BOOK REVIEW

The Ferns of Bombay.*

This little volume is intended for beginners. A brief history of the fern flora of the Bombay Presidency is given in the introduction, followed by descriptions of stems and leaves, their shape, venation, and reproductive organs, with a brief sketch of the life history of these plants and mode of cultivation. Under classification there are 54 genera and 143 species described with localities and altitudinal distribution. Keys to species are given under the larger genera and black and white illustrations in the text, with two colored plates. As a simple guide to the ferns and their allies of that region the book may be heartily recommended.

E. G. Britton,
New York Botanical Garden.

PROCEEDINGS OF THE CLUB

Meeting of October 11, 1922

This meeting was held in the botanical lecture room of Schermerhorn Hall, Columbia University.

The following eight new members were elected:

William J. Bonisteel, N. Y. College of Pharmacy.
James A. Faris, Brooklyn Botanic Garden, Brooklyn, N. Y.
Dr. Takewo Hemmi, Kyoto Imperial University, Kyoto, Japan.
Clarence J. Hylander, Hartsdale, N. Y.
Albert E. Lownes, Providence, R. I.
Robert E. Morse, Newark, N. J.
Prof. Mabel A. Rice, Wheaton College, Norton, Mass.
Dr. John S. Ware, Stapleton, N. Y.

Mr. Elba E. Watson, Grand Rapids, Michigan, was reinstated to membership.

The scientific program consisted of informal reports on summer work and observations.

* Blatter, E., & Almeida, J. F. The Ferns of Bombay. Pp. i–vii + 1–228. *pl. 1–15* + *f. 1–43*. 1922. D. B. Taraporevala Sons & Co., Bombay. Price 7 s. 8 d.

Mr. A. T. Beals remarked on slime-moulds collected during the summer, with an introductory sketch of the general morphology of the group, their natural habitats, and best methods of preservation.

Dr. F. J. Seaver reported on a field trip to Elmsford, N. Y. *Glonium stellatum*, a fungus not previously observed by him in the local flora region, was among the plants collected.

Dr. Alfred Gundersen made some observations on the flora of the northeastern parts of the Catskill Mountains.

The absence of trees common near New York, such as hickories, locust, sweet gum and all oaks except the red, together with the abundance of species such as fir and white birch, gives to the higher regions of the Catskills a distinctly northern aspect.

Above 2000 ft. elevation in the region surrounding the Big Hollow valley red oak was found only on the south slope, fairly common up to and slightly above 3000 ft. elevation. White pine and American elm were seen rarely and only on the lower south slopes. Sugar maple, American linden and American ash were more common on the south than on the north slope. Red spruce, white birch, pin cherry and mountain maple were common on both slopes; fir, hemlock, yellow birch, mountain ash and striped maple most abundant on the north slopes, black spruce occasional there; these all grew up to or near the summit of Black Dome, 3990 ft., third highest of the Catskill mountains.

Chestnut, entirely absent from this part of the mountains, is frequent on the Hudson valley slopes up to 2000 ft. elevation and occasionally higher. While the trees are usually attacked by the bark disease, many seem to be in fairly good condition. Another plant found only on the east side of the mountains is mountain laurel, abundant in places between 1600 and 2200 ft. elevation.

It is well known that going northward there is an increasing similarity in American and European plant and animal life. Thus it is of interest that in the region studied the genera of trees are just those of Norway, with the exception of hemlock and fir, absent from northern Europe. Of shrubs two species are the same in the Catskills and in Norway, juniper and alder (*Alnus incana*). In ferns and clubmosses there is a much greater correspondence.

Dr. M. A. Howe gave a brief account of the 1922 dahlia border at the N. Y. Botanical Garden and invited those interested to see it while at its best.

Dr. Tracy E. Hazen outlined his three months connection with the Colombian Expedition of 1922. Arriving at Buenaventura on July 8th, the railroad journey of some seven hours to the summit of the pass of the western Cordillera of the Andes is one of surpassing interest botanically, with a constant succession of beautiful scenes; mangrove swamps, tropical forest abounding in Heliconias, Cecropias, tree ferns and fascinating panorama of varied palms; the narrow gorge of the Dagua river opening up above into a most surprising cactus and acacia desert, to which later a very rewarding visit was made in company with Mr. Killip and a camera.

At an elevation of 5,250 feet, the village of La Cumbre, built up almost entirely since the establishment there through private American enterprise of the well equipped Smith Clinic, commanding magnificent views of mountain and valley, and surrounded by rich subtropical forest, was a most delightful base for a week at the beginning and again at the end of the trip. Descending to the Cauca valley, the other members of the expedition, Dr. F. W. Pennell and Mrs. Pennell and Mr. Ellsworth P. Killip, who for some weeks had been in the south at Popayán, were met at Cali. Down the Cauca by river boat to Zarzal, thence by mule train up into the Quindio region of the Cordillera Central occupied the latter half of July and August. From Salento as a base, the ride with Mr. Killip over the historic Quindio trail to Ibague furnished perhaps the greatest combination of exhilarating scenery and memorable botanizing of the summer, with its great variety of orchids and passion flowers, and, finest of all the miles of trail through the forest of majestic wax palms (*Ceroxylon andicola*).

Through the courtesy of Señor Alfonso Tobon, about two weeks were spent above Salento at Alaska, the mountain estate of the Tobon family, which stretches up through fine temperate forest to paramo and snow fields. The flora of the high moor surrounding the expedition camp on the high paramo at the foot of the Nevado del Quindio was enticing for the photographer: a profusion of dwarf gentians, lupines, heaths, figworts, and composites, surrounded by the tall, densely woolly Frailejon (*Es-*

peletia) and other composite shrubs. The return journey to the west coast also furnished features of unfailing interest.

Dr. Michael Levine gave a brief account of some aspects of his summer's work in the laboratory of the Montefiore Hospital, where he was engaged in some comparisons of animal cancers and the tumors, galls, or cancers of plants. In the tumors or galls of plants there appear to be no giant cells and multipolar spindles such as occur in animal cancers. And there is no conclusive proof that the so-called "strands" in animal cancer have any homologies in the cancer-like growths of plants, though *Ricinus* has something resembling these strands. Radium emanations were found to inhibit the growth of tumors in *Ricinus*.

Mr. Edgar Nelson made some remarks on his work in collecting the pollen of various plants for the use of physicians who are investigating the relation of various kinds of pollen to hay fever. It appears that each victim of hay fever is affected by one particular kind of pollen and that physicians now determine the particular kind by experimental inoculations with extracts of the pollens of the suspected species of plants.

MARSHALL A. HOWE,
Secretary.

MEETING OF OCTOBER 25, 1922

The meeting of the above date was held in the morphological laboratory of The New York Botanical Garden.

Dr. Aniela Kozlowska, 120 Madison Avenue, was elected to membership.

The scientific program consisted of a discussion of "The Cacti of the Atlantic Coastal Plain" by Dr. N. L. Britton and Dr. John K. Small. Dr. Britton introduced the subject by referring to the extensive systematic studies of the cactus family that have been in progress for several years with the cooperation of The New York Botanical Garden and the Carnegie Institution of Washington. Three volumes of the beautifully illustrated cactus monograph, embodying the results of these studies by Drs. Britton and Rose, have already been issued, and the manuscript for the fourth and final volume is now being sent to the printers. Dr. Britton then referred to field studies of the

cacti of the Atlantic Coastal Plain, especially of Florida, recently made by Dr. Small, with the support and cooperation of Mr. Charles Deering.

Dr. John K. Small then gave a summary of the progress of our knowledge of the Atlantic Coastal Plain cacti during the past twenty-two years. At the beginning of the present century 7 species were commonly recognized for this area; in 1918 the number had been increased to 12; and now, in 1922, about 40 species are recognizable. Of these species, 4 are naturalized and the others are without doubt natives. Thirty six of them occur in Florida only. The island of Nantucket is the most northern range of the family. After this introduction the meeting was adjourned to one of the greenhouses in Conservatory Range No. 2, where all of the species of the Atlantic Coastal Plain were represented by living plants, whose leading characteristics and relationships were pointed out by Dr. Small.

MARSHALL A. HOWE,
Secretary.

MEETING OF NOVEMBER 14, 1922

The meeting was held at the American Museum of Natural history. The chairman announced the subject of the meeting to be "Wild Flowers and their Insect Visitors" and introduced the speaker, Professor O. P. Medsger.

Professor Medsger spoke of the general adaptations of plants to secure pollination by means of the wind or by insects, showing pictures of many plants, some with the insects on them, and described his own observations on pollination. He showed pictures of timothy grass in blossom, showing how well it is adapted for wind pollination, then told of seeing bumble- and honey-bees climbing up the heads in the early morning, gathering the pollen. Many plants well adapted for wind pollination are visited and must often be pollinated by insects that feed on pollen. In contrast, the arbutus and lily of the valley, plants adapted by odor and nectar to secure insect visitors, seem to be rarely visited and seldom set fruit. The azalea and rhodora are visited by bumble-bees and butterflies which easily reach into the long corolla tubes. The mountain laurel is visited by bumble-bees and small native bees. The four-leaved milkweed is one of the few flowers visited by the honey-bee. Honey-bees

seem to visit few of our native plants, but commonly pollinate introduced plants such as butter and eggs, white clover, and thyme. The last-named plant, where introduced into the Catskill Mountains, has become so abundant in some localities as to ruin farms but make bee-keeping successful. At least forty-five species belonging to the Mint Family alone, have been introduced from Europe into eastern United States. A large majority of these seem to be pollinated by the honey-bee. The members of our rich native flora, lived, bloomed, and produced seed ages before the honey-bee was introduced from abroad. The most important insects in the pollination of our native flowers are the bumble-bees. For example, they regularly visit the hepatica, trilliums, moss pink, cyprepedium, wild geranium, columbine, Bouncing Bet, clematis, jewelweed, wild carrot, sumach, milkweed, mallows, closed gentian, thistle, and asters. The columbine is also on rare occasions visited by hummingbirds. The bumble-bee sometimes robs the columbine by biting into the nectaries from the top and so transferring no pollen. They do the same thing with the fringed polygala and jewelweed.

Mining-bees, resembling bumble-bees in appearance, live along the edges of the Jersey marshes, and carry enormous masses of pollen which they fashion into balls about half an inch in diameter to act as food for the developing larvae. These bees visit the rose mallows in great numbers. Other mining-bees, especially valuable in fertilizing the smaller native blossoms, are those belonging to the genera *Andrena* and *Halictus*.

Flies are important visitors of many plants; the false and two-leaved Solomon's seal, white baneberry, black snakeroot, and skunk cabbage are visited chiefly by flies and all produce abundant fruit. The wild carrot is visited by several varieties of insects, but chiefly by flies resembling wasps. The evening primrose is visited by moths, especially hawk-moths. The Joe-Pye weed, boneset, and thistles by butterflies and such day-flying moths as *Thisbe*.

The plant on which most insects were seen was the staminate plant of staghorn sumach. On one flower cluster fifteen species were seen at one time, another cluster showed thirty insects of fourteen species. In the closed gentian bumble-bees insert their tongues, then push in the head and all or nearly all of the body. When they back out a little fringe of white is left at the

top of the flower so that one can tell at a glance which flowers have been visited.

Tragedies are sometimes observed, as bees or flies caught by their feet by the pollen masses of the milkweed and held till dead, or bumble-bees unable to get out of the pouches of the lady's-slipper (*Cyprepedium*) and perishing in their beautiful prisons.

GEORGE T. HASTINGS,
Acting Secretary.

MEETING OF NOVEMBER 29, 1922

This meeting was held in the Morphological Laboratory of the New York Botanical Garden,

Dr. Barnhart exhibited a beautifully bound set of Michaux's North American Sylva, recently presented to the Club by Mrs. Richard M. Hoe. This was the Philadelphia edition of 1859, including three volumes of the English translation of Michaux's original work, supplemented by two volumes written by Thomas Nuttall.

The first paper on the scientific program was by Dr. Mel T. Cook, his subject being "Recent Studies of the Brown Rot of the Peach."

The brown rots of pomaceous and drupaceous fruits are due to fungi, at least one of which was first described by Persoon in 1796 as *Torula fructigena*. In 1801 he transferred this to *Monilia*. About the middle of the last century it was asserted that there were two species in England, *M. fructigena* on pomaceous fruits and *M. cinerea* on drupaceous fruits. In America, however, the species which is especially destructive on drupaceous fruits and rare on pomaceous was supposed to be the former. In 1902, J. B. S. Norton discovered the perfect stage and assigned it to *Sclerotinia fructigena*. In 1913, Matneny stated that it was properly *S. cinerea* and this view has been very generally accepted by the American mycologists.

The fungus attacks (a) peach fruit, causing a rot; (b) peach twigs, causing them to die back; (c) peach blossoms, causing a blight, frequently supposed to be frost; (d) peach twigs and branches causing canker.

The cankers have been discussed by many workers. The speaker has determined that the fungus is frequently carried over by canker on the new growths and this has been verified by several workers. Very similar cankers are frequently formed as a result of spray and dust injuries. The mycelium rarely penetrates into the xylem.

The apothecia are formed on old mummied peach fruits lying on the ground in uncultivated orchards, especially those growing in wet clay soil.

The second paper was by Dr. Arthur Hollick on "Some Fossil Fruits of the Tertiary of the West."

Dr. Hollick first remarked upon the genus *Ficus*, of which about 600 living species and about 300 fossil species have been described. Most of the fossil species have been based upon leaf impressions and the genus has been a sort of catch-all for leaf impressions of rather doubtful relationships. One genus (*Ficoxylon*) has been based upon wood of *Ficus* affinities and seven species have been based upon fruits. Of these seven, one is from the Middle Cretaceous of Greenland, two from the Middle Cretaceous of Kansas, two from the Lower Tertiary of Wyoming and Montana, one from the Middle Tertiary of Colorado, and one from the Quaternary of British Columbia. Specimens of fruits of *Ficus Ceratops* Knowlton from the Eocene, Fort Union formation, of Montana, and of *F. neurocarpa* Hollick, from the Dakota group of Kansas, were exhibited.

Dr. Hollick also showed fossil cones of *Sequoia* from the Eocene of North Dakota and leafy twigs from the Eocene of Alaska, with cones and branches of the living Sequoias of California for comparison.

The recent death of Professor Elias J. Durand of the University of Minnesota, a member of the Club, was announced, and the chairman appointed Professor Robert A. Harper, Dr. F. J. Seaver, and Mr. James A. Crawford as a committee to draft suitable resolutions.

Adjournment followed.

MARSHALL A. HOWE,
Secretary.

Meeting of December 12, 1922

The meeting of the above date was held in Lecture Room 139 of Barnard College. The speaker of the evening, Dr. D. T. MacDougal, discussed "The Constitution and Action of Living Matter."

Living matter, Dr. MacDougal stated, is made up mainly of gums or mucilages, soaps, and lipoids or fatty substances. These substances are mixed together, but are not dissolved in each other, and the intimate processes that constitute life take place chiefly in the liquids which fill the spaces in this complex sponge. Twist and tangle together a few hundred short frayed fibers of cotton, silk, wool, and linen, wetted in mucilage, and you will have a model of the invisible structure of protoplasm, magnified many thousand times.

Our inquiries have been rewarded so far as to allow us to see that the building materials of the protoplasmic city, like brick, stone, metal, boards, and cement, enter sparingly into compounds with one another and simply adhere and intermix. The proteins may dissociate to some slight extent, the soaps are known to form several kinds of ions, and these substances liquefy the lipoids; beyond this, substances of the four named groups of colloidal material do not diffuse into each other or dissolve each other, so that they must, upon admixture in a liquid condition, set or form a gel in which the separate substances would form interlaced meshworks.

Beyond the recognition of such objects as starch grains, oil drops, crystals, etc., as separated material, any distinction between the living and non-living in the cell is purely academic and hence futile to the physiologist. In this connection, reference may be made especially to the wall, which with its liquefiable pentosans and lipoids may well be regarded as a living part of the cell until it reaches extreme age or highly specialized differentiation.

Life in the last analysis consists of a series of correlated transformations of energy, or chains of metabolism, which take place in the liquid occupying the spaces of a colloidal meshwork. The ions and substances concerned in these never-ceasing changes are at all times subject to the surface forces of the particles or strands of the meshwork, as modified or determined by the electric charges carried.

The meshwork or more solid part of the jelly is in a perpetual state of alteration by hydration and dehydration. When we attach to a living cell-mass a delicate apparatus by which its quiverings are recorded, as has been done by the Indian mystic Bose, we get results comparable to those which could be procured by registering the vibrations of the walls and floors of a crowded tenement house. Accentuated activity would be noted after sunrise, lulls and minor disturbances recorded during the day, and a subsidence before midnight. These facts would offer but a fantastic basis for any interpretation of the working capacity, qualities, or the nature of the activities of the living human units of the building. Similar studies of the quiverings of the protoplasmic jelly structure have been made by this Indian mystic the basis of fanciful and sentimental interpretations of the action of living matter, which have attained a great vogue, especially among naturalists who have not surveyed the groundwork of physiological action. The comparison here given is both apt and accurate, and the results in question spell but little progress in the solution of any serious physiological problem.

After discussion, adjournment followed.

Secretary.

NEWS ITEMS

Dr. John K. Small, head curator of the museums and herbarium of the New York Botanical Garden, returned on January 10 from a month's visit to southern Florida.

At the annual meeting of the Board of Managers of the New York Botanical Garden, held on January 8th, Dr. Frederic S. Lee was elected President, succeeding Dr. W. Gilman Thompson, who had served in that capacity since the death of Hon. Addison Brown in 1913.

Dr. A. B. Stout, director of the laboratories of the New York Botanical Garden, is spending the scholastic year at Pomona College, Claremont, California, where he is giving occasional lectures on problems of plant-breeding and conducting investigations on sterility and fertility in different varieties of oranges with reference to crop production.