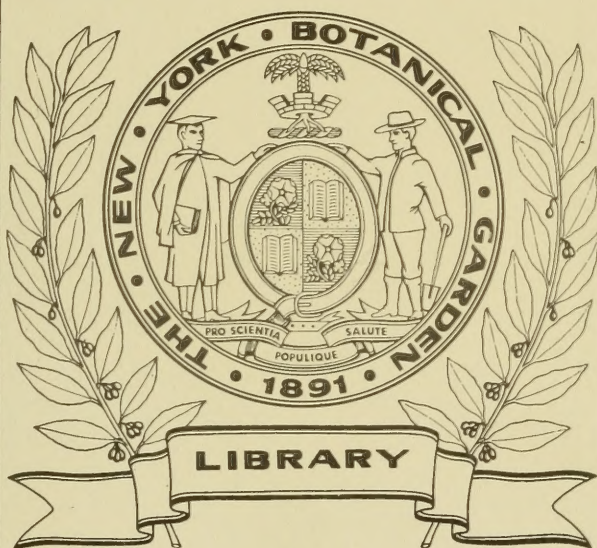


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1930



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 30

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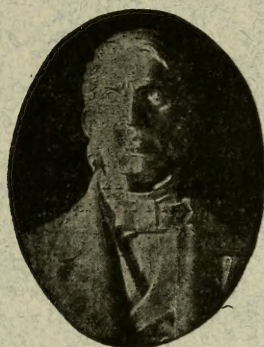
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John Torrey, 1796-1873

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

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2587 Sedgwick Ave.

New York City

TORREYA

Vol. 30

January-February, 1930

No. 1

Back Yard Botanizing

H. A. GLEASON

My home in Bronxville does not occupy a large plot of ground by any means, but it has provided me with an extraordinary amount of botanizing during the past seven years. Scores of uninvited guests, some of them welcome, many distinctly unwelcome, have come in and made themselves at home. Some of them have been weeded out and destroyed, some have disappeared naturally, others are still there and defy all my efforts to dislodge them.

Whence do they come? Many from the little vestiges of original forest vegetation which still are plenty in and around Bronxville; some merely from my neighbors; some in packing or earth or seeds from distant sources; many from places not only unknown but even un conjectured. The point is that they come, some of them every year, some of them once only. One never knows in the spring what the coming summer will produce and every season brings a fresh surprise. Every strange seedling is allowed to grow and is carefully watched until it is large enough to identify. That often means waiting until they bloom, and that in turn may lead to a permanent occupant of the garden where we had wished for a mere temporary one.

In 1928 we were away during the entire growing season and had no idea of what new visitors we may have received. The next year was accordingly of exceptional interest, since we had the immigrants of two years to become acquainted with.

The systematic botanist likes to classify, and I shall arrange these visitors to my garden in three groups, mentioning many of them by name and discussing some of the more interesting ones in more detail.

First, we have the ordinary weeds of cultivated grounds. These plants doubtless migrate into my garden every year from my neighbors in all directions, or from street-sides and vacant lots, and for that matter, from my place to my neighbors as well. We are all very generous with our weeds. If by careful work I exterminate one species completely, I know it will be back next year anyway. There is no hope for their permanent banishment. All we can do is try to keep their numbers down to a minimum.

These common weeds we shall have to classify further into those of flower-beds, hoed ground, and the bare soil under shrubbery, and those of the lawn. The two groups are quite distinct in species.

In the beds and shrubbery the commonest weeds are the sorrel (*Oxalis cymosa*), the chickweed, galinsoga, nimble Will (*Muhlenbergia diffusa*), and wandering Jew, all of which tend to spread into the shadier edges of the lawn. Others which are present every year but do not constitute a serious menace are shepherd's-purse, foxtail, carpet weed, and purslane.

Galinsoga is an interesting weed, and I believe it would repay some careful experimentation. Seeds which have passed the winter refuse to germinate until the ground is thoroughly warmed in late spring and then grow to a fair size before blooming. Seeds produced during the summer germinate immediately, even until after frost. As the days become shorter in late summer and early fall, so does the life cycle of the plant, until in October it may set seed when only an inch high. Is this an effect of temperature or is it due to the shorter period of daylight? And if the summer seeds germinate so quickly, why do not all of the seeds germinate the same year, the later ones taking advantage of the warm days of Indian summer? Obviously, if they did, we would not have galinsoga with us much longer. I commend the plant to my colleagues at the Boyce Thompson Institute for study.

Numerous other weeds are sporadic in appearance, easily eradicated, and not always developing in successive years. Such are the fleabanes (*Erigeron ramosus*, *annuus*, and *canadensis*), smartweed, cinquefoil (*Potentilla monspeliensis*), red sorrel, Canadian blue grass, pepper grass, and wild carrot. I have seen single plants only of Spanish needle (*Bidens vulgata*), tumbleweed, ground ivy, and burdock. A single plant of another cin-

quefoil (*Potentilla recta*) was preserved for six years and showed no tendency to spread. A huge Mexican tea (*Chenopodium ambrosioides*) was in full bloom on my return to the place in the late summer of 1925; it has not reappeared. During the first year of my occupation lamb's quarter was so abundant that it gave us a fine dish of greens, but it has scarcely been seen since then. Single plants of Deptford pink and winter cress appeared in 1929, a night-flowering catchfly in 1926, an unnamed *Cyperus* in 1927.

While weeds are a nuisance in cultivated grounds, they can at least be reduced by the hoe, but in a lawn they are a pest. Excluding white clover, the presence of which is often desired, I have noted nearly thirty kinds of weeds in my limited expanse of lawn. A few of these are dangerous and ruin the lawn if strenuous measures are not used against them. These are the two species of plantain, *Plantago Rugelii* and *P. major*, the dandelion, the mouse-ear chickweed, the crab-grass, and the self-heal. Of these only the last two need any comment.

Our native self-heal is usually an erect plant, sometimes three feet high, with flower-heads an inch long. The form which grows in lawns is a prostrate creeper with flower-heads seldom more than half an inch long. It has often been said that its prostrate habit is due to the lawn mower which keeps the leaders clipped off; this is not the case. Young prostrate plants from seed have been carefully watched and allowed to grow unchecked, but still retained the creeping form and small heads. In the lawn it forms small but always increasing patches which kill the grass completely. The stems are fragile so that the plants have to be pulled up piecemeal. Fragments of it are scattered by the mower or rake and take root, and seed reproduction is effective also. In 1922 my lawn contained one fair-sized patch; now it has a dozen small ones scattered widely across it.

Crab-grass does not germinate until late summer. Under ordinary conditions it makes fair-sized plants before blooming, which can be pulled up easily, although care must be used to take every bit of them out. A single fragment left in the soil will bloom as a dwarf and furnish seeds for next year. Last summer was so dry that crab-grass did not germinate at its usual time, and when rains finally came the season was so late that it had to hurry its bloom. As a result it never was a serious weed, but

it appeared by hundreds instead of by tens and bloomed at a very small size. I noted plants only two centimeters long from the base of the stem to the top of the spike. It was impossible to get them all and I predict an epidemic of crab-grass for 1930.

Wild garlic is unsightly in the spring, when one spares the lawn mower to give the crocus a chance, but my few plants are easily kept in check and each year sees less of it. Orchard grass is another persistent pest and new clumps appear as fast as I dig the old ones out. Timothy and red-top bother but little. Knot-grass and spurge (*Euphorbia maculata*) grow in a few isolated patches. Bitter Dock appeared in 1928 and tried to bloom in 1929. The latter year also brought black medick for the first time. Four species of rosette plants, the buttercup (*Ranunculus acris*), ox-eye daisy, mullein, and moth mullein appeared with regularity each year, although two of them are biennial and none is allowed to seed. Two creeping species of *Veronica* were first noted in 1929, and must wait for flowers and fruits before they can be identified.

My second class is far more interesting than the first. It includes the native woodland plants of the vicinity, which are trying to reclaim what they once possessed. Some of them have to be treated as weeds and ruthlessly exterminated, but most of them are welcomed and encouraged to grow, provided they have selected a reasonable place.

Of young trees, I have had black oak, hickory, sugar maple, silver maple, tulip tree, black cherry, and sassafras, only the last one being kept. Two kinds of goldenrod (*Solidago neglecta* and *speciosa*), heart-leaved aster, and two or three white asters appear in numbers every year and a few plants of each are kept for autumn bloom. Blue violets invade my flower beds by the hundred and must be hoed out as soon as they have finished blooming. One plant of groundnut has bloomed for eight seasons and its relative, the hog peanut, appeared under some shrubs in 1927. Venus' looking-glass came up under a fir tree in 1924; it does not like the dressing of granulated peat but is still trying to live. Indian tobacco (*Lobelia inflata*) bloomed for the first time in 1925, and every year since then we have had numerous plants. Certainly some of them must hide away in a corner and ripen seeds, for I have not been able to exterminate it. Black-eyed Susan has appeared and bloomed in three places but re-

fuses to stay longer. Three-seeded mercury, wild lettuce, clearweed, poke, small-flowered crowfoot, five-finger, and loosestrife have each appeared once, and the last alone was allowed to remain. It succumbed to the drought of 1929. A dozen or more plants of honewort came up at the edge of the rhododendrons in 1929. A tiny plant of bladder fern settled in a crevice in an oak tree, a foot above the ground, in 1827. It leads a precarious existence there but came through last summer's drought alive. *Merchantia* probably arrived during the wet summer of 1928. Last summer several small patches sent up reproductive branches growing close to the shade of my boundary fence.

All of these are growing, or trying to grow, under shrubs or trees and in the beds. Out in the lawn conditions are much less favorable for woodland plants, yet several have shosen to try it. *Festuca octoflora* mingles with the bluegrass in several places. Star grass and avens have each appeared once. A few plants of blue-eyed grass and spring beauty bloom every spring. The sensitive fern has burrowed under my fence from a patch at the side of the street. *Carex laxiflora* is pretty well established in a shady corner and does not seem to mind the lawn mower. Robin's plantain is almost a weed, so that I dig out some scores of the basal rosettes every summer. Yarrow has been seen once or twice. My prize possession in this class, however, is *Selaginella apus*, of which at least a dozen plants grow on a moist shaded slope. They probably arrived in 1928, since they were well established in 1929.

Our third class includes cultivated plants that come up spontaneously about the place. Seedlings of snowberry, Japanese barberry, and horse chestnut are common, and come from parent plants on the ground. A blackberry vine appears each year, though I have been trying to kill it since 1922. Wild plants of cosmos bloom nearly every year among my iris. Seedling locusts are abundant, coming from a parent tree just over my line fence. Single plants have been noted of snow on the mountain, Japanese honeysuckle, raspberry, and apple. A large gaura came in with some pansies and flowered in my window box. Two seedlings of trumpet creeper germinated together in 1929 and are now trying to climb up my fence.

Finally, and most remarkable of all:

A certain small bed of lily of the valley offered nothing un-

usual in 1922, 1923, or 1924. In 1924 a small plant with linear leaves came up in the middle of it, and was suspected to be a lily. In 1926 it was larger and the two beautiful flowers showed it to be *Lilium auratum*! Seven flowers were developed in 1927, five in 1928, and five on two stems in 1929, when the bulbs were nearly destroyed by beetles and were removed to another place. How *Lilium auratum* ever transported itself unassisted into my garden is a mystery to me. My readers may explain it for themselves, if they can.

I have not tried to mention all the plants which grow, or have grown, naturally on my place; the total is more than a hundred and fifty species. Nor can I account for the absence of some other common things. Why has not such a common weed as the giant ragweed, abundant on a vacant lot a hundred yards away, not come in? Why doesn't the jewel weed settle down by my sensitive fern, since the two so often live together? And were the dozen seedling jack-in-the-pulpits which came up under my weigela actual immigrants, or merely the progeny of my own plant, ten feet away down the hill?

As for the ragweed and jewel weed, I have every confidence that I shall get them both in due time. In fact, I expect to add at least ten species to my list every year. Some of these days I may even find a bloodroot growing among my violets and a lady-slipper beneath the pines.

NEW YORK BOTANICAL GARDEN

My Wild Flower Garden in the Heart of New York City

DOROTHY OAK

Each spring, as soon as the roads are passable, I begin going off into the country in my car, to collect specimens for my school work. Therefore, even before the maple buds begin to swell or the first skunk cabbage appears, I am collecting twigs and cocoons. My car was bought with an eye to utility for this purpose and I often bring back more mud inside than out!

In these drives on all the highways and byways around the city, we have seen the development of many of the suburbs, and in our opinion it is the clearing of the ground for subsequent building, which is the greatest factor in the extermination of the smaller wild flowers.

As a member of the Wild Flower Preservation Society, I listened with interest to the suggestion concerning the establishment of wild flower sanctuaries, and decided to try to transplant all the "wildings" I could, both to the city yard and the garden at Woods Hole, Mass. It is the success I had in the city, that I am concerned with here.

We lived in an ordinary 19-foot wide house in the heart of Harlem, but our yard has southern exposure and added to that, we had the advantage of an opening in the houses to the south of us, right through to the next street, so that we got an unusual amount of sunlight.

After many experiments and failures, I discovered that the east side of the yard, near the fence, which received the afternoon sun, was best for most of the early spring flowers. A shady corner in the back of the yard, where the ice remained very late, became the "fern corner." Here we transplanted the ostrich, cinnamon, sensitive, Christmas and evergreen wood fern. From Vermont, one year, we brought some ebony spleenwort, which survived several years, growing weaker with each succeeding winter, however. In this corner, among the ferns, were Jack-in-the-pulpit, wild iris, purple and yellow violets, bird foot violets, and red and white trilliums.

On the eastern side of the yard, a large patch of bloodroot had developed from a few plants, and each year they appeared a few days or a week before I could find them in the woods. Hepaticas, with Dutchman's breeches, brought from near Dan-

bury, Conn., were near by. A little later came the saxifrage, bellwort, Solomon's seal, bluets, columbine, yellow cinquefoil, and a lovely mass of wild geranium. The wood and rue anemone and wild strawberry were here, too, and I finally succeeded in establishing the spring beauty. Still later in the spring, we had the star of Bethlehem and in the fall, the tansy and wild clematis brought from Martha's Vineyard. I also had several pussy willows grown from slips cut from wild bushes.

At one time, we had several very handsome, yellow ram's head orchids and some fine specimens of the pink moccasin flower and rattlesnake plaintain. These precious plants, brought carefully from Vermont, and nursed tenderly, were dug up by our pet dog!

Each spring I read Whittier's "Jack-in-the-pulpit" to my classes and I was usually able to show them living specimens of most of the flowers mentioned, taken from my own back yard.

One flower I never tried to transplant, because of its very deep corm was the yellow adder's tongue, though after my success with the spring beauty, I planned to try it.

Considering that every summer, from June to September, the weeds grew rank and there was no one to fight caterpillars or water the yard, I think my wild flowers did pretty well. We fertilized them with tea leaves, coffee grounds, wood and paper ashes, bone meal and sheep manure, chiefly the three former, however!

Three of the fences were covered with luxuriant ten year-old woodbines and near the fern corner stood a maple tree transplanted in my childhood as a seedling from Central Park.

With the exception of the clematis, tansy, and lady slippers, all of the flowers were collected within an afternoon's drive from the heart of the city—most of them came from regions of Westchester County, which are being rapidly developed, or from the edges of the main roads where they had been overlooked by motorists whose chief object is to cover mileage and who, consequently, do not see the smaller wild flowers.

I hope this brief account will prompt others, who are interested in saving our native wild flowers, to transplant them to city back yards—if they are fortunate enough to have a yard, where, at least these flowers will not be left to "bloom unseen" and unappreciated.

NEW YORK, N. Y.

Contributions to the Flora of Long Island, New York Sixth Paper*

WILLIAM C. FERGUSON

All the plants listed in this paper, at every locality cited, were collected by the writer, mostly in the seasons of 1928-29. There are a few exceptions to this of plants not before recorded in these papers, and also some new localities for rare plants listed in former papers. These records are restricted to plants that in the writer's experience are rare on Long Island. Duplicates of most have been deposited in public herbaria.

Sparganium and *Lemna* were named by Dr. P. A. Rydberg.

Cuscuta by Dr. T. G. Yuncker.

Gramineae by Mrs. Agnes Chase.

Carex by Mr. K. K. Mackenzie.

Juncus Dudleyi, *secundus*, *debilis* by Mr. F. V. Coville.

Eleocharis palustris group by Dr. M. L. Fernald, who has just published a revision of this group in *Rhodora*, April, 1929.

All doubtful plants by the staff of the New York Botanical Garden. The writer gratefully acknowledges his appreciation of this generous aid.

SPARGANIACEAE

SPARGANIUM EURYCARPUM Englm. Rare in swamps, South Jamaica.

SPARGANIUM ACAULE (Beeby) Rydbg. Rare in wet borders of streams. Freeport, Merrick, Seaford, Massapequa, Amityville, Babylon.

SPARGANIUM DIVERSIFOLIUM Graeb. Rare in wet borders of streams and swamps. Baldwin, Seaford, Amityville.

GRAMINEAE

PASPALUM CIRCULARE Nash. Rare in meadows. Oakdale.

PANICUM LUCIDUM Ashe. Rare or occasional in sphagnum bogs and swamps. Meadowbrook, Ronkonkoma, Freeport, Seaford, Laurelton, Bellmore, Brookhaven, Cold Spring Harbor, Babylon, Massapequa.

ZIZANIA PALUSTRIS L. In water. Rare and local; very large colonies at Sayville and Brookhaven. Small colonies at Flushing, South Jamaica, Bayport.

STIPA AVENACEA L. Rare or occasional in dry woods. Easthampton, North Sea, Hither Woods, Montauk, Sag Harbor, Oakdale, Wyandanch.

MUHLENBERGIA FOLIOSA Trin. Rare in damp meadows. Fresh Meadow Road, Flushing.

* Previous papers in this series appeared in *Torreyana* **22**: 43-49, 1922. *Bull. Torey Club* **51**: 177-201, 1924; **52**: 133-136, 1925; **53**: 303-308, 1926. *Torreyana* **28**: 45-51, 1928.

BRACHYELYTRUM ERECTUM (Schreb.) Beauv. Occasional in rich hilly woods in and north of the morains, locally abundant. Queens, Port Washington, Smithtown, Millneck, Glen Cove, Plattsdale. Very rare south of the morain at Oakdale.

TRisetum PENNSYLVANICUM (L.) Beauv. Rare in swamps and wet thickets. Yaphank, Cold Spring Harbor, Oakdale, Sagville.

UNIOLA LAXA (L.) B.S.P. Rare in moist, rich woods. Merrick.

PANICULARIA GRANDIS (S. Wats.) Nash. Rare in swamps. Newtown.

PANICULARIA NERVATA (Willd.) Kuntze. var. *stricta* Scribn. Rare in rich soil and drier parts of swamps in North western Long Island. Winfield, Newtown, Woodside. Grows in drier situations, culms more scattered, not densely tufted like the species. Is much lower and slenderer, with narrower leaves, the dark brown spikelets having longer scales and maturing two or three weeks earlier. The writer believes this plant will eventually be given specific rank.

CYPERACEAE

CYPERUS FLAVESCENS L. Rare, wet sandy shores and swamps. Sayville, Oakdale, Wantagh, Valley Stream, Cold Spring Harbor.

CYPERUS ENGELMANNI Steud. Rare on wet shores. Baisley Pond, Jamaica.

CYPERUS SPECIOSUS Vahl. Frequent throughout in wet fresh, brackish and salt shores and swamps. Reported in my former papers as *Cyperus ferax* Richard; Dr. N. C. Britton now names our common Long Island plant —*speciosus*—and states that *ferax* is southern, reported as far north as New Jersey and possible on Long Island.

ELEOCHARIS PALUSTRIS¹ (L.) R. & S. var. *major* Sonder. Rare. Often in water. Wading River. Seaford.

ELEOCHARIS SMALLII¹ Britton. Frequent in swamps and wet shores. Winfield, Cold Spring Harbor, Massapequa, Millneck, Ronkonkoma, Sag Harbor, Meadowbrook, Bridgehampton, Flushing, Amityville.

ELEOCHARIS CALVA¹ Torr. Rare in swamps. Cutchogue, Woodside, Massapequa.

ELEOCHARIS UNIGLUMIS¹ (Link). Schultes var. *halophila* Fernald & Bracket, Rare, salt and brackish shores and marshes. Easthampton. Montauk.

SCIRPUS MICROCARPUS Presl. Rare in swamps. Flushing, Woodside.

SCIRPUS PALUDOSUS Nelson. Frequent throughout in salt marshes. The validity of this species as distinct from *Scirpus robustus* Pursh is established beyond doubt. The writer's suggestion that it might prove to be a seedling of *robustus* is not worth consideration. (Bull. Torrey Club 1925.)

RYNCHOSPORA TORREYANA A. Gray. Very rare in damp soil. Amityville.

SCLERIA TRIGLOMERATA Michx. Rare in moist soil. Oakdale, Amityville, Seaford.

SCLERIA MINOR (Britton) Stone. Very rare in most meadows. Oakdale, Babylon.

¹ *Eleocharis palustris* in North America. M. L. Fernald, Rhodora, April 1929.

SCLERIA PAUCIFLORA Muhl. Rare in dry or moist soil. Pine barrens at Oakdale and Ronkonkoma. Hempstead Plains at Garden City. Mineola, Westbury, and Hicksville.

CAREX LEPTALEA Wahl. Occasional in wet sphagnum thickets, Millstone, Flanders, Central Islip, Montauk, Lakeview, Wyandanch, Cold Spring Harbor, Roosevelt, Smithtown, Oakdale, Bayport.

*CAREX RICHII*² (Fernald) Mackenzie. Rare in swamps. Fresh Meadow Road. Flushing.

CAREX BUXBAUMII Wahl. Very rare. Wet place in hilly rich woods. Queens.

CAREX BARRATTII (Schw.) Torr. Rare in swamps. Islip, Wyandanch, Lynbrook, Oakdale.

CAREX POLYMORPHA Muhl. Rare in damp soil. Oakdale.

CAREX TETANICA Schkr. Rare in damp meadows. Newtown, Winfield.

CAREX TRISPERMA Dewey. Rare in sphagnum in wet bogs and woods. Oakdale, abundant; the only station the writer has seen the typical species.

CAREX TRISPERMA Dewey var. *Billingsii* Knight. Rare in wet sphagnum. Speonk, Flanders, Babylon, Lindenhurst.

CAREX LACUSTRIS Willd. Very rare in swamps. Winfield.

CAREX PRAIREA Dewey. Very rare in swamps. Winfield.

CAREX HYSTRICINA Muhl. Rare in swamps. Newtown, Winfield, Locust-Valley, Oakdale.

LEMNACEAE

LEMNA TRISULCA L. Rare in streams. Oakdale.

LEMNA CYCLOSTASA (Ell.) Chev. Rare in streams and ponds. Oakdale, Queens.

LEMNA PERPUSILLA Torr. Rare in streams, ponds, and ditches. Queens, Newtown, Oakdale, Babylon.

LEMNA MINOR L. Frequent throughout in ponds, streams and ditches.

SPIRODELLA POLYRHIZA (L.) Schult. Frequent throughout in ponds, streams and ditches.

JUNCACEAE

JUNCUS DUDLEYI Wiegand. Very rare in damp meadows. Winfield.

JUNCUS SECUNDUS Beauv. Very rare in dry soil. Flushing, Wyandanch.

JUNCUS DEBILIS Gray. Very rare in wet-sand. Amityville.

JUNCUS SUBCAUDATUS Coville and Blake. Rare in swamps and wet shores. Wantagh, Merrick.

JUNCUS GERARDII Lois. Very common in salt and brackish marshes. Rare in fresh water swamps. Winfield. Fresh Pond. West Forest Hills, Middle Valley. The foregoing are in my herbarium and in addition I have recorded it at Woodside, and Newtown.

MELANTHACEAE

OCEANORUS LEIMANTHOIDES (A. Gray) Small. Rare in pine barren wet thickets. Babylon.

LILIACEAE

LILIUM CANADENSE L. Rare in moist meadows and rich woods. Montauk, Flushing, Queens.

² Bull. Torrey Club. Vol. 49 No. 12 December 1922, Mackenzie.

ERYTHRONIUM AMERICANUM Ker. Locally abundant in wet woods. Plattsdale, Woodside, Flushing, Bayside, North Beach, Millneck, Newtown, Glen-cove.

HAEMODORACEAE

GYROTHECA TINCTORIA (Walt.) Salisb. Rare. Damp meadow. Oakdale.

ORCHIDACEAE

IBIDIUM PLANTAGINEUM (Raf.) House. Very rare in damp meadows. Winfield.

FAGACEAE

QUERCUS VELUTINA Lam X MARYLANDICA Muench. Rare in dry soil. Central Park. Determined by Wm. Trelease.

POLYGONACEAE

PERSICARIA FLUITANS (Eaton) Greene. Rare in swamps north of Moraine. (*Polygonum Hartwrightii* Gray.) Winfield.

CABOMBACEAE

CABOMBA CAROLINIANA A. Gray. Rare in ponds in hilly rich woods. Queens, two widely separated small ponds.

RANUNCULACEAE

BATRACHIUM TRICHOPHYLLUM (Chaix.) F. Schultz. Rare in streams. Valley Stream, Massapequa, Lindenhurst, Oakdale, Islip.

CRUCIFERAE

ARABIS GLABRA Bernh. Rare along roadsides. Massapequa.

CARDAMINE PARVIFLORA L. Rare in rich damp woods and on sandy wet shores. Richmond Hill, Queens, South Jamaica, Roslyn, Glen Cove, Wading River.

ROSACEAE

RUBUS ODORATUS L. Rare, roadsides and hilly woods. Cold Spring Harbor

CALLITRICHACEAE

CALLITRICHE PALUSTRIS L. Occasional in ponds and streams. Cold Spring Harbor, Rosedale, Great River, Bayside, Valley Stream, Flushing, Islip, Massapequa.

CALLITRICHE HETEROPHYLLA Pursh. Occasional or frequent in ponds and streams. Massapequa, Freeport, Valley Stream, Montauk, Mill Neck, Seaford, Wantagh. I have also identified both species at several other localities.

HYPERICACEAE

ASCYRUM HYPERICOIDES L. Rare. Damp meadow. Merrick. Hilly rich woods Wyandanch.

HYPERICUM DISSIMULATUM Bicknell. Rare in swamps and on wet shores. Bridgehampton, Wantagh.

VIOLACEAE

VIOLA ERIOCARPA Schwein. Rare in rich hilly woods. Woodside, Locust Valley.

LYTHRACEAE

ROTALE RAMOISIOR (L.) Kuhn. Rare in swamps and on wet shores. Cypress Hills, Lynbrook, Queens, Kew Gardens.

ARALIACEAE

PANAX TRIFOLIUM L. Rare in wet woods. Cold Spring Harbor, Millneck, North Beach, Glen Cove, Bayside.

AMMIACEAE

WASHINGTONIA CLAYTONI (Michx.) Britton.

WASHINGTONIA LONGISTYLIS (Torrey) Britton. Both species are frequent or common, in rich woods on and north of the moraine. The former less frequent and averaging smaller than the latter. Very rare south of the moraine. Both species growing together south of Baisley Pond, South Jamaica.

PYROLACEAE

PYROLA CHLORANTHA Sweet. Rare in dry pine woods. Oakdale, (2 colonies), Sayville, Ronkonkoma.

PRIMULACEAE

NAUMBERGIA THYRSIFLORA (L.) Duly. Very rare in swamps. Newtown.

GENTIANACEAE

DASYSTEPHANA ANDREWSII (Griseb.) Small. Very rare. Swamp north of moraine. Winfield.

ASCLEPIADACEAE

ASCLEPIAS RUBRA L. Rare in moist soil. Babylon.

CUSCUTACEAE

Including all reported in former papers. The two common species on Long Island are,

CUSCUTA COMPACTA Juss and *CUSCUTA GRONOVII* Willd., both varieties. The others are rare.

CUSCUTA PENTAGONA Englm. Rare in dry or wet places. Lynbrook, Newtown (*Cuscuta arvensis* Beyrich.)

CUSCUTA POLYGONORUM Englm. Rare in open swamps and wet woods and thickets. Queens, Plattsdale (Three widely separated colonies.)

CUSCUTA CORYLI Englm. Rare in wet thickets and swamps. Middle Island, Sag Harbor, Easthampton, Coram, Sea Cliff, East Islip, Oakdale.

CUSCUTA GRONOVII Willd. var. *vulgivaga* Englm. Frequent, mostly in wet places. North Branch, Westhampton, Bellmore, South Jamaica, Merrick, Millneck, Massapequa, Hempstead, Cold Spring Harbor, Valley Stream, Queens, Easthampton, Glen Cove, East Islip, Plattsdale, Wantagh.

CUSCUTA GRONOVII Willd. var. *latiflora* Englm. Frequent, mostly in wet places. Bayside, Oyster Bay, South Jamaica, Babylon, Southold, Flushing Montauk, Water Mill, Mill Neck, Roosevelt, Valley Stream, Sag Harbor, Woodside, Oakdale, Amityville, Wantagh.

CUSCUTA COMPACTA Juss. Frequent in wet places. Wantagh, Laurelton, Speonk, Babylon, Lindenhurst, Massapequa, Mill Neck, Merrick, Roslyn Flushing, Smithtown, Wyandanch, Central Islip, Roosevelt, Valley Stream, Queens, Sag Harbor, Easthampton.
The writer has seen and recorded the three last in many other localities.

LABIATAE

KOELLIA INCANA (Michx.) Kuntze. Rare in dry soil. Southold, Baldwin.

SCROPHULARIACEAE

SCROPHULARIA MARYLANDICA L. Rare in hilly rich woods. Bayside.

LENTIBULARIACEAE

STOMOISIA JUNCEA (Vahl.) Barnhart. Rare in swamps and sandy shores. Flanders, North Bellmore.

STOMOISIA VIRGATULA Barnhart. Very rare on wet sandy shores. Oakdale.

RUBIACEAE

GALIUM VAILLANTII D. C. Rare in field and thickets. Massapequa.

CAPRIFOLIACEAE

TRIOSTEUM ANGUSTIFOLIUM L. Rare in hilly rich woods of moraine. Glenhead.

COMPOSITAE

SOLIDAGO FLEXICAULIS L. Very rare in hilly rich woods of moraine. Glen Head.

LEPTILON PUSILLUM (Nutt.) Britton. Rare in dry or moist sandy soil. Ronkonkoma, Central Islip, Coram, Oakdale, all four stations in pine barrens. Point of Woods, growing extensively back of sea beach.

HELIOPSIS SCABRA Dunal. Rare in dry woods or their borders. Babylon.

SENECIO AUREUS L. Rare in wet meadows, swamps and wet woods. Bayside, Mill Neck, Winfield, Newtown, Flushing, Smithtown.

SENECIO GRACILLIS Pursh. Very rare in damp meadow, Oakdale. Determined by J. K. Small.

HEMPSTEAD, N. Y.

Chemical Simulation of Organisms for Class Use

ILLO HEIN

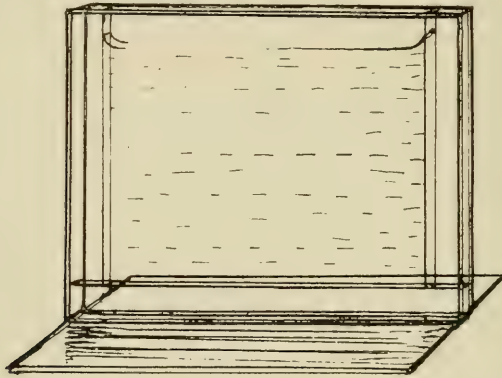
To enliven the student's interest and arouse his curiosity in plant and animal form development excellent opportunities are given the teacher in the hitherto neglected chemical imitations of organisms. Many beautiful and suggestively similar imitations of leaves, roots, stems, fern fronds, fungi, wing patterns of butterflies, bird feathers, a variety of sea life, algae, shells, corals "fairy rings," cell shapes, division figures, and countless other organic forms and patterns can be easily made with a little experience in the appropriate mixing of certain chemicals. Such imitations as have been made by Liesegang (1911), Küster (1913), Leduc (1912), and Gebhardt (1912) are stimulating and suggestive not only to the investigator but also to the students in elementary biology for whom they should be as instructive as entertaining.

The student can with simple apparatus and a few chemicals perform the experiments himself or they may be made by the teacher as demonstrations. The student can see before his eyes the production of forms and patterns in inert substances by some of the same processes which take place in and control the growth of organisms.

Just a few of the possible demonstrations are given below as suggestive of what can be done. Many other striking imitations can be devised by an imaginative teacher either by modifying or elaborating the directions given or by using other chemical combinations many of which may be found in the appended literature list. The materials and apparatus are inexpensive and can be employed with little expenditure of time.

Very beautiful imitations of fern fronds which are striking in their similarity may be made with certain crystalline precipitates in colloid solutions. A small plate of window glass, cleaned photographic plates, or lantern slide covers are very satisfactory. The plate is coated with a thin ten percent solution of gelatine containing five cc. each of saturated solutions of ammonium chloride and sodium chloride. The salts will crystallize out over night in various patterns many of which are similar in appearance to the outline of the fronds of selaginellas and ferns. (Figs. 3 and 5).

For the preparation of imitations of striped patterns, pigmentation of butterfly and bird wings, banded structure of ice, agate, onyx, quartz, etc., zonation in the molluscan shell, fish scales, mammalian bone, zebra and other hair patterns and banded leaves, concentric zonation in bacterial and fungous cultures, the chemically produced Liesegang rings may be used. Small glass plates similar to those described above are covered with a thin coating of ten percent gelatin solution containing one percent or less of Potassium bichromate or Sodium arsenite and then a drop of concentrated silver nitrate solution or a small crystal is placed where the center of the concentric rings is desired. With a little ingenuity the position of the silver may be varied by making lines and other combinations so that the various patterns enumerated above may be made.



Exhibition case constructed of lantern slide covers. Appearances such as are shown in figure 4 may be represented in such a glass box.

Very beautiful and fantastic tri-dimensional structures of calcium phosphate and carbonate imitative of ornamental diminutive gardens, suggestive of sea bottoms containing, shells, algae, and corals; the well known coral fungus, roots, rhizoids, stems and branches, carpophores, etc. will form in the solution described below. Tests tubes, beakers, vials, aquarium jars or any glass receptacles are satisfactory. I have found that a very entertaining little narrow glass box can be made of two lantern slide cover glasses between which strips of plate glass are cemented around the margins with a water proof glass, cement or

bee's-wax. The exhibition jar is filled with a mixture made up of 50 cc. saturated solution of sodium carbonate, 25 cc. saturated solution of dibasic sodium phosphate, and 50 grams of calcium silicate. When the liquid is fairly clear small pieces of calcium chloride are dropped to the bottom of the jar. In from one to several hours the forms will arise from the chloride particle (Figs. 1, 2, and 4). The structures may attain a height of from a few to thirty or more centimeters. Their growth can be checked and varied by carefully adding distilled water. By very slowly moving the solution, branching and other variations may be induced. When the desired structures are completed the liquid may be slowly siphoned off, they are sufficiently hard and rigid to stand by themselves in the air but are very brittle and must be handled with care. Some of the aqueous cytological stains if carefully poured over the bottom will add to the attractiveness of the preparations. Carmine or light green will diffuse to the tops of the structures without altering their form.

If in the above preparations a very dilute solution of the same mixture is added after the mimic organisms are formed bladder-like enlargements will "grow" at the tips and increased resemblance to plant forms may thus be obtained (Figs. 1 and 4).

Other three dimensional imitations can be made by dropping a mixture of equal parts of sugar and copper sulphate crystals into a warm solution made up of 100 cc. distilled water, 10 grams gelatine, 10 cc. saturated solution potassium ferrocyanide (yellow) and 10 cc. saturated solution of sodium chloride. Tree-like trunks and branches, roots, leaves, and bud imitations are formed. When the gelatine solidifies the preparation is permanent and may be preserved and transported without injury.

Attention should be drawn to the possibilities in soap bubbles for a study of contact and pressure relations in cell form. Soap bubbles as is well known exhibit identical forms to those of massed cells in a parenchyma. A square glass jar, about quart size or larger, can be filled with soap bubbles by pouring into it a little soapy water and then blowing into this with a glass tube. The importance of surface tension and the principle of minimal areas, mutual contact and pressure in the control of cell form can here be pointed out. It can be shown to the student that in a froth as well as in massed cells the walls meet

in groups of three at 120 degree angles, that the cells average six sides in section and fourteen altogether in response to the principle of minimal areas.

Drops of dilute india ink on gelatine covered plates diffuse in all directions giving a variety of patterns which also simulate organic forms. By placing two drops side by side and a more concentrated one between them imitations of nuclear divisions in various stages, showing asters, spindles, centrosomes, and chromosomes may be obtained.

THE PENNSYLVANIA STATE COLLEGE
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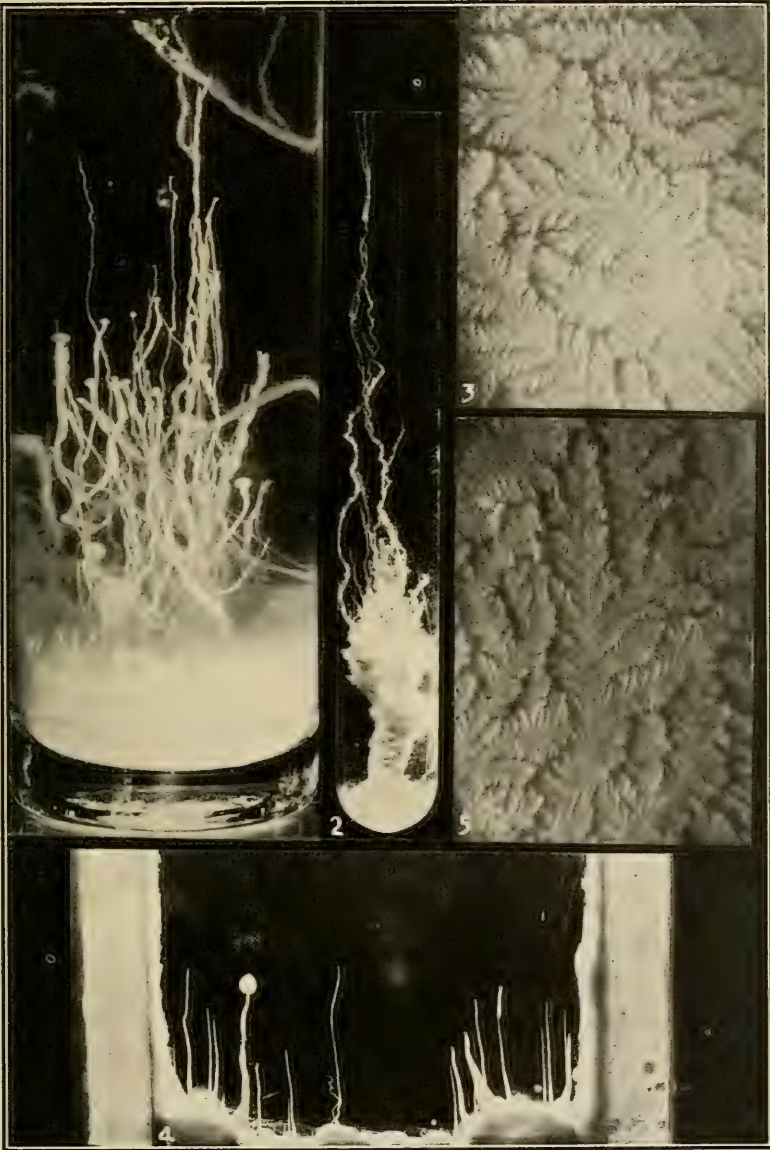
DESCRIPTION OF PLATE

Fig. 1. Imitations of fleshy fungi produced in crystalline solutions. The enlargements at the tips appeared when the mixture was diluted.

Fig. 2. Test tube preparation. The same substances were used but in more concentrated mixtures.

Fig. 3 and 5. Imitations of fern like growths crystallized from solutions of Ammonium and Sodium chlorides.

Fig. 4. Preparation made in the exhibition jar shown in the text figure.



Hein-Chemical Simulation of Organisms

Sibbaldiopsis tridentata Found in the Catskills

RAYMOND H. TORREY

In a previous note regarding the scattered distribution of *Sibbaldiopsis* (*Potentilla*) *tridentata*, on mountain tops from Maine to North Carolina, and its absence, so far as I then knew, from any of the Catskill summits, and the Great Smokies in Tennessee, which were included in my personal observations, I speculated whether the plant did not prefer exclusively open, bleak situations.

I have recently received two interesting communications on this subject: one from Dr. Edgar T. Wherry, Chief of the Bureau of Chemistry and Soils of the United States Department of Agriculture, explaining the occurrences of *Sibbaldiopsis* on the basis of its probable intolerance of shade, and the other, from Mr. William Gavin Taylor, of Arlington, N. J., reporting that he found the plant in the Catskills, on Overlook Mountain, a summit which I had not examined. Mr. Taylor's location, on an open ledge, at the brink of a cliff, overlooking the Hudson Valley, with a sweep of northern winds for a hundred miles, is possibly the only stand of the plant in the Catskills. I am sure it is not found on more than twenty other high summits on which I have looked for it, in this region.

Dr. Wherry wrote, regarding my inquiry as to the distribution of *Sibbaldiopsis*: "I have been trying to work out some explanation of this based on the chemical character of its soils, but without success. It seems to grow on gravelly soils irrespective of their derivation, although always acid in reaction. So my conclusion would be that this plant is absent on some mountains where one might expect it because it is so intolerant of shade and competition. It evidently survived the glacial period on the peaks of the Blue Ridge in Virginia and North Carolina—by the way, these are largely of Archaean rocks—and then gradually migrated northward when the ice retreated. Carrying of seeds by the wind seems out of the question, so birds are the only likely means of transportation. I suppose that once in a thousand years a seed of it might stick to a bird's feet or feathers, and when this bird alighted on another similar peak for food the seed dropped off and started a colony there. Under such circumstances chance evidently plays a large role, and the absence of the plant on a particular mountain might merely mean that this 'ac-

cident' did not happen to occur on that one. On the other hand, when there is a series of peaks like the Catskills, the plant surely got onto some of them shortly after the glacial period, and thrived there for a time until the forest invaded the mountain when it died out. Its absence on Mt. LeConte can be similarly explained, namely it was there once, but was subsequently killed out by the advance of the forest. Of course even on forested mountains there are some bare ledges, but if the plant did not happen to reach these particular ledges in time, it would not be preserved there."

Mr. Taylor, reporting on *Sibbaldiopsis* on Overlook Mountain, says: "Mrs. Taylor and I did not appreciate that this plant was a special rarity in the Catskills. In September we found the plant (not in bloom) on the easterly top rocky cliff on Overlook. We followed the trail from the old burned hotel, up along the edge of the easterly rampart where we found the plant growing strongly on the exposed ledges. We checked the plant, upon our return home, against Britton & Brown. The plant was a new find for us and we were quite pleased with our discovery. The elevation was about 3100 feet."

Mr. Taylor's location is one of the most exposed spots in the Catskills, with the full sweep of the winds down the Hudson Valley, and is probably the only place in the region left that is bleak enough to please *Sibbaldiopsis*.

My report that this plant was threatened with extermination on High Point, on Kittatinny Mountain, the only stand in New Jersey, owing to the construction of a huge monument to the war veterans of the state, interested two persons who propose to try to save or restore it. Mr. J. A. Allis, of Upper Montclair, N. J., said that if it proves after the construction of the monument is finished and the ground cleared up, that none of the species is left, he will bring some from the northern mountains and replant it there, in some place where visitors will not disturb it. Major W. A. Welch, General Manager of the Palisades Interstate Park, has urged John J. Stanton, secretary of the High Point State Park Commission, to preserve and restore the natural mountain top turf after the debris of construction and laying out of the automobile road and parking place is cleared, and Mr. Stanton has promised to do it. So we shall see if any of the plant is left, and report accordingly, and if not Mr. Allis will restore it.

HOLLIS, LONG ISLAND

BOOK REVIEWS

Our Wild Orchids*

AN APPRECIATION

In this satisfying volume we have a record and a revelation; a record of careful investigations, a revelation of what may be accomplished by persistent and loving study. The area represented by the seventy-two species, figured and described, is that of Gray's Manual, the nomenclature that of Ames' Enumeration. One European species, *Habenaria albida* is added to our previous listing, as are *Malaxis spicata* brought from Florida and *Listera borealis* from far north into our limits; and *Malaxis paludosa*, recorded in Gray from one station, is now reported from two others and said to be well established in Ontario. It is demonstrated conclusively that *Isotria affinis* is a good species. Four notable species are chosen for the colored plates.

The foreward by Professor Ames is sympathetic; the authors introduction, the keys, the use of popular names and the "special features" designed to facilitate amateur study, have distinct values.

This long-desired book fulfills the hopes with which it has been awaited. The result of years of patient study, tireless pursuit and very intelligent scrutiny, it brings equally to the professional and the amateur botanist, a wealth of information and of incentive toward wider, more discerning, more satisfying acquaintance with members of the Royal Family of plants. This reviewer, who has studied in their homes many of the species figured and described, can appreciate the indefatigable diligence, the refusal to be baffled, that made possible these unparalleled records. Opportunities for travel denied to most

* *Our Wild Orchids*. Trials and Portraits.

By Frank Morris and Edward A. Eames

With a foreword by Oakes Ames

Professor of Botany in Harvard University

Large octavo. 450 pages, including a complete glossary. With 130 full-page illustrations, four in color. \$7.50.

Charles Scribner's Sons

amateurs and technical equipment possessed by few have been invaluable auxiliaries in the quests through field and forest, over "moor and fen"; but these material helps would have produced scant results without the drive of that dominant interest which, again and again, has transformed "trials" into "trails!"

A short treatise might easily be written in detailed comment on the stories told by these enthusiasts, twice-told, by camera and pen, incomparably told by each partner in this pioneer enterprise. It must suffice to name here a few of the more striking touches: as the detecting of the bluish tinge in the leaves of the Ram's Head; the vertically-folded overlap in the lip of *Cypripedium passerinum*; the unique nipple of *Habenaria flava*; the aspect of the spur in *Habenaria clavellata*, "like the slender abdomen of a stinging insect"; the apt characterization of the flowers of *Habenaria hyperborea*, "snuggling right up to the main stem"; the "blending of syringa with cloves" in the fragrance of the flowers of *Habenaria dilatata*; "Hooker's hooks", a delicious pen-picturing; the perianth of *Malaxis monophylla* "not so much white as colorless or faded like withered tissue." The keen scrutiny and trained judgement shown in such illuminating phrases is evidenced also in many sane conclusions reached by comparing varied experiences, such as: the "smothering" of *Cypripedium acaule* by ericaceous growth that was at first protective (this fate befalls *Arethusa*, too, and other species); the recognition of the power of adaptation of many species under different, even contrasted conditions, (hence the inaccuracy of some book-descriptions); the periodicity of many, notably the "rarer" kinds; the necessity, if we would search thoroughly, of standing still and gazing long.

The reader of these glowing pages is enthralled as much by the fascinating stories and the exquisite pictures as by the marvelous results obtained. There is a certain aggravation, to one accustomed to finding the less common species in small groups, it at all, in reading of such thrilling experiences as seeing hundreds at one time, or of embracing in one sweeping glance three *Habenarias*, besides *H. albida*, a rare form of *Cypripedium* and *Listera cordata*; though such rich variety can be duplicated in more than one bog in northeastern Vermont. To one whose botanizing has been done to the south of "the unguarded boundary," it seems odd to have the White *Malaxis* reported as more com-

mon than the Green, and *Corallorrhiza trifida* as one of the commonest of the genus. These records indicate, of course, local observations; but it is inaccurate to allude to *Tipularia* as probably not self-propagating so far north as New York, or to *Calypso* as having been found formerly in the neighborhood of nearly every city in New York State—whatever may have been true in Ontario.

The makers of this great book, creators, in truth, of the idea as well as of the beautiful structure, are alive to all aspects of Nature; as may readily be inferred from their discriminating comments on less-noticed details and their sane conclusions about distribution and associations. Allusions are frequent to scenes of landscape beauty and to incidents of animal life. There is a "bedtime story" of fox cubs that would gladden every youngster and a tale of an enterprising mink that thrills. When this book is in every public library, as it may be expected to be, the perusal of its attractive pages will rouse in many a boy and girl a true enthusiasm for the wonders of the out-of-doors. At last "our wild orchids" are introduced persuasively to a widening constituency. A grateful reader records here his sense of obligation.

H. M. DENSLOW

CHELSEA SQUARE, N. Y.

A Fungous Flora of Manitoba made its appearance last October from the press of Longmans, Green & Co. The text is by the distinguished Canadian mycologist, Dr. G. R. Bisby and A. H. R. Buller, both of Manitoba, and Dr. John Dearness of western Ontario, with a preface by Mr. E. J. Butler of the Imperial Bureau of Mycology at Kew, England. The work is unusually comprehensive, complete and accurate, and is much more than a list of species. The topographic and climatic conditions of the several areas are described, the relationship of the phanerogamic flora, observations on carpophilous fungi, parasites of man, geographic distribution, historical account, rare species, and many other topics are treated with considerable fulness. The compact list of species, which includes myxomycetes, bacteria and lichens, occupies somewhat over half of the volume. Hosts, substrata, localities and many interesting observations are recorded. There are 45 new species and 2 new

varieties included in the list, belonging to nearly as many separate genera, all but eleven being described here for the first time. Ample indexes and a map complete the volume, a well bound, duodecimo of 194 pages.

J. C. ARTHUR

FIELD TRIPS OF THE CLUB

COLUMBUS DAY WEEK-END IN THE CATSKILLS

Ten members of the Torrey Botanical Club enjoyed the Columbus Day week end in the northeastern Catskills, with headquarters at the Hotel Bellevue, at Haines Falls. Transportation was wholly by automobile, in cars provided by Mr. Anderson, Miss Griffin, Mr. Highton and the leader. This gave the party great flexibility of range, and if motor travel could more generally be organized through the cooperation of members who could provide cars, it would give the club excursions a much wider variety of regions for field study, and reduce transportation costs materially. This idea has occurred to me as a result of experience and reports on several excursions of the 1929 season, notably those at Branchville, N. J., at Spotswood, led by Prof. Chrysler; and to Spruce Pond, where Mr. Anderson transported most of the party in his car.

Most of the party left New York City and Newark, N. J., late Friday afternoon, and took the back route, via Suffern, Central Valley, Newburgh (the west end of the city), Modena, New Paltz, Kingston, Saugerties and the Rip Van Winkle Trail, to Haines Falls, arriving about 10 p. m., in time for a good night's sleep. This route from Newburgh to Kingston was chosen because the main river route, 9-W, is badly obstructed by new work.

On Saturday morning, the cars took the party quickly around into Plaats Clove where the Devil's Kitchen, the two gorges through which Plattekill Creek drops off the mountain front, was explored, and where Dr. A. J. Grout, our moss expert found much to interest him. After luncheon, most of the party climbed over High Peak, 3650 feet high, and descended past Round Top and out over Clum Hill to Tannersville, thence back to Haines Falls. The climb up the south side of High Peak over a new trail recently marked by members of the

Touristen Verein die Naturfreunde, (the Nature Friends), who have a camp on the slope; proved to be steep and "sporty" in places, with steeply slanting ledges, narrow crevices and overhanging cliffs. The summit is clothed with dense fir and spruce. A log observatory raises one above the trees and gives a full circle view of the entire Catskills and the Hudson Valley. The descent to Tannersville was easy, through changing zones of fir and spruce, yellow birch and mountain maple, beech and finally open pastures with sugar maple and hay-scented fern.

In trees and shrubs and herbaceous flowering plants, one rarely finds anything uncommon in the Catskills. There is not so much variety of species as in the Highlands of the Hudson. A limited number of phanerogamous species appears to have adjusted itself to the altitude, soil and moisture conditions and the association seems rather exclusive. One finds, above 3000 feet, northern species such as Goldthread, Twisted Stalk, Twin-flower and Bunchberry, but there are no alpine plants such as *Sibbaldiopsis* and *Arenaria* which might be looked for at 3500 feet, and are found at lower altitudes in the Taconics, 40 miles east. The dense forest cover on the Catskill sandstone had evidently killed off any alpine species, which are found on the bare Taconics, of more ancient schists. Several species of *Lycopodium* were found, including *annotinum*, *lucidulum*, *clavatum*, *obscurum* and *complanatum*.

On Sunday morning the party, now numbering a dozen, and with another car, that of Miss Griffin, who had been calling on Dr. Gunderson, at Maplecrest, motored leisurely homeward. A stop was made in Stony Clove, where Dr. Grout collected several mosses; and another at the Olive Bridge Dam, on Ashokan Reservoir, to view the aerator and the mountain panorama. The rest of the route was via New Paltz, Newburgh and Bear Mountain.

RAYMOND H. TORREY

FIELD TRIP OF NOVEMBER 9

Seven members of the club met at White Plains for a trip through the woods near Silver Lake. A search was made for wild flowers of which twenty three species were found, all of them occasional blossoms that had persisted far beyond the

usual flowering time. The flowers found were five species of *Aster* (*cordifolius*, *ericoides*, *longifolius villicaulis*, *multiflorus* and *tardiflorus*), five golden-rods (*Solidago bicolor*, *caesia*, *juncea*, *latifolia* and *rugosa*), common daisy, dandelion, fleabane (*Erigeron annuus*), yarrow, pepper grass (*Lepidium virginicum*), red and alsike clovers, Queen Ann's lace, buttercup, Deptford pink, self heal, rocket (*Hesperis Matronalis*), and witch hazel. Most of the witch hazels had finished blossoming but a few of the shrubs were well covered with flowers. On all of them the seeds had been discharged from the fruits. Many other wild seeds and fruits were noted, one new to several of the party was the blue cohosh (*Caulophyllum thalictroides*) which was abundant on one hillside.

GEORGE T. HASTINGS

DOUGLASTON TO HOLLIS, NOVEMBER 16

Twenty-three members of the Torrey Botanical Club, New York Microscopical Club and guests enjoyed a brilliant fall afternoon, in a ramble across the hills and hollows and among the kettle hole depressions and ponds of the terminal moraine of the Glacial Period, in Queens Borough, Between Douglaston and Hollis, on Saturday, Nov. 16. The route was via Alley Pond, across the moraine to its front north of Creedmoor, then westward along the front to Hollis.

The water in many of the kettle hole ponds had evaporated in the summer's drought, and much of the water vegetation which is so interesting in spring and early summer was stranded on the dry bottoms, but still persistent in exsiccated forms. In the well known Potamogeton Pond, north of Queens Village, *Potamogeton natans* was prostrate on the wet turf and hard to find, but *Riccia natans*, notable in its floating state when the kettle hole is watered, was still plentiful on the soil. *Peltandra virginica* and *Isnardia palustris* were also stranded, but evidently not worried at all, sure that the water would be back again in the spring.

In the examination of a dozen or more of the kettle hole ponds, along the eastern edge of the Queens woods close to the Nassau County line, from Alley Pond toward Creedmoor, and westward just back of the outer slope of the moraine past

Bellaire and Queens, it was interesting to see that certain plants seem to have established themselves in one or another of the ponds, almost to the exclusion of others.

In a pond three fourths of a mile south of Nassau Boulevard, the Water Loosestrife, *Decodon verticillatus*, held almost complete possession. In another the Buttonball Bush, *Cephalanthus occidentalis* was supreme. In the well watered pond a little east of the Rocky Hill Road, *Brasenia peltata*, the Water Shield, was the exclusive occupant, or at least the conspicuous one at that season, although in summer, other species would probably be found. In two of the ponds in the new Hillside Park, which were dry on the date of this excursion, *Potamogeton natans* is the conspicuous occupant in summer on one, and *Utricularia vulgaris* in another. Members of the New York Microscopical Society have found a similar exclusiveness in minute animal forms, in some of these ponds, species plentiful in some being absent in others.

It is still possible by dodging the motor highways, to enjoy a pleasant woodland ramble in these Queens woods, but with the extension of roads and building, it will not be many years before they are cut up. It may be hoped that the city will be able to secure several hundred acres more, in addition to the Hillside and Alley Pond parks, and that part of its acquisitions may be kept in a natural state.

PROCEEDINGS OF THE CLUB

MEETING OF NOVEMBER 20, 1929

The meeting was called to order by President Denslow at 3:30 P.M. at The New York Botanical Garden. The minutes of the meeting of October 16, held at The New York Botanical Garden, were read and approved.

The following were unanimously elected to membership in the club:

Dr. E. P. Meinecke, Forest Service, Ferry Building, San Francisco, California; Prof. Clyde T. Reed, Texas College of Arts and Industries, Kingsville, Texas; Mr. F. W. Hunnewell, 5 University Hall, Harvard University, Cambridge, Massachusetts; Miss Dorothy Hammond, 418 Central Park West, New York City; Mr. Harold N. Moldenke, The Villa Elsenore,

R. F. D. No. 3, Plainfield, New Jersey; Mr. Alexander F. Skutch, 3509 Clark's Lane, Baltimore, Maryland; and Dr. E. B. Merrill, Director, The New York Botanical Garden, Bronx Park, New York City.

The resignation of Miss Rosella Ames was accepted.

The reading of the report of the Coördinating Council of Nature Activities was accepted.

Dr. Gleason gave a report of life membership in the Torrey Botanical Club. The report of the committee was accepted without adopting it. It was moved by Dr. Britton and seconded by Mr. MacKenzie that fee for life-membership would be \$100.00. This was unanimously voted. It was moved and seconded that all members who had been members of the club for fifty years or longer on January 1, 1930 become automatically life members without further dues. This motion was unanimously adopted, and Dr. Barnhart was appointed a committee of one to draw up and submit these amendments to the constitution in proper form.

It was moved by Dr. Gleason and seconded by Dr. Harper that the Torrey Botanical Club publish the botanical results of the Tyler-Duida Expedition, providing funds are available for the purpose, as a volume of its Memoirs.

Dr. Gleason moved and Dr. Hazen seconded the motion that the President of the Club appoint a committee to solicit funds for the above purpose. Dr. Gleason, Dr. Britton, Dr. Harper, Mr. MacKenzie and Mrs. Trelease were appointed.

Dr. H. A. Gleason gave a talk on "Plants of Mount Duida." The studies on the flora of the Mount Duida summit, so far as they have yet been made, indicate an endemism of more than sixty per cent. Of the remaining forty per cent., many species have been hitherto known only from Mount Roraima, some 350 miles to the eastward. The flora seems to show even greater affinity to that of southern Brazil than does Roraima, but an Andean element is also present. Among the new discoveries exhibited were a new genus and three new species in the family Rapateaceae, a new genus of Ochnaceae, with strikingly handsome flowers, and three new species of the Southern American pitcher-plant, *Heliamphora*. A full-sized plant of the rare *Barbacenia Alexandrinae* was also displayed.

Dr. E. B. Matzke gave a talk on "Variations in *Stellaria aquatica*." The cotyledonary node of *Stellaria aquatica* commonly has two branches in the axil of each of the two leaves; the two succeeding nodes more usually have a single one in the axil of each leaf. From there on there is, as a rule, a single branch in the axil of one of the two leaves at each node—the leaf arrangement being decussate. Thus spirals are formed by the branches; in 187 cases this spiral was counterclockwise, in 197 clockwise, both types occurring on the same plant with no apparent regularity in their distribution.

The direction of the spiral is correlated with the overlapping of the sepals in the first flower in the inflorescence; and the arrangement of the sepals of subsequent flowers of the dichotomous cyme is definitely related to that of the first flower.

Variations occur in the number and character of the sepals, petals, stamens and carpels; these variations occur with noticeable regularity in certain positions in the flower. Thus axes of symmetry are established in the flower which bear a definite relation to similar axes in different flowers of the same inflorescence.

It is thus possible to establish the type characteristic for the stem, the inflorescence and the flower, and the common variations from that type.

There is a progressive seasonal sterility of the stamens in *Stellaria aquatica* from the beginning of the flowering period in July to its termination at the end of November.

FORMAN T. MCLEAN
Secretary

MEETING OF DECEMBER 3, 1929

The meeting was called to order at Millbank Hall, Barnard College, at 8:30 P.M. by President Denslow. Ninety people were present including a number of visitors from the teachers of Biology in the schools.

The following were unanimously elected to membership in the club:

Dr. Charles C. Deam, Research Forester, The Department of Conservation, Bluffton, Indiana; and Miss Marjorie Swift, The New York Botanical Garden, Bronx Park, New York City.

The meeting was then turned over to Professor E. W. Sinnott of Barnard College who conducted the "Symposium on Some New Materials and Methods of Value in Botanical Teaching." Dr. Sinnott made a brief comment on his own work in plant breeding, stressing particularly the importance of heterozygosis.

He then called on Dr. Harper who discussed Growth in Plants, and remarked on what wonderful contrivances the hereditary genes must be which control growth. He particularly stressed the behavior of the myxomycetes which develop during life as amoeboid slime molds in which apparently each individual cell is independent of every other. At fruiting time these cells build this into complex fruiting bodies which are always very regular in character. Just how do the genes in the cells cause each one of these to assume its proper place in this fruiting structure?

Dr. Benedict was then called upon for a discussion of Fruit Morphology. He took as an example the apple and explained in detail its structure and development.

Dr. Forman T. McLean talked about Mineral Nutrition of Plants and distributed an outline of his talk giving brief directions for setting up sand cultures to show the need of the fertilizer elements of plants and solution cultures to similarly show the need for the ten so-called essential elements. He stressed the fact that there are now recognized many more than ten chemical elements required by green plants but that the exact number is not yet fully determined.

Mr. Charles A. Gramet of Stuyvesant High School then exhibited demonstrations of Photosynthesis by the water displacement method. He particularly stressed the importance of experiments by Ingen-Housz and made it quite clear that any kind of plants can be used in these experiments, it not being necessary to use exclusively water plants.

Dr. E. B. Matzke then told us about the studies to determine the fundamental shape of plant cells in undifferentiated tissues. According to the most conclusive evidence, such cells are not dodecahedrons but fourteen sided figures with faces consisting of squares and triangles.

Dr. B. O. Dodge discussed Sex in Fungi and showed how one may use *mucor* to show sexual reproduction in the phy-

comycetes. He laid particular stress on the ascomycetes, showed how the ascus is the result of the fusion of the two cells and further demonstrated the results of cross-breeding in *Neurospora* bread molds which he has been studying. He also explained how heterothallic strains arise from the small uninucleate ascospores which regularly occur in his eight-spored strains and sometimes arise also by the production of small supernumerary spores in the normally four-spored strains.

Professor Sinnott then directed the attention of the gathering to the exhibits and to the refreshments arranged in another room of the building, called attention to the different exhibits by Dr. Harper, Professor Hazen, Mr. Hastings, Dr. Matzke, Mr. Karling, Dr. McLean, and others and made mention also of his own of lawngrass seedlings mounted under the microscope to show protoplasmic streaming.

The formal meeting was adjourned at about 9:30 P.M.

FORMAN T. McLEAN
Secretary

MEETING OF JANUARY 7, 1930

The meeting was called to order at the American Museum of Natural History at 8:30 P.M. by President Denslow.

The following were unanimously elected to membership in the club:

Miss Sarah Garland, 606 West 122nd Street, New York City; Miss Margaret Lodor, 284 Paulison Avenue, Passaic, New Jersey; Dr. Henry Knute Svenson, Brooklyn Botanic Garden, Brooklyn, New York.

The resignation of Dr. Jas. A. Faris was accepted with regret.

The reports of the Secretary, of the Treasurer, of the Editor of the Bulletin, of *Torreyia* and of the Business Manager were read and approved.

Dr. H. M. Denslow, Honorary Custodian of the Herbarium, reported on enlarged facilities for housing the local herbarium.

Dr. J. H. Barnhart reported as Delegate to the Council of the New York Academy of Sciences that our relations with them continue as in the past.

Dr. R. A. Harper reported as our representative to the Council of the American Association of the Advancement of Science.

Mr. Raymond H. Torrey, as Chairman of the Field Committee, reported very satisfactory results during the year and further stated that he wishes to secure the services of a number of new volunteer leaders of field trips for the coming season's program.

Dr. E. W. Sinnott, as Chairman of the Committee on Entertainment reported that the collations served at the seven meetings at the American Museum cost about fifteen dollars total and that this expense was met by donations by individuals. The American Museum restaurant staff handled this work at the Museum meetings and the entertainments at the Brooklyn Botanic Garden and Barnard College were provided by those institutions. It was voted by the club to continue this policy of serving refreshments at the downtown meetings and the President was authorized to appoint a new committee to continue the work.

The report of the death of Maturin L. Delafield a former treasurer of the Torrey Botanical Club was read by the President, and Dr. Howe and the Secretary were appointed a committee to propose a suitable resolution to be published in *Torreyana* and a copy sent to the family of the deceased.

Officers for the ensuing year were elected as follows:

President—Dr. Edmund W. Sinnott

Vice Presidents—Dr. C. Stuart Cager and Dr. Marshall A. Howe

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Delegate to the Council of the New York Academy of Sciences—
Dr. M. A. Howe

*Representatives on Council of A. A. A. S.—*Dr. R. A. Harper
and Dr. B. O. Dodge

The meeting was adjourned at 9:15 P.M. and refreshments were served in the Bird Hall by the refreshment committee.

Respectfully submitted,
FORMAN T. MCLEAN
Secretary

NEWS NOTES

Dr. Henry Knute Svenson, formerly of the editorial staff of Biological Abstracts has taken the position of Curator of Plants at the Brooklyn Botanic Garden.

Dr. George M. Reed of the Brooklyn Botanic Garden has prepared an interesting series of exhibition cases showing varieties of grains and of types of corn and of hybrids of corn and of sorghum, the latter with the two parents and the cross between them. These have gone to the high schools of New York where advanced biology is taught.

Dr. Bernard O. Dodge, of the New York Botanical Garden was among the experts who helped plan a method of preserving a series of paintings in the administration building of the Panama Canal at Balboa. The paintings had been attacked by mold which threatened to destroy them. They have now been coated with a thin film of paraffine wax which gives promise of permanent preservation.

Dr. J. C. Arthur, professor emeritus of botany at Purdue University, celebrated his eightieth birthday on January 11. At a luncheon held in his honor Dr. Arthur gave an account of the development of the department from its founding in 1888. Dr. Arthur was head of the department from the time of its founding to his retirement in 1915. He has been actively engaged in a study of rusts since his retirement and has just published a book entitled "Plant Rusts." (Science)

Dr. William A. Archer recently resigned from the Office of Plant Disease Survey of the U. S. Department of Agriculture and began work on January 15th as professor of plant pathology in the School of Agriculture and Veterinary Science at Medellin,

Colombia. Dr. Archer has taught and done research work at New Mexico State Agricultural College, the University of Michigan and Oberlin College. With Dr. Archer went Mr. Charles H. Ballou as entomologist. Mr. Ballou has been technical assistant in the Japanese Beetle Control Laboratory at Moorestown, N. J. (Science)

Dr. Caroline A. Black, Chairman of the department of botany of Connecticut College, died on January 19 at Cincinnati, Ohio. She was taken ill while returning from the Des Moines meeting of the Association for the Advancement of Science. (Science)

I was interested in the note in *Torreyia*, Vol. 29, No. 6, Page 152, on *Aconitum noveboracense*, by H. A. Gleason and Wm. J. Bonisteel, referring to the large colony on the Beaverkill, in the southwestern Catskills. May I report another station, where I saw at least twenty flowering plants, and where there are probably more. This was on a brook on the north slope of Doubletop Mountain, about five or six miles east northeast of the Beaverkill station. On a climbing and camping trip in the southwestern Catskills, in July, 1923, with Harold F. Scutt of Douglaston, L. I., we made camp at the highest water on a little stream on the north side of Doubletop, about dark and in getting ready for the night did not observe the plants about us closely. But in the morning, going to the stream for water, I saw a group of this species of Monkshood, with flowers and fruit. The altitude was about 2800 feet. Further down the stream were more plants. This brook is a tributary of Dry Brook, which enters the east branch of the Delaware (to which Beaverkill is also tributary) at Arkville.

RAYMOND H. TORREY

Back numbers of *Torreyia* wanted. In order to make up complete sets we need a few complete copies of volumes 27 and 29 and additional copies of Vol. 27, number 2 and Vol. 29, number 1. If members have these volumes or the separate numbers they are willing to send to Dr. Marshall A. Howe, New York Botanical Garden, Bronx Park, New York the club will be glad to pay \$2.00 each for the complete volumes or 50 cents for the numbers especially wanted.

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EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS



John Torrey, 1796-1873

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GEORGE T. HASTINGS

2587 Sedgwick Ave.

New York City

TORREYA

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March-April, 1930

No. 2

Material for Demonstrating Sexuality in the Ascomycetes

B. O. DODGE

Nothing since the time of Pasteur and Koch has done more to revolutionize our ideas regarding the nature of fungi than the art of culturing them from single spores. When our corn, wheat, cotton and fruit crops aggregate several billions of dollars in value annually and we realize that pathogenic fungi frequently take toll of a large percentage, it would seem that the student in Botany and Biology should be privileged at least a nodding acquaintance with a representative of each of the large groups of fungi.

The question is, what is the best form in each case for classroom demonstration. Any species, to fulfil these requirements should first of all be readily available. It must be one that will go through its life cycle in culture. It should show both types of reproduction, asexual and sexual, and produce fruiting bodies readily demonstrable, at least under the low power of the microscope. Other things being equal, a form which is heterothallic or haplo-dioecious* will prove far more interesting to students. For example, among the Phycomycetes, *Rhizopus nigricans* and *Phycomyces Blakesleeanus* serve admirably for the purpose. Any student who inoculates a petri dish culture with the two strains of the latter species and sees for the first time the row of zygo-spores developing along the line where the two mycelia meet,

* In dioecious flowering plants the stamens and pistils are borne on different individuals. A heterothallic or haplodioecious fungus is merely analagous to a dioecious flowering plant. It is one in which an individual haploid gametophytic mycelium is either of one sex or the other. Sexual reproduction occurs only when two mycelia of opposite sex are mated or grown together. A homothallic or haplomonoeocious fungus is one in which each individual mycelium is capable of reproducing sexually and if differentiated sex organs are developed both kinds will be formed on the same mycelium.

and contrasts this picture with one obtained by inoculating a culture on opposite sides with two doses of the same strain, is fully impressed with the necessity for mating two strains of opposite sex in order to lead to sexual reproduction.

No ascomycete so far discovered serves better to demonstrate sexual reproduction than *Pyronema*. The beautiful rose colored ascocarps are frequently seen in places where brush piles have been burned over a few weeks previously. It fruits abundantly in petri dish cultures on many kinds of agar media, and

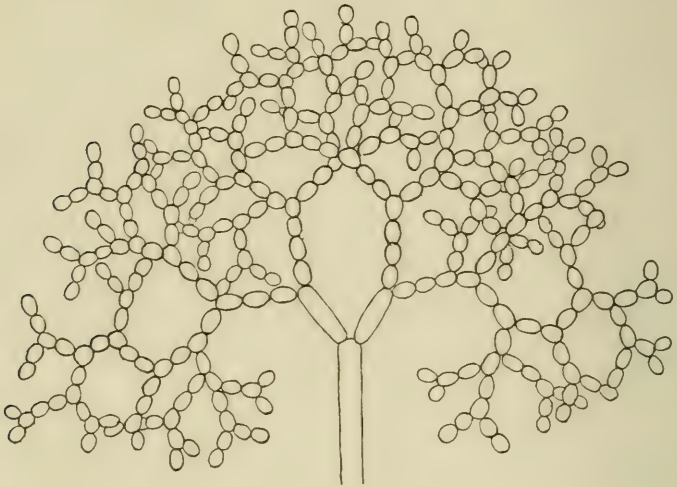


Figure 1.

Monilioid conidia, asexual spores, of *Neurospora sitophila*. Sporophores branch dichotomously and especially when young show a beautiful symmetry

the ascospores remain viable for a long time. Numerous oogonia and antheridia which can be readily distinguished are developed in the cultures. One objection to *Pyronema* is that it does not produce asexual spores and the ascocarps do not show simple striking distinguishing features. Furthermore, the species is haplo-monoecious. *Ascobolus magnificus*, a species whose ascocarps present a very striking appearance, is heterothallic and develops very large oogonia and antheridia. The ascospores are beautifully colored. It is a very rare species, however, and one not easily cultured. *Ascobolus carbonarius* is rather common on burned places and develops large sex primordia, but this species also is not readily cultured.

The ideal ascomycetes for classroom work are the species of the orange-colored monilioid molds in which the conidia or asexual spores are borne in chains (Fig. 1) and which have as their perfect or sexual stage the pyrenomycete *Neurospora* (Fig. 2). The ascocarp or perithecium has a well differentiated wall and ostiole, apical opening, and is small enough to be

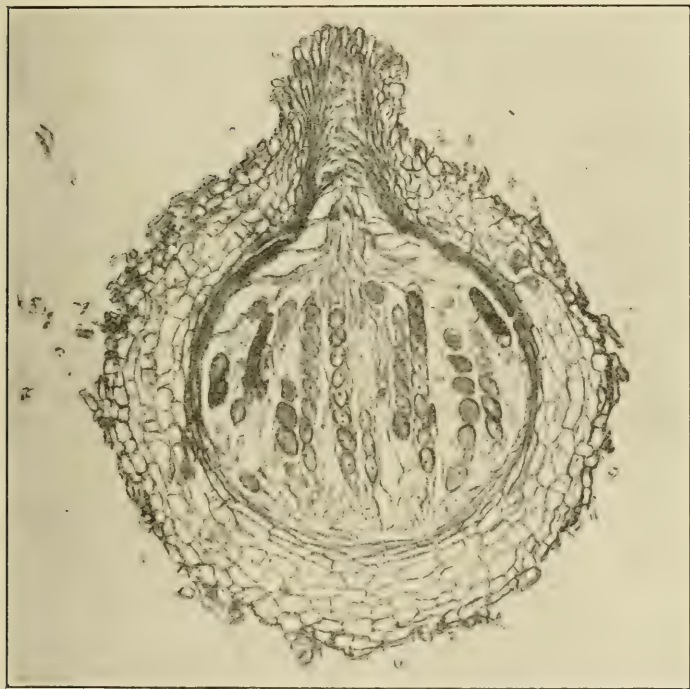


Figure 2. Ascocarp or perithecium of *Neurospora sitophila*, $\times 200$.

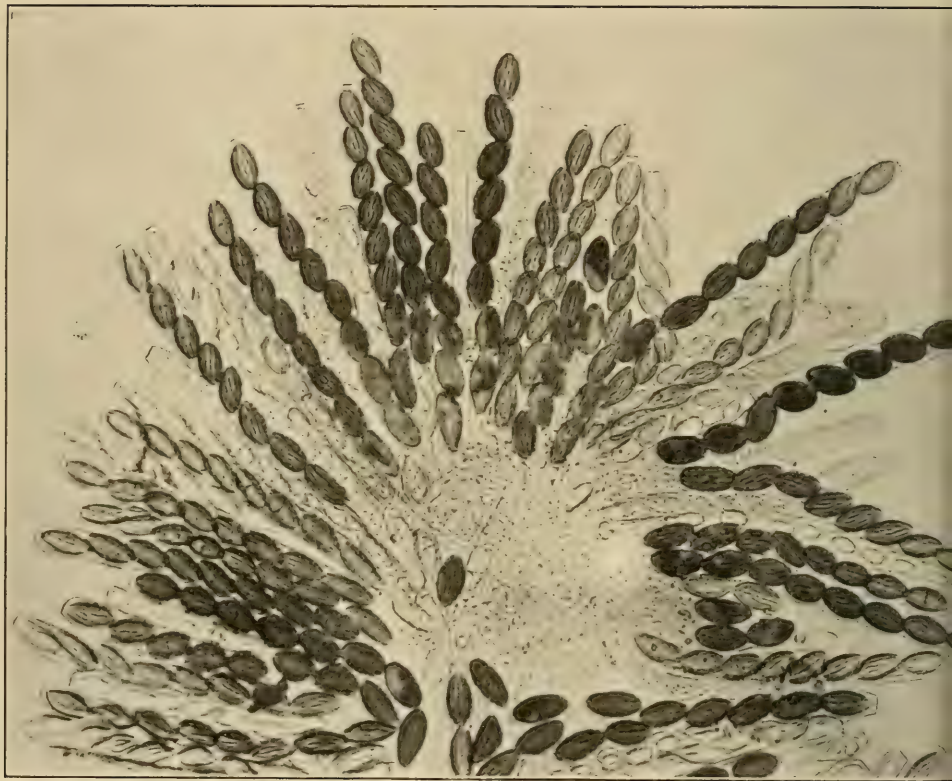
examined under the microscope. The asci are few in number and develop large colored spores with ribbed markings. (Plate 2). These fungi reproduce themselves asexually by means of spores formed on dichotomously branched conidiophores. *Neurospora sitophila* is the common orange-colored mold of the bakery. *N. crassa* grows everywhere in the tropics on sugar cane bagasse and on burned over places in forests. Both are heterothallic or haplodioecious. *N. tetrasperma* is known only from a few places as yet, but would serve the best for classroom work, because it is either homothallic or heterothallic, depending upon

the strains being cultured. It does not produce very many of the monilioid asexual spores. This is an advantage, because the details of the development of the asococarps can be more readily studied on this account. Normally the mycelium is homothallic, or haplomonoecious. One can always obtain heterothallic strains by selecting small ascospores. In this case asocarps will be produced only when two mycelia of opposite sex are mated in



Figure 3. Petri dish culture inoculated with two strains of opposite sex of *Neurospora tetrasperma* showing characteristic distribution of ascocarps. The black smudged areas show where the ascospores have been discharged.

culture. Figure 3 shows a petri dish culture in which the unisexual strains S_1 and S_6 have been growing for several days on corn meal agar. Fruit bodies are first formed along the line where the two mycelia meet, after which they appear one by one along the lines of radiately growing hyphae of the strain S_6 . Just why the stimulus of fertilization results in a production of ascocarps back along the lines of mycelial growth is not yet known. However, the fruit bodies from this combination always form on the mycelium of the strain S_6 , so that it looks as though the sexes are differentiated and that strain S_6 develops the



Dodge, Sexuality in the Ascomycetes

oogonia. It is hoped that some plan can be worked out later by which anyone desiring strains of *Neurospora tetrasperma* for class use can readily obtain them from some central culture laboratory.

Albino strains of both sexes of *Neurospora sitophila* have been developed. These strains can be mated together to produce albino races which breed true for this character. When crossed with typical orange-colored monilioid races half of the progeny will be albinistic and half typical thus providing a good example of mendelian segregation. Furthermore, fertile interspecific hybrids between the eight-spored *Neurospora sitophila* and the four-spored *N. tetrasperma* can be produced in culture, so that we have at hand very desirable illustrative material for classes in genetics.

NEW YORK BOTANICAL GARDEN

DESCRIPTION OF PLATE 2

Asci from an ascocarpe of *Neurospora sitophila*. Each ascus contains four spores of each sex. $\times 300$.

Lessons in Apples

RALPH C. BENEDICT

If stones may contain sermons, certainly apples may be expected to harbor at least a few lessons. Actually, they are regularly used in scores of thousands of classrooms in biology, botany, and general science and are admirable objects for class study for a variety of lessons.

Their use is desirable, not only because of their abundance and cheapness, and the intrinsic interest of their structure and functioning, but even more because of the pedagogic importance of leading beginners in science to realize that the most familiar objects may present intellectually stimulating mysteries. The all-too-frequent bromide, "How can you bear to pull a flower to pieces? I just love to enjoy them for their beauty," represents a common adult attitude of mind which constitutes a difficult bar to the advancement of science. It is one of the science teacher's privileges to interfere with the habituation of children into that fatuous attitude, and to show by the use of flower and fruit material in the classroom that the study of the internal structures reveals intellectual beauties and harmonies of the highest type without detracting one whit from the emotional stimulation aroused by external beauties of form and color.

Out of a variety of lessons in which apples may be usefully employed in elementary instruction, three, which are thought to have special application in high school teaching, are considered in the pages which follow. The purpose of this paper is not to present necessarily any new facts about apples, but rather to assemble a series of observations relating to the use of apples as teaching material. It is worthy of emphasis, however, that there are many undiscovered details regarding the commonest biological material and that this constitutes one of the chief challenges to interest of this subject, both for the teacher and, as a point of view for classes.

WHAT IS AN APPLE?

To define the apple in terms of the usual definition of a fruit, we find that the full, triply phrased statement is required: An apple is (1) "a ripened ovulary (2) with its contents, the seeds, and (3) with any closely adhering floral parts." Actually, thus,

the apple consists chiefly of the thickened and fleshy, edible stem (receptacle, or 'adhering floral part'), in the center of which is buried the ovary, constituted of an outer, fleshy layer, and the inner fibrous surface, immediately enclosing the five locules, each with a few seeds (typically not more than two).

Usually it is rather easy to distinguish between the tissues of the receptacle and those of the ovary wall, although their con-

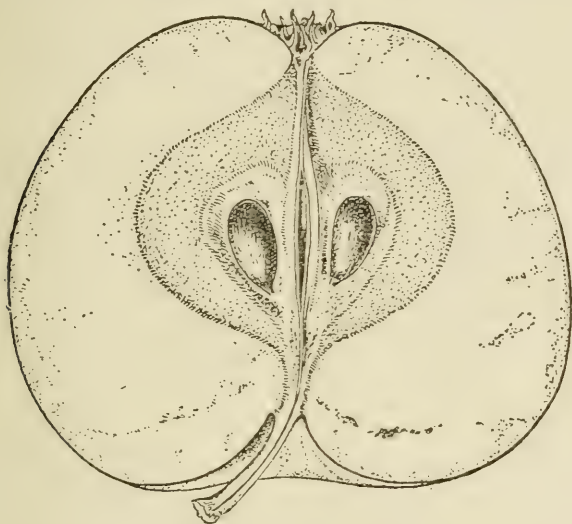


Figure 1. What's wrong with this picture? The figure represents a too conventionalized diagram of a lengthwise section of an apple, taken from an elementary botany text. Comparison with figures 5 & 6 of Plate 4 will show the inaccuracy of representing opposite locules. The densely dotted area represents ovary wall.

sistency and flavor are similar. Some varieties show the distinction more plainly than others; e. g., the Jonathan, in which the ovary wall begins to turn brown as soon as exposed to the air, and assumes a different shade of color from the mass of receptacle tissue. In length-wise sections, the line of demarcation is most plainly shown when the cut has been made along one of ten principal fibro-vascular bundles. In cross sections there is a distinct line which connects the ten bundles, usually showing a definite though irregular course, which varies in different varieties of apple.

Textbooks galore contain illustrations of the internal structure of apples. Unfortunately, such illustrations are too frequently conventionalized to an extent that they present definite and unnecessary inaccuracies. These are to be found, not only in general science and elementary biology texts, but also in first year botanies bearing distinguished authorship.

The first illustration is taken from the latter source. Perhaps the artist thought it necessary to meet the common desire for balanced structure, and thus showed opposite locules where such can not occur, unless abnormally. It would seem, however, that there is no more reason for misrepresenting the internal arrangements of apple carpels than there is for showing all twigs with opposite leaves or scars. Such conventionalization, if intentional, is contrary to the fundamental aim of teaching accuracy of observation and representation, and, in any event, the mistake hardly seems to offer any real advantage.

A similar conflict between strict accuracy and the desire for a balanced drawing presents itself also in diagrams of flower structure. Here, however, there is no single structural type concerned. The diagrams are not usually identified with any specific flower, and the picturing of opposite petals, with subtending sepals and associated stamens, a combination scarcely obtainable in nature, is justified as a generalized diagram.

An actual cross section of an apple shows clearly why the representation of opposite locules in a lengthwise section is inaccurate. The five locules stand out in a clear-cut star pattern, which varies according to the stage of ripening, and among different varieties. (Plate 3, figs. 8-12)

Can you cut a lengthwise section so as to get an exact bisection of the pentagonal figure? This constituted an annoying problem for me until I found that the five sepal lobes furnish a definite clue, and that by cutting between two lobes and through the opposite one, an accurate bisection of the locular figure may usually be obtained. (Plate 3, figs. 5 and 6)

What variety is best for class study? The problem of bisecting the star was further simplified when some study was made of the common varieties of apples usually available in the markets. Some types are definitely better than others. The difference is not so much between named varieties themselves, as between the long or western and the short or eastern shapes

which seem to characterize the apples of these different regions. The same variety shows marked variation in shape according to its locale.

In the elongated 'sheep nose' shape, there is generally a clear, external indication of the pentagonal nature of the fruit. The "Delicious" variety shows five prominent knobs at its distal end; so, also the western Spitzenberg, though less prominently. Both these apples are more or less five sided and angled in cross section, as is the "Winter Banana," which in addition, often shows narrow, roughened ridges along the angles. (Plate 3).

In these types of apple, it is relatively easy to locate the knife cut so that it will bisect the internal pentagon. In the broader, oblate form, there is usually no external indication except the rather indistinct five sepals to guide the location of the cut. The longer apples are further much better for the study of the vestiges of the stamens, sepals, and style. The little cavity under the sepals is deeper, broader, and the three parts stand out distinctly. It is even possible to count the twenty stamens.

APPLE VARIETIES AND BREEDING

Some twenty years ago I recall reading that there were then over one thousand named varieties of apples. Since then, the numbers have undoubtedly been considerably augmented. Relatively few, however, find their way into city markets but there are enough different types which can be easily obtained during the school year to make apples especially available for studies in variation and classification.

Posit the problems: How many kinds can you name? What are the distinguishing characteristics? What are the best varieties? The collected material which a single class may bring in will furnish the basis for a good laboratory exercise in which a list of such differential features as the following may be discovered: color, and color patterns; size and shape; surface, whether with bloom, like the McIntosh Red, greasy like the Pippin, or not so distinctive; toughness of skin; texture of flesh, whether firm or mealy, juicy or dry; flavor, whether sweet, sour, intermediate, or with a special flavor like the Winter Banana.

The market varieties available will vary according to the season of the year. The collection to be found during the fall

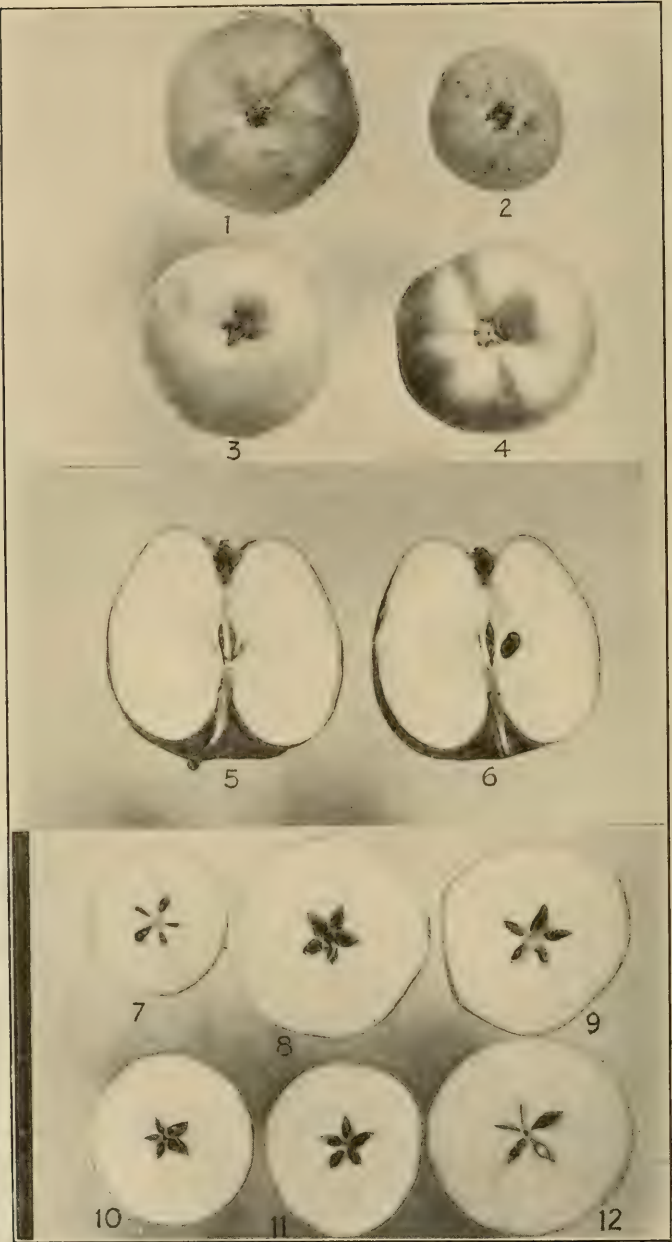
months will include several which will be missing by mid-winter and spring. As each apple variety passes toward the end of its marketable period, its flesh becomes progressively mealy, owing to the gradual digestion of the middle lamellae. The best keeping types are those in which this change is delayed the longest. The old Russet variety probably holds the record in this respect, as it can be kept in ordinary farm cellar conditions well into the July following its harvesting. The early ripening summer and fall apples, some of which have extremely delicious flavors, are poor in keeping qualities.

During the past fall, in a casual study of the varieties offered in a few city stores, and with contributions from two or three friends, the following sixteen different sorts were collected; Winesap, Jonathan, Delicious, Greening, Pippin, Lady, Snow, McIntosh Red, Winter Banana, (eastern and western), Spitzenberg (eastern and western), Russet, Baldwin, York Imperial, and Rome Beauty. The average store keeper cannot be relied on for identification. Two of them insisted that the Pippins were Greenings, although admitting that real Greenings were different. As a matter of fact, all the above list displayed rather well marked differences. In a larger field of varieties, their differentiation would not be so easy, but for the purposes of classwork, the number obtained would probably be even smaller and the difficulties fewer.

From the standpoint of plant breeding, the recognition of the distinctive varieties and their differential characteristics would offer an excellent basis for considering the problems of selection as for flavor and texture, keeping and marketing etc. The fact that apple breeding has been chiefly a matter of discovery of branch mutations or chance seedlings, and their propagation by grafting, and that most of our current varieties are old,—the McIntosh Red is a 1796 seedling,—would serve to re-emphasize the relative newness of modern scientific as opposed to the older empirical breeding methods. The distinctive forms in the same variety, as represented by western and eastern fruit of the same name, constitute an excellent example of variation due to environment.

ADAPTATIONS OF THE APPLE

It is always interesting to propose for the first time to a class of youngsters the problem: Why are ripe apples bright-colored,



Benedict, Lessons in Apples

fragrant, tasty, and nutritious? and to let them make their own discovery in discussion that these characteristics must be considered on a 'malocentric' rather than a homocentric basis. Similar questions may easily be propounded with flowers as the objective material, or any other economic forms of life, but fruits offer a larger combination of these man-favored factors.

When the adaptive values of these advertising and nutritive features have been appreciated, the problem may be further emphasized by reference to the developmental, contrary characteristics. Why are apples green, hard, bitter and indigestible until ripe? This leads to a further question: What advantage is afforded by the tough fibrous inner ovulary wall? By the hard seed coat? By the bitterness of the infinitesimal amount of prussic acid in the seed? The fact that the seed is so protected by its hard seed coat that it may be avoided, or if taken into the mouth, may escape being chewed, and may further resist digestion in the alimentary canal, until finally, as a result of these parental provisions, it achieves planting on a non-competitive basis,—all these constitute discoveries for which the common apple is particularly favorable material.

Finally, by way of conclusion, the following technical facts may be noted. Scientifically, the apple has been commonly classified as *Pyrus malus* Linnaeus; *Pyrus* being the Latin name for pear, and *Malus* for apple. Apples, pears, and crab apples are in the same genus, *Pyrus*. All apples are *pome* fruits, as are also quinces, and the drier fruits of the hawthorn or thornapple, though these latter belong to different genera.

BROOKLYN BOTANIC GARDEN

EXPLANATION OF PLATE 3

Figures 1–4. Viewed from calyx end. 1. Winter Banana; note five ridges and pentagonal outline. 2. Russet pear. 3. Pippin; note absence of angles. 4. Delicious; note pentagonal outline and knobs.

Figures 5 & 6. Two halves of Delicious variety. The line of the ovulary wall can be faintly seen. Note single locule exposed. Each locule corresponds to one of the knobs.

Figures 7–12. Comparing cross sections.

7. Russet pear. 8. Winter Banana. 9. Delicious; note pentagonal outline in figures 8 & 9. 10. McIntosh. 11. Jonathan. 12. Pippin; The shape of the star figures varied with different varieties and the degree of ripeness. That of the Pippin (12) would open out and the locules become more connected with further ripening. The differences in numbers of seeds is a more constant character, —the Rome Beauty may have three, even four in one locule.

Serapias Helleborine in Buffalo and Vicinity

CHARLES A. ZENKERT

No mention is made of *Serapias Helleborine* L., under any of the names formerly employed, in the catalogue of "The Plants of Buffalo and Its Vicinity" published by David F. Day in April 1882, but in the preface to the first supplement the following is recorded with evident satisfaction: "Probably the most interesting addition now made to our list of plants is of that remarkable orchid *Epipactis Helleborine* *Irm.*, found within the limits of our city, in July, 1882: —its second discovery in America."*

Today, fully forty-seven years after, *Serapias Helleborine* is still thriving in Buffalo on the very site of its original discovery. Furthermore, a mile or more from this station and still within the city limits, this "remarkable orchid" has succeeded, to no small extent, in escaping the fate of so many other wild plants that have vanished in the wake of population increase and real estate development; in fact, it has here survived, in some instances, under conditions so adverse as almost to bid defiance to some of our most common and aggressive weeds.

Elsewhere in Erie County, in the wooded tracts and in more natural surroundings, it grows rather widely distributed under diversified soil conditions. It is easily the most common of our orchids. The plant is known to occur also in some of the adjacent counties, although these have been less thoroughly explored.

In the catalogue part of the supplement already referred to, the original Buffalo discovery is recorded as follows:

"*Epipactis Helleborine*, var. *viridens* *Irm.*

"Near Scajauquady's Creek, Buffalo:—The second known station of the species on the American continent. Here first found by Miss Edna M. Porter, July 1882. Equivalent, according to Gray, to *E. latifolia*. . . ."

Thereupon follows a generic description of *Epipactis* transcribed from Watson's Botany of California, as well as a specific description of the plant as found in Buffalo. The concluding paragraph is significant:

* Bulletin of the Buffalo Society of Natural Sciences, Vol. IV, p. 256.

"In our station certainly indigenous. About 200 individuals were counted, all growing within the space of a few hundred feet along a northerly hillside, from five to thirty feet above the creek. The diversity of color, which the flowers on different plants display, indicates that the variety, *viridens*, has no stability of character."

The foregoing positive statement as to the indigenousness of the plant here found stands in marked contrast with the now generally accepted view that the species has been "probably introduced."

As might be expected, this interesting addition to the flora of Buffalo was the subject of considerable contemporary study and investigation. Thus, experiments conducted by Miss Porter ascertained that a certain wasp, determined at the time as *Vespa diabolica*, was an active pollinating agent. At a later period, solicitous individuals, fearing that the plants might become extinct at the original station, transplanted roots to some outlying localities. In this manner, human agency became a contributing factor in distribution, although the weight of the evidence points to several natural centers as sources of distribution at least equally important.

The discovery was made in Forest Lawn Cemetery, which, together with Delaware Park to the north and northwest, was originally a forested area. A visit to this, the original station was made during the fourth week in September of the past season. Forty-seven years had naturally wrought considerable changes. Graves and monuments to the dead had encroached to the very shoulder of the hillside, and down below, on the other side of the creek, the grass was mown down to almost the water's edge. However, along the thus isolated wooded hillside, *Serapias Helleborine* was still found growing, if not in its erstwhile profusion, at least in ample numbers and in a partly vigorous state. Among the trees observed there, were oaks, maples and beeches. Some withered remains of a typical Spring wood flora were still in evidence, and at this time of the year *Solidago latifolia* was flowering in conspicuous masses.

About a mile to the northeast of this, the original station, and adjacent to Delaware Park, there was formerly a wooded tract which up to twenty years ago still had the aspect of an

"oak grove." Gradually this section, the Amherst-Parkside district, became studded with houses, although the trees were spared as much as possible. Ten, or even five years ago, *Serapias Helleborine* was conducting itself there in a rather wanton and capricious manner. It fairly obtruded itself on the observing eye. Asphalt pavements and flagstone sidewalks, indeed, smothered it, but in the uncut grass between sidewalk and curb it persisted. It could hardly cope with the lawn mower, but in garden plots alongside houses, and under shrubs, and along hedge rows it secured a new lease of life. Under these congenial conditions, some unusually vigorous plants developed, such as are still to be found occasionally to this date. In unfavorable situations it has clung tenaciously to the hard, clayey soil.

During the fourth week of August last, half a dozen or more specimens were observed on Amherst street growing in hard, barren clay alongside the sidewalk and under the iron fence of Delaware Park. A fruiting specimen was dug out with a *chisel*, foreknowledge of the character of the soil having suggested the advisability of using this implement instead of an ordinary hand-trowel. On the other side of the street, occupied by dwellings, there was still a vacant lot with some of the original vegetation surviving amid piles of stone and building debris. Several specimens were observed there growing apparently on mounds of barren clay, but digging with the chisel revealed the fact that the plants had forced their way up, from the original ground level, through six to ten inches of compact clay that had been dumped overhead.

Thus, in the forty-seven years since it was first reported *Serapias Helleborine* has persisted within the city limits of Buffalo with remarkable vitality and tenacity. Gradual reduction of forested areas, the works of man—clearing, filling, grading—by no means doomed it to extinction. In the Amherst-Parkside section, it actually seems to have experienced a regeneration or re-invigoration as open places were created and added sunlight became available. Five or ten years ago, an observer unfamiliar with antecedent conditions, seeing the plants there weed-like in aspect and habitat, might have drawn conclusions not altogether warranted.

In the rest of Erie County, as already intimated, the species is well distributed and fairly abundant, with indications that

the same holds good for at least some of the adjacent counties. It occurs in rich woods, open woods, edges of woods, thickets and clearances, but, so far as observations go, it is invariably associated with woodlands, past or present. Where it now grows in more open situations, it seems either to have spread from woods or to have survived long after deforestation. What Wiegand and Eames say concerning the habitat of this plant in Central New York, in the Cayuga Lake Basin, applies in no small measure to its manner of occurrence in Northwestern New York, namely: "Unlike most adventive plants, it occurs usually in wild places that little suggest such introduction." Its occurrence also in Erie County and adjacent territory in situations little suggesting introduction from abroad, tends to revive the issue as to its indigenoussness, particularly in view of the positive pronouncement, made at the time of its first discovery in Buffalo, that the species was "certainly indigenous."

In the matter of habitat, the plant does not appear to prefer any particular kind of association, being equally at home in beech, oak, or mixed woods. In rich moist woods it seems to shun wet situations and favor hummocks, knolls or slopes. It is frequently found on wooded hillsides, where, on more horizontal projections, soil carried down from above may accumulate. In fact, a moderate superdeposition of soil has been observed to be a decidedly favorable factor in almost any situation. It would seem that the underground portions of the plant have a certain inherent vitality.

Apparently indifferent to the chemical composition of the soil, *Serapias Helleborine* grows in the humus of rich woods, along shaley ravines, in clayey loam, or on limestone substratum. At Harris Hill, Erie County, it is found in the earth-filled crevices of a limestone outcrop. At Indian Falls, Genesee County, it has been observed along a hillside in the talus deposited between fragments of limestone. Several slender and almost prostrate specimens were here found growing from underneath limestone slabs, which had to be overturned to reach the roots. Occasionally plants are encountered in rather unexpected situations, as in the town of Amherst, Erie County, where a little colony was discovered growing in black muck, in a copse of trembling aspens overshadowed by a solitary elm and surrounded by swampy terrain, with evidences about of more extensive forestation in the past.

Observations in the field and inspection of plants as they were being put into the press, have disclosed some evidences of insect depredation, but to no marked degree. One, indeed, encounters numbers of non-fruiting specimens, but whether these were retarded by drought or affected by insects, has not been ascertained. At any rate, not far off from plants thus affected good flowering and fruiting specimens may usually be obtained without much trouble. In a few instances, cobwebby deposits have been discovered on the fruit and the foliage, and on one or two plants put in the press small spiders were detected. On the whole, however, the adverse effects of insect visitation seem to be negligible.

With so many elements entering into the matter of the plant's ability to persist, increase, and spread, it is difficult to assign a predominant rôle to any single agency. A combination of factors and circumstances obviously comes into play. All in all, *Serapias Helleborine*, as occurring in Buffalo and vicinity, is still to present-day observers, in a more extended and perplexing sense, what it was to those who almost half a century ago first welcomed it as "that remarkable orchid."

BOTANICAL SECTION, B. S. N. S.
BUFFALO, N. Y.

The Herbarium of the Royal Museum, Sophia, Bulgaria

A. McKEA

King Boris, enthusiastically follows in his father's, King Alexander's, footsteps. He is an eminent naturalist, and he is also interested in botany; so much so that he has recently had built a beautiful new wing to the museum in which to house the Royal Herbarium. He sent Professor Stoyanoff to Kew Gardens for four years that he might be able to arrange the Herbarium and classify the specimens by the English method.

The work of collecting is enthusiastically carried on by the King. He is often away on excursions in all parts of the Kingdom but he is particularly interested in the plants that grow at high altitudes in his own beautiful Balkans, and also in Thrace and Macedonia.

Professor Stoyanoff who is in charge of the
Sectio Botanico
Museo Naturalis
Suae Majestatis Bulgarium
Sophae

is also a member of the Faculty of Agriculture of the Sophia University. He speaks English perfectly, and courteously and with pride, showed some of the plants gathered at high altitudes by the King, notably several unusual species of *Trifolium*, *Cypridium Calceolaris* and many varieties of the polymorphic *Orchis Morio*. The white form and an unusual reddish purple, and several nana forms, and a special one from Thrace with few flowers, which resembles, but is *not* *Picta*. Also an *O. Morio* from Sarnac, of the Sredna Gora, *O. Morio* from near Sophia with very slender leaves and few flowers, and *O. Morio* from the high mountains of Custindil.

Regarding the perfume rose of Kasanlik. There are two varieties under cultivation there. *Rosa Damasena* and *Rosa alba*. There are several different kinds of soil and the fields of roses seem to thrive equally well in all. Professor Stoyanoff thinks the climate much more important than the soil. The flowers are very small. These great fields of roses bloom in May and in the first week in June. The perfume factory is quiescent in the winter.

NEW YORK CITY

A New *Ranunculus* from Crater Lake, Oregon

F. LYLE WYND

In 1896, Edward L. Greene described a new species of *Ranunculus* from Crater Lake. Following the description he remarks, "A very neat and very well marked new *Ranunculus* altogether resembling a small *Ficaria*." During the last several years the author has collected a large series of this supposedly new and well-marked species not only from the type locality but also from the surrounding territory. The differences described by Greene have not been found, and from this fact it is supposed that Greene based his description on abnormal specimens.

Following is the description given by Greene (*Pittonia* III: 91, 1896):

"Ranunculus gormanii. Small and slender perennial, with a fascicle of thick but long and slenderly tapering fleshy-fibrous roots; leaves on almost filiform petioles 1 to 3 inches long, the lamina broadly ovate, or deltoid-ovate, acute, coarsely few-toothed, 1/2 to 3/4 inch long, only the petioles somewhat pilose-hairy; Stems several, prostrate at the base, rooting, and bearing leaves at 2 or 3 nodes, the terminal part naked, ascending and scapiform, bearing a solitary small flower; sepals spreading; petals 5, oblong, obtuse, twice the length of the sepals; achenes small, glabrous, moderately compressed, with a slender curved beak as long as the body."

The type locality is given as, "On moist banks at Cathedral Springs, Crater Lake, in southern Oregon, 22 Aug., 1896, collected by Mr. M. W. Gorman." While the name Cathedral Springs is no longer in use, the locality may be identified as the springy bogs at the base of Castle Crest (formerly Cathedral Rocks) which is easily accessible just above Park Headquarters.

The italics in the description given above indicate those features which are not found in the series of the author's specimens. In spite of several years of intensive collecting in and around the type locality, no "typical" specimens have been seen. Since there is but a single species of low, creeping *Ranunculus* in the vicinity, it is here proposed to recharacterize

Greene's species as based on more adequate and normal material.

Ranunculus terrestris sp. nov. A small, delicate perennial, growing in damp or swampy places, from a fascicle of thick but long and slenderly tapering fleshy-fibrous roots; leaves on delicate, almost filiform petioles; petioles of the basal leaves 1-4 inches long, those of the cauline leaves $1/4$ to 1 inch long or sometimes the terminal pair of leaflets sessile, somewhat sparsely pilose-hairy; the lamina broadly ovate or deltoid, rarely lanceolate, sometimes almost round, usually obtuse at the apex but sometimes rounded, very rarely acutish, perfectly entire, $1/4$ to $3/4$ inch long, the larger ones rounded at the base delicately membranous, glabrous; stems several from the fascicle of fleshy roots, somewhat pilose-hairy, simple or with a few very rudimentary branches, prostrate for most of its length erect or ascending at the terminal part, very rarely having a few delicate rootlets from the prostrate nodes; the erect terminal part usually with a pair of approximately opposite leaves, which are sometimes sessile and very much reduced, bearing a single small waxy-yellow flower 8mm. wide when fully open; petals 5 oblong or orbicular, twice the length of the sepals; achenes small, glabrous, moderately compressed, with a slender beak $1/2$ to $1/3$ the length of the body.

Differing from *Ranunculus flammula* var. *reptans* in the distinctly wider leaves and in somewhat longer styles.

Since Greene's plant is here regarded as merely an abnormal form of this proposed new species we would include it as a synonym.

The type has been deposited in the Herbarium of the University of Oregon as:— Wynd, no. 2086, Red Blanket Creek in the southwest corner of Crater Lake National Park. Other specimens in the University of Oregon Herbarium which have been examined and referred to this species are those of Sheldon, no. S12457, Lake Valley, Lane County, Oregon, July 17, 1903.

UNIVERSITY OF OREGON HERBARIUM

FIELD TRIPS OF THE CLUB

WINTER WALK OF SUNDAY, FEBRUARY 16, STATEN ISLAND. FROM PLEASANT PLAINS 'TO KREISCHERSVILLE. 21 PRESENT

We were fortunate in having for this winter field-trip the only real winter day of the entire season. A temperature of only 10°–15° F. throughout the day and a snowfall of 3 or 4 inches during the previous night made cross-country walking over the frozen ground easy. A fire and hot coffee tended to reduce shivering. In this region, pines were well represented; *P. Strobis* by a stand of large trees near the bridge road, *P. rigida* by scattered individuals, and *P. virginiana*, the objective of the trip, by about 50 trees (some up to 50 ft. in height and 1½ ft. in diameter) in a cat-brier jungle. Only a half dozen trees of *P. virginiana* had last year's cones, but cones of previous years were abundant. The station is probably the northernmost for the Virginia Pine. Other points of special interest were the barrens covered in places by bayberry bushes, *Myrica carolinensis*, with a great quantity of berries; groves of sweet gum, *Liquidamber Styraciflua*; and a single medium-sized tree of the rare red birch, *Betula nigra*, growing in a small swamp south of the stand of *Pinus virginiana*.

H. K. SVENSON

THE INWOOD-PALISADES WALK OF SUNDAY MARCH 9

47 members and guests present.

Before skirting Inwood's northern shore line, we stopped to study some of the winter buds of *Ailanthus glandulosa*, *Morus alba*, *Quercus alba* var. *latiloba*, *Q. velutina*, *Q. bicolor*, and *Q. coccinea*, the while taking note of a picturesque "Gum" tree (*Nyssa sylvatica*). This surprising group at 204th Street and 10th Avenue constitutes one of the few remaining stands of native growth on northern Manhattan. Typical of the fast disappearing vacant lots of Gotham, here were colonies of *Ailanthus*, with the *Ailanthus* Silk-moth cocoons (*Philosamia walkeri*) festooned about and dangling within easy reach, offering particular delight to some of the younger members of our group. It was with interest that I found this cocoon on the

mulberry tree and also on a young elm close by. The proposed introduction of a silk industry into America over fifty years ago was necessarily abandoned when it was learned that the silk from these cocoons was not of high grade; the silk can not be reeled, but is carded and then spun into a coarse material.

As we went through Cooper Street, a Japan Pagoda Tree (*Sophora japonica*) was an object of unusual interest to many who had never before seen this valuable tree. It was still bearing much of the fruit which formed a heavy crown earlier in the winter. In the Orient the flowers, buds, bark, roots, and wood of this species are utilized commercially, and even the pods produce an important medicine. A good specimen of *Broussonetia papyrifera* near by was also illuminating to the student, inasmuch as this particular tree showed to advantage both opposite and alternate buds.

Passing over much historic ground we entered Inwood Park where close by as recently as 1925 was unearthed the lower jaw of a mastodon. The commencement of the magnificent stand of tulip trees greeted our sight here, and several cameras were focussed on a most unique object, a young black birch growing out of the trunk of one of these superb Liriodendrons. We examined the very beautiful bursting buds on *Ulmus fulva*, noted the tortuous branching of old Sassafras trees, and found the new plants of *Leonurus Cardiaca*. Paulownias with their upright panicle flower-bud clusters attracted attention.

It was a bit early in the season to hope for many migrant birds but already the "Red-wings" were up, and our customary winter residents were heard and seen from time to time. The marsh on the way to the "Great Tree" was resplendent with the staminate catkins of *Alnus rugosa*; and we were surprised to come upon *Symplocarpus foetidus* in an advanced stage. In all likelihood this is the last showing of the species on Manhattan Island. Presently we came to Shora-kap-kok, the dell which is replete with Indian lore and where there is now an Indian Museum. The Museum was opened for us, and Mr. Reginald Pelham Bolton, historian of Inwood, told of the efforts to preserve the spot and to bring back some of the wild-flower life to the region.

Spirits were high and the day fair, and many who had not before crossed these paths marvelled at the variety of woody

plants: the splendid oaks, noticeably *Quercus montana*, also *Q. borealis* and *Q. velutina*; here a brilliant *Cornus Amomum* or there a *Benzoin aestivale* about ready to flower, and revealing on careful search the cocoons of the Promethea moth. Further search brought to view a few Cecropias near by.

Upon reaching the extreme northern limit of Inwood Hill, we passed a number of fine ornamental trees, remnants of another era: *Pinus nigra*, showing the "scars" of the Yellow-bellied Sapsucker, an interesting *Fraxinus excelsior* with its black winter buds, *Magnolia Soulangeana*, and *Pinus sylvestris*.

Half way over the Hudson we saw Black Ducks on the river, and along with them a few American Mergansers. The golden disks of *Tussilago Farfara* in great profusion greeted us upon our arrival at the Palisades. *Stellaria media* in bloom formed carpeted mats in still greater abundance. Elms were in full bloom, flower buds swelling on *Acer rubrum* and *Sassafras variifolium*, and every indication of an early Spring was at hand. Those who had come to collect specimens were delighted to find the large stand of *Equisetum hyemale* var. *affine* with newly formed strobili. *Geranium Robertianum* was freshly green in the interstices of the rocks, and "escapes" told the tale of former habitations: *Heimerocallis fulva* and *Ornithogalum umbellatum* pushing their way up; and further along *Philadelphus coronarius*. *Viburnum Opulus*, probably var. *americanum*, *V. acerifolium*, and *V. prunifolium* still bore last year's fruit. The vivid pistillate flowers of *Corylus americana* were in their prime, and buds of *Staphylea trifolia* were showing signs of Spring along with *Sambucus racemosa*.

Song sparrows were in heavy migration and caroling from tree and bush at every bend of the trail. Buttermilk Falls of Green Brook made an impressive sight, bordered with ice, and had developed a flourishing colony of *Conocephalum conicum* on its flank. The Carolina Wren, a permanent resident of the Palisades, was heard at intervals, and Duck Hawks were seen soaring near the rim of the Cliffs. More tulip trees in the rich woods brought to mind again the story of their unique vernality.

It was with regret that we left the scene of our trip, for enthusiasm was still unabated, particularly amongst the large number of young people, the youngest of whom was twelve

years old. This leads me to wonder—Why not A JUNIOR BRANCH OF THE TORREY BOTANICAL CLUB, for the embryo botanist—THE BOTANIST OF TOMORROW!

HELENE LUNT
Inwood-Manhattan

PROCEEDINGS OF THE CLUB

MEETING OF JANUARY 15, 1930

The meeting was called to order at The New York Botanical Garden at 3:30 P. M. by President Denslow. The minutes of the meeting of January 7th, were read and approved. Thirty-five members were present.

The following were unanimously elected to membership in the club:

Mr. B. R. Abbott, 27 West 44th Street, New York City; Mr. J. E. Adams, 115 West 68th Street, New York City; Mr. F. M. Cota, 3846 Cherokee Street, San Diego, California; and Prof. Kingo Miyabe, Hokkaido Imperial University, Sapporo, Japan.

The resignation of Mrs. Ellis Parker Butler was accepted.

The auditing committee have gone over the treasurer's accounts and found them in excellent order and correct. The report of the auditing committee was accepted.

Dr. Arthur Harmount Graves spoke on "The Recent History and Present Status of the Chestnut."

The subject was discussed under the following headings:

1. The value and varied uses of the American chestnut.
2. The natural range of the species.
3. The condition of the chestnut during the past century, particularly in the southern states.
4. The chestnut bark blight.
 - a. Discovery in 1904 by Herman W. Merkel, in New York Zoological Garden.
 - b. First study by Dr. W. A. Merrill.
 - c. Spread of the disease.
 - d. Penna. Chestnut Blight Conference, 1912.
 - e. Controversy over source of fungus: a native or an introduced species?

- f. Discovery of the parasite on native chestnut in China by Frank N. Meyer in 1913.
 - g. The search for resistant individuals about N. Y. City and elsewhere. About 75 resistant individuals found in Greater New York and vicinity.
 - h. Present extent of the blight in U. S. Entire area where chestnut is of commercial importance has now been reached.
 - i. The cause of frequent basal sprouts from trees apparently killed by the blight; due to a greater resistance of root as compared with stem tissues.
5. Resistant exotic chestnuts.
- a. Large healthy trees now growing in the vicinity of New York described and illustrated.
 - b. Crosses made by the Office of Forest Pathology, U. S. D. A., with a view to obtaining desirable resistant types.
 - c. The recent explorations of the Japanese islands, resulting in the securing of resistant forest types of the Japanese chestnut.

The speaker outlined his own research and his personal experiences as special agent of the Office of Investigations in Forest Pathology, U. S. D. A., insofar as they were related to the above topics.

Dr. A. B. Stout spoke on the "Studies on the Variegation of *Pelargonium*."

Meeting adjourned at 5 P. M.

Respectfully submitted,
 FORMAN T. McLEAN
Secretary

MEETING OF FEBRUARY 4, 1930

The meeting was called to order at the American Museum Natural History at 8:15 P.M. by President Sinnott. Thirty-six members were present.

The following were unanimously elected to membership in the club:

Mr. Ronald Bamford, 612 Livingston Hall, Columbia University, and Dr. C. L. Lundell, Columbia University, New York City.

Mr. Kenneth K. MacKenzie of 615 Prospect Street, Maplewood, New Jersey, was elected to life membership in the club.

The following resignations were accepted with regret:

Mr. Charles Greenberg, Miss Ruth N. Walker, Miss Helen A. Simmerman, Miss Elizabeth Kargus and Miss Anna G. Eggerdink.

The death of Mr. E. G. Arzberger, was also reported.

Dr. R. P. Wodehouse of the Arlington Chemical Company gave a talk on "Pollen Grain Morphology." He illustrated his talk with lantern slides made from his own careful studies.

Meeting adjourned at 9:40 P.M. for refreshments.

Respectfully submitted,
FORMAN T. McLEAN
Secretary

NEWS NOTES

TESTS REVEAL WHICH OAT VARIETIES ARE MOST RESISTANT TO DISEASES

As the first step in a program to reduce the annual loss suffered by oat farmers on account of rusts, the U. S. Department of Agriculture, in cooperation with 65 experiment stations, has completed tests extending over a period of five years to determine varieties resistant to stem rust. Incidentally, observations also were made on the resistance of these varieties to crown rust and the smuts of oats.

An important fact brought out by the tests is that there seems to be no relation between resistance to stem rust and resistance to crown rust. Some of the varieties most resistant to one rust were least resistant to the other. Observations on the smuts, another important group of oat diseases, indicate that there is also no relation between smut resistance and rust resistance in the varieties tested.

A detailed report of the tests has been published by the U. S. Department of Agriculture, in cooperation with the Minnesota Agricultural Experiment Station. The publication is Technical Bulletin 143-T, "Field Studies on the Rust Resistance of Oat Varieties."

SEARCH FOR SOYBEAN SEEDS IN JAPAN IS SUCCESSFUL

W. J. Morse, forage-crop specialist, Bureau of Plant Industry, U. S. Department of Agriculture, who has been in Japan for several months collecting new varieties of soybeans, reports that to date he has collected more than 5,000 lots, representing every type of soybeans grown in Japan.

A large number of soybean introductions have been sent into the United States by the Foreign Plant Introduction Office of the department in the last 20 years. Now the crop has established itself as one of major importance in this country, with a value of \$70,000,000 for 1929. Due to increased utilization as a forage crop, for production of soybean oil and meal, and as a human food, it seems likely that the soybean will continue to grow in importance in the United States.

Soybean oil is becoming an important item in the manufacture of soap, paints, linoleum, rubber substitutes, and glycerin in this country. When properly refined, the oil may be used in almost any foodstuff in which a vegetable oil is used.

With increase in the demand for soybean oil from American industries, efforts are being made by the Department of Agriculture to develop varieties with a high oil content. Where the beans are grown as a forage crop, especially for hogs, there is a demand for varieties with a low oil content, as the oil has a tendency to cause the meat to be soft, especially where large quantities of the beans are fed.

The Boyce Thompson Institute has begun the construction of a new unit of laboratories which will a little more than double the present laboratory space. The new unit will be put up at a cost of about \$400,000. It is expected that it will be ready for occupancy by January 1, 1931.

Dr. R. A. Harper will retire from the Torrey Professorship of Botany at Columbia University at the end of this term. This position was established in 1904 and has been held by Dr. Harper since 1911. Dr. Harper expects to remain in New York City.

Dr. H. K. Svenson, Assistant Curator of Plants of the Brooklyn Botanic Garden, left the last of March to accompany the Vincent Astor expedition to the Galapagos Islands. The

expedition plans to visit some of the least known of the islands of the group. Dr. Svenson, as botanist of the expedition, will collect on all the islands visited. The expedition will return the latter part of May.

Mr. Charles E. Foote, of Jackson, Michigan, died on the sixth of February. Mr. Foote had been a member of the Torrey Botanical Club for many years.

A Memorial to Lamark. Lamark died a little over one hundred years ago. The only memorial of him in France was his birthplace, the home of his ancestors, at Bazentin, a small village of the Somme. During the war the house was destroyed and only a few scattered bricks and blackened stones are left. On the centenary of his death the Societe Linneenne du Nord de la France decided to erect a memorial on the site of the old house. The memorial will stand in a garden in which will be planted the species especially studied by Lamarck or named after him. A request is made of botanists in the United States to help with this memorial. Subscriptions, checks or international postal orders, should be directed to the Banque de France, succursale d'Amiens (Somme) to the account of the Societe Linneenne, subscriptions Lanmark No. 2.433.

Dr. George M. Reed, Curator of Plant Pathology at the Brooklyn Botanic Garden, sailed in the early part of February for Japan, where he will make a special study of the Japanese Iris, its history, culture, and nomenclature. Dr. Reed expects to be gone about seven months. The cost of the trip, which will be about \$3000.00, has been defrayed by special contributions. Included among these are \$1000.00 from the National Research Council and \$250.00 from the American Iris Society. The remainder has been contributed by various individuals in different parts of the country.

SOME NOTES FROM SCIENCE

Dr. O. E. Jennings, head of the department of botany of the University of Pittsburgh and curator of botany and director of education at the Carnegie Museum, received the honorary degree of doctor of science at the convocation of the University of Pittsburgh in February.

Dr. O. L. Sponsler, professor of botany in the University of

California at Los Angeles, has been chosen president of the Western Society of Naturalists.

Dr. A. J. Grout, moss specialist, has been appointed to the all-year staff of the Biological Laboratory of the Long Island Biological Association, at Cold Spring Harbor. Dr. Grout has desired to retire from teaching in order to devote his full time to the preparation and publication of a series of monographs, the first of which has already been published, on the mosses of North America. This summer Dr. Grout will represent the Biological Laboratory at the international Botanical Congress to be held at Cambridge, England. While abroad he will check up type specimens of American mosses located in European museums.

Professor Charles J. Chamberlain, professor emeritus of botany in the University of Chicago, delivered a lecture on February 1, before the Royal Canadian Institute of Toronto on Tramping through Southern Mexico. He will this spring conduct a lecture course at the University of California, Los Angeles.

THE TORREY BOTANICAL CLUB

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Of former volumes, 24-56 can be supplied separately at \$4.00 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 (50 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1-17 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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BY

GEORGE T. HASTINGS



John Torrey, 1796-1873

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Common Plants as Domestic Remedies in Maine

ANNE E. PERKINS

From my earliest recollection many plants were highly esteemed as medicine and collected at the correct time, dried, spread, and generally hung in bags in the attic. Some gathered only a few; others many, as certain women were noted for their skill in compounding medicines from "roots and yarbs," although I never knew them to sell a remedy but in neighborly fashion take it in time of sickness or respond to a request for it.

The main divisions appear to be, bitter tonics and appetizers, alteratives, cough remedies, intestinal astringents, diuretics, "salves" and healing ointments. Some kept a secret the exact ingredients, especially of "salves." Our attic was always redolent of tansy and pennyroyal, catnip and spearmint, great bundles of thoroughwort hung from the rafters, also mullein, cleavers, snake's head, motherwort and mugwort, hops, wormwood, etc.

In the spring after the traditional sulphur and molasses to "clear the blood," a bitter tonic was made of the root of yellow dock (*Rumex crispus*), dandelion root, barberry bark or root and a swallow taken before meals—a nauseous dose. The mucilaginous root of elecampane was used in the same way, sometimes with the addition of one or more of these, burdock, tansy, hops, thoroughwort! But thoroughwort (*E. perfoliatum*) was par excellence the remedy in hard colds of the type of influenza, with much headache, muscular pains, and prostration, and in regular medicine it is a valuable remedy in just these ills. Our mothers could not afford to call a doctor for every ailment of the children and learned domestic remedies. A mustard foot-bath, "thoroughwort tea" and a good sweat, keeping the patient in bed afterwards "broke up" many a cold. If children or adult had a "cankered sore mouth," gold thread was used or

the red berries of sumac, both apparently efficacious. They fought so against the bitterest medicines, that a mild tonic of sarsaparilla root was given (*Aralia nudicaulis*) in the spring. "Saffron tea" was considered helpful in jaundice of infants or to "bring out the measles." Sweet flag was used as a vermifuge, aided by pumpkin seeds, which were used as a diuretic as well. In adults juniper berries were used as a diuretic in urinary difficulties. "Chamomile tea" was made sometimes from *Anthemis Cotula* (to take which was a terrible ordeal). Nose-bleed was treated by yarrow (*A. millefolium*) which has in homeopathic medicine a legitimate use in hemorrhage. In kidney troubles, cleavers was given (*G. asprellum*—and this was also used to fill straw beds.) Slippery-elm bark and cherry bark were valued ingredients of cough-syrup, to which was sometimes added concentrated syrup of beet juice. My mother made a cough syrup famous in the community, much in demand for asthma and chronic bronchitis, of which *Lobelia inflata* was an important element and sometimes mullein and horehound. (*Lobelia* was collected in August or September after the capsules were inflated, these and the root being the most powerful, though all parts are used in medicine. The U. S. Dispensatory gives it as valuable in asthma and spasmodic bronchitis.) However as a rule mullein was used in a so-called "bath" (fomentation) which meant that a flannel bag of several thicknesses was filled with mullein leaves first heated, "steeped" in vinegar, then applied to the painful part, generally the abdomen, in cramps, colics and stomach aches. Tansy and hops were used in the same way and the moist heat certainly relaxed and soon relieved ordinary pain. Warts on our youthful hands sometimes disappeared by magic when white oak chips were steeped and the liquid applied. This was at times used when an astringent effect was needed on "sores" and ulcers.

"Pine pitch" was wonderfully healing and was used alone or with hot "mutton tallow" and beeswax on cracks of the hands and chronic ulcers with great relief. Witch hazel, also balm of Gilead buds in rum were used on bruises and superficial cuts. There was always a bottle of these buds in rum. Wormwood was used for sprained ankles or muscular soreness, an excellent remedy. In fevers, horse-radish leaves with or without vinegar were applied to the soles of the feet, burdock and plantain leaves

being used in the same way. If a patient were nervous and restless, a "poultice" (fomentation) of hops to the feet or abdomen was thought to soothe. Children were given for colds such mild remedies as "catnip tea," "spearmint tea" and thoroughwort for hard colds.

A persistent diarrhoea called for "wire-bush tea" a decoction of *Spiraea tomentosa*. This was also given to calves with the "scours."

Cypripedium acaule ("valerian," nerve-root) was given to nervous women, hysterical and sleepless; as it was given in rum, sometimes the most temperate of women slept profoundly after taking it! The rum-cherry (black) in rum or brandy and blackberry cordial were valuable in diarrhoea. Cherry bark in rum was a remedy for coughs. An analysis of many of the patent medicines like Peruna and Paine's Celery Compound shows that our Puritan ancestors in a prohibition state did not disdain the use of alcoholics! under the guise of medicine. The "snake's head" and "stingo" used as a tonic by the elders was *Chelone glabra* in rum ("stingo" being the popular name for whiskey or rum.)

The old folks made wine and ink of elderberries and snuff of pulverized bayberry leaves (*M. cerifera*) which, from the resulting sneezes, was surely powerful! Bayberry was used in candles, of course.

The bark of hornbeam, *Carpinus caroliniana*, was used in indigestion. Hops in addition to the uses mentioned was put in rootbeer and new twigs of black birch and sassafras root added. This was thought to be tonic in effect and a pleasant beverage.

After childbirth or in diseases of women, both motherwort and mugwort were used. Pennyroyal was used for cramps and it as well as tansy was taken in the hope of its being an abortifacient; smeared on the face and hands it kept away mosquitos.

Chimaphila umbellata "Noble Pine" was used in cases of tuberculosis and it was popularly believed that "if one chewed a leaf a day, it would prevent consumption."

Phytolacca or "garget" was used to "doctor" cows with garget. (It is a valuable medicine in the treatment of glandular infections and a certain type of throat infection.) Onions and cranberries were used as poultices and the former for colds.

Calendula blossoms were crushed and put in alcohol, used on sprains and cuts of horses and cows. Sometimes a salve was made in tallow. Perhaps there is no more healing ointment than that made of Calendula in modern times, in spite of the scepticism of the U. S. Dispensatory.

Plantain was crushed and put on poison ivy eruption, as was jewel weed (*Impatiens biflora*). A salve made from plantain was healing and soothing to ulcers and hemorrhoids. St. Johnswort (*H. perforatum*) was used on bruises and on stiff muscles.

Grated horse-chestnuts made into a "salve" were also applied to hemorrhoids.

After months of cold winter without green vegetables and canning not having reached its present extent, anything that could be used as greens was welcomed and considered in some degree medicinal, particularly dock and dandelions, horse-radish, grated or the leaves as greens, mustard, cowslips, pig-weed, red-root, house-leek, "pusley," milkweed, unfolding brakes, phytolacca sprouts, "tongue" (aster), "wild beet," *Saxifraga Pennsylvanica* being the chief herbs used. *Geranium maculatum* and ordinary red clover were known as "blood remedies" and healing for sore mouths. *Ledum groenlandicum*, "Labrador tea" was esteemed as a tonic. *Lycopus Virginicus* was used for some ailment and viburnums of various kinds in cramps. These "teas" were decoctions and infusions prepared by "steeping" and would not keep unless in alcohol or syrups. It is interesting to note that while many of these remedies are still used in homeopathic and eclectic medicine, the U. S. Dispensatory dismisses most of them as of little or no value. A few quotations follow:

Anise seed used in colic (sometimes caraway do.)

Berberis vulgaris, bark of the root—bitter tonic, mild laxative, used in liver trouble.

Calendula *flowers* no virtues but used as a local application in inflammations, wounds and ulcers.

U. S. D. often refers to a plant as used in "days of therapeutic darkness," "no action, feeble action, etc."

Chimaphila umbellata, used by No. Am. Indians in scrofula or rheumatism—no properties except feeble diuretic.

Coptis trifolia, simple bitter tonic. In N. E. used as local application in apthous ulcerations of the mouth.

U. S. D. says yellow Cypripedium known as "Am. Valerian."

"Male Nervine" is a gentle nervous stimulant or antispasmodic—but does not mention *C. acaule* which was used in Maine and is not mentioned in U. S. D.

Eupatorium is damned with faint praise, when the book says it may be useful in formative stages of colds and similar disorders.

Rhus glabra, mild and pleasant astringent and gargle.

Geranium maculatum, one of our best indigenous astringents and a popular domestic remedy for diarrhoea, gargle in sore throat and cankers.

Hamamelis—of slight value though used for all ills flesh is heir to.

Inula Helenium—a tonic, gentle stimulant probably of no service for other diseases.

Juniper berries used as a diuretic.

Lappa—alterative, diuretic, etc. no reason to believe of medicinal value. Leaves used externally in eruptions and ulcers.

Pepo used in tape worm for over a century.

Phytolacca, the dried root an emetic, purgative, narcotic—used as alterative, gargle and ointment.

Rumex crispus, alterative, laxative (in homeopathy used for a cough.)

Taraxacum, a former cholagogic for torpid liver, of doubtful value.

Mullein used in pectoral complaints, the oil for hemorrhoids and inflammations, fomentation of leaves as an anodyne, dried leaves smoked in asthma and bronchitis.

White pine bark in cough syrup, has no virtue.

Pitch used in some sluggish skin diseases.

Balm of Gilead buds, counter irritant in muscular rheumatism and expectorant in bronchitis.

Prunus serotina in cough syrup, of doubtful value.

Quercus alba, an astringent wash.

Rhus glabra, an astringent gargle.

Hops, hop pillow, hop fomentation, bitter tonic, possible sedative.

Among unofficial drugs of U. S. Dispensatory are:

Wormwood

Achillea

Aesculus

Chelone, tonic, aperient, act on liver

Anthemis Cotula

Hypericum perforatum in olive oil a home remedy for bruises and wounds

Impatiens biflora, fresh juice for Rhus poison

Ledum groenlandicum in rheumatism homeopathically, substitute for tea and a tonic

Liatris scariosa, for snake bites

Lycopus virginiana, astringent, narcotic (Homeopathically used for goitre)

Spiraea tomentosa, roots used in treatment of diarrhoea, flowers diuretic

Tansy, domestic abortifacient, has no such effect but is a poison, aromatic bitter tonic

Mullein oil in ear-ache

Trifolium pratense—blood remedy

GOWANDA STATE HOSPITAL

HELMUTH, N. Y.

The Known Range of *Phlox wilcoxiana*

E. R. BOGUSCH

When the writer first described *Phlox wilcoxiana*, the general range was stated as being on the Gulf coastal plain of Texas. At that time the complete distribution was still not known. Subsequent studies have revealed that although the greatest abundance centers around the type locality, a few specimens have been collected beyond this region. These were from stations either far to the west or to the east and do not necessarily imply the presence of the species in intermediate positions within these extremes.

Phlox wilcoxiana is entirely a Texas species. The area on which it occurs in greatest abundance, when compared in size with some of the smaller adjoining states, is found to roughly equal that of the state of Mississippi.

The flowering period is usually in March and April, but favorable seasons occasionally produce flowers as early as the middle of February, and continued mild weather may permit a few plants to remain until the latter part of June. The type locality was revisited in the summer of 1929 and two good specimens found in moist shaded situations. All plants of this species on exposed slopes were fully matured. When in their prime, the plants cover many miles of sandy hillsides in a glow of red, which is, aside from other characters, a recognizable feature of the species.

Distribution data is based upon two sources; the one is first hand field experience distributed over parts of five years, and the other data is taken from notations on specimens contained in the herbarium of the United States National Museum, the herbarium of the Missouri Botanical Garden, the herbarium of the University of Illinois, and from sheets of the writer's private collection.

Neuces and Kleberg Counties mark the absolute southern limit of the species. From here the line goes northwest to Frio County, then turns northeast through the southeastern corner of Medina, Bexar, Comal, Hays, and Travis Counties. Here it turns northward to southern Milam County and then runs directly east to the northern end of Jasper County. From this point the eastern limit is marked by a line which runs due south until it is terminated by the Gulf Coast.

Within this range, the focus of distribution, based on frequency, is centered on Gonzales, eastern Caldwell, Bastrop, Fayette, Lavaca, and Victoria Counties. In the accompanying map, each point corresponds to a collected specimen. From this focus the number of specimens encountered diminishes more rapidly westward than it does eastward, the tapering seemingly being more gradual in this direction.



Map showing the distribution of *Phlox wilcoxiana*, Bogush

A single specimen collected in 1889 by Nealley at Peña in Brewster County constitutes the only record this far west. One collection at Covington, Louisiana by Bro. Anect in 1919 and another at New Orleans by J. F. Joor in 1887 complete the record for Louisiana. Of those specimens recorded for the southern states, bearing a resemblance to *Phlox wilcoxiana*, all have been ruled out as forms of *Phlox drummondii* with the exception of three additional ones from Florida. One collected in 1910 from Orange City bears no collector's name. The same is true for one from Lake City in 1896. The third is that of Hitchcock in 1900 in Jacksonville.

Specimens examined:

TEXAS. Without definite locality—Berlandier 2526; Ridell '42; U. S. Nat. Herb. 44635; Lindheimer '43; Lindheimer '44; Lindheimer '48; Short '42.

Brewster County—Nealley 307, Peña.

Victoria County—Tracy 9436, Victoria; Lindheimer 425, Victoria; Lindheimer 427, Victoria; Eggert '00, Victoria.

Walker County—Dixon 204, Huntsville.

Gonzales County—Bogusch 1495, Gonzales; Bogusch 435, Gonzales; Bogusch 1191, Ottine; Bogusch 1475, Ottine; Bogusch & Molby 2727, Ottine; Bogusch & Molby 4329, Ottine.

Bastrop County—Tharp 1959, Bastrop; Bogusch & Molby 2964, Bastrop.

Lavaca County—Fisher 85, Hallettsville.

Colorado County—Howell 355, Columbus.

De Witte County—Bray 137, Cuero; Marlott '96, Cuero.

Harris County—Wooton '93, Houston.

Austin County—Wurzlow '91, Industry.

Washington County—Lindheimer '39, Mill Creek.

Llano County—Lindheimer '48, Llano.

Wood County—Eggert '00, Granbury.

Florida. Fla. Agri. Col. 1266, Lake City; Mo. Bot. Gard. 850048, Orange City; Hitchcock '00, Jacksonville.

Louisiana. Bro. Anect. 44, Covington; Joor '87, New Orleans.

UNIVERSITY OF ILLINOIS

URBANA, ILLINOIS

Notes on Flacourtiaceae I

PERCY WILSON

1. *Samyda Lunana* P. Wilson, sp. nov.

A shrub with appressed pubescent twigs, the older branches grayish or grayish-brown; petioles 2–3 mm. long; leaves obovate or elliptic, 1.5–2.8 cm. long, 0.8–1.2 cm. broad, rounded and sometimes emarginate at the apex, acute at the base, glabrous above, the surface roughened by elevated glands, appressed-pubescent on the midvein beneath, crenulate; flowers mostly solitary in the axils of the leaves; calyx-lobes oblong-elliptic, 6 mm. long, the tube 4.5 mm. long, mostly appressed-pubescent.

Type collected on Lomas de Banao, Santa Clara, Cuba, *A. Luna* 859 (Herb. N. Y. Botanical Garden).

2. *Samyda cubensis* P. Wilson, sp. nov.

A shrub with ferruginous-pubescent twigs, the hairs spreading; petioles 2–3 mm. long; leaf-blades oblong-elliptic to elliptic, 1.5–4.5 cm. long, rounded or obtuse and sometimes emarginate at the apex, obtuse or somewhat inequilaterally rounded at the base, nearly glabrous on both surfaces, crenulate-serrulate or nearly entire; flowers solitary in the axils of the leaves; calyx-lobes oblong, 5 mm. long, 2.5–3 mm. broad, obtuse at the apex, pubescent; stamens 10, the staminal-tube united nearly to the apex; anthers ovate, 1 mm. long; ovary ovoid, compressed, pubescent; style 4 mm. long; stigma capitate. Type collected in Cuba, *Charles Wright* 1896 (Herb. N. Y. Bot. Garden). In the Gray Herbarium this number is represented by *Samyda dodecandra* Jacq.

3. *Samyda macrantha* P. Wilson, nom. nov.

Samyda grandiflora Griseb. Cat. Pl. Cub. 11. 1866. Not *S. grandiflora* Spreng. 1825.

Distribution: Cuba and Isle of Pines.

4. *Gossypiospermum praecox* (Griseb.) P. Wilson, comb. nov.

Casearia praecox Griseb. Cat. Pl. Cub. 10. 1866.

Casearia eriophora C. Wright; Griseb. Cat. Pl. Cub. 11. 1866.

Guidonia Rosauriana Maza, Dicc. Bot. 11. 1889.

Guidonia praecox Maza, Anal. Soc. Esp. Hist. Nat. 23: 56. 1894.

Guidonia eriophora Maza, Anal. Soc. Esp. Hist. Nat. 23: 56. 1894.

Ampelocera crenulata Urban, Repert. Sp. Nov. 15: 399. 1919.

Gossypiospermum eriophorum Urban, Repert. Sp. Nov. **19**: 7. 1923.

Distribution: Cuba: South America.

5. **Casearia tremula** Griseb.; Sauv. Anal. Acad. Ci. Hab. **5**: 201. 1868.

Zuelania tremula Griseb. Cat. Pl. Cub. 9. 1866.

Casearia spiralis Johnston, Proc. Am. Acad. **40**: 691. 1905.

Casearia bonariensis Boldingh, Fl. Dutch W. I. **2**: 68. 1914.

Laetia glabra Brandeg. Univ. Calif. Pub. Bot. **6**: 369. 1916.

Guidonia tremula Maza, Anal. Soc. Esp. Hist. Nat. **23**: 56. 1894.

Distribution: Cuba, Curacao, Aruba, Bonaire, Margarita; southern Mexico, Columbia and Venezuela.

Illustration: Boldingh, Fl. Dutch W. I. **2**: pl. 8.

6. **Myroxylon clarense** (Urban) P. Wilson, comb. nov.

Xylosma clarense Urban, Repert. Sp. Nov. **22**: 89. 1925.

Distribution: Cuba.

7. **Myroxylon Dussii** (Urban) P. Wilson, comb. nov.

Xylosma Dussii Urban, Repert. Sp. Nov. **22**: 89. 1925.

Distribution: Guadeloupe.

8. **Myroxylon Shaferi** P. Wilson, sp. nov.

A shrub about 2.4 m. high, the young twigs brown, puberulent with spreading hairs, the branches gray; petioles about 0.5 mm. long; leaf-blades elliptic or somewhat obovate, 2–5 mm. long, 1–3.5 mm. broad, rounded or obtuse at the apex, acute or occasionally somewhat rounded at the base, coriaceous, glabrous; primary veins indistinct above, rather prominent beneath; flowers and fruit unknown.

Type collected at Pena Blanca and vicinity, Pinar del Rio, Cuba, *J. A. Shafer* 13879 (Herb. N. Y. Bot. Garden).

NEW YORK BOTANICAL GARDEN

A Drug Map of the World

ROLAND M. HARPER

The National Wholesale Druggists' Association has recently published a drug map of the world, by Edwin L. Newcomb, measuring about three by five feet, and intended to be displayed in drug store windows during "National Pharmacy Week" (the third week in October). The map shows the approximate source of about 225 standard drugs, by means of their names inserted at the proper places. The drugs named are nearly all crude drugs of vegetable origin, "official" (officinal) in the United States Pharmacopoeia or the National Formulary. No inorganic products, and only three or four of animal origin, are included. There are also three which might be said to belong to both the vegetable and animal kingdoms, namely, nut-galls, and white and yellow wax (the two last being different forms of beeswax).

There are of course all gradations between the most important vegetable drugs and those which are of imaginary value or inert, and the number officially recognized varies in the pharmacopoeias of different countries and in the same country at different times, with a tendency to reduce the number from time to time as synthetic products and surgical processes are substituted for the old herb medicines. New discoveries in medicinal plants are rare, and most of our vegetable drugs have been known for a century or more, and some since pre-historic times.

In some cases two or more different drugs are yielded by the same plant, or the same drug may appear in the trade in different forms, such as powder, tincture, oil, etc. On the other hand, the same drug or its equivalent may come from either of two or more related species, and occasionally from different genera or families.¹ Although Dr. Newcomb's selection includes some drugs which are no longer in the U. S. Pharmacopoeia, but may still be articles of commerce, and omits several officinal plants (perhaps because there was not room for them all on the map), such discrepancies may not seriously affect the following generalizations.

¹ Two striking cases of this are anise, from *Pimpinella Anisum* of Europe and *Illicium verum* of eastern Asia, and storax, formerly derived from *Styrax officinalis* of western Asia (said to be now nearly extinct), and now from two species of *Liquidambar*.

The first glance at the map shows that drug plants are very unevenly distributed over the earth. It is not surprising that they are scarce or absent in arctic regions and deserts, and in other sparsely settled regions where there are few persons who can identify and gather them. On the other hand, there is a marked concentration of them in many mountainous regions. This may be mostly because mountain regions generally retain much of their original wild flora, and most medicinal plants which may have originally inhabited fertile plains have given way to cultivated crops. Another possibility is that the soil has something to do with it. For some reason not understood, medicinal plants seem to be rather partial to climax vegetation with abundant humus, and scarce in acid soils (there are few or none among the bryophytes, and in such acid-loving families as the Cyperaceae, Juncaceae, Orchidaceae, Hypericaceae and Ericaceae), and perhaps also in alkaline soils (preferred by such families as the Chenopodiaceae, Cactaceae, Onagraceae, Boraginaceae and Ambrosiaceae). If they really avoid alkaline soils that may explain why they are much more numerous in the eastern than in the western United States. Mountains on the whole seem to have soils neither acid nor alkaline, but approximately neutral.

If we interpret the tropics mathematically as that portion of the earth within $23\frac{1}{2}$ degrees of the equator, 159 of the drug plants mapped by Dr. Newcomb come from the North Temperate zone, 59 from the tropics, and only 5 from the South Temperate zone. Only a few are common to temperate and tropical regions. Dividing them by continents and smaller divisions, we find that Canada has 17, the eastern United States 88, western United States 14, Mexico and Central America 13, the West Indies 11, South America 24, Europe 69, western Asia 24, eastern Asia 40, Africa 29, and Australia and Polynesia 5. This grouping of course involves more duplication than the zonal one, for several species are common to different continents, or native in one and introduced or cultivated in another. Of those in the eastern United States, 62 are pretty certainly native, 16 are usually weeds, and 10 cultivated. Information is lacking as to the status of those in other countries, but they are probably mostly native also; for it is not usually profitable to cultivate a plant for medicinal purposes as long as the same species

is common somewhere in the wild state.² (Some plants which are cultivated for food or fiber, such as corn and cotton, do indeed yield medicinal products also; but those are by-products, and plant breeders usually emphasize one particular quality in a plant, and any other is only incidental.)

If we study the representation of different families in the medicinal flora of the world we find some interesting variations. The families most largely represented in Dr. Newcomb's list are Leguminosae (including Mimosaceae, Caesalpiniaceae and Fabaceae, for these families are not usually separated in the literature of pharmacy), Compositae (Carduaceae), Umbelliferae, Solanaceae, Liliaceae (including Melanthaceae, etc.), Zingiberaceae, Ranunculaceae, Rutaceae, Rosaceae (including Amygdalaceae, etc.), Labiatae (Nepetaceae), Rubiaceae, Gramineae (Poaceae), Malvaceae, Cucurbitaceae, Piperaceae, Cupuliferae (Fagaceae), Lauraceae, Menispermaceae, Loganiaceae, Rhamnaceae, Gentianaceae, Iridaceae, Berberidaceae, and Caprifoliaceae (each of these including at least three medicinal species). But if we consider the ratio of medicinal plants to total number of species, the sequence would be quite different, and some small families might outrank the Leguminosae and Compositae.

There is of course a vast difference in the families represented in the temperate and tropical floras. The leading drug plant families in the North Temperate zone seem to be Compositae, Umbelliferae, Leguminosae (etc.), Solanaceae, Labiatae, Malvaceae, Rutaceae, Cucurbitaceae, Berberidaceae, Rhamnaceae, Cupuliferae, Gentianaceae, Rosaceae, and Caprifoliaceae; and in the tropics Leguminosae (etc.), Piperaceae, Rubiaceae, Zingiberaceae, Menispermaceae, Simarubaceae, Myrtaceae, Sterculiaceae, Loganiaceae, Solanaceae, and Rosaceae.

In the North Temperate list there are 3 algae, 2 fungi, 1 lichen, 2 pteridophytes, 4 conifers, and 19 monocotyledons. The tropical drug plants are all angiosperms, and only 8 of them monocotyledons; though the proportion of monocotyledons is about 13% in both zones.³

² Report upon the Cultivation of Drug and Dye Plants, H. H. Rusby, *Journal of the New York Botanical Garden* 16, 155, Aug. 1915.

The Outlook for Drug Culture in North America, H. H. Rusby, *Columbia University Quarterly*, 19: 7-14, Dec. 1916.

³ See *Torreya* 5: 207-210. (Jan. 1906).

By size, etc., the drug plants of temperate regions may be classed as follows:—Large trees 16, small trees 10, woody vines 2, shrubs 25, herbs 100, and cellular cryptogams (thallophytes) 6. In the tropics 25 are trees (large or small), 5 woody vines, 11 shrubs, and 11 herbs, according to the best information available at this writing.

The parts used vary considerably too in different zones. Among the vegetable drugs mapped in the North Temperate zone, whole plants (sometimes excluding roots) contribute 15, roots, rhizomes, tubers and bulbs 53, twigs 1, juice, gum or resin 12, bark of stem 15, bark of root 4, leaves (and tops) 25, flowers and parts thereof (and buds) 11, drupes, berries, and other fleshy fruits (including rind, pulp, or juice) 15, and dry fruits, achenes, seeds and spores 17. In the tropics, roots and rhizomes contribute 11 of our drugs, stems or wood 3, gum, juice, or wood extract (including powder in wood) 13, bark 5, leaves (and twigs) 7, flowers and parts thereof 2, fleshy fruits 7, and dry fruits and seeds 8.

An analysis of the chemical or therapeutic properties of all these drugs by zones, countries, families, plant parts, etc., would doubtless also show some interesting contrasts, but would be a much more difficult matter, for many drugs have several different properties, some more important than others. But such a study might very well be made by some one studying the medicinal flora of a single state or other limited area. Probably as many as half of the drug plants in the United States can be found in any one of several eastern states.

ATHENS, GA.

**Star-flowered Solomon's Seal, *Vagnera*
stellata (L.) Morong, on Eastern
Long Island, N. Y.**

ROY LATHAM

A note in *Torrey*, July-Aug., 1929, by Mr. Raymond H. Torrey, published a record for this species growing in sand dunes in Sunken Meadow, Long Island and considered it a rare occurrence in his experience.

I would record here that the species is quite general and common to abundant on eastern Long Island, occurring on both forks. I have always considered and recorded the plant one of the common species in the flora of the Southold township. Dune and beach sands are its common habitat in this region and it frequently straggles out into sandy brackish swamps. In Orient where the species is certainly abundant it is more general in distribution than elsewhere on the north shore. In Orient on the beach sands between Gardiner's and Long Beach Bays the plant grows in large thrifty beds associated with the red cedar, *Juniperus virginiana*; beach plum, *Prunus maritima*; bayberry, *Myrica carolinensis*; pitch pine, *Pinus rigida*; post oak, *Quercus stellata*; sea lovage, *Ligusticum scothicum*; sea-side golden-rod *Solidage sempervirens* and many other plants in the flora common of the sea coast. This locality is occasionally washed by flood tides, but very rarely during the growing season.

On the mainland in Orient we find the plant in various situations, but most frequently in dry woodlands. One tract of dry soil covered with a heavy growth of red cedars, which has been cleared since the World War, contained a covering of this Solomon's-seal. The large plants were knee-high and extended over an area of two and one-half acres. The soil is a rich, dry loam—known as the famous Orient potato soil, but extremely acid before being limed.

At Southold and Peconic we find the species in the dune sand, often high and dry, dwarf of growth and struggling to keep above the shifting sands.

We record the species in Mattituck, Riverhead, Calverton and on the Islands of Shelter and Gardiner's.

On the south shore we record the species from Montauk.

Locally common on dune and beach sands at Napeague, Promised Land, Amagansett and westward along the ocean front through Easthampton, Bridgehampton and Southampton. And at Three Mile Harbor westward through the Little Northwest, Sag Harbor, Noyack, North Haven, North Sea and locally common on the dry sands in the hills of the Shinnecock.

ORIENT, N. Y.

FIELD TRIPS OF THE CLUB

EARLY BLOSSOMING TREES ON BEAR MOUNTAIN TRIP

Several trees and shrubs were found in bloom, on Sunday, March 23 on a field trip in the Hudson Highlands, in the eastern part of the Bear Mountain-Harriman State Park. *Acer rubrum*, *Populus tremuloides*, *Corylus americana*, *Ulmus fulva* and *Alnus rugosa* were in full bloom. *Betula lenta* was well advanced. Several good stands of the American aspen were seen, some of even age, which had escaped fire and were eight to ten inches in diameter, handsome in their olive bark. Gray birch and American aspen are the trees that usually cover up the cut over and burned areas first in this region.

Herbaceous plants were not in bloom, except the hardy skunk cabbage. Coltsfoot, *Tussilago farfara*, was seen in bright golden bloom along railroad fills on the way to Bear Mountain; it bloomed on the Palisades about March 10. *Arbutus* buds were showing a trace of color, *Hepatica* was still wrapped in fur.

Four *Lycopodiums*—*lucidulum clavatum*, *obscurum* and *complanatum* were seen in a swamp west of Bear Mountain; also a sturdy clump of the striking Tree Moss, *Climacium*.

Leaf and flower buds of the red-berried elder, *Sambucus racemosa*, were ready to open, along the new fill of the Popolopen Drive. Why do not those who are concerned in producing new cover for such construction work, use this handsome native shrub more often, with its early flowers, and early fruit, maturing in late July. It will grow in raw rocky fill, and asks no favors, only a start. *Rubus odoratus* is another native shrubby plant which volunteers to cover such raw spots, and is handsome in leaf and bloom. The parapet blocks on this Drive are interesting specimens of the geological formations of the district.

RAYMOND H. TORREY

FIELD TRIP OF APRIL 6, 1930

A party of thirty four members and friends of the club started north from the Dyckman Street ferry along the Palisades. Near the ferry house the party stopped to examine the patch of coltsfoot that had been found in blossom on the trip of March 9th. The month that had elapsed seemed to have made little difference in the appearance of the plant, there were

about the same number of open flower heads, but no sign of any in fruit. Along the path there was a more noticeable change, the elms and alders that had been in full bloom had now past the blossoming season, red maples that had not shown flowers before were now in their prime. A few hepaticas were found in blossom and dutchmen's breeches was abundant on the hill-sides, some fully out, but mostly with the flower buds only half open. A patch of periwinkle, *Vinca minor*, showed its violet blossoms half hidden among the evergreen leaves. This and a few gnarled apple trees marked the location of a home of long



Staminate flowers of willow partly transformed to pistillate.

ago. Near Buttermilk Falls the party climbed to the top along a long disused road, stopping to note the flower buds of the red-berried elder, the opening leaf buds of the bladder nut and the vines of the moon seed, *Menispermum*. Search along the brook at the top failed to reveal any of the golden club, *Orontium aquaticum*, in blossom, though a few leaves had reached the surface and some of the flower spikes were showing below. Back in the Kelders the heart-leaved willow was just coming into bloom while *Salix discolor* was past its prime. Two shrubs, apparently of *discolor*, were found with the flowers showing all stages of transition from staminate to pistillate. Evidently staminate plants, every catkin had some flowers with stamens transformed into pistils. Dissection with a pen knife showed ovules in these ovaries while the stamens were all shedding pollen. The accompanying sketches show some of the many forms,

the long silky hairs of the scales being omitted in all but the first. As the party descended the broken edge of the Palisades above Alpine the rock cress, *Arabis lyrata*, showed masses of white flowers in the crevices of the rocks, while numerous plants of the sickle pod, *A. canadensis*, had clusters of flower buds down close to the leaves. In a hedge along the road above the Palisades one of the party stopped to examine an old bird's nest, finding in it two eggs, one evidently that of the builder of the nest, a chipping sparrow, though the egg was bleached white, the other a cow bird's. Few birds were seen, the ones most worthy of note being a few phoebes and a small flock of fox sparrows.

GEORGE T. HASTINGS

FIELD MEETING OF APRIL 12

Springs flowers were found to be late in bloom, on the joint excursion of the Torrey Botanical Club and the New York Section of the Green Mountain Club, in the South Mountain Reservation of the Essex County Park system, on Saturday, April 12. Apparently cool weather had slowed up the progress of vegetation; the woods were still mostly brown and bare, but along the streams, some greenery was afforded by the skunk cabbage and green hellebore. Spice bush was only beginning to bloom in a few sunny spots. A few hepaticas were found in blossom.

However, in the absence of blooming plants, the party of twenty nine, under the leadership of Mr. Andrew Scarlett of South Orange, N. J. found several objects of geological interest. Chief among these was the Turtle Back Rocks, on First Watchung Mountain, near Northfield avenue, a striking example of incipient columnar formation in basalt. Boulders containing marine shell casts, from the Silurian formations of the Upper Hudson Valley, were found in glacial gravel in a pit, south of the Orange Reservoir. Fresh exposures of the columnar basalt in a quarry west of South Orange, were also of interest.

RAYMOND H. TORREY

FIELD MEETING OF APRIL 26

Spring had advanced swiftly in two weeks. The field meeting of Saturday afternoon, April 26, was another joint excursion.

sion of the Torrey Botanical Club, and New York Section of the Green Mountain Club, including also members of the New York and Brooklyn Entomological Societies, and the Yosians. Twenty eight were present. The route was from Douglaston, along the edge of the salt meadows, to Alley Pond, up the valley sapped in the moraine by a spring brook, through the kettle hole moraine area to Hillside Park and to Hollis.

The most striking flower display was the colony of Golden Club, *Orontium aquaticum*, in Potamogeton Pond, north of Queens Village. There were hundreds of the golden spadices, in the height of bloom, a splendid sight in the slanting light of the afternoon sun. This is certainly the largest and perhaps the only remaining station for this plant within the limits of Greater New York. *Riccia natans* which was found by members of a Torrey Botanical Club party last November, in this pond, then dried up, in its terrestrial state on the moist turf, had not reappeared in its floating form. *Sium cicutaefolium* was plentiful mixed among the Golden Club.

An interesting plant, not common in the vicinity of New York City, was *Duchesnea indica*, the Indian Strawberry, near Alley Pond. Another adventive, which caused discussion, because of a suggestion of sumac about it, though this was dispelled by the bare panicles of last year's bloom, was *Sorbaria sorbifolia*, escaped from cultivation on the site of an old farm, on a lane running south from Alley Pond.

Ranunculus fascicularis and *abortivus* were two members of that genus in bloom; also, in the same family two anemones, *Anemone quinquefolia*, and *Anemonella thalictroides*. Hepatica does not appear to have survived in the Queens woods, but Bloodroot, *Sanguinaria canadensis* was pleasingly persistent, some times in woods and again along hedgerows between fields where rocks had been piled. The Yellow Adder's Tongue, or Fawn Lily, to give it the much better common name proposed by John Burroughs, *Erythronium americanum*, was also common in wet places. While these are common species in outlying parts of the suburbs of New York City, it was pleasant to find them surviving so well within the limits of the metropolis and within sight of the skyscrapers on Manhattan. Spice bush was in height of bloom too, around Alley Pond.

The kettle hole ponds were dryer than usual at the season, and their conditions, where some that ordinarily sustain Pota-

mogeton, Brasenia, Utricularia and other water plants, were quite dry, raised the question as to how these aquatics sustain such drying out of their habitats. One kettle hole, which I found golden with the flowers of *Utricularia vulgaris*, in July, 1929, was dry, and the plant can scarcely develop this year unless there is more moisture in the next few weeks. But perhaps they rest and take no harm, and reappear when conditions are suitable, if such dryness is not repeated too many seasons in succession.

RAYMOND H. TORREY

PROCEEDINGS OF THE CLUB

MEETING OF FEBRUARY 19, 1930

The meeting was called to order at The New York Botanical Garden at 3:30 P. M. by President Sinnott. The minutes of the meetings of January 15 and February 4 were read and approved. Twenty-two members were present.

A motion was made and seconded that the following members be made life members of the club:

Mr. George E. Osterhout, Windsor Weld Company, Colorado, and Miss Caroline Coventry Haynes, Highlands, Monmouth County, New Jersey.

A motion was made and seconded that our previous president, Dr. Denslow, be made a life member.

The following were unanimously elected to membership in the club:

Mr. Alexander Hirshkowitz, 1760 Montgomery Avenue, New York City; Mrs. Jennie L. S. Simpson, Hunter College, Park Ave. at 68th Street, New York City; Miss Marjorie Aldous, 43 High Street, Passaic, New Jersey.

The resignations of Miss Johanna Oppenheimer and Mr. Hans Wilkins were accepted.

The death of Dr. A. H. MacKay was also reported.

A committee consisting of Dr. Marshall A. Howe and Dr. Forman T. McLean, appointed at the meeting of January 3, to prepare a minute on the death of Maturin L. Delafield, reported as follows:

Maturin Livingston Delafield, whose death in Lausanne, Switzerland, on December 18, 1929, at the age of 60, we much regret to record, was Librarian of the Torrey Botanical Club

for four years (1889-'92) and Treasurer of the Club for three years (1898-1900). His services to the Club are held in grateful remembrance by its older members. In 1899, he became a Patron of the Botanical Society of America, a distinction that he shared later with Mr. J. P. Morgan and Dr. and Mrs. N. L. Britton. Ill health unfortunately led to his retirement from business and from office in the Club, after which, he lived abroad, chiefly in Switzerland. However, he continued his interest in plants and his membership in the Club. In view of the final passing of a member of forty two years standing.

BE IT, THEREFORE, RESOLVED, that the Torrey Botanical Club sincerely deplores the loss of a faithful and accomplished friend in the death of Maturin Livingston Delafield; and that a copy of this minute be transmitted to his bereaved family.

Mr. W. S. Bourn of the Boyce Thompson Institute, gave a talk on "Destruction of Aquatic Plants in the Sounds Region of Eastern North Carolina." He described the changes in the aquatic flora in some of the fresh water lakes along the coast of North Carolina caused by admitting salt water through the canals. This apparently resulted in the destruction of the pond weed which is one of the principal food plants of the wild fowl. He strongly advocated the replacement of tide locks in the canals in order to restore the fresh water condition of the lakes.

Professor E. W. Sinnott followed with an interesting account of "The Relations between the Characters of the Petiole and those of its Constituent Cells in *Acer*."

Meeting adjourned at 5:00 P. M.

Respectfully submitted,
FORMAN T. McLEAN
Secretary

MEETING OF MARCH 4, 1930

The meeting was called to order at the American Museum of Natural History at 8:15 P. M. by President Sinnott. Fifty-one members were present.

It was moved by Dr. Benedict and seconded by Dr. Harper that the club go on record as favoring Legislative statute for the protection of native wild plants. The secretary was instructed to send communications to this effect to the Governor of New York and local representatives in the Legislature.

The following were unanimously elected to membership in the club:

Mr. N. C. Thornton, Boyce Thompson Institute for Plant Research, Yonkers, New York; Mr. Wm. Conway Price, Boyce Thompson Institute for Plant Research, Yonkers, New York.

The following resignations were accepted:

Dr. Winifred J. Robinson and Dr. Lewis E. Wehmeyer.

The death of Mr. Charles E. Foote was reported with regret.

Mr. Carl T. Ramsey gave a talk on "Insect Pollinating Mechanisms in Native and Cultivated Orchids."

The orchid family is not only cosmopolitan but truly a multitudinous host, embracing 400 genera and about 15,000 known living species. Orchids are found at all latitudes and altitudes from sea level to 13,000 feet and from the tropics north to the limits of vegetation towards the poles. In North America, north of Mexico there are 146 species.

All of our existing orchids are dependent on insects for pollination. We do not know just when the orchids started their flirtation with the insects but we may safely assume that it may have been during the Cretaceous age, possibly 30 million years ago. Early in their development they not only became the most gorgeous and exclusive race of plants but likewise learned to climb trees and precipitous cliffs to find the sunlight they always demand even in the densest tropical forest. The strange and fascinating forms of the orchids are all fashioned to suit them for insect pollination. Until this is fully understood the marvel of the orchids' delicate and tinted lips cannot be appreciated. Further, in most cases each species has a separate insect to pollinate it. This, of course, makes the operation a most uncertain one, so comparatively few orchids ever set seeds. How this interesting and complicating relationship first arose is almost beyond speculation. The illustrious Darwin clearly demonstrated a half century ago that all of this was an effort to produce a healthy race when fusing new blood in the process of cross-pollination. There are comparatively few orchid hybrids, but every orchid is the result of a cross, few of them being even able to develop seed from their own pollen. Further the structure is such that a pollination of orchids without the help of insects is almost impossible under natural conditions. The showy orchid, one of the handsomest of our native species is

adapted to pollination by wild bees. The sticky masses of pollen are so placed that they are sure to adhere to the eyes of the bee when he visits the flower and need to be dried out by exposure to the air before they rise to a position where they can pollinate another flower. This insures that the pollen will only be used in cross-pollination with a flower from another plant. Arethusa has a much simpler arrangement, its pollen sticking like a porous plaster to the back of the bee already to be scraped by the stigma of the next flower visitor.

Mr. Ramsey went on to tell of the insects that pollinate different species of the fringed orchids, and the mechanisms that insure pollination; how the different times of flowering discourage hybridizing, despite which occasional hybrids are found,—but they are exceptional. He also intimated that at least one native orchid, Calopogon, is a practical joker and a fraud, enticing the bumble bee into the flower, tumbling him about and plastering him with sticky pollen, then tumbling him out to seek another flower, without any reward of nectar at all! That the bee, undaunted goes on the next orchid bloom and pollinates it, only to get the same rough treatment, speaks more for his busy industry than his shrewdness.

In many of the orchids, the flower structure not only attracts one particular insect, but also guides and forces him to follow certain narrow paths, to insure that he does the required work—whether he gets paid in nectar or not. Most of the orchids, unlike our native Calopogon, are honest and reward their insect benefactors properly. To further attract the proper insects, some of the orchids have nocturnal fragrance as well as brilliant coloring and grotesque form.

Mr. Ramsey also described the remarkable structures of the Lady's Slipper and many of the exotic orchids, showing how each is cunningly fitted for pollination by a particular insect.

The talk was illustrated by beautifully colored slides of the orchids as Mr. Ramsey has found them growing, and drawings to show details of the devices for pollination.

Meeting adjourned at 9:40 P. M. for refreshments.

Respectfully submitted,

FORMAN T. MCLEAN

Secretary

MEETING OF MARCH 19, 1930

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 February 19 and March 4 were read and approved. Twenty-five members were present.

The following were unanimously elected to membership in the club:

Mr. L. Gordon Utter, Brooklyn Botanic Garden, Brooklyn, New York; Miss Margaret Paine Fisher, Woodrow Wilson Hotel, New Brunswick, New Jersey; Miss A. Thurston, 93 Belvedere Avenue, Yonkers, New York.

The following resignations were accepted:

Mr. Arthur C. Lasswell, Mr. Arthur Carpenter, and Mr. Charles E. Raynal.

A letter was read by our President from the Wisconsin Go-Hiking Club urging us to save the Wolf River district. The matter was brought up and discussed but no action was taken regarding it.

Mr. Chester W. Emmons gave a talk on "Clamp Connections on Mycelia of Fungi."

Professor J. S. Karling gave a talk on "Recent Studies on Chytrids."

There was a discussion after each talk.

Meeting adjourned at 5 P. M.

Respectfully submitted,

FORMAN T. MCLEAN, *Secretary*

MEETING OF APRIL 1, 1930

The meeting was called to order at the American Museum of Natural History at 8:15 P. M. by President Sinnott. Eighty four members and friends were present.

Mrs. R. P. Wodehouse, 75 Ridge Drive, Yonkers, New York, was unanimously elected to membership in the club.

Professor M. A. Chrysler of Rutgers University gave a talk on "Color Photography and Autochrome Pictures of the New Jersey Pine Barrens." He showed lantern slides made by three different methods, a large number of them illustrating the vegetation of the New Jersey pine barrens.

Meeting adjourned at 9:40 P. M. for refreshments.

Respectfully submitted

FORMAN T. MCLEAN, *Secretary*

NEWS NOTES

U. S. EXPLORERS HUNT ALFALFAS
ON PLAINS OF CENTRAL ASIA

After visiting most of the countries of Central Europe and working their way well into Asia, H. L. Westover and W. E. Whitehouse, representatives of the Bureau of Plant Industry, U. S. Department of Agriculture recently returned to the United States, bringing several hundred new plant varieties, principally alfalfa and fruits.

One of the principal purposes of the trip was to obtain varieties of alfalfa which might prove immune from or resistant to bacterial wilt, a disease which is proving serious to alfalfa growers in the Middle West. Preliminary tests had indicated that varieties from Turkestan and France were somewhat resistant to the disease.

Besides obtaining alfalfa seed from every section of Turkestan, Mr. Westover also brought back seed from France, Italy, Germany, Poland, Austria, Rumania, Hungary, and Czechoslovakia. In all, he brought back about 170 lots of alfalfa seed. These seeds will be tested at our experiment stations to determine whether or not they are resistant to wilt. Doctor Whitehouse was successful in his search for fruits, and brought back seeds of apricot, almond, apple, pistache, and melons. The melon seed will be used by plant breeders who are trying to combat melon wilts by breeding new wilt-resistant strains of high quality. The wild fruits are to be tried out in an effort to determine their value as stocks and in addition they may prove of value to plant breeders.

THE SEARCH FOR FRANKLINIA

Tallahassee, Fla.—Another search for a rare plant has failed. In the spring of 1773, William Bartram, noted botanical explorer, discovered a handsome shrub, something like a bay, near the Altamaha river, while on his way from Savannah, Ga., to Florida, on horse-back. He called it *Franklinia Altamaha*.

In the next few years other botanists visited the locality, and transplanted specimens to northern gardens, where some of their descendants still survive. But since 1790 all searches for it in its native haunts have been fruitless, although there have been a few false reports of its re-discovery.

Last year a horticulturist from Washington thought he had re-discovered it at the original locality, and the story was given wide publicity in the newspapers, but it turned out that he mistook the tan bay, a tree of the same family, for it. This spring, Dr. Edgar T. Wherry, of the U. S. department of agriculture, and Dr. Frank Thone, of the Science Service news bureau, accompanied by the man who believed that he had re-discovered the plant last year, and Dr. C. C. Harrold, of Macon, who has the *Franklinia* growing at his home, made a careful search for it along the Altamaha, but without success.

At the last session of the New York State Legislature an appropriation of \$400,000 was made for the equipment of the new Plant Sciences building which is nearing completion. The building is to cost about \$1,000,000 exclusive of equipment.

Measuring star size and plant growth. The interferometer, used in measuring the size of stars has been adapted by Dr. K. W. Meissner, of Frankfort, Germany, to study the growth of plants. With the instrument the growth of plants can actually be seen and watched. For most plants the growth is about one hundred thousandth of an inch a second. With the direct light of a mercury vapor lamp the rate increases greatly, ether fumes caused growth to stop almost instantly.

Llewelyn Williams, assistant in wood technology on the staff of the Field Museum, Chicago, and leader of the Peruvian division of the Marshall Field Botanical Expedition to the Amazon, returned the middle of May. He has made collections of woods and other botanical material in the Amazonian forests of Peru, and explored some regions believed never before to have been entered by a white man. Mr. Williams has been in the field about one year. The other division of the expedition, which worked along the Amazon in Brazil under the leadership of Dr. B. E. Dahlgren, acting curator of botany, returned several months ago. (*Science*)

Dr. J. Arthur Harris, professor of botany and head of the department of botany in the University of Minnesota since 1924, and from 1907 to 1924 botanical investigator at the Station for Experimental Evolution of the Carnegie Institution of Washington, died on April 24. Dr. Harris was in his fiftieth year. (*Science*)

THE TORREY BOTANICAL CLUB

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Of former volumes, 24–56 can be supplied separately at \$4.00 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 (50 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–17 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.

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EDITED FOR
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BY
GEORGE T. HASTINGS



John Torrey, 1796-1873

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TORREYA

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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 panicle 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, up-lifted, 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 occurred 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 B₁. 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 observation 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 disagreements 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 sili-ceis," 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 Shawan-

gunk 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 cyclostosa* 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, *Hemerocallis 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, *Dieckmannia 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.

¹ 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 ginseng, 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* Dayenport; *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	Nighthawk
Killdeer	Swift, Chimney
Dove, Mourning	Hummingbird, Ruby-throated
Vulture, Turkey	Kingbird
Hawk, Marsh	Flycatcher, Crested
Hawk, Sharp-shinned	Phoebe
Hawk, Cooper's	Pewee, Wood
Hawk, Red-shouldered	Flycatcher, Least
Hawk, Sparrow	Jay, Blue
Kingfisher, Belted	Crow, American
Woodpecker, Hairy	Starling
Woodpecker, Downy	Bobolink
Woodpecker, Red-headed	Cowbird
Flicker, Northern	Blackbird, Red-winged

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

BIRDS OBSERVED ONLY AT HIGH POINT. ALTITUDE 1809 FEET

Junco	Kinglet, Golden-crowned
Warbler, Myrtle	

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.

THE TORREY BOTANICAL CLUB

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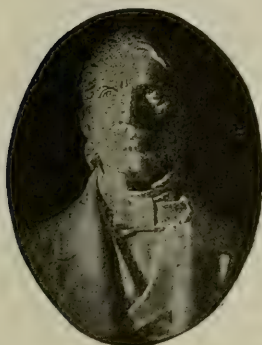
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THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS



John Torrey, 1796-1873

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GEORGE T. HASTINGS

2587 Sedgwick Ave.

New York City

TORREYA

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Inwood Park, Manhattan

ARTHUR HARMOUNT GRAVES

Inwood Park is located in the Borough of Manhattan, New York City, at the extreme northwest corner of Manhattan Island, extending to the Hudson River on the west and to Spuyten Duyvil Creek, also known as the "Ship Canal," on the north (Fig. 1.). Because it was a camping ground of the Indians of Manhattan and still preserves many evidences of their occupancy, and possesses, furthermore, most attractive scenic features as well as an interesting and varied flora, it deserves to be better known.

My own acquaintance with the region dates from the summer of 1918. At that time I was detailed by the United States Department of Agriculture to search the country about New York City for chestnut trees resistant to the bark blight. In the course of my peregrinations I came across this interesting locality, where by the way, several specimens of disease-resistant chestnut were found. I was indeed surprised to find that on Manhattan Island, the busy, thickly populated borough which is the original New York City, a wild, wooded section of this sort existed. Then it was still owned privately and was in considerable *dishabille*—especially the parts such as Shorakapkok Glen. Fallen trees, dead decaying branches, weeds and climbing plants, together with the vigorous growth of tall, stately tulips and oaks, and an understory of spice bush, all combined to produce an effect of natural wildness that was far remote from the general conception of what is meant by New York City. It is most fortunate that since then all this land has been taken over by the city under the name of "Inwood Park," and fortunate also that for the most part it has been left in a state of nature: some roadways and paths have been constructed, and

the private organization, the Dyckman Institute, has done much toward making Shorakapkok Glen more attractive.

How to Reach the Park. The best way to reach Inwood Park is via the Dyckman Street Station of the Broadway-



Figure 1. Contour map of Inwood region. Enlarged from Harlem sheet, U. S. Geological Survey, edition of 1900, reprinted 1928. Many of the recent streets are not shown. 1, Cock Hill; 2, Ostrya Hill; 3, Hill of the Five Oaks; 4, Shorakapkok Glen. The hill to the west of Ostrya Hill was occupied by the "House of Rest." $3\frac{1}{4}$ inches=one mile.

Seventh Avenue Subway. Walk west toward the Hudson River, crossing Broadway, and turn up Payson Avenue, the second street to the right beyond Broadway. Or, one may continue on the Subway to the 207th Street Station—the one next to Dyckman Street. Proceeding west on 207th Street, a walk of a few blocks brings one to the Park. The road turns to the

north here, skirting the hill, with Spuyten Duyvil Creek on the right, and eventually ends at Shorakapkok Glen.

Geographic Features. Inwood Park contains three principal elevations. 1. *Cock Hill*, so called during Revolutionary times, with an altitude of about 220 feet, is the highest and westernmost, commanding a view of the Hudson and the Palisades to the west and northwest, as well as the mouth of Spuyten Duyvil Creek¹ where it enters the Hudson. It is also generally known as Inwood Hill. On a southern shoulder of this hill stands the "House of Rest." (p.121). 2. Almost due south of Cock Hill lies another, lesser elevation, about 140 feet at the highest point, which we may call "*Ostrya Hill*," from two small hop-hornbeams (*Ostrya virginiana*) near its northern end. Here a ledge of bare rock is exposed, from which is afforded a view to the eastward of the upper part of Manhattan and, at certain points, of University Heights (New York University); also to the northward, through the trees, of the hill beyond Spuyten Duyvil Creek. 3. Northeast of *Ostrya Hill* is still another eminence, of about the same elevation (really a shoulder-like extension of *Ostrya Hill*) and plateau-like—so flat, indeed, that a tennis court, it appears, was once located there. For this, because there are splendid specimens of five different species of oak growing there within a short radius, we would suggest the name "*Hill of the Five Oaks*."

Shorakapkok Glen, also known locally as Cold Spring Hollow,² the depression between the Hill of the Five Oaks and Cock Hill, slopes gradually upward toward the south from the shore of Spuyten Duyvil Creek. On its western side, in caves formed of giant slabs of rock which in past ages became detached from

¹ Spuyten Duyvil Creek gets its name from *Spyt den duivel*, which is the Dutch equivalent for "in spite of the devil." "Supposed to be derived from the following circumstance: When the English fleet appeared in New Amsterdam (New York) Harbor, the governor's trumpeter was sent to warn the farmers up the Hudson and summon them to the defense of the city; on reaching this creek he found no ferryman willing to take him across on account of the high wind, and swore to cross the stream "spyt den duivel"; but was drowned in the attempt to swim across." *Encyclopedia Americana*. Vol. 25, p. 461. 1928. This narrow strip of water, which bounds the north end of Manhattan Island, connects the Harlem and the Hudson Rivers. Since it was straightened for navigation purposes it is now often known as the "Ship Canal."

² Bolton, Reginald Pelham. *Washington Heights, Manhattan: its eventful past*. p. 2. Dyckman Institute: New York, 1924.

the near-precipice above, dwelt members of a tribe of Indians who were inhabiting the upper end of Manhattan Island when the white men arrived in the early 1600's. These were the "Rechgawawanc, probably 'Rechgawac's people' [Rechgawac being the sachem] but they were part of the Weckquaesgeek, a larger chieftaincy which had its headquarters at Dobbs Ferry."³ That these Indians lived here is attested by the finding of their rude implements buried in layers of ashes on the floors of the caves, and by the ancient shell heaps, the remains of which may still be seen near the path leading down into the valley and elsewhere in this neighborhood. "Here, in the solitude of wild nature, it will take but little effort of the imagination to bring before the mind the scene, when the bustling horde of Rechgawawanc swarmed about the rocks, through the woods, and along the banks of the creek—the men bearing from their log canoes baskets filled with oysters, the squaws mending grass nets and hempen fishing lines, or filling the cooking-pots with red-hot stones from the wood fires, the smoke of which blackened and the heat of which split the sides of the rocks beneath which they were kindled; the girls carrying water in gourds from the gushing spring; the boys playing games with bones or stones or practicing their future prowess with bow and arrow; while the papooses with baby stolidity were perched near the crackling fires, sucking a bone of the latest toothsome addition to the larder, be it deer, dog, or bear.

Or amid the wintry snows, when the fires were kindled inside the rock-shelters, and within the bark huts erected on the shell-covered knolls, one can readily picture the same occupants wrapped in furry bear, downy beaver, or silky deer skins, huddled around the crackling logs, pounding corn, boiling "sapsis," scraping hides, splitting pebbles and flints, and longing for the return of spring."⁴

The "gushing spring," which they must have cherished, has been cleared out and preserved in a most fitting and artistic manner by the Dyckman Institute, and will be found near the shore of the creek and by the side of the little building which forms the Indian Museum of the Institute.

³ Bolton, R. P., l. c. p. 3.

⁴ Bolton, l. c. p. 14.

NOTES ON THE VEGETATION

The following observations are for the most part set forth in the form of a guide, and apply mainly to the woody plants, for the reason that these plants form the most conspicuous features of the vegetation. They are given partly for the sake of a record and partly to assist beginners who wish to become acquainted with the plants of this interesting region.

1. *Ostrya Hill*. To explore the southern slope of *Ostrya Hill* we may enter the Park via Dyckman Street and Payson Avenue, turning in from the street to the woods on the left, just after passing a road on the left, and a vacant lot. A few paces bring us to a path which circles the south side of the hill, and nearby we find the black cherry, sassafras, bitternut hickory, a lone tree of black walnut (close to the path), hackberry, ailanthus, and staghorn sumac—the last not common in Greater New York. Thick mats of Japanese honeysuckle cover much of the ground; and here and there also the poison ivy, really a creeping or climbing species of sumac, may be distinguished by its three leaflets. The common elder grows near the path, as also a lone, young pear tree, and further on an apple tree, as well as the black locust and American elm. The slippery elm, with larger, rougher leaves, ash-gray twigs and mucilaginous bark with its peculiar flavor, grows a few yards farther to the north in this same section, near a wildling peach. The last, together with the pear, apple, ailanthus, and Japanese honeysuckle are living testimonials of the white man's invasion.

Further up the hill to the northward we find a small tree of the comparatively rare red mulberry—the native species, with larger, rougher leaves than the far more common and introduced white mulberry. This little mulberry grows in a comparatively open space bordered by white ash and black cherry. Continuing up the hill past a large white oak, the path leads past the rear of a house. Near this point, on the left, climbing high on dead elder stems and other upright supports, we recognize the moonseed, an attractive native vine which grows also just across the river along the Palisades.

Continuing northward we come out opposite a large tulip tree onto a road, and a few paces bring us to the brick piers of the rear entrance to the "House of Rest." This has for many

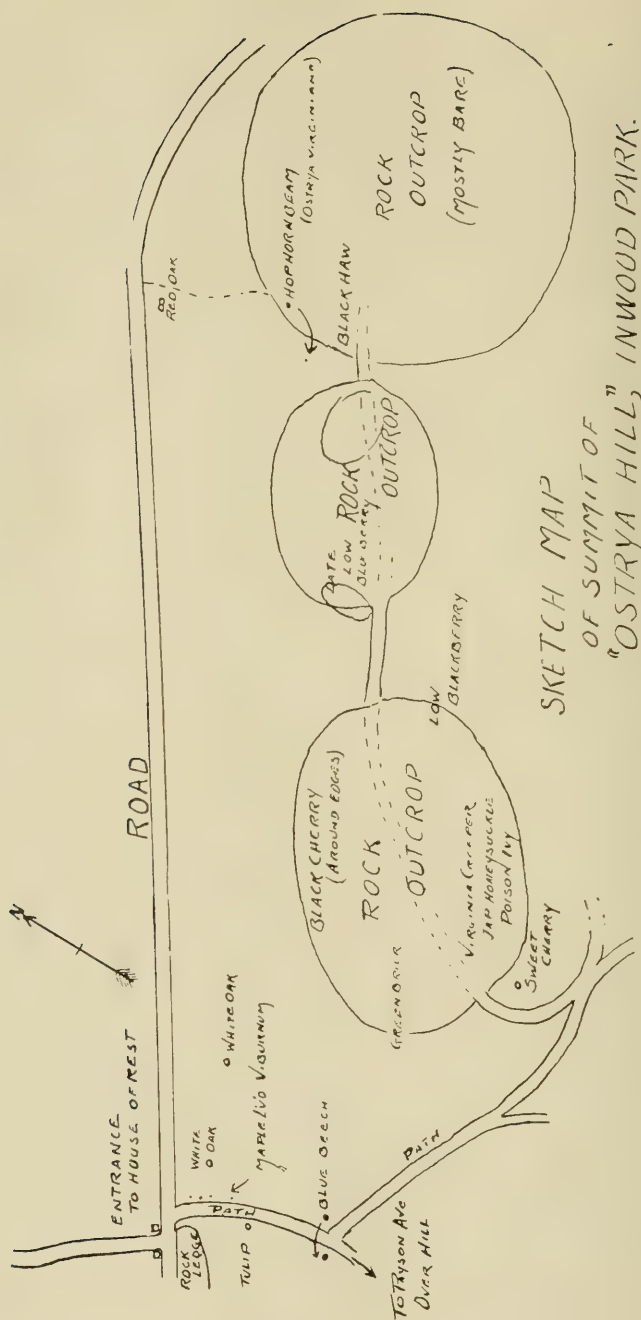


FIGURE 2. Sketch map of summit of Ostrya Hill. One inch = approximately 40 feet.

years been a home for consumptives, but has now become city property.

Opposite the entrance gates near a low, rounded outcrop of stone, we turn into the path leading off to the right (southeastward), over the hill. Large white oaks are on our left, a tulip tree near the path on the right, with several small blue beeches nearby. The low, maple-leaf viburnum is much in evidence. We do not go down the hill, but take the first turn to the left, and strike for the bare ledges to the northeastward. A rough sketch of the locality is given in text figure 2. On reaching the first bare rock outcrop we find the green brier, the Virginia creeper, the poison ivy, and the Japanese honeysuckle all striving to cover it. At the further end of this outcrop grows a form of the dewberry (*Rubus villosus*), perhaps variety *humifusus*. At the next bare spot we come upon a patch of the late low blueberry, a plentiful supply of stunted black cherry (for the soil here is extremely thin where it exists at all) and a few other low trees. Descending slightly to the next bare ledge—which is the last—we pass by two good sized black haws, both about ten feet high, and come out at the northern terminus of this whole formation. Here and there, in clefts and hollows in the rock, grow red oak, American elm, staghorn sumac, late low blueberry, Virginia creeper, sweet birch, bitternut hickory, white ash, ailanthus, chestnut oak, and a few depauperate plants of *Rubus allegheniensis*, which seems to be the common high bush blackberry of this locality. On the western edge are the two small trees of the hop-hornbeam, growing as large as they can with the limited supply of soil at their command.⁵ The resemblance of their leaves to those of the sweet birch nearby is striking, but they can be recognized by the bark, and their twigs lack the wintergreen flavor of the birch. This whole rocky ledge, wherever it is exposed, reveals the characteristic banded structure of the Manhattan gneiss.

If we descend now to the northward, passing a fine red oak with two leaders (measuring 9 feet, 11 inches in circumference,⁶ 4 feet from the ground at the north side) we regain the road, which here turns to the eastward. Here we pause and look northwestward down into the upper limits of the Shorakapkok

⁵ A large tree of the hop-hornbeam will be found near Spuyten Duyvil Creek, at the northern foot of the "Hill of the Five Oaks." It has been incorrectly labelled "*Carpinus caroliniana*."

Glen. Down the hill, about 30 feet to the northwest, is another fine red oak (9 feet, 1 inch in circumference measured 4 feet from the base on the south side) with strong buttressing roots, and a little further on, in the same direction, one of the native hemlocks.

2. *Shorakapkok Glen*. To explore the Glen we now go back on the road about thirty paces, passing by a few plants of the rather rare wineberry (*Rubus phoenicolasius*), its stems covered with reddish bristles. At length we reach a path which leads down the hill past a rather large witch hazel on the right, with a fine specimen of sweet birch on the left further on. Now the path turns abruptly to descend northward down through Shorakapkok Glen. In a few paces we arrive at a little rivulet—perhaps the upper end of the gushing spring at the bottom of the valley—with a splendid hemlock on the right and a spice bush on the opposite side leaning over to reach the water. An army of jewelweed approaches from above. Continuing down the valley we come upon a large colony of staghorn sumac, some individuals being of unusually large size and measuring over a foot in circumference at the base, and over twenty feet in height. The smooth sumac may also be seen here, as well as the slippery elm. Below we come out into a considerable open space with occasional butternuts and clumps of large staghorn sumac. In the woods on our right are tall tulip trees and red oaks mingled with occasional sweet birches, flowering dogwood, and rarely slippery elm and chestnut oak. Over on the left, along the rocky cliffs, we spy the moonvine luxuriously clambering over the young trees, as well as bitternut hickory, black cherry, and some small hackberries. We come to intersecting paths with a tall tulip at the junction, and looking back up the valley can easily imagine the Indian squaws tending their crops of maize, beans, and squashes. If, indeed, they raised any crops at all, this deep, rich soil was the ideal spot for their garden.

Turning to the left, in about thirty paces we pass by a paulownia tree with a young shagbark hickory nearby. Other paulownias may be seen further up the rocky slope. With their leaves always in 2's and with a tendency to form short pointed lobes here and there, they can be readily distinguished from the catalpa with its entire leaves, usually in whorls of three. On the right at this point we see some of the finest, tallest, and straightest tulip trees in the Glen—like cathedral

columns—perhaps fifty feet up to the first branch. This path leads up to the summit of the cliff, so we retrace our steps to the tulip tree at the intersection and proceed northward again. Bending under large clumps of spice bush, which becomes more and more omnipresent the further we descend, we come again into a small open space guarded by lofty, majestic tulips. Taking the next fork to the left we go partway up the slope to the Indian caves or rock shelters,⁶ whence we get a glimpse of Spuyten Duyvil Creek to the northward through the trees. Round about are several good specimens of sugar maple, and in season one may find in this vicinity the blue cohosh (*Caulophyllum thalictroides*) and the Dutchman's breeches (*Dicentra Cucullaria*). Continuing down the path to the river we come out into open ground—evidently an old Indian feasting ground, if one is to judge by the numbers of oyster shells imbedded in the earth on all sides. In the rear of a large sign, recently erected, "Shorakapkok: Indian Village Site," we see a good example of the native beech, 6 feet 8 inches in circumference measured 4 feet from the ground, with a few smaller trees of the same species nearby. This, as far as I know, is the only colony of native beech in the park.

We find the spring near the Dyckman Institute museum and there we refresh ourselves, admiring meanwhile the giant tulip nearby, probably the largest and most famous tree in Greater New York. On it we read:

Tulip Tree
Liriodendron tulipifera
Circumference 19 Feet
Height 123 Feet
Age about 238 Years

HENDRICK HUDSON ENTERED THIS INLET IN 1609 AND MAY HAVE MET THE INDIANS HERE, WHO USED THIS PLACE FOR A CAMP AS SHOWN BY THE QUANTITIES OF OLD BROKEN OYSTER SHELLS AROUND THIS TREE AND NEARBY.

THIS TREE WAS THOROUGHLY REPAIRED AND THE FENCE
ERECTED AROUND IT, OCTOBER, 1912⁷

⁶ For excellent pen drawings and interesting descriptions of these, as well as of the whole neighborhood, see Torrey, Raymond H., Frank Place Jr., and Robert L. Dickinson, *New York Walk Book*, pp. 12-16. American Geographical Society; New York, 1923.

⁷ Since the above was printed the tree has again been repaired and the inscription erased. Probably it will be replaced by a similar one.

With the help of a boy scout I measured this tree again July 8, 1930, with results as follows:

Circumference, 4 feet from ground: 17 feet, $9\frac{1}{4}$ inches.

“ 1 foot from ground: 23 feet, $6\frac{1}{2}$ inches.

“ at ground level, including projecting root buttresses: approximately 30 feet.

3. *Hill of the Five Oaks*. We may best reach this by continuing up Payson Avenue from Dyckman Street.⁸ Just beyond the last house on the right we enter the little plateau-like region where typical specimens of fair size of the following species of oak may be seen:

- Quercus alba*
White Oak
- Quercus montana*
Chestnut Oak
- Quercus velutina*
Black Oak
- Quercus coccinea*
Scarlet Oak
- Quercus borealis*
Red Oak

The relative position of the different individuals may be seen from the accompanying map (Fig. 3.). From the Hill of the Five Oaks we may descend into Shorakapkok Glen by taking any one of a number of paths leading down the hill to the left.

4. *Cock Hill*. We may reach this by taking the path westward from the Glen, and paralleling the Spuyten Duyvil Creek. The grade mounts steadily upward, and a side path to the southward leads us to the top of the cliff, or we may continue on the original path to the viewpoint

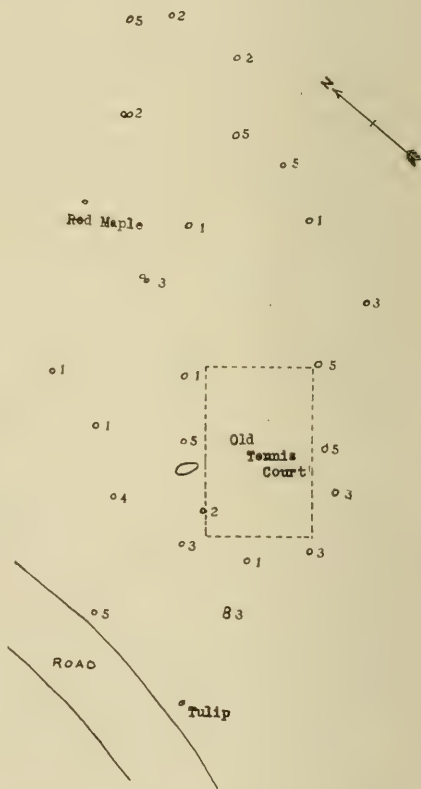


FIGURE 3. Showing location of the five species of oak on the Hill of the Five Oaks. 1, White Oak; 2, Chestnut Oak; 3, Black Oak; 4, Scarlet Oak; 5, Red Oak. One inch = approximately 70 feet.

which includes a sweep of the Hudson and the mouth of Spuyten Duyvil Creek. The path to the cliff leads to a road near the cliff edge and here we find among the ruins of old buildings a variety of interesting plants. The white willow, which is not of common occurrence, appears to be established here; and clinging to old masonry with a little soil mixed with crumbling mortar I have found the Kenilworth ivy, *Linaria Cymbalaria*, a pretty little creeping herb, apparently encouraged by the presence of the lime, and well established. There are many interesting and handsome planted specimens of exotic and introduced trees and shrubs to be seen on the hill, such as the copper or purple beech, Austrian pine, paulownia, weeping cutleaved birch, etc. A tree of the red ash grows near the cliff road and has been apparently planted. Another individual, probably native, may be seen just northwest of the Dyckman Institute building in the Shorakapkok Glen and close to the river. The twigs and leaves are downy and the habit is more spreading than in the white ash. The large white pines growing on Cock Hill are probably planted.

A proposed List of Plants of Inwood Park. It would be interesting and certainly valuable as a record to have a complete list of the plants growing at the present time in Inwood Park, as well as the other parks of greater New York—at least for those which are still fortunately maintained in a wild or semi-wild condition. This might form an objective for some of the Club's field trips in the future. That the flora of Inwood has changed, the following list of orchids collected there, in 1866–8 chiefly by Dr. H. M. Denslow, his uncle Mr. W. W. Denslow, and others, bears witness. These plants seem to have long since vanished.⁹ The data for this list have been kindly furnished by Mrs. Palmyre DeC. Mitchell of the New York Botanical Garden.

1. *Orchis spectabilis* L. May 14, (no year given, but evidently 1887. See Bull. Torr. Bot. Club 14: 153. 1887.) Miss E. Cannon.
2. *Pogonia trianthophora* (Sw.) BSP. "N.Y. Island" Wm. Bower, 1866.

⁸ Or, after leaving Ostrya Hill we may continue northeastward on the road.

⁹ See also Denslow, H. M., Native orchids in and near New York. *Torreyana* 27: 61–63 1927.

3. *Spiranthes gracilis* (Bigel.) Beck. Sept. 1867. H. M. Denslow.
4. *Epipactis pubescens* (Willd.) A. A. Eaton. Sept. 1867. H. M. Denslow.
5. *Corallorrhiza odontorhiza* Nutt. Sept. 1867. H. M. Denslow.
6. *Liparis liliifolia* (L.) Richard. Sept. 1, 1867 "Ex Herb. W. W. Denslow."
- Liparis liliifolia* (L.) "Inwood, N.Y. Isl.", June 23, 1868. H. M. Denslow.
7. *Tipularia discolor* (Pursh) Nutt. Flint's Woods, Inwood, north and west slope. Aug. 23, 1867. "Herb. W. W. Denslow."

As a beginning of a list of the plants of the present time I have recorded below the woody plants now growing without cultivation. Undoubtedly additions can be made to this list. It is interesting to note that of the 70 species recorded, at least 16 (the starred species) or over 20 per cent, are introduced:

LIST OF WOODY PLANTS GROWING NATURALLY
IN INWOOD PARK

- Tsuga canadensis* (L.) Carr. Eastern Hemlock
- **Salix fragilis* L. Crack Willow
- **Salix alba* L. European White Willow
- Salix cordata* Muhl. Heart-leaf Willow
- **Populus alba* L. White Poplar
- Myrica carolinensis* Mill. Bayberry
- Juglans cinerea* L. Butternut
- Juglans nigra* L. Black Walnut
- Carya ovata* (Mill.) K. Koch. Shagbark Hickory
- Carya alba* (L.) K. Koch. Mockernut Hickory
- Carya glabra* (Mill.) Spach. Pignut Hickory
- Carya cordiformis* (Wang.) K. Koch. Bitternut Hickory
- Corylus americana* Walt. Hazelnut
- Ostrya virginiana* (Mill.) K. Koch. Hop-hornbeam
- Carpinus caroliniana* Walt. Blue Beech
- Betula lenta* L. Sweet Birch
- Alnus rugosa* (Du Roi) Spreng. Smooth Alder
- Fagus grandifolia* Ehrh. Beech
- Quercus alba* L. White Oak
- Quercus montana* Willd. Chesnut Oak
- Quercus borealis* Michx. f. Red Oak
- Quercus coccinea* Muench. Scarlet Oak
- Quercus velutina* Lam. Black Oak
- Ulmus fulva* Michx. Slippery Elm
- Ulmus americana* L. American Elm
- Celtis occidentalis* L. Hackberry
- Morus rubra* L. Red Mulberry

- Liriodendron tulipifera* L. Yellow Poplar
Menispermum canadense L. Moonseed
Sassafras variifolium (Salisb.) Ktze. Sassafras
Benzoin aestivale (L.) Nees. Spice Bush
Hamamelis virginiana (L.) Witch-hazel
Platanus occidentalis L. Sycamore
 **Pyrus Malus* L. Wild Apple
 **Pyrus communis* L. Pear
 **Rubus phoenicolasius* Maxim. Wineberry
Rubus occidentalis L. Black Raspberry
Rubus villosus Ait. Dewberry
Rubus allegheniensis Porter. High Blackberry
Prunus serotina Ehrh. Black Cherry
 **Prunus avium* L. Sweet Cherry
 **Prunus persica* (L.) Stokes. Peach
 **Robinia Pseudo-Acacia* L. Black Locust
 **Ailanthus glandulosa* Desf. Ailanthus
Rhus typhina L. Staghorn Sumach
Rhus glabra L. Smooth Sumach
Rhus toxicodendron L. Poison Ivy
Celastrus scandens L. Climbing Bittersweet
Acer saccharum Marsh. Sugar Maple
 **Acer platanoides* L. Norway Maple
Acer rubrum L. Red Maple
 **Aesculus Hippocastanum* L. Horse-chestnut
Psedera quinquefolia (L.) Greene. Virginia Creeper
Vitis aestivalis Michx. Summer Grape
Tilia glabra Ventenat. Basswood
Cornus florida L. Dogwood
Cornus Amomum Mill. Kinnikinnik
Nyssa sylvatica Marsh. Black Gum
Vaccinium vacillans Kalm. Late Low Blueberry
Vaccinium corymbosum L. High Blueberry
Fraxinus americana L. White Ash
Fraxinus pennsylvanica Marsh. Red Ash
 **Solanum Dulcamara* L. Bitter Nightshade
 **Paulownia tomentosa* (Thunb.) Steud. Royal Paulownia
 **Catalpa bignonioides* Walt. Common Catalpa
 **Lonicera japonica* Thunb. Japanese Honeysuckle
Viburnum acerifolium L. Maple-leaf Viburnum
Viburnum prunifolium L. Black Haw
Sambucus canadensis L. Common Elder
Smilax rotundifolia L. Green Brier

The following probably also occur:

- Rubus odoratus* L. Purple Flowering Raspberry
Gaylussacia baccata (Wang.) C. Koch. Black Huckleberry
Sambucus pubens Michx. Red-berried Elder
Amelanchier canadensis (L.) Medic. Serviceberry

BROOKLYN BOTANIC GARDEN,
 BROOKLYN, N. Y.

Some Changes in the Weed Flora of Whatcom County, Washington

W. C. MUENSCHER

When the timber is removed from a forested region and the land is cleared for agricultural purposes, usually only a few weeds are present to contend with during the first few years. The native woodland species that are accustomed to the reduced sunlight, moist humus cover, higher atmospheric humidity, and other factors and conditions associated with a woodland environment, usually are unable to persist very long after the land has been cleared. Soon however, exotic weeds arrive, establish themselves and frequently multiply and spread rapidly. The interval between the time when most of the native species disappear from the arable land and the time when the foreign ones arrive, while somewhat variable with local conditions, as a rule is very brief.

After a number of years many of these introduced species may become very troublesome. Indeed, they may even form the most conspicuous part of the vegetation of waste land and roadsides. The less common species often go unnoticed until they are more widespread, when it is usually difficult to obtain much information concerning their first appearance.

At various times the writer has had opportunities for making observations and records of the flora of Whatcom County, Washington, the most northwestern county in the United States. Some of the more important changes observed in the weed flora of this county are recorded here.¹

The eastern portion of Whatcom County lies in the Cascade mountains and, for the greater part, is still covered with virgin evergreen forests. This discussion refers only to the western portion of the county, extending from sea level on Puget Sound eastward for about 30 miles to the foothills of the Cascade mountains. The annual rainfall in this region averages about 40 inches, very little of which falls between July and September. The soils consist mostly of sandy and silty loams. Clay soils

¹ Based largely upon observations and records made by the writer as follows: 1900-1911; June-Sept. 1912; Sept. 1913; June-Sept. 1914; Aug.-Sept. 1915; Aug.-Sept. 1916; May-June 1918; Jan.-Sept. 1919; June 1929. Specimens of most of the species reported have been deposited in the herbarium of Cornell University.

are relatively infrequent but extensive areas of peat soil are common. The general features of the climate and soil² and of the flora³ of this region have already been described. This area lies in the humid transition zone and consists mostly of very gently rolling uplands that were originally covered with a dense forest in which the Douglas fir, *Pseudotsuga taxifolia* Britt. was the dominant tree. The broad alluvial valley of the Nooksack river, and to some extent the valleys of smaller streams, as well as several extensive peatbogs, were originally covered with forests in which the western red cedar, *Thuja plicata* D. Don., and the Sitka spruce, *Picea sitchensis* Carr. were the dominant trees. Practically all of the forests have now been removed, the greatest activity having taken place during the last thirty years. Most of the lowlands, and such peat bogs as could be drained, have been cleared for farming land. Much of the upland has also been cleared and the remainder is mostly "logged off" or stump land used for pasture. The county has two seaports, Bellingham and Blaine, and the several towns within its boundaries are served by three railroad lines. Opportunities for bringing seeds of weeds into this county have been favorable since every year large quantities of feed and seeds are shipped in.

NATIVE WEEDS

After the removal of the forests only a few of the native species persisted as troublesome weeds in the clearings. Even some of these are species accustomed to the open places along the banks of streams or shores of lakes where trees were absent on account of the periodic fluctuations of the water level and erosion. The common brake fern, *Pteridium aquilinum* var. *pubescens* Underw. was the most troublesome pest on newly cleared uplands. Under thorough cultivation, or with persistent efforts to eradicate it, the brake fern usually survived only a few years but in some pastures and grasslands, it has survived for twenty years or more. In some neglected logged off pasture lands it has even spread. In the lowlands, especially in sandy soil, the common field horsetail, *Equisetum arvense* L., became

² Mangum, A. W. Reconnaissance soil survey of the eastern part of the Puget Sound Basin, Washington U. S. Dept. of Agric., Bureau of Soils Bull. 1911.

³ Muenscher, W. C. Flora of Whatcom County, Washington. Muhlenbergii 9: 101-132. 1914.

very abundant, especially in meadows where it is even now a bad pest in many places. *Equisetum Telmataei* Ehrh. was frequently troublesome, especially in poorly drained pastures. On recently burned over stump lands and newly cleared land, the fireweed, *Epilobium angustifolium* L., frequently persisted for several years on the uplands, while on the lowlands, *Epilobium adenocaulon* Haussk., was a common pest in pastures, meadows and grainfields. Neither of these weeds persisted long under cultivation.

NATURALIZED AND ADVENTIVE WEEDS

1. Species well established and rather generally distributed before 1905.

In meadows: *Ginnania lanata* (L.) Hub., locally known as mesquite grass, especially common on peat land; *Achillea Millefolium* L., *Plantago lanceolata* L., *Rumex acetosella* L., on uplands. In pastures: *Cirsium lanceolatum* (L.) Hill, *Cirsium arvense* (L.) Scop., *Verbascum Thapsus* L., *Taraxacum officinale* L., *Bromus hordeaceus* L., *Aira caryophylla* L. In grainfields: *Brassica arvensis* (L.) Ktze., *Brassica juncea* (L.), Cosson, *Brassica campestris* L., *Raphanus sativus* L., *Spergula arvensis* L., *Avena fatua* var. *glabrata* Peterm. and, especially in peat land, *Polygonum hydropiper* L. On cultivated soils and in gardens: *Chenopodium album* L., *Amaranthus retroflexus* L., *Stellaria media* (L.) Cyrill, *Capsella Bursa-pastoris* (L.) Medic. *Sonchus asper* L., *Sonchus oleraceus* L., *Polygonum Persicaria* L. and *Polygonum Convolvulus* L. About barnyards and in waste places: *Polygonum aviculare* L., *Plantago major* L., *Anthemis Cotula* L., *Sisymbrium officinale* (L.) Scop., *Rumex crispus* L., *Echinochloa crus-galli* (L.) Beauv. Although native on the Pacific coast, *Matricaria suaveolens* (Pursh) Buch. and *Erigeron canadensis* L. appear as if introduced in Whatcom County.

2. Species occurring before 1905 but apparently not spread to any extent since.

Mostly in waste places or about farm buildings: *Arctium minus* (Hill) Bernh., *Centaurea Cyanus* L., *Cytisus scoparius* (L.) Link., *Panicum capillare* L., *Veronica arvensis* L., *Marrubium vulgare* L., *Nepeta hederacea* (L.) Trev. and *Lychnis Coronaria* (L.) Desv.

3. Species observed first between 1905–1910, but which since then have spread and were rather common weeds in 1929.

Chiefly in upland meadows: *Chrysanthemum Leucanthemum* var. *pinnatifidum* Lecoq. and Lamotte. In pastures and meadows on clay or peat soil: *Ranunculus repens* L. Mostly in dry upland pastures: *Trifolium procumbens* L., *Trifolium dubium* Sibth., *Geranium molle* L. and *Bromus tectorum* L. In waste places and cultivated ground: *Lactuca scariola* L., *Oenothera biennis* L., *Sisymbrium altissimum* L., *Brassica nigra* (L.) Koch, and *Geranium pusillum* Burm. f.

4. Species observed first between 1905–1910 but still appearing only very locally.

Setaria viridis (L.) Beauv., *Hypericum perforatum* L., *Silene noctiflora* L., *Solanum dulcamara* L., *Digitalis purpurea* L., *Rumex obtusifolius* L., *Sisymbrium Sophia* L., *Medicago Lupulina* L., *Erodium cicutarium* (L.) L'Her., *Nepeta cataria* L., *Malva rotundifolia* L.

5. Weeds observed first between 1910–1919.

Hypochaeris radicata L., *Crepis capillaris* (L.) Wallr. and *Linaria vulgaris* L. locally common in grasslands, pastures and waste places in 1929. *Cichorium Intybus* L., *Daucus Carota* L., *Hordeum jubatum* L. and *Pastinaca sativa* L. local in waste ground and along roadsides in 1929. *Agrostemma Githago* L., *Saponaria Vaccaria* L. and *Bromus secalinus* L., observed in a wheat field and about poultry yards in 1919, but have shown no tendency to spread.

6. Species apparently recorded for the first time since 1920.

**Ranunculus acris* L., first noticed in 1922, was widespread and very abundant in wet meadows, pastures and along roadsides in 1929. *Barbarea vulgaris* R. Br., *Silene latifolia* (Mill.) Britt., *Lychnis alba* Mill., *Dianthus armeria* L., **Erysimum cheiranthoides* L. and *Malva moschata* L. were found locally in new meadows and along roadsides in 1929. *Agropyron repens* (L.) Beauv., *Chenopodium urbicum* L., **Conringia orientalis* (L.) Dumont. and **Fumaria officinalis* L. occurred in cultivated soil near farm buildings. **Conium maculatum* L., **Symphytum asperum* Lep., *Sonchus arvensis* L., **Centaurea Jacea* L., *Melilotus alba* Desr. and **Melilotus officinalis* (L.) Lam. were observed in waste ground and along roadsides. The species pre-

ceded by an asterisk are not included in the flora by Piper and Beattie⁴ covering this part of Washington.

Of the 96 weeds reported from Whatcom County, Washington, five are native species. The rest are naturalized or adventive, mostly from Europe. Among the 46 widespread, or at least locally common, naturalized weeds, 33 were already so by 1905, eight more species became so by 1910; three more by 1919, and two more by 1929. Among the 42 uncommon or very local weeds, eight species were known to occur in the county before 1905; 12 more by 1910; seven more by 1919; and 15 more by 1929. Among the earlier weeds brought into Whatcom County the most noxious are the Canada thistle, *Cirsium arvensis* (L.) Scop. and the mesquite or velvet grass, *Ginnania lanata* (L.) Hub., and several mustards, *Brassica* spp. Among the most noxious of the recently introduced weeds are the tall field buttercup, *Ranunculus acris* L., and the winter cress, *Barbarea vulgaris* R. Br. Both of these species are already widespread and in the future will, in all probability, become very common on the heavier soils and lowlands. The quack grass, *Agropyron repens* (L.) Beauv. and the perennial sow thistle, *Sonchus arvensis* L., the worst weeds in the northeastern and north central States, respectively, have become well established in Whatcom County. It remains for the future to reveal to what extent these pests will trouble the farmers of Whatcom County.

CORNELL UNIVERSITY

Stations for the Southern White Cedar

In a talk before the club on May 6th Mr. Torrey spoke of several unusual stands of the Southern White Cedar. Mr. Russell B. Evans reports another location, a swamp west and north west of Franklin Lake, N.J. The swamp occupies a glacial kettle hole. Most of the trees in the swamp are dead, dozens of them are up to a foot in diameter. Some living trees are near the outlet and some dead ones have been dragged out, barked and cut up, as the waste on the knolls west and south of the swamp indicates.

A census of the stands of *Chamaecyparis thyoides* remote

⁴ Piper, C. V. and R. K. Beattie. Flora of the Northwest Coast. 1915.

from the coast, with the elevations above sea level, has been prepared by Mr. Raymond H. Torrey.

Franklin Lake, Passaic County, N.J., 417 feet.

Cedar Ponds, Passaic Co., east of Greenwood Lake, 1025 feet.

Belcher Creek, south of Greenwood Lake, Passaic Co., 700 feet.

Wawayanda Mountain ("Cedar Swamp") west of Greenwood Lake, Passaic Co., 1210 "Cedar Swamp," High Point State Park, Sussex Co., 1650 feet.

Formerly on Tuxedo Lake and Lake Tiorati in Harriman State Park, N.Y., at about 700 and 1040 feet respectively.

All are north of the terminal moraine, and are presumably colonies which migrated north after the ice age, but instead of going along the coast to New England shores, they went inland—70 miles in the High Point occurrence.

FIELD TRIPS OF THE CLUB

Members of the Torrey Botanical Club party at the home of Dr. Will S. Monroe, Couching Lion Farm, North Duxbury, Vt., over the Fourth of July week end, led by William Gavin Taylor, report among their finds the Luminous Moss, *Schistostega osmundacea*, and the Rock Brake, *Cryptogramma Stelleri* both on talcose schist rock, in Fayston Pass, south of Couching Lion, and east of Stark Mountain. As explained by Mr. A. T. Beals, who found this station first, in 1929, the luminosity is due to light reflecting qualities in the structure of the protonema. The golden-green glow in the dark recesses under an overhanging rock is described as quite surprising by Mr. J. A. Allis, a member of the club, who visited the site later, and found the Rock Brake, newly reported there. The party which visited Smuggler's Notch found the stand of *Saxifraga aizoon*, which has been reported before and brought back a plant to establish in Dr. Monroe's alpine garden, which, by the way, was finer than ever this year.

Twenty members and guests of the club took part in the excursion to Bear Mountain Park, Sunday, July 20, under the leadership of Mr. Raymond Adolph, forester of the Palisades Interstate Park. The shores of Queensboro Lake yielded some interesting water plants, including *Alisma Plantago-aquatica*, and *Lythrum Salicaria*, small stands of the latter having advanced from the marshes along the Hudson in recent years and established themselves at several of the inland lakes and beaver ponds in the Park. The spread of the Purple Loosestrike, from its large and dense colonies along the Hudson, during the past ten or twenty years, has been continued evidence of the adaptiveness of the beautiful and interesting immigrant from Europe, which is now one of the commonest of our marsh plants, not only of brackish spots along the Hudson as far south as Piermont, but in fresh water marshes, along the Wallkill, on tributaries of the Hudson in Dutchess and Columbia counties, and more recently along the upper part of the Hackensack meadows, near Little Ferry. It is now established in several of the park lakes, and in the beaver meadows near Lake Nawahunta and Middle Kanawauke Lakes, and seems to thrive as well in fresh water as in brackish.

On the annual visit to Spruce Pond, on the western border of the Harriman State Park, on July 27, under the leadership of Archibald T. Shorey of the Brooklyn Boy Scouts, the interesting flora of the place was enjoyed by a party of ten. New visitors to the place were introduced to the species for which it is notable, the large stand of Virginia Chain fern, the museum piece of *Drosera longifolia*, in bloom on the half submerged log at the south end, and the colony of *Calla palustri* on the west side. The plants of *Andromeda polifolia*, an uncommon northern shrub in this latitude, among the *Chamaedaphne calyculata* beds along the south shore seem to be increasing. The red spruce and American larch, which have one of their southernmost stands at Spruce Pond, interested the field students.

On the excursion of Sunday, August 3, to Bradley Mine, in the Harriman Park, led by the chairman of the field committee, two plants which attracted interest among the usual late summer composites, were *Geranium pusillum*, a pale small-flowered species of this genus, along the road south of the Harriman dairy, and *Corydalis sempervirens*, the latter not so much because of any rarity, but for its adaptiveness to the particular conditions. It was found along the new park entrance road from Lower Cohasset Lake to Arden. Recent blasting had destroyed some mature plants on the ledges, but their seeds were ripened and as they were scattered over the dirt fill of the road, hundreds of them had taken root and were sending up their cotyledons. This plant, growing on arid ledges, and of a rather delicate texture, seems able to stand a lot of drought and even of burning of the older plants by spring forest fires, for the seeds spring up in late summer and maintain it.

Bradley Mine was of considerable geological interest, with the great chamber from which the iron ore was taken and a large dike of comptonite, a kind of basalt, seen in the walls of the entrance; and a coating of the old Grenville limestone, covered with spongy looking pyroxene deposits. We met in the mine Mr. Labounsky, a field worker for Professor J.J. Colony of Columbia University. Prof. Colony is working on a report of the New York State Museum on the geology of the Schunemunk quadrangle which will be of great interest to hikers who like to know the geology of the park.

While working on the Kittatinny Mountain section of the

Appalachian Trail this summer, I found another stand of the Bunchberry *Cornus canadensis* which appears to be the farthest south in this latitude. I have previously reported it on Schunemunk Mountain in Orange County N.Y. at 1600 feet and in a swamp farther north on Kittatiny Mountain at 1500 feet. This new location is in a swamp about 1400 feet above sea at the head of a brook which plunges down the steep west side of the mountain to enter the Delaware River near Poxono Island, about eight miles above Water Gap. As in the other stands it did not seem happy. It displayed few evidences of blossoms, and no fruit whatever. Apparently it was maintaining itself only by extension by stolons. These few stands, in the southern New York and northern New Jersey highlands, at elevations up to 1500 feet, where it seems to find conditions somewhat approximating those farther north in the high Catskills and in northern New England where it is common, are presumably relicts of the colder conditions of earlier times in the last post-glacial period.

Another evident post-glacial relict which I found this summer with Forester Raymond Adolph of the Palisades Interstate Park, was a large and thriving colony of the Bearberry, *Arctostaphylos uva-ursi*, on an open ledgy hilltop north of Long Pond, overlooking the Central Valley-West Point highway. It covers half an acre and showed plentiful green fruit. This is the fourth of such stands of this plant I have found in the Orange County highlands, where it has been reported as rare; two others being in the Harriman Park, on Black Mountain and Fingerboard Mountain—both on the Appalachian Trail, and the other on Mombasha High Point, southwest of Mombasha Lake, also on the Appalachian Trail.

Evidence of the desperate efforts of plants at survival and the advantage taken of the slightest encouragement, were, seen in a badly burned area on the south end of Kittatiny Mountain, west of Branchville, N. J. Several hundred acres of the mountain top were burned over, during the August drought, in a blaze exceedingly fierce for summer conditions, but everything was so dry that the destruction was as bad as is seen in spring or fall forest fire hazard periods. Even the thin vegetable soil was reduced to black ashes; the trees and shrubs were burned to death, and yet a few bits of green were to be

seen. They were the cotyledons of plants of open ledges, *Corydalis sempervirens*, *Geranium carolinianum*, *Saxifraga virginienensis*, and perhaps *Phlox subulata*. The parent plants appeared to have been burned to nothing, roots and all, but they had ripened their seeds before the blaze and scattered them on the ground. A week after the fire there was a heavy rain, and the seeds evidently have survived destruction by the searing heat, for scores of tiny seed leaves were coming up in the blackened humus. A box tortoise, found dead nearby, was not so fortunate; the poor fellow had been roasted in his shell, before he could escape the swift flames with his slow and clumsy gait.

Down from the summit a bit, where bracken fern had been thick, and where its drought-dried leaves burned like tinder, the roots had survived in some places, and the plant was sending up new fronds, as if it were April. This fire was said to have been started deliberately by huckleberry pickers, who believe such burnings cause the berry bushes to come in thick for a while. The only berry fruits which appeared to have survived and which lay in the burned ground, were those of the Chokeberry, *Pyrus arbutifolia*, whose rather heavy pulpy covering of the seeds had probably protected them so that they will sprout, but they will do the huckleberry pickers no good.

Members of the Torrey Botanical Club and of the Trail Campers of America greatly enjoyed a visit to the gardens on the estate of Clarence M. Lewis, banker, at Skyland, near Sterlington, N.Y., Sunday, Sept. 14. The visit was arranged by Mr. Charles Crowell, founder of the Trail Campers, who have a lodge on Stony Brook, north of Sloatsburg, which has been used by members of the Brooklyn Nature Club and other nature students; and upon the invitation of Mr. Lewis, through his superintendent, Mr. Kendall. Mr. Lewis has large numbers of alpine species, obtained from M. Correvon, the Swiss specialist in such plants, which are doing well in the soils carefully adapted to their needs. Scientific names are shown on stamped metal tags, and the exhibit is very instructive. Mr. Lewis' gardener has also made a sort of Nature Trail of native plants, brought from the woods on his 2,000 acre estate, or from other parts of the country. A great display of horticultural, named, forms of an aster, the ancestors of which were our common New England Aster, *Aster novae-angliae*, made a splendid sight.

Dr. A. B. Stout of the New York Botanical Garden has some surplus specimens of the Day Lily, *Hemerocallis*, with which he has long been working, installed in this garden, through Mr. Lewis' cooperation. This flower collection is a treat, in assembling so many exotics, alpine and others, in so small a space and it would be a privilege if the Torrey Botanical Club could make an annual visit there.

RAYMOND H. TORREY
Chairman Field Committee

FIELD TRIP OF SUNDAY, SEPTEMBER 7

Thirty two members of the club and friends were led on this trip at Caldwell, N. J., by Professor Oliver P. Medsger. The trip led through some interesting second-growth woods and over a small hill whose dry top showed fine clumps of the stiff-leaved aster, *Aster* or *Ionantis linariifolius*. A number of species of aster and goldenrod were noted, also species of *Desmodium*, including *nudiflorum*, *rotundifolium*, *grandiflorum*, *Dillenii*, and *paniculatum*. Fortunately the fruit of these latter were not quite ripe so comparatively few clung to the clothing of the party. Some fine plants of the smooth false foxglove were seen. On top of the hill where lunch was eaten there was a plentiful growth of the shrubby bitter sweet, but most of the fruiting vines had been pulled down and the branches broken off, the ground being littered with the broken twigs. Here, as in many places near the cities, the vines found are mostly staminate, the pistillate plants having been destroyed by those who love beauty, or can make a profit from others love of it.

FIELD TRIP OF SUNDAY, SEPTEMBER 14

In spite of the usual deterrents for this season of the year; namely hot, muggy weather and an army of mosquitoes prepared for the attack, ten people made the trip to Fresh Kills and vicinity Sunday, September 14th. On account of the great crowd of Sunday excursionists at the bus at St. George, the trip was taken in reverse order, the party entraining for Eltingville, whence a bus was taken to Richmond Road at its intersection with the highway across Fresh Kills. Here botanizing commenced.

As usual at this time of the year, the meadows were adorned here and there with large colonies of *Helianthus giganteus*; and *Solidago maritima*, the seaside goldenrod, was beginning to contribute its share to the picture. Another *Helianthus*, *H. tuberosus*, the Jerusalem artichoke, was found well established near the old gravel quarry, and specimens with good tubers were obtained. Close by, *H. annuus*, the common sunflower, was growing on a rubbish heap. Other composites observed were *Eupatorium perfoliatum* and *pubescens*, as well as tall, vigorous, glaucous-stemmed plants of *E. purpureum*, one of the forms of the plant known commonly as Joe-Pye Weed. The closely related *Mikania scandens*, climbing over roadside plants, was much in evidence. Three wild lettuces, *Lactuca spicata*, *canadensis*, and *scariola* were found. *Bidens frondosa*, *connata*, and *comosa* were seen, the last being of frequent occurrence. Besides *Solidago sempervirens*, of the goldenrods, *S. rugosa*, *canadensis*, and *graminifolia* were well represented, the last in extensive colonies. *Erechtites hieracifolia* was also of frequent occurrence and extremely variable in height. Of the asters, *A. novae-angliae*, *novi-belgii*, *paniculatus*, *multiflorus*, and *subulatus* were seen and collected, the last being frequent in the brackish soil of the marshes. Another interesting plant was the orchid, *Spiranthes cernua*, growing low down among the high grass and other plants near the creek just below the Episcopal church, where there is probably very little salt present. *Cicuta maculata*, the poison hemlock, is of frequent occurrence in the upper and fresher portion of the marshes. *Ptilimnium capillaceum* was also found in similar locations. *Zannichellia palustris* was found in fruiting stage in the upper parts of the creek. Patches of the interesting grass, *Tripsacum dactyloides*, whose grain-bearing heads are brittle and break off in sections, were also seen. There were, of course, vast colonies of the reed, *Phragmites communis*, *Spartina cynosuroides*, and *Sorghastrum nutans*. *Pluchea camphorata*, the salt marsh fleabane, and the beautiful, rosy-tinted *Sabatia stellaris*, were found in their accustomed haunts, but not in great abundance. Near them was the seaside Gerardia, *G. maritima*. The trip ended in the late afternoon at the headwaters of the stream, near the Episcopal church at Richmond.

ARTHUR H. GRAVES

FIELD TRIP OF SUNDAY, SEPTEMBER 21

The excursion to Franklin Notch, in the Preakness Mountain region northwest of Paterson, N.J., Sunday, Sept. 21, which was scheduled for the study of agaric fungi, under the leadership of Dr. William S. Thomas, was altered, owing to the enforced absence of Dr. Thomas in Europe, to a general one on fall flowers, although one or two mushroom addicts found plenty to interest them, too especially some large masses of the honey agaric, red russulas, and Caesar's *Amanita*. Ten were present.

The most unusual plant seen was *Pedicularia lanceolata*, the Swamp Lousewort, in the meadows along Barbour's Brook. It is quite different from *P. canadensis*, the common woodland species blooming in the spring; with stiff upright stems, one to three feet high, and much larger flowers than the spring species. A large colony of *Spiranthes cernua* was seen in this swamp, with *Lobelia siphilitica*, *Bidens cernua*, *Sanquisorba canadensis* (still in bloom), and *Gerardia purpurea*. *Spiranthes gracilis* was found in a dryer situation.

In the Notch, the interesting flora maintains its numbers with large masses of Blue Cohosh, *Cañlophyllum*, in plentiful fruit; *Clematis verticillaris*; one of the few places where it is still found within 30 miles of New York; large stands of the Upland Lady Fern—some of the fronds over three and a half feet long, exceeding the Cinnamon Fern near by—*Allium tricoccum*, the Wild Leek, whose black, shot-like seeds were striking at the season; Wild Ginger, Herb Robert, and plentiful Maidenhair and Ebony Spleenwort. Cardinal Flower was still in bloom in the wet spot at the south end of the Notch.

On the old road west of High Mountain, the Golder Saxifrage, *Chrysosplenium americanum*, was a plant rather rare in the near environs of the metropolitan district. Cancer Root, *Conopholis americana*, was another interesting find.

RAYMOND H. TORREY

NEWS NOTES

The New York Botanical Garden is offering a series of courses on the growing of plants and on plant classification. One set of courses is on Tuesday afternoons, the other on Saturdays.

Classes are in charge of Dr. Forman T. McLean and Dr. Elmer D. Merrill.

The University of Pittsburgh has organized the University of Pittsburgh Lake Laboratory to carry on investigations at the biological laboratory at Presque Isle, Lake Erie, and to conduct summer work in botany and zoology. Dr. Otto E. Jennings, head of the department of botany is director and Dr. S. H. Williams, professor of zoology, associate director.

Dr. D. T. McDougal, of the Carnegie Institution of Washington, was appointed as representative of the Torrey Botanical Club to the International Conference on Plant Nomenclature.

The New York Botanical Garden was represented at the fifth International Botanical Congress at Cambridge, England, by Director E. D. Merrill, Dr. J. H. Barnhart, Dr. B. O. Dodge, Dr. H. A. Gleason and Dr. A. B. Stout. They will remain until late in the fall as they are planning research work at Kew and the European institutions. Dr. Merrill is one of the vice-presidents of the Congress and also a vice-president of the section on taxonomy.

Dr. F. O. Bower, emeritus professor of botany at the University of Glasgow, who succeeds Sir Thomas Holland as President of the British Association for the Advancement of Science, took as the subject of his address "Size and Form in Plants." The meeting of the Association was at Bristol from September 3-10 (Science).

One and a half billion dollars annually is the average amount of the injury plant diseases do in the United States each year, says Dr. R. J. Haskell, plant pathologist of the U. S. Department of Agriculture, who is in charge of the plant disease survey of the Bureau of Plant Industry. Other nations suffer proportionate losses, although statistical information is lacking in many countries. In Canada the estimated annual losses average about 15,000,000 English pounds. England estimates that plant disease takes an average of 10 per cent of the value of its plant products. It is estimated, that the United States wheat crop is reduced by about 97,000,000 bushels a year, on the average, by rusts, smuts, root rots and other diseases. The corn crop is curtailed by approximately 271,000,000 bushels and white potatoes by about 95,000,000 bushels annually.

In a new bulletin, *Miscellaneous Bulletin No. 77*, American

Medicinal Plants of Commercial Importance, the United States Department of Agriculture reports on a wide range of wild plants used in the preparation of medicines. Many wild plants, some of them weeds, some attractive wild flowers such as yellow lady's slipper and trailing arbutus and others; important forest trees, as the white pine, oak and ash, have long been used in the practice of medicine. In this bulletin 128 plants of medicinal value, or reputed value, are described and methods of handling for commercial purposes are indicated, but nothing is said regarding the medicinal values. Accompanying each description is a picture of the plant.

Dr. Elmer D. Merrill, director of the New York Botanical Garden has been made a professor at Columbia University. The University continues to grant credit for courses taken and work done at the Garden.

THE TORREY BOTANICAL CLUB

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BY

GEORGE T. HASTINGS



John Torrey, 1796-1873

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A Laboratory Lesson in Variation

RALPH C. BENEDICT

It is commonly agreed that the essence of good scientific teaching consists in 'exposing' the student to objective realities, and in helping him to draw his own deductions and inductions from what he observes. With respect to evolution, however, is it not a fact that this topic is chiefly presented and studied, at least in elementary courses, through the medium of books? That many learn to talk glibly regarding the 'evidences' of evolution who have no real first hand acquaintance with the underlying facts? A comment of the late John M. Coulter a few years ago is pertinent in this connection. (*Science* 63: May 1926). "The meaning of evolution is probably more misunderstood than any doctrine of science. The reason is that it has been discussed very freely by those who are not informed, and in this way much misinformation has been propagated."

It is the purpose of this article to offer an outline of a possible laboratory lesson through which the most fundamental factor of evolution may be presented objectively. The lesson, which has been used a number of years in fourth year high school biology, is based on the following premise: While all the data derived from the study of the facts of morphological resemblances among related forms, of geographic distribution, of geologic succession of types, of embryologic and ontogenetic development, of plant breeding, etc., are valuable and important as circumstantial evidence, any final understanding of the basic problem of evolution must be sought in a study of *variation* as a *process*.

If the pupil can be shown that occasionally in reproduction a given parent or parents produce offspring which differ from the parent type, and not merely by the re-shuffling of charac-

teristics already possessed by collateral forms, he has been brought face to face with the elemental fact upon which any real understanding of evolution must be based. His clear perception of this primary fact will enable him to analyze and ap-



Photograph from the Brooklyn Garden

FIGURE 1. Vegetative reproduction in *Nephrolepis*. In this case, the three bud plants are all like the parent. In variation one or more would be different. Such a variation would have to take place along the slender connecting stem.

preciate the meaning of the whole problem. He will be looking at the problem sharply and clearly, not merely vaguely and in the large. The methods of the proposed lesson are outlined in detail as follows:

SPECIFIC PROBLEM: WHAT IS MEANT BY VARIATION?

Variation is one of the numerous words which have a number of different connotations. It should be clear at the start that the looser, broader meanings are definitely excluded; that the word is not used here in the common interpretation as referring to the range of differences among a group of sibs, or between the individuals of a larger species population. The meaning can be finally narrowed and sharply delimited to the desired application, as indicated in the preceding paragraph, by raising the question: Will evolution take place if offspring always repeat the exact characteristics of their parents? In other words, why must variation occur as a process in reproduction if new forms are to occur?

Is there any evidence of such variation? Is there any material which can be introduced into the school laboratory to help in answering the questions raised? In this connection, the Boston fern series, a number of which are common in the florist trade, furnish excellent material for class study. They are relatively common, and the material is not difficult to obtain. The range of variation between the different varieties is wide, the differences well-marked, and the material is large enough so that the differences can be easily discerned. The total number of scores of types have had a recent history. The method of reproduction is entirely vegetative, thus eliminating any complication of the possible influence through hybridization. Incidentally, it may be noted that the Brooklyn Botanic Garden has served for nearly twenty years as a source of sets of specimens of these ferns, both series of leaves and of growing plants for experimental and teaching use. So far as material is available, the writer will be glad to furnish further material of this sort.

The mode by which variation must have taken place in these fern types can be easily pointed out, and is illustrated in figure 1. This shows a parent plant of the wild sword fern (*Nephrolepis exaltata*) from which the Boston fern was derived, in association with three offspring which have arisen along a lateral stolon. Such stolons are common in florists' or house specimens of Boston fern varieties, and the method of vegetative propagation along stolons can usually be demonstrated by digging up a little surface dirt around a well-established pot plant, or a demonstra-

tion, like that illustrated, can be prepared if provision is made a few weeks in advance of need.

While in general, as in the case illustrated, the offspring are practically identical with their parent, it has occurred a number of times, in the florists' cultivation of millions of Boston fern plants, that an occasional bud plant has arisen which, while still

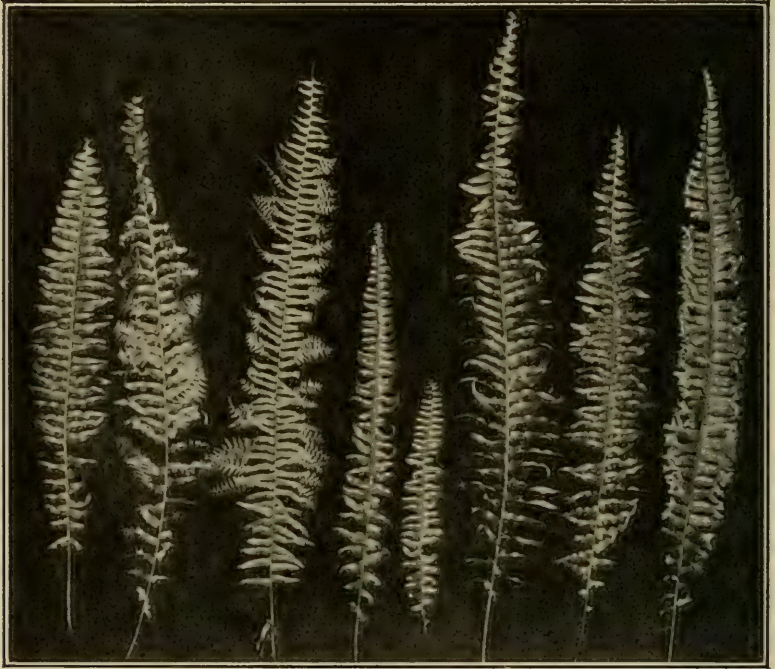


FIGURE 2. A leaf of the Boston fern (left) with leaves of the seven primary sports. In each case, the original mutation took place in vegetative reproduction (See Fig. 1). The seven varieties are arranged as follows: Piersoni; Anna Foster; Scotti; Giatrasi; Harrisi; Rossevelt; Gretnai.

in physical connection with its parent plant, has shown distinct differences from that parent. In figure 2, there is shown the leaves of a typical Boston fern together with seven such departures or variations. Beginning with the first new plant, each of these variations thereafter reproduced only its own type, maintaining the difference from the parent Boston fern, and thus representing that kind of variation that is inherited, or *mutation*.

This does not establish just what the process of variation is; it merely makes obvious the fact of its occurrence, and it is evident also, that whatever happened must have taken place somewhere along the stolon or reproductive branch from which the different buds arose. Further inquiry and speculation as to the exact nature of variation must wait until some later lessons in which the cell basis of reproduction and heredity, and of possible gene modification can be examined.

The third figure, showing the representative pinnae of the same leaves shown in figure 2, makes clearer just what types of differences have occurred as a result of the variation process in the Boston fern. When it is realized that these differences parallel to some extent the characteristics which distinguish recognized fern species, added emphasis is given to their possible significance. When, in addition, consideration is given to the extremes of modification developed through secondary and further variation in this same group of ferns, resulting in the scores and scores of well distinguished varieties, a new understanding should attach both to the meaning of variation as a process and to its underlying significance in any consideration of the whole process of evolution. Space does not permit any other illustration of the wide variety of size and form represented in the whole series of Boston fern mutations which has been presented elsewhere. However, a chart showing the genealogy of a large number of the named varieties which had been introduced up to about ten years ago is reproduced, taken from another source. As it happens, the wave of interest on the part of florists in introducing new types of these ferns has practically ceased, owing to a variety of factors.

Besides the varieties which have been introduced commercially with names, scores of others have been noted by florists which, while distinctive enough, did not appear to offer commercial possibilities and so did not attain to the dignity of being named. Dozens of new forms have appeared in the collections at the Brooklyn Botanic Garden during the years of experimental culture, most of which have been described in various reports, although without special names.

Some reference to the specific varieties illustrated and their most obvious distinguishing characteristics will be appropriate. Four different kinds of variation are represented among these primary-sports of the Boston fern: (1) increase in division, from

once to twice pinnate; (2) dwarfing; (3) increase in ruffling; and (4) cresting.

The second and third leaves and corresponding pinnae represent increased leaf division. The third leaf is from the "Anna Foster" variety, the earliest of all the Boston fern sports, but it was soon supplanted in the esteem of the florists by the "Pier-son" fern, shown in the second leaf and pinnae, due to the more desirable horticultural characteristics of the latter. From this form alone, scores of secondary tertiary, and higher degree sports have developed, resulting in various degrees of leaf division,—as much as five pinnate,—and other modifications.



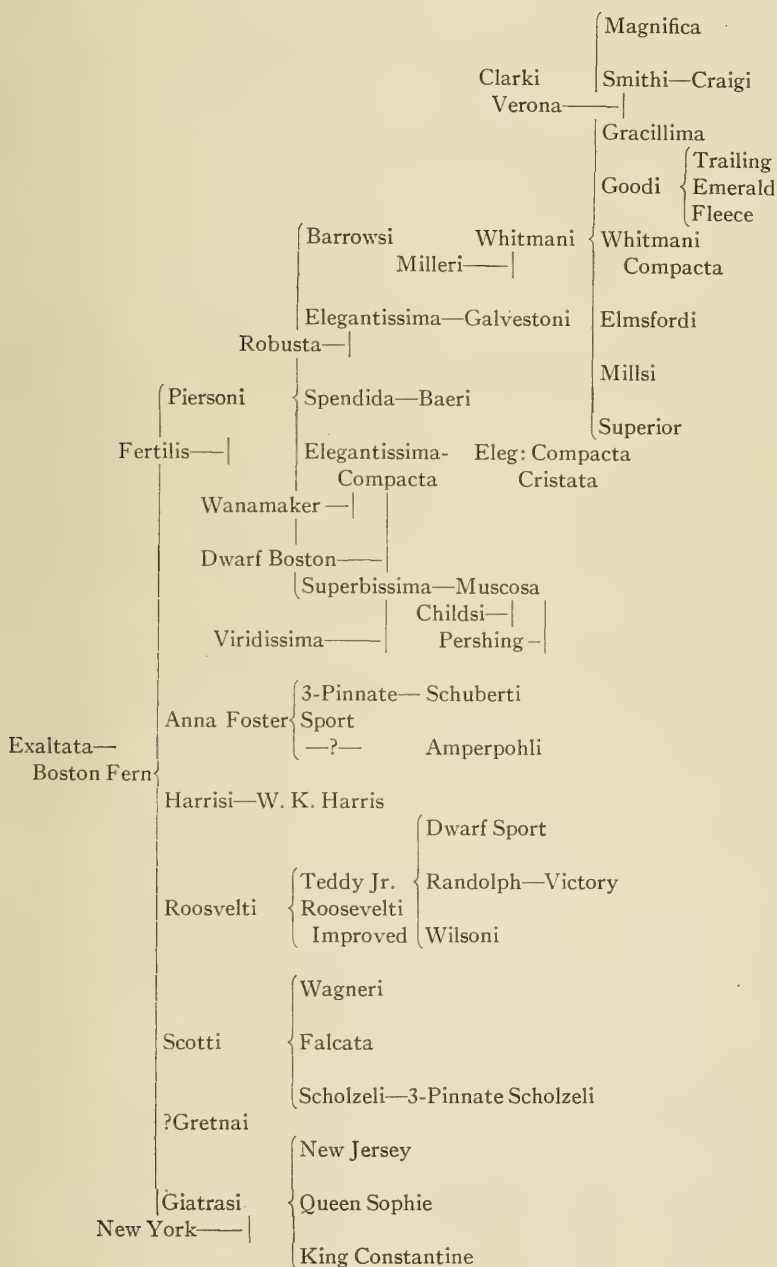
FIGURE 3. Pinnae of the Boston fern and of the seven primary mutations, arranged as in Figure 2. It is a simple laboratory exercise to have pupils make outline drawings of a Boston fern pinna with one or more of the other types for comparison.

The fourth and fifth leaves and pinnae represent dwarf types, respectively "Scott's" fern, of Brooklyn origin, and the "Giatras" fern, Hoboken Greek. In addition to their smaller size, each offers other differences in outline, marginal characters, and configuration of the pinnae, as well as in habit of growth.

The sixth and seventh leaves and pinnae present intensification of the ruffling or waviness of the pinnae, horticulturally known as *crisping*. The larger leaf (6) is called the "Harris" fern, after its introducer, a Philadelphia grower. The other, the "Roosevelt" fern, was introduced by an Ohio florist.

Lastly, there is a *crested* or "fishtail" type of variation, which occurs not infrequently in wild native species. In the Boston

GENEALOGY OF THE AMERICAN VARIETIES OF BOSTON FERN



fern series this variety first appeared in Louisiana, and takes its name from the town of its origin, "Gretna."

In using this material in the laboratory, pupils have usually been asked to make diagrammatic outline sketches of the Boston fern type of pinna with one or two of the mutative types, to emphasize the visible differences. In their notes, emphasis was placed on the inherited character of such variations and the fact that this constituted them as mutations. At the same time, by way of comparison, they were usually given the chance to examine some type of spotted bean, such as the "yellow eye," which had a large pigmented area on a white background. These were used to illustrate the "fluctuating" type of variation, as offering differences grading by imperceptible steps into the parent form and not repeated in inheritance, anyone of which might give rise in reproduction to a complete series of color spot gradations.

That evolution if has taken place, must have occurred by means of inherited variations will be accepted as axiomatic, regardless of whether one believes all variations proceed from the stimulation of hybridization or through spontaneous variation of some unexplained cause. That the student who has examined material of the kinds presented here will thereafter always carry a clearer conception of what is meant by variation, and a better understanding of the relation of this process to evolution seems, to the writer, to be a justifiable conclusion.

BROOKLYN BOTANIC GARDEN

"Lily Pond Lane"

(A bit of Long Island Ecology)

ARABELLA MCKEE

On the North Fork, near the end of Long Island there is a sandy lane leading to the sea. The approach is through the oak woods. Among the oaks are a few graceful birches and an occasional beech; and here and there are scattered some big lichen covered rocks, that rolled over from Connecticut in the glacial ice, our very first "*settlers*" from that state.

As one descends to within a few feet of the sea level, and approximately within 500 feet of the sea itself, the whole character of the vegetation changes. There are no trees but various bushes and shrubs and plants growing at the tension lines, this is due to the character of the soil, which becomes more and more sandy, and to the strong sea winds.

A little path to the left leads to a fresh water pond now fed by springs. It is not at all brakish although it was originally part of a great cut off from the sea which occurred hundreds of years ago. Possibly it was a small glacial kettle still earlier, as the few rounded rocks on the steep slope of the south side of the pond would seem to indicate. There is a series of such ponds along our shore—and some of them are true glacial kettles;—Fuller in the U. S. Geol. Survey (p. 177)—accounts for such great stretches of sand forming cut offs as follows.

"Currents sweeping along any stretch of coast tend to move in straight or gently curving lines just outside of the headlands, rather than in lines conforming to the minor irregularities and indentations of the shore. The material they transport is deposited owing to the slacking of their progress when the deeper water is reached, forming bars—more or less completely connecting the headlands, and at many points *enclosing areas of relatively deep water*. The beach between Hortons point, and Duck Pond Point, was formed in this way and a second bar is in process of formation"—This precisely accounts for our Lily Pond.

Here in the early spring the air is spicy from millions of plum blossoms. (*Prunus Maritima*). There are no leaves so early in the season, so there is only the white flower of *Prunus*, the yellow sand and the deep blue of the sea. Later there is shad bush (*Amelanchier intermedia*) and in turn creamy spikes of clethra,

white balls of cephalanthus, high bush blueberry, (*Vaccinium corymbosum*), the fragrant swamp honeysuckle, (*Azalia viscosa*). Candleberry bay (*Myrica Carolinensis*). "Sweet fern" or "sweet gale" (*M. asplenifolia* or *Comptonia peregrina*).

In late May or early June, in certain rather dry sandy places and under the tall bushes is a colony of the tall stemmed pink lady slipper (*Fissepes acaulis*).

Later in the summer, orange and lavender milkweed (*Asclepias intermedia* and *Asclepias tuberosa*) and several varieties of Solidago peep out from the tangle that the catbrier (*Smilax glauca*) makes in the low bushes. Here also climbs a lovely perennial lathyrus that should be *Lathyrus latifolius*, and it probably is, but the blossoms are always a bright deep pink (not at all purple) and the leaf has four leaflets,—the vine is an unusually pretty green and has very wide winged stems and long branching tendrils. It thrives in my garden and in the richer soil often grows to a length of three yards. It seems worth of some attention from the horticulturists.

In the dry sand among the bay bushes there is a little association of the delicate polygala, *Polygala viridescens* and an occasional spiral of the fragrant little orchid, *Ibidium Beckii*.

Great clumps of *Osmunda regalis* grow in the shallow water at the east end of the pond. One must go early in the season to watch the royal leaves unfurl and to see each leaflet mirrored in the still water. Here in August among these ferns is the "pink-purple" loostrife (*Decodon verticillatus*), Tennyson's "willow herb,"—this plant forms a curious cork-parenchyma-like substance at the base of the submerged stems.

From the rich muck at the bottom of the pond, the long stemmed, purple lined leaves and fragrant lilies of *Castalia odorata* rise to the surface of the water and spread out their shining waxy-green leaf surface to cover almost two thirds of the pond. Thousands of creamy lilies lift their faces to the sun; and as the sun's rays visit them they seem to absorb the light, until it shines again from their golden hearts. *Castalia* has even invaded the occasionally submerged beach. Sometimes one may gather it dry shod.

Far back on the south side of the little lake is a high bank with rocks and trees—on the north side nearer the sea is a low, gently sloping beach of coarse wet sand, frequently submerged. Here is the only station for *Sphagnum* in this immediate locality.

Fixed in the sphagnum is a wonderful colony of the spatulate leaved sun dew (*Drosera intermedia*) In May and June it fairly carpets the wet sand and each ruby tentacle is covered with a diamond drop that sparkles in the light of the morning sun. Later in the day they are not so beautiful or active as the heat seems to absorb somewhat the moisture accumulated during the night. In the late afternoon and evening they are again more active. In July their delicate white flowers begin to open, adding pearls to the plant's jeweled coronal. In August the seeds mature. The veneration of the flower stalk is entirely circinate, that of the leaves not so perfectly so. This *Drosera* often reproduces a new plant from a leaf of the old. Early in the season at the time of the maximum growth, when there is plenty of moisture, they are often quite tall $2\frac{1}{2}$ to $3\frac{1}{2}$ inches—the petioles 2 to 3 inches long. The pulvinus is very active at times in lifting and lowering the leaves; much more so than in any *Drosera rotundifolia* I have ever seen. The glandular hairs are 4–5 mm. the leaves themselves half an inch in length and quite broad above the centre of the leaf.

Only in two places have I found the *Drosera*, both on the north beach of two adjacent ponds—growing under practically the same conditions, i.e. in the wet, frequently submerged coarse sand in or near the Sphagnum and sheltered by the bushes on the north. Unless so protected the two colonies would be buried deep in the dry sand, brought in, in winter, by the strong winds from the sea. This sand now piles up in small dunes beyond the bushes.

How did this isolated form come here? Is it endemic—a relic left by the reduction of the area of a favorable habitat when the two adjacent ponds were originally part of one vast cut off from the sea? And when *Drosera intermedia* grew along the entire north shore of this cut off? At all events the actual localization seems the result of a reduction of the generic area and a narrowing of the specific area, now the only refuge in the immediate vicinity where these highly organized moisture loving plants can grow. Although the coarse sand would seem far from an ideal soil, it retains the moisture better at times when the beach is not submerged. Noting *Drosera*'s delicacy and beauty, it is difficult to realize its insect catching activities. In June I observed hundreds of these plants. Some were working together; and often as many as five or six leaves of the same plant pragmatically

engaged in forming a cage to hold prey larger than a single leaf could hold. Often there are several plants engaged, two or more leaves from different plants forming a cage around a single entrapped insect. This I have seen repeated in the laboratory when a small piece of chicken liver was placed on one leaf.

The most important thing to these insectivorous plants is that they should be in the best position for catching insects.



Drosera intermedia—several leaves holding one insect—leaves from two plants with one insect.

Here the small flying and crawling insects are plentiful. From many observations I do not think that the plant waits for the insect to alight on the leaf, and merely responds by a touch-reaction, but I believe that it makes quite elaborate preparations in advance, and it behaves as though it *enjoyed* the sport,—Spreading the broad surface of the leaves out side by side and with interlacing tentacles, turning the outer glandular hairs down—and the upper ones up, so obtaining a maximum surface.

In the dusk the tiny insects fly about and are even caught on the wing. When the flying insects are scarce, the pulvinus actively lowers most of the leaves except the very young ones so that they lie almost flat on the ground and are so enabled to catch the little crawlers.

I know whereof I speak, because in '24 being temporarily lame as the result of an accident there were no more long tramps through woods fields and marshes for me. So I became the disciple of the lame Epictitus and spent philosophically and happily most of the pleasant spring and summer days on the sand in the sunshine, re-reading Darwin's "Insectivorous plants" and watching this particular colony of *Drosera*, the clouds and sea—and *all* the lovely growing things around me. There is no other spot near by where so many amusing things grow in so confined an area. After carefully noting Darwin's experiments—and repeating some of them, it seemed to me that leaves—cut from the plant or glued—could hardly react naturally. That is why I determined to watch the natural reactions of *Drosera*. This highly organized protein-loving little plant seems so much nearer to Homo-Sapiens than most of the insectivorae, that as I watched I marveled, for it seems to hold the very secret of life and our relation to the vegetable kingdom. Even one tiny cell may hold this hidden riddle of the world!

In studying this *Tapis Vegetal* I have carefully noted all the interesting species that grow in the tufts of *Sphagnum*, and some of these seem to indicate a primitive character of the vegetation.

Among the *Drosera*—just beyond them from June 10th to July 20—flowers the lovely Orchid (*Pogonia ophioglossoides*). The fragrant rose and white pogonia.

In the early spring, the long leaved red stemmed white violets (*Viola lanceolata*) are there also. Even *Xyris* (*Xyris flexuosa*) itself thrives in the moist sand, and sundry primitive lycopods, *Lycopodium alopecuroides* notably, crawl out from clumps of growth, like great green worms from among the mosses and sun dews.

A tiny hypericum seems to live in peace with its taller relative (*Hypericum canadense*).

The graceful, long stemmed marsh fern (*Dryopteris tholyp-teris*) proudly lifts its feathery foliage high above these lowly

marsh plants, this and various sedges—the round stemmed monotypic sedge *Dulichium arundinaceum* and the lovely *Cyperius paniculatus* and a white *Luzula (albida)* grow up to the tension line, where the roses riot in the drier sand.

Later in the season the Melastomaceae is represented by a colony of the square stemmed *Rhexia*—(*Rhexia virginica*). This is the only plant of the family that ever ventures so far north. In late July and August this “meadow gift” makes this corner of the world gorgeous, flaunting royal purple petals surmounted by a showy crown of golden stamens.

The red and russet leaves, the goldenrods and asters, keep the autumn glorious and when winter comes the sedges are still lovely. When the plums have lost their leaves the sea seems nearer. The myrica branches and twigs are laden with fragrant waxy berries. The cephalanthus with swaying coppery balls, and the perfect tiny seed urns of *Rhexia*, rise above the water of the submerged beach where *Drosera* and the other marsh plants are no longer seen.

Apologia.—New York City is creeping down Long Island ten miles a year. Even *our* countryside is being “developed,” our quiet woods in many places are now full of summer bungalows—here and there is a velvet, lawn-trimmed estate of a multimillionaire,—where there are no houses as yet, there are signs nailed to the trees, “This Land for Sale by such and such Realty Company.”

“Lily Pond” has a sign but it still reads “Private Property, no trespassing.” The realtor is there also. I have seen him with note book and pencil figuring the value of beauty in dollars and cents and his engineers surveying the land to the water’s edge. At best it cannot be long before this favored spot is invaded by the oncoming hosts.

Long Island is still of interest to the field worker and there are many species now on the island which will tend to disappear which should be put on record.

FIELD TRIPS OF THE CLUB

Field Trip of October 5th. Mr. R. C. Geist, vice president of the Metropolitan Council of Geography Teachers, sends a report of the field meeting at Cross River, Westchester County, which was a joint excursion of the Torrey Botanical Club and and council. Fourteen members and guests made the trip starting from the Bronx Botanical Garden in three automobiles. Dr. Michael Levine was the leader, and the subject, Fall fungi, which were studied in the woods about West Lake, on Cross River. A small rattlesnake was seen. Luncheon was enjoyed in one of the shelters in the Pound Ridge Reservation of the Westchester County Park Commission. The Fall coloring offered another subject for study. The automobiles were furnished by Dr. Levine, Miss Mabel E. Rice of the Julia Richman High School and Mr. Alexander L. Jessup, president of the Catskill Mountain Club; several members could not join for lack of additional motor accomodations.

WEEK-END TRIP OF OCTOBER 11 TO 13

The convenience, flexibility and speed of automobile transportation, for covering a wide field of botanical study, was demonstrated, for a small party, in one car provided by Mr. Louis W. Anderson, of Elizabeth, N. J., on the Columbus Day week end at Delaware Water Gap. Headquarters were made at Witzel's Killmont Farm, at Columbia, N. J. On Oct. 11, the party of five climbed Mount Minsi, on the Pennsylvania side of the Gap, and followed the Appalachian Trail westward, including the fire lookout, which gives splendid views up and down the river and over the Blue Ridge and Poconos. On the 12th, Mount Tammany, on the New Jersey side, was climbed, and the party inscribed their names and that of the club in the register placed on the summit by Clement Haupt of Belvidere, N. J. A new stand of Walking Fern was found on Dunnfield Creek, on a sandstone stratum, probably rather high in lime. In an abandoned slate quarry, south of Mount Tammany, remarkable sheets of the Liverwort, *Conocephallus conicus*, were found, colonies ten feet long and four feet wide, with unusually large lobed fronds, on smooth faces of the highly tilted slate, wet by dripping water.

On the 13th, leaving the farm house, the party rambled over 200 miles of New Jersey roads, before reaching home. High Point State Park was visited, and a few additional remaining plants of *Potentilla tridentata*, surviving from the construction of the war monument, in its only stand in New Jersey, were found, so that it promises to persist, as most visitors do not know its rarity. The Wallkill Meadows, along the west side of Pochuck Mountain, were next visited. The fringe of Lizard's Tail, *Saururus*, which borders the Wallkill in these Drowned Lands, was noted. On a limestone knob rising out of the meadow, near Owen, Walking Fern, Maidenhair Spleenwort and American Yew were found. An addition to one's list of Walking Fern occurrences is always a delight and we found two on this trip. After luncheon on the high plateau, north of Stockholm, the last visit of the day was made in the Cedar Swamp on the Wawayanda Plateau, west of Greenwood Lake where the Southern White Cedar, *Chamaecyparis* was seen in great numbers. *Coptis trifolia*, the Goldthread also occurs in the swamp.

Such motorized trips of the club always prove interesting, for their variety and scope, and it would enlarge the programs of the field meetings immensely if more of them could be arranged, and motor transportation obtained for larger numbers. Parties can reach more remote places, in a day's outing, than by rail and foot.

RAYMOND H. TORREY

FIELD TRIP OF OCTOBER 19TH TO CEDAR PONDS

About eighteen members of the club joined half again as many of the Paterson Ramblers on a trip to the Cedar Ponds. From Greenwood Lake the party followed through the woods, noting many interesting plants and the colors of the trees which seemed to tint the light that sifted through. At a fork in the trail part of the group turned off to visit the fire tower, the others kept on towards the ponds. As a maze of paths and old wood road spread through the woods it is not surprising that only after walking a number of miles did the party realize that they had gone beyond the ponds. After lunch they turned back, but again divided at a fork in the trail, some to take the shorter way to Sterling Forest, some to find the ponds. At last seven of the original forty five reached the goal. Close to the pond there

is a fringe of small red spruce, further back where the land is low a good growth of the southern white cedar. Pitcher plants were abundant in the sphagnum of the pond border. It was interesting to note that most of the leaves contained lumps of ice. Just why water should freeze in the leaves of the pitcher plant and not in the pond nor in the pools in the moss is hard to understand. Possibly transpiration from the leaves lowered the temperature the fraction of a degree necessary to bring it below the freezing point. No trace of sundew could be found, apparently it had disappeared earlier in the season. Along the trails were large patches of various *Lycopodiums* (*lucidulum*, *inundatum*, *obscurum dendroideum* and *complanatum*), all with abundant fertile branches. In some of the swampy ground the Virginia chain fern and the Massachusetts fern were found with numerous other commoner species.

GEORGE T. HASTINGS

FIELD TRIP OF NOVEMBER 9TH TO SILVER LAKE

A party of nearly sixty, members of the club, of the Inkowa Club and of Teachers' Training School, made the trip through the woods around Silver Lake, White Plains. Along the paths were found numerous individual flowering plants—left-overs from earlier in the season. There were several golden rods (*Solidago juncea*, *speciosa*, *aspera* and *bicolor*), a few asters (*Aster cordifolius*, *novae-anglae*, *novi-belgii*, and *multiflorus*) the common dandelion, yarrow, pepper-grass (*Lepidium virginicum*), one turnip plant by the roadside and some small seedlings of another mustard. In the woods a few small trees of witch hazel were covered with blossoms while others near by were entirely past flowering. Attention was given to the many devices for seed scattering; the erect capsules of black snake-root (*Cimicifuga racemosa*) swaying in the wind; the winged seeds of tulip tree and sugar maple thick on the ground; the fluffy pappus balls of the asters, goldenrods, dandelion and others; the feathery seeds of the milk weed; the grapples of bidens, burdock and cocklebur; the berries of viburnum, spice bush and bitter sweet; the nuts of hickories, beech and oaks. Some of the beech trees bore abundant fruit that was tested and found good by the party. After lunch near the "hermit's cave" the group, rested on a sunny bank while Captain Paul Schaefer told of the plant, bird and animal life of Northern

Greenland. He told of stalking like a giant through a forest of dwarf willows in Northern Labrador. Of the large flowers of the little arctic poppies only a few inches high, of the saxifrage whose leaves furnished a salad to the explorers, of the blueberries that often ripened under the snow. All the plants blossom together about as soon as the short arctic summer begins. The color of the arctic is not prevailingly white, the captain said, but often brilliant red or purple due to the lichens which cover the rocks. His description of the birds and mammals was as interesting as that of the plants, especially of the little auks or dovebies which were noisy all day long during the nightless summer months so that sleeping was difficult and of the burgomeister gull that frequently caught and devoured the dovebies while in flight. The talk was the high spot of a day perfect as to weather and full of botanical interest. The rocky hills with the fine forest covering, the curious swamps in the depressions on the hill tops, the patches of hemlock and the varied undergrowth make the region one of unusual charm. White Plains is to be complimented on keeping such a region in a wild, unspoiled condition.

GEORGE T. HASTINGS

PROCEEDINGS OF THE CLUB

MEETING OF MAY 21, 1930

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 April 16 and May 6 were read and approved. Twenty-two members were present. As Dr. Harris of Cold Spring Harbor has passed away a motion was made and seconded that resolutions be prepared and recorded in the minutes of the Club. The chairman appointed a committee of three consisting of Dr. John Hendley Barnhart, Dr. A. F. Blakeslee and Dr. Howard J. Banker to prepare such resolutions.

A motion was made and seconded that we appoint an endowment committee to take care of the Endowment Funds.

The following were unanimously elected to membership in the club: Miss Elizabeth Aldrich, 136 West 12th Street, New York City; Dr. Paul W. Graff, Research Dept., Corn Products Refining Company, Edgewater, New Jersey; Miss Frieda Lichtman, 128 Fort Washington Avenue, New York City; and Miss

Mabel E. Rich, 1 Mayflower Drive, Colonial Heights, Tuckahoe, New York.

The resignations of Mr. J. H. Parker and Mr. Victor Schechter were accepted with regret.

Dr. Elmer D. Merrill, Director-in-Chief of The New York Botanical Garden gave an interesting talk on the "Recent Developments in Botanical Exploration in China."

Mr. Kenneth R. Boynton, Head Gardener, of the New York Botanical Garden gave an interesting talk on the "New Species in the Florists Plant List."

Meeting adjourned at 5 P.M.

Respectfully submitted,
FORMAN T. McLEAN
Secretary

MEETING OF OCTOBER 7, 1930

The meeting was called to order at the American Museum of Natural History at 8:20 P.M. by President Sinnott. Minutes of the meeting of May 21 were read and approved. Thirty-four members were present.

Dr. and Mrs. N. L. Britton, who had previously been unanimously elected to honorary life membership, chose to become regular life members and contributed \$100.00 each toward the club. Their contributions were accepted with appreciation, and they were unanimously elected to regular life membership.

The following people were unanimously elected to membership in the club: Miss Bertine E. Weston, 62 West 45th Street, New York; Miss Eleanor A. Friend, 40 Thayer Street, New York; Miss Grace R. Frazee, 67 East 4th Street, Clifton, N. J.; Mr. V. L. Frazee, 67 East 4th St., Clifton, N. J.; Miss Augusta Kovaleff, 237 West 107th Street, New York; Miss Beatrice Scally, 244 Glenwood Avenue, East Orange, N. J.; Miss A. Mabel Barrow, 447 Greene Avenue, Brooklyn; Miss Trotman C. Barrow, 447 Greene Avenue, Brooklyn; Mr. James Murphy, 110 East 42nd Street, New York; Mr. Harold J. Engstrom, 179 Chippewa Road, Tuckahoe; and Mr. Robert R. Coles, 7 Glen Place, Glen Cove, Long Island.

The resignation of Dr. R. G. Eccles was accepted with regret.

Dr. A. H. Graves reported that Japanese chestnuts were fruiting freely on Long Island and showed burs of these containing chestnuts.

Dr. F. T. McLean reported that Dr. Rusby found young fruiting chestnut trees on his farm at Pequonnock.

Dr. R. A. Harper told about the destruction of lawns and of seedlings of Azaleas and Crepe Myrtles by growths of *Myxomycetes* smothering the plants.

Mr. Alfred T. Beals also reported on similar action of *Myxomycetes* in seed beds and lawns.

Dr. C. S. Gager told about his visit to the Botanical Gardens in Berne, Padua and Pisa and of the contrasts of the botanical gardens of Italy with those of England. The Italian gardens exist for the plants. In them there are a great many kinds of plants very well grown but with very little thought to ornamental effects. The English Botanical Gardens, on the other hand, emphasize the ornamental display of their plants and they use fewer kinds. Thus the plants exist in the English Botanical Garden for the gardens.

Mr. G. T. Hastings reported on his observations of ferns and wild life during his summer vacation in Pennsylvania.

Dr. T. Hazen told about his visit to the Hopkins Marine Laboratories of Leland Stanford University in California where he collected Kelps 60 feet long. He also showed samples of algae which grow in salt brine. Some of these cause the development of red color in commercial salt, the red algae being able to live even in the dry salt crystals. One of these organisms causes a sweetish odor in the red colored salt. He also observed the little red organisms causing the phenomenon of red snow. In contrast with this he found other algae growing in Hot Springs where the temperature was too high to bear the hand comfortably.

Mr. Beals gave a good detailed report of his finding the interesting purple fringed orchis in Northern New Hampshire. He also made mention of a trip to White Bog, New Jersey where he saw some of the large varieties of blueberries developed by Miss White and Mr. Coville.

The meeting was adjourned at 9:45 for refreshments which were served by Mrs. Hastings.

Respectfully submitted,

FORMAN T. MCLEAN

Secretary

NEWS NOTES

On October 15, Ernest Henry Wilson, Director of the Arnold Arboretum and his wife were killed when his automobile skidded and plunged down an embankment near Worcester, Mass. Mr. Wilson was often known as "Chinese" Wilson because of his many visits to China in search of plants. Professor Sargent under whom Mr. Wilson served when the former was director of the arboretum, termed Mr. Wilson the ablest collector of trees and shrubs in the world.

INTERNATIONAL BOTANICAL ADDRESS BOOK

At the final plenary meeting of the Fifth International Botanical Congress, Cambridge, England, August 23, 1930, it was unanimously resolved that an international address book of botanists should be prepared and published. A committee consisting of Professor L. Diels, Director of the Botanic Gardens, Berlin-Dahlem; Dr. E. D. Merrill, Director of The New York Botanical Garden; and Dr. T. F. Chipp, Assistant Director of the Royal Botanic Gardens, Kew, England, was appointed to consummate the project.

The last publication of its kind, Dorfler's *Botaniker Addressbuch*, was published in 1909; the need of an up-to-date publication has been increasingly felt in late years, with the rapid growth of botanical science and the necessity for more general communication and cooperation among botanists in different parts of the world.

Dorfler's address book had about 12,500 entries. It is estimated that a comprehensive new address book will contain in excess of 20,000 entries. To make it reasonably complete the cooperation of botanists everywhere is desired. Will individuals who desire their names to appear in the new botanical address book send me a post card giving the data required. What is needed in each case is the name and initials of the individual, his or her address, degrees and titles, position, and special field of interest. Please compile the data on an ordinary post card, in typewriting if possible, and send it to the undersigned; all such supplementary data will be collated with those supplied by the selected collaborators, before transmission to Dr. Chipp at Kew.

E. D. MERRILL
*New York Botanical Garden,
Bronx Park, New York*

Mr. A. Tennyson Beals sends a correction as to the discoverer of the Luminous Moss in Fayston Pass, Vermont; it was not he, as previously reported, but Mr. William Gavin Taylor, another member of the club. Mr. Beals writes:

"Dr. H. Garns in 'Die Pflanzenreale,' in 1928 shows on a world map the distribution of this moss, *Schistostega osmundacea* (Dicks), Mohr. This plant is known from only twenty regions (and never plentiful anywhere) and these are all located in the North Temperate Zone. It has been recorded from 15 European regions, pretty well scattered over that continent; from the Amur region in China; one station in Japan; western North America centering about Vancouver, B.C., Southern Canada and northern United States, along the Great Lakes, which region extends east across the Adirondacks in New York, and into Vermont and New Hampshire, and there is a final station on Mount Desert, Maine. Anyone finding this plant at a new station, even in a region where it is known to occur, has achieved a real botanical discovery and should not be deprived of the honor of making such a record.

"Mr. William Gavin Taylor found the Luminous Moss in Fayston Pass, in 1929, and should be credited with its discovery there. I happened to be near at the time but would very likely have overlooked it, as we were hurriedly getting ready to return to Dr. Monroe's home, so we wouldn't be late for supper.

"Incidentally, I found a new station for this plant in 1922, one hundred and fifty miles north of Quebec, Canada, on the shore of Lake Edward. My station is not included in Dr. Garn's map of its distribution."

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