Two wholly new chapters have been added, viz., the 'Nature of the Alternation of Generations,' and 'Fossil Archegoniates.' The whole number of pages in the earlier book is 544, while in the present volume it is 657. So, too, there are 266 figures in the old book, and 322 in the new. The amount of enlargement of the bibliography may be estimated from the fact that it covers 13 pages in the first edition, and more than 23 in the second.

In his closing chapter, the author presents a revision of the summary and conclusions of his earlier book. Briefly, he now holds that the archegoniate series began in the green Algae near *Coleochaete;* that the Liverworts are the most primitive of existing archegoniates, and that other groups have descended from them. The peculiar chromatophore of Anthocerotaceae possibly suggests the independent origin of this group, and this with other structural facts requires that they be accorded higher rank than heretofore, possibly that of a class coordinate with 'Liverworts on the one hand and the Mosses on the other.' Pteridophytes still consist of three classes, all evidently related to the Anthocerotes, but representing entirely different lines of development. The eusporangiate ferns are regarded as the lowest of the *Filicinae;* Hymenophyllaceae, while of pretty ancient origin, are regarded as an aberrant group; and the *Polypodiaceae* constitute the modern fern type. "That heterospory arose in a number of widely remote groups is unquestionable." This suggests the possibility of a multiple origin of the spermatophytes. "Except for their siphonogamic fertilization, Gymnosperms are much nearer the Pteridophytes than they are to the Angiosperms." "The close resemblance between the Conifers and the Lycopods, especially *Selaginella,* probably points to a real relationship." Cycads are regarded as descended from fern-like ancestors. While the position of *Isoetales* is still in doubt, it is regarded as possible that the Angiosperms may have arisen from them.

This edition without question must prove to be as helpful and suggestive as the one it supplants, and will be used by all students who wish to obtain a clear notion of the structure and relationship of higher plants.

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SCIENTIFIC JOURNALS AND ARTICLES.

The first article in the September number of the *American Geologist*—'Pleistocene Features in the Syracuse [N. Y.] Region,' by Professor H. L. Fairchild—was prepared for the field program of the meeting of Section E of the American Association for the Advancement of Science at Syracuse last summer and is illustrated by two plates. Professor Charles S. Prosser contributes a paper entitled 'Notes on the Permian Formations of Kansas.' The recent investigations concerning the age of the upper Paleozoic formations of Kansas are reviewed and it is shown that the European and American geologists who have studied the subject most carefully in recent years correlate them with the Permian. 'The Atlantic Highlands Section of the New Jersey Cretacic' is described by Mr. J. K. Prather and is illustrated by three plates. Professor William H. Hobbs publishes 'Contributions from the Mineralogical Laboratory of the University of Wisconsin.' It consists of a description of minerals from various localities, illustrated by one plate of metallic copper from Soudan, Minn., and figures of other minerals.

The leading article in the September-October number of the *Journal of Geology* is by Professor Rollin D. Salisbury on 'The Mineral Matter of the Sea, with some Speculations as to the Changes which have been involved in its Production.' Dr. Reginald A. Daly contributes a paper on 'The Classification of Igneous Intrusive Bodies,' which is illustrated by nine figures. Mr. J. K. Prather describes 'Glauconite' from the (Cretaceous) Greensands of New Jersey and gives a plate of photomicrographs. 'The Mesozoic of Southwestern Oregon' is described by Mr. George D. Louderback. The rocks are called the Myrtle group or series and the Dillard series. Their lithologic characters, economic relations and areal distribution are well de-

scribed and an interesting comparison is made with 'the standard California type formations.' The concluding paper, the 'Arapahoe Glacier in 1905,' is by Professor Junius Henderson.

The American Naturalist for October contains articles on 'A Peculiar Variation of *Terebratalia transversa* Sowerby,' by H. W. Shimer; 'Studies on the Plant Cell, VIII.,' by Bradley M. Davis; and '*Diadasia* Patton; a Genus of Bees,' by T. D. A. Cockerell. The article on the plant cell is the final one of the series and it is noted that the author has a number of complete sets of reprints, and that enquiries concerning them may be addressed to him at the University of Chicago. Professor Cockerell's article includes a table for the identification of all the species of the genus.

The Museums Journal of Great Britain for October has for its leader an article on 'Local Museums,' by J. Willis Bund, one of several papers dealing with this subject that were read at the last meeting of the Museums Association. The matter is one that should be specially commended to the attention of our schools and colleges, local museums being all too rare in the United States, where much time and effort is thrown away in the attempt to make a small museum cover the universe instead of devoting its energies to the immediate locality. Among the notes American readers will blush to find the prominence given to some comparatively recent occurrences at the Metropolitan Museum of Art.

THE closing (October) number of volume 6 of the *Transactions of the American Mathematical Society* contains the following papers:

MAURICE FRÉCHET: 'Sur l'écart de deux courbes et sur les courbes limites.'

JOHN EIESLAND: 'On a certain system of conjugate lines on a surface connected with Euler's transformation.'

L. P. EISENHART: 'Surfaces of constant curvature and their transformations.'

N. J. LENNES: 'Volumes and areas.'

E. O. LOVETT: 'On a problem including that of several bodies and admitting of an additional integral.'

F. R. SHARPE: 'On the stability of the motion of a viscous liquid.'

A. LOEWY: 'Ueber die vollständig reduciblen Gruppen, die zu einer Gruppe linearer homogener Substitutionen gehören.'

W. B. CARVER: 'On the Cayley-Veronese class of configurations.'

This number also contains: Notes and Errata, volumes 5, 6; Table of Contents, volume 6.

SOCIETIES AND ACADEMIES.

THE PHILOSOPHICAL SOCIETY OF WASHINGTON.

THE 604th regular meeting was held October 7, 1905, with President Littlehales in the chair.

The evening was devoted to a paper by Professor W. D. Miller, of the University of Berlin, on 'Symbiosis.' He defined symbiosis as a life relationship existing between different kinds of animals or plants, or between animals *and* plants. The relation of the mistletoe to the tree on which it grows, for instance, is a symbiosis. According as advantage or disadvantage accrues to one or the other or to both of the parties concerned the symbiosis is designated as parasitism, commensalism and true or mutualistic symbiotism.

By parasitism we designate that type of symbiosis in which one individual lives at the expense of the other, doing it some harm without making any return; the first being called the parasite, the latter the host. Such is the relation of fleas, lice, bugs, tapeworms, etc., to the human being. By far the most important of this type is that existing between bacteria and the human subject.

By commensalism (*con, mensa*) we designate a symbiosis in which the one party lives from the superabundance or from the crumbs of the table of the other, deriving thereby a benefit from the relationship, but doing no harm and also making no return. In true symbiosis *both parties* derive an advantage from the relationship. Such is the symbiosis between the hermit crab and the sea anemone, between ants and plant lice, etc.

Especial attention was called to the tripartite symbiosis existing between animals, higher plants and bacteria, all animals being dependent upon plants for their food, the higher