Radiation Detectors

Nuclear Instruments and Their Uses. vol. 1, *Ionization Detectors, Scintillators, Cerenkov Counters, Amplifiers: Assay, Dosimetry, Health Physics.* Arthur H. Snell, Ed. Wiley, New York, 1962. viii + 494 pp. Illus. $7.50.

It is often difficult to deduce the contents of a novel by its title, but this is not usually the case with technical books. Therefore, readers should be warned that this fine volume is not a book on nuclear instrumentation, although its title is probably indicative of the intentions of the Instruments and Techniques Subcommittee of the National Research Council.

The book is a compilation of seven articles dealing with four types of radiation detectors (ionization chambers, proportional counters, scintillation counters, and Cerenkov counters), electrometers and amplifiers, radioactivity assay, dosimetry, and health physics.

In the opening section Franzen and Cochran discuss ion-pair formation and associated statistics as well as ion collection and losses for various geometries. They include a review of experimental determinations of W (electron volts per ion pair) that will be useful, although refined values have been published in the literature.

The treatment of proportional counters gives useful information on pulse profile and the statistics of proportional multiplication.

In its treatment of the ion chamber and the proportional counter, the book suffers because it does not have an elementary qualitative discussion of the operating principles that will provide uninitiated readers with an overall picture before they plunge into the mass of detail concerned with these detectors.

Murray's section on scintillation counters is loaded with valuable information from the voluminous literature. Murray discusses the mechanism of the scintillation process and presents data on the nonlinearities that have received considerable attention in recent years. The scintillators discussed include inorganic crystals, organic crystals and plastics, organic liquids, loaded liquid scintillators, and noble gas scintillators. Photomultipliers and scintillator counter assemblies are described, including assemblies for high-resolution gamma ray spectroscopy and for neutron spectroscopy.

Cerenkov radiation and Cerenkov counter techniques are lucidly discussed by Moyer. The optical systems and factors controlling efficiency and resolution are considered.

Fairstein's paper on electrometers and amplifiers combines sophisticated analysis with useful "cookbook" data. Optimization of signal-to-noise ratio is discussed in detail.

In the final three sections the contributors draw on their extensive experience to review the general problems and techniques in radioactivity assay, dosimetry, and health physics.

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Pteridophyta

The Morphology of Pteridophytes. The structure of ferns and allied plants. K. R. Sporne. Hutchinson, London; Hillary House, New York, 1962. 192 pp. Illus. $2.50.

This small text, one of the Hutchinson University Library series, is primarily intended for British university students. Despite certain limitations, it does seem to meet a need for an inexpensive current summary of the subject. Each main group of the Pteridophyta is discussed in some detail, in terms of its principal members, and the important features are illustrated with line drawings. The work generally follows the classification of Reimers (Engler's Syllabus, ed. 12) and recognizes five groups—Psilophytopsida, Psilotopsida, Lycopsida, Sphenopsida and Pteropsida. Unfortunately there is no discussion of the morphological bases of other contemporary classifications or of their relative merits.

The limitations of the treatment raise the question of what can reasonably be expected of a textbook. Sporne's treatment is somewhat restricted in its scope, and in some ways he does not present a currently accurate account of the subject. The implicit promises made in the preface of "a reappraisal of the old theories in the light of recent knowledge" and of the presentation of "the many important advances . . . made . . . in the last decade" are not wholly fulfilled. The application of the telome theory is discussed at length but it is not really assessed (except to exclude the Lycopsida from its scope). The field of experimental morphology is not exploited, nor is it evaluated in terms of classical morphology. This is rather surprising when one considers that British botanists have been among the most active leaders in this field and that much of the work has been done on the pteridophytes.

Although recent advances in paleobotany have been integrated into the text, the same cannot be said for recent information about the living ferns. The systematic literature has not been sufficiently explored, although it contains much pertinent morphological information. I noted a few erroneous or confusing statements—the stems of *Equisetum giganteum* to "13 m." long (they are to 5 m. tall); the fronds of *Todea barbarea* "once-pinnate" (they are bipinnate); the fronds of most species [of Cyatheaceae] "several times pinnate" (they are mostly less than tripinnate). There is grave confusion in the discussion of apogamy. The cytological basis of the phenomenon is not presented accurately, and it is at least partly confused with that of apospory.

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Evolution for the Masses

Evolution. Ruth Moore and the editors of *Life*. Time, Inc., New York, 1962. 192 pp. $3.95.

This volume is an addition to the Life Nature Library. As one might expect, it is superbly illustrated, and the text material is handled (to its detriment) with typical journalistic fervor. Each of the book's eight sections consists of a discussion followed by one or more "pictorial studies." The book begins with Darwin and passes through Mendel to DNA. Then it surveys "A half billion years of creation" and eventually arrives at "The emergence of *Homo sapiens*." The choice of material is reasonable, and the presentation is well balanced. Unfortunately, there are many distortions. Generally these are a consequence either of exaggeration or of oversimplification. They do not occur too frequently in the text itself, but they do appear with

dismaying regularity in the descriptions accompanying pictorial studies. This produces some strange inconsistencies. Thus, for example, chapter 4 gives a reasonably adequate discussion of chromosomes, genes, and DNA. Then, in the pictorial study that follows, reference is made to the "*child-deciding chemicals*" in human sperm. The general level of the text is such that this sort of inanity is quite uncalled-for. The book appears to have been written by two people for two different audiences. One author, responsible for *most* of the text, is competent and writes for intelligent and interested readers. The other seems to distrust the intelligence of all human beings and condescends to aggravate their ignorance with parodies of logic. The contribution of the latter could have been eliminated by a minimum amount of thoughtful editing, and the book then would have been excellent. Since the general reader cannot be expected to differentiate the leading from the misleading, the book, as it now stands, cannot be recommended as a volume that fulfills even the minimum requirements for educational material.

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Notes

Studies and Methods

Minerals in the Infrared: A Critical Bibliography (Stanford Research Institute, Menlo Park, Calif., 1962. 88 pp. Paper, $1), compiled by R. J. P. Lyon, is an alphabetically arranged list of 440 references to infrared studies of minerals and to studies of experimental methods. In a short 12-page introduction Lyon discusses the output of infrared research on minerals by country and explains the use of the bibliography. Guides to particular information are provided by an author index, a lengthy mineral and subject index (which also distinguishes papers that contain spectra), and a useful table of studies which organizes references by classes of mineral and important subjects.

The bibliography itself occupies only 29 of the 88 pages, and it is not annotated. A spot check revealed a number of references that could have been included but were not and a few errors—for example, the entries for a group of Lazarev's papers on silicates refer to the English translation journal but give the page numbers of the Russian original.

Research on the infrared spectra of minerals has been widely scattered through many journals, and the mineralogist who contemplates work in this area will find that Lyon's bibliography is not only an extremely useful shortcut, but the only available one to the literature.

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Geological Science

The sourcebook, **Geology and Earth Sciences Sourcebook for Elementary and Secondary Schools** (Holt, Rinehart and Winston, New York, 1962. 511 pp. Paper, $2.40), edited by Robert L. Heller, has 23 chapters, of which the first 20 are concerned with un-allied geology, whereas the other three consider geology allied to biology, chemistry, and physics. The general treatment in the geological chapters, from minerals to geologic maps, is this: Introduction; Presentation; Suggested problems and questions; Unsolved problems; Demonstrations, projects, and experiments; Teaching aids; and References. In other words, each chapter is complete in itself and can be used as a unit without reference to the others. The appendix lists the State geological surveys, the U.S. Geological Survey and its principal research centers, suppliers of teaching aids (such as films, fossils, and laboratory equipment), films, references sources, and publishers. The addresses provided here will certainly be valuable to elementary and secondary school teachers.

The second volume, **Study of the Earth: Readings in Geological Science** (Prentice-Hall, Englewood Cliffs, N.J., 1962. 416 pp. $3.95), edited by J. F. White, is a series of well-selected, stimulating papers by some 27 authors, grouped under the following headings: The law of uniformity and geologic time; The earth model—problems and implications; Crustal features and processes; Past climates and drifting continents; The history of life; and Origin and evolution of the earth. With the exception of the paper on James Hutton which was adapted from Karl von Zittle's *History of Geology and Paleontology* (1901), most of the papers were written during the latter part of the past decade. The various papers are well worth reading, and they constitute a stimulating reference book.

These books, although dissimilar and very different in their approach, make a valuable pair for elementary and secondary school teachers. The first, which is definitely aimed at elementary and secondary schools, can be very valuable at that level; *Study of the Earth* is excellent for supplementary reading at any level, from elementary school through college, and will also find a place as reading material for those who would like to know more about geological science but who do not have a large library at hand.

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Fossils

In his preface to **Aus Jahrmillionen: Tiere der Vorzeit** (Fischer, Jena, 1962. 417 pp. DM. 30) Arno Hermann Müller notes that prehistoric life is often presented to the public in the form of fantastic restorations of monsters in unnatural associations and surroundings. His aim, with the assistance of his technical collaborator, Helmut Zimmerman, who was responsible for the photographs, has been to show a general audience what fossils really look like by means of 290 large, clear photographs of museum specimens. All of the photography is competent, and some is strikingly beautiful. Forms illustrated have to some extent been limited by ready availability of suitable specimens, but a fair sampling of the animal kingdom (including Protozoa) is included.

Each major group is introduced by brief, competent discussion of its characteristics and history. Captions give popular name, technical generic name, general stratigraphic and geographic source, and enlargement. A loose-leaf geologic time table is provided.

This publication, in German only, can hardly achieve general popularity in this country, but many interested in science and in photography should derive from it esthetic and, at the intended level, intellectual pleasure.

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