

zation." These are charmingly written essays on a variety of figures not usually discussed in this context; e.g., Ernest Renan and Evariste Galais. The introduction by Conway Zirkle is exceptionally well done as he pinpoints what Snow discusses as "two cultures." There are also general essays on the history of science, history of medicine vs. art, and even a proposal for "An Institute for the history of science and civilization." This will be wanted by those interested in this phase of science and recommended for those who do not see much importance to it.

P. K.

GREAT AMERICAN SCIENTISTS, Editors of *Fortune*, 144 pp., \$1.95, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1961.

These are reprints in paperback form from *Fortune* of a quite readable survey of the histories of physics, chemistry, astronomy, and biology in the last twenty to thirty years. In other words, the articles take the works of living scientists and fit them into a context of modern research in a most intriguing way. It is a wonderful book to recommend to your better students—but of course read it yourself first. You will enjoy it. Congratulations to those responsible.

P. K.

THE AUTOBIOGRAPHY OF SCIENCE, 2nd. Edition, Forest Ray Moulton and Justus J. Schifferes, 748 pp., \$5.95, Doubleday and Co., Garden City, New York, 1960.

This is a compendium of excerpts from the writings of famous personalities in science from the ancients to 1960. Starting with Genesis the book teaches every area of science and ends with Harrison Brown, Bridgman, and an account of the development of the tranquilizer drugs. This is not science writing at its best as these are from original sources, but it is an excellent source-book for historical backgrounds in most of the major developments in science.

P. K.

THE MAJOR ACHIEVEMENTS OF SCIENCE, A. E. E. McKenzie, Vol. I, 367 pp., \$5.50, Vol. II, 194 pp., \$3.50, Cambridge University Press, New York, 1960.

Vol. I of this work takes up major ideas of science in a historical treatment while Vol. II constitutes a chapter by chapter use of extracts from original writings of the scientists discussed in Vol. I. The translations are quite good, and only comparatively brief excerpts are used. Printed in Great Britain, the volumes are interesting in the selection of the generalizations to illustrate the "major achievements of science."

Biology does not lose out as practically half of the first volume is devoted to it. There is a major emphasis on the scientific ideas involved, and the life facts of each scientist are minimized. The final chapter is an interesting one which is largely on modern philosophies of science. Some ideas on the influence of scientific organizations is also given. A fine addition to the library.

P. K.

THE DREAMS OF REASON, René Dubos, 167 pp., \$5.00, Columbia University Press, New York, 1961.

A distinguished biologist in this series of essays, originally given as lectures at the Brookhaven National Laboratories, ranges the spectrum of science, and in so doing disproves G. P. Snow's phrase of "two cultures." Sometime and somewhere science was divorced from natural philosophy and the humanities, but no one can read this book by Dubos without doubting that this divorce was invalid or illegal. The author displays his insight and scholarliness which often embarrasses those in the humanities who stereotype the scientist as a thing apart, a drab hack puttering and recording data. One of the main themes of these lectures is that "science is like a revelation that enlarges awareness by sharpening and extending the direct perceptions from which philosophy originated." When he comes to the utopia of a diseaseless and problemless world, he shows how absurd this dream really is. Social forces determine the goals of the scientist, but Dr. Dubos pleads for the right of the scientist to pursue truth for its own sake. The title of the book comes from Goya's phrase, "the dreams of reason can produce monsters." The book is a stimulating exercise for every biologist—especially those preoccupied with observational work and those exclusively pursuing "dreams of reason."

P. K.

Science Projects

A PREPARATORY GUIDE TO INDIVIDUAL INVESTIGATIONS IN SCIENCE, Paul Westmeyer, 177 pp., J. Weston Walch, Publisher, Portland, Maine, 1960.

Although this book is billed as usable as a text in advanced science, it is difficult for this reviewer to conceive of it in that light. It is useful for the student and teacher in constructing experiments and investigations.

All the sciences are included. Biology is there by virtue of experiments concerning light on bacteria, gibberellic acid effects, and maze learning. The format is to take several basic investigations, such as those above, and then trace their development in building apparatus, selecting hypotheses, collecting data, and arriving at conclusions. A great many helpful ideas are explained.

The publication is marred by its format so that it is difficult to find the precise idea the reader wants to trace. There is an extensive bibliography. Should be useful in the project-centered course and for student reading in project work.
P. K.

MICROSCOPE EXPERIMENTS FOR ELEMENTARY AND HIGH SCHOOL, 60 pp., \$1.00, Testa Manufacturing Company, El Monte, California, 1960.

Every biology teacher seems to be anxiously looking for suggestions and helps for laboratory work and projects. This is another attempt to help in the field of microscopy. A small book but well written, it is full of information about simple microscope exercises divided into those concerning form, plants, animals, insects, and inorganic substances. The introduction is lucid and well done. A handy little booklet for the beginner.

P. K.

Science Teaching Aids

THE EFFECTIVENESS OF FILMED SCIENCE COURSES IN PUBLIC SECONDARY SCHOOLS, W. James Popham and Joseph M. Sadnavitch, 64 pp., Department of Education and Psychology, Kansas State College of Pittsburg, 1960.

This publication describes an experiment designed to evaluate the filmed physics course consisting of a series of 162 lectures and demonstrations by Professor Harvey White, and the filmed chemistry course of 160 lectures and demonstrations by Professor John Baxter. Briefly, the results indicated that (1) in *subject matter achievement*, the chemistry films were as effective as conventional methods but the physics films were not; (2) the film and non-film approaches fostered comparable *student interest* in physical science, and (3) the film approaches fostered *attitudes* more unfavorable toward physics and chemistry as school subjects than the conventional approach did.

This is one of several research reports which will help science teachers and others to reach decisions concerning the best ways of upgrading and achieving their teaching objectives in the face of ever increasing enrollments. It is the fifth reported research evaluating the filmed physics course and the first evaluating the filmed chemistry course. This publication briefly reviews these previous researches.

The filmed course approach has had an increasing emphasis in recent years and most science educators will want to keep up to date on researches such as this. However, as with all researches, the results of this experiment must be interpreted within its limitations; that is, such variables as the sample used, the validity

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of the measuring instruments, teacher competency, and utilization procedures must be considered.

This experiment by itself does not provide sufficient evidence to reach a decision concerning the effectiveness of these two filmed courses but is a valuable contribution to the growing fund of knowledge concerning them.

George Vuke
Audio-Visual Center
Indiana University

Education

SCIENCE AS THOUGHT, Howard E. Gruber, 30 pp., University of Colorado Behavior Research Laboratory Report No. 16, Boulder, Colorado, 1961.

News stories of the implications of this study for the expenditure of federal money for the training of science teachers appeared widely throughout the country. The author concludes after a survey of the participants of nine academic Year Institutes that only a negligible percent of these people teach science as a way of thought and that, if this is one of the purposes of AYI, the program is failing miserably. While one must agree, by the simple process of observation, with many but not all of the author's