

eral position seems sound and exceedingly sensible. On the other hand, what he has to say about probability, induction, or the theory of measurement would not give an uninitiated reader any feeling for the fact that these areas of the philosophy of science are full of exact results and specific unsolved problems. There is also, it seems to me, a disproportionately detailed discussion throughout the book of the relevance for scientific method of recent results in mathematical logic in comparison with the discussion of corresponding results in mathematical statistics.

PATRICK SUPPES
*Applied Mathematics and Statistics
Laboratory, Stanford University*

Principles of Field Biology and Ecology.

Allen H. Benton and William E. Werner, Jr. McGraw-Hill, New York, 1958. vii + 341 pp. Illus. \$6.50.

By approaching ecology from three directions—as a field study, as a taxonomic challenge, and as an economic problem because of man's biasing effects—Benton and Werner demonstrate a close relationship between the various principles described. A surprising amount of space is given to a clear account of the development of field biology in America, a topic usually neglected in any volume dealing with population dynamics and ethology. The concluding chapters, on the use of biological literature and on the choice and conduct of a field problem, will be helpful to advanced undergraduates and beginning graduate students.

The references following each chapter and a glossary of terms used in the book offer assistance and make the text matter itself more lively and interesting.

LORUS J. MILNE
MARGERY MILNE
*Department of Zoology,
University of New Hampshire*

Morphology of Plants. Harold C. Bold.

Harper, New York, 1957. xxiii + 669 pp. Illus. \$8.

This textbook organizes in one volume a survey of the whole plant kingdom. To cover this great diversity the author has adopted the "type method"—that is, the use, for each major group, of illustrative types for detailed study. Wherever possible the types are genera that are readily obtainable. Bold admits that there will be inevitable disagreement about emphasis and choice of types, but on the whole he seems to have made an excellent selection.

In format the volume is neat and attractive. In general, each major group of plants is dealt with in one chapter, which comprises an introduction or description of the general features of the groups, followed by detailed coverage of representatives. Coordination of the diverse subjects is accomplished largely by recapitulations and summaries. The greater part of the book concerns living plants. The treatment of fossil plants is concentrated in a single chapter, "Plants of the past," which is presented after all the living forms have been discussed. Although this approach has the disadvantage of separating the fossils from their nearest living relatives, it has the advantage of serving as a review and synthesis of the plant groups. It can also serve mechanically to bring all the fossil forms together in the laboratory.

The author has relied more heavily than the writers of conventional texts on photographic illustrations. Many of those that are included are good, but unfortunately many are only fair—either not clear or out of focus. More labeling might improve some of the photographs and drawings and increase their effectiveness.

A very useful appendix (pages 621–652) describes procedures and devices for preparing laboratory materials and adds much to the value of the book. It is Bold's belief that living materials are indispensable for good teaching. I believe that many teachers have a need for instruction, however, if this high ideal is to be achieved. The author has met this need by providing numerous tips on techniques, many of them original. Another pedagogically desirable innovation, in my opinion, is the providing of derivations of scientific names from the Greek or Latin roots.

My major criticism is that the number of plant divisions (the phyla) has been increased to approximately double that taught by most teachers. Bold has made a radical (called "conservative") classification that treats vascular plants, for example, in nine separate divisions—Psilophyta, Microphyllphyta, ArthropHYta, Pterophyta, Cycadophyta, Ginkgophyta, Coniferophyta, Gnetophyta, and Anthophyta. He holds that evidence of ultimate interrelationships of these assemblages, especially among land plants, is so tenuous that they must be considered as polyphyletic.

One may argue that not enough attention has been given here to efforts of phylogenists and taxonomists to detect and correlate not only differences but resemblances as well, and to weigh them justly. I really wonder whether the beginner in morphology has the necessary equipment to evaluate, on so little evidence, the propriety of the various "phylogenetic speculations," or whether an

elementary textbook such as this one is the appropriate arena for such discussion.

The author, obviously, has not tried to avoid controversy in his presentation. This is evident again, for example, in his dealings with the interesting idea that seed plants are homosporous. There is no question in my mind that the text will stimulate both the teacher and the student. The style of writing is good, the book is interesting, and the text, in general, seems to me to be superior. Teachers will undoubtedly find the book a most valuable text, and it is probable that biologists in other fields will find it a useful and handy reference to general plant morphology.

WARREN H. WAGNER, JR.
*Department of Botany,
University of Michigan*

De l'actinie à l'homme. vol. 1, *Anticipation et mémoire*. Bases de l'évolution psychique. Henri Pieron. Presses Universitaires de France, Paris, 1958. viii + 306 pp. F. 1600.

Henri Pieron (1881—), who began his psychological writing just after the turn of the century, has been the leader in experimental psychology in France for the past 40 years. He inherited Binet's laboratory at the Sorbonne and Ribot's chair in the College of France and has been editor of *l'Année* since the 1920's. These important positions have enabled him to experiment, to lecture, and to publish extensively. This latest book, *De l'actinie à l'homme*, volume I, is a collection of 33 of his articles taken from 17 different journals, all French except one—a 1938 Russian journal of physiology. The dates of the articles range from 1907 to 1946, only four having appeared after 1916.

The collection is arranged in four parts: the first pertains to methodological problems of an objective psychology; the second, to studies of rhythms of behavior in sea anemones, certain Crustacea, and man; the third, to studies of mnemonics or cues for homing and direction orientation in mollusks and ants; and the fourth, to studies of memory in mollusks and to some general observations on animal memory. Each part begins with a brief introduction that has as its goal the tying together of the different parts in such manner as to show that anticipation (revealed by rhythms of behavior) and memory are the evolutionary bases of mind. I am not enthusiastic about this aspect of the volume, for while the book thus provides in one place many facts about animal behavior, it does not make clear which of the connections that Pieron sees are his own