to computations for excavations and embankments of railroads and canals, and the method of using the prismoidal formula by means of corrections applied to the volumes as determined from average end areas is developed at length. It is to be regretted that the author uses the Latin word formulæ instead of the English word formulas. M. M.

SCIENTIFIC JOURNALS.

Botanical Gazette, October: Mr. J. H. Schaffner, in a paper on 'Karyokinesis in the root tips of *Allium Cepa*,' states that he finds the root tips of *Allium Cepa* very valuable objects for the study of nuclear division. The details he illustrates upon two handsome plates, because, he says, "accounts and figures of karyokinesis in plant cells are very scarce, and the so-called diagramatic or schematic figures and descriptions given in most text-books are but a poor guide for the student and young investigator." A student of Mr. Schaffner's, Mr. Edward L. Fulmer, writes on the 'Cell division in pine seedlings,' illustrating the process by two plates. Mrs. Fannie D. Bergen continues, in two installments, her list of 'Popular American Plant Names.' These papers are reprinted from the *Journal of American Folk Lore*. Dr. Byron D. Halsted has a short discussion of the newer aspects of botany, especially the ecological ones. The paper summarizes some remarks before the National Educational Association at Washington. Dr. C. F. Millspaugh contributes 'Notes and new species of the genus *Euphorbia*,' illustrated by his admirable figures. A biography of Joseph F. Joor, with portrait, and a short sketch of the DeCandolle family are written respectively by Mr. J. B. S. Norton, of the Missouri Botanical Garden, and Dr. G. E. Stone, of the Massachusetts Agricultural College. Mr. Clarence J. Elmore has studied the question of polyembryony in certain wild species of *Allium*. He finds the contents of the embryo sac exceedingly variable, the frequent absence of antipodals being especially noteworthy. In Open Letters, Dr. Robinson disavows responsibility for 'The American Botanist,' which was dated without authorization from the Gray herbarium; and Mr. Cockerell has a short letter on the nomenclature of *Eschscholtzia Mexicana* and *Philibertella heterophylla*. Reviews are given of Barnes's 'Plant Life;' Britton and Brown's 'Illustrated Flora,' volume three; 'The Ninth Report of the Missouri Botanical Garden;' part two of Durand and Schinz's 'Flora of Africa;' Courchet's 'Text-book of Botany,' and Schneider's 'Guide to the Study of Lichens.' Twelve pages of Minor Notices of books and papers, Notes for Students, and News complete an unusually varied number.

SOCIETIES AND ACADEMIES.

BIOLOGICAL SOCIETY OF WASHINGTON—295TH REGULAR MEETING, SATURDAY, OCT. 22.

Dr. T. S. Palmer mentioned the reported occurrence in Patagonia of a living representative of the extinct Mylodons.

Mr. G. H. Hicks exhibited specimens of *Pinus torreyanus* and spoke of its extremely restricted distribution.

Dr. J. N. Rose presented a paper on his 'Proposed Arrangement of the subfamily Agaveæ,' stating that it was partly based on his four months' study of the group in its home in Mexico. The paper, which was illustrated by specimens, photographs and drawings, was particularly interesting from the fact that living types of all the genera were shown.

Mr. F. A. Lucas spoke on 'The Fossil Bison of North America, with description of a new species' for which the name *Bison occidentalis* was proposed. The horn cores of this species were of moderate size, although much larger than those of the existing species; their circumference at base was equal to, or slightly greater than, length along upper curve; they were sub-cylindrical in section and regularly curved upward and backward. The type from Fort Yukon was No. 4047 of the collections of the U. S. National Museum. The species was readily distinguished from *B. antiquus*, with which it had been confounded by the fact that in *antiquus* the horns stood at right angles to the longitudinal axis of the skull and were not directed backwards.

Mr. A. J. Pieters read a paper on 'Problems of Aquatic Vegetation,' stating that aquatic plants, especially the unicellular algæ, are the primary source of food supply in the lakes. The relation between the higher plants and the low

forms that feed on them are but imperfectly understood, although we know that millions of minute animals and plants make a home among *Characeæ, Naias* and other phanerogams.

The effect of the growth and decay of the larger plants upon the algæ is probably of much importance, but definite information is wanting. Our conception of the relation between the phanerogams, the medium in which they grow, and the bottom may be somewhat changed if the experiments of Hochreutener on the flora af Lake Geneva can be confirmed. He found that the species studied absorbed eosin solution much more readily by their roots than by their leaves. If this proves to be true the study of bottom samples will be more important than before.

The most important problem in fresh-water algology is the study of the rate of growth of unicellular forms, and all the questions necessarily connected with this.

Specimens were shown that illustrated the effect of depth and local conditions of environment on the habit of species. Rootstocks, tubers and bulbs were shown and attention was called to their importance in the questions concerning the propagation and reproduction of aquatics.

Mr. Gilbert H. Hicks read a paper on 'The Effect of Certain Fertilizers on the Germination of Seeds.' Attention was called to the losses which often result in practical farm operations from the failure to secure a 'stand' of certain crops, due to the excessive or improper use of chemical fertilizers which often prevent or retard the germination of the seeds.

The paper was based upon experiments conducted in one of the greenhouses of the Department of Agriculture upon seeds of wheat, lettuce, radish and crimson clover. In one series of greenhouse 'flats' seeds were planted in rows directly in contact with the chemical; in another series the upper stratum of soil was mixed with the same amount of chemical used in the previous case and the seeds were planted in this stratum; otherwise the conditions of growth were exactly the same. Checks were also conducted at the same time. The plant food elements—nitrogen, potash, phosphoric acid and lime—were used in the forms of nitrate of soda, muriate of potash, dissolved bone black and powdered oyster shells. In addition to these a 'balanced' fertilizer, consisting of a mixture of the above ingredients, was employed.

The experiments proved to be of much interest and appeared to warrant the following conclusions:

1. That muriate of potash and sodium nitrate used as fertilzers in strengths of one per cent. or more are very detrimental to the germination of seeds, whether applied directly or mixed with the soil.

2. That fertilizers composed of phosphoric acid or lime are much less injurious to germination than sodium nitrate or muriate of potash, and if not used in excess may be harmless.

3. That commercial fertilizers should not be brought into direct contact with germinating seeds.

4. The effect of treating seeds with chemicals before planting is no index to the action of those chemicals when applied as manures to the soil.

5. That the chief injury to germination from chemical fertilizers is effected upon the young sprouts after they leave the seed coat and before they emerge from the soil, while the seeds themselves are injured only slightly or not at all.

6. It is highly improbable that potash, phosphoric acid, nitrogen or lime used as fertilizers actually favor germination.

F. A. LUCAS,
Secretary.

BIOLOGICAL SECTION, NEW YORK ACADEMY OF SCIENCES—MEETING OF OCTOBER 10, 1898.

IN the absence of Professor Wilson, Professor Osborn in the chair.

Professor Osborn referred to the loss sustained by the Academy and the biological sciences in general through the death of Professor Baur, of Chicago, and Dr. Arnold Graf, of New York.

Following the usual custom, the meeting was devoted to reports given by various members of their summer's work.

Professor Osborn described the different museums which he visited in Europe, giving a brief account of the good and bad points of each. At Stuttgart he saw a unique and undescribed fossil, *Hyrax*, which Professor Fraas very generously gave him the pleasure of describing. The

description was presented at the meeting of the British Association in Cambridge.

Professor Osborn was followed by Professor Britton, who gave a *résumé* of the work accomplished during the summer on the building and grounds at the Botanic Garden in Bronx Park.

Professor Dean reported on a few results on the embryology of the Hag Fish, which he thinks is similar to that of the shark. He also described the appearance of a Central African Lung Fish (*Protopterus*), which was sent to him in a ball of dried mud.

Dr. O. S. Strong and Mr. H. E. Crampton reported briefly of the nature of the work accomplished at the Marine Biological Laboratory at Woods Holl, bringing out particularly the fact of the cordial relations between the Fish Commission investigators and those of the Laboratory.

Mr. N. R. Harrington related some interesting experiences in connection with his expedition to the Nile valley in quest of *Polypterus bishir*. The expedition, which was made possible by the generosity of Mr. Chas. H. Senff, was undertaken by Mr. Harrington and Dr. Reid Hunt. As guests of the Egyptian government they enjoyed unusual advantages in securing their ends, but only after repeated trials and discomforts and many disappointments did they finally get the fish.

Other brief reports were made by Professor Lloyd (on the botanic gardens of Germany), Dr. Brockway and Mr. Calkins.

Gary N. Calkins,
Secretary of Section.

GEOLOGICAL CONFERENCE OF HARVARD UNIVERSITY, OCTOBER 11, 1898.

Mr. A. W. Grabau opened the work for the year with a paper on 'Some Methods of Stratigraphical Field-work.' He illustrated practical suggestions on collecting fossils and measuring sections by cases drawn from his detailed study of the Eighteen Mile Creek section, New York. Mr. J. R. Healy described the features studied by the Harvard mining class during its summer visit to the Lake Superior mining region. The party examined the underground workings of thirteen mines, and the open-cut workings in the extensive iron-ore deposits of the Mesabi Range.

OCTOBER 18, 1898.

Dr. F. P. Gulliver delivered a paper on the 'Physiography of the Ural Mountains, and illustrated it with numerous lantern views. The Great Plain of Russia, a plain of denudation, rises gently and constantly from the center of the country into the Urals. It has been traced upon the folded and faulted Devonian strata of the outer ranges, and also upon the more intensely plicated Carboniferous beds and upon the granite of the Central Urals. In addition to this, Dr. Gulliver observed remnants of peneplains at two other distinct levels. The relative attitudes of these levels indicate, first, that the Ural Mountains have been elevated as a whole in the form of an arch with a north-south axis; and second, that this elevation, and the dissection consequent upon it, occurred in at least three distinct stages.

The physiographic features noted on the western side of the continental divide are repeated on the eastern side, with the addition of a steep fall-off from the Ilmen Mountains to the great Siberian peneplain. Richtofen holds that this is a sea scarp cut by the same sea that carved the Siberian plain. Others believe that it is a fault scarp which marks the disjointing of the Siberian plain from one of the upper levels of the Urals.

J. M. Boutwell,
Recording Secretary pro tempore.

NEW BOOKS.

The Psychology of Peoples and its Influence on Their Evolution. New York, The Macmillan Company. 1898. Pp. xii + 236.

The Fishes of North and Middle America. David Starr Jordan and Barton W. Evermann. Washington, Government Printing Office. 1898. Part 4. Pp. xxx + from 1241–2183.

Laboratory Exercise in Anatomy and Physiology. James Edward Peabody. New York, Henry Holt & Co. 1898. Pp. x + 79.

Observations of the Planet Mars during the Opposition of 1894–95, made at Flagstaff, Arizona. Percival Lowell. Annals of the Lowell Observatory, Vol I. Boston and New York, Houghton, Mifflin & Co. 1898. Pp. xi + 391.