Book Reviews

Visual Aids in Geology

John Wiley & Sons are preparing a set of approximately 250 Kodachrome slides to illustrate the revised edition of the *Textbook of geology*, Part I: *Physical geology*, by the Yale authors, Chester R. Longwell, Adolph Knopf, and Richard Foster Flint. The new edition is due August 15, but it is expected that the visual material may be ready even earlier.

Most of the photographs were taken by O. E. Childs, assistant professor of geology at Colgate University, who has already prepared a set of color illustrations on general geology, as well as on historical geology, for Educators Visual Aid Service at Ann Arbor, Michigan. To secure photographs that will adequately cover so vast a subject, Childs traveled from Maritime Canada to California and from Montana to Georgia. Not content with ground shots alone, he took to the air in several parts of the country to provide broader vistas of landforms and shorelines which cannot ordinarily be encompassed from a single vantage point on the ground. Supplementing Childs' collection of photographs are pictures taken by the authors and by a few other geologists who have had exceptional opportunities to photograph special features like Parícutin.

At this date the selection of views is neither final nor complete, but gaps are being rapidly filled in. Some subjects in geology are notoriously difficult to illustrate, and in the preliminary set of photographs the authors and publisher have not yet mastered the problem of balance, which baffles every teacher and textbook writer in the field. Only a few diagrams will be included, but the text itself is the proper medium for diagrammatic material, and color slides may appropriately exploit the field in which the text is helpless, namely, in giving the most realistic impression possible of what landforms, structures, geologic agents in action, rocks, and minerals actually look like in nature.

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Visual Aids in Biology

General biology. (3rd ed.) J. W. Mavor. New York: Macmillan, 1947. Pp. x + 986. (Illustrated.) $5.50.

Laboratory exercises in general biology. (3rd ed.) J. W. Mavor. New York: Macmillan, 1947. Pp. xiv + 333. $3.25.

Slidefilm series to accompany general biology. New York: Macmillan. $15.00.

This college text has proven its usefulness during the life of the previous two editions. The third edition has been enlarged to the point where it is hoped the author will not expand further. There has been a growing tendency in texts at nearly any educational level to approach the content of an encyclopedia. These are excellent for the advanced student but of questionable value to the initiate. Mavor's text has an excellent balance between the quantity and choice of subject material and the overall amount of time that any one college subject can be expected to demand of its students.

The volume is divided into 6 parts and contains, in addition, an appendix of classification. Part 1 deals with the nature of life, beginning with the much-heralded scientific method and devoting most of its 7 chapters to protoplasm, cells, and cellular physiology. Part 2 is devoted to plant life, which it covers in 10 chapters. Part 3 introduces the invertebrates in 8 chapters, and it is to be noted that Dr. Mavor places emphasis upon a few of the phyla—notably the protozoa, the coelenterates, the flatworms, the roundworms, the segmented worms, and the arthropods. All others, including the molluscs, are briefly treated in a single chapter. In Part 4 (10 chapters) we find a discussion of the anatomy and physiology of frog and man. Part 5, on development and heredity, appears in 3 chapters, and Part 6, on the organic world and its evolution, ends the text portion with 6 chapters ranging through ecology, the history of life on the earth, the theory of evolution, the evidences for, and the mechanisms of, organic evolution, and early man.

Dr. Mavor has followed sound teaching policy in the construction of his book. From the student's standpoint, his clarity of style, the black-faced type for important words, the careful organization, the summary topical outline, and the questions at the end of each chapter make it highly desirable both as a source of information and a book easily studied. The diagrams and figures are excellent, and the text has been well illustrated with many photographs. The content is essentially orthodox. Controversial issues which often worry students are left to the instructor, as well they might be in an elementary text.

Published with the text and correlated with it is Dr. Mavor's *Laboratory exercises in general biology.* It is a good laboratory manual as manuals go, but I rather suspect that most of us prefer to run our laboratories according to our own notions and are therefore not as dependent upon laboratory outlines as we are upon a good solid textbook.

Last but not least, Dr. Mavor and the Macmillan Company have pioneered in furnishing 35-mm film strips as visual teaching aids. Teachers will be glad to know that publishers are aware of the need of well-correlated visual material to accompany textbooks. This present approach appears to be experimental, for only three "slidefilms" are available, one on the alternation of generation of plants, one on plant physiology, and one on life through the ages, which is mostly animal in its treatment. These vary in length but present, with titles, about 50 frames.

The two botanical strips, which are well done, depend largely upon drawings and diagrams to present the facts and the concepts. Some of the figures appear in the text, some have been redrawn to change the presentation, and some do not appear in the book at all. The third, on life through the ages, is largely material that does not appear in the text. Each film is designated to accompany a specific chapter or chapters in the book.

It is hoped that more of these visual aids will become available, and it is presumed they will if the present three are well accepted. Debate will flourish over the merits of a film strip compared to individual projection slides. Yet the story to be told follows a logical sequence, and there are the added advantages of lower price and ease in handling. The reviewer recommends that the readers see these film strips to learn what can be done at relatively little cost to him.

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Scientists starred 1903-1943 in "American Men of Science": a study of collegiate and doctoral training, birthplace, distribution, backgrounds, and developmental influences. Stephen Sargent Visher. Baltimore: Johns Hopkins Press, 1947. Pp. xxiii + 556. (Illustrated.) $4.50.

This book possesses significance and guidance value for the postwar era of science and higher education. It is a study which should, for example, be taken into account in connection with two current proposals: (1) recommendations by the President's Commission on Higher Education to double by 1960 the Nation's present collegiate enrollment, subsidized largely on the basis of the financial need of applicants; and (2) proposed legislation to create a National Science Foundation to grant Federal collegiate scholarships and graduate fellowships in science upon the basis of competitive tests. Pertinent considerations with respect to such action are supplied in Prof. Visher's analysis of the background and training of 2,607 distinguished scientists whose work has been a vital factor in the achievements of American science during the past four decades and more.

The 2,607 scientists are the total of those listed with asterisks in the 7 editions of the directory, *American men of science*, published from 1906 to 1944. The creator of the directory was the late J. McKeen Cattell, eminent psychologist, educator, and editor of *Science*.

In the first edition, which included approximately 4,000 scientists, Cattell starred one-fourth of them as outstanding in accordance with the judgment of leading research scientists in 12 sciences, as of 1903. This system of voting by scientific peers was continued in subsequent editions. Dr. Visher does not overlook the shortcomings of the Cattell system in the light of the development of other scientific fields beyond the original 12 or of the increasing number of scientists in proportion to those starred. Nevertheless, the starred scientists do form "the largest highly and impartially selected group," and, as such, there is importance in this extensive study of their collegiate and doctoral training, their birthplaces, their distribution, their backgrounds, and their developmental influences.

Out of the wealth of deductions from the evidence Dr. Visher has assembled, the following are a few:

"It is impossible to conclude how much is biological heredity and how much is social environmental heredity." Enthusiasm for research is the one common characteristic of the group. "In other respects they differ widely. . . . Many have been highly trained, often in famous institutions; others have attended only little known and perhaps relatively weak institutions."

"Large classes and student body are unfavorable to the production of future scientists." Science students "must have intimate contact with stimulating teachers."

Qualities which the starred scientists themselves considered most significant are "perseverance, curiosity, mental alertness, initiative and critical insight."

RAYMOND WALTERS

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The scientists speak. Warren Weaver. (Ed.) New York: Boni & Gaer, 1947. Pp. xiii + 369. $3.75.

In all probability, the reader of this review heard several of the intermission science talks broadcast on the Philharmonic Symphony program during recent years. Unless he were especially unlucky, he heard good talks—sound, clear, informative, and interesting ones and, often, containing a bit of inspiration. These talks, collected in a volume, have lost none of their appeal. They constitute an impressive survey of scientific knowledge and a remarkable exhibit of science exposition.

Most authors have not been content to parade their facts but have also given some glimpse of procedures or reasoning or implications, or of the attitudes that guide a good scientist or the manner in which he operates. The "springs" of science thus lie outlined through its upholstery of accumulated information. This is rare and good in science popularization. Little is accomplished by making the public gape at faintly adumbrated wonders achieved by a modern medicine man; much, by helping people understand the importance of expertness, the power of rational experimentation, the compulsion of evidence, the dedication to impersonal ends.

The editor has given the volume continuity in two ways. First, he has grouped the 81 talks into 14 chapters, e.g. "The Science of the Earth," "Atoms and Molecules," "Science and Health," "Science and the War," "The Long-term Values," some of which are surprisingly coherent and all of which gain perspective by introductory notes. Second, he has supplied a prefatory chapter, "Science and Complexity," which outlines the history of scientific thought and method in a manner hard to surpass. Dr. Weaver presents the sequence of: "problems of simplicity," involving two or few variables, solved by the classical physical approach before this century; "problems of disorganized complexity," solved by probability theory and statistical mechanics dealing with large numbers, solved mainly after 1900; and "problems of organized complexity," those of a large but limited number of variables which interact as part of an organic