ture is brought out strikingly in this connection. In many cases new combinations are made for specific names originally proposed in wrong genera, which are then, even on the same page, reduced to synonymy under other species. This seems to be perfectly correct zoological practice, but most botanists scrupulously avoid making unnecessary new combinations. Perhaps the bogey of adding to synonymy has been grossly overemphasized by botanists, since this wholesale creation of new binomials does not seem to inconvenience the zoologists in the least.

In sizing up the character and importance of this series, one may say that it seems to set the pattern for much of the most needed taxonomic work in both zoology and botany during the next century.

F. R. FOSBERG
National Research Council

Classical Electricity and Magnetism. Wolfgang K. Panofsky and Melba Phillips. Addison-Wesley, Cambridge, Mass., 1955. xi + 400 pp. Illus. $8.50.

After teaching for a long time from notes and by a multitude of references, it is good to find in a single book material of which one can say, "This is written just about the way I would like to have it done." No two teachers would agree in detail on what should be included in any textbook, but most will feel that this one contains a well-balanced assembly of topics for a graduate course. There is material on wave guides and cavities and material on scattering. Relativistic electrodynamics and the fields from a moving charge are discussed at some length.

The use of meter-kilogram-second units in a book having the stature of this one will speed their acceptance among physicists. Conformal mapping and the Schwarz transformation are treated too lightly to enable the student to work the assigned problems. A scaler magnetic potential that arises from conduction currents is defined, but another that arises from magnetization is also defined. The same symbol is used for both. A little maneuvering could show that the two are identical, but the student may well think that they are distinct. It has always been hard to find problems for an advanced electromagnetics course that are of just the right degree of difficulty; the present book does much to relieve that situation.

The adverse criticisms are trifling ones. This is an excellent book that gives in one volume material that has been scattered throughout many books.

ROBERT H. WHITMER
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Experimental Design and Its Statistical Basis. D. J. Finney. Univ. of Chicago Press, Chicago, Ill., 1955. xi + 169 pp. $4.50.

This book is in the series entitled "The Scientist's Library: Biology and Medicine," for which the editor's specifications included emphasis on introductory concepts and problems, assumption of a "common level of scientific competence" among readers, and avoidance of popularization—not easy specifications to meet in the subject of this volume. The author had to write principally for those biologists and medical research workers, still numerous, who are unfamiliar with the past 30 years' developments in the logic, and consequent practice, of experimentation; therefore he had to risk revealing that much of his potential readers' experimentation involves biased or inefficient designs and hazy inferences.

Even if a reader starts with a conception of statistics as some arithmetic for use after an experiment, he can hardly retain that notion after seeing this comprehensive up-to-date presentation of principles with illustrations from a wide variety of experiments on animals and plants, in field and laboratory, and from human therapeutic trials.

The author writes "in the hope of arousing interest," and makes "no claim that the subject is easy, but only that those who will rid themselves of the fear of mathematics can understand much without using advanced mathematical techniques." His advice with reference to some sections—to pass over difficulties without struggling with them greatly—could well apply to any passages that are difficult on the first reading.

One of the book's virtues is that probably no one will learn from it enough arithmetic to swell the multitude of misleading t's and χ^2's in current medical and biological literature—products of an unfortunate sequence in the development of modern statistics; namely, the dissemination of arithmetical techniques before the emergence of experimental methods (such as strict randomization) that are essential to justify the arithmetic after an experiment.

A good book stimulates one to suggest possible improvements, and here are three suggestions.

1) Does not even a brief display of the arithmetic of χ^2 and of t, early in an exposition of experimental design, tend to orient the reader in an undesired direction?

2) Is not the justification of normal (Gaussian) curve methods—an admittedly uncomfortable but fundamental question—too brief? It is to be hoped that, as experimenters become more at home with statistical thinking, they will raise this question insistently. An introductory book could, perhaps, best anticipate such inquiry by pointing out the distinction between techniques of design (such as the Latin square and randomization), which can be justified by well-known properties of our universe, and normal-curve techniques of analysis, which are justified for some phenomena by extensive experimentation and for others by little more than the statistician's analog of "clinical instinct."

3) The last sentence of the text rightly says that any biologist who has read the book will realize the need for a statistical specialist's advice—a very desirable outcome; but one could wish for a few remarks on problems met by a statistical consultant who continues to conduct his own experimental research. Such a person knows how constant must be the vigilance if bias is to be avoided that will render any statistical tests or estimates highly questionable. He knows how scarce statisticians are compared with the myriads of researches that need statistical aid throughout. He is faced with colleagues' demands for statistical analysis of their data, often prompted by journal editors or arithmetically minded referees who are willing to *assume* that an experiment was suitable for such treatment.

On the other hand, he knows that many experiments, not suitable for statistical arithmetic, have led toward the truth because the data have been produced and assessed by a skilled and self-critical experimenter who has arrived at a cautious conclusion—statistical, it is true, but without the spurious definiteness of a P value or a confidence limit.

When a book tends to increase the demand for a scarce commodity, it would not be unfitting for it to give advice to those who wish to obtain the commodity but can obtain little or none of it.

DONALD MAINLAND
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The World We Live In. Lincoln Barnett and editorial staff of *Life*. Time, Inc., New York, 1955. 304 pp. Illus. $13.50, regular ed.; $15.50 deluxe boxed ed.

When the judges met in 1953 to select the winners of that year's AAAS–George Westinghouse Science Writing awards, they unanimously voted a special citation to *Life's* science department and Lincoln Barnett for the series of articles then appearing in *Life, The World We Live In.*

The series has since been completed and is now available in book form. In 1953 the judges considered the magazine

series "a distinguished example of science journalism." So is the book. The 13 chapters cover the physical history of the world, from the birth of the earth, and the universe of which it is a part, through geologic change and biological evolution, to the world of today with the varied life forms of its major climatic regions. In an introduction Vannevar Bush calls it a "lucid, interesting and withal accurate account of the world we live in . . . [it] will captivate the imagination of millions of non-scientific people who would otherwise not concern themselves with its subject matter. No pains were spared to make it accurate. Many scientists were consulted and gave their best advice to make its statements true and accurate in scale. The result is a natural history in modern dress . . . which should delight as well as instruct a vast number of people."

Indeed many scientists were consulted, some 250 of them from the United States and other countries, plus a dozen and a half scientific institutions.

The *Illus.* in the bibliographic citation is a pale understatement of the scores and scores of excellent photographs and paintings. In black and white and in color, from a few square inches in size to double-page spreads, the illustrations are the heart of the book and its justification. The text explains, sometimes amplifies, and gives continuity. But the illustrations catch the eye first and will probably be turned to again and again after the text is read.

The book is not only excellent science journalism but appears likely to become one of the most successful of all ventures in this field. *Life* received more than 400,000 requests for reprints of the magazine articles and reported an advance sale of approximately half a million copies of the book. The success is deserved, for the authors, photographers, painters, and publishers have done an excellent job.—D.W.

Introductory Nuclear Physics. David Halliday. Wiley, New York; Chapman & Hall, London, ed. 2, 1955. ix + 493 pp. Illus. $7.50.

In a rapidly expanding field of research such as nuclear physics, textbooks must be frequently revised to include new information and new theoretical ideas. The second edition of Halliday's book on nuclear physics, first published in 1950, has been substantially improved. The book is designed for an advanced undergraduate course and introduces the student to the entire field of nuclear physics. Shortened by 65 pages with the elimination of much experimental detail and the frequent use of small type, the new edition is made more valuable by the extended treatment of theoretical ideas underlying nuclear physics. The experimental information has been brought up to date, and the author has continued his practice of making many references to original articles. Thus the book is valuable as a reference as well as a textbook. The author has included many good problems and has retained his easy informal style that makes the book a pleasure to read.

Although a considerable familiarity with the basic ideas of atomic and nuclear physics is assumed, a chapter on the elements of quantum mechanics has been added to allow a more thorough treatment of nuclear theory as the various problems arise. Several results of theory that were simply stated in the first edition are explained in greater detail in the text or in a series of appendixes treating aspects of wave mechanics and other theoretical problems. The subject of gamma radiation and internal conversion has, for example, been expanded from a few pages to a full chapter.

Other new chapters are concerned with two-nucleon systems and the passage of charged particles and gamma rays through matter. The chapter on cosmic rays has been condensed and a new section has been added on subnuclear particles. The chapters on detectors of nuclear particles and accelerators, brought up to date in this edition, will be useful to beginning research students.

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Radioisotopes in Biology and Agriculture: Principles and Practice. C. L. Comar. McGraw-Hill, New York–London, 1955. xiii + 481 pp. Illus. $9.

There are now in existence many books covering applications of radioisotopes to biological studies. The inclusion of details of typical experiments on large domestic animals and on plants and fertilizers is the main feature that distinguishes *Radioisotopes in Biology and Agriculture* from other books in this field. For this reason it should be attractive to investigators in agricultural biology.

The sections dealing with general principles of radiotechniques are well organized and presented with sufficient simplicity and clarity to be understandable to a beginner. The chapter entitled "Basic difficulties in tracer methodology" is especially well presented and covers the problems of purification, radioactive decomposition, and isotope effects that should be emphasized to students in this field.

One of the surprising features of this average-sized book is the amount and nature of the reference material. Included are a glossary of terms in nuclear science, tables of solvent systems and reagents for paper chromatography and for column chromatography, a table comparing various commercial filter papers, and a table listing various ion-exchange resins and their properties. The latter are accompanied by discussions of principles and operation of chromatography. Although these excellent sections on chromatography are intended to serve as handy reference sources, they may unfortunately find little use, since few investigators may think of referring to a text on radiotechniques for detailed information on chromatography.

I was somewhat surprised to find that so few of the illustrating experiments presented deal with C^{14}, since it is the radioisotope most used in biological studies.

Radioisotopes in Biology and Agriculture is an excellent book. To researchers in agriculture it offers something hitherto unavailable. As far as general biology is concerned it is now one of many good textbooks on radiotechniques.

SIDNEY UDENFRIEND
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New Books

The Coast Salish of British Columbia. Homer G. Barnett. Univ. of Oregon, Eugene, 1955. 320 pp. $5.

Vector Analysis. Homer E. Newell, Jr. McGraw-Hill, New York, 1955. 216 pp. $5.50.

The Geometry of Geodesics. Herbert Busemann. Academic Press, New York, 1955. 422 pp. $9.

Éléments de Mécanique Quantique. Ph. Pluvinage. Masson, Paris, 1955. 547 pp. Broche, F. 4000; cartonné toile, F. 4600.

Actions Chimiques et Biologiques des Radiations. M. Haissinsky, Ed. pt. 1, *Aspects Physiques de la Radiobiologie*; L. H. Gray. pt. 2, *Chimie des Radiations des Solutions Aqueuses. Aspects Actuels des Resultats Experimentaux*; M. Lefort. pt. 3, *Modern Trends in Radiation-Biochemistry*; W. M. Dale. Masson, Paris, 1955. 254 pp. F. 2800.

A Century of Progress in the Natural Sciences, 1853–1953. Published in celebration of the centennial of the California Academy of Sciences. California Acad. of Sciences, San Francisco, 1955. 807 pp.

Biochemistry and the Central Nervous System. Henry McIlwain. Little, Brown, Boston, 1955. 272 pp. $9.50.

An Introduction to Reactor Physics. D. J. Littler and J. F. Raffle. McGraw-Hill, New York; Pergamon, London, 1955. 196 pp. $4.50.

How to Make Cacti Flower. E. Lamb. Pitman, New York, 1955. 80 pp. $1.95.

Family and Fertility in Puerto Rico. A study of the lower income group. J. Mayone Stycos. Columbia Univ. Press, New York, 1955. 332 pp. $6.