which are much more extensive than those in most texts at this level. A brief treatment of sets and set notation is relegated to the appendix because it is really not essential to the development of the text.

The author introduces terminology consistent with modern curricular developments but at times appears to find their use somewhat cumbersome. For example, a function is defined early in the text as a special subset of the real Cartesian plane, but the author quickly points out that "equations" will, at times, be referred to as "functions," although such usage is not in strict conformance with the stated definition. The concepts of "variable" and "solution set" are introduced, but "unknown" occasionally slips into the writing.

The style of exposition is clear and concise, and the exercise sets contain many problems of a nonroutine nature. In fact, instructors should emphasize that many of the exercises are critical to the text development and very important for later study of the calculus. The author has made a fine selection of topics that need emphasis prior to a course in the calculus, and he seems to have developed his writing in a style which should be understandable by the intended audience.

DONALD J. DESSART
Department of Mathematics,
University of Tennessee

Second International Pharmacological Meeting

Drugs and Enzymes (Pergamon, New York, 1965. 516 pp., $15), edited by Bernard B. Brodie and James R. Gillette, presents a valuable record of symposia held in 1963. The discussions by many of the speakers, most of them authorities of world renown, were so filled with solid facts and sound speculations that much of the volume is stimulating reading today and an important reference for research worker, graduate student, and teacher, despite subsequent research in most of the areas. A thorough reading should greatly increase the sophistication in the approach of the pharmacologist who is trying to relate his observations to possible cause-and-effect involvement of enzymes.

The first section contains 20 papers on the relationship between biochemical effects of drugs in vitro and their pharmacological action in vivo. Brodie's introduction points up important considerations not recognized in the past and not always clear to investigators today. However, it does not make clear that tentative proposals about where a drug may act are determined to a significant degree by the methods of study available or being used at any given time. The net influences of reversible binding are considered in great detail by Gillette, some in detail unnecessary for the more sophisticated but perhaps important for neophytes. McIlwain's discussion of ion movements in the nervous system seems dated, but Repke's discussion of the cardiac glycosides and membrane ATPase is excellent. Greengaard and Giacobini's reports on the relation of metabolism to activity in nerve tissue are valuable. Bacq and Liebecq present a long and complete consideration of radio-protective materials. Spector summarizes the ramifications that result from monoamine oxidase inhibition. The detailed analysis of carbonic anhydrase inhibitors (by Wirz, Maren, and Wistrand) illustrates so clearly the depth of understanding that we must have before we can with certainty ascribe physiological effects to an observed effect on an enzyme.

The second section contains an important and timely series of 21 discussions of the biochemical mechanisms of drug toxicity. The rapid increase in our appreciation of hereditary factors in individual variation and what it does to the "normal distribution" and "average dose" is discussed by Kalow and Netter, while Fouts, Conney, and Remmer present an extensive discussion of the adaptive changes in drug metabolizing systems and how they affect individual responses. Axelrod, Adler, and Williams thoroughly cover the conversion of substances to active drugs and to more toxic products. The papers by Horning, Poggi, and Heimberg give an extremely valuable summary of the mechanisms by which CCl_4 and certain other substances influence liver lipids. This work has added significantly to our knowledge of normal lipid-transport processes. The cumulative effects of reserpine on the pituitary-adrenal system, drugs causing porphyria, and a very detailed discussion of photosensitivity to drugs are also included. The great problem in determining the biochemical mechanism when a drug, such as thalidomide, is converted to 12 metabolic products is carefully outlined by Faigle and others.

F. EDMUND HUNTER, JR.
Pharmacology Department,
Washington University Medical School,
Saint Louis, Missouri

An Introduction to Genetics

Faced with two more books on the history and significance of genetics, a reviewer cannot help but ask, "Is this book necessary?" With several excellent books of this sort already at hand, a new entry into the field should justify its existence either by unusual excellence or by unique qualities.

F. A. E. Crew's **The Foundations of Genetics** [Pergamon Press, New York, 1966. 202 pp., $3.75 (paper)] covers familiar ground, from plant hybridization before Mendel to the human implications of genetics. It is almost entirely concerned with transmission genetics; less than 4 percent of the book is devoted to molecular genetics. There are 20 portraits of prominent geneticists, only two of whom are still alive (and both have retired). Within this framework, Crew's book is a good, though not inspiring, work. It might be useful to a student who wanted to review the development of genetics to 1953, but the general reader is not likely to find the book of much interest.

Broadly the same ground is covered in **The Language of Life** [Doubleday, Garden City, N.Y., 1966. 256 pp., $5.95] by George Beadle and Muriel Beadle—but in a completely different manner. To begin with, it is a rare example of a book that is consistently addressed to the same audience throughout—the ignorant but intelligent layman. The authors are unusually suited to the task they undertake, one being a Nobel laureate in genetics, and the other a former newspaper woman. As they explain in the foreword: "The writing was done by Muriel, who is not a scientist; in fact, until she attempted this book, she had learned only enough jargon to know that geneticists who refer to their children as F_1's are describing them quite precisely—if in scientific shorthand—as 'first generation hybrids.' The theory behind our collaboration, therefore, was that if George could explain genetics in terms simple enough for Muriel to grasp, *anybody* could understand it. It was our hope, initially, that we could

do the job without using any language unfamiliar to non-scientists. This hope has not been realized. Scientific terminology has been held to a minimum however. . . ."

Their book is not one for the half-hearted reader; the layman needs seriously to start at the beginning and work through it chapter by chapter. Given a serious interest, the reader should be able to master all parts of the presentation, for it is skillfully done. Molecular biology is introduced early and constitutes, by rough estimate, 45 percent of the book. The step-by-step explanations are accompanied by numerous clear diagrams and many telling analogies. The exposition is an admirable blend of the historical and the contemporary, the former being viewed in the perspective of our present position. Personal anecdotes enliven the account, many of them (I believe) published here for the first time.

The last five years have seen several books published with coverage similar to *The Language of Life*, but in my opinion it is the best of them all. I wholeheartedly recommend it to any serious layman who wants to know what modern genetics is all about.

GARRETT HARDIN
Department of Biological Sciences, University of California, Santa Barbara

Mammals on Display

A Zoo Man's Notebook (University of Chicago Press, Chicago, 1966. 216 pp., $4.95), by Lee S. Crandall, is a popular abridgment of Crandall's recent, exhaustive monograph *The Management of Wild Mammals in Captivity*, which was hailed by reviewers and professionals as a zoo-keeper's bible. Omitted here are most of the minutiae of the zoo business—statistics, diets, techniques of maintenance and display, medication, and the like, Treated are selected species, representative of the whole array of zoo mammals, that are familiar to almost everyone, together with piquant accounts of some truly exotic, little-known animals. This skillful adaptation for the general reader has required careful selection and some additional writing provided by William Bridges, the author's associate at the New York Zoological Park for more than 30 years. The book is illustrated with 63 photographs, all of the highest caliber, depicting most of the types discussed. A convenient index is provided on the inside covers and flyleaves.

In a section devoted to bears, we get a brief review of their characteristics, the various kinds and their natural distribution; their winter dormancy, breeding habits, weights, and longevity, and their behavior in captivity. Further on we learn of the problems involved in breeding and rearing tigers in captivity, and how 28 of the offspring of Dacca and Rajpur were reared. Elsewhere we read of the procurement and transportation to New York of the giant panda from the bamboo thickets of western China, the mountain tapir from Ecuador, the platypus from Australia, the bongo and okapi from the forests of Kenya and the Congo, the takin from the mountains of southeastern Asia, and the oryx from the Arabian deserts. Interesting details are recounted of all these species and of many others.

Crandall writes in the fine tradition of his former colleagues Ditmars and Beebe, but his style is distinctly his own. Apparent throughout is his sympathy for and warm understanding of his subjects. The reader gains a new insight into the lives of these creatures, and an appreciation of the challenge and complexities of managing a zoo. Here and there are interspersed appropriate anecdotes and personal observations and experiences. In brief opening and closing sections bits of a biographical nature are delightfully presented. The book ends all too soon. It is sure to appeal strongly to all those with an interest in the animals on the other side of the bars and, indeed, to a far wider audience as well.

RICHARD H. MANVILLE
Bird and Mammal Laboratories, U.S. Fish and Wildlife Service, Washington, D.C.

A Russian Monograph in Translation

General Chemistry (Gordon and Breach, New York; Noordhoff, Groningen, 1965. 694 pp., $17.50) by N. Glinka is listed as a 1965 edition by the publishers, but it is a translation of a Russian text which was listed as being in its eighth edition in 1956. An Estonian translation was noted in 1960, but there is no indication that either that or the present volume is based on work any later than the 1956 edition. David Sobolev translated the volume from the Russian.

The book is offered in the publisher's catalog simply as a comprehensive introduction to inorganic and organic chemistry, recommended especially for self study. As such, the coverage of topics is reasonably good. There are 26 chapters, including chapters on atoms and molecules, the periodic law, atomic structure, the structure of molecules, the structure of solid substances, the development of the periodic law, chemical kinetics and equilibrium, solutions and their properties, the theory of electrolytic dissociation and of formation of complexes, and the atomic nucleus.

In comparison with the modern introductory textbooks used in this country, Glinka's volume would be classed as "descriptive." Principles are often treated as subheadings—catalysis, for example, appears under sulfuric acid; adsorption and thermochemistry, under the carbon group; and balancing of oxidation reduction equations, under the halogens rather than the section on oxidation and reduction. The treatment of kinetic molecular theory is weak, but there is reference to the expectation that the student will have covered this in his physics courses. The coverage of solutions and colligative properties is good, with the theory of electrolytic dissociation being carried through the concepts of interionic attraction and interaction with solvent. However, acids, bases, and salts are treated as such, with no mention of the proton concept of acids. The handling of chemical kinetics and equilibrium is surprisingly weak. The Periodic Table is presented essentially in the Mendeleyev (the translator's spelling) form, with iron, cobalt, and nickel, for example, being discussed under Group VIII. Discussion of molecular structure includes the concepts of ionic, metallic, and covalent bonding. The impact of quantum theory and wave mechanics is mentioned, but valence is interpreted essentially in terms of atoms acquiring stable electron shells, similar to those of the inert gases, by transfer or sharing of electrons.

Very few quantitative relations are used. An occasional calculation is included in the text, but there are no problems or exercises. (Glinka does have in print a separate problems book, but that volume is not mentioned here.)