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A Sketch of the Progress of Botany in the United States in the Year 1879

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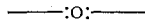
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A SKETCH OF THE PROGRESS OF BOTANY IN THE
UNITED STATES IN THE YEAR 1879.

BY PROF. C. E. BESSEY.

A. Anatomy and Physiology.—In this department the observations of the botanists of this country, as shown by their published papers, were directed mainly to the reproductive organs and their functions; and with one or two exceptions the papers were short, involving but a few quickly-made observations. Little or no work was done in micro-anatomy (histology) and proper physiology.

While we may regret that so much of the field has been so sadly neglected in our country, we should remember, that as a rule our botanists are overloaded with other duties which render it often impossible for them to command the time for making the necessary investigations.

In the January number of the *NATURALIST*, Prof. J. E. Todd published a paper "On Certain Contrivances for Cross-fertilization in Flowers," illustrated by eight wood-cuts, in which he described the modes of pollination in *Martynia*, *Penstemon* and *Lobelia*, and added a few observations upon the structure of the Iris flower. In the same journal Mr. William Trelease published (p. 427) a paper "On the Fertilization of several species of *Lobelia*," and another (p. 688) on "The Fertilization of our native species of *Clitoria* and *Centrosema*," both illustrated by several cuts. Thomas Meehan's paper "On the Fertilization of *Yucca*," read before the American Association for the Advancement of Science, is interesting from the fact that it shows that in *Yucca*, where we appear to have so perfect an adaptation of flower and insect (*Promuba yuccasella*), pollination may still be effected by other and unusual means.

Prof. W. J. Beal described in the *American Journal of Science and Arts* for May, some "Experiments in Cross-breeding plants

of the same Variety." Of Indian corn and wax beans, two lots of each were obtained from widely different localities; these were so planted as to secure cross-fertilization in certain cases, and fertilization without crossing in others. The result was shown to be highly favorable to the crossed plants.

Dr. M. E. Elrod's paper on the "Seeds of the Violet and other plants as Projectiles," in the February *NATURALIST*, and that of R. E. C. Stearns in the July number of the same journal, on "The Form of Seeds as a Factor in Natural Selection," contribute somewhat to our knowledge of the means for the distribution of the seeds of plants.

Of other papers in this department, the following may be mentioned: "Trimorphism in *Lithospermum canescens*," by Mr. E. F. Smith in the *Botanical Gazette* for June; "Sexual differentiation in *Epigæa repens*," by Mr. L. F. Ward; "Note on the movement of the stamens of *Sabbatia angularis*," by the same author, both read before the American Association for the Advancement of Science; "Objects of Sex and Odor in Flowers," by Thomas Meehan, read before the A. A. A. S., and printed in the *Scientific American*, Oct. 1879, pointing out that "variation is not merely an incident of form, but that it must necessarily be a primary object in nature; that the institution of sex is but an incident in the primary law of variation; and that all the machinery for fertilization and cross-fertilization is with the object of causing a change of form far in the future, and with no material bearing on the good of the individual, or even of the race." Here should be mentioned Prof. Tuckerman's paper, "The Question of the Gonidia of Lichens" (*Am. Jour. Sci. and Arts*, March, 1879), a review of Dr. Mink's recently published observations. The reviewer gives a short résumé of the lichen-gonidia controversy, and records some observations of his own, which he regarded as confirmatory of those of Dr. Minks.

B. Systematic Botany.—a. Fungi.—One of the most important contributions in this department is Mr. C. H. Peck's "Report of the Botanist" in the Thirty-first Annual Report of the New York State Museum of Natural History. This report, although bearing date of January, 1878, was actually not published until 1879. Many new species of Fungi (mostly Basidiomycetes and Ascomycetes) are described. One of the most interesting of these is the one which lives parasitically within the abdomen of the seventeen-

year Cicada, and which Mr. Peck proposes to put into the new genus *Massospora*, which he briefly characterizes. The table giving the synonymy of the Myxomycetes of New York, and the critical notes which follow are valuable, especially to those who do not have access to Rostafinski's work.

In the "United States Species of Lycoperdon," a paper read Feb. 4, 1879, by Mr. C. H. Peck, before the Albany Institute, we have the first approximately complete account of the puff-balls of this country. The paper opens with a general description of puff-balls, covering six pages. This is followed by a synoptical table of the species, which are arranged under two sections, viz: *Bovistoides* and *Proteoides*, according as the peridium ruptures irregularly or regularly. The excellent specific descriptions which follow in the body of the paper, are based upon Mr. Peck's personal observations, and these are supplemented by remarks upon the general and more obvious characters, as well as the distinguishing features of such species as are closely allied and liable to be confused. Nineteen species are thus described in full, and four others, known to occur in the United States, but not seen by Mr. Peck, are more briefly noticed at the end of the paper. A list of publications consulted closes this valuable contribution.

The same indefatigable mycologist, in several short articles in the *Botanical Gazette*, described thirty-eight new species from various parts of the United States. Of these twenty are Uredineæ, six Hymenomycetes and four Gasteromycetes.

M. C. Cooke, in the March number of *Grevillea* described several new species from California, and in the September number of the same journal, Mr. Cooke and J. B. Ellis described thirty or more new Fungi from New Jersey.

Baron Theumen's short contribution in the October Bulletin of the Torrey Botanical Club, contained descriptions of several new species.

In F. B. Hine's "Observations on Several Forms of Saprolegnieæ," begun in the October (1878) *American Quarterly Microscopical Journal*, and concluded in January, 1879, we have one of the first records of a careful study of the plants of this interesting order in this country. Four plates, filled with many figures, accompany the paper.

J. B. Ellis' paper "On the Variability of *Sphæria quercuum*

Schw.," published in the Proceedings of the Academy of Natural Sciences of Philadelphia, 1879, p. 66, shows the growth of a healthy critical spirit, the author having satisfied himself that the species named includes thirteen or more forms hitherto regarded as distinct species.

Dr. Farlow's lecture on "The Diseases of Forest Trees," an abstract of which was published in the Transactions of the Massachusetts Horticultural Society (1879), consists of a plain account of the fungoid growths upon forest trees. As a contribution to the popular economic mycology of the United States, this lecture is to be regarded as a most valuable one.

Thomas G. Lea's list of "The Fungi collected in the vicinity of Cincinnati," originally published in 1849, was republished with a few additions, by J. F. James in the Journal of the Cincinnati Society of Natural History, 1879. In its revised form it includes 319 species.

Of the two American *exsiccati* now publishing, Centuries III and IV of Ravenel and Cooke's Fungi Americani appeared early in 1879, and Centuries II and III of Ellis' North American Fungi.

b. Algæ.—In the Proceedings of the Boston Society of Natural History, 1879, Dr. B. D. Halsted published a valuable paper on the "Classification and Description of the American species of Characeæ." Eight species of *Nitella*, one of *Tolypella* and nine of *Chara* are fully described. The references to descriptions and *exsiccati* appear to be full, and the geographical distribution of the species is as well worked out as the material at the command of the author would admit. A valuable list of the works consulted in its preparation is found at the end of the paper.

Dr. T. F. Allen's "Characeæ Americanæ," of which Parts I and II were issued in 1879, is another valuable contribution to our knowledge of the hitherto little studied American species of the Characeæ. Each part consists of a colored lithograph of a species accompanied by descriptive letterpress.

"The Seaweeds of Salt lake," is the title of a short article by Dr. Packard in the November NATURALIST. It is composed mainly of Dr. Farlow's preliminary report upon a collection of Algæ obtained by Dr. Packard from the Great Salt lake of Utah. Two of the species are recognized as marine forms, while the third is new.

Francis Wolle, in an article entitled "Dubious character of

some of the genera of fresh water Algæ," published in the *American Quarterly Microscopical Journal*, records some of his observations upon the unicellular forms of vegetation occurring in fresh water, and "questions the place given them as plants," and suggests that many of them "are merely forms of gonidia or spores or sporangia, various stages of development in the life history of filamentous plants." The same writer, in the Bulletin of the Torrey Botanical Club (January and February, 1879), published a "Synopsis of the Discoveries and Researches of fresh water Algæ in 1878," in which some American species are, for the first time, described, and many others catalogued.

Fasciculus III of *Algæ Exsiccatae* Am. Bor., containing thirty species of the larger algæ (Fucaceæ and Florideæ) was issued by the authors, Farlow, Anderson and Eaton, during the year 1879.

c. Lichens.—But little appears to have been published in 1879 by the lichenologists of this country. Prof. Tuckerman's list of the lichens in Dr. Rothrock's "Catalogue of the plants collected in Nevada, Utah, California, Colorado, New Mexico and Arizona" (Wheeler's Report, Vol. VI) is the only publication in this department which has come to hand.

d. Bryophytes (Mosses and Liverworts).—In the catalogue just referred to above, Thomas P. James enumerates seventy-nine species of mosses, and C. F. Austin fifteen species of liverworts. In Mr. James' list the less known species and genera are described, and to nearly all short notes upon habit or habitat are appended.

"Descriptions of some new species of North American Mosses," by Leo Lesquereux and Thomas P. James (Proc. Amer. Academy of Arts and Sciences, 1879), includes the descriptions of fourteen new species, mostly from the Southern and Western States.

Under the titles of "Some New Musci" (*Botanical Gazette*, April, 1879), "Bryological Notes" (Bull. Torr. Bot. Club, Sept., 1879), and "Notes on Hepaticology" (Ibid, April, 1879), the lamented C. F. Austin described a considerable number of new mosses and liverworts.

e. Pteridophytes (Vascular Cryptogams).—It is a pleasure to direct the attention of botanists to the industry of Prof. Eaton, whose "Ferns of the Southwest" (Wheeler's Report, Vol. VI), "The Ferns of North America" and "New and little known Ferns of the United States" (Bull. Torr. Bot. Club, pp. 306, 360), appeared wholly or in part in 1879. The first includes descrip-

tions of all the less known ferns of the Southwest, *i. e.*, the Utah-Arizona region. In all sixty-six species are noticed, and one figured in Plate xxx. It should be remembered that while the preface to the work bears the date of 1877, the date of its actual appearance in the volume of which it forms a part is properly 1879. A few copies were separately distributed some time in advance of the publication of the whole report, but the exact date of this distribution is not known to the writer of this paper. The great work on the "Ferns of North America" with its fine colored plates was nearly brought to a close during the year 1879. It will forever remain a monument to the ability of its author.

In "Fern Etchings," by John Williamson we have a notable example of the good work which may be done by the painstaking lover of plants. The volume contains plates of sixty-eight ferns of the United States, with letterpress descriptions of each.

G. E. Davenport's "Catalogue of the 'Davenport Herbarium' of North American Ferns" is interesting as being the first complete catalogue of the ferns of this country. It contains one hundred and forty-two species, besides sixteen varieties.

Among other publications, Mr. J. F. James' list of vascular cryptogams in his catalogue of Cincinnati plants, above referred to, and Prof. J. W. Chickering's list in his catalogue of the plants of Dakota and Montana (Bull. U. S. Geol. and Geograph. Survey, Vol. iv), deserve mention. Baron Eggers' similar list, in his "Flora of St. Croix and the Virgin islands" (Bull. U. S. Nat. Museum) should also probably be noticed here.

f. Phanerogams.—The most notable contribution in this department is the "Report upon the Botanical Collections made in portions of Nevada, Utah, California, Colorado, New Mexico and Arizona, during the years 1871 to 1875," by Dr. J. T. Rothrock, being Vol. vi of the Reports upon the U. S. Geographical Surveys west of the 100th meridian, in charge of Lieut. Wheeler. The work contains a General Report, in which the general features of the flora of the Colorado and the New Mexico districts are separately described. This portion also contains some valuable and interesting notes upon economic botany. The main part of the work consists of the catalogue proper. This is modeled after Sereno Watson's "Botany" of the Clarence King Reports. All the genera and species not contained in Gray's Manual, or in Watson's Botany, are here fully described.

While Dr. Rothrock bore the burden of the work, he availed himself freely of the aid of such excellent botanists as Mr. Watson, who worked out the Leguminosæ, Dr. Engelmann (Cactaceæ, Asclepiadaceæ, Gentianaceæ, Cuscutæ, Euphorbiaceæ, Cupuliferæ, Loranthaceæ, Coniferæ, Amaryllidaceæ and Juncaceæ), Prof. Porter (Polemoniaceæ, Borraginaceæ, Scrophulariaceæ, Labiataæ and Polygonaceæ), M. S. Bebb (the genus *Salix*), Wm. Boot (the genus *Carex*) and Dr. Vasey (the Gramineæ). Twenty-nine excellent plates of flowering plants, mostly from drawings by Isaac Sprague, accompany the volume.

Dr. Gray's "Botanical Contributions" (Proc. Am. Acad. of Arts and Sciences) contained (1) "Characters of some new species of Compositæ in the Mexican collection made by C. C. Parry and Edward Palmer, chiefly in the Province of San Luis Potosi, in 1878," and (2) "Some new North American Genera, Species, &c." The new genera are *Suksdorfia*, a Saxifragaceous genus from the Columbia river, and *Howellia* (Lobeliaceæ) from Oregon.

Sereno Watson's "Contributions to American Botany, ix" (Proc. Am. Acad. of Arts and Sciences), issued July, 1879, contained (1) a "Revision of the North American Liliaceæ," and (2) "Descriptions of some new species of North American Plants." Under the first part, the fifty genera and two hundred and thirty-five native species are arranged and described. The whole order, which here includes the Melanthaceæ, is divided into sixteen tribes, "based upon the characters of the inflorescence, and such others as can be used without separating evidently allied genera." The Alliæ come first, then the Milleæ, Convalarieæ sixth, Yuceæ ninth, with Liliæ, Uvulariæ, Trilliæ, Veratreæ following in order, and the Xerophylleæ at the end. In the second part the new genus *Hollisteria* (Eriogoneæ) is described.

"The Willows of California," by M. S. Bebb, issued July, 1879, consists of advance sheets of the "Botany of California, Vol. II." Six new species and seven new varieties are described.

Wm. M. Canby, in the *Botanical Gazette* for March, published under the title of "Notes on Baptisia," a valuable synopsis of an arrangement of the North American species, sixteen in number.

Among the lists of plants the following may be mentioned, viz: Prof. J. W. Chickering's "Catalogue of the Phænogamous and vascular Cryptogamous Plants collected during the summer of 1873 and 1874 in Dakota and Montana," published in Bull. U. S. Geol. and Geog. Survey, Vol. iv; this enumerates 673 flowering

plants; J. F. James' "Catalogue of the Flowering Plants, Ferns and Fungi growing in the vicinity of Cincinnati," with 869 flowering plants; "Colorado Plants," a list of plants collected in Central and Southern Colorado, by I. C. Martindale, published in the November *NATURALIST*, with notes upon the rarer species; "Ballast Plants in New York city and its vicinity," by Addison Brown, in the November *Bull. Torr. Bot. Club*, enumerating 258 species.

Here must be mentioned the fine work by Thomas Meehan, "The Native Flowers and Ferns of the United States," consisting of chromo-lithographs with explanatory letter-press. This work continued to be issued in parts through the year.

Baron H. F. A. Eggers' "Flora of the St. Croix and Virgin Islands," published in *Bull. U. S. Nat. Museum*, should probably be noticed here. It enumerates 977 flowering plants.

C. Geographical and Geological.—Under the title of "A Visit to the Shell islands of Florida," A. H. Curtiss, in the February, March and May numbers of the *Botanical Gazette*, gives an interesting account of the vegetation of these little-visited islands. Much like this also is J. H. Redfield's "Notes of a Botanical Excursion into North Carolina," in the July and August numbers of the *Bull. Torr. Bot. Club*. In the party were Dr. Gray, Prof. Sargent, Mr. Canby and others, and one important object of the excursion was the finding of more specimens of *Shortia*.

"The Forests of Central Nevada, with some remarks on those of the Adjacent Regions," by Prof. C. S. Sargent, in the June *Am. Four. Sci. and Arts*, contains notes upon the trees of the region, and comparative lists of the ligneous floras of the Rocky mountains, the Nevada and the Sierra Nevada regions. Much like the foregoing in treatment, but referring to very different plants, is Dr. Gray's paper, "The Pertinacity and Predominance of Weeds," in the September *Am. Four. Sci. and Arts*.

In the Bulletin of the U. S. Geol. and Geographical Survey, Vol. v, W. H. Holmes contributes an interesting article on the "Fossil Forests of the Volcanic Tertiary Formations of the Yellowstone National Park." In some places the aggregate thickness of the strata reaches more than one vertical mile (5500 feet), and throughout these strata are found vast numbers of silicified remains of tree trunks. The article is accompanied by a figure of the north face of Amethyst mountain, showing a precipice composed of upwards of two thousand feet of strata.

In the *American Journal of Science and Arts* for April, Leo Lesquereux published a review under the title, "Notice of Gaston de Saporta's Work: 'The Plants of the world before the advent of man,'" which is to be regarded as a real contribution to Phytopalæontology.

Dr. Dawson's paper "On Tertiary Plants," published in the Report of the Geological Survey of Canada for 1879 has not been seen by the writer of this article.

D. Historical.—"The Chronological History of Plants: Man's record of his own existence illustrated through their names, uses and companionship," by Charles Pickering. In this large volume the author aimed to present in a condensed form all that is known as to the plants used by or spoken of by the ancients. It is a monument to the patience and industry of its lamented author.

Of a very different nature is Frederick Brendel's "Historical Sketch of the Science of Botany in North America from 1635 to 1840." (*AM. NATURALIST*, p. 754). Beginning with Cornut's *Canadensium Plantarum Historia*, 1635, "the first book on North American plants ever written," the author notices in chronological order the publications relating to American botany down to the year 1840.

E. Text Books.—Two notable text books made their appearance during the year, viz: Gray's "Botanical Text Book: I.—Structural Botany," and Goodale's "Concerning a few Common Plants." The first is the now well-known revision of the old Botanical Text Book. It is unnecessary to describe it; it at once took rank as one of the best books on structural botany extant. The second book is unfortunately less widely known. It was prepared as a supplement to a series of lectures to the teachers in the public schools of Boston and vicinity. As an aid to the earnest teacher seeking for the best methods of presenting the more important facts in the structure and physiology of the flowering plants, this little book is a valuable contribution.

F. Periodical Publications.—The two purely botanical journals of this country, *The Bulletin of the Torrey Botanical Club* and *The Botanical Gazette*, continued throughout the year without any marked change in their character.

The same may be said of the botanical departments of the *AMERICAN NATURALIST* and the *American Journal of Science and Arts*.

Two journals, in which botanical articles frequently appeared, ceased publication for want of adequate support, viz: *Science News* and *The American Quarterly Microscopical Journal*.