

contains elementary properties of characteristic functions, the inversion formula, the Helly theorems, the continuity theorem, and the Bochner-Khinchine theorem.

The most exciting chapter is chapter 9, on infinitely divisible distributions. Here the author limits himself to distributions with finite variance; he derives, in this case, the canonical representation of the characteristic function of such a distribution, and he proves limit theorems for sums of independent random variables. Chapter 10 is a masterful introduction to the theory of stochastic processes. Included in this chapter are the following topics: Poisson processes, Markov processes, processes with stationary independent increments, stationary processes and their spectral representation, and the Bochner-Khinchine ergodic theorem. Except for the last chapter (chapter 11, on the elements of statistics), all the chapters are good. What the author does well in the last chapter is his presentation of the Kolmogorov-Smirnov two-sample test. However, the rest of this chapter seems to be too hurried and inadequate. One such case is on pages 403 and 404, where a rather confused explanation is given of errors of type I and II in hypothesis testing.

The negative side of this book is small in comparison to its positive attributes. However, one negative aspect is that the mathematical prerequisites are not clearly stated. At first one gets the impression that the prerequisite is a rigorous course in advanced calculus. However, some measure-theoretic results of an advanced nature are assumed and used later, thus creating an uneven mathematical level for the book. Thus, if knowledge of a standard amount of measure theory had been assumed of the reader, not only could the mathematical level of the book have been kept even, but also certain basic topics that had to be omitted could have been included. For example, this book should contain a development of conditional expectation as a Radon-Nikodym derivative, the martingale convergence theorem, Kolmogorov's zero-one law, and the three-series theorem.

In general, Gnedenko's book is a milestone in writing on probability theory, and it will undoubtedly find its way to the bookshelves of mathematicians devoted to this field.

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19 OCTOBER 1962

A Challenging Puzzle

The Planet Saturn. A history of observation, theory, and discovery. A. F. O'D. Alexander. Macmillan, New York, 1962. 416 pp. Illus. Plates. \$12.

To those people who have had an opportunity to see Saturn through a large telescope, it is perhaps the most esthetically pleasing object in the heavens. But to the cosmogonist, it is perhaps the burial crypt of many of the secrets of the origin of the solar system. Its oblate globe together with its rings strongly resembles the lenticular cloud of dust and gas from which it is believed the sun and planets were formed. Saturn was probably formed from a similar smaller cloud of the same nebula, and the rings may be a remnant of that cloud.

This book is but the third extensive treatise concerning Saturn to have been written. It follows the study of the planet in a historical and chronological fashion from 650 B.C. until A.D. 1960. The extensive visual phenomena as seen by many observers as well as the recent astrophysical studies are all included, often with quotations from and references to the original papers. But as a reference volume this book suffers from its chronological approach. For example, the rings are discussed on practically every page following the chapter which treats the introduction of the telescope. If one wants to find information about subdivisions in the rings, the index refers him to 41 pages scattered between pages 122 and 420.

A reader will probably find many parts fascinating, such as the one that treats the eventual realization by Huygens that the puzzling appearances and disappearances of "ears" on the globe were produced by rings encircling the planet. On the other hand the reader will possibly be bored by many of the plodding visual studies presented near the middle of the book. However, much of this material does not yet have an adequate physical explanation, and some of it seems contradictory.

I noted an important error. The author states that the presence of molecular hydrogen cannot be ascertained from a planet's spectrum. He was quoting H. N. Russell who was apparently thinking only of dipole absorption. G. Herzberg, in 1952, found lines due to induced-dipole absorption by hydrogen in spectra of Uranus and Neptune.

C. C. Kiess published spectra of Jupiter in 1960 showing quadrupole absorption by hydrogen. This year H. Spinrad found the quadrupole lines in Saturn's spectrum.

On the whole this is a useful book to the researcher, for it brings to light much of the little-known and unexplained visual phenomena that occur on the ball and rings of the planet.

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Natural History

The Senses of Animals and Men. Lorus and Margery Milne. Atheneum, New York, 1962. x + 305 pp. Illus. \$6.95.

Since remotest antiquity man has been fascinated by animal life and conduct. As if drawn by an irresistible allure, he wove fanciful tales about the animals he knew and romanticized freely about the ones he invented. The tall stories recounted by Pliny, frequently with due apology for their extravagance, and the utterly charming concoctions of the numerous medieval bestiaries bear full testimony to this inherent and characteristic curiosity of man in his fellow creatures.

The present volume may be said to cater to this same basic curiosity, but in a manner that reflects the new, sound, and no less intriguing horizons of modern science. The book is natural history at its very best, full of the fascinating aspects of animal behavior that are effected mostly by sensory intervention. It brings together, in readable prose and logical organization, virtually all that has recently been brought to light, through keen observation or ingenious experimentation, concerning the little-known world of animal conduct. From Steche's experiment with the electronically controlled dance of a mechanical bee sending forth a live swarm to a predesignated region, to the sea lamprey's electric arc, emerging from and reentering its body, with which it detects obstacles that affect it, to the remarkable adaptations of the wax-eating birds of the genus *Indicator*—incident piles upon incident, chapter follows chapter, unfolding adaptive behavior, mostly genetic in nature, whose functional expressions never lose their attraction and wonder. The mediation

of every known sense organ is considered as well as many as-yet puzzling behavior patterns, such as, the migration of birds, periodicity, adaptation to hemispheric divergence, and mating behavior.

The book will be of interest not only to all students of biology, but equally to all nature and animal lovers. It is rich in natural history and in the latest experimental attacks upon everyday phenomena of the living world, and constitutes thoroughly entertaining and informative reading.

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Notes

Evolutionary Genetics

As Eliot Spiess remarks in his foreword to this collection, **Papers on Animal Population Genetics** (Little, Brown, Boston, 1962. lxxi + 513 pp. Paper, \$5), the advances of population genetics during the past decade have been rapid. I know of no better way for a geneticist or an advanced student of genetics to follow these advances than by using this well-organized volume. It should be noted, however, that evolution, rather than animal breeding, human welfare, or mathematical models, is the focal point; therefore, not all of population genetics is covered. Artificial selection is also rather slighted, but Falconer's book fills this gap. Only two of the 37 papers, both classics, were published before 1954, and none before 1946.

Within its scope, as defined above, the book is a nearly unqualified success. Spiess, the editor of the volume, gives in 41 pages a cogent review and integration of the present status of the theory of evolutionary genetics; this is followed by a bibliography of 400 titles, several of which had been unknown to me. But it is not entirely a reflection of the geographical concentration of geneticists that no paper in a language other than English is mentioned; Lamotte, Sperlich, L'Héritier, and others are therefore omitted entirely. Otherwise the papers in the bibliography and those printed in full are representative of the field of this book.

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Vema Research Series

Abyssal Crustacea (Columbia University Press, New York, 1962. 232 pp. \$10) contains three papers, by J. Laurens Barnard, Robert J. Menzies, and Mihai C. Bacescu; it is the first volume of a series which will be devoted to the researches that result from the expeditions of the *Vema*, the vessel of the Lamont Geological Observatory. Although the principal efforts of the Lamont Geological Observatory have been in the field of geophysics, biology has not been neglected, and it is welcome to see the first volume of the series devoted to that good, old-fashioned, but perpetually essential branch of oceanography, the taxonomy of deep sea animals. Both major papers (on amphipods and isopoda) promise further treatments, presumably in subsequent volumes, and it is to be hoped that the original plans can be carried out. In one respect, however, it must be said that this volume falls short of the tradition set by previous expedition series. This is the matter of the size of illustrations. Many of the drawings were obviously intended to be reproduced on a larger scale, and many of them do not occupy all the space available on the large pages of this volume. Others seem to have been assembled on a page almost as an afterthought, producing the unpleasing arrangements on pages 37 and 56, for example. It is to be hoped that more attention will be paid to this detail in future volumes of what promises to become a classic series for oceanography.

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Polish Medical Dictionary

The English-Polish section of Sabina Jędraszko's **Słownik Lekarski: Angielsko-Polski i Polsko-Angielski** (Polish State Medical Publishers, Warsaw, ed. 2, 1961. 797 pp.) contains some 40,000 entries. A random sampling reveals an adequate selection of English medical and paramedical terms that are followed by clear, precise Polish definitions. Above average typography and legibility and its simplicity of style facilitate use of the dictionary. There are, however, some shortcomings. Although many important abbreviations are in-

cluded—for example, PABA, PTA, and DNA—some equally important terms are not. The coverage also appears to be somewhat unbalanced. Under *suture*, for example, 47 entries are listed, but only five appear under *arteries*. Neither does the inclusion of such words as *cat's purr*, *impudence*, and *lamentable* add to the value of the dictionary. However, with further editing, this section could easily become one of the better interlingual dictionaries.

The Polish-English part does not measure up to its counterpart. The native origin of most of the Polish medical terms requires a Polish-English dictionary to be more complete than an English-Polish dictionary. Unfortunately, instead of being larger, the Polish-English section in this dictionary is considerably smaller; it contains about 14,000 terms—approximately one-third as many as the English-Polish section.

To summarize: Jędraszko has provided us with a long-awaited and good English-Polish medical dictionary, but her Polish-English dictionary is far from adequate.

STANLEY JABLONSKI

National Library of Medicine, Bethesda, Maryland

New Books

Biological and Medical Sciences

Introduction to Physical Anthropology, Laboratory Manual. Jack Kelso and George Ewing. Pruett, Boulder, Colo., 1962. 15 units. Appendix. Illus. Paper.

Lipids and Their Oxidation. The second symposium on foods, held at Oregon State University, September 1961. H. W. Schultz, Ed. Avi Publishing Co., Westport, Conn., 1962. 452 pp. Illus. \$3.

The Person in the Body. An introduction to psychosomatic medicine. Leland E. Hinsie. Norton, New York, 1962 (© 1945). 257 pp. Paper, \$1.45.

Progress in Coagulation. Transactions of the conference held at Wiesbaden, Germany, September 1961. F. Koller and E. Beck, Eds. Schattauer, Stuttgart, Germany, 1962. 388 pp. Illus.

Progress in Medicinal Chemistry. vol. 1. G. P. Ellis and G. B. West, Eds. Butterworth, Washington, D.C., 1961. 271 pp. Illus. \$11.25.

Rapid Microchemical Identification Methods in Pharmacy and Toxicology. Sulfonamides, sulfones, barbiturates, and hydantoins. Felix Amelink. Translated by Benedict Kolthoff. Netherlands Univ. Press, Amsterdam; Interscience (Wiley), New York, 1962. 127 pp. Illus.

Underwater Medicine. Stanley Miles. Lippincott, Philadelphia, 1962. 328 pp. Illus. \$10.