of the environment on man, as in the discussions of diseases contracted from man's surroundings.

The message is documented and restrained. At a time when the woods are full of preachers, prophets of doom, alarmists, and gushing emotionalists, Benarde brings us relief. He presents the problems calmly and clearly, analyzes them objectively, and helps us to see them in balanced perspective. He is at his best when describing diseases he knows, as a public health physician. Sometimes he gives little more than a catalogue of the characteristics of the diseases, and he frequently forgets his audience and uses unfamiliar technical terms. (Actually, this "failing" may add to the appeal of the book for students with some background in biology.)

Benarde points out how baffling these environmental problems are for the scientist. The scientist is accustomed to altering one factor during an experiment: by one or more such trials he succeeds in ferreting out a cause. Most of our environmental problems cannot be unravelled that way, because they are knotty and full of interlocking factors. Patience and multivariant techniques are required to solve them. For instance, the idea of solving the air-pollution problem by putting an immediate stop to particle emission from power plants and incinerators fails to recognize our need for power and for the elimination of solid wastes.

The reading of this authoritative, thoroughly scientific review will be rewarding to students, teachers, and lay adults alike—especially if one has already read some of the "inflammatory" books. However, the author's effort to be objective (on radiation, for instance) sometimes leaves an impression of complacency about the problem, and this may be as dangerous as the approach of the alarmist.

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History

TOWARD A HISTORY OF GEOLOGY, ed. by Cecil J. Schneer. 1969. M.I.T. Press, Cambridge, Mass. 475 pp. $22.50.

After the publication of *The Origin of Species* many major geologic concepts won acceptance "on the strength of the inspiration that was the theory of evolution," Schneer says. This statement sets the interdisciplinary tone that should make this book interesting to practitioners, teachers, and students in all scientific disciplines.

The volume consists of papers presented in 1969 at the New Hampshire Interdisciplinary Conference on the History of Geology, sponsored by the Council on Education in the Geological Sciences with the support of the National Science Foundation. Each contributor writes about a scientist (or a group of scientists) of importance in pre-*Origin* days; the result is a fragmentary but well-documented discussion of Darwin's immediate predecessors and of the ideas that were abroad in Darwin's time. These ideas must have deeply influenced him: one recalls the cherished copy of Lyell's *Principles of Geology* that he carried on the *Beagle*.

The interdisciplinary nature of the book is seen, too, in the varied backgrounds of the contributors. Of the 26 authors, four are primarily geologists, nine have published widely in both geology and the history of geology, two are historians of biology and medicine, one is a museum curator, and one is a metallurgist. Certain chapters are of peripheral interest to biologists, but 17 of them are fully relevant. The articles on Saint-Hilaire *vs.* Cuvier, by F. Bourdier; on Scheuchzer and *Homo diluvii testis*, by M. Jahn; and on the Dana–Lewis controversy in America on evolution, by M. Sherwood—these deal almost entirely with paleontology, paleobiology, and pre-Darwinian ideas of the development of life and of species. The names of Linnaeus and Lamarck come up again and again: Linnaeus, although primarily a systematist of organisms, also created a classification of the "mineral kingdom."

One is reminded that before Darwin's time most scientists were "natural philosophers" interested in all aspects of the earth and of life. Although this book stresses the geologic aspects of natural history, it makes clear the essential unity of the natural sciences—a unity that, today, becomes even more apparent.

Other features recommend this book. It contains a useful 21-page index, biographic sketches of the contributors, and a number of interesting figures and plates. Many of the articles have extensive reference lists. Anyone interested in the history of the natural sciences during the 18th and early 19th centuries will find this a useful and readable book. Unfortunately, the high price will put it out of the range of many who might otherwise buy it.

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Radiation Biology

RADIATION AND ITS USE IN BIOLOGY: A LABORATORY BLOCK, by William V. Mayer. 1970. Educational Programs Improvement Corp., Boulder, Colo. 62 pp. Price not given.

This is the most recent of the Biological Science Curriculum Studies laboratory blocks. The block begins with an introduction designed to acquaint students with radiation and is followed by two inquiries using ultraviolet light and its effect on microorganisms. After an aside on the use of radionuclides, there are four inquiries that deal basically with the handling of radionuclides, including their detection by cloud chamber and by autoradiography, and the behavior of gamma rays and particles in relation to the Geiger-Müller counter. The subject of fallout, in the next inquiry, is correlated with half-life and background count, both of which are necessary to interpret data obtained by using radionuclides. The next five inquiries exemplify the use of radionuclides in the solution of biologic problems. Among these inquiries are the responses of plants and animals to injected radionuclides, the effect of irradiation on growth, the use of radionuclides in ecology, and their use in physiology, as shown by a study of photosynthesis.

The concluding "On Your Own" section allows the student to investigate the use of radionuclides in determining fluid volumes, to correlate the effect of irradiation on tissues wth various rates of metabolism, to ascertain the possibility of preserving foodstuffs by irradiation, to determine genetic damage occasioned by exposure to radiation, and to investigate the effect of irradiation on a typical enzyme. References are appended.

Given the experience and expertise of the author in developing curricular materials for secondary-school students, one would expect a piece of work that is both scientifically and pedagogically sound. In these respects the student and the teacher will not be disappointed. The block is organized so that the earlier inquiries are more structured than the later ones; and all inquiries are structured in a manner that enhances the use of imagination on the part of students and teachers alike.

The Teacher's Supplement for the block ranks among the best aids to inquiry-teaching this reviewer has seen. Some of the objectives that characterize research, the scientific enterprise, and the people involved in these activities are not merely listed in the preface; rather, these objectives permeate the entire block. An example of this is the inclusion of objectives stated in behavioral terms for each inquiry. This represents a first use of such objectives in the BSCS laboratory blocks. The author has provided a variety of objectives for the higher cognitive levels and has assumed that teachers will be capable of providing for the lower levels. The wide selection of action

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