Book Reviews

Reactor Shielding Design Manual. Theodore Rockwell, III, Ed. Van Nostrand, Princeton, N.J.; McGraw-Hill, New York, 1956. 472 pp.; 481 pp. Illus. $6.

This is the first book to appear that is devoted exclusively to the subject of radiation shielding for nuclear reactors. The work was sponsored by the U.S. Atomic Enery Commission at the instigation of H. G. Rickover, and it was published simultaneously by the two book companies. The compilation of techniques, formulas, and data for use in calculations is based on work in the naval reactor program and the pressurized water reactor program. The information appears to be applicable not only to reactors but to systems using fission-product and cobalt gamma-ray sources.

Chapters 1 and 2 contain well-written basic descriptions of radiation attenuation and dosage limits. Chapters 3 and 4 tell how to determine radiation source strengths and how to design shields for the reactor core and cooling system.

Chapters 5, 6, and 7 provide general engineering principles and data on materials and sources of radiation in reactors. Chapter 8 is devoted to the effect of ducts and voids, and Chapter 9 tabulates geometric transformations and special useful integrals. Chapter 10 provides attenuation coefficients, build-up factors, and nuclear data. The book is replete with graphs and illustrative numerical examples.

The material in the various chapters is well-integrated and demonstrates careful editing. The technical level is such that it may be readily understood by both scientists and engineers. A sampling of the contents indicates that the book is quite comprehensive. One feature that is unfortunately missing is emphasis that authors such as Blizard place on certain principles—for example, that shield design is an art rather than a science, that the unusual radiation is the important one, and that comparison methods are very powerful. If such viewpoints are understood, the book serves as an invaluable source of numerical data and formulas. It is difficult to see how the book could conveniently be used as a text, but it is certain that it should find a prominent place in reference shelves for nuclear engineering classes, for reactor designers, and for those engaged in radiation research.

The editors, authors, and contributors are to be commended for the preparation of this useful addition to the literature of reactor technology.

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Floods. William G. Hoyt and Walter B. Langbein. Princeton University Press, Princeton, N.J., 1955. ix + 469 pp. Illus. $7.50.

William G. Hoyt has been concerned with the many facets of stream flow, of which floods are the most spectacular and costly, for most of his professional career. For many years he was a member of the U.S. Geological Survey, the principal agency responsible for measuring flood flows and studying the conditions that result in them. Later he became director of the Division of Water and Power of the U.S. Department of the Interior, where he was in a position to study many of the proposals for engineering structures to control floods. Walter Langbein was a close associate of Hoyt's for many years on the survey, and his principal hydrologic interest likewise has been the characteristics of stream flow.

To find two men as well informed on the whole range of flood problems would be difficult indeed, and their book reflects their long and intimate acquaintance both with flood phenomena and with the engineers and scientists who are engaged in the field of water supply and water management.

The book is uncommonly timely, for within the last year parts of the nation have experienced devastating drouths and serious water shortages, and other areas, notably New England and California, have suffered disastrous floods. Thus, the nation is more alive than ever before to the enormous and often needless loss of money, lives, and property that is exacted yearly by destructive floods.

The differences of opinion concerning the best ways to control floods are so serious that an understanding of the hydrology of floods has become essential to sound planning of the nation's water management.

The authors begin by establishing the fact that, since the birth of civilization, man, by settling in the fertile flood plains of the world, has exposed himself and his property to losses by floods. By encroaching on stream channels with bridge piers and other structures, he has reduced the area through which floodwaters may pass and has thereby increased the height of flood stages. The authors describe clearly the essential facets of a sound approach to flood problems and the many and varied causes of those problems; the life history of a typical flood; and the estimation of flood damages. A chapter on man's adaptation to floods discusses our present national policy toward floods, which is primarily one of "flood protection." This policy has as its purpose the construction of various types of engineering works that will enable full-time occupancy of lands within the flood plains.

Since there is no specific provision either in the Constitution or in the Amendments thereto relating to floods, the federal flood control program has developed slowly and in a piecemeal fashion. The authors present an excellent résumé of our flood-control policy, pointing out that much of it is predicated on assumptions for which satisfactory proof is lacking. The problems, projects, and plans for individual major basins are well presented. The book contains nearly 100 pages of a well-documented chronology of floods in the United States, beginning with the Mississippi River flood of 1543, which hindered the explorations of the Spaniard De Soto.

The book is well printed and bound, and for the most part highly readable. It should serve as a splendid source book for the layman who wishes to understand the flood problem and his government's attempts to cope with it in different parts of his country. He must not, however, expect that the most optimistic plans will anticipate complete protection from floods. Major storms will still produce floods, but the effects can be ameliorated.

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Methods of Biochemical Analysis. vol. III. David Glick, Ed. Interscience, New York, 1956. 437 pp. Illus. $9.50.

The objectives of this series are to review recently developed and improved methods used in biochemistry, to critically evaluate them, and to present the best methods available in enough detail to enable the individual to carry out the analyses. The authors represented in the third volume have done commendable

work in carrying out these objectives. In general, the applications and the limitations of the various methods are clearly and concisely discussed. The recommended methods are very well presented, and possible sources of error and areas where caution must be observed are pointed out.

This volume is an improvement over the previous volume in that an attempt has been made to discuss methods for related topics in the same volume. For example, about a third of volume III is devoted to methods for polysaccharides, while another third is devoted to the determination of metal complexes and metallic ions.

The group of methods of general interest includes the determination of organic phosphorus compounds, assay of thioctic acid, the determination of histamine, and spectrophotometric methods for the determination of uric acid, hypoxanthine, adenine, and xanthopterine.

The group of subjects related to carbohydrate structure includes the use of periodate oxidations, end-groups analysis of polysaccharides, and the use of infrared analysis in the determination of carbohydrate structure.

The remaining third of the volume is devoted to the measurement of complex ion stability by the use of ion-exchange resins, analysis of metal-protein complexes, application of metal buffers and metal indicators, determination of zinc and flame photometry, and spectrometry.

This volume is an excellent addition to the series on biochemical methodology. It should be of considerable value to the research biochemist.

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Studies of the Psychology and Behavior of Captive Animals in Zoos and Circuses. H. Hediger. Translated by Geoffrey Sircom. Butterworths, London, 1955. vii + 166 pp. Plates. 30s.

H. Hediger, director of the Zoological Gardens at Zurich and professor of animal psychology at the University of Zurich, says: "To me, the animal psychologist seems like a cave explorer, who, making his way through impressive tunnels, finds himself groping at the threshold of some lofty cavern, access to which will some day be granted to his astonished gaze." Hediger has traveled in Europe, the United States, Africa, and the South Pacific islands, always observing the behavior of animals both in captivity and in their native wilds. He has followed his former book, *Wild Animals in Captivity,* with this one, which treats of the psychology of animals.

This is a comprehensive book and attacks many problems. The animals' flight reaction, for instance, is the distance at which an animal becomes alarmed by man or by an enemy, and at which it runs away. Hediger has actually measured the number of feet at which an African buffalo in the wilds will take alarm, and compared it with the distance that alarms a buffalo on a reserve where he has learned that he is safe. The "need to escape" is a greater drive with animals than sex or hunger.

A study of animal tracks, both in the zoo and in the wild, shows that animals, like man, tend to follow certain paths. Of freedom, he says, "It has two aspects; one for the predator that is lucky enough to find a particularly tasty victim; and another for the victim that is lucky enough to escape from a particularly dangerous enemy."

He has not confined his studies to the big, showy zoo animals, but has an interesting chapter on the so-called "hypnosis" exercised by snakes, and a study of "fascinatory organs" used by some snakes to decoy their prey.

The social relationships among animals are discussed all through the book —even the social significance of antlers in deer. When different species live together, one is always dominant. There are fascinating accounts of fighting ceremonials and of mating ceremonials, though Hediger says that too little is known about preliminary courtship rituals except in the case of some birds.

The relations of male animals to the young, of females to their young, and of the young to each other are studied. Begging among zoo animals is said to be not only a request for food but for companionship.

The psychology of circus animals differs from that of zoo animals because of their much closer contact with trainers, grooms, and in some cases with the public.

Descriptions of animals at play include accounts of his visits to the famous trained animals at the St. Louis Zoo and the porpoises at Marineland.

The book is full of interesting information—for example, that the giant sloth of Patagonia was probably kept as a sort of domestic animal by the aborigines; that the Watussi cattle are kept ceremonially, and are not butchered, milked, or bled (their only use is to furnish dung for fuel and urine for bathing purposes); and that, if a dog bites a man, it may be because he regards the man as a social rival.

There are informative notes on the birth of a giraffe and the birth of a kangaroo, and on the sleeping habits of elephants.

The book is divided into 11 chapters, such as "The animal's expression," "Animal psychology in the circus," "Wild and domestic animals," "Mother and child," and "Animals among themselves." The photographic illustrations are unusually good.

This is a book that provides worthwhile reading which nature lovers may read with interest and enjoyment and then put in a nearby file as an excellent reference book. A bibliography of 197 titles is included.

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Précis de Géologie. Leon Moret. Masson, Paris, ed. 2, 1955. ix + 669 pp.

It is very helpful for the American teacher of geology to learn how his subject is presented in other parts of the world. This book by Leon Moret of the Ecole Nationale Supérieure d'Hydraulique at Grenoble, gives an excellent survey of the science of geology as it is taught in French institutions of learning.

One need have no worry concerning the geologic background of our French colleagues, if we can assume that they are familiar with all the information in Moret's book. The book covers both physical and historical geology, and although the organization may differ from most American textbooks, the over-all coverage is about equal to that presented to our geology majors in a first-year course.

The first part of the book, after an introduction in which some general principles of geology are discussed, is mostly concerned with the various rocks and minerals that make up the surface of the earth. The discussion on the classification of minerals and crystals is especially well written.

This book goes on to discuss fossils and the various principles of stratigraphy. There is an abbreviated summary of classification as well as a brief résumé of the main faunal and floral elements of the different major periods.

The third part concerns tectonics, and while this part may be a little more thorough than that given in most comparable American textbooks, the section should be of considerable interest to the somewhat more advanced student.

The fourth part consists of an excellent survey of historical geology, with special emphasis on events in France and elsewhere in Europe. This section leans heavily on the work of Gignoux, to whom suitable credit is given. This section should be very useful to American students who wish to learn more details, especially concerning events in Europe, than are given in the average American