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.

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**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.

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**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.

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**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

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**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

understood, and care is taken to explain clearly points that ordinarily tend to be difficult for the student to grasp. However, in some instances the author's statements are not as precise as might be desired.

The comprehensiveness of coverage of the theory of magnetic amplifiers tends to make this book well suited for use as a textbook in a senior-level course in electrical engineering. The complete lack of problems and the relatively great expense of the book resulting from the inclusion of a large amount of material that would be wholly out of place in such a course tend to detract from the value of the book for class use. Specifically, the material on testing of magnetic materials and on the construction of magnetic amplifiers has no place in a course of such nature; furthermore, because of an almost complete lack of application of the concepts of transfer function and the mathematical analysis developed in Chapters 4–20, the discussions of applications in Chapters 23–28 have little value for a senior-level course.

However, this book should serve as an excellent reference book for the practicing engineer and the senior student alike.

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**Physicochemical Calculations.** E. A. Guggenheim and J. E. Prue. Series in Physics. J. De Boer, H. Brinkman, and H. B. G. Casimir, Eds. Interscience, New York; North-Holland, Amsterdam, 1955. xii + 491 pp. Illus. $7.

*Physicochemical Calculations* will fill a real need for a modern source book on the details of physicochemical computations long felt by physical chemistry teachers and by research workers in this area. The book contains 171 problems based on published work in physical chemistry or chemical physics. Each problem is presented in four sections: namely, data, including detailed references to the sources; procedure, which describes the method of calculation; detailed numerical calculation, paying particular attention to units; discussion of significance of the result and the relation to other work.

The problems are divided into 24 groups on the basis of their subject matter. These groups are atomic and molecular weights, Avogadro number, molecular velocities, interatomic distances, moments of inertia, characteristic frequencies, electric moments and polarizabilities, energies and enthalpies, entropies, heat capacities, equation of state, mixtures of nonelectrolytes, electrolyte solutions, conductance and diffusion of electrolytes, gaseous equilibria, chemical equilibria involving solids, solution equilibria, acid-base equilibria, general electrolyte equilibria, solid surfaces, liquid surfaces, gas kinetics, solution kinetics, radioactivity.

As may be seen from the list of subjects, there is material that will be valuable to the student and the practitioner of physical chemistry at all levels. We are indebted to the authors for their painstaking effort.

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**Enzymologie.** Eine Darstellung für Chemiker, Biologen und Mediziner. Otto Hoffmann-Ostenhof. Springer, Vienna, 1954. xvi + 772 pp. Illus. $26.65.

This book is an expansion of a two-semester course in enzymology for advanced students of chemistry given by the author at the University of Vienna. The first 17 chapters (175 pages) deal with general aspects of enzyme chemistry —history, kinetics, general methods of purification, thermodynamic considerations, analytic procedures employed to follow enzymatic reactions, and so forth. These subjects are not treated extensively, but the material should be useful to a beginning student in this field.

A separate chapter has been devoted to nomenclature, a specialty of the author; in fact the author's method of nomenclature for enzymes is used throughout the book. To give a few examples, D-amino acid oxidase is called D-amino acid $\rightarrow O_2$-transdehydrogenase, DPN-cytochrome c-reductase becomes DPN $\cdot H_2 \rightarrow$ cytochrome c-transelectronase, and phosphorylase is glucose-1-phosphate $\longrightarrow$ amylose-transglucosidase. In some cases, even though much is known about substrate specificity and the mode of action of the enzyme, it has been impossible to arrive at a systematic name, and the author has retained the trivial name of the enzyme, for example, pepsin, trypsin, papain. For those less adventuresome in the matter of nomenclature, the traditional name can be found in parentheses in the text or index. Some readers may consider it a minor annoyance to find the traditional name of an enzyme in the index and there cross-referenced to the author's terminology before finding the page number.

Chapters 18 to 47 (497 pages) contain discussions on the properties of individual enzymes; this portion of the text assumes the proportions of a *Handbuch*. The treatment of the individual biocatalysts is, of course, not as extensive as in a treatise such as *The Enzymes,* but the author has certainly made an effort to include pertinent facts concerning as many enzymes as possible. Literature references, frequently up to 1953, are included in each discussion. In the attempt to make the book as current as possible there has been an occasional presentation of certain material as fact which is still in the realm of theory. For example, on page 166 coA-phosphate is stated to be the intermediate of Kaufman's P-enzyme reaction.

The material in the book is well organized, and the descriptive parts are presented in a concise manner. The section of the text dealing with the individual enzymes should be helpful as a reference source for the student of enzymology.

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**The Biology of Man.** John S. Hensill. With chapters by Joel F. Gustafson and Herman Zaiman. Blakiston, New York, ed. 3, 1954 (Order from McGraw-Hill, New York). vii + 440 pp. Illus. $5.50.

The present book was developed by the author for use in a program in general education. He states his objectives as follows: "This book is planned to achieve several objectives which will give the student a fuller, richer life through an understanding of his own fundamental nature: (1) to understand the relation of other organisms to, and the effects of other organisms on, the human organism; (2) to understand the normal and some of the abnormal processes involved in the origin and development of human life; (3) to understand the mechanism by which human characteristics are, or are not, inherited; and (4) to understand and appreciate the place, force, and significance of biological science in our modern society. Through these the student accumulates a background of information about the one subject that interests him most, himself."

This presentation is a far cry from the older "health and hygiene" approach. Fundamental information is intelligently presented in a manner that develops recent physiological principles. If the student assimilates this information, he will possess an understanding of his anatomical and physiological self, attained by few college students. The presentation of chemical information necessary for understanding physiological activity is mature but not beyond the capabilities of the average college student. Except for a greater stress upon human character-