available and with the vast amount of human material well observed by public health officials in such cities as Leningrad, a real reduction of this multi-billion-dollar affliction should be in sight. Harris' book is well written; it covers a great deal of important material; it is pleasingly designed and printed.

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Plasmas

Advances in Plasma Physics. Vol. 1. ALBERT SIMON and WILLIAM B. THOMPSON, Eds. Interscience (Wiley), New York, 1968. x + 340 pp., illus. $14.95.

Whenever a collection of charged particles is sufficiently dense and sufficiently mobile that their mutual interactions and coupling to external fields produce significant collective effects, plasma physics is supposed to explain those effects. Thus the physics of plasmas is expected ultimately to provide the underlying framework for understanding a wide variety of phenomena in both science and engineering. From the beginning of plasma studies in the late 1920's and early 1930's the interplay between basic and applied work has been strong; it is not surprising that the last two decades have seen the extension of theoretical understanding to include effects characteristic of controlled thermonuclear fusion research, space and solar physics, propulsion and power generation engineering, astrophysics, and solid state physics.

This book is the first volume of a projected series that is evidently intended to focus somewhat more strongly upon the interplay between basic and applied work than the older and complementary series *Review of Plasma Physics* edited by M. Leontovich. A measure of this focus can be obtained from the following classification of the contents of this first volume.

Articles by J. M. Dawson ("Radiation from plasmas"), H. P. Furth ("Minimum-average-*B* stabilization for toruses"), N. A. Krall ("Drift waves"), and T. K. Fowler ("Thermodynamics of unstable plasmas") are in one way or another directed toward some problems important in controlled thermonuclear fusion research, although the first and the last two subjects are fundamental to the behavior of most plasmas. An article by F. L. Scarf ("Plasma in the magnetosphere") is concerned with the interaction of the solar plasma with the earth's magnetic field. An article by T. R. Brogan ("The plasma MHD power generator") concerns a strictly engineering application. No papers on astrophysical or solid state plasmas are included.

The papers are written by leaders in their respective fields. Very little of the material presented is new, but it is here presented in a readily accessible format. The paper "Radiation from plasmas," although not the most comprehensive available on the subject, does treat most aspects of plasma radiation generated by particle encounters. But it omits any discussion of cyclotron or synchrotron radiation, topics of great importance to astrophysical plasmas. Furth's paper on minimum average magnetic field stabilization is the best summary available on this topic. Scarf's discussion of the magnetospheric plasma displays in marvelous detail the validity of his contention that the magnetosphere constitutes an invaluable, giant plasma laboratory in which an enormous variety of phenomena can be observed.

The article on drift waves is very hard reading because the author has taken little pains to be clear. Undefined symbols and an unbending style leave little reason to recommend this paper to anyone unfamiliar with the subject matter. In his article on plasma thermodynamics, Fowler shows how upper bounds can be placed upon plasma transport properties by virtue of thermodynamic constraints and without deducing these properties in detail from first principles.

Of 330 text pages in this volume, 103 are devoted to the development of plasma MHD power generators. This reviewer suspects that this paper will be useful to a very different audience than the others in this volume, being concerned as it is with the difficult "nuts and bolts" problems of making such a generator operational. The proofreading of this article is poor.

All in all the volume contains substantial and useful treatments of some very diverse topics of plasma physics and its applications. Few individuals will likely find a sufficient fraction of the whole to be of such interest as to warrant purchase, but it should be a valuable library item wherever plasma physicists work.

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Familiar Animal

The Biology of the Cockroach. D. M. GUTHRIE and A. R. TINDALL. St. Martin's, New York, 1968. viii + 408 pp., illus. $19.

Especially in the past two decades, great strides have been taken in probing the individual and family secrets of cockroaches. They now are among the best-known insects, even rivaling mosquitoes in the extent to which we understand their growth, reproductive cycles, and responses to various conditions of their environment. Because they are constant domestic pests, occasionally transmitting disease, and also are recognized as fine laboratory animals for teaching purposes and studies of physiology and the action of insecticides, this comprehensive new book by two British entomologists, of the universities of Aberdeen and Birmingham, respectively, is particularly welcome. Its main stated purposes are to help researchers and to introduce cockroaches to general readers. It is a fine book and will doubtless be used in many laboratories as a guide for advanced students and investigators, though too technical for most readers without special background.

The classic work by Miall and Denny in 1886, *The Cockroach*, dwelt more on gross anatomy and included more general illustrations; the present book emphasizes refined physiology and microanatomy. However, the introductory chapter brings out many interesting aspects of the general natural history of cockroaches. Though there are about ten species which frequently occur in modern dwellings (fortunately not all at the same time), there is a surprising number of strictly outdoor species, mostly in tropical and subtropical countries. Some 3500 to 4000 species are "described," that is, already bear scientific names, but at least 2000 more probably remain to be recognized. The authors suggest regions of origin for several common species which have been distributed by human commerce; in the case of *Blaberus craniifer* I believe that West Africa is a mistaken origin, because all 50 species catalogued in the subfamily containing *craniifer* are tropical American in native habitat.

There is now a vast literature on cockroach biology, quite apart from that on taxonomy (with which this book is not concerned). Each chapter has its own supporting bibliography, apparently compiled with much care. Only a few significant omissions or misspellings have come to my attention. Both text and

illustrations contain some original material. Several new terms are proposed for male genitalia in the chapter on external anatomy. The last chapter is a concise summary of modern pest control as applied to cockroaches, with a review of basic effects of different groups of insecticides.

Personally, I would not be without this book. Every department of entomology or biology should have it in the library.

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Rock Mechanics

Engineering Properties of Rocks. I. W. FARMER. Spon, London, 1968 (U.S. distributor, Barnes and Noble, New York). x + 182 pp., illus. $5.75.

Rock Mechanics in Engineering Practice. K. G. STAGG and O. C. ZIENKIEWICZ, Eds. Wiley, New York, 1968. xiv + 442 pp., illus. $14.50.

Although rock mechanics still finds its widest application in engineering, many aspects of this growing field are of interest to geologists and geophysicists. Each new book in rock mechanics will be scrutinized by earth scientists for clues to the earthquake source mechanism and for guides for earthquake prediction, for new studies of the effect of fluids on attenuation, for a better understanding of the relation of properties of rocks *in situ* and in the laboratory, and for new model studies of the deformation and failure of rock masses, to name but a few areas of overlapping interest. The two present volumes offer a rather broad treatment of rock mechanics as a whole. However, only one is likely to have much appeal for earth scientists and engineers.

Engineering Properties of Rocks was written to furnish engineers with a concise review of rocks as a structural material. There are sections on elastic properties, rheology, strength and failure, rock testing, the effect of water, and the effect of pressure and temperature. Measurement of stress and strain is reviewed, and some general design criteria are enumerated.

The book falls far short of its stated purpose. Most topics are treated without regard to modern work, and some without any real understanding of rock mechanics. For example, the physical and chemical roles of water are confused with regard to the effect on strength and elastic properties. It is stated that Poisson's ratio of rocks may be assumed equal to 0.25 for engineering purposes. The significant changes in sound velocity at high stress are overlooked. Because of such shortcomings, I cannot recommend this text for the engineering student or for the practicing engineer, much less for the earth scientist concerned with applications of rock mechanics to the earth.

Rock Mechanics in Engineering Practice is a remarkably coherent advanced textbook in rock mechanics, written by 12 individuals. Although most of the authors are in British universities, reference to the world literature is unusually complete. The book comes very close to achieving its stated purpose of summarizing progress in rock mechanics and suggesting promising lines for future investigation.

As in most textbooks, there are high and low points in the presentation. I found Hendron's review of mechanical properties of rock particularly good, as are Hoek's treatment of brittle failure, Stagg's review of *in situ* tests, and Morgenstern's presentation of limit equilibrium methods. There are excellent chapters on the measurement of stress and strain in rock masses, the dynamic behavior of rock masses, the applications of continuum mechanics, particularly finite-element analysis, in rock mechanics and model simulation of two- and three-dimensional problems. The chapter on the influence of interstitial water is somewhat confusing, and would have been more so had not the editors added a short section giving the modern view of effective pressure. Although the different methods of stress measurement *in situ* are carefully described, I looked in vain for quantitative comparisons of the different methods, for statements as to their relative sensitivity and accuracy. I missed any reference to studies of the effect of size on strength; nor was there mention of thermal stresses. The index to this text is perhaps its weakest part. I came across information quite by accident, and the specialist will simply have to take the time to read the entire book.

In terms of future work, the use of high-speed computers with finite-element and limit-equilibrium methods seem particularly promising, as do the modeling techniques for jointed rock. Further work is needed on a reliable way of determining *in situ* modulus from laboratory tests, although Hendron and Ambraseys suggest an empirical technique which might serve as a good starting point.

All in all, this book is of high quality and, although it assumes a knowledge of elementary elasticity, should be in the hands of most engineering geologists and mining engineers and of any earth scientist concerned with mechanical behavior of rocks under near-surface conditions.

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Books Received

The Absurd Healer. Perspectives of a Community Psychiatrist. Matthew P. Dumont. Science House, New York, 1968. 196 pp. $6.50.

Les Accélérateurs de Particules. Daniel Boussard. Presses Universitaires de France, Paris, 1968. 136 pp., illus. Paper. "Que Sais-Je?," No. 1316.

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