

order of the elements must be preserved though the manner of their association may be indifferent, and a power of a binomial is then different from a product. This applies whether the sum or product occurs simply or as the index of a base.

Descartes wedded algebra to geometry; formalism tends to divorce them. The progress of mathematics within the century has been from formalism towards realism; and in the coming century, it may be predicted, symbolism will more and more give place to notation, conventions to principles and loose extensions to rigorous generalizations.

ALEXANDER MACFARLANE.

LEHIGH UNIVERSITY.

PROCEEDINGS OF THE BOTANICAL CLUB OF
THE AMERICAN ASSOCIATION FOR THE
ADVANCEMENT OF SCIENCE AT CO-
LUMBUS, AUGUST 21-24, 1899.

THE Botanical Club met in the room assigned for the meetings of Section G pursuant to the resolution adopted by the Boston meeting, Tuesday morning at 9 o'clock, Dr. Byron D. Halsted presiding. The sessions were continued at that hour each morning, and completed by a meeting at 1:30 p. m., Thursday. In the absence of the Secretary, A. D. Selby was chosen Secretary *pro tempore*.

The attendance and interest in the proceedings of the Club were very satisfactory. The number of papers read was quite equal to the time secured for them.

Under the title 'A Greasewood Compass Plant,' Dr. C. E. Bessey reported that on the high, western Nebraska foot-hills a shrubby species of *Sarcobatus* was observed to bear its leaves in an upright position, with their blades parallel to the meridian. Specimens were obtained for microscopic examination.

The same author gave an account of 'A Visit to the Original Station of the Rydberg

Cottonwood.' "This species (*Populus acuminata* Ryd.) was discovered a few years ago in Roubedean Township, in Scott's Bluff County, in western Nebraska, in Carter Cañon. This is a broad cañon bounded by high pine-covered buttes, and in the bottom of the broad cañon is a narrower one fringed with deciduous trees—box elder, elm, cottonwood, willow, plum, red cedar, etc., and among them are clumps of the Rydberg cottonwood. The trees are symmetrical and of much greater beauty than those of the common cottonwood. When old the bark of the trunk is light-colored and very deeply fissured.

Dr. N. L. Britton reported to the Club that Mr. and Mrs. A. A. Heller, who were sent to Porto Rico last winter as collectors for the New York Botanical Garden, had returned, having secured about 1,400 numbers, representing probably over 1,200 species, and over 6,000 specimens of plants. They are now being studied.

Dr. William Saunders gave a brief account of 'The Arboretum and Botanic Garden of the Central Experimental Farm at Ottawa, Canada, established in 1889.' During that year 200 species and varieties of woody plants were planted in botanical groups. Additions were made from year to year, and by the end of 1894 the collection included about 600 different species and varieties. Since 1894 progress has been much more rapid, and up to the present time the total number of species under test or which have been tested is 3,071—of these 1,465 have been found hardy, 320 half hardy, 229 tender, 307 winter-killed and 740 have not been tested long enough to admit of an opinion on their hardiness. Where specimens pass the winter uninjured, or with very small injury to the tips of the branches only, they are classed as hardy. When killed back one-fourth to one-half, half-hardy; when killed to the snow-line, tender. A considerable collec-

tion of hardy herbaceous plants has also been brought together, consisting of about 1,100 species and varieties.

'Tomato Fruit-Rot' was discussed by Professor F. S. Earle, Auburn, Alabama. This disease occurs in all parts of the country where the tomato is grown. It has been attributed to a fungus, *Macrosporium Tomato*. Jones and Grout have shown that this fungus is a saprophyte and is not the cause of the disease. In the earliest stages the disease appears as a watery discoloration of the layer just beneath the cuticle. A little later this discolored area becomes covered with minute, sticky drops. These swarm with bacteria. Pure cultures of this germ will promptly produce the disease when introduced under the skin of a sound tomato. The disease cannot be induced by inoculating the flowers nor by smearing it on the surface of the fruit. When the same germ is introduced deeply in the tissues of the fruit, as by the boll-worm, it produces a watery rot.

The germ is non-spore-bearing, motile Bacillus. It is strictly aerobic. It grows readily on the surface of peptone agar and on boiled potato, feebly on raw potato and in milk. It fails to grow on strawberries, apples and cabbage. The disease is probably spread through the agency of some small insect. A species of Thrips has been observed in suspicious connection with it, but its agency in crossing it is not proved.

'On two hitherto confused species of *Lycopodium*,' Professor Francis E. Loyd spoke of *Lycopodium complanatum* and the so-called variety *chamaecyparissus*, having been found by the speaker in southern Vermont. A study of their characters shows them to be quite distinct, specifically.

'Some of the Investigations on Grasses and Forage Plants in Charge of the Division of Agrostology, U. S. Department of Agriculture,' were spoken of by Thomas A. Wil-

liams. He called attention more particularly to the field and coöperative experimental work now in progress in the West and South, and spoke of the need of varieties of grasses and forage plants better adapted to use on (a) Dry, arid soils, (b) Saline and alkaline soils, (c) High elevations. Promising forms for cultivation belonging to such genera as *Agropyron*, *Poa*, *Festuca*, *Bromus* and *Bouteloua* are being studied; also selected strains of such commonly cultivated sorts as timothy and Kentucky blue-grass. He asked the coöperation of those interested that the work may be furthered and bettered.

'The Wilting of *Cleome integrifolia*' was mentioned by Dr. C. E. Bessey, calling attention to the fact that when the plant is supplied with too little water its leaflets stand erect. 'The Powdery Mildew of *Polygonum aviculare*' was discussed by the same author, noting its earlier appearance this season, 1899, in Nebraska and the dwarfing effect in the host.

Dr. N. L. Britton presented 'Notes on the Northern Species of *Celtis*.' The speaker discussed the differential characters of *Celtis occidentalis* L. and *C. Crassifolia* Lam. as illustrated by trees in the vicinity of Columbus.

Dr. Britton also made 'Remarks on some Species of *Quercus*.'

Attention was called to the finely developed trees of *Quercus acuminata* about Columbus, both in its typical narrow-leaved form and in the numerous obovate-leaved trees; the character of bark and acorns of the two were commented upon.

'Ohio Stations for Lea's Oak' was the subject of a report by Dr. W. A. Kellerman. A fourth station in Ohio for Lea's Oak was discovered recently at Cedar Point, near Sandusky, Erie county. Two trees only were detected, and they were surrounded by many Black Oaks (*Q. velutina*), and still more numerous by the Shingle Oaks (*Q.*

imbricaria). Other species of oak occur on the Point. The two trees were a few rods apart; their trunks were about twelve and twenty inches in diameter. The other stations known are Cincinnati, Brownsville, Licking county (the tree cut down in 1892, but sprouts from the stump are growing), and Columbus.

'Labels for Living Plants' were likewise discussed by Dr. Kellerman. He exhibited a modified form of the printed label for living plants, already described before the Botanical Club. In these he uses a printed card label in metal holder covered by mica sheets of proper size. This label in suitable sizes is adapted to use in the greenhouse or out-of-doors.

Under the title 'The Introduced Species of *Lactuca* in Ohio,' A. D. Selby spoke of the recent discovery of plants of *Lactuca saligna* L., south of Dayton; this was first collected in 1898. This species has been studied during a second season and is clearly a distinct species from the pinnatifid-leaved forms of *L. Scariola* L. It is characterized by the slender, twiggy growth, the absence of spines and other minute characters. Photographs were shown to the club. This is seemingly the first recorded occurrence of *Lactuca saligna* in the United States. It seems liable to become widely dispersed.

The same author spoke of some peculiarities of the yearly reappearance of *Plasmopara Cubensis* (B. & C.). This happens in Ohio, usually August 12th to 20th, not earlier, though possibly later the present year. The explanation of this phenomenon was asked; it seems peculiar in the absence of known oöspores.

'What shall we regard as Generic Types?' was discussed by Dr. L. M. Underwood. He reviewed, in the light of his work on the ferns, the method of residues as applied to inclusive genera when they are separated. Another method was suggested,

that of regarding the first described species under the genera as the type of the genus. The Linnæan or pre-Linnæan genera must in this method be studied from their pre-Linnæan history. Professor Underwood was inclined to support the latter method.

After a discussion of the paper it was unanimously *Resolved*: "That the question of the determination of generic types be referred to the Committee on Nomenclature, with the request that the Committee submit a report thereupon at the next meeting."

'A Brief Embryological Study of *Lactuca Scariola* L.' was presented by J. W. T. Duvel. This paper showed very briefly the development of the individual pollen grains from the chains of pollen mother cells. It likewise treated of the entrance of the pollen tube into the embryo sac, illustrating the ejection of the sperm nucleus and its union with the oöspore; this union usually takes place near the center of the embryo sac, though such union may take place adjacent in the pollen tube.

'The Position of the Fungi in the Plant System' was the subject of a paper communicated by Professor H. L. Bolley. He submitted that the reported growth of bacteria on a purely mineral medium would call in question the degenerate character of the group. But in his own work he had found that on cultures made by washing water-glass in running water and then in distilled water other fungi still flourished.

Professor A. D. Hopkins presented some 'Botanical Notes by an Entomologist.' He remarked upon the discriminating power of insects as between allied species of conifers, etc., and reported the occurrence of a *Larix* Swamp in West Virginia.

Professor L. C. Corbett exhibited and illustrated the use of 'A Device for Registering Plant Growth.' This had developed from the author's work at Cornell University and in its completed form is a most satisfactory

instrument. It was exhibited at the request of Dr. J. C. Arthur, by whom the instrument is offered.

Professor O. F. Cook gave 'Notes on Some of the Work of the Division of Botany of the U. S. Department of Agriculture.' The investigations of poisonous plants and the resulting publications were noticed, also the work of the Seed Laboratory reporting upon the germinating power and purity (freedom from weeds and other adulterations) of commercial seeds. Variety tests, particularly of garden vegetables, including recent introductions from abroad are also in progress, and the use of a large tract of land on the Potomac Flats has recently been secured for the purpose. The Section of Seed and Plant Introduction is conducting the importations from abroad and has had, during the past year, agricultural explorers in Japan, Russia and the Mediterranean region. The introduction of new cereals, including rice, garden vegetables, dates and the fig insect (*Blastophaga*) are among the most important items secured. In connection with this work a collection of economic plants is a necessity and has been supplied by an herbarium of economic plants.

Professor W. J. Beal told of the Botanical Club organized by the students and teachers of the Michigan Agricultural College. This has an order of procedure similar to the Botanical Club of the A. A. S. Dr. Beal also spoke of the introduction and persistence of *Cabomba Caroliniana* on the grounds of the Michigan Agricultural College.

Professor A. S. Hitchcock spoke of the peculiar distribution of several swamp plants in Kansas and illustrated by maps. Their scattered and unexpected occurrence was remarked upon. He also exhibited first-year results of certain wheat crosses.

Two or three other titles were passed, owing to the early departure or absence of

the authors. At the close of the session of the Club on Thursday afternoon, N. L. Britton, A. S. Hitchcock and O. F. Cook, comprising the Committee on Nominations, reported, and the Club elected the following officers:

President—Professor F. S. Earle, Auburn, Alabama.

Vice-President—A. D. Selby, Wooster, Ohio.

Secretary—Professor F. E. Lloyd, New York City.

Upon motion, the cordial thanks of the Botanical Club were extended to Professor Kellerman for excellent arrangements; to the Local Committee of the Association for badges, and to the authorities of the Ohio State University for many courtesies enjoyed.

It was remarked by Dr. Britton that the twenty-seven titles of papers presented before the Botanical Club, those before Section G and those presented before the Botanical Society of America show a greater number than in any other science represented at the meeting. This he thought was an augury of widespread botanical activity; it also indicates that but for the affiliated societies Section G would have been overwhelmed.

On motion, the Club adjourned to meet at 9 o'clock Tuesday morning of the next meeting of the American Association for the Advancement of Science.

A. D. SELBY,
Acting Secretary.

THE AMERICAN MICROSCOPICAL SOCIETY.

THE twenty-first annual meeting of the Society was held in Columbus, Ohio, August 17th, 18th and 19th; and, though not largely attended, it was an occasion of good fellowship and enthusiasm.

Among the papers read and discussed were the following: An Expedient in Difficult Resolution, by R. H. Ward, Troy, N. Y. The Relation of Cancer to Defective