cluding electron-phonon interactions and the problem of degenerate plasma), systems of interacting bosons, electromagnetic radiation in an absorbing medium (that is, the calculation of the dielectric constant), and the theory of superconductivity (including a derivation of the phenomenological Ginzburg-Landau theory). Although a number of more recent results are not included, the book should be very useful to a large number of physicists.

It is heartening to see how methods used in one branch of physics can be of fundamental importance in another branch as well. The translator of this book, Richard A. Silverman, deserves special credit because the book is not just a translation, but a complete revision in collaboration with the authors.

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Psychology

The Science of Animal Behaviour. P. L. Broadhurst. Penguin Books, Baltimore, Md., 1963, 135 pp. Illus. 95¢.

This fine little book, written especially for the Pelican paperback series in psychology, presents a quite readable, yet scholarly, survey of animal behavior. Virtually every problem of any importance to students of animal behavior is covered, with illustrative experiments frequently given in detail. Still, the language and style are such that any intelligent layman can read and understand the book.

The first and the last of the book's seven chapters are concerned, respectively, with the reasons for studying animal behavior and with its practical uses. In both chapters, it is emphasized that animal behavior is interesting in its own right. On the other hand, certain inferences can be made from animal behavior to human behavior, and it is a valuable adjunct to human psychology. In addition, it has certain practical uses, and in the future, it may have even more. We may see the day when animals are used for routine manufacturing tasks that bore humans but can be done reliably by animals.

Broadhurst distinguishes between ethology as the field study of animal behavior and animal psychology as a laboratory study. The second chapter covers ethology, the third chapter laboratory experiments, each with illustrative descriptions. The advantages and limitations of each approach are given, with a declared bias toward laboratory work. Ethology, nevertheless, is well represented.

The remaining three chapters are divided among the topics of inborn behavior, acquired behavior, and abnormal behavior. Each chapter covers its field well, stating the principal problems, methods, and kinds of results obtained.

The book should find many uses. It is interesting reading for the layman, whether or not he has had any formal training in psychology. It could be used as supplementary reading material or as the basis of a book report in introductory psychology. In a course in comparative psychology, it would be worth using as a supplementary text, for it provides a better overall view of the field than available textbooks. It should even be read by psychologists and biologists outside the field of animal behavior, for in one evening's reading they can get an up-to-date picture of what has been going on in the field.

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Petroleum Engineering

The Fundamentals of Well Log Interpretation. M. R. J. Wyllie. Academic Press, New York, ed. 3, 1963. xvi + 238 pp. Illus. $7.

In the 10 years that have elapsed since publication of the first edition of *The Fundamentals of Electric Log Interpretation,* great advances have been made in the techniques for evaluating petroleum reservoirs through geophysical methods of well logging. In most instances, reasonably accurate estimates can be obtained of the composition, porosity, and thickness of strata in a borehole and of the nature and percentage of the fluids present. The earliest logs were based on certain electrical properties of rocks when penetrated by a borehole that contained drilling mud, and these are still useful; nowadays, however, focused electrical devices and neutron, gamma-ray, and acoustic velocity logs are common and, when employed in proper combination, give much more precise measurement of the parameters sought. The rapid development of these devices has necessitated a second enlargement of the original book and a complete revision of the chapter entitled "A general method of electric log interpretation" (now an inappropriate title because electric logs are only one of the types treated by Wyllie).

The increased size of this edition is due primarily to discussion of devices or methods of interpretation not included in previous editions, notably the proximity, nuclear magnetism, chlorine, cement bond, and still-to-be-perfected acoustic attenuation log and to the determination of porosity and mineral composition in formations of complex lithology.

Despite a few editorial errors that have crept in, this book continues to be the best mixture of clarity, simplicity, authority, and rigor of explanation on a nonspecialist level that I know in its field.

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Mathematics

Foundations of Linear Algebra. A. I. Mal'cev. Translated from the second edition (Moscow, 1956) by Thomas Craig Brown. J. B. Roberts, Ed. Freeman, San Francisco, Calif., 1963. xii + 304 pp. Illus. $7.50.

The first Russian edition of this book was published in 1948 and the second, which differed considerably from the first, in 1956. A number of expository refinements resulted in a saving of space in the 1956 edition, an economy that allowed the author to include a long and important chapter on multilinear forms and tensors and a detailed account of the basic topics in tensor algebra, without altering the actual size of the book.

Here we are concerned primarily with an English translation of the second Russian edition. The translation and editing appear to be of a high quality, and the final product provides American readers with a polished and attractive introduction to the foundations of linear algebra. The titles of the eight chapters briefly indicate the coverage of the volume: "Matrices," "Linear spaces," "Linear transformations," "Pol-

ynomial matrices," "Unitary and Euclidean spaces," "Bilinear and quadratic forms," "Linear transformations of bilinear-metric spaces," and "Multilinear functions. Tensors."

Much of the book's success stems from the author's wholesome attitude toward the various formulations from which the subject may be approached. "In linear algebra one studies three kinds of objects: matrices, linear spaces, and algebraic forms. The theories of these objects are so closely related that most problems of linear algebra have equivalent formulations in each of the three theories. The matrix point of view, which underlies the present exposition, is the one best adapted to actual calculations. On the other hand, most problems of linear algebra that arise in geometry and mechanics lead to algebraic forms, while the best understanding of the internal connections between different problems of linear algebra is obtained by means of linear spaces. Therefore the ability to pass from one type of formulation to another is one of the most important skills to acquire in the study of linear algebra."

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Rare-Earth Elements

The Technology of Scandium, Yttrium, and the Rare Earth Metals. Eugene V. Kleber and Bernard Love. Pergamon, London; Macmillan, New York, 1963. x + 205 pp. Illus. $7.50.

Within recent years scandium, yttrium, and the lanthanons, atomic numbers 57 through 71, have been prepared as "high-purity" metals. Their physical and mechanical properties have been investigated, and constitutional diagrams have been established for many metals with yttrium and the lanthanons. This book, a revision of a survey undertaken for the U.S. Air Force in 1958, is a compilation of available data on the properties of the pure metals and some of their alloys. It contains 939 references and considers work reported through the latter months of 1960.

A brief review surveys their abundance, occurrence, production, availability, recovery from ores, electronic structure, chemical properties, and nuclear properties. Separating the rare-earth elements, methods of analysis, and the economics of the metals considered are also discussed. Various methods used for reduction and purification are reviewed, and the available data, reported during recent years, on their physical, mechanical, and chemical properties are tabulated.

A chapter devoted to binary constitutional diagrams of the rare-earth metals, with one another and with other metals, contains more than 100 diagrams, many of which are incomplete, as one would expect. The alloying behavior of the metals, as it is related to basic physical principles, is briefly reviewed. The final chapter is a review of the use of the rare-earth elements in alloys, and it is interesting to observe that the only widespread use is that of misch metal, principally for lighter flints. The addition of rare-earth metals to magnesium does, however, increase its strength at elevated temperatures, and several commercial alloys are available. Reports with respect to the influence of rare earths added to steels are quite conflicting; some reports tell of dramatic improvement, but others say there is no improvement or that there is actual impairment.

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Adaptation Tolerance

Parasitism. An introduction to parasitology and immunology for students of biology, veterinary science, and medicine. J. F. A. Sprent. University of Queensland Press, Brisbane, Australia; Bailliere, Tindall, and Cox, London, 1963. x + 145 pp. 35s.

Among the several recent books that present the principles and general laws of parasitism, this little volume by J. F. A. Sprent, the 1962 winner of the Henry Baldwin Ward medal of the American Society of Parasitologists, will be approached with interest. In the first 30 pages Sprent presents concepts and definitions of parasitism and other associations. The rest of the book deals with immunity, which is taken as the central theme of parasitism. Other aspects of parasitism that are of general interest—for example, nutrition and life cycle, and behavioral adaptations—are given only token mention.

Parasitism is defined as an "association whereby one partner gains its nourishment from another, but in such a way as to establish an intimate macromolecular contact, whereby the host is potentially able to recognize the associate as foreign." Adult cestodes are thought not to meet that criterion and are regarded as commensals.

Immunity to heteroparasites and to homoparasites (graft, foetus, tumor), the concept of "self" and "not self," and the clonal selection theory of antibody formation are considered. Among the conclusions is the idea that there is evolutionary selection of hosts toward lower resistance, that is, "adaptation tolerance."

The treatment of parasitism, with concepts only and without description of any parasite, can hardly serve as an introduction to the subject. This is a book for the reader who has some familiarity with parasites and who wants a stimulating introduction to concepts and principles of immunology as it relates to evolution. There is a bibliography of 72 titles of which 18 deal with parasites and 50 with immunity. The very concentrated style may explain some unfortunate implications such as the following: the implication that plague and trichinosis are harmless to rodents (p. 13), that *Entamoeba histolytica* attacks only intestinal cells (p. 23), that yellow fever infects only man (p. 32).

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Uranium Concentrates

The Technology of the Treatment of Uranium Concentrates. N. P. Galkin, A. A. Maiorov, and U. D. Veryatin. Translated from the Russian edition (Moscow, 1960) by R. D. M. Hegarty. R. W. Clarke, Translation Ed. Pergamon, London; Macmillan, New York, 1963. xiv + 204 pp. Illus. $7.50.

This treatise on the technology of uranium production is published in the International Series of Monographs on Nuclear Energy. In their attempt to provide a very ambitious coverage of the subject, the authors range from the