Book Reviews

Colchicine—in Agriculture, Medicine, Biology, and Chemistry. O. J. Eigsti and Pierre Dustin, Jr. Iowa State College Press, Ames, 1955. xvii + 470 pp. Illus. $5.

The object of this book, as stated in the preface, is to bring together the significant contributions and correlate the various lines of research concerned with colchicine and its effects on plant and animal cells. A survey of the progress made to date, rather than any prediction of future possibilities, is emphasized.

The text begins with a discussion of the knowledge of *Colchicum* in ancient civilizations and traces its botanical studies from Dioscorides to the 20th century. Medical uses of colchicine, chemical studies of the pure substances, and sources of the drug are fully covered.

In the chapter "New biological uses of colchicine," it is evident that, through meticulous effort, the priority for the discovery of the effect of colchicine on nuclear divisions is credited to Pernice, who described metaphasic arrest in 1889. A medical student, F. Litz, in the laboratory of A. P. Dustin, senior, at Brussels, Belgium, suggested in 1934 the use of colchicine for altering mitosis and in 1937 demonstrated its effect as an agent for inducing polyploidy. After the colchicine bandwagon arrived in 1938, numerous publications appeared in various periodicals around the world. More than 1600 of these references are cited at the close of the 17 different chapters.

Six of these chapters are devoted to descriptions of the effect of colchicine on cytological processes involved in the induction of experimental polyploids, including amphiploids, autoploids, and aneuploids. Criteria for judging polyploidy and methods by which it may be induced are clearly stated and may well serve as a helpful guide for an amateur in the field.

The authors have emphasized the extreme importance of colchicine as a tool for the plant breeder. The reader is fully aware of its usefulness in the improvement of horticultural plants, cereals, fruits, vegetables, field crops, and medicinal plants. Even forest types have been treated with colchicine. These results are included in the text.

The 29 pages of subject index leave much to be desired. Many plants in which polyploidy has been induced are not listed, although some of these may be found in the author index. The arrangement of bibliographic material makes checking difficult. A list of literature cited at the end of each chapter with a supplementary list of references preceding the author index would be preferable.

Colchicine is a book that every person interested in polyploidy should find very helpful, whether he is seeking a method for the induction of ploidy or an explanation of some genetic behavior of polyploids.

CLYDE CHANDLER
Boyce Thompson Institute for Plant Research

A Manual of Paper Chromatography and Paper Electrophoresis. R. J. Block, E. L. Durrum, and G. Zweig. Academic Press, New York, 1955. 484 pp. Illus. $8.

The first section of this manual, written by Block and Zweig, is an unusually complete description of paper chromatography. The mechanics of the techniques are described in such detail that they may seem irrelevant to those familiar with chromatography. However, such detail will prove to be extremely helpful to the student.

The most remarkable attribute of this section is its completeness. Each phase of the assay is dwelt upon at great length. The authors review the advantages of the various forms of chambers, the name and number of the proper filter paper for the clearest separation of different compounds, the best combination of solvents, and the methods for preparing the samples. For each group of compounds there are many reagents given for the location of the spots. For example, in amino-acid chromatography, there are 67 reagents described, including those for specific amino acids. The authors also indicate those that are recommended. Included are the methods that have been described for all biologically important compounds. There are many tables of R_f values.

Unfortunately, the second section by Durrum is not nearly as complete as the first. Durrum explains in the preface that the space allotted prevented a more detailed coverage. This was an unfortunate policy. If a new section was to be added, then it seems to me that the same thorough coverage should be insured. This is not to imply that the second section is poorly done, for such is not the case. However, the word *manual* cannot be applied.

HOWARD B. BENSUSAN
Department of Physiology, University of Maryland School of Medicine

Annual Review of Nuclear Science. vol. 4. James G. Beckerley, Martin D. Kamen, and Leonard I. Schiff, Eds. Annual Reviews, Stanford, Calif., 1954. ix + 483 pp. Illus. $7.

Seventeen essays in this volume cover nuclear physics and biological, chemical, and geologic applications. For me the outstanding review was Kohman and Saito's "Radioactivity in geology and cosmology." A large number of original references are organized into a comprehensive and logically connected survey. Critical selection is exercised without prejudicing problems still in process of solution. In addition, an element of style makes for a relatively exciting article. Another stimulating review is that of Asaro and Perlman on "Alpha radioactivity," which summarizes simply the chief insights and further problems revealed by recent developments. Also enlightening were "Positronium" (De Benedetti and Corben), "Heavy Mesons" (Dilworth, Occhialini, and Scarsi), and "Vertebrate radiobiology" (Thomson).

Unfortunately, a number of the remaining articles were not such a pleasure to read, mainly because of partial neglect of the supposedly dominant review aspect. The object of a review is to survey developments in a field, showing from a single point of view their logical connection, relative importance, and features of general interest. Since the readers are *not* experts, the presentation should remain as simple and basic as possible. All this implies that questions of literary technique, such as organization and style, are more important than they are in an original research paper. It is disappointing to note that some of the papers reviewed here compare unfavorably in perspicuity with papers in the *Physical Review*. This is especially noticeable in the shorter articles, as is to be expected; the more a subject must be compressed without losing coherence, the greater the literary virtuosity required, and the more patent its lack. One recalls Woodrow Wilson's remark on the 5-minute versus the 2-hour speech.

The writing of a satisfactory review article demands extra effort; but under the present tendency toward fragmentation of research, this effort appears to be of increasing value as a means for scientific workers to keep from becoming ignorant of science.

D. C. PEASLEE

Department of Physics, Purdue University

Les Bactéries Lysogènes et la Notion de Provirus. F. Jacob, Monogr. de l'Institut Pasteur. Masson, Paris, 1954. viii + 176 pp. Illus. + plates. Paper, F. 800.

This monograph contains a detailed description of the remarkable researches that have been carried out in the division of Microbial Physiology of the Pasteur Institute since 1950, studies that have placed the phenomenon of lysogenesis in clear relationship to other aspects of bacterial virology. Included are investigations of the bacteriocins, antibiotics that have certain important properties in common with bacteriophages. Prophages, the latent form of phages in lysogenic bacteria, are extensively considered with respect to their nature and their relationship to the genetic material of the bacterial host cell. This is followed by an enlightening discussion of provirus as a possible explanation of viral latency in animals and plants.

This book will be read with pleasure by all those interested in bacteriophages. It may be read with profit by those interested in plant and animal viruses and, in addition, is heartily recommended to all biologists as an example of the way in which research in an esoteric field may illuminate other branches of biology.

MARK H. ADAMS

Department of Microbiology, New York University

Differential and Integral Calculus. Harold M. Bacon. McGraw-Hill, New York–London, ed. 2, 1955. vii + 547 pp. Illus. $6.

Since Granville's *Elements of the Differential and Integral Calculus* first appeared in 1911, the traditional sophomore course has changed little. Neither arrangement nor presentation of topics in textbooks on the calculus has been significantly different. The revised edition of Bacon's *Differential and Integral Calculus* carries on the tradition.

However, a few calculus textbooks have appeared in recent years that are different. The authors of these textbooks attempt to give the calculus the flavor of contemporary mathematics. One would expect that a revised edition of a "well-liked text" would try to incorporate also some of the concepts of contemporary mathematics. But one looks in vain for evidence. On page 5, for example, is given the usual, unsatisfactory definition of a variable as "a quantity that may have different values," and on the same page one finds that "a *constant* is a quantity that retains the same value throughout any given problem or discussion." In view of the way in which the author handles variable and constant, one is not surprised by the sentence on page 209: "Since the value . . . is perfectly arbitrary, we call [it] an *arbitrary constant.*"

There appears no hint of a contemporary definition of a function. Since several freshman textbooks include a development of a modern concept of a function, there is a feeling of disappointment that a more advanced textbook chooses to ignore this important aspect of mathematics.

MYRON F. ROSSKOPF

Department of the Teaching of Mathematics, Teachers College, Columbia University

Advanced Mathematics for Engineers. H. W. Reddick and F. H. Miller. Wiley, New York–London, ed. 3, 1955. xiv + 548 pp. Illus. $6.50.

This is the third edition of a book first published in 1938. It is based on courses given by the authors to engineering students at the Cooper Union Institute of Technology and is designed to set forth many of the roles played by advanced mathematics in the technology of civil, electrical, mechanical, and chemical engineering. The third edition was prepared by F. H. Miller.

This edition differs from the second principally in a fuller treatment of Legendre functions; in the shortening of the discussion of permutations, combinations, and elementary probability theory to secure space for a short treatment of numerical methods for solving differential equations; and in the inclusion of a section on Laplace transforms. Like its predecessors, the book devotes several chapters specifically to a discussion of differential equations and includes many examples involving differential equations in the other chapters. It is expected that the recurrence of such problems will provide the student with as full a knowledge of the theory and applications of this discipline as is usually obtained in a separate course.

In my opinion, the view is overly optimistic. The importance of a secure knowledge of differential equations for engineering students is such that a full course supplemented by work selected from other chapters of this book would seem to constitute a preferable procedure. This possibility is contemplated by the authors, and the book can easily be adapted to such an arrangement.

The very brief space devoted to probability theory in the revised Chapter IX seems hardly adequate to justify its inclusion in the book, while the introduction to numerical solutions of both ordinary and partial differential equations is necessarily also extremely brief. It would require an extraordinarily competent teacher to give the student an understanding of the content of the problems alluded to in this chapter.

This is a difficulty, of course, that presents itself in connection with most topics presented in a book of this length that deals with differential equations, ordinary and partial; hyperbolic functions; elliptic integrals; Fourier series; Gamma, Bessel, and Legendre functions; vector analysis; probability and numerical methods; functions of a complex variable; and operational calculus.

The difficulty of handling such a variety of topics is minimized by a consistently clear and careful exposition, supplemented by adequate footnote references to mathematical articles and books. With each principal topic, examples are presented in the text dealing with physical applications related to the four main fields of engineering; and extensive and interesting problem material is included.

MINA REES

Hunter College

Magnetic Amplifiers. H. F. Storm. Wiley, New York; Chapman & Hall, London, 1955. xix + 545 pp. Illus. $13.50.

This book comprises a preface, a detailed table of contents, 29 chapters, an extensive bibliography, and a good index. The first three chapters treat magnetic materials and the measurement of their characteristics. Chapters 4–20 and 29 are devoted to the theory of operation of saturable reactors, magnetic amplifiers, and nonlinear inductors. Details of magnetic amplifier construction are presented in Chapter 21, characteristics of metallic rectifiers are presented in Chapter 22, and numerous practical applications of magnetic amplifiers are mentioned in Chapters 23–28.

The book is very well bound, excellently printed, and profusely illustrated with extraordinarily good drawings. The style of writing is such as to be easily