ago The Macmillan Company were ready to undertake the publication, but they wanted a ten-volume encyclopedia alphabetically arranged in place of the separate volumes which were an essential part of the proposal. Several leading scientific men, including Simon Newcomb, agreed to prepare volumes, but the cost and then the war led to postponement.

The editor will appreciate the cooperation of all men of science who approve the plan of making an *Encyclopedia of the Sciences* that will reflect adequately the great advances and dominant position of modern science. He will welcome suggestions and advice.

J. MCKEEN CATTELL

GARRISON-ON-HUDSON,
NEW YORK

SCIENTIFIC BOOKS

Pflanzen als Gesteinbildner. By JULIUS PIA. viii, 355 pp., 166 tf. Borntraeger, Berlin, 1926.

THE author has a well-deserved reputation as an authority on algae, particularly the fossil calcareous forms that bulk so large in the Alpine Triassic and of which geologists in this country have but a slight realization. Consequently, it is Pia's discussion of the algae which holds the most interest for geologists, paleobotanists and algologists. For all these as well as the general student he has produced a comprehensive, well-illustrated and well-indexed text, which is all inclusive, after the German manner, but, unlike some, this appears to cover the literature very well and to be thoroughly up-to-date.

The general scope and contents may be gathered from the following outline: Following a brief introduction there are chapters on bacteria and the simpler algae, followed by chapters on the higher unicellular calcareous and siliceous algae, a short chapter upon the rôle of unicellular plants in the formation of coal and petroleum, and a long and important chapter on those green, brown and red multicellular algae which form calcareous sediments.

Chapter 7, of over 150 pages, deals with mosses and vascular plants, the resulting sediments being considered under the broad headings "Calcareous" and "Coal." Much space is devoted to a rather exhaustive discussion of coal, its origin and history. This is somewhat discursive, and the author takes occasion to discuss the recent discovery of peat-forming plants in the mid-Devonian, world production of coal, peat bogs, lignite and hard coals, their geologic occurrence, chemistry and by-products. There is much of paleobotanical interest in this part of the book, including accounts of the morphology of the more important plant types from the Paleozoic to the Recent which have contributed to carbonaceous deposits.

Although the author is not exactly synoptic in his treatment, I imagine that the matter presented is exactly what the non-specialist or student versed in but a single aspect of the subject will be glad to have brought together in this convenient form.

Contrasted with the discussion of organic sediments in the "Treatise on Sedimentation," by Twenhofel, and others, published last year under the auspices of the National Research Council, it may be noted that the present work gives a much fuller and more satisfactory treatment in the sections devoted to bacterial action, calcareous and siliceous sediments. The fifty pages devoted to carbonaceous sediments in the American work, is however, much better done than Pia's much longer chapter, which was, perhaps, to have been expected.

The German work has essential bibliographies at the end of each chapter, and the elaborate account that is given of the part played by the lower plants in sedimentary processes will, I imagine, come as a surprise to most American geologists, for, in North America, outside the tropics and except for diatomaceous earth, scattered chara marls, etc., plants have not been recognized as having played such a conspicuous rôle in the formation of non-carbonaceous sediments as they have in Europe.

EDWARD W. BERRY

JOHNS HOPKINS UNIVERSITY

The Salamanders of the Family Plethodontidae. By EMMETT REID DUNN, Smith College Fiftieth Anniversary Publications, Northampton, Mass. xi + 1–441 pp., frontisp., 2 unnumbered pls., 86 figs. (distribution maps). 1926. $6.00.

SINCE the appearance of E. D. Cope's "Batrachia of North America" in 1889, there has appeared no synoptic work on the amphibia of this continent save the check lists by Stejneger and Barbour in 1917 and 1923. The numerous individual researches on American amphibians during the past thirty-seven years have resulted in the accumulation of a relatively large mass of literature, never adequately digested. Dunn's monograph of the Plethodontidae now fulfils this need so far as one important group is concerned, and in addition gives us much new information obtained by the author himself.

The Plethodontidae, as here considered, include fifteen genera and eighty-six species and subspecies of lungless salamanders, most of which are also gill-less after hatching. Most of the species occur in North America, either east of the Mississippi River or west of the Sierra Nevada-Cascade ranges. Thirty species of the Genus *Oedipus* occur in Central America and

northern South America, as far as Bolivia and Venezuela, while one isolated species (*platensis*) of the otherwise Californian genus *Ensatina* occurs in La Plata. Two species of *Hydromantes* in Italy and Sardinia constitute the only known Old World species, these being considered cogeneric with a species (*H. platycephala*) of the central Sierra Nevada.

The introduction (pp. 1–57) is an extensive discussion of general problems relating to the group.

For each species a complete chronological synonymy is given, including not only taxonomic, distributional and life history items but many references on embryology and morphology as well. In turn follow the type, type locality, range, diagnosis, formal description, comments on variation, measurements and habits, and often a paragraph discussing the relationships of the form under consideration. Habits are quoted *in extenso,* from all available sources, a feature to be strongly commended as making fairly complete accounts available to isolated students. A detailed list of localities and a map showing the range closes each chapter.

Espada's plate of *Ensatina platensis* (An. Soc. espanola Hist. Nat. Vol. IV) is reproduced as a convenience to other workers in the group.

There are few taxonomic novelties, as most of the changes in names or generic affiliation have already been announced in shorter papers by the author, and the essence of the grouping here presented has already appeared in Stejneger and Barbour's "Checklist." *Oedipus gadovii* Dunn (p. 437) from Xomelta on Mt. Orizaba is the only new form described. The author has studied at first hand all but one of the species, handling in all more than 12,600 specimens. The monograph represents ten years of labor upon a group in which relationships were by no means clear.

The only criticisms which might be levied against the book relate to certain mechanical features. A full bibliography would have been very helpful; searching for obscure references from a synonymy is not altogether easy. The table of contents relates only to genera and there is no index, in consequence of which the reader must hunt laboriously page by page for certain items. Only two unusual species are figured; outline or colored figures of at least generic types would have added greatly to the usefulness of the work. But dismissing these details, the reader finds excellent typography, a pleasing style and a wealth of interesting material. The book will long serve as the standard work of reference on its subject. Dr. Dunn and Smith College are to be congratulated on a worthy contribution.

TRACY I. STORER

UNIVERSITY OF CALIFORNIA,
DAVIS, CALIFORNIA

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A TECHNIQUE FOR ARTIFICIAL FEEDING OF SANDFLIES (PHLEBOTOMUS) AND MOSQUITOES[1]

IN the course of experiments carried on by the Kala Azar Field Studies Unit,[2] Peking Union Medical College, in the attempt to transmit kala azar by means of various species of Phlebotomus, it was found that one species, *P. sergenti,* only rarely developed the flagellates of Leishmania following natural feeds on infected animals. In attempts to overcome this difficulty advantage was taken of the fact that sandflies may drink liquids offered them (Waterston,[3] 1922) and a technique was devised for feeding them rich suspensions of Leishmania.

The apparatus consists of a short length of glass tubing, in one end of which is a cork vise for holding the sandfly. In the other end is a snugly fitting cork sphere drilled to hold the feeding pipette. This permits easy adjustment of the pipette in applying it to the insect's proboscis. The cork vise and pipette holder may be turned from ordinary cork stoppers. Our apparatus was made with the aid of lathe, tool-rest and chisel improvised, respectively, from a small electric motor, the arm of a dissecting microscope and a 45-degree scalpel. Both vise and holder are turned to fit individual pieces of glass tubing. The sharpened ends of a strip of sheet brass bent double are thrust into the newly turned cork and fastened as shown. The cork is then cut longitudinally with a razor, forming the two jaws of the vise. The vise, which is kept open by the spring when free, is held securely closed when thrust into the glass tube. The vise end of the tube should be flamed, but the other end should be left unflamed, as any constriction would compress the pipette holder, which must fit tightly when in position with the tube.

Success in feeding sandflies is dependent on having the tip of the pipette properly made. It is essential that the opening be just large enough to admit the piercing stylets but small enough to exclude the labium, which is pushed back like a sleeve by the pipette. Each of the three Chinese species of Phlebotomus (*P. sergenti, P. major* var. *chinensis,* and *P. perturbans*) requires a different size of opening, within rather narrow limits for each. The

[1] Aided by grants from the China Medical Board of the Rockefeller Foundation.

[2] Charles W. Young, M.D., in charge.

[3] Annals Trop. Med. and Parasit., Vol. XVI, p. 69. 1922.