

pharmacy, a renaissance, it may be remarked, that the author has had much to do in stimulating and fostering. With high ideals of professional duty, he was expected to treat his subject honestly, which he has done to a degree that quite meets the possibilities of the situation. The method followed, for the most part, is that of first presenting his subjects, then following each with its applications in pharmacy.

Eighty-one pages are devoted to an introduction to the principal groups of plants. Greater simplicity could scarcely be found consistent with the degree of concentration required. It is an encouraging sign when pharmacy students can be expected to submit gracefully to such an introduction to their botanical course and when boards of trustees will permit it. The economic relations of the groups are briefly discussed.

The "Outer morphology" of angiosperms is treated in sixty pages, and is accompanied by much excellent elementary physiology. This division of the work is far less commendable than other chapters. Nearly all the descriptive botany that the book contains is found here, and it is inadequate even for the interpretation of the following crude drug descriptions—wholly so for that of the chapters on "classification of angiosperms." The illustrations, apparently from photographs of dried specimens, are most unfortunate. Many of them, even where venation is to be illustrated, are mere smudges. The author adopts the broad interpretation of the term "flower" that has had its day in application to flowerless as well as to flowering plants. The essential characteristic of the flower as being a reproductive organism that supplies a special soil for the germination of the microspore, and for the growth and development of the male gametophyte, is not hinted at, and is indeed necessarily denied by the definition adopted. Notwithstanding this fact, it is found impossible, farther on, to avoid an incidental reference to this fundamental truth. Again, the artificial denial of the nature of the sporophyll as a leaf homologue, which has been so laboriously constructed by morpholo-

gists of recent decades, in the face of almost all natural evidence, is here adopted.

The sixty-three pages devoted to histology, under the title "Inner morphology," is most creditable. The language is simple and exhibits that clearness which bespeaks familiarity, and the illustrations are excellent and well selected. The 132 pages devoted to classification of angiosperms yielding vegetable drugs does not justify its title. The families are enumerated in order, with the drugs pertaining to each, but by no stretch of courtesy can this be called a classification. The condensation of this matter, in immediate connection with the study of drugs in the second part, Pharmacognosy, would have been more natural from the student's standpoint, and really helpful, which now one finds great difficulty in admitting.

Nearly 400 pages are devoted to pharmacognosy, the application of the matter of the first part to the study of drugs. About one fourth of this space is taken up with the subject of powdered drugs. In this entire part, special means are employed to simplify the work of actual identification, and the general discussions and instructions for procedure are admirable.

Altogether, Professor Kraemer's book is probably the most comprehensive and valuable of its kind that has yet appeared.

H. H. RUSBY

The Cambridge Natural History. Edited by S. F. HARMER and A. E. SHIPLEY. Vol. I., including Protozoa, Porifera, Cœlenterata, Ctenophora and Echinodermata. Pp. 671, 296 figures. London: Macmillan & Co.; New York: The Macmillan Co. \$4.25.

To have four very interesting groups of lower animals treated in one volume is to have none of them satisfactorily handled, and in the present volume of this important series we feel the limitations that have been set the various contributors. The different divisions are unevenly balanced as to both matter and substance, and in two of the divisions at least, the impression is gained that the author had

mainly a book knowledge of the group he was monographing.

The section on Protozoa written by Marcus Hartog has a great deal of interesting matter, and the various physiological activities of the unicellular animals, such as digestion, secretion, etc., and the relations of nucleus to cytoplasm and the like, are considered in a broad and suggestive way. The fact that the treatment in all such matters is strongly colored by this author's often unique ideas is only to say that it was written by Professor Hartog, and, although always interesting and on the surface convincing, the generalizations can not always be accepted. We meet again the time-worn discussion on spontaneous generation (gotten up apparently to controvert Bastian's recent outburst), and on animals and plants, but we do not find sufficient emphasis on the more important modern features that are characteristic of the protozoa, such as the physiological importance of the life cycle and the morphological importance of chromidia and nucleus.

The section on sponges by I. B. J. Sollas is not as well written as the other sections and the meaning is frequently hidden in obscurity of the construction. The classification adopted is that of W. J. Sollas and Bütschli, Minchin and Maas are followed in assigning the Porifera to the division Parazoa, apart from the other metazoa and from the protozoa. Morphology and relationships of the spicules are carefully worked out, but we find very little on sponge development. This section is full of matters of popular interest, examples of which are afforded by the suggestion of the therapeutic value of the common house sponge on account of its iodine, and a popular description of the origin of flint.

The account of the Cœlenterata and Ctenophora by S. J. Hickson is little more than a list of families and can scarcely be described as interesting reading. The monotony of almost straight taxonomy is broken a bit by a discussion of corals and coral islands, but the work for the most part is devoid of general interest. With all the valuable and biologically interesting data afforded by the

cœlenterates we feel that Professor Hickson has lost here an opportunity to present a readable account of one of the most fascinating groups of invertebrates.

E. W. MacBride has given a much more general account of the Echinodermata, although here, too, a wealth of biological facts has scarcely been touched, while details of structure fill page after page. The group is taken up somewhat differently than is customary in that the Asteroidea are regarded as the most primitive of the echinoderms, while the Holothuroidea are considered as a continuation of the same line of development that led to the Echinoidea. Unlike the other contributors, MacBride has given more embryology, although his account of the development of an echinoderm taken by itself is not full enough to give a clear picture to one unfamiliar with the complicated metamorphosis of these forms.

We do not see why the Echinodermata should be included with the above lower groups of invertebrates unless it is a characteristic devotion to the tradition of Cuvier's Radiata, or indeed, mere expediency. Certainly it seems poor logic to speak of echinoderms as intermediate between cœlenterates and higher invertebrates (page 428) and then to point out the probable common ancestry of Echinodermata and Vertebrata through dipleurula and tornaria larvæ (page 617).

The volume is beautifully gotten up and has a wealth of tables and keys of classification and is invaluable to the student of animal taxonomy although disappointing here in that it will not carry him into genera and species.

G. N. C.

SCIENTIFIC JOURNALS AND ARTICLES

The Journal of Comparative Neurology and Psychology for May contains three papers. The first, "Concerning the Intelligence of Raccoons," by Professor L. W. Cole, is based upon the study of thoroughly domesticated animals which were reared in captivity. They are found to be more docile than cats and able to form much more complex associations, though they are inferior to monkeys. They do not imitate their fellows, but learn various