worthy of serious study by those who have tabular data to publish, not only because it may be less expensive but also because it avoids all possibility of printer's errors and saves much time usually devoted to proofreading. I have been interested in this method for many years and have used it successfully in several instances, though not recently. A red copying paper used instead of black carbon paper proved just as satisfactory in the reproduction and the red copy was not easily soiled by accidental smudging. Carbon copies may be fixed with shellac solution or similar material. The difficulty of the typist not being able to see the copy as it is being made without use of ribbon can be satisfactorily avoided if certain makes of carbon paper are employed, the type impressions being faintly legible on the reverse of such papers. For one form of typewriter, frequently used by scholars, it is (or was a few years since) possible to secure rolled strips of carbon paper much like the regular ribbon, to be used in place of the latter. The same make of machine controls the type blow by means of a spring, so that perfect uniformity of impact is secured, no matter how the keys are struck, and it has interchangeable type shuttles, allowing the use of many sizes and styles of type and types of many languages. A ribbon may be used instead of copying papers without bad results if a large type is employed and the photographic reduction is great, for the "fringes" practically disappear with such reduction. In such cases a red ribbon has proved better than most black ones. A clearly typed page eight and a half inches wide may be perfectly reproduced as a zinc etching two inches wide or even still narrower and the reproduction is legible without the use of a lens. A reduction to three inches in width is perfectly satisfactory when ordinary typewriter type is used. Tabular matter prepared by hand, by a good draftsman using India ink, is even more satisfactory than typewritten copy and it will bear very great reduction. Erasures on the copy may be made by means of "white ink" (white water-color) but one must make sure that the material used photographs as white; some of the white inks on the market reproduce as black and their use in this way is disappointing. As has been mentioned by others in earlier contributions to this discussion, slight alterations are satisfactorily made by means of paper slips pasted on to the copy.

Those who are interested in this method of publication may be interested in the following references, in which examples of tabular matter thus reproduced may be found. Plant World **17**: 345 (1914); *ibid.* 19: 287 (1916); Physiol. Res. **2**: 341 (1921).

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SINCE my first note, in the issue of December 31, 1926, I have learned that the photographic reproduction of typewriting has been used quite extensively by the Carnegie Institution of Washington. For the marked success attained in printing by this method see, for example, Lehmer's "List of Prime Numbers," his "Factor Table of the First Ten Million Numbers" and Stager's "A Sylow Factor Table of the First Twelve Thousand Numbers."

During the printers' strike in New York a number of years ago several popular magazines were published by the photographic reproduction of typewriting—however, under conditions of incomplete development as to methods, equipment and personnel. The sphere of usefulness and limitations of the method, which is not well known to scientists though likely to prove of great importance to them, would probably be fairly well brought out if the experiences of those who have used it were put on record.

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ENCYCLOPEDIA OF THE SCIENCES

THE undersigned has arranged for publication through The Science Press of an *Encyclopedia of the Sciences*, which is planned to be a survey of science as complete as can be made. It appears that the large encyclopedias, such as the "Britannica," must sooner or later be divided into separate works treating the main lines of human interest and that the alphabetical arrangement must give place to a classification by subjects. The *Encyclopedia of the Sciences* will consist of more than one hundred separate volumes, each treating a special subject but together forming a systematic and completely indexed review of modern science. Such a series of volumes permits each to be published promptly when ready and to be revised when desirable. It also makes possible the purchase of a single volume, the volumes concerned with a special science or the entire work.

It is planned to publish volumes giving general surveys of each of the principal sciences—mathematics, mechanics, astronomy, geophysics, physics, chemistry, mineralogy, geology, geography, meteorology, paleontology, general biology, botany, zoology, physiology, anatomy, bacteriology, pathology, psychology and anthropology. These will be followed by volumes on the different departments or divisions of these sciences. There will also be volumes on the history of each science, with biographical sketches of scientific men. The question of the inclusion of the applied sciences and of subjects such as education, history, economics and philosophy is left open.

The plan of an *Encyclopedia of the Sciences* has long been under consideration. About twenty years

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

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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