobile, via the Albany Post Road, to McKeel Corner, 13 miles north of Peekskill, then six miles east on the county road to Carmel.

RAYMOND H. TORREY

PROCEEDINGS OF THE CLUB

Meeting of February 17, 1932

The meeting was called to order at The New York Botanical Garden at 3:30 P.M. by President Sinnott with thirty-five members present.

Miss Gardis B. Thayer, 18 Elizabeth Street, Rutherford, New Jersey was elected to membership in the club.

The resignations of Miss Kathleen Muchmore, Mr. Randolph Jenks, Mrs. Wm. P. Jenks, Mr. Alfred H. Povah, and Miss Marjorie F. Aldous were accepted with regret.

The following resolution was read and adopted:—

"The Torrey Botanical Club feels keenly the loss to plant science by the death of Professor C. H. Kauffman. Doctor Kauffman's work as a mycologist, a cytologist, and a student of the mycorrhiza is of outstanding significance for the growth of more critical concepts and standards in all these fields.

As a teacher and leader of research among the younger students of the fungi, his work was stimulating and creative in an unusual degree. The Club desires to put on record its appreciation of Doctor Kauffman's high qualities, both as a man and as a scientist."

Signed by the Committee,
R. A. Harper
B. O. Dodge
Fred J. Seaver

Dr. E. B. Matzke of Columbia University gave an interesting talk on "Stamen Variation in Stellaria media."

Mr. George T. Hastings of Theodore Roosevelt High School gave a talk on "Some Botanical Impressions of Hawaii." His talk was illustrated by lantern slides and specimens collected on the trip.

Forman T. McLean, *Secretary*

Meeting of March 1, 1932

The meeting was called to order at the American Museum of Natural History at 8:45 P.M. by President Sinnott with eighty-three people present.

Mrs. Dorothy S. Horwath, 875 West 181 Street, New York

City, and Miss Adele Kline, 209 N. Maple Avenue, East Orange, New Jersey were unanimously elected to membership in the Club.

It was moved by Mr. Torrey that the club endorse the emendment to the penal law, section 1425, adding the wild Azalea to the list of protected plants, and that the Secretary be instructed to write to Mr. Burton D. Esmond informing him of this action. This motion was passed.

Dr. P. W. Zimmerman of the Boyce Thompson Institute at Yonkers gave a very interesting talk on "Motion Picture Showing the Growth and Movements of Plants."

Respectfully submitted,
FORMAN T. MCLEAN, *Secretary*

MEETING OF MARCH 16, 1932

The meeting was called to order at The New York Botanical Garden at 3:30 P.M. by President Sinnott with thirty-one members present.

Mrs. Kenneth M. Goode, Barbizon-Plaza Hotel, Central Park South, New York City and Miss Helen Houghtaling, Coytesville, New Jersey were unanimously elected to membership in the club.

Dr. Alfred L. Gundersen of the Brooklyn Botanic Garden gave an interesting talk on the "Flower Buds and the Classification of Dicotyledons.

Meeting adjourned at 5:00 P.M.

Respectfully submitted,
FORMAN T. MCLEAN, *Secretary*

NEWS NOTES

William Willard Ashe died in Washington on March 18 at the age of 60. Mr. Ashe graduated from the University of North Carolina in 1891 and from Cornell in the following year. He was senior inspector in the forest service. For many years he had been active in the creation, preservation and utilization of wood lots and in the development and aquisition of forest lands by the National Government. He was an authority on the hardwoods of the southern states. He was a member of the Torrey Botanical Club and frequently contributed descriptions of new species or varieties of trees.

Dr. Fred W. Foxworthy, who has been Forest Research Officer for the Federated Malay States since 1918, is retiring from government service, and his address after April 15 will be 1009 Huntington Building, Miami, Florida. Doctor Foxworthy is known for many important contributions to our knowledge of the woods of the Indo-Malayan region. He has held membership in the Torrey Botanical Club since 1906, and this year has become a life member of the Club.

APPEAL

To Botanical Institutes and Botanists for Funds Towards the Erection of a Bust of Dr. John Briquet

On the 26th of October, 1931, Dr. John Briquet, Director of the Botanic Garden and "Conservatoire botanique" in Geneva, died at the age of 61, after a brief illness. This painful loss must awaken sincere regret throughout the botanical world and arouse feelings of deepest sympathy for his family and the institutes with which he was so long and honourably connected. In his death botanists have lost a true friend, a lovable, highly accomplished man and a recognised authority; one whose scientific conscientiousness is reflected in all his published works.

All who have attended meetings of the International Botanical Congresses—in 1900, 1905, 1910, and 1926—will realize the great loss botany has suffered by his death. At those meetings he was an outstanding figure in all discussions on Nomenclature, and the role he played as recorder, by his tactful, sagacious and conciliatory nature, together with his great knowledge of languages and absolute command of the matter in hand, left an indelible impression on the minds of all. Thus he contributed greatly to the unifying of botanical nomenclature, and his services at the memorable Congress held at Cambridge in 1930 will long be gratefully remembered.

The undersigned, personal friends and colleagues of Briquet, representing the botanical circles of his native land, desire to commemorate his great services to our science by the erection of a *bronze Bust* to be placed in the "Conservatoire botanique" in Geneva, along with those of Vaucher, De Candolle, Boissier, Ascherson, Engler and others who have done so much to enrich the herbarium of the Conservatoire, to which Briquet has contributed in so large a degree. We feel sure it is the desire of all botanists to bear this testimony to the very great services he rendered to that botanical institute, as well as to his invaluable and ever willing help to all who used the herbarium. Together with others he made Geneva a Mecca to all botanists.

We shall be glad if you will show your appreciation of the life-work of Briquet by contributing to the above memorial. Subscriptions should be sent to M. le Prof. E. Wilczek, Palais de Rumine, Musée botanique, Lausanne.

Dr. H. Christ, Reihen near Basle.

Dr. B. P. G. Hochreutiner, Director of the botanic Conservatory, Geneva.

M. Oechslin, President of the Swiss botanic Society, Altdorf.

Prof. Dr. E. Rübel, Central president of the Swiss Society of Natural sciences, Zurich.

Prof. Dr. H. Schinz, Emeritus professor at Zurich University.

Prof. Dr. C. Schröter, Emeritus professor at the Federal School of High technical studies, Zurich.

Prof. Dr. E. Wilczek, Conservator of the botanic Museum, Lausanne.

Altdorf, Basle, Geneva, Lausanne and Zurich, March, 1932

THE TWENTY-FIRST annual report of the Brooklyn Botanic Garden, 1931, reports an increase in the attendance for the year and a slight increase in the endowment funds. An extensive educational program has been carried on, both at the garden and through materials sent out to the schools. Research work is in progress at the garden along lines of plant pathology, disease resistance, forest pathology, especially on connection with chestnut blight, work on beardless iris, and work in systematic botany and genetics.

THE NEW YORK STATE Conservation Department has announced the purchase of 24,000 acres of land to be added to the forest preserve. One tract of 21,000 acres in northern Herkimer County, near the Beaver River, is the largest block added to the preserve in recent years. It is extensively wooded with virgin forest. The other tract of land consists of 3,000 acres, comprising Howland's Island in the Seneca River east of Seneca Falls in Cayuga County. It consists of meadow land in the Montezuma marshes. It is partly wooded, but most of it consists of abandoned farm land. It will be developed into a game refuge or public hunting ground. (It is difficult to see how it can be both at one time.)

THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their paper appears, will kindly notify the editor, when returning proof.

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OF THE

TORREY BOTANICAL CLUB

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In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE—a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24-58 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1-18 are now completed. The subscription price is fixed at $3.00 per volume in advance; Vol. 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00. Certain numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) Index to American Botanical Literature, reprinted monthly on cards, and furnished to subscribers at three cents a card.

Correspondence relating to the above publications should be addressed to

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EDITED FOR
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BY
GEORGE T. HASTINGS

John Torrey, 1796-1873

CONTENTS

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MEMBERSHIP

All persons interested in botany are invited to join the Club. There are three classes of membership: *Sustaining,* at $15.00 a year; *Life,* at $100.; and *Annual,* at $5.00 a year. The privileges of members are: (a) To attend all meetings of the Club and to take part in its business, and, (b) to receive all its publications.

Meetings of the Club are held on the first Tuesday of each month at the American Museum of Natural History, New York City, and on the third Wednesday at the New York Botanical Garden.

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Matter for publication, and books and papers for review, should be addressed to

GEORGE T. HASTINGS
2587 Sedgwick Ave.
New York, New York

TORREYA

Vol. 32 July-August, 1932 No. 4

Observations on the flower behavior of the Avocado in Panama

Alexander F. Skutch

About the pleasant grounds of the Research House of the United Fruit Company fronting on the Changuinola Lagoon twenty miles west of Almirante in western Panama, where I resided during the first half of the year 1929, stood about a dozen well-grown avocado trees (*Persea americana* Mill.), some of them very large, well-rounded specimens. While the history of these particular trees is not definitely known, and they were undoubtedly planted at widely separated intervals, they all probably represented the usual unpedigreed and ungrafted stock, such as one finds in the dooryard plantings of the natives throughout the region. The heavy solstitial rains abated early in January, and gave way to the delightful weather which prevails in the region during the early months of the year. The days were generally clear, although the sky was sometimes overcast it seldom rained, and at noon the temperature in the shade rarely exceeded 80° F. In such weather, about the middle of January, the earliest avocado trees began to flower, and thence until the middle of March some of the trees were in blossom. At the same time they shed the old leaves of the previous season, and acquired a new covering of bright green.

Having read a paper by Robinson and Savage (1) on the pollination of the avocado in Florida, I was eager to observe for myself the interesting and peculiar floral behavior which they recorded. A friend familiar with tropical fruit trees with whom I discussed the matter seemed to doubt whether the avocado—at least in the tropics—actually exhibited the double period of anthesis which these authors describe, which made me the more interested to determine for myself what the situation actually was. Although we have several excellent accounts of the anthesis of improved and grafted avocados in subtropical California and Florida, I am not aware that anything has been published, at least in the American botanical literature, concerning the behavior of the flowers of unimproved trees in the tropics. Since such trees seem closer to the ancestral wild stock than the highly selected varieties chosen by commercial orchardists, a record of the behavior of a few of them might contain certain points of interest.

Stout's careful studies of the flower behavior and the pollination of the avocado (2, 3), begun in southern California during the winter of 1922-23, are the basis of our knowledge of the subject. He discovered that each flower has two distinct periods of opening, separated by a period of variable duration in which it is closed. During the first opening the anthers remain closed and shed no pollen, but the pistil is receptive to pollen brought from other trees. In the intervening closed period the stigma withers, with the result that at the second opening of the flower on the following day, when the anthers dehisce and shed their pollen, self-pollination is no longer possible. Since all flowers of a set on the same tree behave in the same manner, opening and closing simultaneously, agreeing in the condition of their anthers and stigmas, with slight or no overlapping of the first and second opening of different flowers, close-pollination is very unlikely to occur.

In respect to their periods of dianthesis, all avocados so far studied fall into two distinct groups. In the one, which Stout has designated as Class A, the flowers open first with receptive stigmas in the morning, when we may for conciseness term them "functionally pistillate," close some time during the middle of the day, remain closed for about twenty-four hours, and open the second time to shed their pollen during the afternoon of the succeeding day. After persisting a few hours as functionally staminate flowers, they close in the late afternoon and never again expand. Trees of Class B are characterized by the fact that their flowers open first in the afternoon,—like the former functionally pistillate during the first anthesis,—and close again late in the day, but on the basis of the time of the second expansion their flowers fall into three groups. In the first (B_1), all the flowers of the tree open for the second time and shed their pollen over a period of several hours the following morning. The life of these flowers is roughly 24 hours. In the second (B_2), after closing at the end of their first period of expansion, the flowers remain closed during two nights and a day, and open again only on the second morning following, when they shed their pollen as in the case of the preceding group. Their life

Fig. 1. The inflorescence of the avocado. The flowers are borne on the basal branches of the newly expanding annual growth increment of the shoot, the terminal portion of which bears the young leaves of the season. February 12, 1929.

is then about 48 hours. The third group (B_3) is made up of trees that bear some flowers which exhibit the behavior of each of the preceding groups. That is, after the termination of their first period of anthesis, some will remain closed a single night and open the following morning, while others on the same tree will remain

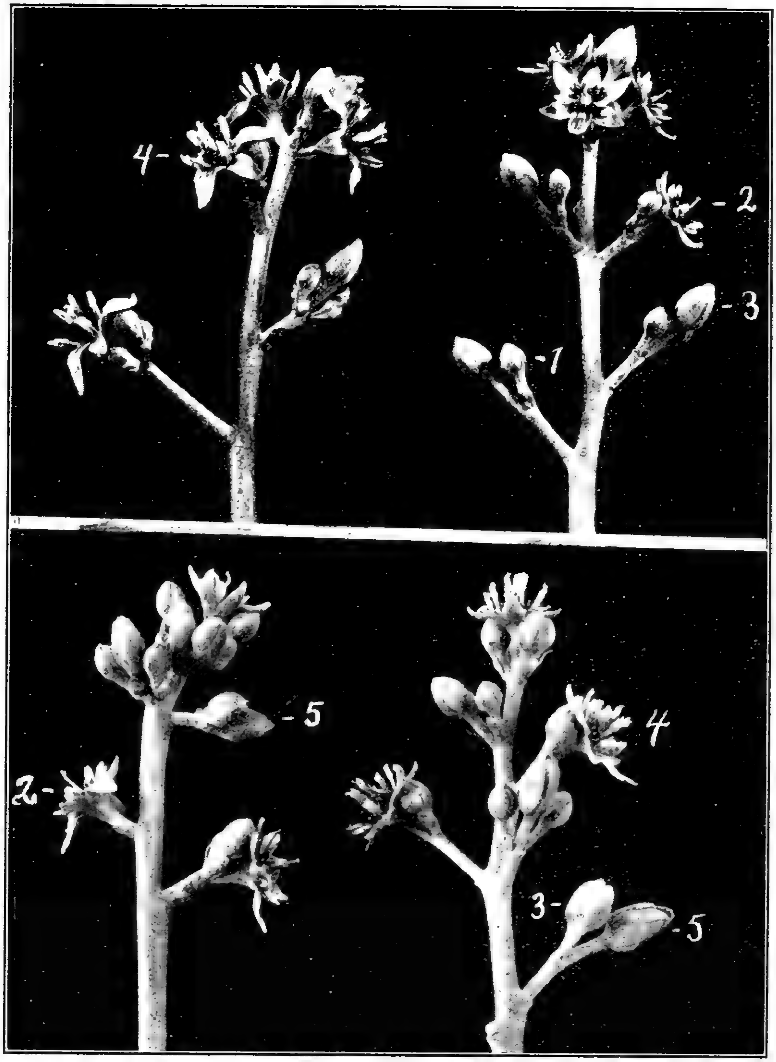

Fig. 2. The reciprocal alternations of the development of the pistils and anthers of avocado flowers. At right, flowers of Taylor, a typical Class A variety; at left, flowers of Panchoy, typical of Class B. The upper photograph shows the appearance of the two classes at the same moment in the forenoon, the lower in the afternoon, when a different set of flowers is open on each tree. In the morning, Class A flowers in their first opening (upper right) are receptive to the pollen which is shed by Class B flowers in their second opening (upper left). In the afternoon, Class A flowers in their second opening (lower right) shed pollen which may be carried to the receptive stigmas of Class B flowers in their first opening (lower left). Photograph by Dr. A. B. Stout.

closed two nights and a day, and expand again on the second morning following.

During the morning, bees and other insects may carry pollen from Class B trees with flowers in their second opening to the receptive stigmas of Class A flowers in their first opening, while during the afternoon the process is reversed.

All trees of the same horticultural variety belong to the same class and their flowers open and close, under like weather conditions, at about the same time. Indeed, since they are all derived by vegetative means of propagation from the same tree, they behave exactly as though they were branches of a single individual.

Stout in California and Florida and Robinson and Savage in Florida have determined the classification of a large number of named varieties.

The small, yellowish flowers of the avocado are borne in panicled clusters on short, leafless branches at the base of the annual shoot (Fig. 1). The fully expanded blossom measures about 12 mm. in diameter. The six perianth divisions are alike in size and color. There are nine stamens arranged in two rows, the six of the outer series situated opposite the perianth divisions, the three of the inner series inserted just inside of those three of the outer series which lie opposite the outer perianth divisions or sepals. In the center of the flower is a single one-ovuled pistil with short style and simple, capitate stigma. During the first opening, when the stigma is receptive, the nine stamens with their closed anthers are bent outward and lie above the inner face of the perianth divisions, leaving the stigma fully exposed (2, Fig. 2). At the second opening, when the stigma is usually discolored, the three inner stamens, their filaments somewhat elongated, stand upright in the center of the flower overshadowing the pistil, while the other six curve obliquely upward (4, Fig. 2). Each anther opens by four neat, uplifted, elliptical valves and sheds its yellowish pollen.

After I had become familiar with the general type of behavior of the trees by preliminary observations, I devoted February 16 and 17, 1929, both clear, warm days, to the observation of eight trees whose lower branches were accessible from the ground or from an eight-foot step-ladder. On each of six of these trees twenty flowers were marked with small jeweller's tags, so there could be no doubt of the behavior of individual blossoms. Both days, from 7:30 A.M., when the earliest flowers were opening, until sun-set, when the last flowers closed, were spent in a continuous round from tree to tree. Less continuous observations to determine certain points of interest were made on subsequent days. The eight trees fell into three well-marked groups.

I. Two trees growing side by side agreed essentially in their floral behavior. Both belonged to class A. The fresh flower buds began to open in the morning at 9:20, and by 9:30 some were completely expanded. The stigmas were fresh and apparently receptive, the filaments declined and the anthers closed. Thus they remained during the remainder of the morning. By 12 noon some flowers began to close; by 12:30 many were closed and others still closing. The flowers then remained closed for slightly more than 24 hours, or until about 1 P.M. the following day, when they began to expand for the second time. The stigmas of most had withered but in a few cases they still appeared fresh. The anthers began to shed their pollen about 15 minutes after the flowers opened. At 4:40 P.M. the flowers began to close, at 5 they were about one-half closed, and at 5:20 completely closed.

These trees, especially the smaller, set a fair quantity of fruit.

II. Two large trees belonged to class B. In both the flowers opened for the first time between 2:30 and 3:20 P.M. and remained in anthesis with receptive stigmas during the latter part of the afternoon, different individuals closing for the night between 4:45 and 6 P.M. They opened the following morning, some with stigmas still fresh in appearance, between 7:30 and 8, and having shed their pollen, made their final closing between 1:10 and 2:30 P.M.

One of these trees, when I left Almirante in June gave promise of a fair crop, while the second bore only a few green fruits.

III. Four of the trees, while giving indications of floral behavior which would place them in class B, were extremely erratic in their anthesis. A small percentage of the flowers opened sporadically during the late afternoon, between 3:30 and 4 on different trees, and remained open for less than two hours, for by 5:30 or 5:45 all were again tightly closed. The degree of spreading of the perianth of these flowers was variable; many opened only very slightly, few of them spread fully in the normal manner. The following morning, between 7:30 and 8, all of those flowers which showed any degree of opening on the previous afternoon, together with many which now for the first time expanded, opened with stigmas still fresh, and soon the valves of the anthers lifted and allowed the pollen to escape. These flowers now remained open for a long period, about six hours, and did not close until between 1 and 2 P.M., when many of the stigmas were still unwithered.

I made observations to determine what proportion of the flowers opened partially or completely on the afternoon before expanding for what would normally have been their second period of anthesis on the following morning. At 4:20 P.M., February 18, the middle of the desultory first period of anthesis, I marked a twig on tree 2 which bore ample clusters of buds but only a single open blossom. On the following morning over 100 flowers on this twig were open and shedding pollen. Other twigs on this tree and its neighbor tree 3 showed a similar low proportion of the flowers with two periods of anthesis. The other two trees in this group had a larger proportion of flowers which opened in the afternoon, but still well under 50 per cent, of the total number. Thus on February 18, at 4:10 P.M., 25 flowers on a marked twig of tree 4 were more or less open. The following morning at 10:40 this twig supported 69 blossoms in full anthesis.

It occurred to me later that all, or at least a much greater proportion of the flowers than the observations just recorded would indicate, might have a very transitory afternoon opening. If such were the case, and the flowers did not all open at the same time, a single examination even in the middle of the first period of anthesis would not reveal their true numbers. Accordingly, on February 25, certain chosen branches on these trees were visited at twenty-minute intervals, and every flower which showed any degree of opening was tagged. A single example will suffice. At 1:10 P.M. the chosen branch on tree 1 bore 107 open flowers in their second period. Since the sky was overcast most of the day, the closing of these flowers was delayed; it began at about two and was not completed until three o'clock. By 4:15 P.M. a few first period flowers had opened on other accessible branches of the same tree, but none on the selected branch. Between 4:55 and 5:15 one flower on this branch opened halfway. It never expanded beyond this point and by 6:25 was practically closed again. Yet next morning this same branch bore 49 open flowers, including that which had partly opened on the preceding afternoon. Similar observations on trees 3 and 4 gave comparable results. On the succeeding afternoon, which was bright and warmer, a larger number of flowers opened on these trees, but still a small percentage of those which expanded the ensuing morning.

Although in a large proportion of the flowers of these four trees the stigmas remained apparently receptive during the second period opening, so that there was a good possibility of the transfer to them of pollen from the same flower and of other flowers of the same or the three neighboring trees in class B, the irregular character of the first opening made the accomplishment of what we may term the "legitimate pollination" of these flowers by the two neighboring class A trees extremely unlikely. When I examined these four trees at the end of March I could find only a single immature fruit in the whole group, despite the myriad blossoms each tree had expanded.

Stout and Savage and Robinson have demonstrated that abnormal weather, especially a cold spell, may cause great disturbances in the daily periodicity of the flowers, amounting sometimes to the complete inhibition of the first period opening. The result is a set of flowers which exhibit only a single period of anthesis, when the pollen is shed. The peculiar behavior of the four trees in my third group was certainly not conditioned by atmospheric conditions, for it occured during warm, bright weather as well as on cloudy and rainy days, and was the usual behavior of the trees in question. It may be noticed in passing that the two trees of group II show an approach to the condition of group III in their relatively brief first period opening (less than 3 hours) followed by a second period of anthesis over twice as long on the following day.

It is hardly an exaggeration to state that a large avocado tree produces millions of flowers each season, and only an exceedingly small proportion of these set fruit even under the most favorable conditions. The normal fate of the flower is then to fall shortly after closing for the second time—by the second day after this final closing most have been shed, by the third day practically all save the few which set fruit. During the height of the flowering season there is a constant shower of effete blossoms, and the ground beneath the trees is thickly strewn with them. The continuous dropping of the closed blossoms reminds one of the sifting down of the corollas of grape flowers beneath a wild vine which is coming into full bloom. As a breeze shakes the bare limbs, the pattering of falling flowers upon the dry leaves which cover the ground beneath the tree sounds like the rustling of the first flakes of an early snow upon the dead leaves of an autumnal forest in the north. After the flowers fall, the naked branches of the inflorescence are themselves cut off from the tree, and finally in many cases the entire inflorescence—when it does not support developing fruit.

As the earliest flower buds expanded in the latter half of January, the trees began to cast off the old foliage which had served them ten or eleven months. As is frequently the case with deciduous tropical trees whose flowers are produced when the limbs are almost or quite leafless, both the process of defoliation and the expansion of the flowers begin and progress most rapidly at the top of the tree, with the result that this usually becomes quite bare of foliage while the lower branches are still well-clothed with the old leaves (see Wright 4, p. 475). Not only are the lower branches the last to lose their old leaves, but they are the first to acquire the new, which are in many cases put forth and sometimes even attain full size before the old leaves in the same part of the tree have been completely shed. Thus it happens that the lower stories of some trees are never bare, while the upper half is often denuded of foliage during at least a considerable part of the period of flowering. Frequently, however, a tree will be found quite leafless at the height of the flowering season, when it is yellow with the myriad buds and blossoms it supports. As with the sassafras, the flowers themselves are borne on leafless branches which spring from the base of the newly expanding annual shoot, and consequently are situated below the young foliage. The tender leaves are a very light green and contrast strongly with the sombre hue of the old foliage still persisting on the tree. By the second week of March, 1929, some of the trees had completed their flowering, while in others flowers were still produced on the upper branches, after the lower had spent all their buds. About half the trees were in full new foliage, but a few were still rather bare.

Summary

Observations were made on the flower behavior of eight avocado trees in a dooryard planting in western Panama. Two of these were typical class A trees, as defined by Stout, and two belonged to class B_1. The other four, while giving indications of the type of behavior of class B trees, were erratic in that only a small percentage of the flowers opened in the afternoon. In most the first period opening was suppressed entirely, and there was a single long period of anthesis in the morning, when the pollen was shed at the same time the stigmas of the same flowers appeared recep-

tive. The four trees of normal behavior set a fair crop of fruit, while only a single fruit was produced by the latter four.

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BALTIMORE, MARYLAND

What is a species?

T. D. A. Cockerell

On reading Dr. Gleason's comments on species on pages 43-45 of the March-April number of Torreya I feel that his philosophy (perhaps not intended to be taken too seriously) is wrong. He says: "Suksdorf may or may not be justified in making so many species." Suksdorf, in my judgment, never *made* a species in his life; he only *described* what he *supposed* were species. Müntzing and Erlanson may be said to have made species, in the manner indicated below. Then Dr. Gleason offers a definition: "A species is a group of one or more individuals which in *your* opinion deserves a binominal name." To me species are objective realities in nature, and subjective opinions do not in the least affect their existence or number. But, it may be replied, is not the conception of a species a product of the human mind, and do not as a matter of fact the number of species differ with the opinion of botanists? Thus Müntzing, in a recent discussion of the cytology of *Potentilla,* states that *P. argentea* L. has different chromosome-races within the species. There are diploid, hexaploid and octoploid races. These plants also differ in appearance, yet Müntzing concludes that "there seems to be no reason to split *P. argentea* into a great number of 'species' of the *Hieracium* type, though this might certainly be easily done." Perhaps someone will do it, and then the number of species of *Potentilla* will appear to rest, not on the actual facts, about which there is no dispute, but upon the opinion of this or that botanist. However, the ordinary conception of a species is that of a group of individuals remaining normally isolated in nature, and exhibiting special specific characters. This is a loose definition, but sufficient to cover the various aspects of the subject. Among insects, which are more specialized and standardized than plants we find pairs of species which are so much alike that it is difficult for experts to distinguish them, yet observaton shows them to be quite distinct entities in nature. We also find cases where the ranges of related species meet and crossing occurs. Among plants, it is easy to see that apparently good species may be dissolved into a variable hybrid population. A very good case is that of the blue *Aquilegia caerulea* and the yellow *A. chrysantha.* As they exist in nature, occupying different ranges, they are excellent species. But in gardens they cross readily, giving rise to fertile hybrids. If the ranges of these plants came to overlap there would arise a variable population which no botanist arriving after the event could break up into two species.

Most remarkable is the recent production,—one may fairly say creation,—of species through crossing. Müntzing crossed *Galeopsis pubescens* with *G. speciosa,* and was eventually able to extract a plant which did not differ at all from the well-known species *G. tetrahit.* This plant was fertile, and the stock can be carried on indefinitely. Heribert Nilsson crossed the willows *Salix caprea* and *S. viminalis,* and obtained a plant which morphologically could not be distinguished from *S. cinerea.* Mrs. E. W. Erlanson, in a recent paper on American roses, remarks: "*Rosa rudiuscula* is a natural hybrid between *R. carolina* and *R. arkansana* (the Western Prairie rose), as I was able to prove by producing it experimentally. It is so characteristic of the rose flora of northwestern Indiana, Illinois, and eastern Iowa that it should be given specific rank." (American Rose Annual, 1932.)

Species are not all of equal rank, if by that we mean antiquity and distinctness, but on the face of the landscape they are real entities, to be studied and discriminated. The recognition of subspecies is a useful device for associating together minor types in groups or aggregate species, and thus avoiding the excessive multiplication of independent binomials. It is quite true, as Dr. Gleason indicates, that legitimate differences occur as to the placing of these forms. In this sense it is perfectly true that the number of species is a matter of opinion. But the number of different kinds of plants is not, and it is I believe a dangerous and false doctrine (met with not infrequently) that species do not truly exist in nature, but are products of human mentality. I would put it this way. The pattern of nature is woven in an intricate fashion, and it was so woven ages before man came on the scene. It is man's opportunity to observe this pattern, recognize its details and reason about the operating causes. To do this is one of the highest functions of the human mind. But truth must always be derived from reality, and all departures from veracity are unscientific.

The inevitable diagreements are partly due to mere mistakes, to be corrected by further observation; and partly due to differences of terminology, to be corrected by conference and agreement.

University of Colorado
Boulder, Colorado

The Corema Conradii station on Shawangunk Mountain

Raymond H. Torrey

The references, in Gray's Manual of Botany, Britton & Brown's Flora of North America, and Norman Taylor's Catalogue of Plants in the Vicinity of New York, and in the catalogue by the State Botanist, Dr. House, to the occurrence of Conrad's Crowberry, *Corema Conradii,* in the Shawangunk Mountains, in Ulster County, New York, long interested the writer before he had an opportunity to find this old station for the plant. The distribution of Corema, as botanical collectors know, is quite remarkable. The southernmost stand in the Pine Barrens of New Jersey, principally on the West Plains, ten miles east of Barnegat, and a few smaller stands in that vicinity, have often been visited in recent years, by the members of the Torrey Botanical Club. Its original discovery, more than a century ago, its temporary loss through failure to find it again, and its rediscovery about 50 years ago, are interestingly told in Dr. Witmer Stone's Plants of Southern New Jersey.

The plant was reported half a century ago, though its identity is doubtful, on Long Island, somewhere between Oyster Bay and Hempstead, but it certainly does not exist anywhere on Long Island now. It occurs on Cape Cod and is frequent on the Maine Coast and becomes commoner northward. The station reported in the Shawangunks interested the writer as the only one, apparently, between the Pine Barrens and eastern Massachusetts.

An expedition was organized, in April, 1932, to rediscover the Shawangunk station. As the references simply stated, "in the Shawangunk Mountains," which are twenty miles long and two to six miles wide, information which might limit the area to be searched was sought of Prof. M. L. Fernald, Curator of the Gray Herbarium, Harvard University, since the reference in Gray's Manual, Seventh Edition, seems to be the one which is adopted by other manuals and catalogues of our flora. Prof. Fernald kindly sent us the data on the tickets of two herbarium specimens of Corema, one found in 1880 by C. S. Smith, "on the summit of the Shawangunk Mountain" which was still rather vague; and the other, much more definite, by J. H. Redfield, June, 1883, with the location in Latin, as follows:

"In rupibus siliceis, super vallem Palmaghat, in montibus Shawangunk."

Palmaghat is the name of a steep sided valley which cuts into the front of the Shawangunk Mountains, west of Gardiner, Ulster County, and south of the Wildmere House, on the summit, at Minnewaska Lake. Its name is said to be Dutch for "Laurel Glen." A request for permission from the owners, the Daniel H. Smiley

Corema in bloom on top of cliff at east side of Palmaghat Valley

Hotel Company, brought a letter from its secretary, Mr. John K. Lathrop, informing us that Corema was known to him, on the trail south of the Wildmere, on the top of the cliffs on the east side of Palmaghat.

The party making this quest was composed of Mr. A. Tennyson Beals, Mr. Carl E. Bliss, Mr. Leon W. Bowen, Mr. W. Lincoln Highton, Mr. Louis W. Anderson, and the writer. We reached the entrance to the grounds of the Wildmere Sunday morning April 24, having chosen that date with the thought that Corema would then be in bloom, which proved to be correct.

The trail led south over the summit to the abrupt sides of

Palmaghat, and within a couple of miles we came upon large masses of Corema, in perfect condition for collecting, with the pollen on the staminate plants scattering in golden clouds at the slightest breeze. Following the trail farther south, we descended into a gully with a brook, and climbing again, along the ledges of the acute-angled point made by the southeast front of the mountain, a 400-foot cliff, and the eastern side of Palmaghat, where ice still remained in the crevices 50 feet below the brink, reached the promontory known by the picturesque name of "Gertrude's Nose." According to A. T. Clearwater's "History of Ulster County" the name is from the most prominent facial adornment of Gertruyd Bruin, wife of Jacobus Bruin, who settled in the Wallkill Valley nearby about 1665. Her neighbors seem to have thought it was merited. Here Corema was in great profusion and fine condition. It extended from the cliff edge north along the ledges, among the thin pitch pines and scrub oak, covering at least 200 acres of the mountain top. It grew only, as Redfield said, "in rupibus siliceis," on the white, almost purely siliceous quartzite, known as Shawangunk Grit, which forms the cap rock of the Shawangunk Mountains and also of their extension southwestward in the Kittatiny Mountains of New Jersey.

The plant was in much finer condition, sturdier and denser, than in the station in the West Plains, in the Jersey Pine Barrens. It appeared not to have suffered from ground fires, such as often destroy patches of Corema in the Barrens, probably because Gertrude's Nose is islanded from fires, by vertical cliffs on the west and south, and by a wet swale on the north, and the vegetation to the east or northeast, its only unprotected side, is too thin to encourage a fire, even if one started from that direction, which would be unusual. It seems, therefore, to have a permanent sanctuary in this location. Specimens were sent to the New York and Brooklyn Botanical Gardens and to the Gray Herbarium in Cambridge, Mass.

Another interesting plant growing about the stems of Corema was the boreal lichen, *Cetraria islandica* ("Iceland Moss.") which is rare and found only on high, open summits, in our latitude.

The Gertrude's Nose station for *Corema Conradii* is not hard to reach, with an automobile. The route is 9-W, from the New Jersey end of the George Washington Bridge, to Newburgh; Route 32 to Modena, and 55, west, via Gardiner, to the top of Shawangunk Mountain, turning in, at the beginning of the drop on the west side toward Kerhonkson, to the entrance road leading to the Wildmere Hotel, on the west side of Minnewaska Lake. Ask for permission to use the Palmaghat-Gertrude's Nose Trail, well marked with lettered arrows, and follow it south and in about two miles begin to look for Corema on the cliff top and it becomes more plentiful out to the point of the Nose.

Hollis, Long Island

Wolfiella floridana in Northern New Jersey

James L. Edwards

In the spring of 1925, while collecting aquatic plants in a pool on the north side of the Passaic River below Little Falls, I found *Wolfiella floridana* growing there rather abundantly. At the time it seemed reasonable to suppose that the plants had been introduced there and would not survive long. Numerous trips to the spot since then have shown that the plants have no difficulty in surviving the winters of this climate since they persist in about the same abundance from year to year in spite of the fact that the pool freezes over annually. Associated with *Wolfiella* at this locality are *Lemna cyclostasa* and *Lemna trisulca*. *Wolfiella* is found in tangled groups of fronds floating just under the surface of the water often mixed with the roots of Lemna and might easily be overlooked.

The occurrence of this plant and its persistence, if introduced, in this region so far north of its reported range seems worth recording.

Montclair, New Jersey

FIELD TRIPS OF THE CLUB

Field Trip of Sunday, April 24, to Hunters Island

About fifteen members and guests made the trip. The route lay along the high road until after crossing East Chester Creek bridge. There it followed the bridle paths skirting the shore. On all sides were evidence of advancing spring and many small plants of the various species of Golden Rods and Asters were noticed as well as wood betony, agrimony, burdocks, curly dock, and jewel weed. Also many clumps of the delicate green foliage of the day lily, *Hamerocallis fulva,* were seen. Spice bush was in full bloom making great thickets of feathery yellow. The flowers in bloom were: grape hyacinth, *Muscaria Botryoides;* dutchman's breeches, *Dicentra Cucullaria;* spring beauty, *Claytonia virginica;* crinkle root, *Dentaria diphylla;* colt's foot, *Tussilago Farfara.*

Much equisetum, both fertile and sterile fronds. All of these were scarce compared with what they were thirty years ago. Many other flowers that were perfectly familiar to the writer, who lived in the vicinity when she was a child were missing. One thing that interested the party was the sight of a loon disporting itself in the water about fifty feet off shore. It seemed quite tame and not at all distressed by the boats and people near by. The party watched it for a half hour diving and swimming under water for thirty seconds, its passage marked by a dark agitated streak, then rising on its tail, while spreading its curved wings and uttering softly its peculiar cry. When the party broke up some returned by the subway, as they had come, and others by the longer route of the Split Rock road and W. and B. R. R.

' The party was glad to observe that there are at present no evidences of preparation for turning Hunters Island into a popular playground and bathing beach, as rumors threatened last year. Perhaps there are some brighter aspects in a shortage of municipal funds.

Zaida Nicholson

Trip of April 30

Six members made the Saturday afternoon trip to Montville, New Jersey. The early spring flowers were at their height of bloom with spice bush and June berry adding color to the woods. The first flower of spring, hepatica, was still in bloom due to the lateness of the season.

Rue anemone made the brightest display in the woods contested by the brilliant yellow marigold in the swamps. Other conspicuous flowers in bloom were the bloodroot, dwarf ginsing, sessile-leaved bellwort, dwarf everlasting, early buttercup, cinquefoil, gill-over-the-ground, golden saxifrage, yellow adder's tongue, and narrow-leaved spring beauty.

Four violets were in bloom, *V. papilionacea, V. conspersa, V. sagittata,* and *V. pallens.*

Of the mosses, *Physcomitrium turbinatum* attracted attention with its shining, erect, urn-shaped capsules.

W. L. Highton

Week-End at Branchville, May 20 to 22

As in other years, the plans for the trip were made by Mr. and Mrs. William Gavin Taylor, who were the most gracious hosts of the party. Over 80 people attended the Saturday evening program, varying numbers going on the different trips arranged for the study of geology, birds and plants. The geological trips were led by Dr. Kummel, the plant trips by Dr. Wherry and Mr. Medsger, and the early morning bird trips by Dr. and Mrs. Chubb. The evening programs were as follows:

Friday evening

Dr. E. W. Sinnott, "The Torrey Botanical Club."

Dr. H. B. Kummel, State Geologist, "Geological Outline" as a preparation for the Saturday geological field outing.

Mr. George T. Hastings, "Some Botanical Impressions of Hawaii." Illustrated by lantern.

Mr. Oliver P. Medsger, "Nature Poetry."

Dr. Edgar T. Wherry, "Collecting Plants from the Atlantic to the Pacific." Illustrated by lantern.

Saturday evening

Mr. Oliver P. Medsger, "Experiences with Birds in Florida and California."

Dr. Edward I. Keffer, "Bird Studies at Gaspé." Motion pictures.

Dr. S. H. Chubb, "Bonaventure Island Bird Sanctuary." Illustrated by lantern.

As Dr. Sinnott was unable to attend the meetings he sent a letter from which the following is quoted:

Most happy reports have come to me as to the pleasant and profitable times enjoyed by every one at this famous annual event. I am glad to say a word or two, thus at long distance, about what the Club means to me and what it should mean to the people of the New York region.

As a professional botanist I have found it most stimulating to meet frequently with people whose interest in plants is purely an avocation. Not only is their enthusiasm infectious but their ideas and knowledge are of great value scientifically. As a means for mutual acquaintance and interchange of ideas between the large number of professional botanists and the much larger number of non-professional ones the Club renders an important service to the science of Botany itself.

Still more valuable, however, is its part in focussing intelligent attention and interest upon plant life. There is an instinctive love in the heart of almost every one for plants. This may, and frequently does, express itself only in an admiration for flowers and a desire to pick them. On a higher level it has led to the tremendous spread of the garden movement in the past two or three decades. Even this, however, is largely an aesthetic enthusiasm unless it reaches further than mere admiration for plants. Only when a person catches a glimpse of the remarkably intricate and beautiful structures of the plant and of the amazing manner in which it maintains its life, and only when he sees the plant population of his region as a result of a long historical process of evolution and migration, and its members as beautifully adapted to the various conditions which present themselves—only then does he experience the real fervor of botanical enthusiasm. In this age of the machine when life in so many respects is artificial, it is becoming more and more necessary to keep in touch with natural and fundamental realities, and an intelligent interest in the plant kingdom is the best means I know for attaining this end. In the great problem of making people happier and persuading them to live fuller lives I am convinced that Botany—together of course with nature study of all sorts—has an increasingly important rôle to play. The Torrey Club is the natural focus for all these activities in the New York region and should be the means of drawing into Botany, as an avocation, thousands of people who now look upon the science as a useless and even silly diversion. The Club can do this best by bringing people in the open to see plants as they grow in the wild, as is being done by our field trips.

The geological trips were by automobile to the tops of several of the higher hills to get a general view of the topography, while the leader described the changes that had occurred in the past ages. Outcrops of the Pre-Cambrian, Ordovician, Silurian and Devonian rocks were visited as well as hills and deltas of glacial materials. Fossils were hunted in several places—mollusks, brachiopods, trilobites and algae being found. In addition Bevin's rock shelter where Indian hunting parties camped in early days was visited.

On all of the trips quantities of Indian paint brush or painted cup, *Castilleja coccinea,* was seen in the fields. In places on the hillsides wild crab apples were in blossom, the species seeming to be *Malus glaucescens* which has been commonly confused with *M. coronaria.* In a meadow a few globe flowers, *Trollius laxus,* were found. Dr. Wherry has added the following notes on plants seen:

On The Pines property the Purple Mountain-Clematis, *Atragene americana* Sims, was in full bloom. A large colony of *Botrychium neglectum* Wood was found on the hill east of barbed-wire fence on east side of the property.

In the Tamarack swamp southeast of Lafayette, *Menyanthes trifoliata* L., *Betula pumila* L., and *Rhammus alnifolia* L'Her were among the northern species collected.

Sunday morning a trip was made to the extensive swamp near Springdale, southwest of Newton. Great masses of the yellow water buttercup, *Ranunculus delphinifolius* grew in the open water. The most striking feature here was the remarkable abundance of yellow Cypripediums. In wet soil the "slippers" were constantly small in size, so that the term *C. parviflorum* Salisbury seems quite appropriate for them. In drier places all the plants bore large-sized slippers, corresponding to *C. pubescens* Willd. These distributional features cast doubt on the frequently expressed opinion that the yellow slipper-orchids are all one species. Other noteworthy finds were showy orchid, *Galeorchis spectabilis, Dryopteris cristata* X *marginalis* Davenport; *Arisaema pusillum* (Peck) Nash; *Geum rivale* L.; and *Trientalis americana* Pursh.

Dr. Chubb adds the list of birds seen by the party, though no one member saw the entire list.

Total List of Birds Observed Within a Radius of Five Miles

Heron, Great Blue
Killdeer
Dove, Mourning
Vulture, Turkey
Hawk, Marsh
Hawk, Sharp-shinned
Hawk, Cooper's
Hawk, Red-shouldered
Hawk, Sparrow
Kingfisher, Belted
Woodpecker, Hairy
Woodpecker, Downy
Woodpecker, Red-headed
Flicker, Northern
Nighthawk
Swift, Chimney
Hummingbird, Ruby-throated
Kingbird
Flycatcher, Crested
Phoebe
Pewee, Wood
Flycatcher, Least
Jay, Blue
Crow, American
Starling
Bobolink
Cowbird
Blackbird, Red-winged

Meadowlark
Oriole, Orchard
Oriole, Baltimore
Grackle, Purple
Sparrow, House
Goldfinch
Sparrow, Vesper
Sparrow, Grasshopper
Sparrow, White-throated
Sparrow, Chipping
Sparrow, Field
Sparrow, Song
Sparrow, Swamp
Towhee
Grosbeak, Rose-breasted
Bunting, Indigo
Tanager, Scarlet
Martin, Purple
Swallow, Barn
Swallow, Bank
Waxwing, Cedar
Vireo, Red-eyed
Vireo, Warbling
Vireo, Yellow-throated
Warbler, Black and White
Warbler, Worm-eating
Warbler, Blue-winged
Warbler, Golden-winged
Warbler, Northern Parula
Warbler, Yellow
Warbler, Magnolia
Warbler, Chestnut-sided
Warbler, Black-poll
Warbler, Black-throated Green
Ovenbird
Yellow-throat, Maryland
Chat, Yellow-breasted
Warbler, Wilson's
Warbler, Canada
Redstart
Catbird
Thrasher, Brown
Wren, House
Nuthatch, White-breasted
Chickadee, Black-capped
Thrush, Wood
Thrush, Veery
Thrush, Olive-backed
Robin
Bluebird

Birds Observed Only at High Point. Altitude 1809 Feet

Junco
Warbler, Myrtle
Kinglet, Golden-crowned

Bird Observed Only at Great Spring Swamp. 10 Miles Distant

Woodpecker, Pileated

PROCEEDINGS OF THE CLUB

Meeting of April 1, 1932

The meeting was called to order at Schermerhorn Hall, Columbia University, at 8:15 p.m. by President Sinnott. There were over 200 people present, including members of the Torrey Botanical Club, Columbia University, etc.

Professor A. C. Seward of Cambridge University gave a very fine talk on "Plant Records of the Rocks."

Forman T. McLean
Secretary

Meeting of April 20, 1932

The meeting was called to order at The New York Botanical Garden at 3:30 p.m. by President Sinnott. Minutes of the meetings of March 1 and March 16 were read and approved.

Dr. Fred W. Foxworthy was elected a life member of the Club.

The following people were unanimously elected to membership in the Club: Miss Amy E. Davis, 1882 Grand Concourse, New York City; Mr. Charles P. Dring, 159 Washington Street, Mt. Vernon, N.Y.; Mr. Robert Ferrari, 283 West 11th Street, New York City; Miss Bertha Flealy, Eastside High School, Paterson, N.J.; Mr. George Harrington, 851 West 177th Street, New York City; and Miss Tillie Schnell, 319 Marcy Avenue, Brooklyn, N.Y.

The resignations of Miss Laura M. Bragg and Mrs. Grace R. Frazee were accepted with regret.

A report was made by the Budget Committee.

Mr. Joseph J. Copeland of the College of the City of New York gave a very interesting talk on "A Botanical View of the History of the Yellowstone." The talk was illustrated by colored lantern slides.

Forman T. McLean
Secretary

Meeting of May 3, 1932

The meeting was called to order at the American Museum of Natural History at 8:15 p.m. by President Sinnott.

Mr. Clarence Lewis, 1000 Park Avenue, New York City, and Miss Dorothy V. Smith, 138 East 94th Street, New York City, were unanimously elected to membership in the Club.

Dr. John M. Arthur of the Boyce Thompson Institute for Plant Research in Yonkers gave an interesting talk on "Some Effects of Visible and Invisible Radiation." His talk was illustrated by a large number of lantern slides. He showed that Salvia flowers best with a day length less than seventeen hours. Lettuce flowers only with a day exceeding twelve hours in length. Buckwheat was unaffected by day length, growing even better with twenty-four hours of illumination than with ordinary light and darkness. Geraniums grew and flowered best with eighteen hours of light and extra carbondioxide (ten times the strength ordinarily found in the air). Tomato in contrast with buckwheat flowered best with eighteen hours of light, twenty-four hours of illumination being injurious. With continuous illumination tomatoes accumulated large amounts of carbohydrates and were deficient in nitrogen. He also showed the effects of different portions of the solar spectrum on the growth of plants. In blue light only, four o'clocks were very deep green in color but much dwarfed in spite of the fact that the light was reduced only 10 per cent of the energy value of sunlight. In red light of 37 per cent strength, the same kinds of plants were etiolated. Petunias showed the same sort of response.

Ultra-violet light which has been so widely exploited as beneficial to man and domestic animals proved definitely injurious to plants when the wave lengths were shorter than those encountered in daylight. Even the wave length of 285 millimeters, only five millimeters shorter than those found in ordinary daylight injured plants after fifty hours' exposure. Where the reduced intensities of light were the same composition as sunlight most of the plants thrive best and made the greatest dry growth with 78 to 35 per cent of full sunlight. Tomato and tobacco proved to be shade, plants thriving best with only 35 per cent full light. Dr. Arthur also gave a very interesting report on the reddening of apples. The Macintosh apples grown in New York State are many of them poorly colored. He found that by exposing them to sunlight soon after harvest in August or September, they developed a good red color, but if exposed under window glass no such color developed. Light from the mercury arc lamp injured the tissues of the apple and prevented coloring at all. Even the light of an incandescent lamp proved injurious to the apples. The injury, however, was not all due to ultra-violet. Using a non-luminous lamp made up entirely of infra-red rays, the same kind of injury was produced. He found ultra-violet lamps with a screen of corex D glass or pyrex glass will color apples satisfactorily during August or September in about forty-eight hours' time. In this way apples raised in the East can be given as good a color as the Western apples. This treatment does not change the flavor or quality but improves the looks of the apples.

FORMAN T. MCLEAN
Secretary

NEWS NOTES

THE NEW YORK State Conservation Department has added to the state forest preserve 24,000 acres of land this spring. The larger part is in Herkimer County, near Beaver River. This tract is heavily timbered with virgin forest. The smaller tract consists of 3,000 acres comprising Howell's Island in the Seneca River, near Seneca Falls, Cayuga County. This is mostly meadow land and in the Montezuma marshes. It will be developed as a game refuge and public hunting ground.

AT THE FIFTIETH meeting of the German Botanical Society in Berlin Dr. E. D. Merrill, Director of the New York Botanical Garden, was elected an honorary member. Two other American botanists have received this honor in the past, Dr. Asa Gray and Dr. Roland Thaxter. At the same meeting Dr. George Shull, of Princeton, was elected a corresponding member. Dr. R. A. Harper, A. S. Hitchcock, E. D. Merrill, B. L. Robinson, and William Trelease were already on this list.

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their paper appears, will kindly notify the editor, when returning proof.

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Correspondence relating to the above publications should be addressed to

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BY
GEORGE T. HASTINGS

John Torrey, 1796-1873

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THE TORREY BOTANICAL CLUB

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2587 Sedgwick Ave.
New York, New York

TORREYA

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Three dune associations compared

Charles B. Atwell

Three small dune areas, far distant from each other, afford some worth-while comparisons of their plant life. The first lies along Seven-mile Island off the New Jersey coast about twenty miles north of Cape May; the second on the west shore of Lake Michigan, near Waukegan, Illinois, forty-five miles north of Chicago; the third on the Pacific coast at Seaside, Oregon, twenty miles south of the mouth of the Columbia river.

On the New Jersey Coast

Seven-mile Island is a narrow strip having, perhaps, an average width of a half mile and cut off from the mainland by a stretch of salt marshes about three and a half miles wide which is indented with shallow tidal channels and inlets from the Atlantic. The island lies in latitude of about thirty-nine degrees, North; has a summer temperature of 70°–75°F. and a summer rainfall of eleven to twenty-one inches, with prevailing winds from the southwest. The dunes on the island with their plant associations are doomed to disappear in a few years because of the rapid growth of the summer-resort villages, Avalon, Peermont and Stone Harbor. The real estate speculator levels the dunes to fill the shallows and marshes and to beautify his property and so bring it into market.

The observations upon which these notes are based were made in the summer of 1923. Examination of cross-sections of the undisturbed dune complex which extends along the island from Peermont to Stone Harbor brings out the following facts.

Along the upper beach and fore dunes, above the ordinary high tide mark, are found frequent clumps of the esculents: sea rocket, *Cakile edulenta*, and seaside sandwort, *Ammodenia peploides;* while, well above the high water mark, the beach grass, *Ammophila arenaria*, and the trailing bean, *Strophostyles hel-*

vola, are abundant and wide spreading. Upon the dune crests, most abundant, are *Ammophila* and two grapes, *Vitis labrusca* and *V. aestivalis;* the black cherry, *Prunus serotina;* the trumpet creeper, *Tecoma radicans*, and poison ivy, *Rhus radicans*, all serving to check drifting sand thus producing dunes which here rise to the height of thirty feet above the sea. Standing upon the dune crests and looking eastward one may see a dune complex with its hillocks and blowouts and projecting snags of red cedar, *Juniperus virginiana*, grave-markers of an ancient forest smothered by wind-swept sands long ago. To the west a dense forest completely covers the lee slopes and extends to the salt marshes.

The tangle of vines, briers, shrubs and scrub oaks render passage through the undergrowth of the forest almost impossible without the aid of a cutting instrument. The term 'forest complex' is altogether appropriate for this plant association. The trees most frequently found are: the two oaks, *Quercus falcata*, and *Q. minor;* the holly, *Ilex opaca;* red cedar, *Juniperus virginiana*, and *Sassafras officinalis*. The common shrubs are the bayberry, *Myrica carolinensis*, and black cherry, *Prunus serotina*, while the vines are: cat brier, *Smilax rotundifolia*, trumpet creeper, poison ivy, and the two grapes mentioned above. On the floor of the forest are occasional, distinctive, large patches of prickly pear, *Opuntia vulgaris*, occurring even where there is a heavy growth of juniper and scrub oaks and consequently much shade.

At Beach, Illinois

The south and east shores of Lake Michigan are renowned for their sand dunes and dune complexes extending from Gary, Ind., eastward through Michigan City and northward to the Straits of Mackinac. Efforts being put forth by learned societies and other organization are likely to succeed in securing reservations and protection for a representative portion of the Indiana dunes through favorable state legislation. The dunes along the eastern coast seem likely to preserve themselves by natural causes in spite of the inroads of railroads and summer resorts. On the other hand, the very narrow strip of dunes along the west shore of Lake Michigan, extending, at one time, from Chicago northward through Lake View and Rogers Park to Evanston, and further north, from Waukegan to Zion City, are nearly extinct due to lakeshore erosion, the extension of the suburbs of Chicago and to the encroaching demands of railroads and industrial enterprises using sand for ballast or building purposes.

At Beach, Ill., four miles north of Waukegan, there remains a narrow strip of shore dunes upon what was, doubtless, originally a sand-bar thrown up by the lake. Back of this strip lie the channels, and the many bars and shallows of Dead River Flats. The shallows are always swampy and in wet seasons usually flooded so that the dune strip has a fresh water sea at its front and a fresh water swamp at its back, these conditions much resembling those prevailing at Seven-mile Island, N. J., except that in the latter case the water is salt and disturbed by diurnal tides. Lying under north latitude of about 42° and subject to a summer temperature of 63–77 F., this area has a summer rainfall of ten to twelve inches and a total annual precipitation of thirty-three inches. The prevailing breeze is from the southwest but it is the occasional strong wind from the east or northeast which drives the beach sands landward to form the dunes.

The characteristic plants upon the upper beach are: the beach pea, *Lathyrus maritimus*, the sea rocket, *Cakile edulenta*, the beach grass, *Ammophila arenaria*, and the beach reed, *Calamovilfa longifolia*, the last two serving most successfully as sand binders in early dune formation. Upon the exposed changing crests and fore dunes are also the sand cherry, *Prunus pumila*, the bear berry, *Arctostaphylos uva-ursa*, the creeping juniper, *Juniperus procumbens*, the shrubby juniper, *Juniperus communis*, var, together with the summer grape, *Vitis aestivalis*, and the poison ivy, *Rhus radicans*.

The forest association upon the lee slopes, from which most of the species found upon the fore dunes appear to have been derived, is now much thinned out. It is made up largely of these distinctive species: the oaks, *Quercus velutina* and *Q. alba;* the choke cherry, *Prunus virginiana;* the two junipers, *J. procumbens*, and *J. communis*, var.; the bear berry, poison ivy and the summer grape. Patches of the prickly pear, *Opuntia Rafinesquii*, are not infrequently found in this association. The white pine, *Pinus Strobus*, which formerly appeared scattered along the stabilized dunes has practically been exterminated north of Dead River outlet.

At Seaside, Oregon

The third locality under consideration lies on the Oregon coast about twenty miles south of the mouth of the Columbia river. It was visited during the month of July, 1919, when these observations and notes were recorded, and revisited in September 1931. Here a long stretch of beach sands and ridges is exposed through which the little Neconicum River cuts its way to the sea. The river rises in the heavily forested slopes of the Coast range a few miles back, eastward from the coast. From the river's mouth southward to the base of Tillamook Head is a narrow forested ridge having beach sands and small dunes along its western or seaside front while salt marshes and the meandering river lie along its rear or eastern exposure. Across and long this ridge or peninsula extends a popular summer resort, the city of Seaside. Our notes apply to the plant life on the drifting sands along the seashore, or Clatsop beach, northward from the bathing beach to the outlet of Neconicum River and also to the forest adjacent thereto. Further northward at Gearhart and along the coast the sand dunes are higher and more extensive. Weather records indicate the prevailing winds are generally from the west but in June from the southwest and in July from the northwest. The winds are moisture laden with a rainfall of six to eight inches in the summer and an annual precipitation of about seventy-eight inches.

Here the drifting, black, basaltic sands appear to pile up less rapidly and shift more slowly than do the drier sands of the New Jersey coast or along the western shores of Lake Michigan. Vegetation advances rapidly upon newly formed ridges and usually holds the crests without blow-outs. Back of the ridges or dunes lie the salt marshes incident to the tidal waters which invade the Neconicum and its branches. Thus topographical conditions are produced quite similar to those found upon the New Jersey coast at Seven-mile Island. A summer temperature of 61 to 67 degrees prevails and gentle showers are frequent throughout July. Once a hillock or small dune is fairly established it is soon overrun by invading plant life of the nearby forest. The older sand ridges have thus become well forested and are to be regarded as permanent except as disturbed by the act of man.

On the shifting sands, at and above the high tide mark, the succulent sea rocket, *Cakile edulenta*, var. *californica*, and the beach pea, *Lathyrus maritimus*, grow thriftily in broad clumps; the sand sedge, *Carex macrocephala*, and the beach grass, *Ammophila arenaria*, are most abundant; while the sandwort, *Arenaria peploides*, and the sea verbena, *Glehnia littoralis*, are thrifty but less frequent in the same zone. The growth of all these species serves to check the drifting sand. Thrifty plantations of *Ammophila* now cover the exposed front of the foremost dunes at Gearhart rendering them practically permanent.

On the dune crests the prevailing vegetation consists of the Ambrosia-like *Franseria chamissonis;* the sand verbena, *Abronia latifolia;* the shrubby knotweed, *Polygonum paronychia*, and the bear-berry, *Arctostaphylos uva-ursa*. Here also, less frequent are found *Lupinus littoralis*, the strawberry, *Fragaria chiliensis*, and the morning glory, *Convolulus soldanella*. Dune tansy, *Tanacetum camphoratum*, and the strawberry become superabundant upon stabilized dunes at Gearhart immediately north of the mouth of the Neconicum River.

The forest upon and back of the dune ridge is a dense tangle characterized by the dominance of lodgepole pine, *Pinus contorta*, and the prevalence of devil's club, *Echinopanax horrida*, the hillman root, *Echinocystis oreganus*, the sallal, *Gaultheria shallon*, the salmon berry, *Rubus spectabilis*, the stonecrop, *Sedum oregonum*, and a rich growth of smaller plants including mosses and ferns.

Comment

Similarity of topography is noted in the three areas under consideration. Each is a narrow ridge of shore sands fronting upon a great sea and having at its back a marshland indented with water-channels and shallows. At Seaside and Seven-mile Island the waters are salt and tidal.

Common to all three areas are *Cakile* and *Ammophila* both serving as sand-binders. The latter by means of its leaf clusters, rootlets and branching rhizomes is most successful in checking drifting sand and is extensively planted for that purpose along the west coast.

The perennial beach pea, *Lathyrus maritimus*, abundant both at Seaside and Beach is replaced at Seven-mile Island by the annual trailing-bean, *Strophostyles;* however, the beach pea is to be found on the coast sands of New Jersey somewhat farther north, and is well-known as a beach plant along the shores of all the Great Lakes and the northern coasts of both the Atlantic and the Pacific.

Trumpet creepers and grapevines form tangles and mats upon the dune crests at Seven-mile Island which serve to check erosion from falling rain while no vines are found on the sands at Seaside. Similarly at Beach, mats are formed on the sands by grapevines and more extensively by creeping juniper.

In the forest on the dunes at Seaside the absence of oaks is to be noted. The dominance of lodge-pole pines which become dwarfed, greatly compacted and tangled from the impact of the ocean winds, is remarkable.

Further contrasts of the plant life of the three areas are brought out in the tabulated lists.

THREE DUNE ASSOCIATIONS COMPARED

New Jersey Seven-mile Island	Illinois Beach (R.R.) Station	Oregon Seaside-Gearhart
	High beach sands and fore dunes	
Cakile edulenta	*Cakile edulenta*	*Cakile edulenta var.*
Strophostyles helvola	*Lathyrus maritimus*	*Lathyrus maritimus*
Ammophila arenaria	*Ammophila arenaria*	*Ammophila arenaria*
	Calamovilfa longifolia	
Arenaria peploides		*Arenaria peploides*
		Carex macrocephala
		Glehnia littoralis
	Dune crests	
Ammophila	*Ammophila*	*Ammophila*
		Franseria chamissonis
		Abronia latifolia
		Lupinus littoralis
		Tanacetum camphoratum
Vitis lubrusca		
Vitis aestivalis	*Vitis aestivalis*	
Tecoma radicans		
	Arctostaphylos uva-ursa	*Arctostaphylos uva-ursa*
Prunus serotina	*Prunus pumila*	
	Forest in lee of dunes	
Quercus falcata	*Quercus rubra*	
Quercus minor	*Quercus velutina*	
Ilex opaca		
Myrica carolinensis		
	Populus balsamifera	
Juniperus virginia	*Juniperus procumbens*	*Pinus contorta*
	Juniperus communis	
Smilax rotundifolia		*Gaultheria shallon*

Tecoma radicans	*Arctostaphylos uva-ursa*	*Arctostaphylos uva-ursa*
		Echinopanax horrida
Vitis	*Vitis*	
Rhus radicans	*Rhus radicans*	
Prunus serotina	*Prunus virginiana*	
		Sedum oregonum
Opuntia vulgaris	*Opuntia Rafinesquii*	

San Francisco, California

The Pteridophytes of Wyoming

C. L. Porter

The first report on the Pteridophytes of Wyoming was published by Elias Nelson in the Fern Bulletin, Vol. VII, April 1899. That report listed nineteen different plants for the state as having actually been collected, as follows:

Asplenium viride Huds.
Athyrium filix-foemina (L.) Roth.
Cheilanthes Feei Moore (Listed as *C. gracilis*)
Cryptogramma acrostichoides A. Br.
Cystopteris fragilis (L.) Bernh.
Notholaena Fendleri Kunze.
Notholaena sinuata Kaulf.
Pellaea occidentalis (E. Nels.) Rydb. (Listed as *P. atropurpurea* var. *occidentalis*)
Polystichum lonchitis (L.) Roth. (Listed as *Dryopteris lonchitis*)
Pteridium aquilinum (L.) Kuh. (Listed as *Pteris aquilina*)
Woodsia oregana Eaton
Woodsia scopulina Eaton
Equisetum arvense L.
Equisetum arvense var. *alpestre* Wahl.
Equisetum hiemale L.
Equisetum laevigatum A. Br.
Equisetum robustum A. Br.
Equisetum variegatum Schleich.
Selaginella densa Rydb. (Listed as *S. rupestris*)

The second, and last, report was published by Leo. A. Hanna in the Fern Bulletin, Vol. XXII, pp. 1–11, 1932. This report dealt only with the fern flora, and listed seven additional species as follows:

Asplenium septentrionale (L.) Hoffm.
Asplenium Trichomanes L.
Athyrium americanum (Butters) Maxon
Dryopteris Filix-mas (L.) Schott.
Pellaea Breweri Eaton
Pellaea densa (Brack.) Hook.
Polypodium hesperium Maxon

The following is a complete list of pteridophytes for the state according to our present knowledge of the flora. It includes eleven additional species of which five are ferns, these new records for the state being marked #.

Asplenium septentrionale (L). Hoffm. Dry rock crevices. Albany Co.

Asplenium Trichomanes L. Dry granite cliffs. Albany Co.

Asplenium viride Huds. Alpine rocks. Teton Co.

Athyrium americanum (Butters) Maxon. In rock slides, among boulders, typically alpine. Teton Co.

Athyrium Filix-foemina (L.) Roth. In moist, shady places, aspen thickets, along streams. Big Horn Co., Teton Co., Yellowstone Nat. Park.

#*Botrychium lunaria* (L.) Sw. Moist meadow. Sheridan Co.

#*Botrychium Coulteri* Underw. In wet soil and lake shores. Teton Co., Yellowstone Nat. Park.

#*Botrychium silaifolium* Presl. Willow thickets and lake shores in wet soil. Sublette Co., Teton Co.

Cheilanthes Feei Moore. Crevices in large, dry rocks, usually on limestone cliffs. Albany Co., Johnson Co., Natrona Co., Platte Co.

Cryptogramma acrostichoides A. Br. Rock slides, alpine. Albany Co., Carbon Co., Lincoln Co., Sheridan Co., Sweetwater Co., Teton Co., Yellowstone Nat. Park.

Cystopteris fragilis (L.) Bernh. Rock crevices, usually in less exposed places. Albany Co., Big Horn Co., Carbon Co., Converse Co., Crook Co., Lincoln Co , Park Co., Sheridan Co., Sublette Co., Yellowstone Nat. Park.

Dryopteris Filix-mas (L.) Schott. Shady ravines on moist soil. Albany Co., Natrona Co., Sheridan Co.

#*Marsilia oligospora* Goodding. Mud flats and shallow water at margins of lakes. Sublette Co., Teton Co.

Notholaena Fendleri Kunze. Collected but once in a rocky canyon at lower elevations. Albany Co.

Pellaea Breweri Eaton. In rock crevices. Carbon Co., Sublette Co.

Pellaea densa (Brack.) Hook. Rock crevices, alpine. Teton Co.

Pellaea occidentalis (E. Nels.) Rydb. Dry rock crevices, prefers limestone. Albany Co., Big Horn Co., Natrona Co.

#*Phegopteris Dryopteris* (L.) Fee. Collected but once, but locally common in a rock slide in Jackson's Hole. Teton Co.

Polypodium hesperium Maxon. Collected but twice, in rock crevices in dry, granite cliffs. Albany Co.

Polystichum lonchitis (L.) Roth. In rock crevices and cliffs. Carbon Co., Lincoln Co., Teton Co.

Pteridium aquilinum (L.) Kuhn. In open aspen groves. Carbon Co., Lincoln Co., Sheridan Co., Teton Co., Yellowstone Nat. Park.

Woodsia oregana Eaton. Among rocks in shady places. Crook Co., Lincoln Co.

Woodsia scopulina Eaton. Among rocks in shady places. Albany Co., Carbon Co., Park Co., Sheridan Co., Sublette Co., Yellowstone Nat. Park.

Equisetum arvense L. Sandy soil in open situations. Albany Co., Park Co., Sheridan Co., Yellowstone Nat. Park.

#*Equisetum fluviatile* L. Swamps and edges of streams. Teton Co.

Equisetum hiemale L. Moist alluvial soil, stream banks. Albany Co., Converse Co., Johnson Co., Park Co., Sheridan Co., Teton Co., Yellowstone Nat. Park.

Equisetum laevigatum A. Br. Sandy soil, damp thickets. Hot Springs Co., Park Co., Sheridan Co., Uinta Co.

#*Equisetum Nelsoni* (Eat.) Schaffner. Sandy-gravelly bar of creek bed. Collected but once by Prof. Schaffner. Big Horn Co.

Equisetum robustum A. Br. Moist ground, stream banks. Teton Co., Albany Co., Uinta Co.

Equisetum variegatum Schleich. Wet meadows, swamps. Albany Co., Teton Co.

#*Isoetes Bolanderi* Engelm. Alpine swamps and lakes. Albany Co., Carbon Co., Sublette Co., Yellowstone Nat. Park.

#*Lycopodium annotinum* L. Collected but once in Yellowstone National Park. No habitat given.

Selaginella densa Rybd. The common Selaginella in the mountains, on rocky soil and barren ridges. Albany Co., Johnson Co., Park Co., Sublette Co., Uinta Co., Yellowstone Nat. Park.

#*Selaginella scopulorum* Maxon. Open, rocky slopes. Big Horn Co., Sublette Co.

#*Selaginella selaginoides* Link. Collected in only one locality, at 8,000 ft. on a mossy lake shore. Sublette Co.

University of Wyoming,
Department of Botany,
Rocky Mountain Herbarium

Wild flowers of the Spuyten-Duyvil and Riverdale sections of New York City

Mary L. Sefferien

This section of New York City extends along the Hudson River from the Harlem River north to the city line at Yonkers, chiefly on the high ridge that slopes steeply down to the Hudson on the west and to the valley through which Broadway extends on the east. There are many fine old estates here, on parts of which the original vegetation has been little disturbed; also there are small areas waiting to be built upon where native plants and introduced weeds crowd each other. It is of interest to record the more or less showy wild flowers still to be found in this part of the city. Many of these, especially those marked scarce or rare, will undoubtedly soon disappear from this section, others quite as surely will be found here for many years to come.

One beautiful morning late in July we had started on a jaunt with our "wire-haired" puppy when we came upon a rather lovely scene,—a partly shaded marsh in which we glimpsed the varied colors of budding and blooming flowers. As we wandered in through the dew-ladened marsh grasses and sedges, tear thumb and jewelweed we found the gold of the yellow and fringed loosestrife, the deep purple of the nightshade or bittersweet with clusters of red and green translucent berries on the same vines, the pink of the swamp rose, the modest little blue skullcap, the soft downy green of thoroughwort in bud, the purplish-pink of Joe Pye Weed growing tall and stately, the lovely lilac of a colony of monkey flowers, the rose-purple of swamp milkweed and, in the shaded background, water hemlock spreading its flat clusters of greenish white flowers. As we came away through the ferns and glimpsed the sunny yellow of the star grass and gathered from the hillside the delicate white blossoms of the starry campion on their graceful slender stems, there came to us a deep sense of appreciation of the quiet beauty of this wooded spot so near our home in the city.

From the early spring when we found the wood carpeted with the dainty spring beauty, adder's tongue lily and cut-leaved toothwort, and the hillside brightened with the light gold of the spice bush, we have watched the coming of the wild flowers to the open wood, marsh, thicket, field and roadside near our home. In April and May came the rue anemone, Dutchman's breeches, toothwort or crinkle root, blue palmate and common blue violets, yellow star grass, blue-eyed grass, wild geranium, sweet Cicely, Jack-in-the-Pulpit, bellwort, Canada may flower, Solomon's seal, false spikenard, catbrier and carrion flower, pink lady's slipper, flowering dogwood, and the viburnums. The roadsides and moist places were being brightened by the yellows of buttercups and mustards. In early June the clovers, melilots, bouncing bet, Deptford pink, Virginia dayflower, chicory and flowering raspberry add their varied hues. The lovely moth mullein comes with its fragile canary-yellow or purplish-white blossoms which open at night and are perfect in the early morning. The evenings at this season bring the charm of the snowy white evening lychnis, the night-flowering catchfly, the dainty bladder campion and the fragrant Japanese honeysuckle. During the early summer we find in the open woods tall meadow rue, four-leaved milkweed, dogbane, smooth rose and two pentstemons. Along the roadsides and in the fields the procession now includes blue vetch, common and daisy fleabanes, common St. Johnswort, tall buttercup, black-eyed Susan, Venus looking-glass, blue vervain, yarrow, Queen Ann's lace, common milkweed, butter-and-eggs, several of the mints, velvet leaf or Indian mallow, and the evening primrose. Through the late summer we find in the thickets which border the woods hazy purple masses of tick trefoil, the slender gerardia, the gleaming white of ladies' tresses, and the delicate purplish-pink clusters of meadow beauty or deer grass. Later the golden-rod and asters blend their golds and amethysts with the Joe Pye Weed, thorowort, ironweed, white snakeroot, white lettuce, and turtle head into a harmony of color which makes these early Autumn days among the loveliest of the year, and in a few weeks these lovely composites, perhaps at their best, add their hues to the colorings of leaves and berries of the trees and vines, to give us in the Fall sunshine the last glowing picture of our wild flowers. Then, still retaining some of their softened color, they so gradually become feathery plumes that, having become so interested in the artistry of seed pods and fliers, we do not realize our wild flowers have gone until one morning in late November we find them all covered with the fleecy blanket of the first snow.

In the following list, which is by no means complete, the letter c means that the plant is moderately common in this section of the city, s means the flower is scarce, and r that it is so rare that only a few plants have been found.

ALISMACEAE

Water plantain	*Alisma Plantago-aquatica* s

ARACEAE

Jack-in-the-Pulpit	*Arisaema triphyllum* c
Skunk cabbage	*Symplocarpus foetidus* c

COMMELINACEAE

Day flower	*Commelina communis* c

LILIACEAE

Asparagus	*Asparagas officinalis* s
Day lily	*Hemerocallis fulva* c
Bellwort	*Oakesia sessilifolia* s
Catbrier	*Smilax rotundifolia* s
Carrion flower	*Smilax herbacea* c
False spikenard	*Smilacina racemosa* c
Solomon's seal	*Polygonatum biflorum* c
Canada May flower	*Maianthemum canadense* c
Adder's tongue	*Erythronium americanum* c
Star of Bethlehem	*Ornithogalum umbellatum* c
Wild garlic	*Allium canadense* c
Grape hyacinth	*Muscaria botryoides* s

DIOSCOREACEAE

Wild yam	*Dioscorea villosa* s

AMARYLLIDACEAE

Yellow star grass	*Hypoxsis hirsuta* c

IRIDACEAE

Blue-eyed grass	*Sisyrinchium angustifolium* c

ORCHIDACEAE

Pink lady's slipper	*Cypripedium acaule* r
Ladies' tresses	*Spiranthes cernua* s
Slender ladies' tresses	*Spiranthes gracilis* s

POLYGONACEAE

Swamp dock	*Rumex verticillatus* c
Curled dock	*Rumex crispus* c
Sheep sorrel	*Rumex acetosella* c
Knotgrass	*Polygonum aviculare* c

Lady's thumb	*Polygonum Persicaria* c
Tearthumb	*Polygonum sagittatum* c
Halbert-leaved tearthumb	*Polygonum arifolium* c
Virginia knotweed	*Polygonum virginianum* c
Climbing false buckwheat	*Polygonum scandens* c

CHENOPODIACEAE

Lamb's quarters	*Chenopodium album* c

AMARANTHACEAE

Pigweed	*Amaranthus retroflexus* c
Tumbleweed	*Amaranthus graecizans* c

PORTULACACEAE

Spring beauty	*Claytonia virginica* c

PHYTOLACCACEAE

Pokeweed	*Phytolacca decandra* c

CARYOPHYLLACEAE

Deptford pink	*Dianthus armeria* c
Bouncing bet, single and double	*Saponaria officinalis* c
Starry campion	*Silene stellata* s
Bladder campion	*Silene latifolia* c
Night-flowering Catchfly	*Silene noctiflora* c
White campion	*Lychnis alba* c
Chickweed	*Stellaria media* c

RANUNCULACEAE

Rue anemone	*Anemonella thalictroides* s
Early meadow rue	*Thalictrum dioicum* s
Tall meadow rue	*Thalictrum polygamum* s
Small-flowered crowfoot	*Ranunculus abortivus* c
Early buttercup	*Ranunculus fascicularis* s
Bulbous buttercup	*Ranunculus bulbosus* c
Tall buttercup	*Ranunculus acris* c
White snakeroot	*Cimicifuga racemosa* s

FUMARIACEAE

Dutchman's breeches	*Dicentra Cucullaria* c

MENISPERMACEAE

Moonvine	*Menispermum canadense* r

CRUCIFERAE

Spring cress	*Cardamine bulbosa* c
Bitter cress	*Cardamine hirsuta* s
Toothwort	*Dentaria diphylla* s
Cut-leaved toothwort	*Dentaria laciniata* s

Black mustard	*Brassica nigra* c
Field mustard	*Brassica arvensis* c
Yellow rocket	*Barbarea vulgaris* c
Shepherd's purse	*Capsella Bursa-pastoris* c
Pepper grass	*Lepidium virginicum* c

CRASSULACEAE

Ditch stonecrop	*Penthorum sedoides* s

HAMAMELIDACEAE

Witch hazel	*Hamamelis virginiana* c

ROSACEAE

Wineberry	*Rubus phoenicolasius* r
Blackberry	*Rubus villosus* c
Wild strawberry	*Fragaria virginiana* c
Cinquefoil	*Potentilla canadensis* c
Agrimony	*Agrimonia gryposepala* c
Swamp rose	*Rosa caroliniana* s
Smooth rose	*Rosa blanda* s
June berry or Shad bush	*Amelanchier canadensis* s

LEGUMINOSAE

Small-flowered sensitive pea	*Cassia nictitans* c
Red clover	*Trifolium pratense* c
White clover	*Trifolium repens* c
Alsike clover	*Trifolium hybridum* c
Hop clover	*Trifolium agrarium* c
Yellow melilot	*Melilotus officinalis* c
White melilot	*Melilotus alba* c
Alfalfa	*Medicago sativa* c
Black medick	*Medicago lupulina* c
Tick trefoil	*Desmodium canadense* c
Tick trefoil	*Desmodium paniculatum* c
Tick trefoil	*Desmodium canadense* c
Tick trefoil	*Desmodium rotundifolium* c
Bush clover	*Lespedeza violacea* c
Trailing bush clover	*Lespedeza procumbens* s
Blue vetch	*Vicia Cracca* c
Hog peanut	*Amphicarpa monoica* c
Wild bean	*Apios tuberosa* s
Trailing wild bean	*Strophostyles helvola* s

GERANIACEAE

Wild geranium	*Geranium maculatum* c
Siberian crane's bill	*Geranium sibericum* s

OXALIDACEAE

Wood sorrel	*Oxalis corniculata* c

POLYGALACEAE

Milkwort	*Polygala verticillata* s

ANACARDIACEAE

Staghorn sumach	*Rhus typhina* c
Smooth sumach	*Rhus glabra* c
Poison ivy	*Rhus toxicodendron* c

CELASTRACEAE

Climbing bittersweet	*Celastrus scandens* r

BALSAMINACEAE

Pale jewel weed	*Impatiens pallida* c
Spotted jewel weed	*Impatiens biflora* c

VITACEAE

Virginia creeper	*Psedera quinquefolia* c
River grape	*Vitis vulpina* c
Northern wild grape	*Vitis labrusca* s

MALVACEAE

Low mallow, cheeses	*Malva rotundifolia* c
Velvet leaf	*Abutilon Theophrasti* s

HYPERICACEAE

Common St. John's-wort	*Hypericum perfoliatum* c
Marsh St. John's-wort	*Hypericum virginicum* s

VIOLACEAE

Common Blue violet	*Viola papilionacea* c
Palmate violet	*Viola palmata* c
Yellow violet	*Viola pubescens* s

MELASTROMACEAE

Meadow beauty	*Rhexia virginica* r

ONAGRACEAE

Evening primrose	*Oenothera biennis* c
Willow herb	*Epilobium densum* s

ARALIACEAE

Spikenard	*Aralia racemosa* r

UMBELLIFERAE

Early meadow parsnip	*Zizia aurea* c
Queen Ann's lace	*Daucus Carota* c
Sweet Cicely	*Osmorrhiza Claytoni* c
Water hemlock	*Cicuta maculata* s
Wild Parsley	*Pastinaca sativa* s

CORNACEAE

Flowering dogwood	*Cornus florida* c
Red osier	*Cornus stolonifera* s

ERICACEAE

Indian pipe	*Monotropa uniflora* r
High-bush blueberry	*Vaccinium corymbosum* s

PRIMULACEAE

Fringed loosestrife	*Steironema ciliatum* s
Four-leaved loosestrife	*Lysimachia quadrifolia* c
Yellow loosestrife	*Lysimachia terrestris* s

APOCYNACEAE

Spreading dogbane	*Apocynum androsaemifolium* c
Indian hemp	*Apocynum cannibinum* c
Dogbane	*Apocynum medium* s

ASCLEPIADACEAE

Swamp milkweed	*Asclepias incarnata* c
Common milkweed	*Asclepias syriaca* c
Four-leaved milkweed	*Asclepias quadrifolia* s

LAURACEAE

Spice bush	*Lindera Benzoin* c

CONVOLVULACEAE

Hedge bindweed	*Convolvulus sepium* c
Dodder	*Cuscuta Gronovii* c

VERBENACEAE

Blue vervain	*Verbena hastata* c
White vervain	*Verbena urticaefolia* c

LABIATAE

Ground ivy	*Nepeta Hederacea* c
Catnip	*Nepeta cataria* c
Skull cap	*Scutellaria lateriflora* s
Peppermint	*Mentha peperita* c
Wild mint	*Mentha arvensis* s
American pennyroyal	*Hedeoma pulegioides* s
Motherwort	*Leonurus Cardiaca* c
Hemp nettle	*Galeopsis Tetrahit* c
Self heal	*Prunella vulgaris* c
Water horehound	*Lycopus virginicus* s
Mountain mint	*Pycnanthemum virginianum* s

SOLANACEAE

Thorn apple	*Datura Stramonium* c
Purple thorn apple	*Datura Tatula* s
Ground cherry	*Physalis virginiana* s
Nightshade	*Solanum Dulcamara* c
Black nightshade	*Solanum nigrum* c

SCROPHULARIACEAE

Turtle head	*Chelone glabra* s
Slender gerardia	*Gerardia tenuifolia* c
Butter and eggs	*Linaria vulgaris* c
Monkey flower	*Mimulus ringens* s
Beard tongue	*Penstemon hirsutus* r
Beard tongue	*Penstemon laevigatus* r
Moth mullein	*Verbascum Blattaria* c
Great mullein	*Verbascum Thapsus* c.
Common speedwell	*Veronica officinalis* c

OROBANCHACEAE

One-flowered cancer root	*Orobanche uniflora* s

PLANTAGINACEAE

English plantain	*Plantago lanceolata* c
Common plantain	*Plantago major* c

RUBIACEAE

Small bedstraw	*Galium trifidum* s
Yellow bedstraw	*Galium verum* c
Partridge berry	*Mitchella repens* r

CAPRIFOLIACEAE

Japanese honeysuckle	*Lonicera japonica* c
Common elder	*Sambucus canadensis* c
Horse gentian	*Triosteum perfoliatum* r
Maple-leaved viburnum	*Viburnum acerifolium* c
Hobble bush	*Viburnum alnifolium* r
Black haw	*Viburnum prunifolium* c

CAMPANULACEAE

Venus looking-glass	*Specularia perfoliata* c

LOBELIACEAE

Indian tobacco	*Lobelia inflata* c

COMPOSITAE

Yarrow	*Achillea millefolium* c
Pearly everlasting	*Anaphalis margaritacea* c
Early everlasting	*Antennaria plantaginifolia* c

Burdock	*Arctium Lappa* s
Burdock	*Arctium minus* c
Heart-leaved aster	*Aster cordifolius* c
Wood aster	*Aster corymbosus* c
Broad-leaved aster	*Aster macrophyllus* s
New England aster	*Aster novae-angliae* s
Late purple aster	*Aster patens* c
Small white aster	*Aster vimineus* c
Heath aster	*Aster ericoides* c
Bur marigold	*Bidens cernua* s
Beggar's ticks	*Bidens frondosa* c
Oxeye daisy	*Chrysanthemum Leucanthemum* c
Common thistle	*Cirsium lanceolatum* c
Yellow thistle	*Cirsium spinosissimum* s
Chicory	*Chicorium Intybus* s
Fleabane	*Erigeron canadensis* c
Daisy fleabane	*Erigeron annuus* c
Daisy fleabane	*Erigeron ramosus* c
Philadelphia fleabane	*Erigeron philadelphicus* c
Robins plantain	*Erigeron pulchellus* s
Galinsoga	*Galinsoga parviflora* c
Boneset	*Eupatorium perfoliatum* c
Joe Pye weed	*Eupatorium purpureum* c
White snakeroot	*Eupatorium urticaefolium* c
Devil's paintbrush	*Hieracium auranticum* c
Tawny hawkweed	*Hieracium canadense* c
King Devil	*Hieracium pratense* c
Wild lettuce	*Lactuca canadensis* c
Prickly lettuce	*Lactuca scariola* c
Fall dandelion	*Leontodon autumnalis* s
White lettuce	*Prenanthes alba* s
Black-eyed Susan	*Rudbeckia hirta* c
Silver-rod	*Solidago bicolor* c
Blue-stemmed golden-rod	*Solidago caesia* c
Canada golden-rod	*Solidago canadensis* c
Early golden-rod	*Solidago juncea* c
Grass-leaved golden-rod	*Solidago graminifolia* c
Rough-stemmed golden-rod	*Solidago rugosa* c
Late golden-rod	*Solidago serotina* c
Showy golden-rod	*Solidago speciosa* c
Dandelion	*Taraxacum officinalis* c
Coltsfoot	*Tussilago Farfara* c
Ironweed	*Vernonia noveboracensis* c
Clot bur	*Xanthium commune* c

Another report of Marchantia polymorpha after forest fires

Raymond H. Torrey

A note by the writer in a recent number of Torreya, on the extensive occurrence of *Marchantia polymorpha* after a forest fire on Kittatiny Mountain, in Warren County, New Jersey, has brought the following letter from Mr. William W. Diehl, Associate Pathologist, Bureau of Plant Industry, United States Department of Agriculture, Washington, D. C.:

Your note on '*Marchantia polymorpha* after forest fires' in the first number of Torreya for this year is very timely to recent observations of mine.

On June 12, I was botanizing on the top, of Old Rag Mountain (Ragged Mountain) in Virginia, near Hoover's Camp, and was surprised at the great amount of *Marchantia polymorpha*, in some places covering an acre or more. The entire area had been burned over very badly some time during the past year so that I assumed then that Marchantia might well be one of the early comers after fires. This was of special interest to me in that I had the impression that Marchantia is generally thought of as rare in the southern Blue Ridge.

The large colonies of this hepatic, which I found on Kittatiny Mountain in autumn of 1931, a year after a great forest fire, which devastated over 3,000 acres, still remain, although some what less extensive now that new herbaceous and shrubby growth is returning. Their sudden and widespread seizure of the open areas of charred humus and thin mineral soil is puzzling to me, when it is considered that the dispersal of the spores of Marchantia is by means of hygroscopic elaters. One would not expect this method to scatter the spores more than a few yards from the parent plants.* I have usually found this hepatic in small colonies along brooks and on peat bogs. There are brooks and small swamps on Kittatiny Mountain, 200 to 400 feet below the highest ridges, where it might have occurred. But within less than a year after the fire, which occurred in August, 1930, Marchantia overspread large areas on the burned soil, with thalli several inches in diameter, confluent so as to completely and ex-

*Note by editor. It is probable that the elaters force the spores from the capsules when the wind causes changes in the humidity of the air and that, once out, the wind carries the spores.

clusively cover patches of many square yards. This was over a distance of two miles along the ridge, along the western edge of the burned area, well within the area, and along its eastern and southern edges. The spores might possibly have been transported from small colonies along a brook emptying Tock's Swamp, which was so wet that it escaped burning, outward a few rods, and have started new thalli on the bare burned soil, but it seems surprising that the crop of spores of the summer and early autumn of 1930 from plants in limited areas should have produced such extensive new growth by autumn of 1931. There was a rainy spell about a month after the fire and the charred soil was well wetted, which probably helped the Marchantia spores to germinate and develop new thalli. But that this extension should have covered many acres of the burned land, at elevations 10 to 300 feet above the previous possible occurrences of the hepatic in the swamp, within so short a time, seems an astonishingly prolific development. Yet Mr. Diehl's observations on Old Rag Mountain in Virginia indicates a similar phenomenon. How did the elaters carry the spores upward as seems to have occured. There can scarcely be any accidental transportation by animals, birds, or insects, over such distances from the swamp. The Marchantia colonies grew all over the burned area. which was three miles long and two miles wide. Nearly everything above ground outside of the swamp was killed. Yet the tiny spores of this hepatic survived in the swamp and soon after the blaze it was the first new plant to take over the black ashes.

Hollis, New York

Rydberg's Flora of the Prairies and Plains[1]

In the center of our country lies a most interesting type of vegetation, in which grasses are the predominant feature. It occupies a great triangle of land, with its base stretching more than a thousand miles north and south along the eastern foothills of the Rocky Mountains and its apex extending east to Indiana. This is the Prairie Province of Pound and Clements.

The flora of this region has been studied more than a century, but the results of the study have not always been accessible to the student or local botanist. The seventh edition of Gray's Manual (1908) covered an area west through Minnesota and to the ninety-sixth meridian in Kansas and Nebraska. Coulter and Nelson (1909) included in their area all of Colorado and Wyoming and a part of South Dakota. Britton and Brown (1913) set the one hundred and second meridian for their western boundary, while Rydberg (1922) took the same line for his eastern boundary. The whole territory has been covered therefore, in its northern part at least, but always in manuals designed primarily for other types of flora in adjacent regions.

Now we have a much-needed book which centers on the prairie flora and covers the six states North Dakota, South Dakota, Nebraska, Kansas, Minnesota, and Iowa. It also extends into the southern parts of Manitoba and Saskatchewan, serves well for the eastern parts of Montana, Wyoming, and Colorado, for northern Missouri, and for the prairie plants of Wisconsin, Illinois, and Indiana.

Like all manuals covering political divisions of a country, it is not strictly limited to the prairie flora. The northeastern third of Minnesota is largely occupied by coniferous forests of the eastern type, the Black Hills by similar forests of the western type, and the eastern deciduous forests invade the territory in long strips following the river valleys almost to its western boundary. The extreme southeastern corner of Kansas is occupied by a distinctively southern flora, so that four types of forest flora are included in the book. Then the Sonoran element of

[1] Rydberg, P. A. Flora of the prairies and plains of central North America. Pages vi, 969. 600 figures. The New York Botanical Garden, Bronx Park, New York. 1932. $5.50.

our desert southwest tends to encroach on the prairies and a number of its representatives occur in southwestern Kansas. Lastly, a few plants of the colder deserts of the Great Basin cross the mountains in Wyoming and appear in western Nebraska. The result is a most interesting assemblage of species, in which plants from many sections of the country are associated. For example, among the eleven species of *Anemone*, we find the southern *A. decapetala*, the eastern *A. quinquefolia*, the northern *A. Richardsoni*, and the western *A. globosa*.

It is now ten years since Rydberg's Manual for the Rocky Mountains was published, almost twenty since the second edition of the Illustrated Flora, and twenty-four since the seventh edition of Gray. Since then taxonomists have not been idle and much careful and critical work has been done on North American plants. Progress has been made in several directions, chief of which are the extension of ranges through discriminating observation, the discovery of new species, and the recognition of differences between well known American plants and European or other extra-limital species whose names they erroneously bore. It is both valuable and refreshing to have this progress brought to our attention in Rydberg's new flora. Thus one notices unfamiliar names in the genus *Amelanchier*, largely due to the careful work of Wiegand, notes that there are two species of the white-fruited baneberries instead of one, and finds eight species of *Apocynum*, seven of which extend into the Gray's Manual range. This feature makes the book invaluable for all taxonomists between the Alleghanies and the Rockies and important as a reference book for eastern botanists as well.

The names used in the book excite alternately admiration and exasperation. For years Dr. Rydberg was a staunch follower of the American Code, but in the last year of his life he revised the names in his manuscript to conformity with the newly adopted, but as yet unpublished international rules. For many years, also, he was a strong believer in the segregation of polymorphic genera into smaller groups, and the book before us plainly shows Rydberg's ideas exemplified in many families. Of course segregation is neither a modern idea nor exclusively American. For example, Rydberg recognizes the old segregates of *Pinus* by Opiz and Necker and of *Saxifraga* by Haworth, as well as the modern segregates of *Astragalus* for which he is personally chiefly responsible. Segregation is a matter of botanical opinion and can not well be covered by rules. The reviewer believes that such segregation rarely adds anything to our knowledge of plant classification and that the segregated groups should be maintained, in most cases at least, only as subgenera or sections. That is certainly the case in *Pinus* and *Pyrola*. Segregation invariably means the relegation of otherwise tenable names to synonymy and often necessitates the creation of new combinations. Under the old American Code the original specific name was almost always carried over into the newly segregated genus, but under the international system this can not always be done. Thus our old friend *Pinus Strobus* was recognizable under its segregation as *Strobus Strobus*, but now it becomes *Strobus Weymouthiana;* we could distinguish the apple in *Malus Malus*, but as *Malus sylvestris* its identity is pretty well lost.

Another class of change in name appears regrettable at first, since it requires us to learn new names for many familiar plants, but really indicates progress in classification and a step toward nomenclatural stability. This rests on the discovery that established names, often of long standing, have been regularly misapplied. Naturally we want to keep the old name where it properly belongs and that compels us to learn a new one. Thus we find that the familiar name *Actaea alba* belongs to a different species and to our common species we must apply the name *Actaea brachypoda*, while the columbine must be called *Aquilegia latiuscula*. Still other changes are caused by the discovery of a prior name for an accepted species. Thus *Scrophularia leporella*, described by Bicknell in 1896, seems to have been detected years before by Pursh and given the name *S. lanceolata*.

The book follows the usual form of a manual. It opens with a key to the families constructed in the usual way. The descriptive matter is concise and the larger genera have small illustrations of one or more species. Ten pages of abbreviations of authors' names, prepared by J. H. Barnhart, give the dates of birth and death. The glossary covers eleven pages. The index is complete. About thirty errata are listed. A summary shows that 3988 species are considered, with the composites, grasses, sedges, and legumes as the largest families, comprising together more than a third of the total.

The preparation of the manuscript of this notable book was the chief labor of Dr. Rydberg during the closing years of his life and was continued by him even during his last illness until a few days before his death. While much of it was then in type, other parts were still in unedited manuscript, and the task of finishing the work then devolved on Dr. M. A. Howe, who toiled unremittingly to complete it. To the hundreds of botanists who knew and loved the kindly author, the book will always stand as a monument to an energetic life wholly devoted to the advancement of botanical science.

H. A. Gleason

The cult of the fantastic clan*

The desert empire of America is no longer the last outpost of greed, gold and desolation. The mystery and terror of it no one can forget who reads Raphael Pumpelly's *Reminiscences*, or drives across the stark Mojave in the dark. And gold still glistens in the pages of J. Frank Dobie's recently issued *Coronado's Children.*

But that this desert has a sort of wild beauty, that its plants were of fantastic shapes and still more fantastic habits, is a comparatively new cult. A few experts, of course, have long known this. The Carnegie Institution at Tucson and Britton and Rose's *Cactaceae* are the two best evidences of the importance of the study of desert plant problems. But only recently have cacti been anything but wierd desert plants to the general public.

California seems to have been the first to quicken public interest in them. They started in Los Angeles the Cactus and Succulent Society, which already has a large membership and publishes a journal. Last March we reviewed here Shreve's *The Cactus and its Home.* And two other publishers now came forward with two more books on the cacti of the southwest.

Thornber and Bonker's *The Fantastic Clan* is the more comprehensive of two, but the least practical on the score of cultivation. Its botanical accuracy was assured by Dr. Thornber's col-

* Schulz, E. D. Cactus culture. Pp. 1–157, Figs. 1–28. Orange Judd Co. N. Y. 1932. Price $2.00.

Thornber, J. J. and Bonker, Frances. The Fantastic Clan: the cactus family. Pp. 1–194, Figs. 1–51 and three colored plates. Macmillan Co. N. Y. 1932. Price $3.50.

laboration, and it is to be assumed that the descriptions of desert trips in search of cacti are by Frances Bonker. Together they have produced a very readable, authoritative volume. It catches the lure of desert beauty, the limitless desolation, the heat and the marvellous awakening of cactus color that comes with certain seasons. And its descriptions of species, while accurate, are in non-technical language.

For the general reader and casual traveller no better book on the cacti of the southwest could be written than *The Fantastic Clan*. But upon the cultivation of them by far the best book is the Orange Judd publication called *Cactus Culture* by Ellen D. Schulz, who is the director of the Witte Memorial Museum at San Antonio.

The cultivation of cacti is very much on the increase. There are many dealers in these plants, and the Santa Barbara Garden Tours Committee recently issued a list of 387 species cultivated in their vicinity. In many parts of the nearly frost-free southwest growing cacti may be easy enough. But in areas of too much moisture or too much cold their cultivation is apt to be difficult.

The author of *Cactus Culture* had both audiences in mind. Her practical thoroughness is obvious in her account of watering, propagation, pests, insects, and all the pitfalls of cactus culture. And she has many useful hints on the making of artistic cactus gardens, of which she manages one at the San Antonio Museum.

The cult of the fantastic clan is growing faster than most easterners realize. Until a year or so ago there was almost no popular literature on cacti, but within six months three books have appeared. Both of the volumes here noticed are well illustrated, particularly *The Fantastic Clan* which, besides many half-tones and line cuts, has three beautifully colored plates. Both books are indexed and each of them admirably fits the niche for which it was written.

NORMAN TAYLOR

A. J. Grout. Moss Flora of North America North of Mexico. Vol. III. Part 2. 1931.

This second part of Dr. Grout's Moss flora deals with what the author calls the subfamily *Amblystegieae* of the family *Hypnaceae*, perhaps better regarded as a separate family *Amblystegiaceae*, as in the second edition of Engler & Prantl.

The treatment follows in general the lines noted already for the first part.

The reviewer, though claiming but a small fraction of the knowledge of these plants possessed by Grout, finds himself on general principles disagreeing in many, if not nearly all points. A lengthy list of these points of difference would serve little purpose; suffice it to say that one of them is the inclusion under names of a great number of trivial "varities" and "forms," a point upon which the author has especially "invited comment." Such differences of opinion do not however prevent a cordial welcome of this or any other equally competent revision of the North American moss-flora, which is sadly in need of a good many revisions. The European moss-flora, or more limited parts of it, have already been revised by many bryologists, without any general agreement on details having been arrived at, but the result of it all is that the European moss-flora is at any rate pretty definitely known, which is far from being the case with that of North America, even if its tropics be excluded.

In conclusion reference may be made to two very dubious systematic inovations. The old *Hypnum Schreberi*, which has become the step-child of recent taxonomy, is included by Grout with *Hypnum cuspidatum* under the genus *Calliergonella* of Loeske, which seems no improvement upon previous attempts to find a place for it in the system. The exclusion of *Amblystegiella* from the family *Amblystegiaceae* needs at least further confirmation before it can qualify for general acceptance.

A. LeRoy Andrews

FIELD TRIPS OF THE CLUB

A party numbering eleven took part in the ramble along the First Watchung Mountain near Bound Brook, New Jersey, on the afternoon of Saturday 21 May. The trip began near the point known as Chimney Rock, where the leader gave a short account of the origin of the basalt ridges which form the Watchung Mountains. A rich upland vegetation was found on the slopes of a valley, while the cliffs afforded good studies of rock xerophytes, chief among which were: *Saxifraga virginiensis*, *Aquilegia*, *Arabis lyrata*, *Phlox subulata*, *Heuchera americana*, together with four kinds of ferns. But the spot which made the greatest appeal to the party was a meadow aglow with *Phlox pilosa*, *Erigeron pulchellus* and *Castilleja coccinea*. One of the members found a clump of *Triosteum aurantiacum*, and another member located a specimen of *Orobanche uniflora*. Access to this area showing such variety of upland plants was made possible through the courtesy of the Bound Brook Water Co.

M. A. Chrysler

Field Trip of June 11 to Great Swamps, Madison, N.J.

One of those rare June days brought a group of fifteen to Morristown for the start of a most interesting day. Perhaps it was the temperature which prevented really serious botanizing in the Great Swamp. The ground was so dried from lack of rain that many of the rarer bog plants seemed just too hard to locate. For the writer the most exciting find was an Alder Flycatcher's unmistakable "Bee wick" note, Mr. Chubb settling for the first time his otherwise impossible identity in her mind. After a short walk the cool shade of a log lean-to welcomed us back to the woods. Lunch was eaten.

Further botanizing occupied the early afternoon in the beautiful wild flower and fern garden of Mr. and Mrs. Spencer Marsh at Madison. There are gathered between forty-five and fifty species of fern, their separate tastes in soil, moisture and sunlight most successfully supplied, judging by the satisfied air with which they were growing. With so many of the rarer northern ferns represented, how can I correctly name all those most worthy of mention? Two Bladder Ferns, two Woodwardias, three Osmundas, three Botrichyums, five Woodsias, eight Aspleniums, eleven Dryopteris. The Adders Tongue, Climbing and Walking Ferns, Maidenhair, Massachusetts Fern, Hart's Tongue, Rock-brake and Cliff-brake were all notable.

Driving on to the magnificent estate of Mrs. William Jenks, we received a thrilling surprise. A swarm of bees had alighted the previous evening on a piece of a farm wagon not far from the hives, and had been successfully detained by the man in charge to await our coming. Inspired by Mrs. Jenks' example, our fears were soon forgotten as we crowded around for closer views of the closely-packed, humming mass, as it hung about two feet from the ground. It wasn't long before most of the group joined the two men assisting Mrs. Jenks in a search for the elusive queen. Handfuls of bees were gently brushed off, examined, and dropped onto a sheet, from which most entered the new hive. Then the frames were removed and scutinized until, after more than an hour, the long, slim, dark, active lady was finally found. Her wings quickly clipped, with no further danger of her escape, we left her and her faithful following to make their new home. For a new sensation, let us recommend the gentle whir and hum of a handful of bees— two or three hundred on one's palm!

The party was ready to relax in enjoyment of the bountiful tea with salad and sandwiches served to us on the terrance overlooking the swimming pool where the rhododendron blossoms brightened the hillside background. Inspection of the gardens and green houses followed, but time was too short to do them justice. With memories of a most gracious hostess, we regretfully departed.

HELEN E. SAUNDERS

PROCEEDINGS OF THE CLUB

Meeting of May 18, 1932

The meeting was called to order at the Boyce Thompson Institute for Plant Research at 3:30 P.M. by President Sinnott. Those who wished to see the laboratories and research work at the Institute met at 2 P.M. There were 53 members present.

Miss Caroline C. Haynes donated $100.00 to the club. A motion was made and seconded that the Secretary send Miss Haynes a letter of thanks.

The following people were unanimously elected to membership in the club: Miss Clara M. Elsaesser, Paterson, New Jersey; Dr. Carl C. Lindegren, Biology Dept., California Inst. Technology, Pasadena, California; Miss Edna Elmore Milliman, Paterson, New Jersey; Mr. John Landon Rodda, Palmerton, Pa.; Mr. John A. Small, N. J. College for Women, New Brunswick, New Jersey.

Dr. B. O. Dodge of The New York Botanical Garden gave a very interesting talk on "The Sexual and Non-Sexual Function of the Microconidia of Neurospora" which is published in full in the June Bulletin of the Torrey Botanical Club.

Dr. F. E. Denny of the Boyce Thompson Institute for Plant Research gave an interesting talk on "The Oxygen Requirements of the Bakery Mold, Neurospora, for Mycelial Growth and Perithecium Formation," as follows:

Because of the observation of B. O. Dodge that with *Neurospora sitophila* the two mycelia of opposite sex are incapable of forming perethecia unless they meet in the presence of air, experiments were undertaken to determine the concentration of oxygen necessary to permit these fruiting bodies to form. At concentrations of oxygen less than 2 per cent, it was found that perethecia formed very slowly, and at less than 0.5 per cent they did not form at all, at least within one month. The oxygen requirement for the growth of the mycelium was found to be much lower, good growth occurring at 0.3 per cent O_2, and visible growth at concentrations of 0.05 per cent or even lower. The apparatus necessary to produce and maintain these concentrations of O_2 was described.

Forman T. McLean, *Secretary*

NEWS NOTES

THE NEW YORK Botanical Garden has announced a series of nine courses to be given this coming year. The courses include plant geography, practical courses in growing of plants, and field courses on trees, ferns, and birds and their food plants. Several of the courses are divided into sections which may be taken separately but which together make a whole. The courses are planned for afternoons, Saturdays, and the bird course for Sunday mornings with, the purpose of making them available for teachers.

Dr. and Mrs. Arthur H. Graves spent the past summer in Europe, visiting the chief botanic gardens in England, France, Germany and other countries. Dr. Graves also spent some time in the study of the European chestnut.

PROFESSOR W. F. GANONG, since 1894 professor of botany and director of the Botanic Garden at Smith College, retired this June under the age limit, and has been made professor emeritus. He will continue residence for the present at Northampton. (*Science*)

The Board of Trustees of Wellesley College has made Dr. Margaret C. Ferguson research professor of botany. She retires from active service in the department of which whe was appointed chairman in 1904. Dr. Ferguson will continue her cytological and genetical studies of *Petunia* at the college. Dr. Laetitia M. Snow has been appointed professor of botany and has been granted leave of absence for the coming year. She will continue her work on bacteria in windblown sand at the Hopkins Marine Station, Pacific Grove, California. (*Science*)

The New York Botanical Garden has received several collections of trees and shrubs during the past summer. In exchange with the Department of Parks of Rochester 160 varieties of lilac in the form of 406 rooted cuttings, 1324 slips representing 298 species of trees and shrubs and 12 young trees representing fastigiate forms of elm, maple, apple and linden, were received. The firm of Bobbink and Atkins of Rutherford, N. J. made the garden a gift of 3000 rose bushes representing 330 named varieties and 500 plants of Hibiscus hybrids. The Boyce Thompson Institute for Plant Research gave the garden some

3400 young trees and shrubs, representing about 1500 species and varieties. These accessions have made necessary the establishing of a temporary nursery in the area once used for "war gardens."

Professor G. Proctor Cooper of East Lee, Mass., and Mr. H. Huebner of Groton, Mass., have been appointed collaborators of the New York Botanical Garden. Mr. Cooper is visiting the West Indies and northern South America making collections of plants and woods. Mr. Huebner is on an expedition to the East Indies where he will give especial attention to collecting ornamental plants.

(*Journal of the New York Botanical Garden*)

Jason R. Swallen, assistant botanist in the Grass Herbarium of the U. S. National Museum, has returned from a several weeks' trip to Yucatan. He brought back a collection of grasses, sedges and parasitic rusts. The trip was made in cooperation with the University of Michigan and the Carnegie Institution of Washington. (*Science*)

Dr. R. A. Harper, of the geological Survey of University, Alabama, came to New York in August to attend the International Congress of Genetics. Dr. Harper remained in the city for a month in order to do some research in the library of the New York Botanical Garden.

THE TORREY BOTANICAL CLUB

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GEORGE T. HASTINGS

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Erigenia bulbosa and some associated and related plants in Alabama

Roland M. Harper

The Umbelliferous genus *Erigenia* is represented by one known species, *E. bulbosa* (Mx.) Nutt., sometimes known as "harbinger of spring," because it is the earliest flowering Umbellifer in the eastern United States. The species was described (as *Sison bulbosum*) by Andre Michaux in 1803, from specimens collected by himself near Knoxville, Tennessee, about seven years before[1]; and it has since been found in most of the northeastern states, outside of New England. It was overlooked by Dr. A. W. Chapman in the first edition of his "Flora of the Southern United

[1] Michaux's journal (edited and published in the original French, with explanatory notes in English, by C. S. Sargent in 1889, and translated, with additional notes, by R. G. Thwaites in 1904) records that while on his way from Nashville to Knoxville, on March 3, 1796, he observed "le petit ombellifere bulbeux" (which he said he had noted some days previously, evidently nearer Nashville) along "Fleen's [Flynn's] Creeke," probably in what is now Jackson County, Tennessee, in the "Highland Rim" region just west of the Cumberland Plateau. The ground was covered with snow at the time. On the 11th of the same month he records finding it on steep rocks along the "Cumberland" (apparently a slip for Tennessee) River near Knoxville, where it was associated with *Saxifraga*, etc.; and that is probably where he collected the type specimen. The original description says of it: "Hab. ad rupes arduas, prope *Knoxville*. Martio, nivoso solo, florens."

Pursh in his North American Flora, 1814, re-named the plant *Hydrocotyle ambigua*, and located Knoxville in Kentucky. Nuttall, who established the genus *Erigenia*, based on Michaux's plant, in 1818, evidently had additional specimens, for he gives its distribution as "In shady soils, subject to inundation, . . . on the Ohio, Missouri, Tennessee, etc. . . . blooming often amidst the snow, about the 12th or 15th of March."

Torrey and Gray in 1840 said of it: Shady alluvial soils, Buffalo, New York! and western parts of Pennsylvania! and on the Ohio! Missouri and other rivers of the Western States." They overlooked Michaux's Tennessee localities, and that may explain why Chapman omitted it from the first edition of his Southern Flora in 1860. Several recent botanists have collected it in the vicinity of Knoxville, however.

States" (1860), but in the supplement to the second edition (1883) it is said to occur at the base of Lookout Mountain, Tennessee, and northward. Gattinger, in his "Flora of Tennessee" (1901), gives its distribution as "O.S.," meaning over the state; but that is doubtless an exaggeration.

In Britton and Brown's "Illustrated Flora" (1896) and Small's "Flora of the Southeastern United States" (1903), the range of *Erigenia* is said to extend southward to Alabama; but no Alabama stations are mentioned in Coulter and Rose's "Monograph of North American Umbelliferae" (1900), or in Mohr's "Plant Life of Alabama" (1901). Dr. Small informs me that his Alabama record is based on a specimen in the Torrey Herbarium labeled as follows:—"Vale of Ovoca, near Huntsville, Alab. Received from Mr. Wells of Princeton. Dec. 31, 1840." The "Vale of Ovoca" cannot now be identified, and nothing seems to be known of the collector; but Huntsville is in the northeastern part of the state, and there is a small village named Princeton in Jackson County, about 25 miles east-northeast of Huntsville, which may have been there in 1840.

There are mountains near Huntsville, with limestone slopes on which many interesting plants grow, and Princeton is in a valley with similar slopes, some of which ought to be a suitable habitat for *Erigenia*, which seems to prefer rich shady woods with neutral or slightly alkaline soils. The writer has visited Huntsville a few times, beginning in March, 1906, and explored some of the most promising mountain slopes; and passed through Princeton late in June, 1932, and explored the same valley about ten miles farther up, without finding any trace of *Erigenia*. But it may be rather scarce in northeastern Alabama, or else none of the recent botanical explorers have been there at the right time to find it in bloom; and it is rather inconspicuous at other times. Most of the specimens cited by Coulter and Rose were collected in April or May, presumably in bloom; but it blooms about two months earlier than that in Alabama, and may wither away and disappear before midsummer, like several other spring-flowering plants.

On Feb. 16, 1906, I was walking along the railroad from Kellerman to Holt, in the Warrior coal field of Tuscaloosa County, Alabama. The rocks there are mostly shale, not perceptibly calcareous, but containing a good deal of potash, which may be just as acceptable to plants as lime has been thought to be; and on the river bluffs near by, and in ravines between them, are many plants which are commonly regarded as lime-loving.[2] I have a distinct recollection of seeing somewhere along that route, probably on a shaly bluff, a plant that I took to be *Erigenia.* But I did not record it in my field notes, perhaps because I saw only one specimen and wanted to see more before making a record of it. And I could not take time to search for more, for I had 16 miles to walk that afternoon, and reached Holt less than ten minutes before the departure of the last car for Tuscaloosa.

On subsequent trips to the same general region I used to wonder why I could never find the plant again; and I did not list it in my account of the "botanical bonanza" in Tuscaloosa County, in 1922 (just cited). But nearly all my later trips were made between April and October, and I could easily have passed by the *Erigenia* in late spring or summer without seeing it.

However, conditions were more propitious on March 4, 1932, when I went with Dr. B. P. Kaufmann of the University of Alabama and a small party of his botany students to one of the shaly bluffs on the Warrior River about ten miles above Tuscaloosa or five miles above Holt, which is the best locality for *Croton alabamensis* and several other rarities listed in the paper just mentioned. In rich shady woods on the south side of the deep ravine that terminates that bluff on the north, on soil of weathered shale mixed with humus, I found several specimens of the *Erigenia* in bloom, thus concluding a quest that had extended intermittently over 26 years. (My 1906 locality, though not remembered exactly now, was some distance back from the river, in the valley of a creek that comes in a few miles above the *Croton* bluff.)

The find was of course made known to other members of the party, and Dr. Kaufmann, looking at the plants more closely than I usually do, soon called my attention to the fact that many of the flowers had three carpels, a character apparently unrecorded in the Umbelliferae. That is not necessarily an abnormality, but merely a variation that has been overlooked; and it might possibly be found to characterize the same species

[2] See Jour. Elisha Mitchell Sci. Soc. **37**: 153–160. 1922.

elsewhere, and to be at least as common as four-leaved clovers, or the tri-carpellary walnuts that are occasionally reported.[3]

Among the immediate associates of the *Erigenia* there was *Trillium decumbens* Harbison,[4] originally described from DeKalb County, Alabama, which now proves to be rather common in the rich ravines above Tuscaloosa. I did not list that in my 1922 paper, though I must have seen it before that time, and perhaps mistook it for a *T. Underwoodii* that had been stepped on. Dr. Edgar T. Wherry, who has a very keen eye for rarities, pointed it out to me on a visit to the same bluffs on April 7, 1922, and it seems to be a perfectly distinct species. *Erythronium americanum*, which is seldom seen farther south, was abundant there, but very few of the specimens seem to bloom at any one time. Other associated plants were *Trillium lanceolatum*, *Dentaria laciniata*, *Saxifraga virginiensis*, *Aesculus Pavia*, and *Adelia ligustrina*, all in bloom except the last.

About six weeks later, on April 14, I was exploring another rich ravine about two miles down the river from the locality just mentioned, and found *Erigenia* again, this time with fruit apparently full grown, though not quite ripe; and I collected a few specimens. Among its associates there (mentioning only the generic name where there is only one species in Alabama) were *Liquidambar*, *Fagus*, *Aesculus Pavia*, *A. parviflora*, *Cercis*, *Ranunculus allegheniensis* (?), *Saxifraga virginiensis*, *Phlox divaricata*, *Nemophila*, *Galium Aparine* (apparently native), *Dodecatheon Hugeri*, *Syndesmon*, and *Isopyrum*; with many other interesting plants farther up the same ravine and in neighboring ones, most of them in bloom at the time, making a wonderful display of spring flowers.

After the trees leaf out and Nature's great spring flower show is over, the botanist's enthusiasm is apt to wane a little. I had made very few visits to the Warrior River bluffs in summer, but on June 22 of this year I thought I would try to find out what *Erigenia* looked like at that season. This time I found none of

[3] Two similar instances in other genera may be worth mentioning here. In 1904 (Bull. Torrey Club **31**: 23) I reported *Chrysobalanus oblongifolius* in Coffee County, Georgia, with two or three carpels, although one is the normal number for that family (Drupaceae). *Saxifraga* is supposed to have two carpels, but in April, 1923, I found three to be the usual number in *S. texensis* on the Grand Prairie and a few other prairies in Arkansas.

[4] Biltmore Bot. Stud. **1**: 158. 1902.

it, but in the same ravine visited in April, or one very close to it, I found a considerable quantity of another Umbellifer, that I had never seen outside of the coastal plain before, namely, *Trepocarpus Aethusae* Nutt., in bloom. That is a fairly common plant in rich calcareous bottoms in the black prairie belt of central Alabama, but its occurrence in a ravine among the rocky hills was rather unexpected. However, I had already noted that several plants have their southern limits in this region, and others their northern or inland limits, and these two Umbelliferae make another such pair, *Erigenia* from the north and *Trepocarpus* from the south.

One other Umbelliferous plant deserves mention here. It is not an associate of *Erigenia* in any sense, but I saw a great deal of it in June in the neighborhood where the first Alabama specimen of *Erigenia* came from. It is *Daucus Carota L.*, an introduced weed of European origin. It is common in the northeastern states, especially in regions that have been cultivated 25 years or more,[5] and as far south as the northern third of Georgia. It is not known in the coastal plain of Georgia, and in traveling northward through the coastal plain from Georgia to New York in July, 1909, I did not see it south of Elizabeth City, N. C., though it was common nearly everywhere north of there.[6]

Strange to say, the only Alabama station for it recorded by Dr. Mohr is on ballast near Mobile, and it may not have persisted there, for that is far out of its normal range.[7] Dr. Mohr of course visited Huntsville, on account of the many things of botanical interest there, but must have done so only in spring, for if he had ever been there in summer he could hardly have failed to notice that *Daucus Carota* is one of the commonest roadside weeds around there. In Alabama it seems to be pretty well confined to a rather small area in the northeastern corner of the state, though. On June 17, 1921, traveling southwestward from Rome, Georgia, on the railroad toward Selma, Ala., I saw plenty of the *Daucus* as far as the state line, but little or

[5] See L. H. Dewey, Yearbook U. S. Dept. Agric. **1896**: 280, 282, 1897.

[6] See Bull. Torrey Club **37**: 595. Jan. 1911.

[7] A remarkable outlying station for it, reported by George V. Nash (Jour. N. Y. Bot. Gard. **6**: 180. Nov. 1905) is in fields near Marmelade, Haiti, about 2750 feet above sea-level. There it is doubtless a relic of the French plantations of the 18th century.

none beyond there. Going over the same route six years later I saw more of it, almost as far south as Anniston, Ala., but mostly in and around towns. Going up to Huntsville in June, 1932, I saw some of it along the railroad a mile or so north of Garden City, in Cullman County, but hardly any more until within a few miles of Huntsville, where it is about as common as it is anywhere in the North, and has been for ten years at least. Traveling by train from Birmingham to New York on Aug. 10, 1932, I first noticed it near Porterville, in DeKalb County, Alabama; and it became increasingly frequent from there northeastward, but mostly in and near towns at first.

University, Ala.

More New Plants from Oregon

MORTON E. PECK

The following new species and varieties are to be added to the flora of Oregon. The type material is in the Herbarium of Willamette University.

✓ **Brodiaea dissimulata** sp. nov., bulbo fere globoso 15–20 mm. lato lamina externa fibrata tenua; scapis tenuis 3–4.5 dm. altis; foliis viridibus usque ad anthesem brevioribus quam scapis 2.5–5 mm. latis; umbellis 5–13 floris, bractiis involucri lanceolatis albo-scariosis pedicellis 8–16 mm. longis; perianthio lato-campanulato 12–15 mm. longo fere per longitudinem partito pallide croceo vel purpureo-tincto, lobis oblongis vel anguste ovatis medionervis nigroviridibus valde notatis; staminibus 6 albis omnibus similibus, filamentis lato-deltoideis basi confluentibus, antheris fere basifixis 2.5–3 mm. longis paullo brevioribus quam filamentis; ovariis capsulisque brevistipitatis.—Type *Mrs. Lilla Leach*, 2945, in dry rocky ground along the Illinois River, near Selma, Curry County, June 3, 1930.

This species is most nearly related to *B. Hendersoni* Wats. but differs in the smaller size, narrower leaves, smaller flowers and shorter, more dilated filaments. It is locally plentiful.

✓ **Brodiaea Leachiae** sp. nov., bulbo ovoideo 1.5–2 cm. alto lamina fibrata crassa; scapa tenuissima scabriuscula obscure purpurea 1.5–2.5 dm. alta; foliis plerumque 2 scapam aequantibus vel superantibus 4–7 mm. latis valde complicatis, ante inflorescentiam non flaccescentibus; umbellis 4–7-floris, bractiis anguste subulato-lanceolatis, pedicellis filiformis 12–25 mm. longis; perianthio 1.5–2 cm. longo campanulato-infundibuliformi vel lobis valde patentibus paullo plus ½ longitudinem partito tubo in basin angustissimam gradatim contracto albo vel caeruleo-tincto, lobis linea lata caerulea saturatius vel purpureo-caerulea distinctis usque ad basin tubi excurrenti; staminibus omnibus similibus, antheris versatilibus coeruleis 2.5–3 mm. longis, filamentis aliquid longioribus anguste subulatis non valde ad basin dilatatis, ovario stipitato stipo bis longiori quam corpore.—Type *Mrs. Lilla Leach* 3260 on a dry hillside along the Illinois River, near Agnes, Curry Co., May 5, 1931, deposited in the Herbarium of Willamette University. A handsome species probably very local. Not closely related to any hitherto described.

Silene pulverulenta, sp. nov., dense brevi-pilosa et viscido-glandularis omnino capillis articulatis; caulibus e caudice brevi fasciculatis copiose ramosis et a basi patentibus crassioribus 6–12 cm. altis; foliis crassioribus inferioribus lato-oblanceolatis acutis sessilibus vel interdum alato-petiolatis 4–8 cm. longis, superioribus angustioribus multoque minoribus; floribus multis, pedicellis 6–12 mm. longis post inflorescentia abrupte reflexis; calyce cylindrato 12–15 mm. longo lobis triangularis actuis 4–7 mm. longis; petalis pallentirubris vel albidis quam calyce 1 cm. longioribus, lamina aut profunde 4-lobata et lobis mediis multo longioribus aut 2-lobatis et eis solum dentatis, squamis coronae integerrimis, auriculis obsolitis; capsulis fere globosis calycem valde distendentibus 7–8 mm. longis stipe 2 mm. longo; seminibus crasso-papillosis.—Type *Peck 14975*, on a dry sandy slope, 2 mi. north of Central Point, Jackson County, June 18, 1927.

This is most nearly related to *S. Hookeri* Nutt. from which it is distinguished by its lower, more condensed habit, and especially by the very viscid character of the pubescence. The specific name is suggested by the fact that the glandular foliage is usually found thickly covered with dust. It has been collected several times in eastern Josephine and western Jackson Counties.

Silene oraria sp. nov., caulibus multis e ligneis rhizomatibus horizontalibus 1–1.5 dm. altis simplicibus tomentosis fere ad basin; foliis oblanceolatis acutis 2–3.5 cm. longis sessilibus vel inferioribus in petiolos alatos angustantibus, caulinis 3–7 jugis altissimo solum jugo multum redacto; floribus 1–3 in pedicellis 6–20 mm. longis; calyce anguste campanulato maturitate multum inflato late elliptico membranaceoque 11–14 mm. longo lobis ovatis et obtusis 4 mm. longis; petalis roseis vel albescentibus 18–22 mm. longis, lamina circiter 1 cm. longa profunde secta, lobis latis rotundisque integerrimis vel 2–3-sectis dentatisve, ungue latis, squamis oblongis integerrimis 3 mm. longis, auriculis latis conspicuisque; capsulis anguste ovoideis 10–12 mm. longo; seminibus universe tuberculatis valdius tergo.—Type *Peck 16513*, from bluffs above the sea at the mouth of Salmon River, Tillamook County, August 10, 1930.

The relationship of this species to *S. Douglasii* Hook. is undoubtedly close; it may be distinguished, however, by the elongated rootstocks, more numerous and broader cauline leaves, more strongly inflated and membranous calyx and larger petals.

Arenaria Franklinii Dougl. var. **Thompsoni** var. nov., caulibus teretibus et foliis clare viridibus et dense adpressis fere tectis; cymis apertioribus, pedicellis 1.5–4 mm. longis; sepalis 5–6 mm. longis petalis subaequilongis.—Type *J. William Thompson 4769*, collected in dry sandy sagebrush plains near Arlington, Gilliam County, June 13, 1928.

Anemone felix sp. nov., rhizomate horizontale simplice 1–1.5 cm. longo 2–2.5 mm. crasso fusco aut nigriscenti in exemplis florescentibus spisse vestito squamis tenuibus fuscis lucidis amplectentibus, squamis in exemplis frugescentibus brevibus firmisque; caule graciliore purpurescenti 5–30 cm. alto sparse villoso capillis patentibus crispisque; foliis omnibus trifoliatis imo interdum cum caule florescente sed frequentius e rhizomatibus sterilibus, foliolis late ovatis aut orbicularibus, duobus vel omnibus saepe 2-partitis fere ad basin vel plus minusve profunde incisis vel crenatis, segmentis rotundis vel mucronatis valde ciliatis aliter fere glabris, petiolis foliorum involucri plerumque brevibus crassis planisque, foliolo medio angustissime usque ad late rhomboideo, lateralibus obliquis omnibus profunde incisis dentatisve apicibus acutis marginibus ciliatis et venis supra saepe cum capillis rectis adpressisque; pedunculo patenti-villoso; flore 18–30 mm. lato; sepalis ovatis oblongisve inaequallimis 5–7 intus albis extus saepe in marginibus vel per medium purpurea clara notatis; staminibus multis 60–75 brevioribus quam sepalis plus demidio, filamentis albis vel rubescentibus; carpelis in flore lanceolatis subtus pubescentibus stylis rectis; achaeniis anguste ellipticis 4 mm. longis, brevistipitatis rostro angusto rectoque, pubescentia densiore capillis brevibus patentibusque.—Type *Peck 16325*, collected in and along the margin of a sphagnum bog near De Lake, Lincoln County, March 27, 1931.

A handsome species, probably quite local differing from *A. oregana* Gray, its nearest relative, in the black, very scaly rootstock, the character of the pubescence, and the large white sepals touched here and there with bright rose-purple.

Myosurus clavicaulis sp. nov., foliis lineari-filiformis patentibus 2–4 cm. longis; scapis cum fructu fere folia aequantibus apices versus dilatatis patentibus; sepalis spatulatis inaequalibus 3–5-nervatis; receptaculis maturatis scapos aequantibus vel superantibus conspicue sursum curvatis; achaeniis maturis parvis minoribus quam 1.5 mm. longis rostro $\frac{1}{2}$–$\frac{2}{3}$ breviori quam corpore recto vel paullo patenti, corpore oblongo tergo valde carinato minime rhomboideo sub rostro abrupte coarctato laterale ventraleque villosulo paullo inflato; seminibus oblongis olivario-brunnescentibus.—Type *Peck 13886*, from a dry streambed 7 mi. west of Riley, Harney County, June 22, 1925.

Most nearly related to *M. apetalus* Gray, but distinguished by the stout, conspicuously clavate scapes, curved fruiting receptacles and small, narrow achenes.

Thelypodium Howellii Wats. var. **spectabilis** var. nov., floribus magnis clare purpureis; marginibus sepalorum petalorumque conspicue albo-scariis; sepalis 8–9 mm. longis vix basi saccatis; petalis 16–20 mm. longis ungue paene bis longiore quam lamina spatulata; staminibus muto brevioribus quam petalis filamentis omnibus libris.—Type *Peck 16066*, in a low alkaline meadow 10 mi. east of Ironside, Malheur County, June 19, 1927.

Cardamine rariflora sp. nov., perennis, caule e rhizomate horizontali compluribus in locis dilatato tubera parva globosa formantibus, fere simplice erecta vel basin versus decumbente glabra 2.5–4 dm. alta; foliis cum petiolis 6 cm. longis foliolis 5–9, remotioribus anguste oblongis ovatis aut linearibus, terminale plerumque maximo, superioribus foliis simillibus inferioribus; racemis sparsis maturitate, usque ad 2.5 dm. longis; sepalis basi saccatis oblongis 3–4 mm. longis marginibus scariosis; petalis albis 8–12 mm. longis; staminibus quam petalis $\frac{1}{3}$ brevioribus; siliquis cum rostris 2.5–5 cm. longis 1.5–2 mm. latis rostro 4–6 mm. longo; seminibus 12–24.—Type *Peck 14803*, in swampy woods near Grand Ronde, Yamhill County, May 15, 1927.

This species is a near relative of *C. occidentalis* (Wats.) How., but is readily distinguished by the remarkably long and loose fruiting racemes, the larger flowers and the long beak of the siliques.

Potentilla indiges sp. nov., pubescentia tota recta plane adpressa caulium et petiolorum sparsa brevique solum in marginibus venisque infra, inflorescentia pubescentiore cinerea; caulibus fasciculatis gracilibus rubescentibus 3–5 dm. altis ad basin patentibus supra erectis; foliis obscure viridibus crassis firmis infimis longo-petiolatis foliolis 7–9 in longitudinem complicatis $\frac{2}{3}$ ad $\frac{4}{5}$ ad medium sectis segmentis lanceolato-linearibus et acutis, foliis caulinis majoribus 1–2; stipulis 3–4 cm. longis sectis ut foliolis; inflorescentia minore densioreque; petalis 8–10 mm. longis apice leve obcordatis lobis calycis dimidio brevioribus.—Type *Peck 16034*, in a meadow along the John Day River 15 mi. above Dayville, Grant County, June 17, 1927.

One should hesitate to add another name to this already over-named section of *Potentilla*, but the present form is so well marked by its pubescence and leaf-characters as to demand specific recognition. It was found plentiful in the type locality.

Oenothera andinum Nutt. var. **anomala,** var. nov., simillima facie formae typicae; floribus plane trimeris; lobis calycis 1–1.5 mm. longis tubo longioribus; petiolis 1–1.5 mm. longis; capsulis paullo triquetris; seminibus fuscis fusiformis aut anguste obovatis.—Type *Peck 15670*, on a dry slope 6 mi. northwest of Paisley, Lake County, July 15, 1927. *Peck 15176*, 10 mi. north of Bonanza, Klamath County, is the same.

Arctostaphylos viscosissima sp. nov., fruticosa ramosissima 6–12 dm. alta, ramulis gracilibus dense pubescentibus capillis brevibus patentibusque et glandulosissimis; foliis anguste ellipticis vel lineari-oblongis vel oblanceolatis valde mucronatis dense viscido-pubescentibus aetate fere glabris 2–3 cm. longis in petiolis 5 mm. longis vel fere sessilibus; paniculis parvis 2–6-divisis minute glandulari-pubescentibus bracteis 2–4 mm. longis, pedicellis glabris 2–5 mm. longis; corolla rubente 4–5 mm. longa; fructibus globosis vel depresso-globosis 4–5 mm. latis glabris, nucleis interdum binis conjunctis.—Type *Peck 8974*, from the dry rocky summit of Bald Mountain, 5 mi. east of the mouth of Euchre Creek, Curry County, July 26, 1919.

This species is well marked by its densely branched habit and narrow, very viscid-pubescent leaves. It was found in abundance in the locality cited.

Mertensia Cooperae, sp. nov., caulibus congestis e caudice ramoso brevi crassoque erectis simplicibus 15–20 cm. altis sparse pubescentibus pilis brevibus basin versus inflexis; foliis infimis vix productis caulinis 8–12 stricte adscendentibus linaribus vel lineari-oblongis obtusis ad petiolos alatos gradatim angustatis cum petiolis 4–8 cm. longis vel supremis brevioribus et basi lata complectentibus, omnibus supra aspere adpressi-pubescentibus setis pustulatis infra sparsius pilosis vel glabris; inflorescentia densissima floribus multis pedicellis copiose adpressi-pubescentibus; calyce 4–5 mm. longa fere ad basin partita, lobis lanceolatis acutis plus minusve strigosis et conspicue ciliosis; corolla 7–8 mm. longa tubo pallido minus bis quam limbo langiore coerulea vix aperta lobis brevibus rotundisque; staminibus paullo sub faucibus insertis vix inclusis filamentis antheras fere aequantibus et vix angustioribus; style 2–3 mm. exserta.—Type collected by *Mrs. R. D. Cooper* in damp ground along Silver Creek, Harney County, 6 mi. west of Riley, June 1922.

This species is readily distinguished by the very dense panicles of small flowers with strongly exserted styles.

Cryptantha fragilis, sp. nov., annua gracilis 3–4 dm. alta sparse ramosa per totam fere longitudinem caulis; ramis longis patentibus pallidis fragilibus sparse hirsutis setis tenuis patentibusque; foliis basin versus congestis linearibus 2–4 cm. longis tenuis hirsutis setis basi saepe pustulatis; spicis geminatis rare ternatis vel solitariis longe pedunculatis primo densis tardius elongatis floribus sessilibus et conspicue 2-seriatis; calyce fructuque prompte maturitate decadentibus; calycibus maturis 3–3.5 mm. longis lobis lanceolatis aliquid obtusis adpresso-hispidis dorso mediali apicibus conniventibus; tubo corollae quam calyce longiore limbo 3.5 mm. lato cristis glandulisque faucis flavulis; nuculis 1–2 late ovatis 2 mm. longis ventrale conspicue carinatis, sulco furcato basin versus sine areola plana, dorso convexulo marginibus rotundis, superficie minutissime muricata et sparse spinulosa; gynobasi circiter dimidio quam nuculo breviore; stylo paullo quam nuculis breviore.—Type collected by *Mrs. Lilla Leach* along the Rogue River 5 mi. below Almeda, Josephine County, June 11, 1928. *Peck 3995*, from 2 mi. east of the Douglas-Curry County line on the trail from West Fork to Marial is the same.

The species is related to *C. Hendersoni* (Nels.) Piper, but is seeming distinct.

Pentstemon hesperius, sp. nov., caule e rhizomate plerumque simplice, basi saepe persistente 6–12 dm. alta simplice vel basin versus divisa glabra ad basin vel sub petiolis in lineis puberula supra pubescentiore; jugis foliorum remotis internodis interdum 2 dm. longis; foliis omnibus integerrimis plerumque obtusis, inferioribus lanceolatis vel oblanceolatis gracili-petiolatis 4–7 cm. longis, superioribus lanceolatis supremis solum redactissimis; inflorescentia densa angustaque omnino conferta vel interrupta, fasciculis inferioribus interdum remotis, puberula aut fere glabra haud glandulare, bracteis superioribus angustissimis setaceis; lobis calycis variabilibus 4–9 mm. longis plerumque longoacuminatis marginibus scariis saepe erosis; corolla 12–15 mm. longa clare coerulea vel tubo infra albido paullo gradatimque ad faucem dilatata non valde bilabiata, lobis brevi-oblongis patentibus labro inferiore intus conspicue flavo-barbato; loculis antherarum omnino dehiscentibus; filamento sterile stamina breviora aequanti flavo-barbato.—Type *Peck 16187*, collected at Gaston, Washington County, in a boggy meadow June 27, 1930, where it occurred plentifully.

A well marked species, taller than any other herbaceous form hitherto known from Oregon. Its discovery is the more interesting from the fact that Pentstemons are rare in northwestern Oregon. The habitat is also remarkable.

Willamette Univ.
Salem, Oregon

Flower buds and the directions of floral evolution

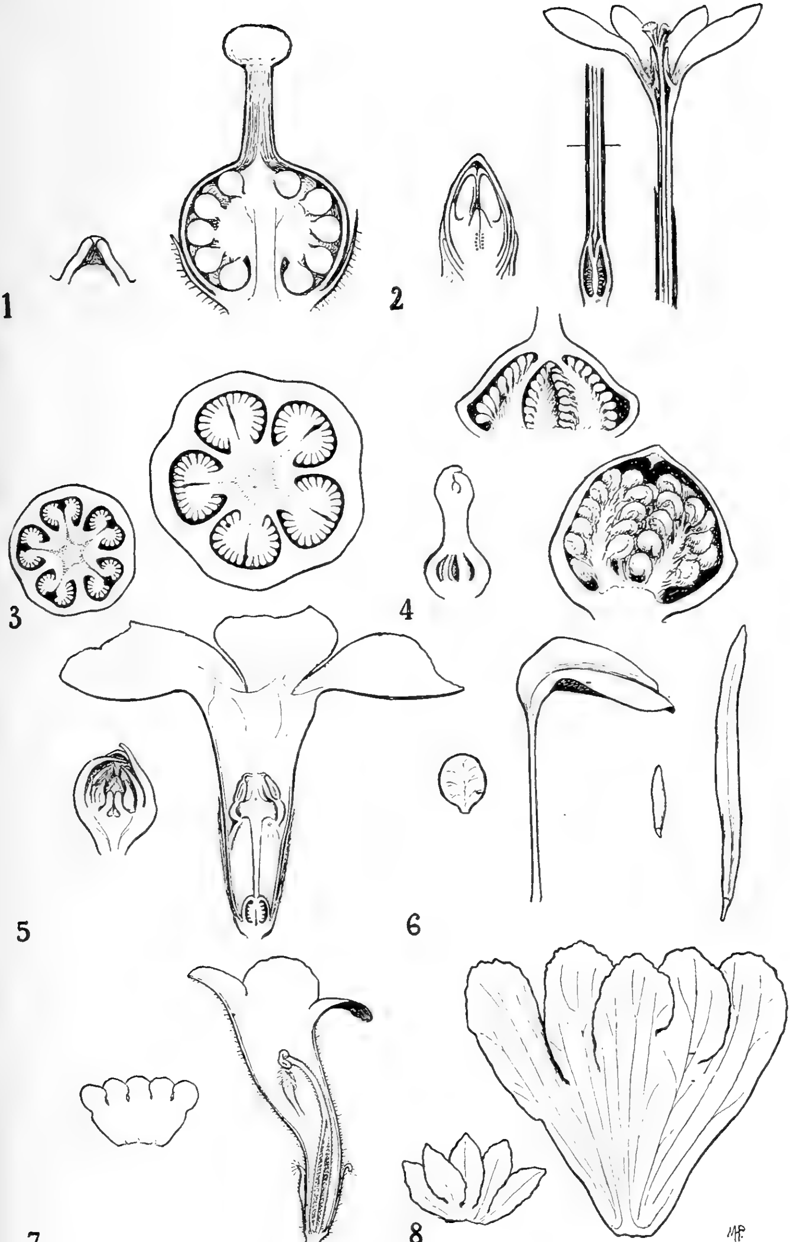
Alfred Gundersen

The comparison of the structure of flower buds with that of adult flowers is an interesting study. Such characters as an inferior ovary, an irregular or sympetalous corolla, or epipetalous stamens are evidently modern improvements. All are relatively less developed in the bud than in the adult flower.

The drawings by Miss Maud Purdy illustrate the development of various characters:

1. *Primulaceae—Primula obconica*
   Style and stigma absent in bud, very distinct in adult flower.
2. *Iridaceae—Crocus vernus*
   Ovary, from superior to inferior.
3. *Ericaceae—Rhododendron indicum*
   Placentation, suggestion of change from parietal to axile.
4. *Portulacaceae—Portulaca grandiflora*
   Placentation, suggestion of change from parietal to central. Three placentae early detach from the walls. Finally the united upper part withers, making apparently three central or basal placentae.
5. *Apocynaceae—Vinca minor*
   Stamens, from hypogynous to epipetalous.
6. *Cruciferae—Cheiranthus kewensis*
   Hamamelidaceae—Loropetalum chinense
   In the buds the petals have the ordinary ovate form; the claw of the petal of *Cheiranthus* and the linear petal of *Loropetalum* develop later.
7. *Gesneriaceae—Chirita lavandulacea*
   Corolla from regular to irregular; in the bud the corolla is nearly regular.
8. *Caprifoliaceae—Lonicera fragrantissima*
   In the bud the united part of the corolla is a fourth or less of the whole, in flower more than half. Similar change is the rule among *Sympetalae.*

That floral development in a general way suggests lines of evolution cannot be doubted. Among recent summaries of evolutionary directions of flowering plants are those by Diels in



Flower Buds compared with Flowers

1920, by Sprague in 1923, by Hutchinson in 1926 and by Zimmermann in 1930. A very brief outline follows:

Ovules and Seeds

1. Ovules many→few
2. Embryo straight→curved
3. Endosperm present→absent
4. Seedcoats 2→1

The number of ovules developing into seeds decreases in the higher flowering plants. We see a similar evolution in the animal world. For example, in fishes thousands or even millions of eggs are laid. In mammals, only a few young are born, but these are given better care. Many plants with a curved embryo grow in dry climates where quick germination is important. In the case of the *Centrospermae* a curved embryo is nearly universal; an exception is *Dianthus* and related genera, with embryo nearly straight. In the Engler system these genera come at the end of *Centrospermae*. Should they be the beginning and thus connect with *Frankenia?*

Carpels

1. Carpels many→few
2. Separate→partly united→wholly united
3. Ovary superior→half inferior→wholly inferior
4. Placentation parietal ↗central
→axile

United carpels, an inferior ovary, and axile placentation are all tendencies in the same direction, namely for better protection of the seed. Another specialized character is partly sterile carpels. The absence or near absence of style and stigma must be considered as primitive. Basal placentation may perhaps be primitive in some cases and derived in others.

Stamens

1. Stamens numerous→2 whorls→1 whorl
2. Free→more or less united
3. From receptacle→from petals
4. Filaments broad→filiform

Stamens few is a character of the advanced flowers. With improved methods of pollination, less pollen is needed. Linnaeus' classification depended on the number of stamens. He began with one stamen; now the sequence must be reversed. Plants with many stamens have in numerous cases also other primitive characters. Stamens in part sterile, or pollen grains more or less united are specialized characters.

Perianth

1. Sepals and petals nearly alike→clearly differentiated
2. Perianth parts many→few
3. Sepals and petals free→more or less united
4. Arrangement spiral→hemicyclic→cyclic
   This fourth series is questioned by Sprague.
5. Regular (actinomorphic)—irregular (zygomorphic)

Comparatively few changes occur in the calyx. Separate sepals are the exception, they occur chiefly in the *Magnolia* and *Parietales* groups. In the corolla of insect pollinated flowers the changes are in the direction of improved adaptation to insect visitors. The evolution of flowers must have proceeded parallel to that of insects. Petals with claws, etc. as in many *Cruciferae*, or flowers with special structures, such as a corona, must be considered as specialized forms.

Receptacle

1. Convex→flat→concave
2. Disk absent→present

Inflorescence

1. Flowers solitary→inflorescence loose→inflorescence condensed
2. Flowers alike→more than one kind of flower
3. Flowers perfect→polygamous→monoecious→dioecious

Vegetative Parts

1. Leaves simple→compound (?)
2. Lacunae at nodes below leaf bases, 3→1 (Sinnott)
3. Trees or shrubs→herbaceous perennials→annuals
4. Vessels scalariform→pitted

Finally, in addition to the evidence from ontogeny, other and entirely independent lines of investigation may throw light on floral evolution. First of these comes paleobotany. It is of special interest that the dicotyledonous genera from the Cretaceous are nearly all woody plants with scalariform vessels. Further, evidence from plant serums may be looked upon as of significance, without considering it as all-conclusive. Also the fact that leaf-eating insects may choose related species for their attacks is significant; it looks as if insects discovered plant families before the botanists. Similarly, plant pathology shows us that fungous parasites often select host plants of related forms.

"Characters must be weighed rather than counted," said Bernard de Jussieu, commenting on the numerical system of Linnaeus. In the old systems, beginning with Tournefort, too much weight may have been attached to the character of sympetaly. In the Bessey system the character of superior or inferior ovary may have been given too much weight. Again in the Hutchinson system the character of woody versus herbaceous plants may have been over-emphasized. In the future the natural classification of the higher plants will gradually develop and it will include all characters. "The jewels in the crown of phylogeny," says Zimmermann, "will only then become significant, when all are together, their beauty many times enhanced by their mutual reflections."

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BROOKLYN BOTANIC GARDEN

More Stations for Potentilla tridentata

Raymond H. Torrey

Search during recent months for more stations of the Mountain or Three-Toothed Cinquefoil, *Potentilla* (*Sibbaldiopsis*) *tridentata*, has disclosed three occurrences, at least one of which appears to be new in the records.

After searching several summits in the Pocono Mountains in Monroe County, Pennsylvania, including Camelback, Bear Mountain and Skytop, with E. M. Zimmerman of Bethlehem, Pa. last fall, without result, an expedition was made farther west, in Luzerne County, following the report in Norman Taylor's catalogue of plants in the Torrey Botanical Club's territory that *Potentilla tridentata* occurs on high summits in that county. Mr. Zimmerman thought Penobscot Knob, 2000 feet high, near Mountaintop, southwest of Wilkes-Barre a likely spot and so it proved. On the rocky ridge east and west of the fire observation tower acres of the plant were found in full bloom in mid-June. It was large, healthy and well flowered. It extended for more than a mile, and other ledges of the same character seen but not explored probably support it. It is the largest colony this writer has seen south of New England.

A few weeks later, Mr. Zimmerman found *Potentilla tridentata* in bloom, on Cresco Heights, 1750 feet, in Monroe County, about a mile north of Cresco station on the Lackawanna Railroad. It was a small colony, but interesting as it is not reported in Monroe County by Taylor. We had not included this point in our search of the previous fall.

On Aug. 7, L. W. Anderson of Elizabeth, N. J., and I found *Potentilla tridentata*, on the cliffs of Sam's Point, just within the boundary of Ulster County, at an elevation of 2200 feet. Although I have not heard any previous report of the plant in the Shawangunks, it always seemed to me it ought to grow there. It is found on the eastern front of the Catskills, at 2500–3000 feet; on Schunemunk Mountain, at 1300 feet, and on Kittatiny Mountain (High Point, 1800 feet) the New Jersey extension of the Shawangunks. Yet it was not found in the northern Shawangunks, about Lake Minnewaska, in a search there in April. A trip to Sam's Point, to determine if it occurred there, was successful. The colony is not large, but appears to be healthy and persistent. It is found on the cliffs west of the road rising from Cragsmoor Post Office to the top, beyond a large boulder on a ledge overhanging the road.

This part of the Shawangunks has several other interesting northern plants. A flowering plant new to me, was *Xyris montana*, with small flowers, and erect, stiff stems, quite different from *Xyris flexuosa*, of lower altitudes. *Aralia hispida*, *Clintonia borealis*, and *Trillium undulatum* are common. Many fine specimens of *Habenaria bracteata* were seen. The bright red fruit of *Amelanchier oblongifolia* made a striking sight. A very little *Picea rubra* is found, evidently survivals of larger stands. *Bartonia paniculata* was another unusual plant. *Corema Conradii*, which we found in April farther northeast on the ridge, on Gertrude's Nose, was absent, though we scoured about ten miles of the summit for it. We found the boreal lichen *Cetraria islandica*, in two places, on Sam's Point and on High Point, near the fire tower, but in lesser quantities than on Gertrude's Nose.

This region resembles the New Jersey Pine Barrens a good deal, with its wide expanses of stunted pitch pines, two to six feet high, dwarfed by the thin soil and the fires set by blueberry pickers, to make the berry plants grow thicker. They seem to pick almost exclusively the berries of *Vaccinium pennsylvanicum* (*angustifolium*) with its plentiful, large and sweet fruit. Scores of parties, picking for the market and for home preserving, were seen, in the burned over areas. *Vaccinium corymbosum* occurs in wet places, and more rarely a larger dark blue fruited species which looks like *V. atrococcum*.

The rocks are covered with a small, polyphyllous form of *Gyrophora*, which is associated with unquestionable large *G. Muhlenbergii*, and has the same horizontal bands of tissue underneath. We found this common on the same geological formation, the Silurian Shawangunk quartzite, in the Kittatinys. Mrs G. P. Anderson thought it a different form, hitherto unnamed, and suggested *Gyrophora Muhlenbergii*, var. *kittatinyense*. In places this lichen appears to have been devoured over large areas, by insects or animals, only the holdfasts being left, but this did not kill the plants, for all were sending out new squamulose processes.

The Pale Laurel, *Kalmia glauca*, is also common on this mountaintop, associated with *Chamaedaphne calyculata*. *Drosera* *rotundifolia* is extremely plentiful in the tiny bogs in holes in the rocks where escape of water is slow, and *Xyris montana* is also common in such places.

Hollis, Long Island

A New Coreopsis from the Southeastern United States

Edward J. Alexander

Examination of the specimens of *C. grandiflora* Hogg in the Herbarium of The New York Botanical Garden has shown the presence of a related but quite different species which has until now passed unnoticed. For this plant the writer herewith proposes the following name:

✓ **Coreopsis saxicola** sp. nov. Herba tota glabra, circa 1 m. alta, foliis pinnatis dissectis, segmentis elliptico-linearis: bractea involucri exterioris ovati-lanceolata aut lanceolata, 7–10 mm. longa; achenia suborbiculata 2–3 mm. longa glandulis columnaribus faciei interiori alis fimbriatis dissectis.

An herbaceous, totally glabrous plant about 1 m. tall, leaf-blades pinnately dissected, the segments linear-elliptic: bracts of the outer involucre ovate-lanceolate or lanceolate, 7–10 mm. long; achene suborbicular, 2–3 mm. long, with stalked glands on the inner face, wings fimbriately dissected.

Specimens examined:

Georgia, Stone Mountain, De Kalb Co., F. W. Pennell #4029, Aug. 2, 1912 (Type).

Georgia, Stone Mountain, De Kalb Co., H. Eggert, July 23, 1897.

Georgia, Stone Mountain, De Kalb Co., J. K. Small, Aug. 1–6, 1895.

Alabama, Double Bridges, Tallapoosa Co., F. S. Earle #2147. Aug. 9, 1899.

In general appearance this plant is very similar to *C. grandiflora*, differing markedly however in the non-ciliate petioles, the much broader outer involucral bracts and the achenes with fimbriately dissected wings.

New York Botanical Garden

Two adventive species unrecorded from the Bahama Islands

L. J. K. Brace

1. *Thlaspi arvense* L. A single specimen recently found in a garden and for the first time definitely observed on New Providence: abundantly fruiting. Whether sprung directly from Europe or via the United States or Bermuda I suppose it profitless to speculate. Evidently climatic reasons alone in the future will control indiscriminate mixing of Floras.

2. *Holcus halepensis* L. This was observed growing in clumps in a small lot, on New Providence; after being uprooted, it soon re-established itself.

Nassau, New Providence

BOOK REVIEWS

A New Handbook of Trees[1]

Dr. Graves and Miss Rusk of the Brooklyn Botanic Garden have published a small book that will be much appreciated by all those interested in the trees and shrubs of our region. It is unique in including both wild and cultivated trees and shrubs and in describing both winter and summer characteristics. The book contains two complete keys to genera, one based on the summer characters, the other on the winter characters. There are concise but complete descriptions of all the woody plants commonly found in the New York region, with directions as to where the more uncommon ones may be seen. Technical terms have been largely avoided, a glossary at the end of the book gives explanations of those it was necessary to use.

The book has grown out of the courses on trees which Dr. Graves has been giving at the Botanic Garden for a number of years. Written to meet the known need of his students it will be found useful to all botanists and nature lovers at all times of the year. While written for the New York area, the trees and shrubs described include nearly all those to be found in the north-eastern United States and so should have an appeal well beyond the limits of the city area. The book is bound in paper and very moderately priced.

George T. Hastings

[1] A teaching guide to the Trees and Shrubs of Greater New York, Arthur H. Graves and Hester M. Rusk.

FIELD TRIPS OF THE CLUB

Paleobotanical Trip at Glen Cove, Long Island

Fifteen members and guests of the club enjoyed one of the most interesting events of the 1932 field schedule, on Saturday afternoon, July 30, at Glen Cove, Long Island, for the study of fossil plant impressions in the Cretaceous clays, under the direction of Dr. Arthur Hollick of the New York Botanical Garden, a distinguished authority on the subject. The tide was low which gave a considerable width of strand for exploration. Hundreds of the flat fragments of concretionary iron sandstone, (limonite) stained red with iron, were split open and a goodly number of impressions of leaves were found. Dr. Hollick has kindly supplied the following list:

Definitely identified:

Laurophyllum lanceolatum Newberry.
Ficus krausiana Heer; and *Magnolia capellini* Heer.
Tentatively identified:
Eucalyptus latifolia Hollick.
Paliurus integrifolius Hollick.
Menispermites, sp.?

Other impressions much resembled Sassafras. Many examples of lignite were seen, including one log, protruding from the clay, ten inches in diameter.

The strand was covered in one spot, below a gray stratum of clay, with numerous nodules of marcasite, with fine crystalline forms, in the characteristic pyritohedrons, or 12-faceted figures. Similar nodules were found in Cretaceous clays, on the paleobotanical trip also led by Dr. Hollick, at Cliffwood, N. J., last year. They have an interest to botanists, since the process of their formation included the effects of chemical reactions due to decaying vegetable matter in the pools and lagoons which must have existed along the shores of the continent during Cretaceous time. The process interested many of those present, and Dr. Hollick has since supplied his views thereon, as follows:

"My interpretation of the iron present in the clays and clay marls is, in a general way, as follows: The original crystalline rocks from which the Cretaceous deposits were derived contained iron in the form of sulphide. In connection with the disintegration of the rocks this was oxidized and converted into sulphate. This was carried in solution in the same waters in which the deposits accumulated. Here some of it was captured by the carbon of contemporaneous plant remains and converted into pyrite or marcasite. There was only sufficient carbonaceous material however, to capture a small amount of the sulphate in the waters, and the surplus sulphate remained in solution in connection with the deposits. Whenever these are exposed to the oxygen of the air the surplus sulphate is oxidized and converted into limonite. The limonite may also have been formed from the sulphate by organic oxygen in connection with the plant remains. Concretions of clay ironstones enclosing plant remains may have been formed in this way."

After the field study some of the party went to the home of Robert Hagelstein, Honorary Curator of Myxomycetes of the New York Botanical Garden, in Mineola, to see his wonderful collections of Myxomycetes (Slime Moulds) and diatoms. Mr. Hagelstein is an international authority on both these forms of low orders of life so extremely beautiful in microscopic details. He has tens of thousands of specimens, some collected nearby on Long Island; others received from many parts of the world, arranged in admirable order, in the attic of his home. He has numerous correspondents who exchange specimens and ask his identifications. One collector, who sent specimens for his opinion, was no less a personage than the Emperor of Japan, who found them in the Imperial Gardens in Tokio. Mr. Hagelstein has a unique and valuable library on myxomycetes, and also on diatoms, and a formidable battery of microscopic apparatus for their study. His enthusiasm for these minute but exquisitely beautiful beings, is infectious; when I become more satisfactorily acquainted with lichens, I think I shall have to take up myxomycetes, which are often associated with the former. While hunting for lichens later in the summer, in a dark ravine on the Appalachian Trail on the east foot of High Point, on Kittatiny Mountain, Susses County, N. J. I found a very beautiful slime mould, *Diachaea splendens*, a dense aggregation of tiny white-stemmed, iridescent blue-topped stalks, each about 2 or 3 millimetres high, which Mr. Hagelstein was pleased to receive, as he had not obtained it hitherto from this region.

R. H. Torrey

A Pseudo Plant Fossil

On the trip to Island Pond, in the Harriman State Park, Aug. 21, a collection of leaf impressions was found in a piece of rock, which, if hastily interpreted, suggested startling conclusions. The rock was a fragment of what had once been magnetite iron ore, associated with the pre-Cambrian granites and gneisses of the Hudson Highlands. Yet in it were several fine smooth, clearly veined impressions of leaves, which looked quite like modern species; one being obviously a print of a gray birch leaf, another of *Clethra alnifolia;* others not so obviously identifiable. This was astonishing on first sight; to find present day leaf impressions in a pre-Cambrian rock. Further examination yielded additional evidence which may support the interpretation here offered; an impression of some woven textile fabric, like canvas; an impression as of a piece of sawn wood, and most disillusioning of all, a lead shot, size B, such as used in shot gun shells, welded into the rock. The puzzle was started toward clearance, by old Manning Kyles, who has lived on Island Pond for years, and who used to be a tool sharpener in the iron mines operated in the vicinity up to about 50 or 60 years ago. Kyles said the fragment looked to him like a piece of iron ore that had been roasted in a kiln, to drive off the sulphur, which was often done when the sulphur was too high to make ore marketable. It was our conclusion that a quantity of this ore was pulled out of a roasting kiln, cast on the ground, in the presence of wet leaves and other rubbish, and the impressions of the leaves, the canvas, the sawed lumber, and the actual B shot, were cast into the hot rock. It seemed difficult to believe that the leaves would remain unburnt long enough to make such impressions in rock that had been nearly molten, but there they were.

An interesting discovery on this trip was a small colony of *Rhexia virginica*, the Meadow Beauty, growing on a beaver lodge on the south end of Island Pond. This plant is not common, in fact, I had never seen it before, in the Highlands, although it is very common in the South Jersey Pine Barren meadows.

Raymond H. Torrey

Unusual Lichen Occurrences

Search of some of our remoter mountain tops during the past summer, primarily for unusual lichens, has been rewarded not only with rare lichens, but some new stations for northern flowering plants. On the Shawangunk Mountain ridge, at Sam's Point, and northward, were found the boreal lichen, *Cetraria islandica*, a glacial relict in our territory, and a much rarer boreal species, *Cetraria saepincola*, which Mrs. G. P. Anderson says was the second station ever reported in the territory of the Torrey Botanical Club, although she found it later in the summer on North Mountain in the Catskills. At the same time we found another station for *Potentilla tridentata*, on the cliffs of Sam's Point, and also, even rarer in our territory, *Arenaria groenlandica*, which I have not hitherto seen south of the Taconic Mountains (Mount Everett, in Massachusetts and Brace Mountain in New York), although I think it has been found on Spruce Knob, at 4600 feet, in West Virginia. The elevation of Sam's Point is 2250 feet.

After receiving the rare and beautiful northern Appalachian lichen *Parmelia Cladonia*, from friends who found it in the Adirondacks, and northern New England (Archibald T. Shorey, from Basin Mountain, Adirondacks; Frederick K. Vreeland, Blue Mountain, Adirondacks; Mrs. Laura Woodward Abbott, Jay Peak, Vermont; and George Dillman, Old Speck Mountain, in western Maine), and getting the "look" of the thing in one's eye, I found it in ample quantity on Peekamoose Mountain, 3863 feet high, in the southwestern Catskills, in September. It was reported from Panther Mountain, some miles north of Peekamoose, years ago, but the specimen is not available, so the Peekamoose location restores it definitely to the range of the club. I believe it may occur on other remote Catskill summits and shall look farther for it.

A trip to the Pine Barrens of New Jersey, in the vicinity of Double Trouble, and Wading River, on Sept. 24, with Dr. A. W. Evans, of the Osborn Botanical Laboratory, Yale University, author of the recent authoritative monograph on the Cladoniae of Connecticut (Mrs. Gladys P. Anderson and Mr. and Mrs. William Gavin Taylor providing transportation), proved very instructive to the writer and rewarding to Dr. Evans. He found two Cladonias which are southern species, which have evidently migrated northward along the warm coastal strip, in the same manner as the numerous southern flowering plants which are found in the flora of the coast strip and the Barrens. They were *Cladonia didyma*, and *Cladonia verticillata*, in a form with dense squamules sometimes almost covering the lowest rank of cups.

What is probably the sole occurrence of the Iceland Moss, *Cetraria islandica*, in the Harriman State Park, and perhaps in the Hudson Highlands, was re-discovered, in a very small colony, at 1350 feet, on the Appalachian Trail, on Fingerboard Mountain. Several more colonies of it were found on Schunemunk, Mountain, west of the Highlands and higher, (1690 feet), in addition to a small occurrence noted last year.

Speculations as to the method of its establishment were roused by discovery of a small colony of the tiny squamulose lichen, *Lecidea russellii*, on a glacial boulder of Wallkill Valley limestone, transported southeast by the ice into the Highlands, and now used as a cairn on the Ramapo-Dunderberg Trail on Fingerboard Mountain, in the Harriman Park. This species is frequent on limestone ledges in western New Jersey and in western Orange County, New York. It was found on Shenandoah Mountain, in Putnam County, N. Y. on a club trip last April, probably on the ancient Grenville limestone. If it is an exclusively lime-loving lichen, (although that is not certain, but awaits later search) the problem of its transportation to the limestone boulder in the park is stimulating. Was it transported, in the form of its extremely minute spores, or in soredia or thallus fragments on the feet of a bird. Or did it migrate from one scattered Grenville limestone outcrop in the Highlands to another, eastward to its present site, possibly along the retreating ice front of the Pleistocene continental glacier? We shall look further to see if it is limited to limestone or may occur on the pre-Cambrian granites or gneisses. The problem is like that suggested by the rare occurrence of the usually, though not exclusively lime-loving walking Fern, on glacial limestone boulders, lying on granite, at Upper Cohasset Lake, in the Harriman Park and near Sand Pond, north of Beaver Lake, in Sussex County, N. J. But Dr. E. T. Wherry has reported the Walking Fern on various other substrata than lime; I found it in September on Catskill sandstone on the Gulf Road, west of Watson Hollow. in Ulster County.

Raymond H. Torrey

Joint Field Trip with American Fern Society at Sparta—August 6 and 7

A party of 8 fern enthusiasts assembled at Sparta on August 6th to visit the best fern spots of the region. The first stop was made at an upland swamp in the hills southeast of the village. A thorough search of this locality resulted in the discovery of 25 kinds of ferns including 8 Dryopteris species and one hybrid *D. cristata x intermedia*. Five Botrychiums were noted, especially noteworthy finds being a small colony of *Botrychium angustisegmentum* and one plant tentatively identified as *Botrychium simplex*. The next stop was in the vicinity of Sparta Glen where Goldie's Fern, Ostrich, Oak, Long Beech, Bulblet Bladder and another Botrychium—*B. Matricariaefolium*—brought the list to 31. By this time the heat and humidity of the afternoon forced a postponement of the rest of the trip until the following morning when a trip to the limestone ledges and swamps in the valley added eleven more. Among these were Adder's Tongue, Rue Spleenwort, Virginia Chain Fern, another Dryopteris hybrid, and the rare hybrid between the Walking Fern and Ebony Spleenwort.

In addition to the ferns, the following flowering plants were particularly noted: *Allium tricoccum*, *Liatris spicata*, *Melanthium virginicum*, *Lobelia cardinalis*, *Habenaria psychodes*, *Potentilla fruticosa*.

Luxuriant stands of *Equisetum hyemale* var. *affine* were seen in three places.

James L. Edwards

Field Trip of September 11

A party of seven crossed Green Pond Mountain and the bed of Green Pond which was entirely dry. Island Pond was found to be much lower than usual with no water flowing through the south outlet.

A bush of *Viburnum acerifolium* was noted having the upper leaves like *V. Lentago*. The dark berries and orange pedicels of the sassafras were very attractive. A fruiting plant of *Vitis* was found but the group was too busy with the fruit to decide which species it was. Several plants of the bottle gentian and of the white snake root were observed. On the shores of Island Pond, there were still left a few dwarf plants of the seven-angled pipewort.

Vernon L. Frazee

Field Trip of Saturday, September 24

On this afternoon a party of thirty six walked along the base of the Palisades from the Dyckman Street ferry to the Alpine landing. Several species of goldenrods and asters were found, most interesting being the tall seaside goldenrod, *Solidago sempervirens*, found on and near some of the tidal mud flats. Here it was growing with marsh grass, *Spartinia cynosuroides*, the halbert leaved orach, *Atriplex patula*, var. *hastata* and a few other salt marsh plants. The striking diversity in appearance and habit of species of knotweeds was observed with interest. The spreading door weed, *Polygonum aviculare*, growing in the path, common lady's thumb, *P. Persicaria*, among the weeds on level ground, water pepper, *P. hydropiperoides*, and tear thumb, *P. sagittatum*, beside a brook, Virginia knotweed, *P. virginianum*, with its fruits that snap away from the stem when touched, growing at the edges of the woods, and the climbing false buckwheat, *P. Scandens*, climbing over bushes and rocks presented greater contrasts than can ordinarily be found in one genus. The most unusual find was a seedling fig tree about two feet high growing in an angle between large boulders.

George T. Hastings

NEWS NOTES

Dr. William Trelease, professor emeritus of botany at the University of Illinois, who spent last winter and the early spring in recreation and botanical work in the Canary Islands and the south of Spain, plans a similar expedition this winter to New Zealand.

(*Science*)

Dr. W. W. Robbins, head of the Division of Botany at the Davis Branch of the College of Agriculture of the University of California, will spend six months in Europe where he plans to continue his investigations on sugar beets, weeds and seeds.

(*Science*)

Dr. R. R. Stewart has brought a large collection of plant specimens from northwest Himalayas, the Punjab and Kashmir to the New York Botanical Garden. Dr. Stewart expects to remain at the garden for a year naming the plants.

Wilhelm N. Suksdorf, for many years an outstanding field botanist in the Pacific Northwest, was struck by a train and killed near his home at Bingen, Washington, Mr. Suksdorf has published many lists of additions to the flora of Washington and recently revised the genus Amsinckia, adding many new species. By his will his large private herbarium is given to the State College of Washington.

A new home for the National Botanic Garden in Washington has recently been finished at the foot of Capitol Hill. Mr. George Hess has been director of the garden for more than sixteen years.

The park naturalists of the Yosemite National Park have this summer established a garden of native plants directly back of the park museum. The work was made possible by a gift of $4,000 by Miss Marjorie Montgomery Ward.

Dr. Roland M. Harper, whose article on Erigenia in Alabama occurs in this issue, has contributed to every volume of Torreya since its establishment in 1901. In a news note of our last issue, on page 140. we referred to his attending the Congress of Genetics in New York. We should have said the Congress of Eugenics.

Dr. Ivan M. Johnston, research associate of the Arnold Arboretum of Harvard University, recently appointed to a Guggenheim fellowship, sailed on November 10 for a year of study in England, Argentina and Chile. He will assemble data for a discussion of the extent and significance of the trans-equatorial relationship existing between the floras of the more or less arid regions of North and South America.

(*Science*)

INDEX TO VOLUME 32

Names of species and varieties described as new are in **black faced** type.

THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their paper appears, will kindly notify the editor, when returning proof.

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50 "	1.81	3.19	4.67	5.61	7.31	8.52	10.34	10.28	15.56	19.08
75 "	2.14	3.68	5.33	6.21	8.36	9.62	11.49	12.37	17.21	21.94
100 "	2.47	4.18	5.88	6.98	9.07	10.78	12.60	13.69	19.30	24.25
150 "	2.97	5.06	7.15	8.36	11.22	13.31	15.62	16.72	23.48	29.48
200 "	3.85	5.55	7.86	9.18	12.44	14.85	17.38	18.53	25.90	32.56
300 "	4.23	6.82	10.12	11.77	16.33	19.30	22.55	23.15	33.22	41.14

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TORREYA

A Bi-Monthly Journal of Botanical Notes and News

John Torrey 1796–1873

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

VOLUME 33

New York

1933

Vol. 33 January-February, 1933 No. 1

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2587 Sedgwick Ave.,
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TORREYA

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Plant records from Buffalo and vicinity

Irving William Knobloch

The purpose of this article is twofold; to honor the memory of the late Dr. G. Claude Hicks, Professor of Biology at the University of Buffalo, and to add materially to the records of the flora of the Buffalo region.

The following list of plants is a record of those collected by Dr. Hicks, together with a few by the author, during the season of 1928. The intensive collections of the *Cyperaceae* testify to his interest in that group and, indeed, it may safely be said that he was one of the most promising investigators in the cytology of that difficult group. The results of his labor there may be observed in the November 1928 and in the October 1929 issues of the Botanical Gazette.

Dr. Hicks sent duplicates of all his collections to the Gray Herbarium where they were critically determined through the courtesy of Professor M. L. Fernald and Dr. Lyman Smith.

Plant records from western New York and adjacent Canada are limited to four or five publications of note and the basis for recognizing new stations and additions to the flora must necessarily rest on these published accounts. These are the records of David F. Day in his catalogue of the plants of Buffalo and vicinity with two supplements; a catalogue of the plants of the Niagara Falls region, by the same author; a catalogue of Canadian plants by John Macoun, as published in the "Geological Survey of Canada"; and a list of plants from Point Abino, Ontario, Canada, published in "The Canadian Field Naturalist" by Homer D. House. Access was also had to a herbarium of local plants collected and presented to the Buffalo Society of Natural Sciences by Frank Johnson.

Equisetum arvense L.	North Evans, N. Y.	9/29/28	K.	N.S.
Sagittaria latifolia Willd. forma *hastata* Robinson	E. Aurora, N. Y.	8/7/28	K.	

Glyceria septentrionalis Hitchc.	Angola-on-the Lake, N. Y.	7/28/28	K.	N.H.
Glyceria nervata (Willd.) Trin.	E. Aurora, N. Y.	8/7/28	H.	N.S.
Panicum capillare L.	Buffalo, N. Y.	9/26/28	H.	
Panicum Lindheimeri Nash.				
var. *fascicularum* Fern.	Hamburg, N. Y.	6/30/28	H.	
var. *implicatum* Fern.	Angola-on-the-Lake N. Y.	7/15/28	H.	
Setaria glauca Beauv.	Buffalo, N. Y.	9/26/28	H.	
Setaria viridis Beauv.	E. Aurora, N. Y.	8/7/28	H.	N.S.
Agrostis alba L.	Hamburg, N. Y.	10/30/28	K.	
Calamagrostis canadensis Beauv.	N. Evans, N. Y.	9/29/28	K.	
Cinna arundinacea L.	Getzville, N. Y.	9/10/28	H.	N.S.
Poa pratensis L.	Tonawanda, N. Y.	6/25/28	H.	
Poa palustris L.	Tonawanda, N. Y.	6/25/28	H.	N.S.
Poa compressa L.	Hamburg, N. Y.	6/30/28	H.	
Festuca elatior L.	Tonawanda, N. Y.	6/25/28	H.	
Bromus secalinus L.	Hamburg, N. Y.	6/30/28	H.	
Bromus tectorum L.	Niagara Falls, N. Y.	6/16/28	H.	N.S.
Asperella Hystrix Humb.				
var. *Bigeloviana* Fern.	Tonawanda, N. Y.	6/25/28	H.	
Elymus virginicus L.	Getzville, N. Y.	9/10/28	H.	N.S.
Hordeum jubatum L.	Tonawanda, N. Y.	7/8/28	H.	
Cyperus strigosus L.	Hamburg, N. Y.	9/9/28	K.	
Carex vulpinoidea Michx.	Tonawanda, N. Y.	6/25/28	H.	N.S.
Carex rosea Schkuk.	Springbrook, N. Y.	6/24/28	K.	N.S.
Carex lupulina L.	Angola-on-the-Lake, N. Y.	7/15/28	H.	N.S.
Carex triceps Michx.				
var. *hirsuta* Bailey	Hamburg, N. Y.	6/30/28	H.	N.H.
Carex stipata Muhl.	Tonawanda, N. Y.	6/25/28	H.	N.S.
Carex crinita Lam.	Tonawanda, N. Y.	6/25/28	H.	N.S.
Carex tribuloides Wahlenb.	Getzville, N. Y.	9/10/28	K.	N.S.
Carex lurida Wahlbenb.	Angola-on-the-Lake, N. Y.	7/15/28	H.	N.S.
Carex tenera Dewey	Hamburg, N. Y.	6/30/28	H.	N.S.
Eleocharis capitata R. Br.	Cedar Bay, Ontario, Can.	7/6/28	H.	
Scirpus validus Vahl.	N. Evans, N. Y.	9/29/28	K.	N.S.
Scirpus cyperinus Kunth.	N. Boston, N. Y.	10/3/28	H.	N.S.
Scirpus atrovirens Muhl.	Springville, N. Y.	7/15/28	H.	N.S.
Juncus effusus L. var. *solutus* Fern. and Wiegand	Angola-on-the-Lake, N. Y.	7/15/28	H.	N.S.
Juncus balticus Willd. var. *littoralis* Engelm. f. *dissitiflorus* Engelm.	Cedar Bay, Ont., Can.	6/7/28	H.	N.H.
Juncus Torreyi Coville	N. Evans, N. Y.	9/29/28	K.	N.S.
Uvularia grandiflora Sm.	Hamburg, N. Y.	4/29/28	K.	N.S.

Habenaria fimbriata R. Br.	Springville, N. Y.	7/15/28	H.	
Polygonum convolvulus L.	Hamburg, N. Y.	9/24/28	K.	
Penthorum sedoides L.	Getzville, N. Y.	9/10/28	K.	
Sedum triphyllum S. F. Gray	Crystal Lake, N. Y.	4/28/28	H.	
Chrysosplenium americanum Schwein.	Crystal Lake, N. Y.	4/28/28	H.	
Rubus alleghaniensis Porter	Tonawanda, N. Y.	6/25/28	H.	N.S.
Medicago lupulina L.	Niagara Glen, Canada	7/8/28	H.	
Lathyrus maritimus Bigel. var. *glaber*(Ser.) Eames	Cedar Bay, Ont., Can.	7/6/28	H.	
Desmodium paniculatum DC.	Springbrook, N. Y.	9/15/28	K.	
Polygala Senega L.	Niagara Falls, N. Y.	6/16/28	H.	
Circaea alpina L.	Angola-on-the-Lake, N. Y.	7/28/28	K.	N.S.
Sanicula marilandica L.	E. Aurora, N. Y.	8/7/28	H.	N.S.
Sanicula canadensis L.	Angola-on-the-Lake, N. Y.	7/15/28	H.	N.S.
Osmorrhiza Claytoni Clarke	Angola-on-the-Lake, N. Y.	7/15/28	H.	N.S.
Apocynum hypericiifolium Ait.	Cedar Bay, Ont., Canada	7/6/28	H.	N.H.
Ilysanthes dubia Barn.	N. Boston, N. Y.	10/3/28	H.	
Senecio Smallii Britton top of gorge, not in the New York flora	Niagara Falls, N. Y.	6/16/28	H.	
Crepis biennis L.	Getzville, N. Y.	10/10/28	K.	
Solidago juncea Ait.	Angola-on-the-Lake, N. Y.	11/28/28	K.	N.S.
Solidago nemoralis Ait.	Buffalo, N. Y.	10/20/28	K.	
Solidago bicolor L.	N. Boston, N. Y.	10/3/28	H.	
Solidago graminifolia Salisb.	N. Boston, N. Y.	10/3/28	H.	
Solidago caesia L. var. *axillaris* Gray	Springbrook, N. Y.	9/15/28	K.	
Ambrosia artemisiifolia Gray var. *aelatior* Smith	N. Boston, N. Y.	10/3/28	K.	
Aster divaricatus L.	N. Boston, N. Y.	10/3/28	K.	
Prenanthes altissima L.	N. Boston, N. Y.	10/3/28	K.	N.S.
Bidens vulgata Greene	Springbrook, N. Y.	9/15/28	K.	
Bidens cernua L.	Springbrook, N. Y.	9/15/28	K.	
Heliopsis scabra Dunal.	Springbrook, N. Y.	9/15/28	K.	
Helianthus scaberrimus Ell.	N. Evans, N. Y.	9/29/28	K.	N.H.
Erigeron ramosus BSP.	N. Boston, N. Y.	10/3/28	K.	

EXPLANATION:

H. means Dr. G. Claude Hicks
K. means Irving William Knobloch
N. S. means New Station
N. H. means New Here

BUFFALO, N. Y.

The Palouse Prairie Balsam-root

E. R. Bogusch

The natural Palouse prairie of southeastern Washington has rapidly disappeared during the last twenty years. This change has been largely dependent upon the advance of agriculture in search of increased acreage. Fortunately, for the student of plant ecology there have been preserved for study a few typical examples of the original Palouse vegetation that give us an approximation of what the climax vegetation consisted before the advent of the white man. One such area has been set aside by the State College of Washington, expressly for botanical study. It was here that Weaver carried on a part of his investigations of the root systems of prairie plants during 1914.

Despite precautions in keeping this strip of ground secure from stock and agriculture, this prairie remnant affords an excellent example of a unit of plants that is out of balance with its surrounding biota. Extensive summer fallows in adjacent fields have materially reduced the atmospheric moisture during the growing season and the plants are dwarfed accordingly.

The most profound influence, however, comes from the presence of ground squirrels, animals that are not components of the true climax as indicated by the presence of *Festuca idahoensis* and *Agropyron spicatum*. The rodents belong to the larger species (*Citellus columbianus*) and are found normally only in the seral habitats induced by erosion and other factors and therefore invade the climax marginally. Due to the increased food supply and the introduction of much disturbed ground incident to agriculture, coupled with the decimation of natural enemies—chiefly coyotes and hawks—these rodents are present in greatly increased numbers.

The accompanying figure is a photograph of the spring aspect of the balsam-root (*Balsamorhiza sagittata*) and represents a typical condition to be found in the preserved areas. This plant, one of the major dominants of the Palouse vegetation, is among the first to resume activity in the spring. The continued destruction of the early shoots results in a stimulation of the radial ones so as to produce the peculiar ring-like growth.

The complete eradication of the plant is usually prevented by other food becoming available at this time. The vigor of the balsam-root is materially affected and such injured plants bloom poorly or in some cases not at all. In all the typical vegetation, still present in the Palouse country, which has been held under observation, fully eighty-five per cent of the balsam-root was

found to be attacked in this manner. This shows a significant tendency toward the elimination of one of the most characteristic plants of the region and presents a problem that must be met immediately to secure the perpetuation of the species.

State College of Washington,
Pullman, Washington

Fasciation in Lespedeza Sieboldii Miq.

Edna L. Johnson

Lespedeza Sieboldii Miq., commonly known as bush clover, is a graceful ornamental shrub or undershrub which has been introduced into this country from Japan. Each year strong wiry shoots are sent up from the crown. It blooms profusely from

Normal and fasciated shoots of *Lespedeza Sieboldii* Miq.

The fasciated stems (right) bear irregularly placed, short-petioled leaves which are smaller and more numerous than those on the normal stem. The inflorescences on the flattened shoots are increased in number, crowded, and lack the normal alternate arrangement. (Some inflorescences and leaves were removed at various places to give a better view of the flattened stems.) The small split-off section of the left abnormal stem shows spiral torsion as did several branches not photographed.

August to October in this latitude and is prized for its abundant late rose-purple flowers which droop in numerous long racemes.

A handsome specimen of this species was observed to show marked stem fasciation for the first time this summer. The shrub which sent up numerous shoots ranging from 6 to 8 feet in length, exhibited fasciation in approximately one-third of its shoots. The branches which are normally almost terete showed flat, ribbon-like expansions from one-fourth to an inch or more in width. In cases where the growth was equal on both sides the stem retained its straight direction but in many stems the growth on one side was more rapid and vigorous than on the other and spiral torsion resulted. In some cases the stem curved so that complete circles were formed. Irregularly placed, short-petioled leaves which were smaller and more numerous than those on the normal stem occurred on the fasciated shoots. The inflorescences also were greatly increased in number and grew in crowded masses in abnormal positions.

A search of the literature showed no account or figure of fasciation of Lespedeza occurring in America. Figini[1] in an article on inheritance of fasciation of *Antirrhinum majus* mentions fasciation of *Desmodium penduliflorum*, a name sometimes given as a synonym for this species.

No cause for the malformation is evident. Cultural methods have been the same as in previous years and there is no evidence of injury to the initial meristem either by fungi or by the action of insects. *Lespedeza Sieboldii* can be grown by division of the clump or by cuttings. An attempt will be made to propagate the fasciated shoots by both of these methods and further observations will be made on the original plant to determine if possible whether the fasciation is of germinal or somatic origin.

University of Colorado,
Boulder, Colorado

[1] Figini, G. P. L'ereditarieta della fasciazione nell' Antirrhinum majus L. Nuovo Gior. Bot. Ital. 33(1): 65–87. 1926. (Biol. Absts. 1:8564. 1926–27.)

Vegetable, mineral or animal?

Curious concentric circles in Shawangunk quartzite, on Kittatinny Mountain, N. J., which have received a wide variety of interpretations

Raymond H. Torrey

There is one chance in three that the objects described in this article may have been of vegetable origin, and as the editor of Torreya has offered me an opportunity to describe them, this account is presented in a botanical journal. I do not offer any positive explanation, but tell what I found and what others thought of them. Perhaps this will bring out further views which may clear the matter up.

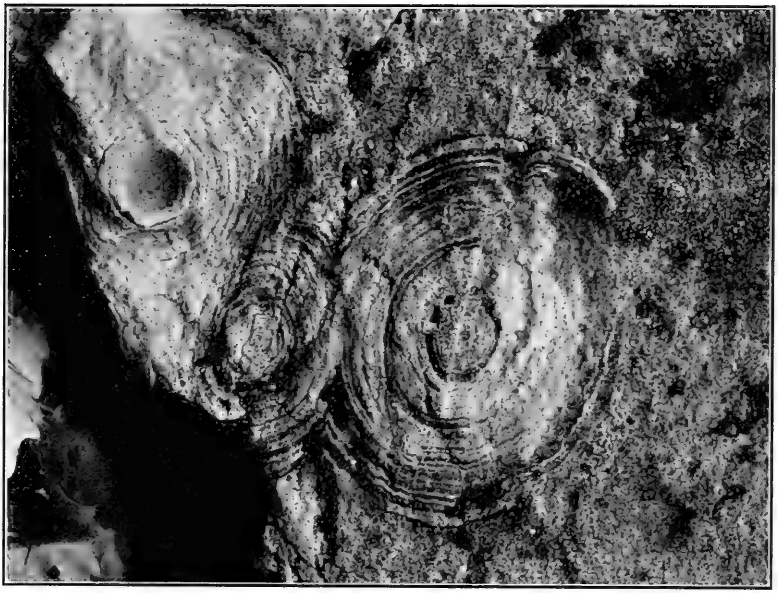
While working on the Appalachian Trail, on Kittatinny Mountain, in Warren County, New Jersey, above five miles northeast of Delaware Water Gap. two summers ago, with Louis W. Anderson, of Elizabeth, N. J., our course was diverted from an older trail by the devastation of a recent forest fire to seek a better route along the edge of the wet swale known as Tock's Swamp, from which Tock's Run drops steeply down to the Delaware River. Beside this swamp, along what is now marked as the Appalachian Trail, was a large oblong boulder, about eight feet long, a foot or two through, and three or four feet out of the wet soil, in which half of it was probably buried. Anderson's eye first caught, and he called to me to see, a number of concentric rings on both faces of the boulder. The photographs in the illustrations of this article, made by Anderson, show them very well.

It seemed to me they must be fossils of some sort, from the regularity of the concentric structure. I recalled the pictures I had seen in some of the New York State Museum Reports, about 1917, of the similar circles in Cambrian limestone in the Mohawk Valley, particularly in Lester Park, near Saratoga, N. Y., which have been called *Cryptozoon proliferum*, and are believed by many paleontologists to be fossils of Cambrian lime secreting algae. But the boulder in which the rings at Tock's Swamp occurred is of the hard quartzose rock, known as Shawangunk Grit or Shawangunk Quartzite, a Silurian formation, which caps the Shawangunk and Kittatinny Mountains, from Mohonk Lake in Ulster County, N. Y., southwest through northwestern New Jersey and along the Blue Mountain of Pennsylvania. Re-reading of the New York State Museum reports showed that no fossils had ever been reported in this formation, other than a few graptolites, in intercalated shales near Otisville, N. Y.

I thought we had found something new. First, I sent Anderson's photographs to Dr. Rudolf Ruedemann, New York State Paleontologist, at Albany. He was much interested, and wrote me:

"I am very much interested in the excellent photographs by Mr. Anderson of the problematicum. They leave no doubt that the fossil is more than mere weathering marks. It agrees in so many features with Cryptozoon as it occurs near Saratoga that I believe it may prove to be that calcareous alga. The occurrence of a Cryptozoon in the Shawangunk grit is not known and if turns out to be one, it should be published." He asked for chips of the material, for the purpose of making thin specimens, but after we had chiselled a complete circle, with a dozen rings, out of the boulder, on another visit, and sent it to him, he doused my hopes of locating a new fossil where it had no business to be, by writing:

"The interesting fossil from Kittatinny Mountain does not seem a Cryptozoon after all. While Cryptozoon is a calcareous alga, this specimen consists of quartz grains. I considered it possible that the quartz might be pseudomorphous after calcite, but Mr. Newland [Mr. D. H. Newland, State Geologist of New York] assures me that the fossil is composed of true sand-grains, or has the same composition as the matrix. It therefore seems that the body must have been a mud-ball such as are found in



sandstone, and that the clay or lime or whatever held the sand-grains together has been dissolved out. Such balls form on the bottom of rivers and shores with sandy bottoms. The concentric shells are so regularly spaced that the thing is most deceptive. It is really too bad that it is not a cryptozoon, it would be such an interesting find."

Meanwhile I had written to Dr. Marshall A. Howe, Assistant Director of the New York Botanical Garden, who is an authority on living and fossil algae and who has described somewhat similar ring-like formations as undoubted fossil algae, in shales and limestones. Dr. Howe seemed to think it possible that the Kittatinny "problematicum," both from photographs and the same specimen sent to Dr. Ruedemann, was a fossil alga, probably a Cryptozoon, which deserved a new specific name. In our further correspondence, we had almost agreed on such a name, as *Cryptozoon kittatinyense*, or *concentricum*. Referring to Dr. Ruedemann's conclusion that it was a mud-ball, Dr. Howe said:

"It is hard for me to believe that a thing of this sort is not organic. However, I do not like to describe things as fossil algae unless they show some microscopic cell structure, which your thing, I judge, does not do. If you want to go ahead and give the thing a name it won't be any worse than what the distinguished Dr. Walcott did in the case of his so-called Pre-Cambrian algae. And he was director of the United States Geological Survey, Secreary of the Smithsonian Institution, and president of the National Academy of Sciences! So you would have a very eminent precedent. Your 'new species' would certainly be as good as his *Newlandia concentrica*."

Dr. Howe informed me that Professor A. C. Seward, Paleobotanist of Cambridge University, who is sceptical as to the organic nature of Cryptozoon, and thinks such concentric rings may be due to purely physical precipitation of minerals, was soon to lecture in New York. So when Dr. Seward appeared before the Torrey Botanical Club, and the department of botany of Columbia University in a lecture at Columbia not long after I put my problem to him. He was much interested, and after his return to England, wrote me for more photographs and actual specimens, which I sent him. He wrote: "I realize that the explanation of the curious structures known as Cryptozoon is one of the most difficult problems and that makes it all the more interesting to tackle."

I also applied to Professor Charles P. Berkey, head of the department of geology and mineralogy at Columbia University, for his views. Anderson and I had made further visits to the region where we first found the circles, and scoured the woods and ledges for a mile north and northeast of the original boulder, on the supposition that it had been transported by the ice of the continental glacier and that we might find its source in some ledge, not far off. We did not find such a ledge, but we did find at least twenty other glacial fragments, of the same quartzite in a fan-shaped area, northeast of Tock's Swamp from a few pounds to a hundred pounds or more in weight, each showing more or less perfect rings. One of these was like a dumb-bell made of two of the circles, each three or four inches in diameter with six or eight rings strongly welded together, which appeared to have weathered out under glacial erosion or later disintegration of a larger boulder. This I sent to Dr. Berkey. He too was much interested, and also referred them to his associates, Dr. G. Marshall Kay and Mr. G. I. Atwater, who made thin sections. Dr. Kay reported that his conviction was that the specimens were of inorganic character. He wrote: "This is evident from the fact that the bedding in the rock passes directly through the spherical masses. The concentric spheres in the weathered specimens are due to the presence of layers about the center of the mass that are differently cemented, with the result that the more poorly cemented spherical layers have been more disintegrated than their adjacent better cemented layers. From a petrographic study of the sections, it seems that an original sandstone has been silica cemented, the cement being added as enlargement of grains. This cement has in turn been replaced in concentric zones about a central point by iron oxide, this replacement in some instances having also affected the original grains of sand. These iron-oxide cemented zones have disintegrated more readily than those in which the silica cement has not been replaced. The structures are most similar to concretions, though they differ from such structures in that the concentric banding is due to zonal replacement of the cement in a quartzite rather than to a zonal cementation of sandstone. In summary, the structures in the specimens of the Shawangunk quartzite are concretion-like structures that bear no evidence of organic origin."

Mr. Atwater's report was that the specimen showed bedded sedimentary original structure, with cementation by silicification, and replacement; that the grains were of quartz, probably originally from vein quartz; quartzite, and infrequent argillite, titanite and tourmaline, with chlorite as an alteration product formed partly after cementation and possibly partly introduced as inclusions in the quartz grains.

Dr. Berkey, expressing the same views as those of his associates, remarked:

"The specimens make a striking exhibit and are, to say the least, unusual, especially for that kind of rock, and we have no adequate explanation for their development in this particular bed on such a large scale, for the formation as a whole, as far as I have seen it, is quite free from such structures. For the main question, however, we are confident that the forms are not organic."

I also sent photographs and specimens to Dr. Henry B. Kummel, State Geologist of New Jersey, in Trenton. His first reaction seemed to indicate a belief that they represented something other than an inorganic formation. He wrote:

"Although you found the specimen on top of Kittatinny Mountain, I am not absolutely certain that it is the Shawangunk sandstone, Mr. Johnson [his assistant] has succeeded in getting a slight lime reaction with a little acid. Since it is a drift boulder, it may have been derived from some distant source and may be some other formation than the Shawangunk. The concentric layers certainly look like a marine algal organism, perhaps Cryptozoon. At one or two points there are forms which look like Crinoid stems, but I am not at all sure that this is correct. At a number of points also I notice what seems to be somewhat definite indications of a cellular coralline structure. Some of the tubular holes look to me more like worm borings than cavities from which pebbles weathered out. Others, however, are unquestionably due to differential weathering. All in all, my guess is that the specimen was originally a sandstone bound together by calcareous cement and that some lime secreting organisms assisted in its formation. I believe that we have something more here than merely water-laid sand layers."

Upon hearing Professor Berkey's views, Dr. Kummel said he thought they were probably correct and that the material was not organic in origin. He referred to cone-in-cone structures in western calcareous shales, which had a striking resemblance to some of the V-shaped cross sections of the concentric markings of my specimens."

Well, here are the varying views on the subject. I still think, with all respect to these distinguished authorities who differ, that we may have some evidence of organic origin. Others have suggested the rings may be due to lime or silica secreting marine animals. Dr. Howe has described some unquestionable fossil algae with concentric circles and microscopic cell structure in younger formations than the Silurian. Both vegetable and animal life existed in the Silurian seas, although no traces have been reported hitherto from the Shawangunk quartzite. Somewhere traces might have been left. I shall look for better material and more of it, to see if I cannot give this thing a name. Or, as Dr. Seward thinks, is there reason to doubt the algal origin of Cryptozoon? The likeness of the perfectly regular rings in the Shawangunk grit and in the Mohawk Valley limestone is certainly suggestive of regular deposition of lime or silica about a growing circular thallus of some large marine alga.

Hollis, Long Island, N. Y.

The name of a fossil Boraginaceous plant

T. D. A. Cockerell

In 1928 (Proc. U. S. National Museum, *73*, Art. 13, p. 1) Dr. E. W. Berry published an account of some fossil fruits (nutlets) from the upper Tertiary of Kansas and Colorado. These he assigned to a species which he called *Lithospermum fossilium*. But he divided this into three varieties, to each of which he gave a name. The first and most abundant variety, which should be considered the typical form of the species, is named *L. fossilium rugosum*. In the Science Bulletin of the University of Kansas, xx (1932) pp. 333–367, Mr. Maxim K. Elias has a very interesting paper on fossil fruits from the same region. The second and third of Berry's supposed varieties he considers to be grasses, pertaining to a new genus *Berriochloa*. But the first is truly Boraginaceous, and related to *Anchusa*. After elaborate study and comparisons, it is made the type of a new genus *Biorbia*, and appears as *Biorbia rugosa*. But since Berry gave the name *L. fossilium* to the species, this cannot be suppressed, and surely we must write *Biorbia fossilia* (Berry).

Boulder, Colo.

Fire weeds

Raymond H. Torrey

Commenting on the writer's note on *Marchantia polymorpha*, after forest fires, Dr. G. E. Nichols, President of the Ecological Society of America, Osborn Botanical Laboratory, Yale University, New Haven, Conn., writes:

"The condition which you describe in your Torreya article is a common one in northern Michigan, where I have conducted a course on bryophytes at the University of Michigan Biological Station for the past dozen summers. Except in dry sandy situations Marchantia is a common and abundant pioneer after forest fires. It frequently comes in on beds of matted down charcoal on sites of former camp-fires. In fact, I commonly refer to Marchantia and Funaria as 'fire weeds,' among the bryophytes."

Funaria hygrometrica was also plentiful in the burned area on Kittatinny Mountain, where I found the extensive Marchantia colonies, and now that Dr. Nichols includes it among bryophyte "fireweeds," I recall I have often seen it in spots that had been burned, including places along railroads where old ties had been burned. It would be interesting to list such pioneers after fires, among all classes of plants. In our hardwood forests, after a severe burning, a common one is *Lechea intermedia;* and on the Kittatinny location, *Acnida tuberculata* was very dense the first year after the blaze and, now, in the second year, *Pycnanthemum incanum* is common. There is some of the common Fireweed, *Epilobium angustifolium*, but it is not as dense as often happens after burns in the North Woods. It seems to me that lichens, especially these growing on earth, come back rather slowly after burnings; although the crustose ones on ledges and boulders, such as *Rinodina oreina*, Lecideas, Lecanoras and Rhizocarpons survive pretty well. The Rock Tripes, Gyrophoras and Umbilicarias, with their large foliose thalli, burn up when caught in the fire belts, and are slow to reappear in such places.

BOOK REVIEW

Weeds of the pineapple fields of the Hawaiian Islands[1]

H. St. John and E. Y. Hosaka are the authors of this popular handbook consisting of non-technical descriptions, with illustrations, of the weed flora of the Hawaiian pineapple fields, with keys, and chapters on dissemination of weeds, and on their mechanical and chemical control. Local Hawaiian, Japanese, and English names are given. The publication renders identification of somewhat over 80 of the most common species found in cultivated areas, and in waste places in and about towns, particularly easy. The work will be found to be just as useful in most other countries in the wet tropics as it is in Hawaii as a guide to the determination of the most common plants. The identifications are for the most part correct. *Dryopteris parasitica* (L.) O. Ktz. is misinterpreted, as it has been in most modern botanical literature, the form illustrated apparently being the very different *D. dentata* (Forsk.) C. Chr. The original Linnaean species is the same as *D. didymosora* (Parish) C. Chr. Some botanists prefer the binomial *Sphenomeris chusana* in place of *S. chinensis*. For the collective species *Fimbristylis diphylla* R. & S. the oldest name is apparently *F. annua* (All.) R. & S. These are however but minor criticisms. The work is supplied with a glossary of the comparatively few technical terms used, and an index. The book is well illustrated with full-page drawings of all the plants described, is printed on good quality paper and attractively bound.

E. D. MERRILL

[1] Weeds of the Pineapple Fields of the Hawaiian Islands, Harold St. John and Edward Yataro Hosaka. University of Hawaii. Res. Pub. 6: 196. 83 figures. 1932. Pub. Office, Univ. of Hawaii, paper 75 cents, cloth, 1.75.

FIELD TRIPS OF THE CLUB

A group of twenty-four made the trip to Franklin Lake on Sunday, October 16. The surrounding hills here are of the basalt rock formation, a northern extension of the Watchung Mountains and are characterized by an exceedingly rich and varied flora. An interesting occurrence here is the walking fern growing on the loose trap rock talus, where it seems to be thriving exceedingly well away from its usual limestone base.

The group of Persimmon trees growing along the edge of the swamp at the Clove were found to be abundantly in fruit. Several members sampled the fruit and found the outer skin rather bitter. The fruit improve with age and are at their best in midwinter when their bitterness has disappeared. Plants noted along the trail were Blue Cohosh with its bright blue berries flimsily supported on the dried and yellow plant stalks, Gold Thread, and One-sided Pyrola, its persistant and dried up flower stalk still proclaiming its identity.

Prickly Pear Cactus is found growing on the exposed trap rock ledges in quite a few places. More rarely *Selaginella rupestris* is found in similar places. The other little member of the tribe, *S. apus*, was found along the trail beside a spring on High Mountain. Here also in open wet meadow spaces were the beautiful Fringed Gentians in full bloom. Intermingled were Bottle Gentians which had bloomed somewhat earlier.

W. Lincoln Highton

Field Trip of Saturday, October 22

A perfect autumn afternoon brought out thirty-five people for the field trip on the western slope of the Palisades near Coytesville, New Jersey. Asters and goldenrods were the primary objectives in this area of beech, oak, and tulip tree woods. The following species were noted: *Aster cordifolius*, *A. divaricatus*, *A. ericoides*, *A. lateriflorus*, *A. macrophyllus*, *A. novae-angliae*, *A. paniculatus*, *A. puniceus*, *Solidago altissima*, *S. caesia*, *S. graminifolia*, *S. juncea*, *S. nemoralis*, *S. rugosa*, *S. speciosa*, and *S. ulmifolia*.

H. K. Svenson

PROCEEDINGS OF THE CLUB

Meeting of October 4, 1932

The meeting at the American Museum of Natural History was presided over by Dr. M. A. Howe. There were 45 members present.

The following were unanimously elected to membership in the club: Dr. George S. Avery, Connecticut College, New London, Conn.; Miss Florence L. Barrows, Apt. 43, 47 Claremont Avenue, New York; Miss Rose T. Bleimeyer, 11420-124th Street, South Ozone Park, N. Y.; Mrs. S. H. Chubb, 6065 Broadway, New York; Mr. L. H. Grunebaum, 37 Wall Street, New York; Mr. Spencer Scott Marsh, Midwood Terrace, Madison, N. J.; Mr. William A. Rauchuck, Box 12, Hamilton Grange New York; Mr. James F. Willey, C. G. 102, Base 2, Clifton, Staten Island, N. Y.

The resignation of Mr. Max A. Elwert was accepted with regret.

It was announced with regret that Mr. W. W. Ashe had passed away.

Dr. Fred W. Foxworthy, who has recently become a life member of the club, reported on some of his experiences in the Federated Malay States where he has been for several years in charge of Forestry Research. He has just published a monograph on the Malayan Dipterocarpacae. He spoke of the very uniform climate and the remarkable growth of the forest there.

Dr. Ralph R. Stewart told of his botanical collecting in the Himalayan Mountains and stated that a number of plants from this region have proven hardy and adaptable in our climate.

Dr. R. A. Harper spoke briefly on his cytological work and on his bog plantings at his home.

Dr. A. H. Graves told of his success in crossing the American chestnut with disease resistant old-world species and stated that he had a large number of seedlings from these growing in his plantations at Mr. Carmel, Connecticut, one of which made phenomenal height growth in the past year, equal to three years' normal growth. He also stated that on his summer absence of three months he visited practically all of the European botanical gardens and was interested to note the differences between the old and new world botanical gardens.

Mr. Raymond H. Torrey told about some interesting findings of rare plants in the Kittatinny Mountains and other nearby ranges.

Dr. Alfred L. Gundersen spoke of his pleasant summer in the Catskills and of the vivid autumnal coloration as noted this year.

Mr. George T. Hastings showed some very interesting mounted specimens of plants collected at Tully, New York, such as Isoetes and the very interesting *Eleocharis Robbinsii.*

Dr. John S. Karling reported that he had not been into the Central American jungles as is his usual custom during summer vacations, since the consumption of chicle has decreased perceptibly. Instead he spent the time on his father's estate in Western Texas digging wells which are water holes for cattle, and reported noticing in some of these wells unusual quantities of Euglena.

Dr. Elmer D. Merrill stated that he had an interesting case in the herbarium two days before. For many years he has been interested in the distribution of weeds particularly in the Orient where very many are of American origin. Most of these reached the Orient in the early colonial period as accidental introductions. Among collections received within the past three or four years from various parts of the Old World, he found specimens of *Borreia laevis*, a widely distributed American weed, from such remote areas as Sumatra, Singapore, Joer in the Southern Philippines, New Britain, Sepik River, New Guinea and Samoa. No record of this plant occurs in any literature pertaining to the flora of the Old World. The weed is apparently a very recent introduction from tropical America. At the same time he reported *Borreia latifolia*, another American weed from Eastern Sumatra and from Singapore, also a new record from the old world tropics.

Dr. Sam F. Trelease and Dr. Ralph H. Cheney also gave interesting reports.

Respectfully submitted,

Forman T. McLean
Secretary

Meeting of October 19, 1932

The meeting was called to order at The New York Botanical Garden at 3:30 P.M. by President Sinnott. There were 32 members present.

Mr. George Hume Smith, 1925 Central Avenue, Indianapolis, Indiana was unanimously elected to membership in the club.

President Sinnott stated that the next meeting of the Club would be held at Schermerhorn Hall, Columbia University, on Wednesday evening November 2, instead of November 1, as Professor Öwind Winge of the University of Copenhagen would speak on "Sex determination in Malandrium and Lebistes."

Last year at the suggestion of several members of the club, the President appointed a committee consisting of Dr. Britton as Chairman, Dr. Howe and Dr. Harper. Dr. Howe presented a proposed amendment to the constitution regarding the appointment of a council to take the place of the executive committee.

Several suggestions as to changes to the proposed amendment were made and the matter referred back to the committee.

Mr. Harold N. Moldenke of The New York Botanical Garden gave a very interesting talk on "The Genus Callicarpa."

Mr. Henry Teuscher gave an interesting talk on "Some Suggestions of a Horticulturist on the Problem 'What Is a Species?'"

Against personal inclination I have had to dive pretty deeply into taxonomy. During the last 10 years I have been called upon twice to establish large arboreta, and in such undertakings one can never get very far, before one runs into a maze of taxonomic problems in which one has to take a stand. To assemble some 6000 species and varieties of trees and shrubs, and to arrange them intelligently, one must decide upon the system which is to be followed. The same species will frequently be received from different sources under 3 or 4 different names, and from these the valid name which is to be used in the future has to be selected. The eternal question: "what is a species?" pops up on every side and has to be solved somehow. The taxonomist gets out of this rather easily. He simply makes up his mind that the plant before him is a new species; he describes it, and gives it a name, and is done with it. The horticulturist who tries to grow this species is practically married to it; and all too frequently, he finds out that his spouse has more than one alias. Certain characteristics, as for instance pubescence, which may be distinct enough on wild growing plants or collected herbarium specimens, frequently become indistinct under cultivation. Extreme forms, so distinct from others that they were considered to be species, will, if raised from seeds, occasionally produce a range of varieties which link them with existing species; or they will even revert altogether to the type of another species. In an extreme case, it has even been reported that from one and the same seedpod were raised under cultivation several forms which from wild collected specimens had been described as separate species. Such regretable mistakes can be avoided only if the study of plants under cultivation is given more serious consideration by the taxonomist. On the other hand, differences appear under cultivation which can not be observed under natural conditions, and for which, though they are of the greatest importance to the horticulturist, the taxonomist does not even offer a term, for instance, variation in hardiness. This variation as shown by the famous hardy race of the Lebanon Cedar at the Arnold Arboretum, and as I observed, also by *Cornus kousa*, *Cryptomeria japonica*, and various other woody plants, remains constant in the offspring, yet it can not be expressed by a name. The inheritable growth habits of trees is another rock on which botanical nomenclature splits. At the Forestry Experiment Station, Wageninger, Holland, I was very much impressed by a beautiful set of races of *Quercus robur* and *Fagus sylvatica*. One of these races always developed more than one leader which, of course, made it worthless for forestation purposes. Another always grew as straight as a candle, and a third, again, always grew crooked and scrubby. These peculiarities of growth were invariably passed on to the respective offspring as they had been through several generations. Such differences in hardiness and growth habit which can be relied upon to remain constant, are of much greater importance to the horticulturist than many of the characteristics which botanists consider sufficient for the separation of species, yet there are no taxonomic terms by which they can be distinguished.

All these rather well known facts I mention merely to give my point more carrying power. What I wanted to present to you in particular is an observation which I made at the Morton Arboretum, Illinois, and which, I believe, will prove of interest to you. To me it brought home more clearly than anything else, how difficult it is to define the term "species." This observation concerns a very widely cultivated, ornamental shurb, the Choke-berry, Aronia.

There are two species of Aronia which interest the horticulturist for their ornamental value:

First, *Aronia melanocarpa* with black fruits which ripen in August and drop early. Its glabrous leaves are usually lustrous above and do not develop a conspicuous fall-coloring. This species usually grows in swamps, though occasionally in dry uplands.

Second, *Aronia arbutifolia* with bright red berries which ripen in September. Usually the berries of this species are still green when those of *A. melanocarpa* are falling, and they remain on the bush until late in the winter. The dull green leaves, which are densely grayish pubescent beneath, color brilliant scarlet in the fall. This species usually grows in swamps and lowlands.

So far so good. These two species are very distinct and can not be mistaken for one another. But there is a third species, if it is a species, which causes a great deal of confusion:

Aronia atropurpurea. This is in all its characters intermediate between the two others. Its fruits are neither red nor black, but purplish-black. Its leaves and branches are quite densely pubescent when young, but get more or less glabrous when mature. It has all the appearance of a natural hybrid, but, in the first place, it breeds true from seeds. A hybrid is supposed to "split up", as the breeder says, and produce in its progeny a certain percentage of plants which resemble the grandparents, or at least one of them. The fact that it apparently does not "split up" is no proof, however, that it is not of hybrid origin. For that matter it could be constant through the dominance of certain characters in a certain combination. It could also be that it does split after all, but that the splitting has not been observed, because it has never been raised in quantity under scientific control. However, that may be, there is another "but" which seems to be of a more serious nature. In its native haunts *A. atropurpurea* is hardly ever found near either of its possible parents. I saw it in the White Mountains, New Hampshire, growing on exposed rocky ledges at about 3000 ft. elevation. Neither of the other two species occurred anywhere in the vicinity for several miles. Well, "that settles it," most people will say; "it is a true species." But, that is not all. There does exist a hybrid between the two species, which first was observed in Europe, where it originated in cultivation. It usually is listed there under the name *Aronia floribunda*, and two varieties of it were distinguished. One, which resembles more closely *A. arbutifolia* was named var. *typica*. It is of more vigorous growth than either of its parents and has the densely pubescent leaves and branches of *A. arbutifolia*, but its fruits are purplish-black. Its leaves color very beautifully in the fall.

The other variety of *A. floribunda*, which is intermediate between the parents, was named var. *glabrescens*, because its leaves become glabrous when mature like those of *A. melanocarpa*. This latter variety is, as far as I can see, indistinguishable from the native American *A. atropurpurea*. If the two are planted together, it is impossible to say which is which.

European botanists did not hesitate to identify *A. atropurpurea* with the hybrid *A. floribunda*. When speaking of *A. floribunda* they will simply state: this hybrid has also been found wild, growing naturally within the range of the two species. Now, it is true, of course, that *A. atropurpurea* grows within the range of the other two, but, that it does not grow between them European botanists have not observed.

American botanists, on the other hand, refuse to this day to accept hybrid origin for *A. atropurpurea*. They either do not mention the hybrid at all, or they will say something like this: There may exist hybrid forms which can not be distinguished from *A. atropurpurea*, but *A. atropurpurea* is a species. Now, where is the truth?

It seems as if the hybrid has never been recognized in American nurseries, but it occurs, and, perhaps, just as frequently as in European nurseries. The Morton Arboretum had proof of that. Some 10 years ago we bought from an Eastern nursery 100 plants of *Aronia melanocarpa*. That is, we bought the plants under that name. What we got, was an excellent line of the two forms of the hybrid. The plants were supposed to have been raised from seeds of *A. melanocarpa*. This claim we could not check, but whatever their origin, the fact remained that there were the two very distinct varieties of the hybrid, agreeing perfectly in every character with the descriptions given in European literature. The var. *glabrescens* was entirely identical with *A. atropurpurea* of which we had some wild collected plants. The two not only looked alike in general appearance, and in leaf and branch characters, but they ripened their fruits at the same time—that is, just between the two other species; their fruits were of the same size, shape and color; they colored their leaves in the same way in the fall, and dropped them at the same time.

These observations, as I have pointed out, were not based on experiment, since we did not produce the hybrid ourselves, but it seems to be beyond doubt that it is possible to produce experimentally a plant which looks exactly like *A. atropurpurea* by cross-fertilizing the two other species. If that were done, would that be a proof that *A. atropurpurea* is of hybrid origin? Not necessarily, I believe. And, at this point I wish to emphasize the fact that the other form of the hybrid, the var. *typica*, has never been found wild as yet, as far as I am aware. And, why could not by some joke of nature an intermediate form originate as a mutant from one species which resembles a hybrid but is not? Should it be possible to prove mutant origin for *A. atropurpurea*, perhaps by cytogenetic tests, what would the taxonomist do? Should he keep two plants separate under two different names which in outward appearance are exactly alike, or should he combine under one name two plants which in origin are fundamentally different?

This suggestion may sound like hair-splitting, but I do not believe that it is. If we do believe in evolution, we have to believe that many plant-forms, which we now call species, have originated not as mutants, as they are usually explained, but by cross-fertilization. As long as they remain constant, the taxonomist may say that it does not matter how they originated; but what about the numberless garden-hybrids which plant-breeders have originated, which also come true from seed and remains constant in their characters? No taxonomist suggests calling them "species," for the simple reason that their hybrid origin is known. Even a binomial name which is such a great practical help to the horticulturist is usually denied to them.

And this leads me back to where I started. I have no solution to suggest for the problem of what is a species, but I believe that a close cooperation between the horticulturist and the taxonomist might help to find a solution for some of the puzzles which I have presented.

Respectfully submitted,
Forman T. McLean
Secretary

Meeting of November 2, 1932

The meeting was called to order at Schermerhorn Hall, Columbia University, at 8:15 p.m. by President Sinnott. There were 200 people present.

Professor Öwind Winge of the University of Copenhagen discussed "Sex Determination in Melandrium and Lebistes." He illustrated the inheritance of a number of color characters and other peculiarities by colored lantern slides.

The interest of the botanists was fully as much aroused by the fish as by the plants.

Meeting adjourned at 9:45 P.M.

Respectfully submitted,
FORMAN T. MCLEAN
Secretary

MEETING OF NOVEMBER 18, 1932

The meeting was called to order at the Brooklyn Botanic Garden in conjunction with the New York Biology Teachers, at 8:15 P.M. by President Sinnott. There were 150 people present.

Dr. C. Stuart Gager of the Brooklyn Botanic Garden spoke on "The Foundational Literature of Botany." He showed a large collection of ancient books on botany, emphasizing particularly the development of the science of plant physiology. The oldest book was by Apulius Barbatus, published in 1483. Dr. Gager then called upon Dr. Alfred Gunderson who devoted about six minutes to brief comment on the ancient literature of systematic Botany beginning with Theophrastus about 300 B.C.

Professor Wheat and Dr. Gramet of the Biology Teachers Association showed an educational film illustrating photosynthesis, with suitable reading inserts which can be used without any supplementary lecture in instructing biology classes.

At about 9:30 the meeting adjourned and those present proceeded to an inspection of the exhibits, principally from the high schools, showing biology activities and new developments in teaching. Among these the clay models from the Theodore Roosevelt High School were particularly instructive.

Respectfully submitted,
FORMAN T. MCLEAN
Secretary

MEETING OF DECEMBER 6, 1932

The meeting was called to order at the American Museum of Natural History at 8:15 P.M. by President Sinnott. There were 46 members present.

A letter telling of the death of Mr. Benjamin Rush Abbott was read to the club.

The resignations of Mr. F. L. Pickett and Mrs. Charles Gormley Stehle were accepted with regret.

Dr. R. R. Stewart, Professor of Biology of Gordon College, Rawalpindi, India gave an interesting talk on "Plant Collecting in Kashmir and Western Tibet."

Dr. Howe read a proposed amendment to the constitution and by-laws of the Club.

Action on this will be taken at the Annual Meeting.

Meeting adjourned at 9:45 for refreshments.

Respectfully submitted,
FORMAN T. MCLEAN
Secretary

NEWS NOTES

Leaders Invited for 1933 Field Schedule

The Chairman of the Field Committee would be glad to hear from members of the Club who have not led field trips during the past few years, or new members who have not led any trips yet, as to excursions which they might organize and conduct for the Club in the 1933 Schedule. The Chairman believes that there may be members, whom he has not particularly invited to lead trips, and who may be well qualified, by acquanitance with interesting botanical localities, to enrich the field schedule. He will be glad to hear from any who will lead field trips, with suggestions as to place, objective, transportation, and choice of dates suitable to them. The field schedules have been enlarged in recent years through the increasing cooperation of members, for the benefit of all, and there are probably others the chairman does not happen to know, who might contribute to the value of our excursions.

Raymond H. Torrey,
Chairman, Field Committee,
99–28 193rd Street, Hollis, L.I., N.Y.
Telephone Hollis 5–5139.

At the Meeting of the Botanical Society of America in Atlantic City in December the following officers were elected: President, E. J. Kraus of the University of Chicago; Vice-president, G. E. Nichols, of Yale University; Secretary, L. C. Petry of Fayette, Mo.; Treasurer, H. A. Gleason of the New York Botanical Garden; Editor of the American Journal of Botany, Sam F. Trelease of Columbia University.

The herbarium of the Field Museum of Natural History has been presented by the University of Chicago with more than 51,000 botanical specimens, assembled by the late John M. Coulter, for many years head of the botanical department of the university. It includes hundreds of type specimens of new plants, historic collections made by early botanists who explored the western and southwestern regions of the United States and thousands of rare plants from widely scattered parts of the eastern hemisphere. With this addition, the herbarium of the museum now consists of more than 656,000 specimens from every part of the earth. Students will continue to have access to the entire study collections of the museum. (*Science*)

At the Atlantic City meeting of the American Association for the Advancement of Science the various societies connected with botany held a joint meeting to commemorate the centenary of Julius von Sachs, the founder of the modern science of experimental plant physiology. Dr. H. D. Campbell of Stanford University, representing the Botanical Society of America spoke on Sach's Textbook: Its Influence on Botany in America; Dr. R. H. True of the University of Pennsylvania, representing the American Society of Plant Physiologists, spoke on Julius von Sachs, the Man and the Teacher; Dr. C. E. Allen of the University of Wisconsin, representing the Botanical Section of the A.A.A.S., spoke on Sachs, the Last of the Epitomists.

Swarthmore College has published a report of the Arthur Hoyt Scott Horticultural Foundation describing the plans for the horticultural development of the college campus, the care and improvement of the natural wooded area along Crum Creek, and the formation of a large arboretum and botanical garden. The purpose of the Foundation is stated to be "to develop on the Swarthmore College property such planting as will best serve the average home owner in Swarthmore and in the surrounding territory. The planting, while of scientific interest to the botanical department of the college, will be primarily focused to give to the students and to the general public an example of the beauty of our native vegetation and of foreign plants which thrive in this climate." One section of the arboretum is to contain only trees, shrubs and herbaceous plants native to Delaware County; another section will contain those native to Pennsylvania; a third section, those native to North America that can be grown in the region. An area about an extensive meadow along the Creek will form the botanical garden with the plants arranged according to botanical families. As to work already accomplished since the Foundation was established two years ago, there is described the improvements made in the natural forest, the making of paths, and development of a nursery as well as the planting done on the campus. In conclusion there is listed the 1250 species and varieties of trees and shrubs and the 550 varieties of herbaceous plants now growing on the College property.

THE TORREY BOTANICAL CLUB

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OF THE

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Correspondence relating to the above publications should be addressed to

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BY
GEORGE T. HASTINGS

John Torrey, 1796-1873

CONTENTS

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THE TORREY BOTANICAL CLUB

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All persons interested in botany are invited to join the Club. There are three classes of membership: *Sustaining*, at $15.00 a year; *Life*, at $100.; and *Annual*, at $5.00 a year. The privileges of members are. (a) To attend all meetings of the Club and to take part in its business, and (b) to receive all its publications.

Meetings of the Club are held on the first Tuesday of each month at the American Museum of Natural History, New York City, and on the third Wednesday at the New York Botanical Garden.

TORREYA IS THE OFFICIAL ORGAN OF THE
WILD FLOWER PRESERVATION SOCIETY OF AMERICA

TORREYA is furnished to subscribers in the United States and Canada fo one dollar per annum; single copies, thirty cents. To subscribers elsewhere, twenty-five cents extra, or the equivalent thereof. Postal or express money orders and drafts or personal checks on banks are accepted in payment. Subscriptions are received only for full volumes, beginning with the January issue. Reprints will be furnished at cost prices. All subscriptions and other communications relating to the business of the club should be addressed to 450 Ahnaip Street, Menasha, Wisconsin, or to the Treasurer, Mrs. R. A. Harper (Mail address—Schermerhorn Hall, Columbia University, New York City).

Matter for publication, and books and papers for review, should be addressed to

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2587 Sedgwick Ave.,
New York, New York

TORREYA

Vol. 33 March-April, 1933 No. 2

Noteworthy plants observed in New Jersey during 1932

M. A. Chrysler

Phoradendron flavescens (Pursh) Nutt. During April one of the New Brunswick High School boys reported to the teacher of biology that he had found mistletoe near his home in Deans, a village 8 miles south-west of New Brunswick. On 27 April the writer visited the locality and found rather small plants of mistletoe growing by the dozen out of burls on the trunk and larger branches of a mature specimen of *Liquidambar Styraciflua*, also on a fallen tree of the same species. The trees grew in low ground with red maples, etc., by a branch of Lawrence Brook.

The finding of these specimens is of interest in confirming the report of W. M. Canby nearly 50 years ago that he had observed the plant between Trenton and New Brunswick.[1] The plant has been reported from a number of places in south Jersey,[2] and specimens are preserved in the herbaria in New York and Philadelphia, but the station is now fixed at a point near New Brunswick, about as far north as the plant now occurs, although there is reason to think that it earlier grew on Staten Island.[3] Forty degrees appears to be about the north limit of the species. Schneck (l. c.) considers *Nyssa* and *Ulmus* to be the most frequent hosts of mistletoe in the northern part of its range, and makes no reference to *Liquidambar*, although this was the host on which mistletoe formerly grew in the neighborhood of Keyport, N. J.

Dentaria heterophylla Nutt. This plant was located by the writer on 6 May in small numbers under the shade of trees on a

[1] Schneck, J. Notes on Phoradendron flavescens Nutt. II. Botan. Gazette *9:* 101–103. 1884.

[2] Stone, Witmer. The plants of southern New Jersey. N. J. State Museum Rept. 1910.

[3] Bul. Tor. Bot. Club *11:* 76. 1884.

small flood-plain in one of the ravines of the First Watchung Mountain near Bound Brook. *D. laciniata* occurs commonly in this flood-plain under similar conditions, and in many parts of central New Jersey, but *D. heterophylla* has been reported from only a few stations, namely, Mercer and Hunterdon Counties, and at Far Hills, Somerset County, 10 miles north-west of the station in the Watchung and in the same drainage system (Raritan River). It is a fairly frequent plant of the Piedmont of Maryland and Virginia, according to the writer's observations, but appears to have its northern limit in Somerset County, N. J.

Rhododendron canadense (L.) B.S.P. It came quite as a surprise to have one of the Rutgers graduates report the occurrence of rhodora on the coastal plain only a few miles from New Brunswick. A visit on 14 May to a flat boggy field near Newmarket confirmed the identification. A single specimen was found in bloom in an open thicket bordering a piece of woodland. Although stations for this plant are known from the highlands of Morris and Sussex counties, no reports have been found as to its occurrence in this part of the state, or so far south. Newmarket lies on the outwash of the terminal moraine; is it not probable that after the Glacial Period northern species were left stranded in favorable positions, of which this is one?

Pogonia divaricata (L.) R.Br. This southern orchid has apparently been observed in New Jersey only a few times. Stone (l.c.) records its discovery at Batsto (south edge of Burlington county) in about 1860. It has also been collected in Cape May county by Stone, and at Quaker Bridge as late as 1915 by K. K. Mackenzie (specimen at New York Botanical Garden). It was accordingly a matter of much interest to the writer to find several plants on 2 July in the Speedwell region, in what Stone calls "the innermost recesses of the pine barrens." In agreement with Stone's observations, the plants were found in much drier spots than are the home of *P. ophioglossoides.* The flower is more striking than beautiful, with its stiff dark-colored sepals and peculiar magenta lip.

Specimens of these plants are deposited in the Herbarium of Rutgers University. Further reports of any of these plants will be welcomed by the writer.

RUTGERS UNIVERSITY
NEW BRUNSWICK, N. J.

A simple way to demonstrate sexual reproduction in the bakery mold, Neurospora

B. O. Dodge and Marjorie E. Swift

The gardener propagates his plants either by cuttings of some sort, or by seeds. The development of a seed usually requires that the egg in the ovule be fertilized. On this account the biologist refers to the formation of a seed as due to sexual reproduction, in contrast to asexual reproduction where new plants arise directly from buds developed from leaf, stem, or root.

The fungi are very low forms of plant life, nevertheless they follow much the same laws of reproduction and inheritance that govern these processes in the higher plants. Fungi reproduce themselves asexually by means of spores of various sorts developed as natural cuttings from the vegetative growth. No act of fertilization is then involved. A square inch of the blue mold found on decaying lemons probably develops a billion or more of these spore cuttings, which serve to propagate the fungus very effectively from month to month and year to year. Sooner or later the fungus will reproduce itself sexually. This does involve an act of fertilization where two nuclei from different cells unite in a fusion. This stage is sometimes very difficult to discover and difficult to demonstrate in culture, once it is known to occur.

In an article published in Torreya, **30**: 35–39, 1930, there was given a short description of experiments with material which could be used by teachers of biology and botany to demonstrate sexual reproduction in the orange-colored bakery mold, *Neurospora sitophila*, which belongs to the class Ascomycetes. It was shown that a single spore culture of this fungus cannot produce ascocarpic fruit bodies by itself. Such strains are unisexual just as are strains of the common bread mold, *Rhizopus*, a fungus used by teachers to demonstrate sexual reproduction in the Phycomycetes. It is necessary to grow mycelia of opposite sex together in the same culture in order to obtain the sexually produced fruit bodies. Therefore, when two mycelia of opposite sex of the *Neurospora* bakery mold are grown from opposite sides in a petri dish culture, many black ascocarps are developed. Very frequently, the ascocarps are distributed over the area occupied by only one of the strains as figured in the article referred to above.

The orange-colored conidia characteristic of *Neurospora* have always been assumed to function only as asexual spores in vegetative reproduction. It has been discovered, however, that these monilioid conidia have another and quite different function in fertilization; that is, they may also function "sexually." This discovery provides the biology teacher with another and much easier method of demonstrating sexual reproduction in Ascomycetes.

It is only necessary to grow one of the unisexual strains in a petri dish culture, and then apply a spore suspension of the conidia from a mycelium of the other sex to any particular spot on the plate culture. This can be done by means of a capillary tube or fine pipette, or a fine water color brush. When one puts pollen on the receptive stigma of a flower we call this act pollinating. Therefore, when one places the conidia of the bakery mold on the receptive organs developed on the mycelium we may refer to the act itself as conidiating.[1] Within twenty-four hours after conidiating the receptive bodies one can see exactly where fertilization has taken place, resulting in the rapid formation of the ascocarpic fruit bodies. With a hand lens or low power dissecting microscope, the student can readily distinguish individual ascocarps, such as were shown in figure 2, page 38, of the article in TORREYA referred to above. Perithecia (ascocarps) are produced only where the conidia come in contact with the receptive bodies of which there will be thousands scattered all over the culture ready to be fertilized. Figure 1 shows a photograph of a plate culture where the fertilizing conidia were originally applied as though one were printing the letters with invisible ink. The receptive bodies that were not fertilized are not visible in this picture except perhaps showing as a fine powder at the center of the culture. The young ascocarps, however, were readily visible 24 hours after the conidia were applied.

Curiously enough the conidia from the culture producing the receptive bodies will not bring about fertilization when applied

[1] The writers are indebted to Dr. H. A. Gleason for suggesting this very descriptive term "conidiate." You pollinate why not conidiate?

to the bodies formed in the *same* culture. It is only when they are taken from a mycelium of the opposite sex that they will be stimulated to develop the ascogenous elements. This brings up the question as to what we mean by sex in the fungi. Here are two mycelia, or two plants we may say, both apparently alike morphologically, producing the same kind of structures, yet they act only reciprocally in sexual reproduction. Of the many races of this fungus that one could obtain from ascospores

Figure 1. Controlled fertilization in the bakery mold. Sexual reproduction only where the fertilizing elements (the orange-colored spores) were placed in contact with the receptive bodies (Fig. 2). The black bodies making up the letters represent something like 4000 sexually produced ascocarpic fruit bodies.

in culture, there would normally be only two kinds when it comes to sexual reproduction. It is convenient to refer to the individuals of the two groups as being of opposite sex. As a matter of fact, it is impossible to apply accurately the terms male, female, sex, and sexuality in connection with these lower plants.

The little sclerotioid receptive bodies (Fig. 2) are readily visible under the lower power of the microscope, so that their location can be marked definitely. They can then be watched, after conidiation, to see that they are the bodies which actually become fertile perithecia. Figure 2 shows seven such receptive bodies as they appeared at the time they were conidiated; and Figure 3, the same bodies twenty-two hours later. The second picture shows that only three of the seven bodies became fertilized. The other four grew no further because they were not fertilized.

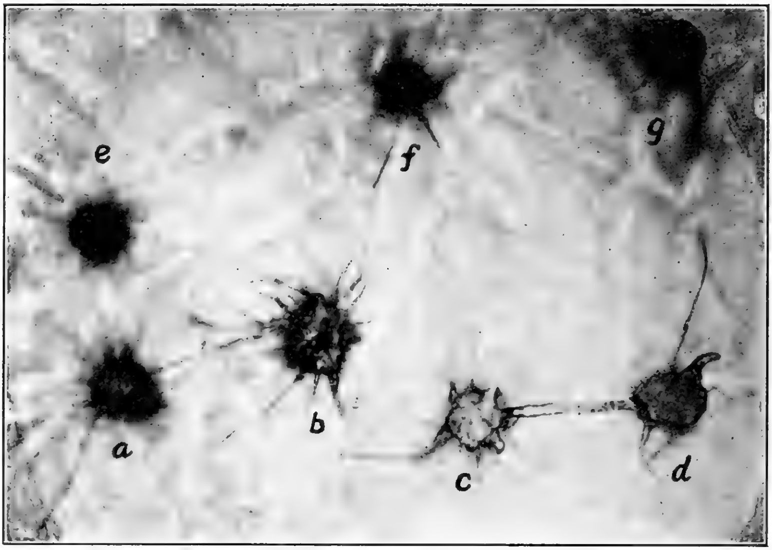


Figure 2. Seven receptive bodies of the bakery mold, ready for fertilization, at 5:30, P.M. At this time the fertilizing elements (the orange-colored spores) were placed on the bodies in a drop of water.

The story of the origin of the ascocarps usually given us in text books of botany implies that there is some sort of oogonium, ascogonium or female receptive body which must be fertilized *before* the ascocarp will begin to grow. This work on *Neurospora* shows that fertilization can be brought about *after* the ascogonial coils are well covered with protecting sclerotioid elements. That is, incipient ascocarps develop to some extent before fertilization. The appearance of the hair-like growths from these bodies (Fig. 2) would suggest that they are all trichogynous receptive elements. As a matter of fact, only one of these outgrowths is the trichogyne end of the ascogonium which is concealed within the incipient perithecium. That a transfer of nuclei from the conidia does take place can be readily demonstrated. Whenever an albino race of one sex is fertilized by applying the orange-colored conidia of the opposite sex from a normal race, half of the progeny ascospores that result are albinistic, and the other half contain factors for the production of orange-colored conidia. The segregation of the factors for sex and the factors for conidia takes place according to Mendel's laws.

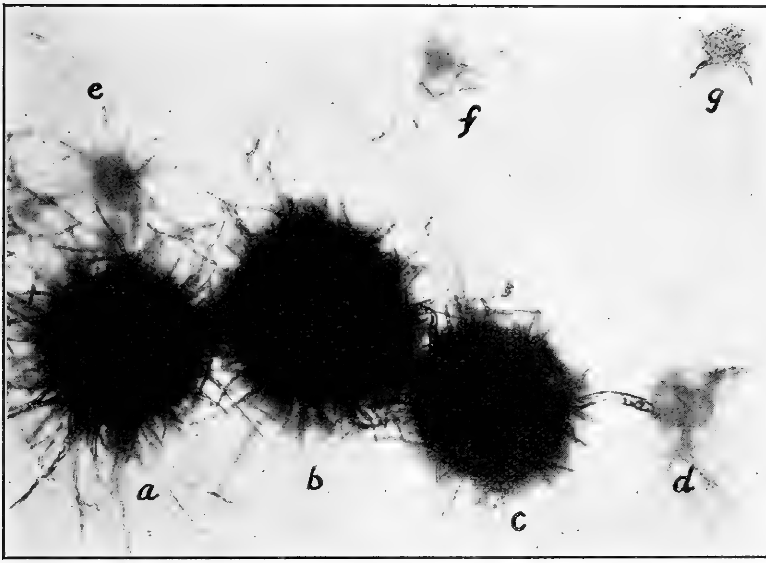


Figure 3. The same seven receptive bodies shown in figure 2, twenty-two hours later, photographed at a higher focus but with the same magnification. Bodies a, b, and c, as seen by their larger size, were successfully fertilized. The others, not being fertilized, made no further growth, and being smaller, they are necessarily out of focus in the picture.

Any mycelium of the bakery mold under favorable conditions can be made to produce minute spermatium-like microconidia (microspores). It has been assumed that these microconidia are male organs, constitutionally different from the orange-colored monilioid conidia borne on the same mycelium.

It has been proved, however, that the microconidia, if placed in the right environment, slowly germinate, and eventually produce perfectly normal mycelia. If the microspore came from a mycelium that also produced monilioid conidia, then its mycelium will produce monilioid conidia. Functionally it isn't male any more than any other structure produced by that mycelium is male. Microspores, monilioid conidia, ascogonia and "sclerotia" are merely specially differentiated structures; as such they are better able to function in certain ways and thus bring about certain developments. That is, as just stated, one is genetically or inherently no more male or female than the other bodies developed on the same mycelium, because in each lies the potentialities of the whole race. Blakeslee's final conclusions are that in the Mucoraceae morphologically the + and − strains do not represent male and female strains. Nevertheless, they are of opposite sex in their reactions. The difference in the size of the fusing gametangia in *Zygorhynchus* or in *Dicranophora* is no criterion of maleness and femaleness. The larger gametangium is + in one case and − in the other. There are certain sex factors in heterothallic species, however, which determine whether or not two mycelia will unite in sexual reproduction. This apparently is essentially the situation in *Neurospora sitophila* where a mycelium is neither male nor female. It produces coiled structures, monilioid conidia, microspores, sclerotia, etc. Genetically they are all exactly alike barring mutations which may have occurred during the life of the culture. The ordinary monilioid conidia can function either in fertilization directly, or as asexual spores in their vegetative function. The microspores can function not only as vegetative spores, but also as "spermatia" in sexual reproduction. There are few cases where the student can be shown so clearly that an organ can be one thing morphologically, and function in an entirely different capacity. It might not be out of place to point out to him that when we use the terms, male, female, sex, sexuality, in discussions involving the lower plants such as the fungi, we are not always consistent. We certainly cannot use these terms in the sense in which they are applied to the animals or to the higher plants. For example, the microconidia of *Neurospora* are homologous with the so-called spermatia of the lichens and other fungi, and probably with the spermatia of the red algae, but they are in no sense sperms. In the red algae and the fungi it is the nucleus (together with whatever cytoplasm that passes on with it) that is, if anything, comparable or analogous to a sperm. When, therefore, one places either the orange-colored conidia or the microconidia of *Neurospora* on the receptive organs, as was done in the experiments described above, he really does not spermatize, he merely conidiates or microconidiates (spermatiates), just as one pollinates.

NEW YORK BOTANICAL GARDEN

A Jacaranda from the Pliocene of Brazil

Edward W. Berry

Some years ago the present writer, in collaboration with Hollick, described[1] a considerable late Tertiary flora from Bahia, Brazil, and it was concluded that the age was probably Pliocene. I have recently received additional material from the same region and among the novelties contained in the latter is an undoubted species of the Bignoniaceous genus Jacaranda of Jussieu.

This may be called **Jacaranda tertiaria** and described as follows:

Leaves odd-pinnate, elongate, linear in outline, at least 7 centimeters long and not over 2 centimeters wide, with a distinctly but not prominently alate stipe and at least 14 pairs of leaflets.

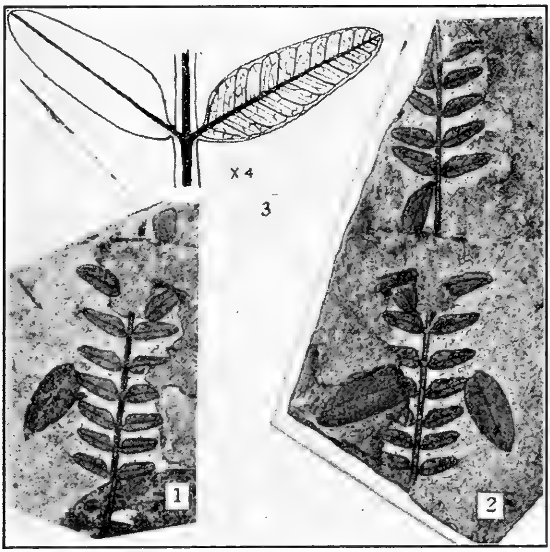
Leaflets small, opposite, diverging at wide angles, regularly spaced, somewhat rhomboidal in outline, widest toward the base, more nearly equilateral toward the tip, which is obtusely pointed. Base markedly inequilateral, the proximal side narrowly straighter. Texture subcoriaceous. Margins entire. No traces of pubescence. Length 6 to 7 millimeters. Maximum width 2 to 3 millimeters. Midvein relatively stout and prominent, approximately straight. Secondaries numerous, diverging at wide angles, rather straight to the marginal region and rather abruptly camptodrome.

Fairly complete specimens of this interesting species are available and there can be no doubt of its botanical identity. When it comes to comparisons with individual existing species of Jacaranda the relationships are not so clear. This is due to the rather close similarity of several of the small leafed pinnate forms, to considerable variations in the size of the leaves in existing species, and to some extent to variations in form of the leaflets, particularly as to the acuteness of the tips.

Among the most similar existing species are *Jacaranda brasiliana* Persoon—a Campos undershrub, *Jacaranda mimosaefolia* D.Don of southern Brazil and northern Argentina, and

[1] Hollick, A. and E. W. Berry, Johns Hopkins Studies in Geology, No. 5, 1924.

Jacaranda filicifolia (Anderson) D.Don of the lower Orinoco and Guiana region. In some respects the last is the most similar, although there is little difference in the degree of resemblance of the three. *Jacaranda filicifolia* is apt to be more acutely tipped, although not invariably so, is apt to be slightly larger, and invariably has fewer leaflets, at least in the material that I have seen. This last statement is also true of *Jacaranda brasiliana*. In this feature *Jacaranda mimosaefolia* is most like the fossil.



Jacaranda tertiaria Berry from the Pliocene of Brazil.
1, 2. Leaves, nat. size.
3. Enlargement to show winged stipe and venation.

The genus has about two score existing species, ranging in size from undershrub and chapparal growth of the Brazilian Campos to large trees of less dry regions. The area of distribution extends from the Bahamas and Central America to northern Argentina and from the Marañon valley in Peru and the Montaña zone of the central Andes to the Atlantic. It is unfortunate that the evidence of relationship to existing species is not more conclusive. The balance of the evidence is slightly in favor of *Jacaranda mimosaefolia* or *filicifolia* rather than the more typical Campos species, although there is nothing conclusive about these comparisons.

But two other fossil species have been referred to Jacaranda. These are *Jacaranda potosina* Berry[1] from the Pliocene of Bolivia and *Jacaranda borealis* Ettingshausen[2] of the Oligocene (Sannosian) of the Tyrol, the latter based upon both leaflets and seeds. Neither of these can be considered to be entirely beyond doubt. It may be repeated that I regard *Jacaranda tertiaria* as botanically beyond suspicion.

THE JOHNS HOPKINS UNIVERSITY
BALTIMORE, MD.

[1] Berry, Edward W., U. S. Natl. Museum Proc., vol. 54, p. 160, pl. 18, fig. 14, 1917.

[2] Ettingshausen, C. von Tertiarflora von Haering, p. 59, pl. 20, figs. 12–20, 1855.

A new blackberry from Colombia

H. H. Rusby

Rubus pendulus sp. nov. Caules robustissimi, ramis scandentibus, ramulis pendentibus; folia trifoliata dense tomentosa; petioli et venae primariae armatae aculeis brevibus recurvis pungentibus; foliola late ovata subcordata obtusa serrato-dentata, supra viridia scabrescentia venis venulisque anguste impressis, subtus fulvo-tomentosa, venis venulisque valde prominentibus; panicula fructifera gigantea pendula dense composita; fructus magni ovatorotundati, calycis persistentis sepalis coriaceis concavis ovalibus acutis; drupellae confertae rotundatae lucidae.

Stems and branches very stout, climbing among the lower branches of trees, some of the branches long-pendulous. Branchlets and petioles fleshy, very stout and, like the herbage, densely ferruginous-tomentose. Petiole and lower surface of midrib prickly, the prickles small, short and stout, little compressed, strongly hooked and acute, with light-colored tips. Stipules and flowers not seen. The two leaves collected are typical. Petioles 9 cm. long, 6 mm. thick at the base, nearly terete. Lateral petiolules about 1 cm., the terminal 4 cm. long, stout. Leaflets 3, all alike or the terminal slightly longer, broadly ovate, lightly cordate, obtuse or obtusish, about 10 by 8 cm., finely serrate-dentate, the stout veinlets extending into the teeth. Leaf thick but not rigid, dark-green and scabrescent above, where all the veins are sharply impressed; beneath yellowish-brown and softly tomentose, the venation very stout and prominent, the secondaries about 12 on each side, nearly straight, at an angle of about 45 degrees with the midrib, connected by numerous straightish tertiaries. Fruit panicles very large and dense, pendulous, Fruits black, densely crowded, nearly sessile, broadly oval to sub-globular, about 2.5 cm. long, the drupelets compact, about 4 mm. broad, with broadly rounded summit, glabrous and shining. Pulp sour and bitter. Sepals 4 or 5 mm. long and equally broad, ovate, concave, rigid, apiculate.

Collected by Rusby and Pennell, at Balsillas, Colombia, 2000 to 2100 M., where it is known as "Mora India," and regarded as scarcely edible.

Specimens deposited in the Economic Museum of the New York Botanical Garden.

New York, N. Y.

CONSTITUTION AND BY-LAWS

Adopted March 25, 1873. Amended at various times and codified March and April, 1927. Printed in Torreya **28**: 119–123. Nov.–Dec. 1928. Revised January, 1933.

CONSTITUTION

Article I—Name

The name of this Society shall be The Torrey Botanical Club.

Article II—Objects

The objects of the Club shall be to collect and diffuse correct information on all topics relating to Botany, and to promote an interest in this science.

Article III—Officers

The officers of the Club shall consist of a President, a First Vice-President, a Second Vice-President, a Treasurer, a Secretary, an Editor, Associate Editors, and a Bibliographer. The officers shall be elected annually by ballot, and shall hold their offices for one year, or until others are installed in their places. At such election the presiding officer shall appoint two persons to receive and count the votes given thereat.

If a vacancy occurs in any of the offices of the Club, it may be filled by special election at a regular meeting of the Club, due notice of such election having been given by the Secretary, and the person so elected to fill a vacancy shall hold his office until the next annual election, or until his successor is chosen.

Article IV—President

The President shall preside at all meetings of the Club, and exercise all the powers and authority usually pertaining to a presiding officer.

Article V—Vice-presidents

In the absence of the President, one of the Vice-presidents shall preside; in the absence of the President and both Vice-presidents, a chairman shall be chosen *pro tempore.*

Article VI—Treasurer

The Treasurer shall collect and have charge of all funds and securities of the Club. Out of such funds he shall pay the ordinary current expenses of the Club, and such other sums as may from time to time be ordered. He shall report to the Council all members six months in arrears for dues. No payments exceeding $25 shall be made by the Treasurer, except as authorized by the Annual Budget or by vote of the Club, unless first approved by the Council. The Treasurer's books shall be audited at least once every year by an Auditing Committee appointed for that purpose. The Treasurer shall render a report of the finances of the Club at the Annual Meeting, or oftener if requested.

Article VII—Secretary

The Secretary shall have charge of the Charter, Seal, Constitution and By-Laws, and the Records of the Club. He shall give due notice of all meetings of the Club, and shall keep full and accurate records of its proceedings. He shall notify each member of his election and report to the Treasurer the name and residence of each active member elected. He shall conduct the correspondence of the Club, and prepare all letters to be written in its name, retaining copies of them.

Article VIII—Editors

The Editors shall edit and supervise all the publications of the Club, and exchange and distribute them at their discretion.

Article IX—Bibliographer

The duties of the Bibliographer shall be such as may be assigned by the Club from time to time.

Article X—Council

There shall be a Council, consisting of sixteen members, including the President, Treasurer, Secretary, and Editor, *ex officio*, with twelve elected members. At the Annual Meeting for 1933 the elected members of the Council shall be chosen by ballot, four for terms of three years, four for terms of two years, and four for terms of one year; thereafter, four members shall be elected each year for terms of three years. Five members shall constitute a quorum of the Council. Vacancies in unexpired terms may be filled by the Club by ballot at any regular meeting.

The Council shall hold regular meetings prior to the first monthly meetings of the Club in January, March, May, and October. It shall annually elect a Chairman, who may call special meetings. The Secretary of the Club shall be Secretary of the Council. The Council shall prepare annually a budget for consideration by the Club, shall approve all contracts, shall pass upon all bills presented for payment, shall nominate candidates for membership and candidates for all elective offices, and shall have power to accept resignations. It shall report to the Club all actions taken. The foregoing shall not be construed as precluding nominations of officers from the floor.

It shall be the duty of the Council to invest the funds of the Club, whenever there shall be a balance in the Treasury of more than five hundred dollars not wanted for immediate disbursement. No transfer of any stock, bond, note, or other evidence of debt standing in the name of the Club, shall be made except by the Treasurer, having the written order of the Council for that purpose, and all transfers shall be countersigned by the President or Secretary.

Article XI—Members

The Club shall consist of active (including sustaining), corresponding and honorary members. Active members shall be entitled to vote and shall be eligible to office. Corresponding members may hold seats at the meetings of the Club, and may make such suggestions for the promotion of its objects as they may think proper, but shall not be eligible to office or entitled to vote. Honorary members may be chosen from botanists who have distinguished themselves through valuable original investigations, and shall be limited in number to five at any one time.

Article XII—Election of Members

Candidates for membership shall be proposed at a regular meeting of the Club, and be voted for at the next ensuing regular meeting, if the nomination be approved by the Council. But upon unanimous consent of the members present, the persons so approved may be elected at the same meeting at which they are proposed. They shall be severally voted for by ballot, and three negative ballots shall exclude.

Article XIII—Annual Dues

Each active member, upon his election and annually at the beginning of each fiscal year thereafter, shall pay to the Treasurer the sum of five dollars. The payment of these annual dues shall entitle each active member to receive all publications of the Club issued during the year.

Active members indicating their willingness to pay fifteen dollars a year shall be designated sustaining members.

Article XIV—Resignation of Members

A member may at any time resign from the Club, on giving notice to the Secretary and paying such sums as he may owe to the Club.

Article XV—Delinquent Members

Any member who after due notice, shall, for the space of six months, neglect to pay his annual dues, shall cease to enjoy his privileges of membership until they are paid.

Article XVI—Expulsion of Members

The Club reserves to itself the right of expelling unworthy members.

Article XVII—Standing Committees

The standing committees created by the By-Laws shall be appointed by the President.

Article XVIII—Fiscal Year

The fiscal year shall commence on the first day of January, and all annual dues shall be payable at that time.

Article XIX—Annual Meeting

The first regular meeting in January shall be the Annual Meeting. Nine members shall constitute a quorum for the transaction of business.

Article XX—Election of Delegates

Delegates and representatives on the Councils of the New

York Academy of Sciences and the American Association for the Advancement of Science, and other organizations with which the Club is or shall become affiliated, shall be elected at the Annual Meeting in January, the numbers of such delegates and representatives to be elected depending on the quota regulations of such organizations.

Article XXI—Amendments

Amendments to this Constitution must be proposed in writing at a regular meeting of the Club, entered on the minutes, and referred to a committee, which shall report thereon at the next regular or special meeting; and, at the regular or special meeting next thereafter ensuing (special notice having been given by the Secretary) a vote by ballot shall take place on the proposed amendment; and, if the same be approved by two-thirds of the members present, it shall thereafter form a part of this Constitution.

BY-LAWS

1—Time of Elections

All the officers mentioned in the Constitution of this Club shall be elected at the Annual Meeting, and shall enter on the duties of their respective offices immediately after the close of that meeting.

2—Mode of Balloting

The officers shall be elected separately by ballot, except that, by a vote of two-thirds of the members present, they may be balloted for upon a single ticket.

3—Meetings

Unless otherwise determined by the Club, the regular meetings shall be held on the first Tuesday and the third Wednesday of each month from October to May, inclusive, except the third Wednesday of December, at such time and place as the Club may direct. Nine members shall constitute a quorum for the transaction of business. The President may call special meetings upon his own motion.

4—Order of Business

The following shall be the order of regular business at all meetings of the Club except at the Annual Meeting:

1. Reading the minutes of the last meeting
2. Nomination of new members
3. Resignations
4. Reports of committees
5. Deferred business
6. New business
7. Election of new members
8. Scientific program.

At the Annual Meeting the order of business shall be as follows:

1. Reading of the minutes of the last meeting
2. Nomination of new members
3. Resignations
4. Reports of officers
5. Reports of standing committees
6. Reports of other committees
7. Deferred business
8. New business
9. Election of new members
10. Election of officers.

5—Standing Committees

The Standing Committees shall be as follows:

1. Program Committee
2. Field Committee
3. Local Flora Committee

6—Program Committee

The Program Committee shall consist of at least two persons whose duty it shall be to arrange for the scientific programs of the meetings of the Club during the year. The Secretary shall be, *ex officio*, a member of this Committee.

7—Field Committee

The Field Committee shall consist of at least two persons whose duty it shall be to fix the dates and places of the field trips, and to select leaders.

8—Local Flora Committee

The Local Flora Committee shall consist of two distinct sub-committees of at least three members each, one for Phanerogams and one for Cryptogams, whose duty it shall be to prepare complete and accurate lists of all the plants, native, naturalized and adventive, occurring within one hundred miles of New York City, and to have such lists published, with as much description and illustration as they shall deem best, and as the funds obtainable for the purpose shall warrant.

9—Donations and Bequests

All donations and bequests shall be appropriated to the object designated by the donor; and the amount and description of each donation, with the name of the donor, shall be registered in a book kept for that purpose, and in the minutes of the Club.

10—Amendments to the By-Laws

Amendments to the By-Laws shall be prepared in writing and referred to a committee, which shall report them at the next regular meeting, and such amendments may be voted on, at the same or any subsequent meeting.

FIELD TRIPS OF THE CLUB

The first field meeting of the 1933 season was scheduled to be held on the grounds of The New York Botanical Garden on Feb. 12. At the hour of starting with the thermometer at 15°, the eighteen members and friends who had gathered for the study of leaf scars, elected to spend part of the morning indoors.

Here were examined comfortably many twigs of native trees and shrubs that showed interesting or conspicuous leaf scars. In addition to the well known species usually seen on a ramble in New York City region were added rare or exotic examples such as:—

Cedrela sinensis, the False Cedar from the Orient, *Asimina triloba*, the Papaw, *Koelreuteria paniculata*, the Varnish Tree; *Leitneria floridana*, Cork-wood; *Ginkgo biloba*, the Ginkgo Tree; *Phellodendron amurense*, Amur Cork-Tree; Magnolia species, *Zanthorhiza apiifolia*, Yellow-root; *Aralia elata*, Japanese Angelica-Tree; *Aesculus parviflora*, the small-flowered buckeye; and *Rhus canadensis*, the fragrant sumac. *Rhus Toxicodendron*, Poison Ivy and *Rhus vernix*, Poison Sumac, were closely scanned, but under glass!

The short walk that followed the indoor period led the party over freshly cleared pathways whereon it seemed best to remain rather than to defile the 8.6 inches of snow lately fallen in a crystal mantle over the Garden. A visit to the Barred Owl, the sight of other winter birds and their unmarred tracks and the winter blooming witch-hazels:—*Hamamelis japonica*, Japanese Witch-Hazel; *H. mollis*, Chinese Witch-Hazel; *H. Vernalis*, Vernal Witch-Hazel and the Japanese Pussy Willows concluded a morning that developed into one of the few perfect winter days of the year.

HELENE LUNT

LICHEN EXCURSION AT ANDOVER, NEW JERSEY

The field trip, for the study of lichens, in the limestone region in southern Sussex County, New Jersey, on March 5, led by Mrs. Gladys P. Anderson, was very instructive to members of the club interested in this class of plants. Mrs. Anderson had a revised field key to the foliose Physciaceae, and search of ledges and earth and trees yielded the following species. *P. speciosa*, rather common on this limestone region; *P. Caesia, hypoleuca, tribacea, stellaris*, varieties *radia* and *rosulata; P. aquila detonsa; obscura*, and *lithotea*.

Other lichens found were the tiny, bright yellow *Candelaria concolor*, the gelatinous brown *Collema pulposum, Cladonia furcata, C. mitrula, C. coniocraea*, the ubiquitous *C. cristatella; C. chlorophora*, forms *simplex, carphophora* and *pterygota; Solorina saccata* was not found, the site where Mrs. Anderson had previously seen it being now occupied by a new camp. Interesting crustose lichens were *Lecidea Russellii*, and *Candelariella vitellina. Dermatocarpon miniatum* was occasional on wet limestone. The territory examined is close to a fault line at the border of the limestone and the gneiss, and it was noticeable that the limestone area was richer in lichens than the gneiss a few hundred yards east. Then, too, the limestone bore characteristic ferns, *Camptosorus rhizophyllus, Pellaea atropurpurea*, and *Asplenium Ruta-muraria*, which were absent from the pre-Cambrian rocks eastward.

Raymond H. Torrey

Palisades in Vicinity of George Washington Bridge
Sunday, March 12, 1933

The unusually cold weather during the ten days immediately preceding this walk was discouraging to early blossoms. On March 11th the temperature (15°) was the lowest on record for that date. Ponds and pools were covered with ice. *Stellaria media*, in a cranny of the rocks of the Palisades, was the only plant found in blossom. Trees and shrubs, therefore, engaged most of our attention. Among those examined, besides the various species of oaks, were *Cornus florida, Viburnum prunifolium, Fraxinus americana, Celtis occidentalis, Carya ovata, Carya alba, Carpinus caroliniana*, and *Liquidambar Styraciflua*. The last was especially abundant on the top of the cliffs north of the bridge. In the same locality were found many egg cases of the praying mantis.

Dried fruits or seed capsules of *Ailanthus glandulosa, Robinia Pseudo-Acacia, Paulownia tomentosa, Clethra alnifolia, Verbascum Thapsus, Verbascum Blattaria* and *Cuscuta Gronovii* were collected. Among the rocks near the river were found Spirogyra and Fucus.

Six members and eleven guests were present.

Ethel Savacool

PROCEEDINGS OF THE CLUB

Meeting of January 3, 1933

The meeting was called to order at the American Museum of Natural History at 8:15 p.m. by President Sinnott. There were 25 members present.

Miss Elizabeth M. Schutt, 280 Gregory Avenue, Passaic, N. J. and Miss Myrtle H. Waterfall, 158 Gregory Avenue, Passaic, N. J. were unanimously elected to membership in the club.

Reports of the Secretary, Treasurer, Editor of the Bulletin and Editor of Torreya were read and approved. The report of the Business Manager was that business was bad.

In the absence of Dr. Denslow, Dr. Merrill made brief comment on the Local Herbarium which he reports has more than doubled by the gift of the Ferguson Herbarium, the Mackenzie Herbarium, and a number of recent additions by Mr. Moldenke. The collection is now approximately 40,000 sheets and is housed in the steel cases provided by Dr. Ferguson. Dr. Merrill states that this coming winter a census will be made, giving the exact count of the material in it. It is a good representative collection of the flowering plants and mosses. The local collections of fresh-water algae, lichens and fungi have not yet been placed in the Local Herbarium, but there is ample space for them. Mr. Torrey brought up the question whether popular guides to these last groups might not be published by the Torrey Botanical Club. Dr. Harper and others strongly seconded this proposal.

In the absence of Dr. Gager, no report was made by the Delegate to the Council of the New York Academy of Sciences.

As Representative of the Club on the Council of the American Association for the Advancement of Science, Dr. Dodge reported that he attended the annual meeting.

Mr. Raymond Torrey reported verbally on the field trips of the year.

Dr. J. S. Karling, for the Entertainment Committee, stated that the finances for that committee are now better than in previous years, reporting a deficit of seven dollars at the particular moment he spoke. He stated that at the down-town meetings the committee served an average of thirty-nine and one-half people at each meeting.

There were no reports of standing committees.

Dr. Marshall A. Howe reported for the committee on the amendment of the Constitution as follows:

To strengthen the legal position of The Torrey Botanical Club as a holder of endowment funds, it has been thought advisable to amend the Constitution and By-Laws of the Club in such a way as to lodge the control of the business affairs of the Club primarily in the Council of sixteen members, as provided for in the proposed new Article X, given below.

The other changes proposed are simply to bring the Constitution and By-laws into harmony with this new idea.

I. It is moved to amend the Constitution as follows:

1. To amend Article III by omitting the words: "The President, the Vice-president, the Treasurer, the Secretary, and the Editor shall constitute a Board of Trustees in whom the corporate rights of the Club shall be vested."
2. To amend Article VI by substituting *Council* for *Finance Committee* in lines 4 and 7.
3. To amend Article XI by substituting *by the Council* for *by a member of the Membership Committee.*
4. To amend by inserting a new Article X—Council, which shall read:

    There shall be a Council, consisting of sixteen members, including the President, Treasurer, Secretary, and Editor, *ex officio*, with 12 elected members. At the Annual Meeting for 1933 the elected members of the Council shall be chosen by ballot, four for terms of three years, four for terms of two years, and four for terms of one year; thereafter, four members shall be elected each year for terms of three years. Five members shall constitute a quorum of the Council. Vacancies in unexpired terms may be filled by the Club by ballot at any regular meeting.

    The Council shall hold regular meetings prior to the first monthly meetings of the Club in January, March, May, and October. It shall annually elect a Chairman, who may call special meetings. The Secretary of the Club shall be Secretary of the Council. The Council shall prepare annually a budget for consideration by the Club, shall approve all contracts, shall pass upon all bills presented for payment, shall nominate candidates for membership and candidates for all elective offices, and shall have power to accept resignations. It shall report to the Club all actions taken. The foregoing shall not be construed as precluding nominations of officers from the floor.

It shall be the duty of the Council to invest the funds of the Club, whenever there shall be a balance in the Treasury of more than five hundred dollars not wanted for immediate disbursement. No transfer of any stock, bond, note, or other evidence of debt standing in the name of the Club, shall be made except by the Treasurer, having the written order of the Council for that purpose, and all transfers shall be countersigned by the President or Secretary.

5. To amend by changing the number of existing Article X—Members—to XI and by renumbering the subsequent articles in accordance with this change.

II. It is moved to amend the By-Laws as follows:

1. To amend Section 5—Standing Committees—by omitting: 1. Finance Committee, 2. Budget Committee, and 3. Membership Committee, and by renumbering the remaining committees accordingly.
2. To amend by omitting Section 6—Finance Committee.
3. To amend by omitting Section 7—Budget Committee.
4. To amend by omitting Section 10—Membership Committee.
5. To amend by renumbering the remaining sections in accordance with the above modifications.

M. A. Howe
S. F. Trelease
R. H. Torrey
Special Committee on the Proposed Amendment

The report of the committee was accepted and the suggested amendment unanimously adopted.*

There being no other deferred or new business brought before the meeting, it then proceeded to the election of officers. President Sinnott announced that he had appointed a nominating committee, and Dr. R. A. Harper reported as Chairman of that committee the following nominations:

* The Constitution and By-Laws as amended are printed in this issue of Torreya.

President—PROF. A. F. BLAKESLEE
Vice-Presidents—DR. H. A. GLEASON AND DR. R. P. WODEHOUSE
Secretary—DR. FORMAN T. MCLEAN
Treasurer—MRS. R. A. HARPER
Editor of BULLETIN—DR. B. O. DODGE
Members of the Council for three years—DR. N. L. BRITTON, MR. R. H. TORREY, MISS C. C. HAYNES AND DR. F. E. DENNY
Members of the Council for two years—PROF. M. A. CHRYSLER, DR. A. H. GRAVES, MR. GEORGE T. HASTINGS AND DR. J. A. KARLING.
Members of the Council for one year—DR. E. D. MERRILL, DR. E. W. SINNOTT, DR. S. F. TRELEASE AND DR. R. A. HARPER.
Associate Editors—ALBERT FRANCIS BLAKESLEE, CORNELIA LEE CAREY, FRANK EARL DENNY, ALEXANDER WILLIAM EVANS, HENRY ALLAN GLEASON, ALFRED GUNDERSEN, GEORGE TRACY HASTINGS, MARSHALL AVERY HOWE, LOUIS OTTO KUNKEL, MICHAEL LEVINE, ARLOW BURDETTE STOUT, SAM F. TRELEASE, W. H. WESTON, TRACY HAZEN, AND JOHN HENDLEY BARNHART.
Bibliographer—MRS. B. O. DODGE.
Delegate to the Council of the New York Academy of Sciences—DR. C. STUART GAGER.
Representatives on Council of A.A.A.S.—DR. D. T. MACDOUGAL AND DR. B. O. DODGE.

Those nominated were unanimously elected.

Meeting adjourned at 9:45 for refreshments.

Respectfully submitted,
FORMAN T. MCLEAN
Secretary

NEWS NOTES

In Torreya for January–February of 1932 there was a note regarding the foundation of the Morris Botanical Garden, School and Museum by the will of the late John T. Morris. Plans for the organization of the Garden are now announced. Dr. Rodney H. True, professor of Botany at the University of Pennsylvania is the director, with the following scientific staff: Dr. John M. Fogg, taxonomist; Dr. Edgar T. Wherry, ecologist; Dr. Harlan H. York, pathologist; Dr. Conway Zirkle, geneticist. Mr. James Lambert, superintendent of the University botanical gardens, is superintendent of the arboretum and Mr. John Tonkin, who was head gardener of the Morris estate, will be head gardener.

Sample sheets of the Flora of the Hawaiian Islands by Otto Degener have been received. The plan of the Flora is unique in that more familiar plants are to be described first without especial effort to complete either families or genera. As the description and illustration of each species are on opposite sides of a page, the pages can be combined according to relationship as fast as they are issued. Mr. Degener has recently shipped a large collection of his plants to the New York Botanical Garden for critical study.

Purdue University announces the completion last summer of the new laboratories for plant physiology and pathology. The laboratories are built around greenhouse units. There is space for elementary study as well as advanced study and research. In the basements there will be equipment for research on controlled light, temperature, and humidity. New advanced courses will be offered both in plant pathology and plant physiology.

(*Science*)

The Stephen Hales Prize of the American Society of Plant Physiologists has been awarded to Dr. Hubert B. Vickery, of the Connecticut Agricultural Experiment Station, for his work on vegetable proteins.

(*Science*)

DR. HUGO DE VRIES, the distinguished Dutch botanist and author of the mutation theory, celebrated his eighty-fifth birthday on February 16.

(*Science*)

DR. ARTHUR HOLLICK died at his home on Staten Island on Saturday, March 11th. Dr. Hollick had been a member of the Torrey Botanical Club for over fifty-five years, having joined in June 1877 with Dr. N. L. Britton. In 1879 Dr. Hollick and Dr. Britton published a Flora of Staten Island and in subsequent years added to this. Dr. Hollick's chief interest for many years was in fossil plants. He was appointed paleobotanist at the New York Botanical Garden in 1901 and was on the staff of the garden from that time on. At the Semi-centennial meeting of the Torrey Club in 1917 Dr. Hollick read a paper from which the following is quoted: "If I remember correctly, it was in 1876 or 1877 that Doctor Britton and I joined the Torrey Botanical Club. We were classmates in the Columbia College School of Mines at the time and had collected plants together in a more or less desultory way. The only instruction we received in botany was one lecture a week during one term, by Professor Newberry, who also lectured on zoology, paleontology and geology. Attending meetings in those days was not so easy as it is now. I lived at Port Richmond on Staten Island. The last boat to the island was at 9 P.M. I used to take the midnight train on the Central Railroad of New Jersey at Liberty Street, get off at Bergen Point Station, walk three quarters of a mile to the shore of Kill van Kull, wake up a man who lived in a little shanty there, and hire him to ferry me over to Staten Island in a rowboat." During all the years Dr. Hollick has been active in the club and has frequently contributed to the programs of the meetings and to its periodicals.

THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their paper appears, will kindly notify the editor, when returning proof.

Reprints should be ordered when galley proof is returned to the editor. George Banta Pub. Co., Menasha, Wisc. have furnished the following rates:

	4pp.	8pp.	12pp.	16pp.	20pp.	24pp.	28pp.	32pp.	48pp.	64pp.
25 copies	$1.54	$2.70	$4.01	$4.84	$6.21	$7.15	$8.90	$9.29	$13.80	$17.49
50 "	1.81	3.19	4.67	5.61	7.31	8.52	10.34	10.28	15.56	19.08
75 "	2.14	3.68	5.33	6.21	8.36	9.62	11.49	12.37	17.21	21.94
100 "	2.47	4.18	5.88	6.98	9.07	10.78	12.60	13.69	19.30	24.25
150 "	2.97	5.06	7.15	8.36	11.22	13.31	15.62	16.72	23.48	29.48
200 "	3.85	5.55	7.86	9.18	12.44	14.85	17.38	18.53	25.90	32.56
300 "	4.23	6.82	10.12	11.77	16.33	19.30	22.55	23.15	33.22	41.14

Covers similar to that of TORREYA. First 50 copies, $2.25. Additional covers, 1½ cents each. Plates: 100 for $1.00

Committees for 1933

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G. T. HASTINGS
J. S. KARLING
R. A. HARPER
E. D. MERRILL
E. W. SINNOTT
S. F. TRELEASE

Endowment Committee
N. L. BRITTON
CAROLINE C. HAYNES
MRS. S. F. TRELEASE

Entertainment Committee
J. S. KARLING, *Chairman*
A. H. GRAVES
MRS. R. A. HARPER
MRS. G. T. HASTINGS
MRS. WM. MITCHELL

Field Committee
RAYMOND H. TORREY, *Chairman*
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HELENE LUNT
O. P. MEDSGER
ZAIDA NICHOLSON
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WILLIAM GAVIN TAYLOR
WILLIAM S. THOMAS

Program Committee
FORMAN T. MCLEAN, *Chairman*
MRS. E. G. BRITTON
WM. CROCKER
A. H. GRAVES
T. E. HAZEN

Local Flora Committee
N. L. BRITTON, *Chairman*

Phanerogams:
N. L. BRITTON, H. M. DENSLOW, K. K. MACKENZIE, NORMAN TAYLOR, R. H. CHENEY, BAYARD LONG, HESTER M. RUSK

Cryptogams:
MRS. G. P. ANDERSON, A. W. EVANS, T. E. HAZEN, MRS. E. G. BRITTON, CAROLINE C. HAYNES, M. A. HOWE, MICHAEL LEVINE, F. J. SEAVER

Chairmen of Special Committees on Local Flora

Ferns and Fern Allies: R. C. Benedict
Mosses: Mrs. E. G. Britton
Liverworts: A. W. Evans
Fresh Water Algae: T. E. Hazen
Marine Algae: M. A. Howe
Gasteromycetes: Clyde Fisher
Russula and Lactarius: Miss G. S. Burlingham
Cortinarius: R. A. Harper
Polyporeae: M. Levine
Rusts and Smuts: P. Wilson
Discomycetes: F. J. Seaver
Lichens: Mrs. G. P. Anderson
Hypocreaceae, Plectascineae, Tuberineae: F. J. Seaver
Erysiphaceae: G. M. Reed
Sclerotium-forming Fungi: Arlow B. Stout
Imperfecti: F. J. Seaver
Phycomycetes: A. F. Blakeslee
Yeast and Bacteria: Miss J. Broadhurst
Myxomycetes: R. Hagelstein

OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A journal devoted to general botany, established in 1870 and published monthly, except during July, August, and September. Vol. 59, published in 1933, contained 564 pages of text and 32 full page plates. Price $6.00 per annum. For Europe, $6.25.

In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE—a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24–59 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–18 are now completed. Volume 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00.

Volume 18, no. 1, 108 pages, 1931, price $2.00. Volume 18, no. 2, 220 pages, 1932, price $4.00. Volume 18 complete, price $5.00.

(3) Index to American Botanical Literature, reprinted monthly on cards, and furnished to subscribers at three cents a card.

Correspondence relating to the above publications should be addressed to

MRS. R. A. HARPER
Schermerhorn Hall,
Columbia University,
New York, N.Y.

Vol. 33 May-June, 1933 No. 3

TORREYA

A Bi-Monthly Journal of Botanical Notes and News

EDITED FOR
THE TORREY BOTANICAL CLUB
BY
GEORGE T. HASTINGS

John Torrey, 1796-1873

CONTENTS

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MEMBERSHIP

All persons interested in botany are invited to join the Club. There are three classes of membership: *Sustaining*, at $15.00 a year; *Life*, at $100.; and *Annual*, at $5.00 a year. The privileges of members are: (a) To attend all meetings of the Club and to take part in its business, and (b) to receive all its publications.

Meetings of the Club are held on the first Tuesday of each month at the American Museum of Natural History, New York City, and on the third Wednesday at the New York Botanical Garden.

TORREYA IS THE OFFICIAL ORGAN OF THE
WILD FLOWER PRESERVATION SOCIETY OF AMERICA

TORREYA is furnished to subscribers in the United States and Canada for one dollar per annum; single copies, thirty cents. To subscribers elsewhere, twenty-five cents extra, or the equivalent thereof. Postal or express money orders and drafts or personal checks on banks are accepted in payment. Subscriptions are received only for full volumes, beginning with the January issue. Reprints will be furnished at cost prices. All subscriptions and other communications relating to the business of the club should be addressed to 450 Ahnaip Street, Menasha, Wisconsin, or to the Treasurer, Mrs. R. A. Harper (Mail address—Schermerhorn Hall, Columbia University, New York City).

Matter for publication, and books and papers for review, should be addressed to

GEORGE T. HASTINGS
2587 Sedgwick Ave.,
New York, New York

TORREYA

Vol. 33 May-June, 1933 No. 3

Desert wild flowers

JACK WHITEHEAD

How fascinating and mysterious are desert wild flowers as seen through the enchantment of April and May in Northern Arizona! Upon entering Arizona, after crossing the Colorado River, the color and beauty of its flora are bewilderingly wonderful and greatly enhanced by a setting amidst splendors of weirdly grotesque, strangely fantastic scenery. What a land of interesting discovery is revealed as the plant lover journeys into this first fifty miles of Arizona territory: from the glamorous Colorado River, through the grandly spectacular Black Ute Mountains, and down into the vastnesses of the Sacramento Valley.

There is nothing especially note-worthy about the fringe of Cottonwoods and Willows, Arrow-Weeds and Salt-bushes densely jungling the banks of the Colorado River. In close proximity, however, are many interesting plants. . . . The HONEY MESQUITE (*Prosopis juliflora*) is a small, straggling, thorny tree clothed in dark green foliage and slender spikes of honey-golden, fluffy, fragrant blossoms. Its flat bean-like fruits, ripening in fall, are favored essentials of Indian sustenance. . . . Showers of Gold! Surely such an expression must allude to Springtime blossoming of PALO VERDE (*Cercidium torreyanum*). Here is a large and spreading, spiny tree, frequently shattered by the elements. Though leafless most of the year, the Spanish Palo Verde is, nevertheless, the "Green Tree" of the desert, because its branches are always smooth and bright green. This *Cercidium* was named in honor of Dr. Torrey. . . . What might be lazy drifts of blue-green smoke, curling along the dry washes, eventually become clumps of DESERT SMOKE TREE (*Parosela spinosa*). This unique wilderness tree, like the Palo Verde, is leafless except for a few weeks in early Springtime. It is intricately and spinily branched and delights with flowers of deepest indigo-blue. . . . In marked contrast to its background of jet black rocks, flourishes the pure white CHRISTMAS DESERT HOLLY, botanically named *Atriplex hymenelytra* by Dr. Torrey in 1857. Arising from a gnarled and woody base, this compact shrub is garbed heavily in silvery tomentose cordate leaves. . . . Surely the sands of the desert are always to be visualized as billowy, wind rippled dunes of shifting silvery brightness, with here and there patches of lovely pink SAND VERBENA (*Abronia villosa*) and blushing white EVENING PRIMROSE (*Oenothera trichocalyx*).

From the sanguinary Colorado River, the road meanders into the spectacular Black Ute Mountains where, in Springtime, the rocky hillsides and the sandy valleys are re-created as veritable desert flower gardens.

THE OCOTILLO (*Fouquieria splendens*) is the most magnificent of desert trees. From a knotty root-crown spring long, unbranched, very thorny stems which, in late Spring, are covered with rosettes of leafy greenery and surmounted by dense panicles of brilliant scarlet flowers. The Ocotillo, contrary to popular opinion, is not a Cactus. . . . A small and straggling deciduous tree, armed with sharp curved prickles, is the CATCLAW (*Acacia gregii*). In Summer the Catclaw is habited in feathery compound leaves and adorned with short cylindrical spikes of fluffy yellow, fragrant blossoms. Its flat, cinnamon-red seedpods resemble miniature frying pans. . . . The Catclaw is host plant for the MESQUITE MISTLETOE (*Phoradendron californicum*). The large reddish bronze bundles of this leafless parasite gather in the branches of many desert trees and there are frequently mistaken for gigantic birds' nests. In late Autumn the Mesquite Mistletoe glows with beauty of small, globose, pinkish and viscid berries. . . . However, at the mere thought of parasites, there flashes a vision of that loveliest plant robber of them all, the DODDER (*Cuscuta denticulata*), painting the desert landscape with golden luminance. . . . It is delightful to discover in this region some plants of the uniquely interesting Cactus family. That tall and widely spreading Cactus with its slenderly cylindrical and densely spiny branches terminating in yellowish green blossoms is the DEERHORN CACTUS (*Opuntia echinocarpa*). The BEAVER TAIL CACTUS (*Opuntia basilaris*) is the low-growing spineless Cactus, with flat blue-green slab-like "leaves" closely dotted with golden brown and crowded along their upper edges with glorious cups of rosy carmine. Easily recognized by the excessively long spines of its flat joints is the GRIZZLY BEAR CACTUS (*Opuntia erinacea*). This Cactus is particularly interesting as its flowers may be either bright pink or soft yellow on different plants. . . . In this world of picturesque grandeur are many beautiful annual plants. The pure white PINCUSHION FLOWER (*Chaenactis douglasii*), the white, flushed pink RAFINESQUIA (*Rafinesquia neomexicana*), and the clear canary yellow SNAKE'S HEAD (*Malacothrix coulteri*) are here; so too, are both the pale blue and the dark purple WILD HELIOTROPES (*Phacelia tanacetifolia* and *Phacelia crenulata*). And LUPINES! Hosts of them in all shades of colorful tintings from pure white to deepest royal purple.

The picturesque gold mining town of Oatman is passed ere the summit of the mountain is reached where a marked change in vegetation is to be noted.

A real tree and the only "Evergreen" of the region is the DESERT JUNIPER (*Juniperus utahensis*). A thing of rugged beauty, symmetrical of habit, and mantled in light green foliage, very profusely begemmed with luminance of silvery berries. This Juniper, locally known as Cedar, is a prevailing tree of desert mountains and usually found in close association with the more famous Pinyon Pine. . . . Bold clumps of stiffly curved leaves resembling the pampas grass of gardens are to be recognized as BEAR GRASS (*Nolina bigelovii*). As the season advances, long straw-colored flower stalks bear congested compound panicles of thousands of tiny, creamy white liliaceous blossoms above the dark green foliage. . . . GOLDEN STENOTOPSIS (*Stenotopsis linearifolius*) is a straggling, sticky shrub common enough on desert mountain slopes. The narrow, fascicled leaves, strongly odoriferous of balsam, grow on fastigate branches which, forming a flat top, are surmounted by bright yellow, raggedly-rayed composite flowers. . . . Vividly contrasting with the somber blackness of its setting is the pure white INCIENSO (*Encelia farinosa*). From its woody trunk spring many short branches bearing terminal whorls of silver white leaves and loose cymes of golden yellow blossoms. . . . The most delightful of all desert plants is the DESERT LILY (*Hesperocallis undulata*). This Easter Lily of the wilds sends up, from between long wavy leaves, a rather fleshy stalk bearing from four to twelve large pure white flowers, all delicately marked with green pencillings. This most capricious of Nature's children is oddly endowed with a faculty for remaining dormant through periods of dry years awaiting the more favorable growing conditions when there is a rainy season on the desert. . . . Many flowering plants grow scatteringly over these desert mountains. The ARIZONA VERBENA (*Verbena wrightii*), dainty in pale lavender-blue and the GOLDEN POPPY (*Eschscholtzia douglasii*), just as exquisite as the larger and more brilliant California Poppy, are there inviting admiration; from the shelter of low desert shrubs leap flaming scarlet tongues of the INDIAN PAINT BRUSH (*Castilleia angustifolia*); and clumps of lavender-purple DESERT ASTER (*Aster tortifolius*) contrast delightfully with those of bright golden yellow DESERT SUNFLOWER (*Geraea canescens*).

Next the scene of floral enchantment is the vast Sacramento Valley. The Black Ute Mountains are behind; and, across a distance of extensive valleyland, loom the towering peaks of the Hualapai Mountain Range.

The SPANISH DAGGER (*Yucca mohavensis*) is the outstanding tree of this immense sandy and rocky valleyland. It is easily recognized by a black, shaggy massive trunk that reaches, either branched or unbranched a height of some ten feet or more. The yellowish green leaves are borne in a terminal rosette and from their midst, in season, arise stubby panicles of fetid, greenish white flowers. . . . Another Yucca is the SPANISH BAYONET (*Yucca baccata*). This is an acaulescent species with basal rosettes of upturned bluish-green leaves and bears the largest flowers of the genus. These showy flowers are creamy white, flushed with bronze-red, and are followed by large conical, edible fruits. . . . A leafless tree, with short black trunk and upright bright green, spine-tipped branches, was named, both as to genus and species, *Canotia holacantha*, by Dr. Torrey. Its local name is PALO CHRISTI. The Palo Christi has inconspicuous white flowers and usually bears many woody, black, long beaked seedpods from previous seasons. . . . A graceful plant with black annulated branches crowded with a wealth of shining bright green leaves, a riot of golden yellow blossoms, and silver velvety seed vessels is the CREOSOTE BUSH (*Larrea* *tridentata glutinosa*). It is the most prevalent large desert shrub and very charming despite its being coated with a sticky, evil-smelling, resinous exudation from which comes its common name of Creosote Bush. . . . A shrub valued by all desert dwellers is the MORMON TEA (*Ephedra viridis*). Equisetum-like in appearance, the Mormon Tea has slender, jointed stems with leaves reduced to rudimentary scales. Staminate and pistillate flowers are borne on different plants and, in springtime, the male-flowered shrub becomes a glory of golden-stamened catkins. A tea made from an infusion of the branches is regarded by Indians and Whites alike as a sovereign remedy in the treatment of disease. . . . Among the beautiful flowering plants of the Sacramento Valley are such perennials as the SALMON GLOBE MALLOW (*Sphaeralcea pedata*), a compact silvery bush with dozens of long spikes flaunting hollyhock-like blossoms of from salmon-pink to terra-cotta; The CREEK SENECIO (*Senecio douglasi*), a charming plant of wide distribution with much divided leaves and an inflorescence of bright yellow blossoms; and the DESERT MARIGOLD (*Baileya multiradiata*) with basal tufts of hoary silver foliage and long-peduncled, semi-double flowers of deepest golden yellow. . . .

Cactuses of varying forms frequent this great desert plain. The CHOLLA CACTUS (*Opuntia bigelovii*) is strikingly apparent on hillside slopes with its single straight black trunk bearing many short and porrect branches, aglow with glistening spiny armament. The inconspicuous flowers are greenish. The BARREL CACTUS (*Ferocactus lecontei*) is a stout and massive barrel intricately protected by broad annulated curved spines, pink and yellow in color. The bright golden blossoms and red-rosy fruits are borne in a nest-like arrangement on top of the plant. The HEDGEHOG CACTUS (*Echinocereus engelmanii*) is a most abundant desert succulent and is everywhere easily distinguished by its cucumberesque stems, all cruelly armed with varicolored spines and its great open chalices of rose-purple loveliness filled with golden stamens, over which, like a tiny butterfly, hovers the pale green stigma. . . . One of the strangest of all desert plants is the DESERT TRUMPET (*Eriogonum inflatum*). From a basal rosette of round, crinkled leaves, the leafless stems arise to repeatedly branch and re-branch. Just below the point of branching these slender stems become very much swollen. Indian folklore proclaiming its swollen stems to be resting places of young rattlesnakes. However, the less romantic white desert dweller disproves this legend in most practical fashion by adding the young and tender shoots of the desert trumpet to the contents of his salad bowl. . . . The fame of Dr. Torrey is well established in the wilderness and many are the desert plants either named by him or in his honor. In this regard the Desert Trumpet is especially noteworthy, inasmuch as it was botanically named *Eriogonum inflatum* by Dr. Torrey in collaboration with General Fremont. This is of interesting importance because the botany of the Southwest owes an outstanding debt to these two great men: the one an eminent botanist, the other an indefatigable plant collector.

Kingman, Arizona

Rock Tripes on a Long Island glacial boulder

Raymond H. Torrey

An occurrence of lichens which stimulates speculation as to its origin is a large colony of two forms of Rock Tripe, on an immense glacial boulder, near Wading River, Suffolk County, Long Island. This boulder, known locally as the Split Rock, is one of the largest in the long list of really big boulders in Fuller's Geology of Long Island. It is a mass of reddish gray granite, probably from eastern Connecticut, and was originally about 20×20×30 feet but is split into several large fragments. It is on a lobe of the Harbor Hill Moraine, about half a mile north of the highway at a point three quarters of a mile west of Wading River. Mr. W. T. Davis, of the Staten Island Institute of Arts and Sciences told me of the lichen colony, from recollections of years ago, and I visited it recently.

Three of the fragments bear dense colonies of the Smooth Rock Tripe, *Gyrophora Dillenii*, and the blistered form, *Umbilicaria pustulata*, mixed with each other. I have not seen these large foliose lichens on any other glacial boulder on the island, but will search others. Earth and bark lichens are quite plentiful on eastern Long Island, where fires have not been too severe, but these Rock Tripes, which are familiar to the most casual observer, in the highlands of New Jersey and southern New York, and are also common on ledges on the Connecticut side of the Sound, are rare on Long Island, where the only rocks on the surface are glacial boulders.

This part of Long Island was covered with ice when the Ronkonkoma Moraine, to the south, was laid down; and was at the front of the ice when the Harbor Hill moraine was formed. Vegetation has since migrated in. The variety and numbers of earth lichens, such as Cladoniae, and various bark and some rock lichens, on small and large boulders, such as Parmelias, and Physcias in Suffolk County, suggest that these species had relatively little difficulty in establishing themselves, in spite of their dependence on associated algae. But these Rock tripes ordinarily like plenty of room; the bigger the boulder or ledge, in their habitats in the Highlands, the better they grow. It is probable that there are not many boulders big enough, or sufficiently exposed in the glacial moraines or outwash, or far enough from the Sound or the ocean to escape the effects of salt spray; to be hospitable homes for Gyrophora or Umbilicaria. The chances against the establishment of the species, in the transmission of their spores, probably from Connecticut, to such boulders and of finding promptly their proper algal symbiont, Cystococcus, with fortunate moisture and temperature to germinate, would seem to be stupendous. But here they are on this split boulder at Wading River and they look as if they had been there for centuries. Birds or the wind must have carried the spores many times before one or the other agency landed them at the right time and place, and Cystococcus was there waiting, and this isolated colony started.

Hollis, Long Island

A poison ivy experiment

Ralph C. Benedict

Poison ivy is generally an interesting topic to everyone. Some of us delight to claim practical immunity while others are pleased to describe various remedies. During the summer, I had some new experience with *Rhus toxicodendron* L. and a little with *Rhus vernix* L.

The latter occurred in connection with a field trip of the American Fern Society and the Torrey Botanical Club at Sparta, New Jersey, where some 40 distinct fern types were noted with two others nearby but not seen on this occasion. Part of the trip was in a swamp in which not infrequent growths of poison sumac were noted. One of the party, very susceptible to *Rhus* poisoning, found he had accidentally come into contact with the leaves of poison sumac. Another member of the party proposed a remedy easily obtainable in almost any situation in this neighborhood, namely, jewel weed. Presently, some jewel weed was found and the juice of the crushed stems was rubbed over the parts of the skin which might have come in contact with the poison sumac.

The sequel, of course, should be that no poisoning appeared on the suspected areas. I must say that I did not hear definitely, but I think this is highly probable since Rhus poisoning usually, if not always, is dependent on contact with the actual sap of the plants.

A little later, I had an opportunity to experiment with jewel weed as a possible remedy. It had been my experience for a long time that neither of these species produced on my own skin any serious disability. A drop of the sap from the broken leaf always gives rise to a small inflamed area not as uncomfortable as a mosquito bite and lasting only a little longer. Accordingly, I proceeded to try out jewel weed as a remedy while spending time at Lake George this last summer. On the back of each hand, I wet a small area by rubbing the broken end of a poison ivy leaf. It may be noted that no poisoning or inflamation developed on the parts of the hands that had held the leaves. Next, on the back of the left hand, I rubbed jewel weed juice by bruising the stems and rubbing them over the area. On the right hand, I had the usual reaction, a small red spot about a quarter of an inch in diameter. On the left hand, I had the worst case of poisoning and inflamation that I have ever experienced. Rubbing on the jewel weed juice served to spread the poisoning and apparently to cause it to take deeper effect than usual. Most of the back of that hand was swollen and red for some days, darkening gradually to look something like a birth mark and finally scaling off in particles to leave little areas of glistening new skin.

The result of the experiment was simply to emphasize past information regarding methods of treatment which cautioned against rubbing possibly infected areas with water or alcohol or other agencies which might spread the sap. The old prescription of strong alkaline soap, such as ordinary yellow washing soap, potassium permanganate, and, more lately, iron chloride are still the best prescriptions. I might add that in my own experience, contrary to wide-spread belief, poison sumac is no more virulent than poison ivy.

Since writing the above and reporting my adverse results with jewel weed juice, I have had the opportunity of talking to two or three good botanists who believe in it. Apparently, however, they recommend it as an alleviation after inflammation has set in, not as an antidote of the actual poisoning.

It is with regret that I report the failure of another proposed experiment, aimed to determine the inheritance of susceptibility. In the family I studied, I found that the father and two sons were almost nonsusceptible, but the three distaff members of the family refused to serve as guinea pigs.

Brooklyn, New York

A new species of Vitex from South America

HAROLD N. MOLDENKE

√ **Vitex Brittoniana** Moldenke, sp. nov. Arbor excelsa; annotinis et hornotinis minute puberulentibus vel glabris; foliis 5-foliolatis (interdum 3-foliolatis); petiolis dense vel minute puberulentibus vel strigillosis, supra planatis, ad apicem valde ampliatis et claviformibus; petiolulis tantum 3–15 mm. longis, supra plerumque valde sulcatis, a pulvinis satis magnis circularibus vel ellipticis emergentibus; laminis utrinque nitidis ellipticis, inter se inaequalibus, ad apicem et basin acutis vel breviter acuminatis, integerrimis, supra glabris, subtus praeter costam et venas secundarias minutissime puberulentes glabratis; inflorescentiis paniculatis.

Tree to 20 m. tall; branches and branchlets stout, more or less tetragonal, medullose, brownish, very minutely puberulent or glabrous, marked with many linear-elongate lenticels; internodes 1–5 cm. long; leaves decussate-opposite, 5-foliate or occasionally 3-foliate; petioles slender or stout, 3–11 cm. long, densely or minutely puberulent or strigillose, decidedly flattened on the upper surface, with minutely projecting margins, conspicuously ampliate at the apex and more or less club-shaped; petiolules slender, 3–15 mm. long, the terminal one usually by several mm. the longest, minutely puberulent or strigillose, usually deeply sulcate above, issuing from comparatively large circular or elliptic cushions whose margins project around the base of the petiolules; leaflets firmly membranous, dark green and nitidous on both surfaces, elliptic (or occasionally obovate), unequal in size, the terminal one 8.5–18 cm. long and 3.5–8 cm. wide, acute or short-acuminate at apex (occasionally rounded and subretuse), entire, acute or short-acuminate at base, perfectly glabrous above, glabrous beneath except for the very minutely or obsoletely puberulent midrib and secondaries; midrib slightly impressed above, prominent beneath; secondaries slender, 9–14 on each side, rather close together, ascending, often only slightly arcuate, slightly impressed above, prominent and conspicuously anastomosing near the margins beneath; veinlet reticulation prominulent on both surfaces; the two lateral leaflets slightly or noticeably smaller; the two basal leaflets usually very conspicuously smaller, sometimes quite rounded at both ends; inflorescence paniculate; panicles simple, axillary, solitary, opposite, 2–4 at the termination of each branchlet, 7–22 cm. long, narrow, usually 3–5 cm. wide, many-flowered; peduncles slender, 3–8 cm. long, very minutely puberulent or glabrous; pedicels slender, about 1 mm. long, puberulent; bractlets numerous, linear or linear-lanceolate, 1–4 mm. long, 1–1.7 mm. wide or less; calyx campanulate, about 2.6 mm. long and wide, lightly pubescent, margin 5-lobed, slightly 2-lipped, the lobes ovate-triangular, about 0.7 mm. long and 1 mm. wide at the base, acute; corolla purple, bilabiate, its tube about 5.2 mm. long, ampliate above, densely long-pilose at the mouth; superior lip 2-lobed, its lobes irregularly rotund or oblong, about 3.6 mm. long and wide, more or less rounded at apex; inferior lip 3-lobed, the lateral lobes broadly oblong, about 4.1 mm. long and 3.6 mm. wide, irregularly rounded, the central lobe greatly enlarged, clawed with a more or less rotund blade, the claw about 1.5 mm. long and 3.3 mm. wide, the blade about 5.2 mm. long and 7.8 mm. wide, its margin irregular; stamens 4, didynamous, inserted about 3.6 mm. above the base of the corolla-tube, exserted; filaments filiform, about 4.6 and 6.8 mm. long, densely pilose throughout; anther-sacs attached only at apex, widely diverging, about 0.7 mm. long and 0.3 mm. wide; pistil exserted, surpassing the stamens; style capillary, about 8.3 mm. long, glabrous; stigma bifid, its branches short, about 0.4 mm. long, acute; ovary globose, about 1 mm. long and wide, densely pubescent, 4-celled, 4-ovuled; fruiting-calyx indurated, coriaceous, campanulate, about 2 mm. long and 5 mm. wide, glabrate, its margin irregularly lobed; fruit drupaceous, obovoid-subglobose, about 10 mm. long and wide, glabrous, fleshy, 4-celled, much wrinkled in drying.

Type collected by George Samuel Jenman (*No. 6921*) at Berbice, British Guiana, in January, 1896, and deposited in the herbarium of the New York Botanical Garden. The species is closely related to the Jamaican *Vitex umbrosa* Sw., which is endemic to that island. Indeed, it has hitherto been invariably confused with this species. The fact that the South American specimens, uniformly labeled "*Vitex umbrosa* Sw." in all herbaria and even cited thus by Schauer, are not conspecific with the Jamaican plant, was first discovered by Dr. Nathaniel Lord

Britton, in whose honor the new species is therefore very appropriately named. *V. umbrosa* differs from our species in having uniformly much more elongate petiolules, in its leaflet blades being much less nitidous (especially beneath), its petioles being not enlarged nor club-shaped at their apex, and especially in its petiolules not emerging from enlarged cushions at their base and in its very shortly or obsoletely toothed calyx. *V. Brittoniana* is known also from Venezuela, French Guiana, Colombia, and Curacao.

The New York Botanical Garden

A new silene from Washington

By C. V. Morton and J. W. Thompson

Silene seelyi, sp. nov.—Species insignis ex affinitate *S. menziesii;* herba 20 cm. alta; caules graciles, glanduloso-puberulenti; folia sessilia, ovata vel lanceolata, parva, basi angustata, apice acuta, integra, utrinque glanduloso-puberulenta, glanduloso-ciliolata; flores solitarii, pedunculati, pedunculo tenui, glanduloso-puberulento; calyx viridis, non inflatus, obscure 10-nervatus, glanduloso-puberulentus, lobis acuminatis, erectis; petala purpurea, lineari-oblanceolata, integra vel plerumque bifida; stamina non exserta, filamentis basi connatis; ovarium breviter stipitatum, 6 valvatum, ovulis numerosis; styli tres, erecti.

Perennial herb about 20 cm. high; stems slender, about 1 mm. thick, numerous, straw-colored, glandular-puberulent, with internodes up to 3.5 cm. long; leaves opposite, exstipulate, connected at base by a low rim, sessile, ovate to lanceolate, the larger 2 cm. long and 1 cm. wide, narrowed at base, acute at apex, entire, sparingly glandular-puberulent on both surfaces, glandular-ciliolate; lateral veins and veinlets obscure; flowers solitary, terminal, borne between a pair of leaves, the buds in the leaf axils developing into lateral branches, thus producing a false dichotomy; peduncles up to 2 cm. long, very slender, about 0.4 mm. thick, green, glandular-puberulent; calyx cylindric, the tube about 5 mm. long, 3 mm. broad, green, not scarious, slightly inflated, inconspicuously 10-nerved, the lobes triangular, acuminate, about 2 mm. long, erect, both the tube and lobes densely glandular-puberulent; petals purple, about 11.5 mm. long, linear-oblanceolate, long and narrowly clawed, entire or mostly bifid, bearing a pair of conspicuous interior scales in the throat; stamens not equalling corolla, the filaments linear-subulate, about 9 mm. long, connate at base into a glandular tube about 1 mm. long, the anthers versatile, about 1 mm. long; ovary short-stipitate (stipe about 1 mm. long), 1-celled, 6-valved at apex, the placenta axial, with numerous ovules; styles 3, distinct, about 5 mm. long; mature fruit not seen.

Type in the U. S. National Herbarium, no. 1,566,404, collected in crevices of cliffs along Nigger Creek, Chelan County, Washington, alt. about 1,200 meters, June 25, 1932, by J. W. Thompson (no. 8565).

Silene seelyi is related to *S. menziesii*, but may be distinguished from that species (and its various forms described by Greene as species, under the generic name *Anotites*) as follows:

Leaves ovate or lanceolate, broadest below the middle, very small (the largest 2 cm. long), glandular-puberulent and glandular-ciliolate; calyx glandular-puberulent; petals purple, the interior scales conspicuous.........**S. seelyi**

Leaves obovate or oblanceolate, broadest above the middle, larger (up to 8 cm. long), puberulent, the hairs not glandular, usually retrorse; calyx puberulent or sometimes glandular-villous; petals white, the interior scales usually absent..........................**S. menziesii**

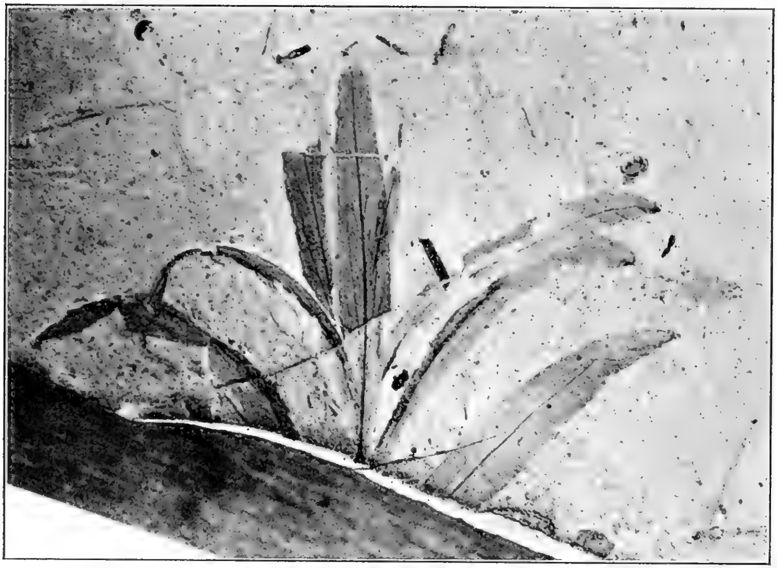
Named for Mr. Clarence B. Seely, of Leavenworth, Washington, a promising young collector, who was assisting Mr. Thompson at the time the plant was discovered.

A fossil golden rod

T. D. A. Cockerell

Solidago praeconcinna n. sp., Folia caulina anguste lanceolata, integerrima, dentis paucis subapicalis excepta; ut *S. concinna* A. Nelson.

Leaves narrowly lanceolate, about 70 mm. long and 7.5 wide, with entire margins, except for an occasional notch near the apex. Venation and all other characters as in *S. concinna* A. Nelson or *S. missouriensis* Nuttall. Creede formation, Miocene Tertiary, near Creede, Colorado; collected by Mr. Allan Caplan.



The specimen represents the end of a leafy stem, with about eight leaves clearly visible. The leaves were evidently soft and flexible, not stiff and coriaceous. If they were restored to life, I should hardly know how to separate them from those of *S. concinna*, an existing Rocky Mountain species. For the photograph I am indebted to my colleague Mr. Hugo Rodeck.[1]

Boulder, Colorado

[1] On the same piece of rock as the fossil *Solidago* from Creeds is a crane fly. On close examination of this, I am unable to separate it from *Tipula limi* Scudder, a common species of the Florissant shales.

BOOK REVIEW

Recent Advances in Cytology[1]

It was only yesterday that Virchow's dictum *Omnis cellula e cellula* crystallized into definite form a series of observations upon the cell. The cell became a measuring rod for a vast unexplored continent and the discoveries made are permanent records of achievement. The cell possesses an organization, all of whose parts cooperate. Cytoplasm, delimiting membrane, nucleus, and plastids together with substances entering, substances leaving, substances synthesized, substances broken down—a series of actions and interactions, nullification of one, retardation of another, acceleration of a third, express in the cell what we call life. Can anyone say which part is more alive than another? Cytoplasm? Cell wall? Plastids? Nucleus? Nucleolus? Centrosome? Spindle fibers? Chromosomes? Are the chromosomes alone the bearers of hereditary qualities? What have been the contributions of the students of cell lineage? Have we forgotten the promorphological properties resident in the cytoplasm of the egg? How about the forces outside the cell? Have they no effect upon morphological expression? Morphogenetic forces inside the cells, morphogenetic forces outside the cells—cells and tissues and organs mutually influencing and modifying one another. A glorious array of solid achievement in less than a century!

A new generation has arisen and it has fashioned for itself a new set of values, using little of the old, freeing itself from many of the supposed factual ties with the past. And were great trailblazers like Flemming and Strasburger, dead only a few years, to return, they would be akin to Rip van Winkle aroused from a long slumber to find that the world had passed them by. The lardmarks that they knew are no longer there—strangers in their own land. The sign posts in Darlington's cytology do not suggest connections with the highways of von Mohl, Naegli, Fol, Buetschli, Hertwig, Strasburger, Flemming, Boveri. Modern cytology begins with the year 1912!

The foreword to the book is written by J. B. S. Haldane who

[1] Recent Advances in Cytology—Darlington, C. D. P. Blakiston's Sons & Co. Philadelphia, 1932.

informs the reader from the very outset that: "This book on karyology marks the beginning of a new epoch, the transition from an essentially descriptive to a largely deductive science. . . . It finds its parallel in the study of the fixed stars. The average cytologist is primarily an observer and unaccustomed to long chains of deductive reasoning. He will find the book extremely difficult. . . . The chromosomes are not only astonishingly similar in all organisms but are mainly responsible for diversities of teeth and xylem. And their study immediately discloses a whole set of new evolutionary principles which are hidden from the macroscopic morphologist."

Then follows the mapping out of the heavens of the new cytology by Darlington. The instruments are in his hands. It is he who with a consummate knowledge of experimental genetics casts his eyes upon the nucleus and studies its stars and planets. He marks their position, apportions their sizes, plots their orbits, determines their magnitudes, and charts their constellations. From the shades of color in the eye of Drosophila, from the proportions of a squash, from the varying spines of a Jimson weed he deduces when they must attract and when repel one another, when there is partial or total eclipse, and when they shall collide, and when they must fragment.

There are still two kinds of nuclear divisions for Darlington —as he calls them simple and double mitosis. Double mitosis is really an abnormality of simple mitosis. It is called meiosis. Chromosomes are two-parted and the preparation for the division of the nucleus does not lead to the formation of a spireme. The spireme concept is untenable on cytological and genetical grounds.

The two parts of the chromosome (chromatids) correspond exactly part for part, chromomere for chromomere. The chromosomes preserve their identity throughout all stages of mitosis and during all succeeding division at succeeding mitoses. The chromatids are cylinders and the chromomeres are arranged in a single spiral. All chromosomes have one constriction unless it is terminal. The spindle attachment always coincides with a constriction. The constriction is a point of weakness in the chromosome. Constrictions give diversity of form to metaphase chromosomes and therefore character to individual chromosomes. Chromosomes of one race because of their constant morphology may be recognized even though they may have entered into a genetic union with those of another race or species.

Meiosis is defined by Darlington as two divisions of the nucleus accompanied by one division of its two-parted chromosomes. It is at meiosis that the final evidence of chromosome pairing in hybrids and non-hybrids, in polysomes, and in polyploids occurs. It is the time when the results of fertilization can be evaluated. That meiosis takes the complicated course that it does in nearly all sexual plants and animals, has one object: "it provides the conditions for crossing over without which recombinations of genes and secondary structural changes in the chromosomes would be excluded. Meiosis has no virtue except in hybridity. Gene changes on the one hand and proportion and quantity changes on the other hand are essential agents in evolution."

The pendulum swings back and it has retreated two hundred years in time. The discarded preformationist has been resurrected, he is now in our midst—modernized to be sure—yet a dominating figure. The chromosomes retain their individuality, in them alone are the units of heredity, the genes. In the nuclei are the predetermined representations of the generations yet to be. The geneticist and cytologist have mapped out the chromosomes assigning definite places to the hundreds and thousands of genes responsible for form and function. And just as the preformationist of the 17th and the 18th centuries saw in the egg the preformed chick, so does the cytogeneticist see the characters of stem, leaves, flowers, roots, tissues, eyes, wings, color, and their endless morphological and physiological attributes in the chromosomes of the egg and sperm.

The role of the cytologist—the student of the physiology of the cell has become more and more circumscribed. The edifices that he laboriously erected have fallen into disuse and are no longer esteemed. He has been forced to retreat from position to position, giving up ground all the time. The cytoplasm and its inclusions have been abandoned. Taking inventory of his wares the cytologist finds that all that he has left now, are chromosomes and spindle fibers. His transactions are with these two commodities. Genetics and cytology have entered into an indissoluble bond; they have erected a new preformationist doctrine.

And yet, in sexual reproduction, there is the inescapable phenomenon that two cells, two whole cells, not merely chromosomes, two cell organizations unite and from that intimate union of all parts of the gametes—*omnis cellula e cellula.*

CECIL YAMPOLSKY
Botany Department, Columbia University

FIELD TRIPS OF THE CLUB

Trip to Nepera Park and the Boyce Thompson Institute on March 25. A party of thirty was met at the Boyce Thompson Arboretum by Mr. J. H. Beale and taken through the nursery where a great variety of trees and shrubs are growing. Some of the heathers were already in blossom, a planting of *Erica carnea* showing as a bright patch of pale purple on the hillside above the nursery. From the nursery the party followed a new road to the top of Sprain Ridge, noting the planting that had been done on the summit of the ridge and at the edge of the woods. Dead and dying trees in the woods have been cut out, otherwise the woods are in their natural condition. Few flowers were in evidence,—a few blossoms of periwinkle, *Vinca minor*, where it had become established in an open place, a dandelion or two and the catkins of alder and hazelnut comprised the total. The gray pussies of large-toothed aspen were well grown, but not yet shedding pollen. In the afternoon the party visited the Boyce Thompson Institute where Dr. P. W. Zimmerman explained some of the work being done in the laboratories and greenhouses. Much interest was shown in the experiments of using wastes from pulp factories, chiefly lignin, for mushroom culture instead of manure. The initiation of root growth on cuttings by treatment with carbon monoxide was very striking and led to a discussion as to the effects of the gas on plants and animals. The effect of oxygenating water in which cuttings were being rooted was equally striking, the stems in cylinders through which oxygen was bubbling being covered with roots from the surface of the water to the bottom, while those in the control cylinders had comparatively few roots and those all near the surface.

GEORGE T. HASTINGS

PROCEEDINGS OF THE CLUB

Meeting of January 18, 1933

The meeting was called to order at The New York Botanical Garden at 3:30 p.m. by President Blakeslee. There were 41 members present. The minutes of the meeting of January 3 were read and approved.

Miss Elizabeth T. Ojerholm of Columbia University, New York N. Y. and Miss Hilda Vilkomerson of the Brooklyn Botanic Garden, Brooklyn, N. Y. were unanimously elected into membership in the club.

Miss Caroline C. Haynes did not wish to become a member of the Council for three years, and Dr. M. A. Howe was elected in her place.

Before the regular meeting the members of the Council met for luncheon and a meeting at Sormani's Restaurant.

They elected an Executive Committee, consisting of Dr. E. D. Merrill, Vice-Chairman, Dr. B. O. Dodge, Dr. F. T. McLean, Mrs. R. A. Harper and Dr. E. W. Sinnott.

A Field Committee was also elected consisting of Mrs. G. P. Anderson, Prof. B. T. Butler, Dr. Arthur H. Graves, Dr. Michael Levine, Miss Zaida Nicholson, Prof. Oliver P. Medsger, Miss Helene Lunt, Dr. Wm. S. Thomas, Mr. A. T. Beals, Dr. Harold Clum, Dr. Clyde Fisher, Dr. Alfred Gundersen, Mr. George T. Hastings, Mr. William Gavin Taylor, Dr. Harry K. Svenson, Mr. Leon W. Bowen .

Dr. William Crocker of the Boyce Thompson Institute gave an interesting talk on "Delayed Germination of Seeds." This talk was illustrated by lantern slides.

Mr. Robert Hagelstein, Honorary Curator, gave an interesting talk on "The Slime Moulds of Long Island."

Meeting adjourned at 5:15 p.m.

Respectfully submitted,
Forman T. McLean
Secretary

Meeting of February 7, 1933

The meeting was called to order at the American Museum of Natural History at 8:15 p.m. by President Blakeslee. There were 25 members present.

Mr. G. Russell Fessenden, 485 Gramatan Avenue, Mt. Vernon, N. Y.; Miss Honora M. Hollinghurst, 2736 Creston Avenue, Bronx, New York; Miss Farida A. Wiley, American Museum of Natural History, 77th Street & Central Park West, New York City, were unanimously elected to membership in the club.

The resignations of Mrs. Allen M. Burnham, Mrs. Cecelia M. Grossman, Miss Bertha Healy, Mr. Joseph Crawford, and Mrs. Marjorie Cotton Wingler were accepted with regret.

Dr. R. P. Wodehouse of the Arlington Chemical Company gave an interesting talk on "Fossil Pollens of the Tertiary Eocene." This talk was illustrated by lantern slides.

Meeting adjourned at 9:45 for refreshments.

Respectfully submitted,
Forman T. McLean
Secretary

Meeting of February 15, 1933

The meeting was called to order at The New York Botanical Garden at 3:30 P.M. by the Vice-President, Dr. H. A. Gleason.

The resignations of Frederick W. Kobbe, Samuel Hirschberg, Dr. George B. Cummins and C. Victor Jordan were accepted with regret.

In the absence of Dr. John S. Karling of Columbia University and Dr. Arthur Hollick of The New York Botanical Garden, who were scheduled to talk, the following people gave an account of the work they are doing.

Dr. M. A. Howe spoke on the Sierra Blanca Limestone and showed some interesting specimens.

Dr. B. O. Dodge discussed his recent experimental work on controlled fertilization in the bakery mold, Neurospora. He reported that the small bodies which had been commonly called sclerotia have been proved to be incipient perithecia which could be stimulated to develop to maturity and form asci provided they were fertilized by the application of either microconidia or the orange colored monilioid conidia. These large conidia have heretofore been assumed to be merely vegetative spores. It has been proved, however, that they also function sexually to bring about fertilization. He showed cultures of strains of one sex which had been conidiated by applying the monilioid conidia with a camels hair brush, with the result that perithecia developed only where the receptive bodies had been conidiated. This provides the biology teacher with material with which he may illustrate sexual reproduction in the Ascomycetes very simply.

He also pointed out that the microconidia have been called spermatia because of their small size. These microspores have been proved to function not only sexually but also as ordinary vegetative spores. This all goes to show that structures which are morphologically one thing may on occasion function in an entirely different manner.

Dr. Koch spoke on the interesting work she is doing with Heliantheae.

Dr. McLean told of his experiments with Sweetglads and showed plants and paintings of them.

Dr. Emmons and Dr. Gunderson also gave interesting accounts of their work.

Meeting adjourned at 5 P.M.

Respectfully submitted,
FORMAN T. MCLEAN
Secretary

MEETING OF MARCH 7, 1933

The meeting was called to order at the American Museum of Natural History at 8:15 P.M. by Vice-President Dr. R. P. Wodehouse.

Miss N. E. Crandall, 223 Cowperthwaite Place, Westfield, New Jersey was elected to membership in the club.

The resignations of Miss Edna E. Milleman, Mrs. E. E. Olcott, Mr. Robert I. Rashby and Dr. F. J. Seaver, were accepted with regret.

Dr. E. D. Merrill, Director of The Yew York Botanical Garden gave an interesting talk on "The Vegetation of the Philippines." This talk was illustrated by lantern slides.

Meeting adjourned at 9:45 for refreshments.

Respectfully submitted,
FORMAN T. MCLEAN
Secretary

Dr. Ludwig Diels, General Director of the Botanical Gardens and Museum of Berlin has come to this country to lecture during the summer at the Century of Progress Exposition in Chicago. Dr. Diels visited the Botanical Garden in New York on his arrival and will stop there again after his return from a visit in Florida.

Dr. Elmer D. Merrill, Director of the New York Botanical Garden presented a paper on Loureiro and his work at the annual meeting of the Philosophical Society of Philadelphia on the 20th of April.

"Science" describes the third expedition from the University of Michigan for a biological survey of the Maya region of Central America in cooperation with the Carnegie Institute of Washington. Mr. C. L. Lundell of the University herbarium accompanied the expedition as botanist. The objective of the expedition is the great savannah area lying beyond Lake Peten, Guatemala, where detailed studies and collections of the fauna and flora will be made. This is a part of a twenty-year project to ascertain the present biological conditions and environment under which the great Maya civilization rose and declined.

Dr. Marshall A. Howe and Dr. E. D. Merrill attended the annual meeting of the National Academy of Sciences in Washington during the last week in April.

It is proposed to name a Colorado mountain peak after Dr. William Trelease, emeritus professor of botany of the University of Illinois, formerly head of the Henry Shaw School of Botany at Washington University, St. Louis, and director of the Missouri Botanical Garden.

The Morris Arboretum of the University of Pennsylvania was formally dedicated on June second. At the exercises addresses were made by Dr. Rodney H. True, of the department of botany of the university, Dr. Reginald Buller, of the University of Manitoba, Dr. Robert H. Harper, of Columbia and Dr. A. L. Lowell, president of Harvard. The honorary degree of L. L. D. was conferred on Dr. Lowell and the degree of D. S. on Dr. Buller and Dr. Harper.

The National Academy of Science has awarded its Public Welfare Medal to Dr. David Fairchild, of the Division of Foreign Plant Introduction of the United States Department of Agriculture, for "eminence in the application of science to the public welfare."

THE TORREY BOTANICAL CLUB

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BY
GEORGE T. HASTINGS

John Torrey, 1796-1873

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TORREYA

Vol. 33 July-August, 1933 No. 4

Some local names of plants V*

W. L. McAtee

Feeling strongly the importance of the subject and the neglect which is its ordinary lot, the writer desires to contribute again toward a glossary of plants. The future ideal compilation will tell where the names are used, will explain their origin so far as possible, and in fine record all matters of interest in connection with them. The study of vernacular names is a fascinating one that brings to light details of intense and peculiar interest not only with respect to the development of our language but also of our people.

As in preceding contributions, an index is given for convenience in correlating the list with other glossaries. In a brief bibliography are included references to sources of plant names additional to those presented in my 1926 paper.

Characeae

1. *Chara* sp.—Musk grass, Currituck Sound, N. C.; lime weed, stonewort; I record these bare names in addition to those I have previously published with localities, because the ordinary plant glossaries pay no attention to algae.

Pinaceae

2. *Taxodium distichum* L.—River cypress, Okefinokee Swamp, Ga. (C. C. Sperry).

Potamogetonaceae

3. *Potamogeton natans* L.—Brown-leaf pondplant, floating brown leaf (trade names).
4. *Potamogeton pectinatus* L.—Sago pondplant (trade name).
5. *Ruppia maritima* L.—Peter grass, Currituck Sound, N. C.; in allusion to the Peter, Blue Peter, or coot (*Fulica americana*).

Naiadaceae

6. *Naias flexilis* Willd.—Bushy pondweed (trade name).

* No. 1 of this series was published in Torreya, *13:* 225–236, 1913; No. 2 in Torreya, *16:* 235–242, 1916; No. 3 in Torreya, *20:* 17–27, 1920; and No. 4 in Torreya, *26:* 1–10, 1926.

Alismaceae

7. *Sagittaria latifolia* Willd.—Wapato duck-potato (trade name).
8. *Sagittaria subulata* L.—Sweet grass, Ossabaw Id., Ga.
9. *Sagittaria* sp.—Bull-tongue, Cameron Parish, La. (A. C. Martin).

Poaceae

10. *Paspalum boscianum* Fluegge.—Bull grass, water grass, Southern Georgia, northwestern Florida (H. L. Stoddard).
11. *Panicum adspersum* Trin.—Brown-top millet (trade name); red-top millet, Leon County, Fla. (C. O. Handley).
12. *Panicum miliaceum* L.—Hog millet, proso (trade names); hershey, Washington County, Colo. (E. R. Kalmbach); the last name undoubtedly a corruption of the German, *hirse.*
13. *Panicum virgatum* L.—Feathergrass, Marsh Id., La. (C. C. Sperry).
14. *Echinochloa crus-galli* L.—Duck-millet, Mississippi Delta, La. (C. C. Sperry); blue duck millet, wild duck millet, billion dollar grass, Japanese barnyard grass or millet, barnyard grass (trade names).
15. *Chaetochloa magna* Griseb.—Jungle millet, southwestern Louisiana (C. C. Sperry).
16. *Zizania aquatica* L.—Duck oats (trade name); blackbird oats, Essex County, Conn. (F. M. Uhler).
17. *Holcus sorghum drummondi* Nees.—Chick grain, Leon County, Fla. (C. O. Handley).
18. *Spartina cynosuroides* L.—Corn sedge, Poplar Branch, N. C.
19. *Spartina glabra Muhl.*—Hog cane, southwestern Louisiana (C. C. Sperry).
20. *Spartina patens* Ait.—Couch grass, southwestern Louisiana (C. C. Sperry).
21. *Spartina* sp.—Quill cane, Cameron Parish, La. (A. C. Martin).
22. *Scolochloa festucacea* Willd.—Whitetop, Homestead, Montana (C. C. Sperry).

Cyperaceae

23. *Cyperus esculentus* L.—Ground nut.
24. *Scirpus americanus* Pers.—Three-cornered grass, southwestern Louisiana (C. C. Sperry).
25. *Scirpus campestris* Britton.—Nut grass, Carson Sink, Nev. (C. C. Sperry).
26. *Scirpus olneyi* Gray.—Three-cornered grass, southwestern Louisiana (C. C. Sperry).
27. *Scirpus robustus* Pursh.—Button grass, Cambridge, Md. (Curtis Insley).
28. *Cladium effusum* Torr.—Cuttin' sedge, Poplar Branch, N. C.

Araceae

29. *Orontium aquaticum* L.—Bull-tongue, Okefinokee Swamp, Ga. (C. C. Sperry).
30. *Peltandra virginica* L.—Duck corn (trade name).

Mayacaceae

31. *Mayaca aubleti* Michx.—Flowering moss, Miccosukee, Fla. (C. C. Sperry).

Pontederiaceae

32. *Pontederia cordata* L.—Pickerel plant (trade name).

Juncaceae

33. *Juncus effusus* L.—Bulrush, Poplar Branch, N. C.
34. *Juncus gerardi* Lois.—Nut grass, Cambridge, Md. (Curtis Insley).
35. *Juncus roemerianus* Scheele.—Wildcat grass, southwestern Louisiana (C. C. Sperry).

Liliaceae

36. *Calochortus nuttalli* T. & G.—Prairie lily, Forsyth, Mont. (C. C. Sperry).

Ulmaceae

37. *Planera aquatica* Walt.—Charmille, Louisiana.

Polygonaceae

38. *Rumex acetosella* L.—Horse sorrel, Garret Co., Md. (F. Warnick).
39. *Fagopyrum fagopyrum* L.—Duck wheat, goose buckwheat (trade names).

Chenopodiaceae

40. *Atriplex hastata* L.—Duck lettuce, Bear River, Utah (A. Wetmore).

Amaranthaceae

41. *Alternanthera philoxeroides* Mart.—Alligator grass, Mississippi Delta, La (C. C. Sperry). Unfortunately in my 1926 contribution this name by some error was attributed to *Monniera*. I trust this correction will prevent the previous mistake from becoming fixed in the literature. Alligator grass as at present recorded is an introduced species that has shown considerable tendencies toward "taking the place" much in the manner of water hyacinth.

Nymphaeaceae

42. *Nelumbo lutea* Willd.—Water chinkapin.
43. *Castalia mexicana* Zucc.—Banana, Florida, or yellow waterlily.
44. *Nymphaea advena* Soland.—Toad lily, yellow waterlily.

Magnoliaceae

45. *Magnolia virginiana* L.—Red bay, Okefinokee Swamp, Ga. (C. C. Sperry).

Brassicaceae

46. *Roripa nasturtium* L.—Pepper grass (trade name).

Capparidaceae

47. *Cleome serrulata* Pursh.—Stinking clover, Mackelwain Lake, Mont. (C. C. Sperry).

Rosaceae

48. *Rubus chamaemorus* L.—Outberry (Box, E. G., Garden, 83, 36–37, Jan. 1919); salmon berry, St. Paul Id., Alaska (Alvin G. Whitney).

Mimosaceae

49. *Acuan illinoensis* Michx.—Ball pod, Mississippi Delta, La. (C. C. Sperry).

Fabaceae

50. *Sophora secundiflora* Cav.—Mountain laurel, Austin, Tex. (C. C. Sperry).
51. *Meibomia purpurea* Mill.—Florida beggarweed (trade name).

ZYGOPHYLLACEAE

52. *Covillea glutinosa* Engelm.—Greasewood, Graham Mts., Ariz. (E. G. Holt).

ANACARDIACEAE

53. *Rhus trilobata* Nutt.—Skunk-berry, Valentine, Nebr. (C. C. Sperry).

CYRILLACEAE

54. *Cyrilla racemiflora* L.—Honeysuckle, Okefinokee Swamp, Ga. (C. C. Sperry).

AQUIFOLIACEAE

55. *Ilex myrtifolia* Walt.—Titi, Wakulla County, Fla. (C. O. Handley).
56. *Ilex vomitoria* Ait.—Tea tree, Beaufort, N. C. (Roosevelt, R. B., Florida and the Game Water-birds of the Atlantic Coast, etc., 1884, p. 44).

APIACEAE

57. *Coelopleurum gmelini* DC.—Pootchka, St. Paul Id., Alaska (Alvin G. Whitney).

OLEACEAE

58. *Forestiera acuminata* Michx.—Swamp privet.

SCROPHULARIACEAE

59. *Monniera monniera* L.—Water "pusley," Louisiana (C. C. Sperry).

RUBIACEAE

60. *Mitchella repens* L.—Pheasant berry, Fairfax County, Va.
61. *Richardia scabra* L.—Alabama clover, John's weed, Greene County, Miss. (H. L. Stoddard).
62. *Galium trifidum* L.—Glue-leaf, Libby, Mont. (C. C. Sperry).

CARDUACEAE

63. *Rudbeckia hirta* L.—Niggerheads, Garrett County, Md. (F. Warnick).
64. *Brauneria angustifolia* D. C.—Niggerheel, Valentine, Nebr. (C. C. Sperry).
65. *Artemisia gnaphalodes* Nutt.—Poverty weed, Boise, Idaho (A. K. Fisher).

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INDEX

WASHINGTON, D.C.

Parmelia Cladonia, a beautiful northern lichen, found on Catskill summits

Raymond H. Torrey

Receipt from friends who sent lichens from the Adirondacks, the Green Mountains of Vermont and from high summits in Maine last summer, of a very beautiful foliose species, identified for me by Mrs. Gladys P. Anderson as *Parmelia Cladonia*, started the writer on a search for the plant within the range of the Torrey Botanical Club. He has been successful in finding it in four stations on higher summits in the Catskills. Mrs. Anderson has found it on two others, so that it seems probable that it may be found on many Catskills summits above 3500 feet, or perhaps lower where conditions are favorable.

When specimens from the Great Rangé in the Adirondacks, collected by A. T. Shorey, of Brooklyn; from Jay Peak, in the Green Mountains, collected by Mrs. Laura Woodward Abbott, of Upper Montclair, N. J.; and from northern Maine, by George F. Dillman, of New York, sent to the writer, were referred to Mrs. Anderson, she identified them, and remarked that the species was reported about 25 years ago, by Mrs. Carolyn W. Harris, of Brooklyn, from Panther Mt. in the Catskills, although the specimen had not been preserved, and Mrs. Harris' report was the only one recorded for our range.

A climb of Peekamoose Mountain, in the southern Catskills, last September, with Louis W. Anderson, of Elizabeth, N. J., resulted in the discovery of *Parmelia Cladonia* in fairly ample quanitity near the summit, from 3500 to 3860 feet. Another expedition with Mr. Anderson to Big Indian Mountain, 3750 feet, last November, disclosed it at 3500 feet on that summit, in great quantitity on dead and living firs in a high swamp.

An opportunity to check Mrs. Harris' report, for Panther Mountain, was afforded on May 28, in a climb of that peak, 3750 feet, via Giant Ledge, 3250 feet. Guided by the directions of C. T. Andrews, proprietor of the Valley View Cottage in Oliverea, an easy ascent was made up a long hogback south of Seymour Brook, a tributary of Esopus Creek, to the rock slide on the west slope of the summit of Giant Ledge, where the sandstone slabs were found to be covered with many Cladoniae.

Mrs. Anderson also found on this mountain several forms of *Parmelia physodes*, *Pyxine sorediata*, and *Cetraria Oakesiana* in fruit, which usually occurs only in the north. There was a little of *Parmelia Cladonia*, mixed, as usual, with *Evernia thamnodes* and *furfuracea* var. *ceratea* and *Parmelia physodes*.

A descent to the col north of Giant Ledge, and a climb of 750 feet up the cliffs and steep slopes, to the summit of Panther, 3750 feet, disclosed plenty of *Parmelia Cladonia*, within the last 100 feet of altitude, especially in a shallow wet basin, with much dead fir evidently overturned by ice storms. If this was Mrs. Harris' station, it is certainly still there. There is another summit, a mile north, 200 feet lower, which was not reached, where it may also occur.

Mrs. Anderson found this lichen in small quantity on North Mountain, east of Haines Falls, last autumn, and she thinks it occurs on Wittenberg, which is probable as that summit is 3800 feet. It seems likely that it may occur on Slide, 4200; on the Blackheads, nearly 4,000; on Hunter, 4025 feet; on the wild Plateau Mountain, 3900 feet; and probably on some others.

Parmelia Cladonia has had other names, the present being the name given by Dr. Zahlbruckner, which must presumably be accepted. Tuckerman called it, or a phase of it, *Evernia furfuracea*, var. *Cladonia*, and it certainly looks like an Evernia. As found in the Catskills, it occurs with an unquestionable Evernia, *E. thamnodes*, and with another plant, which seems to fit *Evernia furfuracea* var. *ceratea*, as described by R. Heber Howe, Jr., in a paper on "The Genus Evernia as Represented in North and Middle America," Botanical Gazette, 51: 431–442, June, 1911. As the writer understands *Parmelia Cladonia*, it is densely intertangled, glabrous gray above, and more or less solid black on the channelled under side. In the Catskill stations it occurs from tiny plants $\frac{1}{4}$ inch long, on living firs, to masses six or eight inches long and two or three in diameter, on dying or dead trees, especially in the Big Indian Mt. locality, the amplest found by the writer in the Catskills. This station is not difficult to reach, by automobile and on foot. One may drive via Kingston and Arkville, then by dirt road south to Seager and follow the yellow blazed state trail to the west shoulder of Big Indian, near the height of land at about 3400 feet before dropping off south into the valley of Biscuit Creek. Turn west, right, toward a dense mass of fir, and there it will be found. Or one can drive via Middletown, Ellenville, Wawarsing, and Route 55 to Curry, thence north on a dirt road to the West Branch of Neversink Creek, along it to the south end of the yellow trail beyond Frost Valley and on that trail via Biscuit Creek to the west shoulder of Big Indian Mountain, where turn left to the fir swamp.

HOLLIS, LONG ISLAND, N. Y.

Historical notes and effects of grazing

Leo A. Hanna

The area under consideration is Bridger Basin, a distinct physiographic and topographic unit of a portion of the Green River valley of southwestern Wyoming. It is characterized by a terrace and escarpment topography on the nearly horizontal Eocene beds. To the casual observer it has the general aspect of a sagebrush plain, but on closer inspection it presents not only sagebrush-rabbit brush communities, but also those of the gravel and the adobe flats, dry washes, fixed sand dunes, badland fronts, and gravel escarpments.

It is often maintained that the present flora of this section is very different from that found here when the emigrants of the fifties and sixties of the last century passed through. The supposed change has been accounted for in various ways, as the result of overgrazing or as the outcome of climatic changes. Of course there has been some overgrazing and ruderals have gained a foothold in many places as along railroads, highways and streams. In most cases, however, their appearance indicates disturbance of the soil by construction work, or by flooding and the incident erosion and deposit. It is the author's opinion that much of the supposed change is to be accounted for by seasonal variations. Dr. Aven Nelson, eminent botanist of the West, crossed the Red Desert on a tour of inspection (1930) for the express purpose of comparing and studying the changes that had taken place in the vegetation during the last thirty years. After a careful study of his original notes (1900) and thoughtful consideration of the problem from all angles, he reached the conclusion that there has been no appreciable change in spite of the fact that vast numbers of sheep browse on the forage of the area.

This contention is sustained by a study of the earliest historical notes available. During June, 1833, John B. Wyeth and party camped on the Green River while exploring its valley. On July 4 he reports in his diary the crossing of Ham's Fork. Townsend's narrative of the expedition, 1833–34 makes the following allusion to the vegetation:

"On the 14 of June we left the Sweetwater river and proceeded in a southwesterly direction to the Sandy river. . . . We found no water on the route and not a single blade of grass. . . . We observed a hoar frost and some thin ice (June 16) this morning at sunrise, but by midday the thermometer stood about 82. . . . Saw large herds of buffalo on the plains of the Sandy river, grazing in every direction on the short, dry grass. Domestic cattle would certainly starve here, and yet bison exist and even become fat. . . . Some of our famished animals attempted to allay their insatiable cravings by cropping the dry and bitter tops of the worm-wood with which the plain is strewed."

In this brief extract we note that the scarcity of grass on the sagebrush plains is reported. The wheat and other grasses are very common to-day but they are in an inconspicuous element of the flora. We can assume that they were not observed or that drought had precluded their growth. The *short dry grass* on which so many bison grazed was probably alkali grass, *Distichlis spicata*. This is the typical grassland of the river bottoms to-day. With it there is a sprinkling of giant rye grass, *Elymus condensatus* and alkali dropseed, *Sporobolis airoides*. That the sparse desert grass and browse is very nutritious has often been noted. (Hanna 1, Nelson 2) It is a fact familiar to all ranchers. The writer of the diary observed a very salient and significant fact, for herein lies the explanation of the value of desert forage and the resulting important live stock industry in a region that appears to be unfavorable to it under casual observation. The "worm-wood" eaten by the hungry animals was of course the common sagebrush, *Artemisia tridentata*, everywhere abundant on the plains of the region of to-day as it was then.

Joel Palmer, a shrewd genial farmer and a former legislator of Indiana, was another leader of the early emigrants. He kept an accurate daily journal and recounts camp experiences in the Green River valley, July 23, 1845. ". . . The road leaves the Green River near our camp and passes over a high and barren country to Black's Fork; this we followed up some four miles and encamped. As upon other streams there is occasionally a grassy bottom, with a little cottonwood and willow brush." How aptly these words apply to the valley of Black's Fork and the surrounding barren uplands. The occasional grassy bottom is the *Distichlis spicata* community discussed in connection with the earlier diary of Townsend. There is the reference to "a little cottonwood and willow brush." They to-day form a conspicuous element of the tree and shrub communities along the river. With the willow and cottonwoods, we find an abundance of buffalo berries, hawthorns, currants, and buckbrush. An emigrant would naturally lump all the shrubs with the familiar and conspicuous willow-cottonwood elements of the flora.

From the diary of John Newman of Platteville, Wis., an emigrant who crossed the Black Fork country in 1857 we read: "A more worthless country I have never seen. Wormwood and a kind of golden rod extend miles on miles. . . . Some of the stock ate the scurfy leaves of spine-covered plants. . . . Low flats of dark green armed brush covered lots of the country along water courses." Here again the "wormwood" alludes to the sagebrush, *Artemisia tridentata.* The golden rod is no doubt a species of rabbit brush, *Chrysothamnus.* These plant forms characterize vast areas of the region. The plants with "scurfy leaves" relished by the stock was probably some species of salt bush. The "spine-covered" plant may possibly have been *Atriplex confertifolia.* The dark green areas of armed shrubs were probably greasewood flats.

These studies seem to bring out the fact that the essential elements of the flora of to-day are very similar to the conspicuous floristic elements prevalent in this region seventy-five or a hundred years ago.

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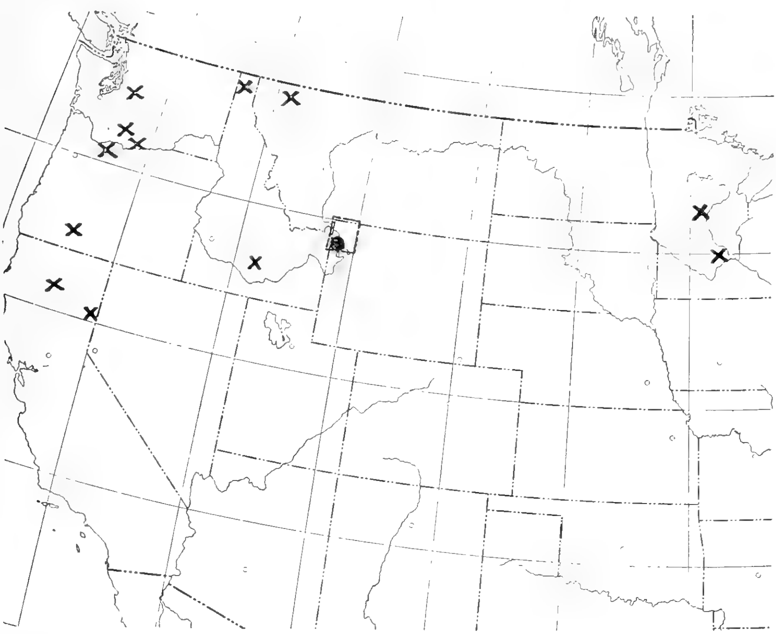
Casper Junior College
Casper, Wyoming

First record of Drosera in Wyoming

Margaret T. Doutt

On July 20, 1930, the writer collected specimens of *Drosera anglica* Huds. (*D. longifolia* in the sense of Rydberg)[1] in the southwestern section of Yellowstone National Park, Wyoming. Previously this genus has not been reported as occurring in that state, the nearest locality being Red Fish Lake, Blaine County, Idaho, approximately two hundred miles to the southwest.

This section of the Park is known as Bechler Meadows, an extensive stretch of open swampy meadow, broken by patches of slightly higher ground bearing Lodgepole Pine. The elevation is 6400 feet. To the north and east, the Meadows are bounded by Madison and Pitchstone plateaus respectively, which rise to an elevation of about 8600 feet, and to the south by the Grand



Map showing distribution of *Drosera anglica* Huds. in western United States.

[1] Rydberg, P. A., 1917. Flora of the Rocky Mountains and Adjacent Plains, p. 373.

Teton Mountains. The Bechler River below Ouzel Falls leaves its canyon in the plateau, and passes into the Bechler Meadows. where it and its tributaries form the primary drainage system.

The specimens were collected between Ouzel Falls and the northwest side of the Bechler River, where, in the swampy meadow of grasses and sedges, numerous individuals were in flower. This is the only place in the Meadows where the species was observed.

Specimens are in the Yellowstone Park Herbarium at Mammoth Hot Springs, in the Carnegie Museum Herbarium, and in the Rocky Mountain Herbarium. The writer wishes to thank the following institutions for information concerning western localities: Missouri Botanical Garden, Gray Herbarium, New York Botanical Garden, Rocky Mountain Herbarium, United States National Herbarium, Herbarium of the Field Museum of Natural History, Herbarium of the University of California, and the Herbarium of the University of Washington.

PITTSBURGH, PA.

BOOK REVIEW

Wild Flowers of the Alleghanies[1]

This book, a flora of the Alleghanies from Alabama to Canada, is written for plant lovers and naturalists who are not trained botanists. Attractively bound and illustrated it is a pleasure to glance through the book or dip in it at random to read the charmingly written accounts of the uses to which various plants have been put or the stories connected with them. The book describes some 1500 species of plants. Many of them are illustrated by line drawings by F. S. Matthews and there are eight colored plates. There is a key to families written by Dr. Karl Wiegand, also a key to the genera of compositae and one to the species of bedstraw (Galium). The lack of keys to the genera of other families, and to species of the larger genera is a rather serious defect. The scientific names used are made secondary in importance to the common ones. Gray's manual is followed in most cases as to names, but no synonyms are given. There is an illustrated key to families, with descriptions of all the families treated in the book, each illustrated by a series of drawings showing details of the structure of some flower of the family. The separate drawings are lettered, but no explanation is given of what the letters refer to, it being left to the reader to interpret, which is not difficult in most cases. Such families as the grasses, sedges, willows and oaks are omitted, probably as being too difficult for or as lacking in interest to the users of the book. Unfortunately there are frequent slight inaccuracies, such as describing the leaves of the lesser duckweed (*Lemma minor*) as being about half an inch in diameter, or stating that the flowers of the cactus grow from the side leaf, or referring to the joints of the pods of the tick trefoil as achenes. Errors such as these may be due to careless proof reading or to carelessness in writing but they are not serious enough to prevent the book being very useful to the flower lover. The author, a pharmacist, describes the book as a labor of love. The way in which it is written shows his appreciation of beauty of form, color and adaptation to function. The descriptions are in many cases from

[1] Wild Flowers of the Alleghanies—Joseph E. Harned. xxxi + 670 pages. Published by the author, Okland, Md. 1931.

his own observation in the field. The book should not only make it possible to become acquainted with most of the wild flowers of the region, but should lead to the greater appreciation of the plants and should ripen the acquaintance into friendship.

George T. Hastings

How plants get their names[1]

In this book Dr. Bailey discusses the rules governing the giving of the scientific names of plants, giving numerous examples of individual plants and the changes their names have undergone. Common names he dismisses with a brief referrence to their interest in language study and suggestions as to how their origin and use may be studied.

A chapter is devoted to Linnaeus as the founder of the modern system of nomenclature. Another chapter is taken to explain the importance of exact determination of species, the use of herbarium specimens for comparison, and the making of herbarium specimens. The development of rules of nomenclature is explained, beginning with the Paris Botanical Congress of 1867 and coming down to the Cambridge Congress of 1930. The International and American Codes are compared but the relative merits of the two are said to be "naturally technical and of little interest to the general inquirer." For cultivated plants he stresses the advantages of class binomials to cover groups where so much hybridizing has occurred that the forms can not be referred to any original species. Attention is also given to the pronunciation of scientific names.

Systematic botany is still as important as any division of the subject, as careful identification and segregation of species and varieties is basic to studies in morphology, physiology, ecology, heridity and distribution. The investigation of cultivated plants to determine origins and identities is also an important field of study.

The last seventy pages of the book are taken up with two lists, one of genera likely to be met in horticultural literature with the pronunciations, the other of specific names with their meanings.

[1] How Plants Get their Names, L. H. Bailey. The Macmillan Co. 1933. vi–209 pages. $2.25.

The synopsis at the beginning of the book says that it "is written for those who may wish to read it but with the horticulturist and garden-lover particularly in mind." The book will probably be of little help to professional botanists, but the fact that it is written by Dr. Bailey is enough to guarantee the reader a few pleasant hours. Possibly, too, it may help to allay the irritation often felt by naturalists and botanists at the frequent changes in scientific names, especially where a name familiar because of long use is changed to something entirely unfamiliar.

George T. Hastings

FIELD TRIPS OF THE CLUB

Wawayanda Cedar Swamp, March 26

A late touch of winter, with four inches of wet snow, on the field trip of Sunday, March 26th, on the Appalachian Trail from the Unknown Pond, on Bearfort Mountain, to Wawayanda Cedar Swamp, delayed members in reaching the rendezvous so that the entire party was never joined during the day. One automobile party which tried to reach the meeting point at the dam of the new "Upper Greenwood Lake," broke down, and their car was not rescued until several days later. The Warwick party headed by Mr. R. R. Goodlatte, spent the afternoon building a new log bridge on the Appalachian Trail across Longhouse Creek, which will be helpful when the trip is repeated in the fall.

Another section, arriving late after skidding off the muddy and snowy dirt road from Newfoundland to Moe, was warned by a friendly filling station man not to attempt to get in to the dam, so they did not, but followed the old road through the swamp, west three miles, and then returned to the Moe-Warwick road via the relocated section of the Appalachian Trail, which includes several huge hemlocks, and tall and dense stands of rhododendron. A number of lichens were found, including *Parmelia physodes*, common in the north, rare in this latitude, but rather plentiful in this high cold swamp; *Cetraria lacunosa* and *viridis*, *Nephromopsis ciliaris*, *Pertusaria velata* and *communis*, *Ramalina calicaris*, var. *fraxinea;* and several Cladonias, most interesting being *C. incrassata*, and *C. caespiticia*, found growing eight to ten feet off the ground on a live red maple, an unusual habitat for this commonly earth and fallen log species.

RAYMOND H. TORREY

FIELD TRIP OF APRIL 16 TO LAKEWOOD AND THE METEDECONK RIVER

Twenty eight members and guests enjoyed the trip along Cedar Bridge Road and the Metedeconk for the observation of early Pine Barren plants. Lunch was eaten on Beacon Hill at an elevation of 138 feet, affording an engrossing view of the Barrens for miles in every direction. In flower were found *Pyxidanthera barbulata*, *Orontium aquaticum*, *Epigaea repens*, and *Chamaedaphne calculata*. Other characteristic barren plants not in flower were *Andropogon glomeratus*, *Hudsonia ericoides*, *Arenaria caroliniana*, *Arctostaphylos uva-ursi*, and *Dendrium buxifolium*. One of the party picked up a dead twig of *Pinus rigida* with an unexpanded cone. On the cone was a well developed plant of *Cladonia cristatella*, which raised interesting speculation as to the rate of growth of this lichen.

CARL E. BLISS

TRIP OF APRIL 23 TO CARMEL, NEW YORK

Although the week preceding the trip was cold for the season of year, many herbaceous plants were seen in bloom. Among them were marsh marigold (*Caltha palustris*), bloodroot (*Sanguinaria canadensis*), trailing arbutus (*Epigaea repens*), early saxifrage (*Saxifraga virginiensis*), hepatica (*Hepatica triloba*), skunk cabbage (*Symplocarpus foetidus*), pussyfoot (*Antennaria canadensis*) and mouse-eared chickweed (*Cerastium vulgatum*).

Many trees in flower were examined and discussed. Two rare mosses, *Andreaea Rothii* and *Ulota americana*, were seen in the fruiting stage and examined by most of us with a hand lens. Those interested in lichens had a fine opportunity to study and collect; *Ramelina* and *Candelaria* were the two uncommon lichens found.

The bird enthusiasts were probably disappointed for very few birds were seen. However a dead red-shouldered hawk was found in good condition.

Fifteen people were present.

ELEANOR FRIEND

Slabsides, John Burrough's Cabin, April 30

The trip led by Dr. Clyde Fisher, to Slabsides, the cabin where John Burroughs did much of his work, west of West Park station, on the West Shore Railroad, on Sunday, April 30, was very fine. In the morning, the party inspected the cabin and climbed Julian's Point, from which there was a good view. There were about 25 on the trip and all signed in the register book at the cabin, under the head of the Torrey Botanical Club.

The afternoon gave us the red letter find, however. On the walk in the woods not more than a mile from the Burroughs place, and near Black Creek, a colony of Walking Fern was found. Nearby, on a boulder, there was a still more luxuriant colony. Dr. Fisher said that he had not known of the occurrence there, and that it was new to him in the flora near Slabsides. The hills there seem to be of red sandstone, with limestone boulders and outcrops. It was on two of these boulders that the fern was growing.

Many spring flowers, including Amelanchier, were in bloom. The only drawback was the unpleasant activity of the black flies, especially on low grounds. In the afternoon some of the party drove over to Riverby, and Julian Burroughs allowed us to enter the bark study. All thoroughly enjoyed the trip.

John W. Thompson, Jr.

At Camp Thendara with the Green Mountain Club, Field Trip of May 13–14

Members of the Torrey Club joined with members of the Green Mountain Club in making a bird census under the leadership of Mr. Warren Eaton. This was the tenth census made by the Green Mountain Club at this season. Altogether 62 species of birds were seen. An interesting fact was that a migration wave of warblers came into the valley below the camp during the morning, with scores of black-throated blue, chestnut-sided, redstarts, and other species. Of plants, the dainty fringed polygala was abundant in the woods; by the marsh grew blue and white violets and dwarf gingseng and in drier localities the downy yellow and dog violets were abundant. One plant of the showy orchid was found in blossom and a single plant of the larger yellow lady's slipper, not yet in blossom. Mr. Atwood noted that the latter was one that had been transplanted to its present location when a small beaver dam flooded a clump of the lady's slippers. Other patches of them had been destroyed in the last few years by the cutting of trees and stacking of wood by park workmen.

GEORGE T. HASTINGS

BRANCHVILLE NATURE STUDY CONFERENCE, MAY 19 TO 21

A party of about sixty members and friends of the Torrey Botanical Club spent the week end at Branchville, where some forty members of the Sussex County Naturalists Society joined the party for the Saturday. As in other years, Mr. and Mrs. William Gavin Taylor were the hosts. Unfortunately Mr. Taylor, after completing all plans for the conference, had to be away but Mrs. Taylor did double duty and saw that the plans were successfully carried out.

The conference included field trips led by Dr. Henry B. Kummel, State Geologist of New Jersey, to study features of local geology; by Mr. C. H. Curran of the American Museum of Natural History to study insects; by Mr. and Mrs. S. Harmsted Chubb of the museum for bird study; and by Mr. Oliver P. Medsger for plant study. There were also evening lectures and time for informal discussion.

Among the many plants in flower the large patches of mandrake (*Podophyllum peltatum*) in pastures and fields near the woods were especially noteworthy. Mr. Medsger suggested that each patch of several hundred plants was in reality a single plant, all being connected by underground stems.

In the Springdale swamp an interesting zoning of plants was noted. Going down a hill covered with sugar maples and oaks the edge of the swamp was found to be lined with black ash, red maple and various shrubs. Globe flower (*Trollius laxus*) was abundant, with bastard toad flax (*Commandra umbellata*) also in blossom and many plants of the grass of Parnassus (*Parnassia caroliniana*). Following the maples and ashes was a fringe of dwarf birch (*Betula pumila*) and willows, the hoary willow (*Salix candida*) and the beaked willow (*S. rostrata*) were common and with them an apparent hybrid. In some places tamaracks (*Larix laracina*) grew in this zone. The more open central part of the swamp was filled with shrubby cinquefoil, (*Potentilla fruticosa*) which makes a level-topped growth of considerable extent. Plants of buckbean (*Menyanthes trifoliata*) were in blossom among the cinquefoil stems and near the edge of the swamp the smaller yellow lady's slipper (*Cypripedium parviflorum*) was not uncommon. The larger species, or variety, (*C. pubescens*) was found in blossom on the slope above the swamp. As in other years, the large clump, of yellow lady's slipper just back of the inn was in prime condition, this year with seventeen blossoms.

The following list of birds seen within a radius of two miles of the inn has been supplied by Mrs. Chubb:

American bittern
Great blue heron
Green heron
Spotted sandpiper
Killdeer
Bob white
Pheasant
Mourning dove
Marsh hawk
Red-shouldered hawk
Broad-winged hawk
Belted kingfisher
Hairy woodpecker
Downy woodpecker
Northern flicker
Nighthawk
Chimney swift
Ruby-throated hummingbird
Kingbird
Crested flycatcher
Phoebe
Wood pewee
Alder flycatcher
Least flycatcher
Blue jay
American crow
Starling
Bobolink
Cowbird
Red-winged blackbird
Meadow lark
Baltimore oriole
Purple grackle
House sparrow
Goldfinch
Vesper sparrow
Grasshopper sparrow
White-throated sparrow
Chipping sparrow
Field sparrow
Song sparrow
Swamp sparrow
Towhee
Rose-breasted grossbeak
Indigo bunting
Scarlet tanager
Purple martin
Barn swallow
Tree swallow
Bank swallow
Cedar waxwing
Red-eyed vireo
Warbling vireo
Yellow-throated vireo
Blue-headed vireo
Black and white warbler
Worm-eating warbler
Blue-winged warbler
Golden-winged warbler
Cape May Warbler
Yellow warbler
Myrtle warbler
Chestnut-sided warbler
Black-poll warbler
Black-throated green warbler
Ovenbird

Louisiana water-thrush
Maryland yellow-throat
Canada warbler
Redstart
Catbird
Brown thrasher
House wren
White-breasted nuthatch
Black-capped chickadee
Wood thrush
Olive-backed thrush
Robin
Bluebird

Making a total of 79 species seen. Of especial interest was the bittern that stayed by a small island in the lake where everyone could watch him.

George T. Hastings

Field Trip of May 21 to Midland Park, New Jersey

Twelve members of the club enjoyed this trip to Midland Park and vicinity. Many flowering plants and trees were observed, among them four chestnut trees in good condition, pink moccasin flowers in abundance, columbine, corydalis, a fine stand of mandrake, pink azalea, Robin's plantain, and wild lupine. The party passed through a lovely grove of gray birch and through a ravine with many ferns and liverworts, sweet white violets growing among them. In the ravine are four pot holes. When the water is low all can be seen, on this day only one could be seen because of the rain the night before. The party continued to Goffle Ridge, a ridge of trap similar to that of the Palisades. Several of the party saw a cardinal and all watched a pair of humming birds about the columbine and corydalis and later resting on a tree. Twice towhees and wrens were seen.

Mr. and Mrs. J. Van Saun

Field Trip of Sunday, June 11

A party of five slowly wended their way up the broad path to Mt. Spitzenberg of the Blue Mountain Reservation this hot but breezy day. The view looking south from the top takes in on a clear day the spires of New York City, the Ramapos, and a good deal of eastern Westchester.

Growing on the rocks was an interesting find: *Helianthemum canadense*, the frostweed. The blossoms seem very fragile. Also one plant of *Potentilla argentea*. Blueberry bushes were heavily laden with unripe fruit. The leader was unsuccessful in finding a plant of *Corydalis sempervirens* which he had noticed here two years ago. By the aid of field glasses we inspected the estate of

Mr. Crosby Gaige where we later were to inspect the collection of rock garden plants.

The path back to Washington Street sported one bush of *Diervilla lonicera* in flower. Two or three specimens of *Asclepias quadrifolia* were also in bloom. The five to six foot, wand-like racemes of *Cimicifuga racemosa* were much in evidence and just beginning to bloom. On a side path we found a few plants of *Penstemon laevigatus*. Several clumps of *Ceanothus americanus* were almost in bloom. In a little brook which trickled under a a corduroy bridge was one plant of *Veronica americana*. One *Anemonella thalictroides* was making a last stand.

Other plants noticed in full bloom were:

Lysimachia quadrifolia, *Potentilla canadensis*, *Rubus odorata*, *Erigeron pulchellus*, *E. annus*, *Cornus paniculata*, *Dianthus Armeria*, *Achillea millefolium*, *Chrysanthemum leucanthemum*, *Sambucus canadensis*, *Trifolium agrarium*, *Melilotus officinalis*, *Sisyrinchium angustifolium*, *Hypoxis hirsuta*, *Stellaria longifolia*, *Hieracium floribundum*, *E. pratense*, *Silene latifolia*, *Lychnis alba*. *Leonurus cardiaca*, *Solanum dulcamara*.

Rudbeckia hirta, *Apocynum androsaemifolium* and *cannabinum*, and *Hieracium aurantiacum* were beginning to open their buds.

Several large specimens of the mushroom *Pluteus cervinus* were in evidence.

In the afternoon the party went to the gardens of Mr. Gaige where a series of beautifully constructed terraces and wall gardens were in the height of bloom. Noticeable were many species of campanulas, silenes, saxifragas, sedums and sempervivums, all in a most pleasing setting of rockwork. Several gardens consisting entirely of evergreens in soft green, gray, and bluish shades emphasized the desirable effects that may be attained without any floral accents. Mr. Gaige also has a very fine collection of herbs the odors of which intrigued the party very much. He had an unusual crisped and crumpled-leaved mint and a mint-scented geranium. The herbaceous garden has a summer house on one side where the party hid from the sun for a time, enjoying the vista through an arched gate of another rock garden.

All concurred that the trip was most delightful, especially the tasting of the first wild strawberries of the season.

George F. Dillman

PROCEEDINGS OF THE CLUB

Meeting of March 15, 1933

The meeting was called to order at 3:30 P.M. by President Blakeslee. There were thirty members present. The minutes of the meetings of February 15 and March 7 were read and approved.

Mr. B. A. Krukoff, c/o Messrs. G. W. Cole & Co., 82 Wall Street, New York, N. Y. was elected to membership in the club.

The resignations of Mr. L. W. Nuttall and Mr. R. S. Williams were accepted with regret.

Dr. Marshall A. Howe reported the death of Dr. Arthur Hollick, one of the oldest members of the Club, on March 11, a little more than a month after completing his seventy-sixth year. Dr. Hollick joined the Torrey Botanical Club, with Dr. N. L. Britton, in October, 1877, and had enjoyed an uninterrupted active membership of nearly fifty-six years. Dr. Howe read Dr. Hollick's interesting "Torrey Botanical Club Reminiscences," presented on the occasion of the semi-centennial of the Club in 1917 and published in volume 17 of the Memoirs. It is expected that a more extended notice of the life and career of Dr. Hollick will appear in an early number of the Bulletin.

Dr. John W. Shive of the New Jersey Agricultural Experiment Station gave an interesting talk on "The Distribution of Iron in Plants." This talk was illustrated by lantern slides.

Forman T. McLean
Secretary

Meeting of April 4, 1933

The meeting was called to order at the American Museum of Natural History by Vice-President R. P. Wodehouse at 8:15 P.M. with forty members present.

Mr. E. J. Alexander, Curator of the Local Herbarium of The New York Botanical Garden, gave an interesting talk on "Local Flora." After a few remarks as to the favorable situation of New York for the study of a variety of floras, a number of slides were shown of common and of rare plants with comments as to the recorded stations of the rare species. In the discussion which followed, Mr. Torrey and Dr. Svenson mentioned other stations for some of the rare plants, in some cases showing them not to be as rare as supposed. This was particularly brought out as to *Trollius laxus* and *Lygodium palmatum.*

FORMAN T. MCLEAN
Secretary

MEETING OF APRIL 19, 1933

The meeting was called to order at The New York Botanical Garden at 3:30 P.M. by Vice-President H. A. Gleason. There were twenty-five members present. The minutes of the meeting of the Executive Committee of the Council on March 15, and of the meetings of the Club of March 15 and April 4 were read and approved.

Dr. Myron P. Backus, The New York Botanical Garden, New York City; Professor E. C. Stakman, University Farm, St. Paul, Minnesota; and Professor F. A. Wolf, Department of Botany, Duke University, Durham, North Carolina were unanimously elected to membership in the club.

Dr. A. F. Blakeslee was elected a representative of the Torrey Botanical Club on the Board of Managers of The New York Botanical Garden for the remainder of this year.

Dr. Sinnott suggested the appointment of a committee to consult with the Biology Teachers concerning a possible amalgamation of Torreya with the publication of the Biology Teachers Association. The President was authorized to appoint such a committee.

Dr. Forman T. McLean of The New York Botanical Garden gave a talk on "Breeding Fragrant Gladiolus." This talk was illustrated by lantern slides.

FORMAN T. MCLEAN
Secretary

MEETING OF MAY 2, 1933

The meeting was called to order at the American Museum of Natural History by the Secretary, Dr. F. T. McLean at 8:15 P.M.

Mr. George Schwartz, Biological Department, New York University, New York City was unanimously elected to membership in the club.

The resignation of Mr. Julius Jacobs, New York, was accepted with regret.

Professor R. A. Harper of Columbia University gave a talk illustrated with lantern slides on the "Light Relations of Fungi." He first discussed the classification of the subject matter of plant physiology in recent text books. He emphasized the fact that most of these ignore the subject of flowering and reproduction. He then took up the question of the importance of light, particularly to maturation and reproduction in the fungi showing that many forms such as *Pilobolus*, *Coprinus* and *Polysphondylium* are all benefitted by light, and certain other fungi notably the cultivated mushroom mature in practically complete darkness. The talk was an entertaining one and thoroughly enjoyed by all of the fifty-four members present as evidenced by the lively discussion following it.

Forman T. McLean
Secretary

NEWS NOTES

The next issue of Torreya, the September-October number, will consist largely of an illustrated article on the Cladoniae of the Torrey Botanical Club Range by Raymond H. Torrey. The article will have a simple key for determining the 45 species and numerous forms that have been found or may be found in our range.

The New York State College of Forestry has named the original building of the college in honor of Dr. William L. Bray, professor of botany and dean of the graduate school. Dr. Bray was the first head of the college and has given courses of botany there and at the summer camp of the college at Cranberry Lake. Before going to Syracuse Dr. Bray was professor of botany at the University of Texas.

At the commencement of the College of the City of Detroit on June 6 the degree of Doctor of Science was awarded Oliver Atkins Farwell, botanist of Park Davis Company since 1892. The citation accompanying the award stressed Dr. Farwell's accomplishments in botany and particularly his work in the revision of the National Formulary and the Pharmacopoeia. Dr. Farwell is a member of the Torrey Botanical Club as well as of numerous other botanical societies.

Last August the University of Wisconsin established an arboretum of 235 acres. Now it is announced that an additional area of 190 acres of marsh and prairie land has been added to the arboretum. The whole area will be a wild life refuge and will be used for experiments in reforestation as well as for an arboretum.

Dr. Arthur B. Seymour who had been associated with the Harvard herbarium for 47 years died on March 29. Dr. Seymour was born in Moline, Ill. and educated at the University of Illinois. In 1886 he became attached to Harvard. He also taught cryptogamic botany at Radcliffe College. He was a contributor to the Century Dictionary and in 1929 compiled a Host-Index of the Fungi of North America.

THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their paper appears, will kindly notify the editor, when returning proof.

Reprints should be ordered when galley proof is returned to the editor. George Banta Pub. Co., Menasha, Wisc. have furnished the following rates:

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OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A journal devoted to general botany, established in 1870 and published monthly, except during July, August, and September. Vol. 59, published in 1933, contained 564 pages of text and 32 full page plates. Price $6.00 per annum. For Europe, $6.25.

In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE—a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24–59 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–18 are now completed. Volume 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00.

Volume 18, no. 1, 108 pages, 1931, price $2.00. Volume 18, no. 2, 220 pages, 1932, price $4.00. Volume 18 complete, price $5.00.

(3) Index to American Botanical Literature, reprinted monthly on cards, and furnished to subscribers at three cents a card.

Correspondence relating to the above publications should be addressed to

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A Bi-Monthly Journal of Botanical Notes and News

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BY
GEORGE T. HASTINGS

John Torrey, 1796-1873

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THE TORREY BOTANICAL CLUB

MEMBERSHIP

All persons interested in botany are invited to join the Club. There are three classes of membership: *Sustaining*, at $15.00 a year; *Life*, at $100.; and *Annual*, at $5.00 a year. The privileges of members are: (a) To attend all meetings of the Club and to take part in its business, and (b) to receive all its publications.

Meetings of the Club are held on the first Tuesday of each month at the American Museum of Natural History, New York City, and on the third Wednesday at the New York Botanical Garden.

TORREYA IS THE OFFICIAL ORGAN OF THE
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Matter for publication, and books and papers for review, should be addressed to

GEORGE T. HASTINGS
2587 Sedgwick Ave.,
New York, New York

TORREYA

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Cladoniae in the range of the Torrey Botanical Club

Raymond H. Torrey

This is an attempt to list and describe the species of the interesting and often beautiful lichen genus, Cladonia, which have been found or which may be looked for, in the range of the Torrey Botanical Club, covering New Jersey, eastern Pennsylvania, Long Island, and the Hudson Valley in New York as far north as the northern Catskills.

This treatment of the subject is offered for beginners, who, like the writer, have become interested in lichens, and for whom there is yet little available in the way of popular guides such as exist for flowering plants, ferns and mosses. This lack of guides has prevented inclusion of lichens in the usual forms of outdoor nature study. Study of lichens seems to have lagged behind that of other plants in the United States, and the number of specialists in lichens is small.

Recent appearance, in scientific journals, of more accessible literature, has stimulated interest in lichens, and it is to be hoped that before long, some well-illustrated guidebook, similar, for example, to Dr. A. J. Grout's "Mosses with a Hand Lens," will appear. Mrs. Gladys P. Anderson, of Rahway, N. J., a member of the club, has been working for years on such a book, and it is hoped it may soon appear. The writer owes largely to Mrs. Anderson his introduction to the study of lichens, as well as unfailing aid in their identification. He also owes thanks to Dr. Alexander W. Evans, of the Osborn Botanical Laboratory, Yale University, for many kindnesses in identifications and encouragement in this field of botany. Dr. Evans' monograph on "The Cladoniae of Connecticut," is the most thorough treatment of this genus for the eastern United States. It was first published in the Transactions of the Connecticut Academy of Sciences, in 1930, and later as a reprint, by the Yale University Press. A revision of his list of species with several additional ones, and clearer definition of others, was published by Dr. Evans, in Rhodora, the journal of the New England Botanical Society, in the issue for July-August, 1932.

As Dr. Evans points out, while his monograph and notes are based on species collected in Connecticut, they are useful in the determination of species from other regions. Dr. Evans has kindly read the proof of this article and made many suggestions for its improvement.

We have also found useful, and a model for this preliminary treatment of the Cladoniae of our range, a paper published in the July, 1931, issue, of Rhodora, on "Cladoniae in the District of Columbia and Vicinity," by C. A. Robbins and S. F. Blake, with a key and illustrations.

These two treatments of our eastern Cladoniae are the only recent ones at present easily available, the only others being that of Professor Edward Tuckerman, of Amherst College, our earliest American lichenist, in his "North American Lichens," published in 1880, long out of print and rare; and in Prof. Bruce Fink's "The Lichens of Minnesota," published in 1910, by the Smithsonian Institution, also out of print and hard to obtain. Prof. Fink also published a number of articles on species of Cladonia in early numbers of the Bryologist, journal of the Sullivant Moss Society, between 1903 and 1908, with excellent illustrations, but gathered together all of his data on the genus in the bulletin on the lichens of Minnesota, which is serviceable in many respects for the lichens of the eastern states as well. Reference should also be made to Nina Marshall's "Mosses and Lichens," (Doubleday) with good illustrations but it too is out of print.

The nomenclature of the works of Tuckerman and Fink has been superseded by modern reclassification in many cases, and the new names for Cladoniae are found in the papers of Dr. Evans and of Robbins & Blake. The scarcity of lichen guides in English and the lack of anything of the sort for our club range, other than Dr. Evans' treatment for Connecticut, has moved the writer to offer this preliminary treatment of the Cladoniae of our immediate region.

Since this paper is offered for beginners, a brief account of the morphology of lichens and of the genus Cladonia may be in order. Using as our authorities here Annie Lorain Smith's

"Lichens," in the Cambridge University Botanical Series, and the introduction to Bruce Fink's "Lichens of Minnesota," it may be stated that after three centuries of varying ideas as to the real nature of lichens, it is now generally accepted that they are dual in nature, a symbiotic association of algae and fungi. Symbiosis (living together) is found in other forms of plant life, but nowhere else in such an extensive, intimate and efficient a manner as in lichens. Schwendener, who first definitely propounded the idea of lichen symbiosis, in 1860, regarded the relation of the fungus as that of a parasite upon the alga, though not a deadly one, and expressed this in the following picturesque language.

"All these plants are not individuals in the common sense of that term; they are rather colonies, consisting of hundreds and thousands of individuals, of which one holds the mastership, while the others in eternal captivity prepare the nourishment for themselves and their masters. The Master is a Fungus of the Class of Ascomycetae, a parasite which lives on the labor of others; its slaves are green Algae, which it seeks or lays hold of and forces into its service. It encloses them, as a spider its prey, with a network of delicate tissue, which is gradually transformed into an impervious integument. But while the spider sucks the life out of its prey, the Fungus stimulates the Algae in its grasp to greater activity, to a more vigorous increase, and thereby renders possible a luxuriant growth and promotes the welfare of the whole colony."

There has been much discussion since Schwendener's time as to whether the association is parasitic or mutually beneficial. Reinke suggested the term "Consortium" as expressing his idea that the symbiosis was a state of mutual growth and interdependence, in which the algal cells produced food products from the substratum, or the air, enabling the fungal cells to develop into their often beautiful and complicated fruiting structures, which produce spores that germinate only if they find within a very brief time after dispersal free algal spores of species similar to those which the parent lichen had in partnership.

That lichens renew themselves in this manner, as well as in others to be referred to later, is proved by the fixity of genera from very ancient geological periods (at least as old as the

Devonian), and by the production of "synthetic lichens," in the laboratory by European experimenters, where lichen spores, sowed upon suitable algal cells, in culture media have germinated into lichens resembling the parents. Readers are referred to Annie Lorain Smith's book for a very full account of the history of the development of knowledge concerning lichens. Her two volume "British Lichens," is also valuable for identification of many cosmopolitan species found in both the old and new worlds. A condensed edition is also available.

To place the Cladoniae, it may be said that lichens in general are of three kinds; crustose, growing closely upon rocks, bark or earth; such as *Lecidea albocaerulescens*, to name a common species in our range, with bluish-gray thallus looking almost as if painted on rock; foliose, leaf-like, such as the familiar Rock Tripes, or Parmelias; and fruticose, shrublike or branching, of which the Cladonias, and especially such densely branching forms as the "Reindeer Mosses," are typical examples.

A Cladonia plant is usually erect, with distinct stems, simple or branched, and often with conspicuous fruit, to use an easily understood term; such as, for example, the familiar Scarlet-crested Cladonia, occurring everywhere in our range, and one of the first lichens to attract the attention of young nature students, because of its brilliant color. In height Cladonias range from tiny species like *C. papillaria*, *mitrula*, *brevis* and *cariosa*, 1/4 to 1/2 inch tall; to *C. gracilis* and *C. rangiferina*, three or four inches tall in our range, and the latter a foot high in northern regions. In area colonies sometimes cover several acres.

To be more precise in terms, the Cladonia plant usually shows two distinct parts, the primary thallus, of scale-like leaves, from a size no larger than the head of a pin to an inch long in different species, prostrate or somewhat raised, sometimes densely aggregated into a crust; and the podetium, the erect portion on which the apothecia, or spore-producing organs, are borne. The podetium is regarded as a sort of secondary thallus.

Both primary thallus and podetia contain algal cells, just under the surface, spherical and bright green when moist, which are usually identified as in the genus Cystococcus. They are enmeshed by the hyphae, thread-like processes extending from the fungal coat of the lichen inward, (to be seen only under a high power microscope). This leathery coat is very thin, and in some species is absent, when the podetium is described as decorticate, and may be covered by powdery granules, known as soredia. When moist the green algal cells show through the transparent fungal envelope, when present, and make the whole plant much more conspicuous and handsome than when it is dry, when the color is much duller. The decorticate forms are whitish looking whether wet or dry. But all show up much more plainly when moist, so that a rainy day is a good day to pursue Cladonias. When the plants are badly weathered, by long covering under snow and ice in winter, or by a summer drought, their appearance is much changed and they are more difficult to identify, though if not too much affected by such experiences, wetting will restore them to fullness and make their characters clearer for study.

The podetia, which give the most useful characters for classification for the beginner, are densely branching, as in the "Reindeer Mosses" and the Unciales (see key); short branched, as in some of scarlet-fruited species; simple and unbranched in others, and in some species bear cups ("Fairy Cups" of children), which may be simple and sterile or may bear apothecia, on the cup rims or on branches which in some cases may be quite complicated, with or without squamules (scaly leaves), as in forms of *C. squamosa;* or the cups may be in ranks of two to five, growing out of the rims, as in *C. gracilis;* or out of the middle of the cups, as in *C. verticillata.*

Cladoniae reproduce in the three ways found in lichens, by spores, by soredia, and by fragmentation. Reproduction by spores produced in the apothecia, while most interesting, as corresponding somewhat to the methods of mosses, hepatics and ferns, is probably the least certain. The lichen spore, by reason of the long habituation of the plants to symbiotic association between certain fungal and algal species, must find, within a brief time after dispersal, and within a small area about the parent plant, free algal cells of the species with which the lichen fungus concerned has established symbiosis. The chances against such conjunctions must be very great, but the spores are produced in large numbers and contact is evidently established frequently enough to make the process sufficiently effective. It is probable that evolution is still going on and new associations and what man calls new species are still being developed.

The second method is surer. The soredia are granules containing both fungal and algal cells borne on the thallus or podetium. As the thallus and podetium mature, or regenerate after drying out or weathering, soredia develop on the surfaces. These gradually loosen and fall off, and may roll or be blown by the wind or carried by insects or animals for some distance. Timely moisture and a temperature above freezing are all they need to start new colonies, which in time will develop perfect lichens, bearing apothecia. Most reproduction of Cladoniae is probably effected by this method.

Fragmentation, by the drying out and breaking up of lichen thalli, occurs in large foliose species, such as Parmelia, and if fortunate wetting by rain or dew occurs soon after scattering of such fragments, they may start new colonies, as the soredia do. Occasional reproduction of Cladoniae may occur in this manner.

The genus Cladonia is divided, according to the arrangement now generally used, which was adopted by Professor Edward August Vainio, the distinguished Finnish authority, into three subgenera: Cladina, including the "Reindeer Mosses;" Pycnothelia, with the single species *C. papillaria*, short, simple forms; and Cenomyce, with foliaceous primary thallus, which the first two subgenera lack, including a great variety of species. The Latin names must be used here, for few lichens have common names, and students should learn the scientific names in the beginning, for with an understanding of the meanings of the Latin and Greek roots, from which the specific titles were framed (except in the cases of some honorific names), their fitness and accuracy will be appreciated. The botanists of the Eighteenth Century who studied lichens often showed a keen appreciation of outstanding characters and some of their specific names have survived for two centuries. If the student is unfamiliar with Latin and Greek, the meanings of the roots of the specific names may be found in such works as Jackson's Botanical Dictionary.

An interesting method of determining the precise identity of a number of species of Cladonia is by the application of strong solutions of potassium hydroxide (KOH) or calcium hypochlorite to the squamules or podetia. It works best on the back of primary squamules. A prompt and often striking color reaction is obtained, through the effects of these alkalis upon the acids in the lichen thallus. The solutions may be obtained from a druggist or the chemicals may be purchased and solutions made at home; an old iodine dropper bottle is a good container. In some cases where other characters may not be positive, a species may be accurately determined by the yellow, red or brown color changes. In the key, KOH+ means that a reaction occurs; KOH− that it does not; and $CaClO_2$ is noted in the same way.

Key to Groups and Species

Subgenus 1. CLADINA (Nyl.) Vain. Primary thallus crustaceous, soon disappearing, rarely seen. Podetia slender, one to four inches tall in the species in our range, much branched, arachnoid-tomentose, (like a spider's web, or with fine down like hairs) without cortex (Latin bark or rind) or distinct outer layer, except a "pseudo-cortex" of scattered or contiguous warty excrescences, gonidia, green algal cells; tips of branches with two to eight minute forks, usually brownish; apothecia small, circular, rarely seen. The species in this subgenus are usually densely massed and tangled together, often in large colonies, and two or more species are often found together in the same colony. Terminal apices blunt. They are known generally as "Reindeer Mosses," because they are the principal food of reindeer in countries near the Arctic Circle, such as Lapland, northern Scandinavia, northern Russia and Siberia, and the support indirectly of several millions of human beings who depend for food and clothing upon the reindeer. They are generally of a grayish, or grayish green color, but may be brighter green in the shade, or sometimes olive-tinted and are recognizable from species of other subgenera from their massed, entangled habit. (Species of *C. furcata* are also entangled but otherwise different.) They have been used for human food, being ground up with rye or other cereal flour, and this mixture is said to be nourishing and tonic in effect.

Podetia in dense, irregularly entangled colonies

Podetia often polytomous (many-branched) with whorls of three or more branches surrounding gaping axils; outer podetial layers persistent.

Podetia ashy-gray, darker in old plants; or sometimes brownish or greenish; surface arachnoid, KOH+, yellowish. (Pl. 1, f. 1.)

1. *C. rangiferina.*

Podetia yellowish-green, varying to gray, whitish or greenish; usually more delicate than *C. rangiferina;* KOH−. Podetia straw-colored, or greenish or grayish, with frequent sub-secund (on one side) branches between the whorls of branches on the main axes, outer branches often curving in one direction, apices nodding, with tips

3–8 pointed; gonidia grayish, greenish or brownish; interspaces tomentose. 2. *C. sylvatica.*

Podetia sometimes whorled throughout along the main axes, or with occasional single branches between whorls; peripheral branches upright, or in older plants, curving or nodding, with ultimate branches in clusters of three or more, sometimes distinctly parallel; podetial surface smooth, or in older plants verruculose (with minute warts). (Pl. 1, f. 3.) 3. *C. mitis.*

Podetia rarely polytomous (many-branched) and usually dichotomous (branching by two forks) or occasionally with single branches on one side; straw-colored, greenish, whitish or brownish.

KOH+, pale yellow, outer podetial layers persistent, monopodial (single stemmed) appearance clear in larger axes; podetial surface smooth, or verruculose in older plants. (Pl. 1, f. 2.) 4. *C. tenuis.*

KOH−, monopodial appearance not so definite, podetia irregularly branched or subdichotomously divided, podetial surface rough with disintegrating gonidia as plant matures, gonidia greenish, yellowish or whitish, or darkening. 5. *C. impexa.*

Podetia in regular, smooth, compact colonies, plant masses often with an even, curving top, the podetia being all of nearly equal length; polytomous (many-branched); with whorls of branches around gaping axils; whitish or pale gray; KOH−, outer podetial layers often disintegrating—surfaces arachnoid. Characterized in appearance, by the smoothly rounded masses; children call them "biscuits," or "castles" in New England. 6. *C. alpestris.*

Subgenus 2. PYCNOTHELIA Ach. Primary thallus granular-crustaceous, persistent. Podetia short, $\frac{1}{8}$ inch to one inch tall; stout, simple, or short-branched, terminating in blunt tips. Apothecia small, brownish-red. The single species in this sub-genus is in strong contrast, in its simple forms, to those of the previous division. It resembles, as Robbins and Blake note, "minute cacti," a fact brought out well with a hand lens. Forms described in notes on habitats. (Pl. 1, f. 4.) 7. *C. papillaria.*

Subgenus 3. CENOMYCE. (Ach) Th. Fr. Primary thallus foliaceous (with leaf like squamules) persistent, or sometimes disappearing.

Series A. COCCIFERAE Del. Apothecia scarlet, or rarely flesh-colored or whitish in some color forms. This series includes some of the most conspicuous and well known species of Cladonia. The brilliant color of their fruit, especially in the common *C. cristatella*, has given them popular names, such as "Scarlet-Crested Cladonia," "British Soldiers," "Red Tops," etc. They are among the most striking and beautiful of lichens.

a. SUBGLAUCESCENTES Vainio. Primary squamules grayish-green above, white beneath; podetia whitish to grayish green; podetia sometimes fertile, with rather small scarlet apothecia, or sterile, with blunt or pointed apices, mostly decorticate, (without a definite outer cortex or skin), and the decorticate areas farinose-sorediate, or granulose.

Podetia usually basally corticate, but with cortex discontinuous above, especially below the apices. KOH—. (Pl. 1, f. 7.) 8. *C. Floerkeana.*

Podetia sometimes basally corticate, but above wholly decorticate and farinose-sorediate. KOH—. (Pl. 1, f. 6.) 9. *C. bacillaris.*

KOH+ (yellow). (Pl. 1, f. 10.) 10. *C. macilenta.*

Podetia first covered with scattered or crowded squamules, or granules, interspersed with fine soredia, both later disappearing, leaving the medulla exposed. KOH—. (Pl. 1, f. 8.) 11. *C. didyma.*

These four species look much alike on casual observation and often grow together, but close examination with a lens, and application of potassium hydroxide will bring out their distinctions. In height they run from ½ inch or less to 1–2 inches *C. Floerkeana* is often stouter than the other three, gives no reaction with KOH and the often dense cover of soredia almost buries the small scarlet apothecia on the tips, so that they can be seen only by looking down vertically upon the tops of a colony. *C. bacillaris* is usually more slender, taller, and often has quite conspicuous apothecia, usually single and terminal, bulging beyond the diameter of the podetium. Some podetia branch at the tips. *C. macilenta* is much like *bacillaris* with apothecia often deeply covered by soredia, and occasionally branching podetia, but is distinguished by the prompt yellow reaction with KOH, lacking in *C. bacillaris* and *Floerkeana*. *C. didyma* might be taken, at first sight to be a stunted form of one of the other three, but the presence on young plants of podetial squamules or granules distinguishes it, and also, in favorable locations, a dense, even-topped habit of its colonies, less scattered than the other three.

b. STRAMINEO-FLAVIDAE Vainio. Primary squamules yellowish-green above, white or yellowish beneath; podetia yellowish-green.

Podetia cup-forming, sterile or fertile, (CaCl) KOH+, pale yellow.

Cortex persistent, not sorediate. 12. *C. coccifera.*

Cortex disintegrating, usually sorediate. KOH—, ¼ to 1 inch tall. (Pl. 1, f. 11.) 13. *C. pleurota.*

Cortex continuous or rimose (chinky), lower part sometimes squamulose, cortex often yellow-sorediose, margins of cups often irregularly dentate or proliferate, podetia tallest of our red fruited Cladoniae, sometimes 3 inches or more high. KOH—. (Pl. 1, f. 9.) 14. *C. deformis.*

Podetia not cup-forming, always terminated by apothecia; cortex continuous, or areolately dispersed, or absent. KOH—.

Plants not sorediate; podetia variously branched in several different forms—described in habitat notes—decorticate areas whitish, arachnoid. (Pl. 1, f. 5.) 15. *C. cristatella.*

Plants more or less sorediate, sometimes densely so, podetia simple, club shaped, decorticate areas naked; in large, well-fruited, dense colonies apothecia tend to face one way, so that one sees a red color looking at the plants one way, and a greenish yellow color when looking at them in reverse. Podetia often squamulose, sometimes naked; in extremely squamulose forms the apothecia are degenerate in size, or even wanting, and the podetia are densely clad in small squamules. (Pl. 1, f. 12.) 16. *C. incrassata*.

Series B. OCHROPHAEAE. Vainio. Apothecia brown to flesh color.

a. UNCIALES. (Del) Vainio. Primary thallus foliose, disappearing, seen only in young plants. Podetia not persistent at base, cylindrical or irregularly swollen, corticate (except in *C. Boryi*), never squamulose, becoming much branched and intertangled; cortex usually smooth and shining (except in *C. Boryi*), *apices spinose*, which distinguish the species in this group from the Cladinae, which they resemble in the massed habit, The Unciales further differ from the Cladinae in the conspicuous, smooth cortex (with the exception noted), the latter being rough surfaced. One to four inches high.

Podetia smooth and firm on surface, yellowish gray to brownish green, with axillary or internodal perforations conspicuous in older plants, both sterile and fertile; cupless. (Pl. 2, f. 1.) 17. *C. uncialis*.

Podetia smooth, yellowish gray to pale yellowish green, occasionally with shallow cups, axillary perforations rare on sterile plants, found on fruiting plants; more diversely branching than last. (Pl. 2, f. 2.) 18. *C. caroliniana*.

Podetia delicate in surface, tending to be decorticate, dull ashy gray, sometimes quite stout, up to 8 millimeters in diameter, older plants with reticulate or perforated surfaces and bearing large and distinct cribrose (latticed) cups; axillary perforations numerous. (Pl. 2, f. 3.) 19. *C. Boryi*.

b. CHASMARIAE (Ach). Floerke. Primary squamules persistent or disappearing, white beneath. Podetia usually persistent basally, *cupless or with open cups*, not closed by a diaphragm, axils usually open.

Primary squamules large, with entire or sinuate margins, podetia absent, apothecia rare, sessile on the primary squamules. KOH + faint yellow. 28. *C. apodocarpa*.

Primary squamules largest of any species here described, with broad, rounded lobes, with stout branching podetia, subulate-tipped, and sterile, or bearing small cups, simple or proliferous, rather rarely fruiting, faint yellow reaction with KOH. (Pl. 3, f. 6.) 29. *C. turgida*.

Primary squamules small to medium, with finely incised to crenate marginal divisions.

Podetia reduced to short stalks bearing apothecia, or the apothecia sessile on the primary squamules. KOH –. (Pl. 3, f. 5.) 26. *C. caespiticia*.

Podetia well developed.

Podetia cup-forming, cups sometimes very small, in other forms well developed and densely branching; cortex disintegrating. KOH –. (Pl. 2, f. 5.) 24. *C. squamosa*.

Allied to *C. furcata*, but distinctive in producing cups with punctured or lacerate closing membrances, and proliferations which sometimes bear cups. KOH –. 22. *C. multiformis.*

Primary squamules smaller than in last three species, podetia bearing cups with no or very slight closing membrane, or cupless. KOH –. (Pl. 2, f. 7.) 23. *C. crispata.*

Podetia not cup-forming.

Plants very small, and delicate, on decaying wood; sorediate granulose, or granulose-squamulose, cortex dispersed or wanting, podetia short, simple or branched. KOH + yellow. (Pl. 3, f. 1.) 25. *C. delicata.*

Plants neither granulose nor sorediate, usually on earth.

Podetia short-branched, cortex areolate, apices obtuse, axils round-perforate. KOH + yellow. (Pl. 3, f. 2.) 27. *C. floridana.*

Podetia much-branched, branches often dichotomous, slender and elongated; cortex continuous or areolate; apices often subulate; axils irregularly gaping. KOH –. (Pl. 2, f. 4.) 20. *C. furcata.*

Like *C. furcata*, but sorediose. 21. *C. scabriuscula.*

c. Clausae Vainio. Primary thallus persistent or disappearing; squamules white or creamy beneath. Podetia usually basally persistent, cupless, *or with closed cups;* axils closed. Podetia not intertangled, but growing by themselves. This series includes many cupped forms familiar even to the casual observer of lichens, known to children as "Fairy Cups."

Podetia cup-forming.

Plants neither sorediate nor granulose.

Cups regular.

Cups deep, usually with short marginal proliferations, cortex warty-areolate, with flat raised plates, or smooth. (Pl. 4, f. 3.) 37. *C. pyxidata.*

Cups shallow, 2 to 5 ranked, larger cups centrally proliferate, smaller cups toward margins or marginal, cortex smooth. (Pl. 4, f. 2.) 35. *C. verticillata.*

Cups as above, but with dense and rather large squamules on lower and sometimes upper ranks. (Pl. 4, f. 4.) 36. *C. calycantha.*

Cups shallow, broad or narrow, in 1 to 4 ranks, proliferate from the margins, cortex smooth. (Pl. 4, f. 1.) 34. *C. gracilis.*

Plants sorediose or granulose.

Cups irregular, shallow, one sided, with only one rank of proliferations, usually fertile. (Pl. 4, f. 7.) 39. *C. nemoxyna.*

Soredia farinaceous, squamules large with lobate margins, podetia subulate, or truncate, with small narrow cups. KOH + brownish. (Pl. 4, f. 6.) 40. *C. coniocraea.*

Same as above, but with subulate podetia more frequently bearing apothecia; cups when present as above but smooth inside. KOH+ brownish. 41. *C. ochrochlora.*

Cups deep and often large, simple, or much varied by proliferations, with second ranks of cups or with ample apothecia. KOH−. (Pl. 4, f. 5.) 38. *C. chlorophaea.*

Cups shallow and small, irregular, or usually lacking and replaced by subulate apices which are often fertile. KOH−. 42. *C. pityrea.*

Podetia not cup-forming. Plants neither sorediate nor granulose.

Primary squamules minute, podetia simple or slightly branched and short with large apothecia or much branched with small apothecia. Cortex irregular or lacking. KOH−. (Pl. 3, f. 3.) 30. *C. mitrula.*

Primary squamules small, medium to large: podetia simple and club shaped, or with short branches.

Podetia grayish green to olivaceous, cortex continuous to areolate, surface sometimes flattened or depressed.

Primary squamules somewhat erect and densely crowded; podetia in one form densely squamulose. CaCl (KOH)+ bluish green. (Pl. 3, f. 4.) 43. *C. strepsilis.*

Plants small, but stouter and more branched than above, KOH−. (Pl. 3, f. 7.) 31. *C. clavulifera.*

Podetia short and slender or stout. Obconic, usually somewhat branched, KOH+ yellow, followed by brick red. (Pl. 3, f. 8.) 32. *C. subcariosa.*

Podetia short and usually simple, obconic, thickest just below apothecia, cortex fissured in small areoles, KOH−. (Pl. 3, f. 9.) 33. *C. brevis.*

Forms of species and habitat notes.

1. C. RANGIFERINA (L.) Web. (Pl. 1, f. 1.) In moss or thin soil over ledges, in the Highlands of New Jersey and southern New York, not very common; f. CRISPATA Coem., a smaller, densely intertangled, erect form, is sometimes found with the species.

2. C. SYLVATICA (L.) Hoffm. Occasionally found mixed with *C. rangiferina*, but not common; plentiful on Fire Island Beach, L. I.

3. C. MITIS Sandst. (Pl. 1, f. 3.) Common in eastern Long Island, covering large areas in open sandy places in Suffolk County: also on the New Jersey Pine Barrens: less frequent in the highlands.

4. C. TENUIS (Floerke) Harm. (Pl. 1, f. 2.) Occasionally found mixed with *C. mitis*, or sometimes in exclusive colonies,

preferring more shade than other Cladinae, in eastern Long Island, and in Pine Barrens; less common northward.

5. C. IMPEXA Harm. Reported by Dr. Evans in Connecticut, to be looked for in our range.

6. C. ALPESTRIS (L.) Rabenh. Found by this writer on North Mountain, in the northeastern Catskills at 3000 feet. Common in eastern and northern New England. Orient, L. I. (Roy Latham).

7. C. PAPILLARIA (Ehrh) Hoffm. (Pl. 1, f. 4.) Common, in the New Jersey Pine Barrens, in eastern Long Island, and in barren, gravelly, or sandy places elsewhere in area covered, sometimes at high elevations, to above 2,000 feet in Shawangunks and Poconos. Occurs in three forms, of which f. MOLARIFORMIS, with relatively large, stout and much branched podetia is commonest; f. PAPILLOSA, with small papilliform podetia, fairly common in arid or exposed places, from sea level to 2,000 feet; and f. STIPATA, with sterile, densely papillose upper branches, rarer, on high summits of Shawangunks and Poconos.

8. C. FLOERKEANA (Fr.) Floerke. (Pl. 1, f. 7.) occasionally mixed with *C. bacillaris* and *macilenta*, in moist woods, on earth or rotten wood, along New Jersey Pine Barren streams, or in low places on Long Island; less common in Highlands. Our usual form is var. INTERMEDIA Hepp, esquamulose; var. CARCATA, squamulose; and var. SQUAMOSISSIMA, densely squamulose, are recorded by Dr. Evans in Connecticut and may be looked for elsewhere in our range.

9. C. BACILLARIS (Ach.) Nyl. (Pl. 1, f. 6.) Never very plentiful in any one place, but widely distributed in our area, taller in moist places, dwarfed in thin soil over rocks in the highlands. Forms found by writer were f. CLAVATA (Ach.) Vainio, with blunt tipped podetia and f. PERITHETA, (Wallr.) Arn., with minute accessory apothecia on short lateral branches.

10. C. MACILENTA Hoffm. (Pl. 1, f. 10.) May be found with two previous species, but is rarer, and not readily distinguishable until KOH test is made, when yellow reaction determines it. In Pine Barrens and eastern Long Island, in the Catskills up to 2500 feet, probably elsewhere in our range. Our usual form is f. STYRACELLA, (Ach.) Vainio, with farinose soredia; other forms are GRANULOSA and CORTICATA.

11. C. DIDYMA (Fée) Vainio, (Pl. 1, f. 8.) related to and

somewhat resembling the previous three species, but usually smaller, primary squamules not sorediose, podetia first covered with squamules, or granules, and sometimes fine soredia, which later disappear, leaving the cartilaginous translucent surface; podetia simple or sparingly branched. Not rare in the Pine Barren swamps, on decaying wood; found in Wawayanda swamp, may be looked for in similar situations in northern part of our range.

12. C. COCCIFERA (L.) Willd. This species was found by Robbins & Blake in Maryland, but not by Dr. Evans in Connecticut, up to 1932. It is listed to suggest that students look for it, most likely in sandy loam, probably near the coast, in our range.

13. C. PLEUROTA (Floerke) Schaer. (Pl. 1, f. 11.) This handsome species, with red apothecia on the rims of bright green sorediose cups, has been found by the writer at several points in our range, most commonly in eastern Long Island, but never much of it in one spot. One may think he has found the rarer *C. coccifera*, but *pleurota* differs in being sorediose, while *coccifera* is smooth. Our usual form is f. DECORATA (Vainio) Evans, with short podetia, and often rather large red apothecia sessile on the margins. Var. FRONDESCENS, with squamose podetia, is reported by Evans in Connecticut and may be found elsewhere in our range. F. *decorata* is sometimes found among *C. chlorophaea* and *C. squamosa* var. *levicorticata*, m. *rigida*, in eastern Long Island. Its cups are often sterile, when they might be taken for *C. chlorophaea* f. *simplex*, but its bright green color identifies it, *C. chlorophaea* being a duller green.

14. C. DEFORMIS (L.) Hoffm. (Pl. 1, f. 9.) This species has been found once by the writer in our range on Panther Mt. 3760 feet, in the Catskills. It is not reported by Evans in Connecticut, but is listed to encourage students to look for it. It is common in the Adirondacks and northern New England, in coniferous forests, above 2000 or 3000 feet. It may be among northern species of Cladonia and other lichens, which, as suggested by Mrs. G. P. Anderson, might be looked for on the higher and more remote Catskill summits, the general flora, of which, above 3500 feet, is largely that of the northern spruce-fir zone.

15. C. CRISTATELLA Tuck. (Pl. 1, f. 5.) One of the commonest, most brilliantly colored and well known of our Cla-

doniae, familiar to children and natural history students. Every where in our range, though richest in numbers in the sunny pine and oak woods of eastern Long Island and in the Pine Barrens. Large colonies are often found on dead wood in the Highlands. It climbs to 3700 feet in the Catskills. It is represented with us by the following forms. f. BEAUVOISII (Del.) Vainio, with smooth podetia and scarlet apothecia; f. OCHROCARPIA Tuck. similar but with buff apothecia; f. RAMOSA, Tuck. like *Beauvoisii;* but densely branched from the base; f. VESTITA, Tuck., with more or less densely squamulose podetia, sometimes quite stout, and with abundant and often large and conspicuous scarlet apothecia; f. SQUAMULOSA, Robbins, like *vestita*, but with flesh colored apothecia; f. PLEUROCARPA, Robbins, with scarlet apothecia on short, lateral branches; or sessile on the sides of the podetia; f. DEGENERATA Robbins, with scarlet apothecia on short, often decumbent apothecia; f. ABBREVIATA, Merrill, with almost or quite sessile scarlet apothecia on the primary squamules; Dr. Evans has reported f. SQUAMOSISSIMA, with the podetia densely covered with small compact squamules, in Connecticut and it may be looked for elsewhere in our area.

16. C. INCRASSATA Floerke. (C. PALUDICOLA of older authors.) (Pl. 1, f. 12.) A very handsome species, when well fruited, with densely crowded podetia. Limited to its favorite habitats, usually on rotten wood in swamps, though sometimes in drier places. Found along cedar swamp streams in the Pine Barrens, in Wawayanda Cedar Swamp, west of Greenwood Lake, and in low places on eastern Long Island. A form, f. SQUAMULOSA, Robbins, with podetia densely squamulose, occurs with the species.

17. C. UNCIALIS (L.) Web. (Pl. 2, f. 1.) Well distributed in our area, from a few feet above sea level in Long Island and the Pine Barrens to over 2,000 feet on the Shawangunk Mountain. Students are referred to Dr. Evans' "Notes on the Cladoniae of Connecticut," Rhodora, July-Aug., 1932, for detailed and revised treatment of this and the two following species and their forms. *C. uncialis* varies much in size and shades of brownish and yellowish green, from densely matted dwarf plants of exposed places in the highlands, to taller, more open, slenderer forms in Long Island and the Pine Barrens, but the pointed,

usually brownish tips of the ultimate branches distinguish it from the Cladinae, with which it is often intermixed. F. DICRAEA (Ach.) Vainio with subulate apices is our commonest form, and f. OBTUSATA (Ach.) Nyl. with blunt apices, occurs. Other forms, which this writer has not identified in our range, are described by Dr. Evans.

18. C. CAROLINIANA (Schwein.) Tuck. (Pl. 2, f. 2.) Resembles *C. uncialis*, and is found with it, especially in eastern Long Island and the Pine Barrens, but is less yellowish or brownish, is more densely branching, and the axils are closed, or almost wholly so, while the axils of *C. uncialis* are often open. There are also microscopic differences. When the two are seen together, in herbarium specimens or material identified in the field by one who knows them, the distinctions are obvious though not always easily described. F. DILATATA, rather tall and stout; f. FIBRILLOSA, with fine hairs on the tips; and f. TENUIRAMEA, a low growing, lax form, may be found on Long Island and in south Jersey.

19. C. BORYI Tuck. (Pl. 2, f. 3.) A very striking Cladonia when one comes to know it, often standing out in the midst of a dense colony of *C. mitis*, when its terminal, cribrose (lattice-like) cups are well developed, and distinguished by its stout podetia, sometimes 8 millimetres in thickness, and their ashy gray, weathered look. It has the most conspicuous cups of any of the Unciales. In pine woods on ground not recently burned over in eastern Long Island, on Napeague Beach, Montauk Point, and the New Jersey Pine Barrens. Apparently wanting in the highlands. F. LACUNOSA and f. RETICULATA have been identified by Dr. Evans in material collected by this writer on eastern Long Island.

20. C. FURCATA (Huds.) Schrad. (Pl. 2, f. 4.) A very variable species, fairly common throughout our area, in all sorts of situations, wet and dry, low and high, from a few feet above tide-water in eastern Long Island to 4,000 feet in the Catskills. Distinguishable by the loosely branching, often two-forked habit. Common forms are var. RACEMOSA (Hoffm.) Floerke, with smooth dull or bright green podetia; var. PINNATA (Floerke) Vainio, f. FOLIOLOSA (Del) Vainio, with squamulose (often quite large, dense squamules), podetia, and var. RACEMOSA f. CORYMBOSA, (Ach) Vainio, with green or sometimes olive-tinted po-

detia, and occasionally with small brown apothecia. Other forms, which may be looked for in our range, are described by Dr. Evans, in the Cladoniae of Connecticut and additional notes in Rhodora. This species is often taken by beginners to be one of the Cladinae, but is distinct from members of that subgenus, by its loose, sprawling, low spreading form of branching and its generally greener color, in contrast to the ashen tints of the Cladinae. Also, it often bears podetial squamules, which the Cladinae never do.

21. C. SCABRIUSCULA (Del.) Leight. (Pl. 2, f. 6.) This species resembles *C. furcata*, but is distinct in bearing soredia, which disperse with age, leaving the podetia whitish: Found by this writer in the Catskills, west branch Neversink Creek, at 2500 feet, but may occur elsewhere in our range.

22. C. MULTIFORMIS Merrill. Allied to *C. furcata*, but bearing cups of peculiar, variable form, with the membranes punctured or lacerate; sometimes with proliferations bearing cups or branched. Not common.

23. C. CRISPATA (Ach.) Flot. (Pl. 2, f. 7.) In C. CRISPATA, f. DIVULSA, recorded by Evans in Connecticut, there are cups with no or very slight closing membrance. *C. squamosa*, f. *levicorticata* may be mistaken for *C. crispata*, but the latter is smooth, the former usually squamulose. F. DIVULSA may be looked for in our range. F. ELEGANS, which is often densely squamulose, and cupless, occurs in eastern Long Island and perhaps elsewhere in our range.

24. C. SQUAMOSA (Scop.) Hoffm. (Pl. 2, f. 5.) An extremely varied species, with simple and complex forms. Its variations have led to the division of some forms into "modifications," represented by the abbreviation "m." But if one is unable to reduce a specimen into one of the forms and modifications given by Dr. Evans and by Robbins and Blake, he may call it simply "*C. squamosa*," and not be wrong, even if not precisely right. Immature or weathered specimens may be irreducible beyond the species. The commonest form in the sandy moraine hills in eastern Long Island and in the New Jersey Pine Barrens, is f. LEVICORTICATA, m. RIGIDA, Sandst., ranging from simple, stiff little cupped podetia, with rough cortex, to fantastically branching cups, with a maze of proliferations. F. DENTICOLLIS (Hoffm.) Floerke, and f. PHYLLOCOMA (Rabenh.) Vainio, or something

very like them, though the writer has often found it safest to call them simply *C. squamosa*, occur in the Hudson Highlands, and the Catskills where they grow very robust, up to three or four inches in height. Students who would determine all the possible forms in our range are referred to Dr. Evans' Monograph and Notes, and the Robbins and Blake paper.

25. C. DELICATA (Ehrh.) Floerke. (Pl. 3, f. 1.) A small, pretty species, on decaying logs and tops of stumps in woods, probably fairly common, but overlooked because so tiny. Occurs in Franklin Clove, N. J., and in Wawayanda Cedar Swamp, and probably in similar swampy woods elsewhere in our area. Represented in our range by f. QUERCINA (Pers.) Vainio.

26. C. CAESPITICIA (Pers.) Floerke, (Pl. 3., f. 5.) Fairly common on the ground among hardwoods, sometimes on logs, and once found by the writer ten feet high on a living red maple in Wawayanda Cedar Swamp. Probably overlooked because of the sessile, brown apothecia, much like the color of dead leaves.

27. C. FLORIDANA Vainio. (Pl. 3, f. 2.) Low, rather densely branching, not common, to be looked for in open, sandy woods, in the Pine Barrens and on eastern Long Island. Yellow reaction with KOH is helpful in identifying it.

28. C. APODOCARPA Robbins. Common in open hardwoods, often in quite large colonies; may be taken for some other Cladonia in an immature, unfruited condition, as its apothecia are extremely rare. Yellow reaction with KOH on the white undersides of the rather large squamules distinguishes it.

29. C. TURGIDA (Ehrh.) Hoffm. (Pl. 3, f. 6.) Not common. F. SCYPHIFERA, with small, flat cups, reported from Green Pond, N. J., by Leon W. Bowen; f. CORNICULATA, with large primary squamules and rather robust podetia, with olive-tinted subulate tipped branches, reported in Connecticut by Evans; occurs in Adirondacks and may be looked for in Hudson Highlands or Catskills.

30. C. MITRULA Tuck. (Pl. 3, f. 3.) On earth in old fields, woods, and banks along old woodroads, fairly common throughout our area, except in higher Catskills. The usual form is f. IMBRICATULA (Nyl.) Vain., with large brown apothecia, wider than the diameter of the podetia; with it sometimes occurs f. PALLIDA Robbins, with flesh colored apothecia; also f. MICRO-

CARPA, with small brown apothecia in compact clusters on terminal branches.

31. C. CLAVULIFERA Vainio. (Pl. 3, f. 7.) Not common, but to be looked for with *C. mitrula, brevis* or *strepsilis*, found by writer in eastern Long Island, Franklin Lake, N. J., and in Pine Barrens, as f. NUDICAULIS Evans; and f. SUBVESTITA Robbins, with squamulose podetia may be looked for in similar situations.

32. C. SUBCARIOSA Nyl., (Pl. 3, f. 8.) In old fields, or open woods, in sandy or clayey soil, widely scattered, numerous in some localities, elsewhere wanting; often occurring with *C. strepsilis, brevis, mitrula* and *papillaria*, in eastern Long Island; with *C. pleurota* and *verticillata* in Bear Mountain Park; usually as f. EVOLUTA Vainio, with smooth, stout, obconic podetia, or f. SQUAMULOSA Robbins, with squamulose podetia, less common. Forms not yet found by this writer, but possibly occurring in our range are f. EPIPHYLLA Robbins, with apothecia sessile on primary squamules, and f. PALLIDA Robbins, with flesh colored or whitish apothecia. *C. subcariosa* may be mistaken for some of the other low, brown fruited species, but application of KOH instantly determines it, with the immediate appearance of a dirty yellow color, followed within 15–30 seconds by a permanent brick red, the only Cladonia with this color reaction.

33. C. BREVIS Sandst. (*C. alpicola* of Dr. Evans' Monograph of the Cladoniae of Connecticut, but he prefers *brevis* in his later Notes in Rhodora). (Pl. 3, f. 9.) Very low, 1/4 to 1/2 inch with dark brown bulging apothecia, occasional in open sandy woods in Suffolk Co. L. I., perhaps also in the Pine Barrens.

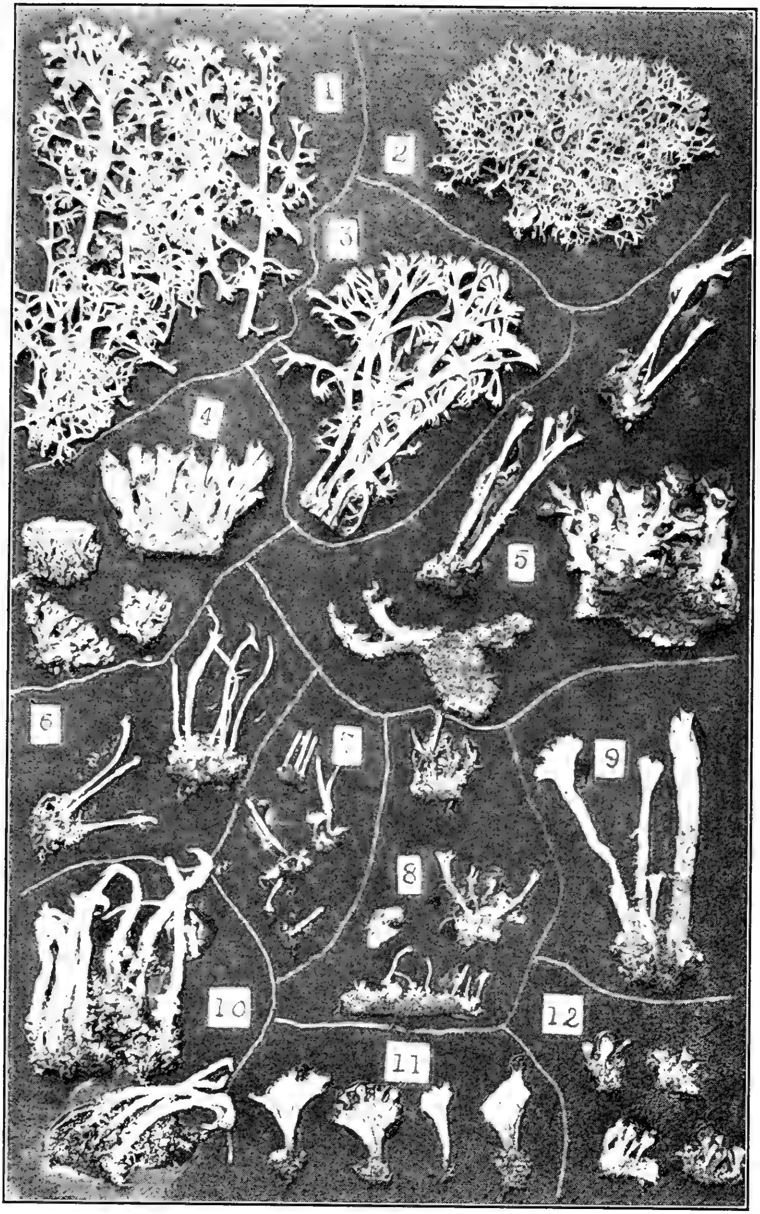
34. C. GRACILIS (L.) Willd. (Pl. 4, f. 1.) Common north of our range, in Adirondacks and New England, and occurring in the higher Catskills. Examples seen by or sent to this writer are var. DILATATA (Hoffm.) Vainio with stout, usually smooth podetia, but Dr. Evans reports in Connecticut, three forms of this variety, f. ANTHOCEPHALA (Floerke) Vainio, with squamulose podetia; f. DILACERATA (Floerke) Vainio, with irregular squamulose cups, and f. SQUAMULOSA (Schaer.) Sandst. squamulose below, sterile; also f. CHORDALIS, with slender, erect, cylindrical podetia, all of which may be looked for in the northern parts of our range, in the Catskills or Taconics.

35. C. VERTICILLATA (Hoffm.) Schaer. (Pl. 4, f. 2.) On the earth, along banks and old fields and open woods, edges of wood-roads, widely distributed but usually in small colonies. We have f. EVOLUTA (Th. Fr.) Stein., with smooth podetia, and central proliferations only; and f. APOTICTA (Ach.) Vainio, similar but with proliferations also from the sides of the podetia.

36. C. CALYCANTHA Vainio. (Pl. 4, f. 4) much like *C. verticillata*, but not quite as stout, and with dense, branching squamules on the lower, first or second ranks of cups; along the borders of streams and swamps in the Pine Barrens.

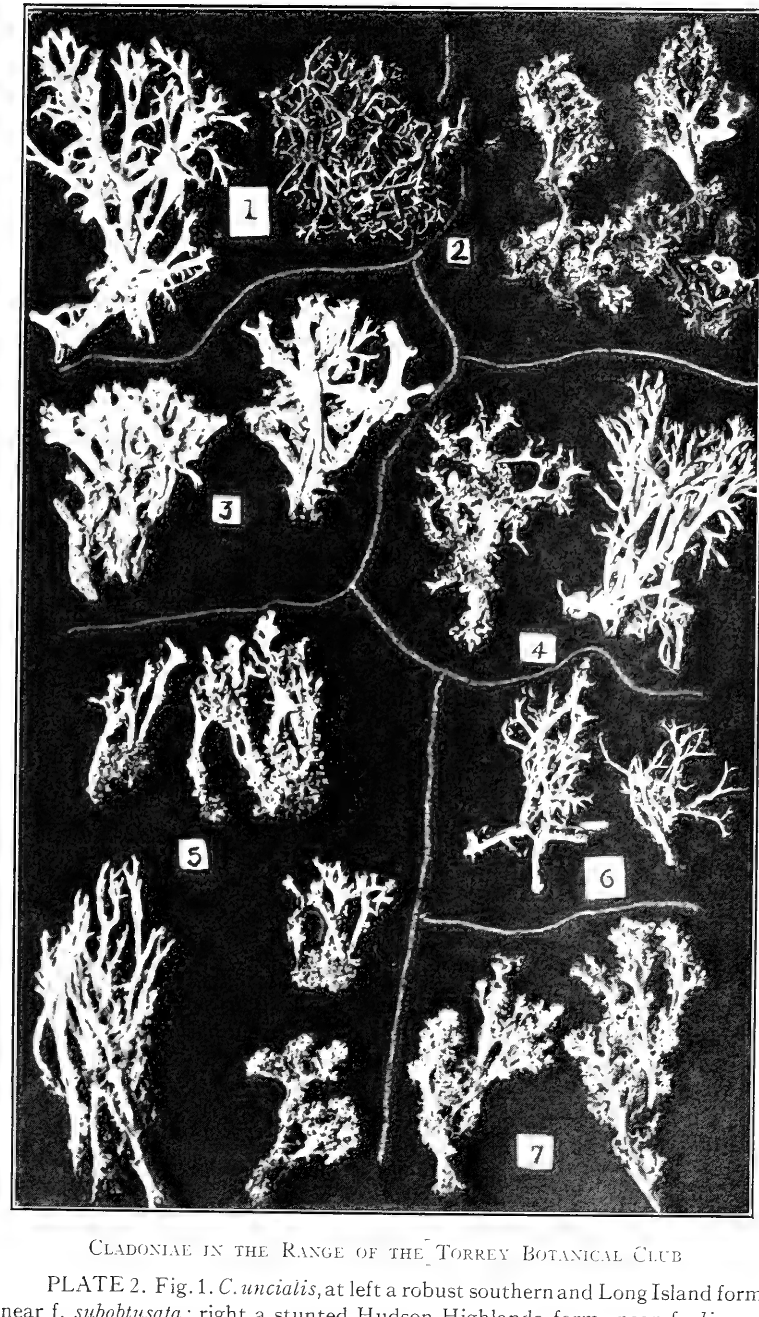
37. C. PYXIDATA (L.) Fr. (Pl. 4, f. 3.) As now limited to forms with deep cups, with raised flat green areoles, separated by whitish lines, or smooth; not sorediose, this species appears to be scarce in our area.

38. C. CHLOROPHAEA (Floerke) Spreng. (Pl. 4, f. 5.) This is *C. pyxidata*, f. *chlorophaea*, of Fink's "Lichens of Minnesota," (for the benefit of those who possess that valuable work), and of some older writers, but *C. pyxidata* is now restricted to the forms described under No. 38. As described by Evans, and Robbins and Blake, *C. chlorophaea* is one of the commonest Cladoniae in our area, rivalling *C. cristatella* in that respect. Some confusion has been introduced by the use of the name, *C. Grayi*, by Sandstede, for this species or something like it, which the German authority distinguishes by recording a mild taste, and chemical difference, as against other closely related cup-like forms. See Dr. Evans' Notes on the Cladoniae of Connecticut, Rhodora, August 1932, pages 159–160. After consultation with Dr. Evans, this writer has concluded to use *C. chlorophaea*, and ignore *C. Grayi*, for the present, as the former is more convenient for students, especially for the several forms which are clearly described in Evans' Monograph on the Cladoniae of Connecticut, Pages 465–472. Common forms in our area are: f. SIMPLEX (Hoffm.) Arn., with 1-ranked esquamulose sterile plants, with decorticate surfaces of cups smooth and opaque; f. PROLIFERA (Wallr.) Arn., like f. *simplex*, but with cups marginally proliferous, usually into a second rank of smaller cups; f. PTERYGOTA (Floerke) Vainio, sterile squamulose plants; f. CARPOPHORA (Floerke) Anders, esquamulose plants, with distinct cups bearing sessile or stipitate podetia, often with proliferations larger than the cups and with conspicuous apo-



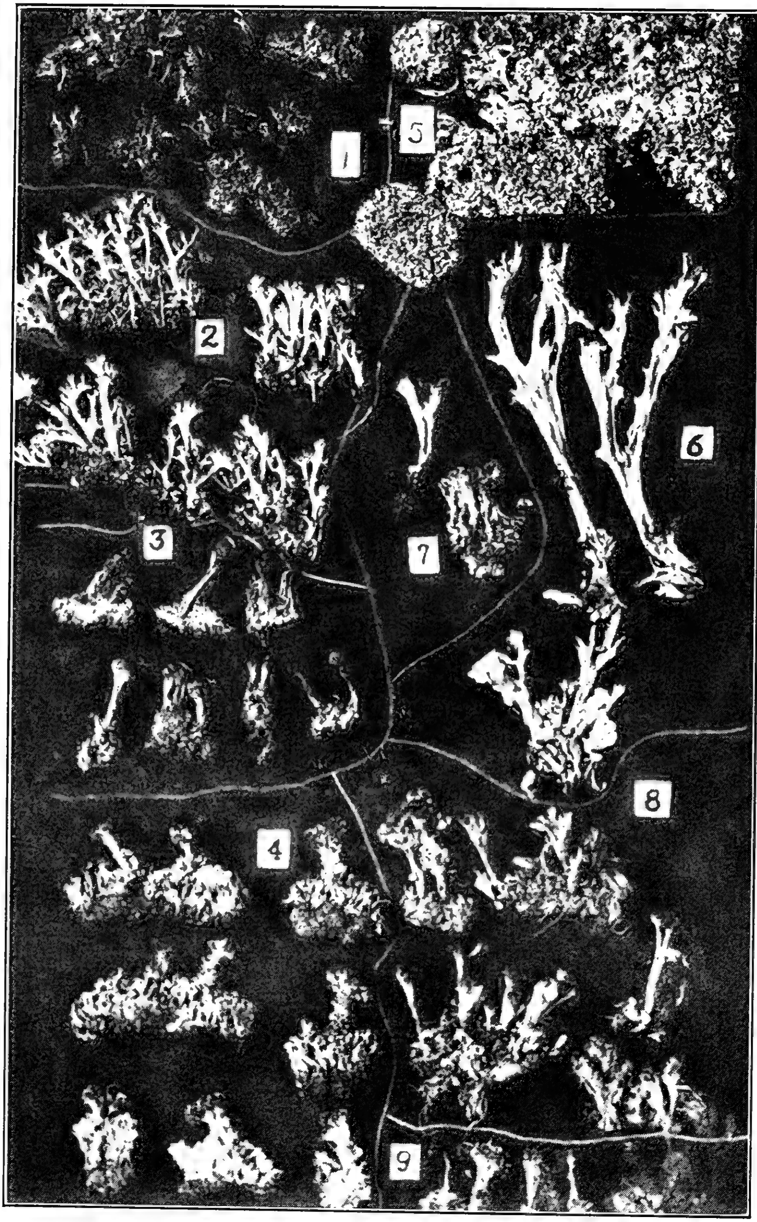
CLADONIAE IN THE RANGE OF THE TORREY BOTANICAL CLUB

PLATE 1. Fig. 1. *Cladonia rangiferina*. Fig. 2. *C. tenuis*. Fig. 3. *C. mitis*. Fig. 4. *C. papillaria*, upper right a well developed specimen; lower right, younger; left, upper, f. *papillosa;* lower, tending toward f. *stipata*. Fig. 5. *C. cristatella;* upper and left specimens, f. *Beauvoisii*, right, with large apothecia, f. *vestita*, lower left, f. *squamosissima*. Fig. 6. C. *bacillaris;* specimen at right, f. *peritheta*. Fig. 7. C. *Floerkeana*. Fig. 8. C. *didyma*. Fig. 9. *C. deformis*. Fig. 10. *C. macilenta*, f. *styracella*. Fig. 11. *C. pleurota*, f. *decorata*. Fig. 12. *C. incrassata*.



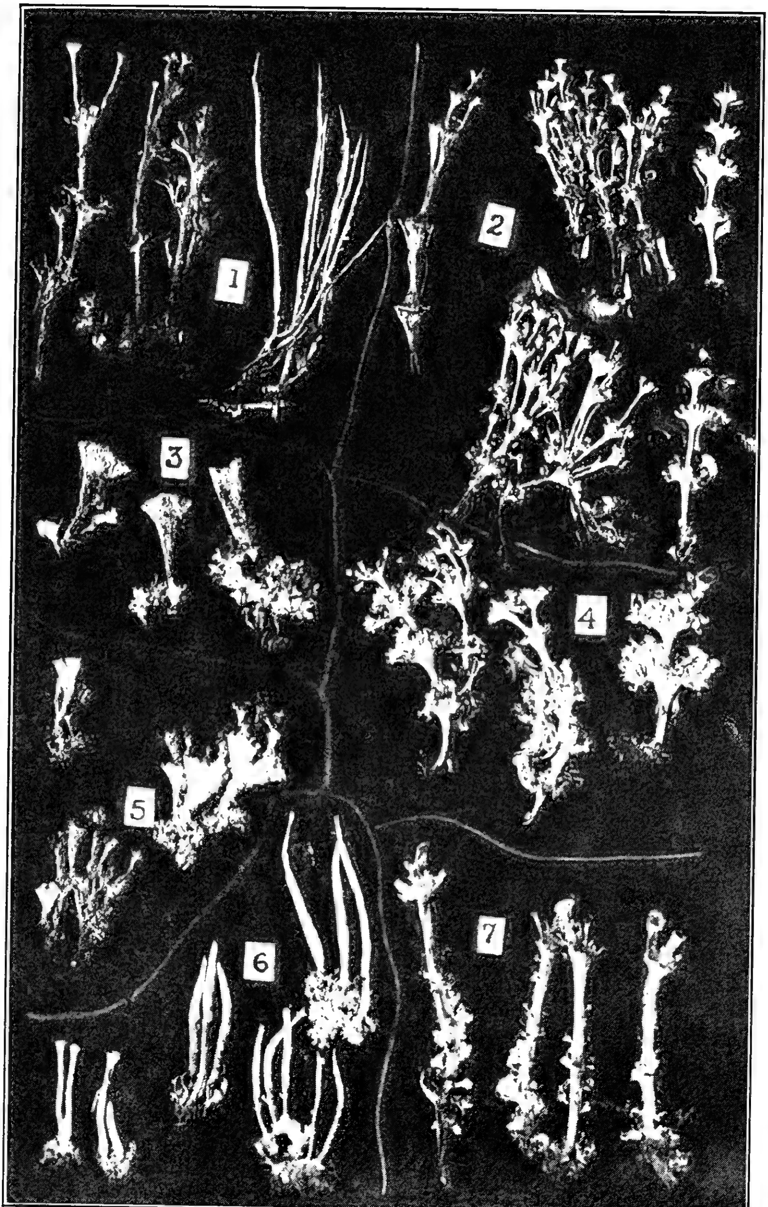
CLADONIAE IN THE RANGE OF THE TORREY BOTANICAL CLUB

PLATE 2. Fig. 1. *C. uncialis*, at left a robust southern and Long Island form, near f. *subobtusata;* right a stunted Hudson Highlands form, near f. *dicraea.* Fig. 2. *C. caroliniana*, f. *dilatata*. Fig. 3. *C. Boryi*, f. *lacunosa*. Fig. 4. *C. furcata*, left, var. *pinnata*, f. *foliolosa;* right, var. *racemosa*, f. *corymbosa*. Fig. 5. *C. squamosa*, top and right, including bottom, f. *levicorticata*, m. *rigida;* lower left, near f. *denticollis*. Fig. 6. *C. scabriuscula*. Fig. 7. *C. crispata*, f. *elegans*.



Cladoniae in the Range of the Torrey Botanical Club

PLATE 3. Fig. 1. *C. delicata*, f. *quercina*. Fig. 2. *C. floridana*, f. *brachiata*, with branching ultimate tips of podetia; f. *esquamosa*, simpler. Fig. 3. *C. mitrula*, f. *imbricatula*. Fig. 4. *C. strepsilis*, this colony, at Commack, L.I., included f. *subsessilis*, very low; f. *glabrata*, with podetia smooth, and f. *coralliodea*, with taller, branching podetia, densely squamulose. Fig. 5. *C. caespiticia*. Fig. 6. *C. turgida*, f. *corniculata*. Fig. 7. *C. clavulifera*, upper specimen f. *nudicaulis*, lower tending toward f. *subvestita*. Fig. 8. *C. subcariosa*, slender forms f. *evoluta*; stout, dilated, branching forms f. *pleurocarpa*. Fig. 9. *C. brevis*.



CLADONIAE IN THE RANGE OF THE TORREY BOTANICAL CLUB

PLATE 4. Fig. 1. *C. gracilis*, right, var. *dilatata*, left var. *chordalis*. Fig. 2. *C. verticillata*, f. *evoluta*, Fig. 3. *C. pyxidata*. Fig. 4. *C. calycantha*. Fig. 5. *C. chlorophaea*, upper left, f. *simplex;* right and lower, f. *carpophora*. Fig. 6. *C. coniocraea*, upper forms, with subulate tips, f. *ceratodes*, lower, with small cups, f. *truncata*. Fig. 7. *C. nemoxyna* f. *fibula*.

thecia; f. HOMODACTYLA (Wallr.) Robbins, similar to the last, but the cups broken up by deep sinuses between the fruited stipes; f. LEPIDOPHORA (Floerke) Sandst., like *carpophora*, but squamulose. These forms, and probably others recorded by Evans and by Robbins and Blake, occur in our range in a variety of habitats, on earth, over mosses, on decaying wood, on the bases and even high on the trunks of living trees.

39. C. NEMOXYNA (Ach.) Nyl. (Pl. 4, f. 7.) Rare, seen or reported in few instances in this area (Ramapo Torne, J. W. Thomson, Jr.; Olive Bridge, Ulster Co.) on thin soil over ledges or in crevices of rocks. Our specimens were f. FIBULA, with irregular, one-sided cups, and short fruited proliferations.

40. C. CONIOCRAEA (Floerke) Spreng. (Pl. 4, f. 5.) Fairly common on earth, on decaying wood, on bases and trunks of trees, sometimes several feet, above ground, throughout our area, more frequent in the deciduous hardwood forests of the Highlands, than nearer coast. Our commonest form is f. CERATODES (Floerke) Vainio, with esquamulose, subulate tipped podetia; with it may be found f. TRUNCATA (Floerke) Vainio, with blunt tipped podetia occasionally bearing small, narrow cups; less common is f. PHYLLOSTRATA (Floerke) Vainio, with squamulose podetia. F. EXPANSA with large, often erect primary squamules, upper surface concave, KOH+, pale yellow, occurs on tree bases in "Sunken Forest" on Fire Island, L. I.

41. C. OCHROCHLORA, occasionally found with *C. coniocraea* and distinguishable by the frequent brown apothecia.

42. C. PITYREA (Floerke) Fr. Rather rare, more likely to be found in the northern part of our area, in Shawangunks and Catskills; podetia with cups and with subulate apices on same plants.

43. C. STREPSILIS (Ach.) Vainio. (Pl. 3, f. 4.) Found with *C. brevis*, *subcariosa* and *papillaria*, in eastern Long Island, and in the Pine Barrens, dwarfed f. SUBSESSILIS, the taller f. GLABRATA Vainio and the branching f. CORALLOIDEA (Ach.) Vainio.

FIELD TRIPS OF THE CLUB

SWAMP SURVIVALS NEAR MOONACHIE, NEW JERSEY

The field trip of the Club, on Saturday afternoon, June 19, in the surviving area of the swampy woods of the Hackensack Meadows, south of the Paterson Plank Road, near Moonachie, N. J., between Secaucus and Carlstadt, was exciting as well as interesting, for the small but doughty party reached the spot in machine-gun showers of hailstones as big as, well, cherries, and before entering the swamp, was driven to the shelter of an automobile by another fusillade from a thunderstorm, also with hail. After that it stopped raining, but it was so wet in the woods that it might as well have rained, as far as clothes were concerned.

This is one of the most interesting places for botanical study near New York, from which it is but six miles in a straight line, and is easily reached by bus or trolley via 23rd street ferry to North Hoboken, and along the Plank Road through Secaucus, to Washington avenue, in the southern part of Moonachie Township, 3/4 mile west of the Hackensack River Bridge. It is surprising to find there *Rhododendron maximum*, as reported 52 years ago by Dr. N. L. Britton, although it is not in very healthy condition, much of it seems blighted and some has been damaged by boys picking the flowers to sell to motorists on the highway. *Magnolia virginiana*, the Laurel Magnolia, frequent here, suffers from the same vandalism, but seems to sustain it better. One sees specimens which have been pulled over to break flower clusters from their tops, and often the main trunks have been broken near the butt by this abuse, but they have mended themselves in a prone position and the lateral branches have grown upright and produced more blooms, again to be ravaged by the roadside flower sellers.

Chamaecyparis thyoides, the Southern White Cedar, which once covered hundreds of acres in the Hackensack Meadows, is represented in this swamp by many large stumps three feet in diameter, probably cut 75 years ago or more, which must have been extraordinarily large specimens; by some smaller dead standing trees and by a very few small and unthrifty living trees; it does not seem destined to survive here much longer.

Some of the largest specimens of the Poison Sumach, *Rhus Vernix*, I have ever seen, with butts six inches in diameter, occur in this swamp. Most of the trees are *Acer rubrum*, but here and there are hummocks with more upland species, *Fagus grandifolia, Sassafras variifolium, Quercus palustris* and *Prinus*, even a few *Q. alba*, and *Betula populifolia*, the Gray Birch common in higher, dryer locations. The United States Geological Survey map shows the area in white but with no contour line, which indicates it is above high tide, but it cannot be more than a few feet. The water in the ditches after the thunderstorms was flowing outward toward the salt marsh. The occurrence of Beech, Birch and Chestnut Oak suggests that it may have been drier than now, and that it is sinking to tide level, either by a general sinking of the Atlantic Coast or by disturbances in the meadows due to diking and collapse of dikes years ago. *Maianthemum canadense*, and *Aralia nudicaulis*, which seem more like Hudson Highlands species than inhabitants of a swamp so near tide, also occur among the beeches and birches. Mr. James L. Edwards, of Montclair, who knows the swamp well and assisted our leader, Mr. W. Lincoln Highton, has found *Coptis trifolia*, the Goldthread, a northern plant, found but rarely in the Highlands, in the Moonachie locality.

The commonest shrub is *Vaccinium corymbosum*, the Swamp Blueberry, which makes these woods a resort for pickers in late summer. It is so dense that some have been lost and a few years ago two berry pickers could not get out for two days. *Amelanchier canadensis* was in fruit, pleasant to the taste. Some *Ilex verticillata* survives.

Two species of the Chain Fern, *Woodwardia virginica* and *areolata*, are both common in this swamp, which is not often the case north of the moraine. The Massachusetts Fern, *Thelypteris simulata;* Marsh Fern, *Thelypteris palustris;* New York Fern, *Thelypteris noveboracensis; Osmunda regalis, cinnamomea* and *O. claytoniana;* and the Sensitive fern, *Onoclea sensibilis* are plentiful. A little Spinulose Spleenwort, *Aspidium spinulosum*, was found on a dry spot. Mosses were not numerous in species, the only ones noticed being *Sphagnum, Leucobryum, Aulacomnium* (probably, capsules immature), and an infertile, uncertain *Hypnum*. Lichens were not common, at least at this time; they may be better defined at other seasons. *Cladonia in-*

crassata, sterile, was found on overturned stumps; and *C. cristatalla, f. vestita*, was found fruiting in one place. It looks as if it might be a good place for Slime Moulds later in the summer.

Artificial disturbance of the flora is apparent where a new fill for a road to a bridge now being built across the river, south of Secaucus, cuts along the eastern border of the swampy woods. Here the Roman Wormwood, *Ambrosia artemisiifolia*, was dense along the slope of the fill and the nearby mosquito ditches. Another plant appearing adventive on the raw fill built only two or three years ago, but native, was *Geranium carolinianum*.

Raymond H. Torrey

PROCEEDINGS OF THE CLUB

MEETING OF MAY 17, 1933

Meeting was called to order at The New York Botanical Garden by President A. F. Blakeslee at 3:30 P.M. There were 48 members present. Minutes of the meetings of April 19 and May 2 were read and approved.

Miss Dorothy Francis, Memorial Hospital, 2 West 106th Street, New York, N. Y.; Miss Harriet E. Russell, 632 West 125th Street, New York, N. Y.; and Mr. Ernest L. Spencer, Rockefeller Institute for Medical Research, Princeton, N. J. were unanimously elected to membership in the club.

The death of Mr. William H. Smith, March, 1933, was announced with regret.

Dr. A. B. Stout, of The New York Botanical Garden gave an interesting talk on "Facts and Theories Regarding Incompatibilities in Fertilization." This talk was illustrated by lantern slides.

Forman T. McLean
Secretary

THE TORREY BOTANICAL CLUB

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OF THE

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In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE—a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24–59 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–18 are now completed. Volume 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00.

Volume 18, no. 1, 108 pages, 1931, price $2.00. Volume 18, no. 2, 220 pages, 1932, price $4.00. Volume 18 complete, price $5.00.

(3) Index to American Botanical Literature, reprinted monthly on cards, and furnished to subscribers at three cents a card.

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GEORGE T. HASTINGS

John Torrey, 1796-1873

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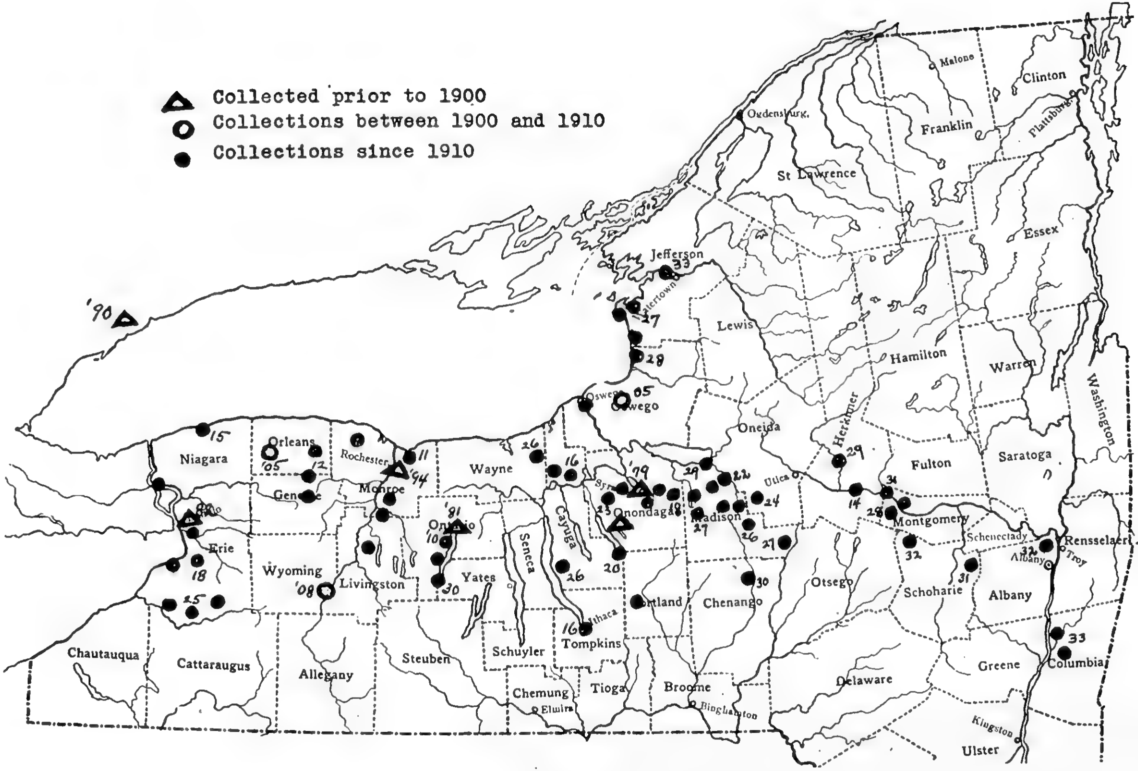
Distribution and spread of Serapias Helleborine in New York State

H. D. House

The number of extralimital species of plants which have found a place in our flora is so large that only occasionally is there more than passing comment regarding any of them. They are chiefly the so-called "weeds" of our cultivated and waste fields, meadows and cut over woodlands. Some species like *Epilobium hirsutum* and *Lythrum Salicaria* have within recent years become conspicuous and not altogether undesirable elements of the flora of our river borders and other wet places across the state.

In the eastern United States the orchid family (Orchidaceae) contains but a single naturalized species, *Serapias Helleborine* L. How it first reached our shores is now impossible to say, nor is it certain that it came through a single introduction. The first discovery of it was made near Syracuse by Mrs. M. O. Rust, August 2, 1879 and by Miss M. P. Church, August 6, 1879 (Bull. Torrey Bot. Club 6: 329. 1879). It was next found near Canandaigua, July 22, 1881, by members of the Canandaigua Botanical Club, near Buffalo, by David F. Day, in 1882, and near Rochester by M. S. Baxter in 1894. Between 1900 and 1910 only two or three additional localities were added to this list, but since 1910, due perhaps to the more rapid spread of the species and more intensive field work on the part of local botanists, the species has been found eastward to the Hudson river valley and northward to the St. Lawrence.

The plant is not mentioned by Macoun (Cat. Canadian Plants Pt. IV, 1888), and the earliest Canadian records which I can find are collections in the National Herbarium at Washington from Lambton Mills, Ontario (near Toronto), by W. and O. White, July 1890, and near Montreal by G. B. Ashford, July 31, 1904.



Outline map of New York State showing the distribution and spread of Serapias Helleborine L., between 1879 and 1933.

From the centers of earliest discovery in central and western New York the species has spread eastward and southward, chiefly in the moist woods of the limestone areas. Its absence from adjacent and intervening areas of acid soils seems to indicate its decided preference for calcareous soils. In 1930 it was observed in Montgomery county, in 1931 in Schoharie county, in 1932 in Albany county and in 1933 in Columbia county in the Hudson valley. These observations seem to indicate that the species may already have reached the calcareous areas of western New England and may be expected to appear farther south in the Hudson valley and northward into Vermont as well as in the calcareous areas down the St. Lawrence river region.

It seems desirable to place some of these facts on record, and the accompanying map is based upon collections in the New York State Museum, the Gray Herbarium, New York Botanical Garden herbarium, and the herbarium of the United States National Museum. It is not the purpose of this note to cite the numerous collections which have been made, but merely to indicate on the accompanying map the year of collection for most of the localities known. This shows perhaps better than any other method the progressive spread of the species from 1879 to 1933, a period of over fifty years since the initial discovery of the species near Syracuse. Reference to the map also shows that the known localities seem to form five or six rather definite groups. It is possible that the species occurs more evenly distributed than this grouping seems to indicate. On the other hand it may represent the spread of the species from separate centers of introduction occurring at different dates.

New York State Museum, Albany, N.Y.

Dicentra eximia at the Delaware Water Gap

James L. Edwards

On January 15th, 1933, Mr. Leon W. Bowen, Mr. W. L. Highton, and the writer went to the Delaware Water Gap to look for evergreen Aspleniums on the cliffs with the hope of finding either Bradley's or the Pinnatifid Spleenwort growing with the Mountain Spleenwort which is fairly common there. While climbing over the ledges on the New Jersey side, about a third of the way to the top, the withered leaves and flower stalks of an unfamiliar plant were noticed in the crevices of the rocks. When examined closely, the general resemblance to the cultivated Bleeding Heart led us to believe that the plants were *Dicentra eximia* (Ker.) Torrey, which none of the party had ever seen growing in a wild state. On June 1st, 1933, the writer returned to the spot to check the identification, found the plants in full bloom, and collected specimens. The plants were found in one relatively small area on the mountain side. Many of them were growing on easily accessible shelves but a few large and healthy plants were seen high up on the face of the cliff. After surveying this locality the writer spent some time looking across the river with field glasses at the cliffs on the Pennsylvania side speculating as to the possibility of the plant being found there also. It was noted that the same more resistant strata of rocks appeared in cliffs on both sides of the river at about the same elevation and that apparently favorable ledges existed directly opposite the New Jersey site. On July 29th, 1933, with Mr. W. L. Highton, these Pennsylvania ledges were visited and a few plants were found very close to the section previously chosen as the most likely place. Due to the heat of the day extended search was not attempted and consequently the extent of the Pennsylvania station is not known to the writer at the present time.

This handsome plant was formerly found in central New York. In Pennsylvania it has been recorded from McKean Co. in the western part of the state. The station at the Delaware Water Gap appears to be at least 150 miles from any other station. Probably the discovery of the plant at the Water Gap is really the rediscovery of a station known long ago to Mr. C. F. Austin. He had reported the plant from this vicinity but when a search was made for specimens in his collection, at the time Dr. N. L. Britton was preparing his catalogue of New Jersey plants, none were found. About that time evidence was found which tended to prove that a mistake in identification had been made as wrongly labeled material was found. Since the plant had not been found again in New Jersey, Austin's record was disregarded and the plant was omitted from Britton's catalogue. Now it seems more reasonable to think that Austin was right in his early report and that some confusion of labels and specimens took place after his death.

Montclair, New Jersey

A search for two of America's rarest conifers

Walter C. and George Q. Shepard

The family called TAXACEAE, or yew family, contains about twelve genera and nearly 100 species, yet only five species are indigenous to the United States. Of these five species, two are native to the Pacific coast region; one, *Taxus canadensis*, is found in the Northeast; while the other two, *Taxus floridana* and *Tumion taxifolium*, much rarer and more localized in their distribution, are found along the east side of the Apalachicola River, in Florida.

Check-lists and works on the distribution of conifers give little specific information as to the location of these rare trees. For instance, files in the U. S. Department of Agriculture at Washington still state that *Taxus floridana* is found from "Aspalaga to the vicinity of Bristol"; yet Aspalaga, which appears once to have been a more or less flourishing bluff-settlement and boasted a ferry across the river, has been entirely off the map for some twenty-five years and is today nothing more than a memory. Indeed, even if it were possible to state the exact locations of the various groups of these trees, the locations would be untenable for very long. Botanists have been exploiting them on a small scale, but the chief exploitation has been in the hands of manufacturers of bows and arrows. The wood of this tree is smooth, close-grained, hard, flexible and durable, and is therefore ideal for making bows.

Tumion taxifolium, which is the more common of these two conifers, is not so difficult to find since its range is longer and more continuous than is that of *Taxus floridana*. In fact, there is a group of the former which can be reached just off the Florida State highway where it crosses the Apalachicola River at River Junction; and its range extends over the State boundary into Decatur County, Georgia. *Taxus floridana*, on the other hand, is now almost extinct in its native habitat and is known to be growing in only a few isolated places within its limited range.

Inquiries revealed to the authors the location of one or two scattered groups of yew, but it was from Mr. D. H. Ward of Bristol, County Agent of Liberty County, that we managed to locate a grove where both yew and tumion were growing together. Mr. Ward gladly agreed to serve as guide for us. So, having completed arrangements for the trip, we set out at daybreak on a Saturday morning in late April.

After motoring several hundred miles, we arrived about noon at Blountstown, Florida. Here we crossed the broad, peaceful, muddy waters of the Apalachicola on an obselescent ferry, and hurried on to Bristol.

Mr. Ward met us with a cordial welcome, told us that he had been awaiting our arrival and that he was ready to accompany us. It was indeed fortunate that we were able to secure him as our guide, for had it not been for him we would never have been able to locate the trees we were looking for.

It was a matter of only a few miles' drive to the site of the trees. Over a little-travelled, sandy country road, bordered for the most of the way by a scant low growth of "black jack" oaks interspersed with pines, we rode until stopped by a wire fence which blocked the faint outlines of the old and almost forgotten roadway. Stopping our car near the fence, we proceeded on foot, ever watchful for any sign of the trees we sought.

For a short distance we followed a brook which flowed sluggishly along under a dense canopy of magnolias, sweet-gums, and underbrush. Then, on emerging into the open, we went along a cattle-trail that wound across a broad field, quite free of vegetation except for patches of grass and an occasional live-oak, but dotted everywhere with gopher holes. When we next entered the woods we came upon a wide ravine some forty or fifty feet deep with almost precipitous sides. It was here, on a steep side of this ravine, that we first sighted tumion; and it was up and down the side of this long ravine that we later found more and more tumion and eventually a few dozen yews.

The symmetrical and gracefully-drooping tumion ranged in size from small plants not more than a few inches high to middle-sized trees twenty feet tall; and dominated the landscape. In both form and foliage they are so different from other trees growing thereabout, the yew excepted, that one almost loses sight of everything but of them. A lover of trees surely cannot help being impressed by their unusual growth and beauty.

Clambering up and down the steep cliffs, on the thick carpet of leaves of which we slipped and fell innumerable times, we wandered through scores of tumion trees before catching our first glimpse of yew. In mature specimens it is usually easy enough for a person to distinguish the two genera, inasmuch as their manner of branching is distinct; but in small plants the similarity is often so close that at a distance they appear, especially to those unfamiliar with them, one and the same.

Botanically speaking, Florida tumion and Florida yew are closely related. Both are evergreens of the same family, although of different genera. Neither is very tall-growing, but specimens of tumion have been known to grow some forty feet in height. They both have rather broad, linear, pointed leaves 3/4 to 1 1/2 inches long. The seed of each is a drupe, covered with flesh. And their bark is scaly or fissured and not decidedly different in color. However, Florida tumion grows in an open pyramidal shape, with its branches disposed in tiers like the araucarias and especially like the California-nutmeg; whereas Florida yew is more rounded, and when compact it is not very unlike English or Japanese yew.

The surest means of distinguishing the two plants is in one or both of two ways. Simply grasp a branchlet carefully, and if it pricks you as though it were a tier of needles, you can be assured it is Florida tumion, for Florida yew is as soft to the touch as hemlock. If, however, your hands are tough and your decision uncertain, pull off a few leaves, rub them between your fingers, and if they emit a pungent odor like bruised red pepper, you may bet you last dollar that the tree is none other than tumion; which, because of its characteristic odor when bruised, is sometimes called stinking cedar.

Having accomplished his work of guiding us to where the trees were growing, Mr. Ward returned to Bristol after wishing us goodnight. However, we had come prepared to spend the night, and as dusk was slowly setting in by this time, we at once began to hunt for a suitable camp-site. Our first thought of course was of water, and we were not long in finding some. By retracing the steps which we had followed along the brook earlier in the afternoon, we soon came to a small cataract. Although the water here, as elsewhere along the stream, was very shallow, nevertheless we dug at the base of this cataract a basin large enough for our needs and left it long enough to allow the mud to settle and the water to become clear. In the meantime we brought our car as near as possible to the water-basin.

The evening air was crisp but not cool enough for a fire. Nevertheless, we expected a swarm of mosquitoes as the evening progressed and so we collected a supply of light-wood knots and built a slow fire under a log. Thus, we soon had a fire which required little replenishing and the smoke from which, happily enough, kept away from us those troublesome insects that soon could be heard on all sides as they buzzed their unholy tunes in the surrounding shadows.

Besides being moderately weary from our exertions of the day, we planned to rise early next morning and so went to bed early. Our bed-covering was brought along with us, but to make sleeping more comfortable we gathered a big pile of Spanish moss, which formed the foundation of our bed.

Next morning we rose at daybreak, had a quick breakfast, and set out for the ravine. It was a delightful place. It seemed as if we had stepped into an exotic paradise, or rather into a huge greenhouse. The atmosphere was warm and humid, and the dew was dripping gently from the trees all about us.

Besides a spade, a bucket, and an axe, we had also brought with us a quantity of burlap for balling the plants. It was our desire to get well-shaped, small plants of a foot or so in height rather than larger specimens, for the smaller a plant is, generally speaking, the more easily and successfully it can be transplanted.

We soon found that we were going to have a busy morning. We made our way through the grove and selected the specimens we were to take back with us. The soil there was unusually well-drained both because of its large content of sand and because of the sloping sides of the ravine. We had a long trip ahead of us and as the weather in Florida at that time was dry and warm we felt that it was necessary for us to water thoroughly each specimen we dug up so as to prevent it from drying out.

The closest water supply was in the bottom of the deep ravine. As I have said before, it was a big job to climb the steep, slippery sides even empty-handed, but with a bucket of water to fetch up, it was obviously even more difficult. One by one, however, we got them dug, burlapped, and watered, so that by noon we had succeeded in getting some fifteen specimens. We were now ready to stop work.

Soon afterward we were on our way home, and with us we brought our little treasure of young trees. These were added to our private collection of conifers. It had been a pleasant undertaking and we felt, as we rode away, that we had been fully repaid for the effort and time which we had spent on it.

Three months after being transplanted, these specimens, with the exception of four or five, appear to be in good health. They seem to prefer a peaty soil and undoubtedly they thrive best in a shady or partially shaded location.

BAGDAD, FLORIDA

A color phase of Sitilias caroliniana and some analogous variations in other genera

Roland M. Harper

Sitilias caroliniana (Walt.) Raf.,[1] is a common weed of unknown origin,[2] belonging to the Cichoriaceae, growing along roads and railroads and in waste places in all the southeastern states, and blooming mostly in May.[3] It looks much like a dandelion both in flower and in fruit, except that it is taller, with a branched stem instead of a scape, and its flowers are usually lemon-yellow instead of golden yellow. The flowers open on sunny mornings, and face the sun. The descriptions call for a brownish pappus (whence one of its former generic names), but in my experience it does not differ noticeably from that of *Taraxacum*.

Available descriptions mention no variation in color of flowers, but in and around Tuscaloosa, Alabama, many of the plants, perhaps as many as one-tenth in some areas, have the corollas, stamens, etc., cream-colored instead of yellow, though apparently identical in all other particulars, and having exactly the same habitat and time of flowering. This is not a mere fluctuation, as in many species whose flowers range all the way from some definite color to white, for no intermediate forms have ever been detected. And it can hardly be called an albino, for

[1] This was first described in 1788 by Thomas Walter, who referred it to the Old World genus *Leontodon*. Michaux in 1803, Pursh in 1814, and Nuttall in 1818, referred it incorrectly to three other genera, and DeCandolle in 1838 made it the type of a new genus, *Pyrrhopappus*, overlooking or ignoring the fact that Rafinesque had "beaten him to it" about two years before. DeCandolle's name was accepted for half a century, and then Rafinesque's name was unearthed and substituted for it by the nomenclature reformers of the latter part of the 19th century.

The conventional methods of citing synonymy, as typified for this species in Mohr's Plant Life of Alabama (Contr. U.S. Nat. Herb. **6**: 754. 1901), do not make it plain why the generic names used by Walter, Michaux, Pursh and Nuttall do not take precedence over Rafinesque's. There should be some indication that the plant was incorrectly referred to those genera.

[2] For notes on native weeds see Bull. Torrey Bot. Club **35**: 347–360. 1908; **37**: 117–120. 1910; Torreya **31**: 1, 48. 1931.

[3] In northern Florida a few of the plants may bloom as early as February, but not many before April.

the flowers are never pure white, and it is much more abundant than albinos usually are, though rather limited geographically. I do not recall ever seeing it outside of Alabama, or more than 100 miles from Tuscaloosa, though I have known it for over twenty years.

To determine the exact status of the cream-colored form would require breeding experiments, or perhaps an examination of chromosomes, for which I have no facilities. At present I cannot say whether it breeds true indefinitely, or is continually being derived as a mutant from the common yellow form (which always grows near by). If it occurred throughout the range of the species, or else only rarely, or if it were connected with the type by intermediate forms, it would scarcely be necessary to mention it except by amending the description of the species to include the variation in color.

But as this may be a nascent species of recent origin, which may hereafter become more widespread, it seems desirable to give it a name, to focus attention upon it momentarily at least. On account of current bibliographic practices, which attach much more importance to communications embodying new names than to others of equal length, this note might soon be forgotten if the cream-colored form were left unnamed. I therefore propose to call it **Sitilias Caroliniana**, *forma* **alabamensis**.[4] Precedent for naming such a slight variation is afforded by several cases of similar color phases, not correlated with differences in environment or time of flowering, which have been given names in the past.

For example, *Sarracenia purpurea heterophylla* Eaton, with greenish foliage and flowers, *Aquilegia canadensis flaviflora* (Tenney) Britton, with yellow flowers, *Argemone alba* Lestib. (*A. Georgiana* Croom), which seems to be only an albino or white form of *A. mexicana* L., and many horticultural varieties, some of which may have originated in the wild state. Several species of *Ilex*, both deciduous and evergreen, with normally red berries, have occasional yellow-fruited forms, which have been given subspecific names for that reason.[5]

[4] Specimens which represent the type were collected in the eastern part of Tuscaloosa, near the University, at 8 A.M., May 20, 1933.

[5] One such form, of *Ilex myrtifolia* from Mitchell County, Georgia, was described by me in Torreya **2**: 43–44 (March, 1902), with references to two

Our two common jimson weeds (*Datura Stramonium* and *D. Tatula*), barnyard weeds of probable South American origin, have essentially the same habitat but usually occupy different areas. They differ little except in color of stem and corolla, but these differences seem to be constant, and they have been regarded as distinct by most authors ever since the time of Linnaeus.[6]

There are several other weeds that exhibit marked variations not correlated with environment, but in form rather than in color, and a few of those will be mentioned here, to call attention to the problem and stimulate further investigation. The prickly lettuce, a weed not mentioned in our older manuals, and probably of recent introduction, is now scattered over the upper South and some additional territory, especially along railroads. (It is not listed in Mohr's Plant Life of Alabama, 1901, but grows now in Tuscaloosa, and various other places in the state.) It has been variously called *Lactuca virosa*, *L. Serriola*, and *L. Scariola* (these names all given by Linnaeus at different times). The commoner form has leaves rather deeply pinnately lobed. But another form, with leaves entire or nearly so (sometimes distinguished as var. *integrata*), has exactly the same habitat and perhaps a similar distribution, though the two are not always found together. In this case, as in *Datura*, we may possibly have two distinct species introduced at different times, though the difference is so trivial that one might expect hybrids or intermediate forms. Such, however, do not seem to be on record. Both have the leaves twisted into vertical planes, and they sometimes show a tendency to point north and south, as has been observed before.

In the vicinity of Tallahassee, Florida, and probably elsewhere in that latitude, there are two species of pokeweed, *Phytolacca decandra* L. and *P. rigida* Small, the former with drooping racemes, and the latter with racemes erect or nearly

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other cases in the same genus, but I did not think it worth while to give it a name. About 23 years later, S. F. Blake, quite oblivious of my contribution, described the same thing from Appling County, Georgia, in a magazine which circulates much less among students of southern plants (Rhodora **26**: 231. Feb. 1925), as forma *Lowei*, after the collector.

[6] This problem was discussed critically over 100 years ago by Dr. William Tully, of Middletown, Conn. (Am. Jour. Sci. **6**: 254–258. 1823.)

so, even in fruit. There is not much other difference, except that *P. rigida* tends to be smaller and with narrower leaves, as if adapted to poorer soils. They both grow in waste places, sometimes together, but the former ranges far to the northward, and may have been in Indian clearings before the time of Columbus, while the latter is chiefly confined to Florida, and escaped attention until it was described by Small in 1905.[7] Whether it had been there from time immemorial, or was a recent introduction from some unknown foreign source, or a recent mutation from *P. decandra*, we do not know, and perhaps never will know. This is another problem that deserves the attention of geneticists; and readers may recall similar cases in their own neighborhoods.

Some other closely related pairs of weeds, that often grow in the same habitat, and bloom at the same time, without apparent intergradation or hybridization, are *Acalypha virginica* and *A. gracilens*, *Plantago major* and *P. Rugelii*, and *Specularia perfoliata* and *S. biflora*. And there may be others in large and more or less weedy genera like *Panicum*, *Paspalum*, *Cyperus*, *Euphorbia* (and its segregates), *Oenothera*, *Solidago*, and *Aster*.

UNIVERSITY, ALA.

[7] Bull. N. Y. Bot. Gard. **3**: 422–423, April, 1905. (Type from near Miami.)

Geum virginianum L. var. Murrayanum Fernald

Irving William Knobloch

On June 6, 1930, a *Geum* was collected at Angola-on-the-Lake, in western New York, which a superficial examination took to be *Geum virginianum* L. but which later checking showed to be the variety *Murrayanum* Fernald. The variety is, according to Fernald (Rhodora 25:99, 1933), distinguished from the species proper by its strictly glabrous fruits. Specimens of this variety from western New York are on file at the Gray Herbarium and it is more common than the species in the Cayuga Lake basin region, according to Eames and Wiegand, but the state herbarium at Albany, N. Y. has no western New York specimen on file. There are three specimens in the herbarium of the Buffalo Museum of Science labeled *Geum virginianum* from western New York. Two of these, collected in Buffalo long before the variety had been differentiated from the species, are definitely the species having their fruits abundantly setose. The third sheet has the fruits glabrous and should be labeled var. *Murrayanum* Fernald. It appears therefore that the record herein mentioned from Angola-on-the-Lake, N. Y. is the first published record of this variety from this vicinity.

Buffalo, N. Y.

A new species of Talinum from Trans-pecos Texas

C. H. Mueller

In July of 1932 the author collected numerous specimens of an apparently undescribed species of *Talinum* in the Chisos Mountains of Western Texas. The plant was found in one locality scattered on the dry, grassy, sloping banks of a southwesterly directed arroyo at about 6500 feet altitude. Two specifically undesignated specimens of the same plant in the herbarium of the University of Texas prove that it had been collected previously by Dr. M. S. Young as follows: "Summit of Mr. Livermore, Davis Mountains, August 15, 1914," and "Very abundant on high, rocky slopes, Pine Canyon, Guadalupe Mountains, Texas, August 15, 1916." The range of this plant, then, is the mountains of Western Texas and probably of Southeastern New Mexico and Northern Mexico.

The material is very distinct from other species examined and from the descriptions of Mexican species.[1] The most closely related species seems to be *Talinum calycinum* Engelm., which differs materially in having a long peduncle, somewhat longer leaves, and a relatively longer style as compared with the filaments. For this new species is proposed the name *Talinum Youngae* in recognition of Dr. Young's much earlier collection of the plant and of her tireless work in a country which was then relatively unsettled and must have confronted her with many hardships. A description follows:

Talinum Youngae sp. nov. Perennial from a much branched, large, fleshy root; glabrous; stems several, leafy, spreading, typically branched and 8 to 10 cm. tall (rarely as short as 6 or as tall as 15); leaves densely but evenly distributed, not rosette-like, sessile, the upper linear, nearly terete, 10 to 28 mm. long and 1 to 2 mm. broad, the lower shorter, broader, and manifestly more flat, each (regardless of position on the stem) subtended by a free, flattened margin extending entirely around the base below the point of attachment; peduncles axillary, 3 to 15 mm. long (usually 10 or less), 1 to 3 flowered (usually 3); pedicels 10 to 20 mm. long, each with 2 acute bracelets about

[1] Rose and Standley, *Contr. U. S. Nat. Herb.*, vol. 13, pt. 8, 1911. Wilson, *N. Am. Flora*, vol. 21, pt. 4, 1932.

2.5 mm. long inserted below the middle, the cluster subtended by 2 acute bracts 4 to 5 mm. long; sepals 6 to 8 mm. long and about 5 mm. broad, acute, ovoid-lanceolate, hyaline margined; petals about 12 mm. long and 8 mm. broad, spreading, light rose; stamens about 18 with filaments 4 to 5 mm. long; ovary 1 mm. long or more, ovoid; styles less than 1.5 mm. long, entirely united, and early deciduous; stigma capitate; fruit elliptical, about 4 mm. long and 3 mm. broad; seeds smooth, slightly angular but not concentrically ridged.

Talinum Youngae sp. nov. Perenne, glabrum 8–10 cm. altum; folia sessilia, 10–28 mm. longa et 1–2 mm. lata, superiora linearia, subteretia, inferiora latiora plana, omnia margine libera complanata sustenta; pedunculi axillares 1–3-flori, 3–15 mm. longi; pedicelli 10–20 mm. longi; sepala ovoideo-lanceolata, 6–8 mm. longa; petala pallide rosea, 12 mm. longa, 8 mm. lata; stamina circa 18 filamentis, 4–5 mm. longis; ovarium ovoideum, 1 mm. longum; styli minores quam 1.5 mm. longi, omnino connati, mox decidui; stigma capitatum; fructus ellipticus, circa 4 mm. longus; semina laevia, paulo angulata.

The type specimen (Mueller no. 8571) collected July 6, 1932 in "Upper Cat-tail Canyon," Chisos Mountains, is deposited in the herbarium of the University of Texas, and a co-type in the herbarium of the Field Museum of Natural History. Dr. Young's notations indicate that a duplicate of her collection from the Davis Mountains is deposited in the herbarium of the Missouri Botanical Garden under the number 57.

University of Texas

BOOK REVIEWS

Three Keys to Plants in the Torrey Club range[1]

This booklet deserves a warm welcome by all those of our region interested in wild flowers. Covering the area of the Torrey Botanical Club, the keys make use of easily recognized characters, such as color, shape and leaf arrangement. Groups that have proved particularly difficult are taken. The first key, to submerged and floating aquatic plants includes water lilies, duck weed, Potamogetons, Utricularias and others. The second key includes the fall flowering monocotyledons, exclusive of grasses and sedges. The third includes all the flowering composites. This last has 12 sub-keys, under such heads as—composites with spiny or prickly leaves; unarmed composites with disk flowers and white rays; white asters; blue purple and pink asters; unarmed composites with disk flowers and yellow orange or brown rays; bidens; goldenrods; eupatoriums; unarmed composited with drooping heads of ray flowers.

With the key it is a simple matter to determine any of the composites, goldenrods, asters or others that have been difficult with the manuals, because of the much greater number of species found in the wide range covered. Of asters, 30 species are given and about as many goldenrods, which include all those reported from our region. The pamphlet can easily be placed in a pocket or handbag and determinations quickly made in the field. A complete glossary and an index which gives the common as well as the scientific names of all the plants complete the book.

In preparing the keys Miss Barrett made use of the local herbarium at the Bronx Botanical Garden, of Norman Taylor's "Flora of the Vicinity of New York" and of the regular manuals.

George T. Hastings

[1] Three keys to Wild Flowering Plants of Connecticut, Southeastern New York, New Jersey and Eastern Pennsylvania. Mary Franklin Barrett. Published by the author at Bloomfield, N. J. 1933. Paper covers, 2 plates, 46 pages. 50 cents.

Hawaiian Mosses[2]

A decade ago the reviewer criticised local scientific institutions for their plan of desiring to publish simply a check list of Hawaiian plants instead of producing a complete, fully illustrated flora of the Hawaiian Islands. Receiving no encouragement for undertaking such a more pretentious work which should prove of value to the layman as well as to the scientist, he set out alone to write a fully illustrated flora of the Hawaiian Islands as far as the Vascular Plants are concerned. Now he is agreeably surprised to find that the B. P. Bishop Museum of Honolulu has just published a moss flora by Edwin B. Bartram which exceeds in excellence his fondest hope. It is not only illustrated, but it is written so that everyone can understand it, whether technically trained or not.

Bartram's "Manual of Hawaiian Mosses" will always remain a classic in its field. It is a scholarly work of 275 pages, carefully describing and illustrating every moss ever recorded from the Hawaiian Islands. Due to the author's studies and his personal collecting in 1930 in the Islands, 195 species and 19 varieties are now known to comprise the Hawaiian moss flora. Of this number 120 species and 16 varieties prove to be endemic, while 75 species and 1 variety are of more extended range. Seventeen species and 4 varieties are described as new, and 29 nomenclatorial changes have been made. The work also describes the life history and structural features of mosses in general; gives a key to the genera and species represented, a glossary and a complete index.

The "Manual of Hawaiian Mosses" is of interest not only to local botanists and plant lovers. It is recommended to every serious student of the group in the world if for no other reason than that it deals with many cosmopolitan species.

OTTO DEGENER, HONOLULU, T. H.

Manual of Plant Diseases[3]

The second edition of Heald's Manual of Plant Diseases has been enlarged to 935 pages; it shows considerable new material

[2] Manual of Hawaiian Mosses, Edwin B. Bartram. B. P. Bishop Museum, Honolulu. T. H. 275 pages. 1933.

[3] Manual of Plant Diseases, Frederick DeForest Heald, McGraw-Hill Book Co., 1933.

and a certain amount of revision. It is a pleasure to note that the author has retained the original plan of the book which makes it a work on botany rather than a mere compendium of diseases. It thus takes on both a physiological and an ecological interest. The author is evidently not greatly concerned with genetics, at any rate he gives scant attention to the subject of disease-resistant strains. Like others who are engaged in "practical" work he has not been able to refrain from introducing some "Farmers'-Bulletin" illustrations such as Fig. 2 "Class in Plant Pathology at the State College of Washington." This and other figures could be omitted to advantage.

A convenient division of the book is made, into four sections: I, Introduction and symptoms of disease; II, Non-parasitic diseases; III, Virus and related diseases; IV, Parasitic diseases. In the last-named section there are chapters on diseases caused by bacteria, slime molds, fungi, parasitic seed plants, and nematodes. Most of the diseases are discussed as follows: history, geographical distribution, symptoms, economic importance, etiology, host relations, prevention and control.

Every botanist needs to know something about plant diseases, and here is a very satisfactory presentation of the subject. The book in its present form should prove even more useful than the first edition, which has been a standard reference work for seven years.

Francis Ramaley

FIELD TRIPS OF THE CLUB

Excursions to Montauk Point

Because of the unusual botanical and geological interest of Montauk Point, and the low excursion rate of $1.50 for the trip of 200 miles out and back now offered by the Long Island Railroad, the chairman of the field committee scheduled four excursions this season to that locality and all of them were well attended and enjoyed. In early June, club members joined with the Reptile Study Society in exploring the eastern tip, near the lighthouse and the bluffs; on July 30, the western end, in the Hither Hills State Park, was examined; and other parts were covered in trips in mid-August and early September.

On the July 30 trip, led by the writer, 28 members and guests were present. The best way to save time and reach interesting regions for botanical study, is to get bus transportation from the railroad station, a few miles east or west and walk back to the station for the return train. On this trip, we took a bus six miles west to the low part of the point, at Napeague Beach, and rambled eastward, through the oak and pine woods of the Hither Hills, out to the beach of the north shore, on Block Island Sound, and along the beach back to Montauk village.

On the inner slope of the backbeach dune, besides the usual marine flowering plants, among which *Chrysopsis mariana* was most common and brilliant at the time, were found some interesting lichens, rather surprising so close to the sea. There were large mats composed of *Cladonia sylvatica* and *Boryi*, and among them was found a large colony of the Iceland Moss lichen, *Cetraria islandica*, var. *crispa*, which is generally thought of as a northern species. Beach plums and Bayberry bore small but well fruited plants of *Usnea barbata*, also reminiscent of the North Woods. Small colonies of *Cladonia cristatella*, f. *vestita*, covered the dead bases of Beach Grass.

The party then struck north, across the railroad track and among the moraine hills, veneered with dune sand, blown from Napeague Beach and Harbor, and covered with a dense, gnarled growth of white, red and black oak, with occasional holly. Our course brought us to the south side of a kettle-hole pond, Nommonuck or Fresh Pond, the eastern end of which is still open, but the western half is filling up with sand blowing from Napeague Harbor, which has shallowed the kettle so that swamp vegetation is filling it up, leaving a few small open pools here and there.

The blowing dune is reached at the west end of the kettle area, where its southern limb is moving into the depression. The dune is roughly crescentic, and most active on its south and north limbs, where trees 30 to 50 feet high are being rapidly covered and killed. There was a brisk westerly wind and grains of sand were blowing down the front of the dune, in copious quantities, visibly covering the leaves on the forest floor as we watched. On days of strong wind, the toe of the dune must advance some inches, and some of the trees had obviously been covered several feet deep around their bases during the present season.

In the center of the crescentic dune, the advance seems to be slowed up a bit and there is a little island of pitch pine and bearberry, and patches of *Cladonia Boryi* and *sylvatica*, and bits of probable kettle remains, with sour gum, holly, and greenbriar, which seems to have escaped burying by the blowing sand.

After an exhilarating swim, in the warm, calm water, on the North shore, we moved along eastward, at the foot of the moraine bluffs. Large, healthy looking colonies of *Ammodenia peploides* grew thickly on this strand. An interesting exotic was the Chinese rose, *Rosa rugosa*, which has been established in many places on Montauk Point, possibly by the floating of its large hips from some cultivated stand of the species on the Connecticut or Rhode Island shore. Its large handsome flowers and immense hips, as big as small tomatoes, make it a striking plant.

Boulders of New England granite, on the top of the bluffs, proved to have an interesting flora of crustose lichens, including *Rinodina oreina*, which is an inhabitant of hilltops in the Highlands of the Hudson, and seemed odd a few feet above sea level; *Lecanora melanaspis* and *cinerea*, and *Biatorella clavus*. Some of us had a pleasant visit with Mr. Edward Vail, a fisherman, and his wife, who were pleased at our interest in the lichens on their big boulder. They are friends of Roy Latham, of Orient, who wrote an account of the Flora of the Town of Southold, L. I., which appeared in Torreya about 15 years ago.

A handsome colony of *Solanum virginianum*, with large lavender blue flowers, and spiny stems, was found, in the lane back to the station.

RAYMOND H. TORREY

The South Jersey Trip, August 27, was a big success botanically though there was somewhat to be desired as to members. There were found three species of *Habenaria*,—*integra*, *ciliaris*, and *blephariglottis*. We were too late for *H. cristata*. A fine stand of *Coreopsis rosea* was observed near Waretown. As all had seen *Lygodium* we did not go in to see that although we were near one of the finest stands in New Jersey. *Euphorbia polygonifolia* was abundant while *E. corollata* was rather rare and past its prime. Only three specimens of *Eryngium virginiaum* were found Freshly collected specimens of *Eryngium yuccaefolium* and *Nymphoides Nymphaeoides* were shown but not the stands. *Schizaea* was observed in Mr. Frazee's pet stand, which he claims to be the farthest north in New Jersey. The promised *Gratiola aurea* did not materialize as the location was completely flooded. A well matured fruit of *Citrullus Citrullus* was found and enjoyed by all.

V. L. FRAZEE

PROCEEDINGS OF THE CLUB

Meeting of October 3, 1933

The following people were unanimously elected to membership in the club: Miss Ruth M. Anderson, 66 East 83rd Street New York; Miss Dorothy Jewett, 434 Richmond Avenue, Maplewood, N. J.; Mr. George M. Krall, West Trenton, N. J.; Mrs. S. W. Peloubet, 228 Sagamore Road, Maplewood, N. J.; Mr. Charles H. Sass, 1824 Colden Avenue, Bronx, New York; Mr. George Henry Schneller, 105–19 37th Avenue, Corona, New York; Dr. MacMillan Wright, 97 Summit Avenue, Montclair, N. J.; Miss Anna M. Wychoff, 1104 4th Avenue, Asbury Park, N. J.

The resignations of Mr. George Hume Smith and Mr. Paul Patterson were accepted with regret.

The loss of two members, Mr. William A. Rauchuck and Dr. Ephraim Nobel Lowe through death, was reported.

It was voted that a committee be appointed by the President to write resolutions of commendation to John D. Rockefeller on his gift of land to the Palisade Interstate Park. Dr. R. A. Harper and Dr. B. O. Dodge were appointed.

The President called on various members of the club to tell of their field experiences during the summer.

Miss Nicholson told of her trip in the South. Mr. Hastings spoke of his collecting at his camp this summer. Mr Torrey told about a trip along the St. Lawrence and Gaspé Bay region. Dr. Harper told of his experience in growing the compas plant, Silphium sp. and flowering sedge and expressed a desire for seeds of Silphium of local origin for comparison with the Western species which he is growing.

Dr. Dodge asked if members of the club would tell about stands of southern white cedar, *Chamaecyparis thyoides*, on Long Island and Dr. Svensen was able to mention several of these.

Dr. Hazen told about his trip in England and his collecting around Plymouth and about the meeting of the British Association during the summer, particularly emphasizing that the English made more of a social event than a business gathering of it. He also mentioned the very fine collection of Sundews and

American Pitcher Plants at the Royal Botanic Gardens at Kew, and brought up the question why more of these things are not found in American botanical gardens. Professor Blakeslee said that uncommon things are found in American gardens and local things are neglected.

Mrs. Goode mentioned that the clubs in South Carolina were very successful in preventing people from dumping rubbish on waste lots and woodlands by simply publishing in the local papers instances of such violations.

Dr. Sinnott emphasized the severity of the drouth through Western Connecticut during July. He said that in his home in Woodbury during August and September many of the spring flowers blossomed a second time due to the check of their growth during the drouth. He also mentioned the abundance of the very tall fringed gentian during this season around his place. Sometimes it disappears from a locality for a number of years and then comes back. He also mentioned that the shagbark hickory has very little fruit this year.

Dr. Blakeslee brought up the question of periodic fruiting of white pine, whether this was due to climatic or other influences.

Dr. Gunderson spoke of his stay in the Catskills and specially mentioned the six species of club mosses found around his camp there. He brought out the fact that these are often found growing together there whereas in most places in Europe there is frequently only one species in a locality, the distribution being local.

Mrs. Anderson told about the Torrey Club trip to the White Mountains which she led in September for lichens and emphasized particularly the distribution on the Summit of Mt. Katadin where she found more species of Cetraria than Cladonia. The Cetrarias are better adapted to dry and exposed places. The Cladonias being more common in sheltered and places near trees and edges of rocks.

Forman T. McLean
Secretary

NEWS NOTES

Among the foreign members elected to the Linnean Society of London was Dr. Elmer B. Merrill of the New York Botanical Garden. Dr. Merrill was the only American elected this year.

Dr. Adolf Pascher, professor of botany at the German University at Prague, has been appointed director of the Botanical Garden and Institute. (Science)

At Oberlin College, the retirement is announced of Professor Frederick Orville Grover, head of the department of botany. Professor Grover became associate professor at Oberlin in 1898 and was appointed professor in 1900. (Science)

An Opportunity to Cooperate in the Study of Hawaiian Plants!

Because of the unique geographical position of the Hawaiian Islands, the writer ten years ago realized that the existence of a complete, illustrated Hawaiian flora would be of considerable scientific interest and value. As no work of this kind has ever been written—few people are aware that vast areas on many of the larger islands are even now botanically almost unknown—he resolved to attempt this task himself. Meeting with some local opposition and relieved of all teaching duties, he has been able to concentrate since 1927 on the collecting and studying of Hawaiian Vascular Plants. The resulting herbarium, now stored at the New York Botanical Garden, comprises about 40,000 specimens. The writer wishes to communicate with botanists who are interested in some of the Hawaiian genera represented and who may desire to aid in their study. The result of such studies would be finally embodied in the "*Flora Hawaiiensis*" or "New Illustrated Flora of the Hawaiian Islands." Address Otto Degener, Care New York Botanical Garden, Bronx Park, New York.

At the Arboretum of the University of Wisconsin which was established last fall, some 13,000, Norway and White Pines and 2000 Spruce trees have been planted and other young trees have been set out. The Arboretum is to be an outdoor experimental laboratory and Wild Life Sanctuary. The committee in charge is headed by Dr. E. M. Gilbert, Professor of Botany at the University. Dr. George W. Longenecker has been appointed director of the Arboretum and Mr. Aldo Leopold, Professor of Wild Life Management and Research Director.

The Sixth International Congress of Botany will meet at Amsterdam from September 2 to 7, 1935. It was originally planned to hold the congress in September of the present year. (Science)

From the United States Department of Agriculture comes the announcement of the appointment of Knowles A. Ryerson as Chief of the Bureau of Plant Industry, effective January 1, to succeed Dr. W. A. Taylor. Dr. Taylor retires after 42 years' service in the Department of Agriculture, the last 20 of which have been as head of the Department's largest scientific bureau. Dr. Ryerson is at present in charge of the Division of Foreign Plant Introduction. During the war Dr. Ryerson served with the Forest Engineers branch of the A.E.F. in France and in several other capacities. He received from the French government the Chevalier du Merite Agricole.

Frederick D. Richey, at present in charge of corn investigation of the Bureau of Plant Industry, has been appointed to assist Dr. Ryerson, as Assistant Chief of the department. Dr. Richey will give special attention to research activities.

Karl F. Kellerman, former Assistant Chief, becomes head of a new Division of Plant Disease Eradication and Control in the Bureau of Entomology. The division has had transferred to it all activities directed towards the control and eradication of the phony peach disease, blister rust, barberry rust, citrus canker and Dutch elm disease. Dr. Kellerman will devote his entire time to plant disease work, in which work he has been an outstanding leader for twenty years.

In connection with the erosion-control undertaken by the Forest Service through the 103 erosion-control camps of the Civilian Conservation Corps many thousands of trees must be planted. Most of the planting will be done by the corps, but many farmers will plant on their own land where gully-stopping dams have been built. Black locust, pine, cottonwood and willow trees have already been set out in some of the areas, more of these and other trees suited to the localities concerned will be planted in the spring.

Mile-long rock gardens. At Cornell University a fund of $250,000 received from the estate of the late Colonel Henry W. Sackett is being used to make accessible and to beautify the gorges of Fall and Cascadilla Creeks. Trails with steps and walls of native stone have been built. Hundreds of young trees and shrubs characteristic of the region have been planted. Rhododendron, flowering dogwood, yews, fragrant sumach, striped maple and hemlock from the university's own nurseries have been used. In addition 500 ferns have been placed in the rocks of the gorge walls and along the stream banks.

Parke, Davis and Company of Detroit have given to the University of Michigan a herbarium of 50,000 specimens and part of their large botanical library. The herbarium includes plants from South America, Mexico, the East Indies and Africa, as well as 15,000 Michigan plants collected by Dr. O. A. Farwell.

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Names of species and varieties described as new are in **black faced** type.

THE TORREY BOTANICAL CLUB

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OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A journal devoted to general botany, established in 1870 and published monthly, except during July, August, and September. Vol. 59, published in 1933, contained 564 pages of text and 32 full page plates. Price $6.00 per annum. For Europe, $6.25.

In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE—a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24–59 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–18 are now completed. Volume 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00.

Volume 18, no. 1, 108 pages, 1931, price $2.00. Volume 18, no. 2, 220 pages, 1932, price $4.00. Volume 18 complete, price $5.00.

(3) Index to American Botanical Literature, reprinted monthly on cards, and furnished to subscribers at three cents a card.

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