Populations and Variation

The Biology of Human Adaptability. Based on a Wenner-Gren conference held at Burg-Wartenstein, Austria, in 1964. PAUL T. BAKER and J. S. WEINER, Eds. Oxford University Press, New York, 1966. 549 pp., illus. $16.80.

This volume, the outcome of a conference at which anthropologists gathered to discuss "the biology of populations of anthropological importance," provides an excellent summary of current knowledge of human variation and a prolegomenon to research forthcoming under the International Biological Program (IBP). Topical and geographic divisions are covered, with particular attention to American Indians and to populations of Africa, New Guinea, the Arctic, and southwest Asia. Urgent research needs are discussed for each of these areas, and attention is drawn to rapidly disappearing populations. Adaptation to cold stress and high altitude, nutritional problems, and adaptation to temperature and exercise are all covered, and the usefulness of Israel as a genetic laboratory composed of highly varied subpopulations is pointed out.

In the introduction Weiner outlines major problems in human population biology. These include worldwide genetic polymorphic systems, worldwide data collection on growth and physique, intrapopulation adaptation to environmental stress, comparisons between urban and nonurban groups, disease as a selecting agent, and biological factors in population dynamics. In addition, Weiner covers medical geographic surveys related to current projects of the World Health Organization. The book continually stresses the need for a worldwide cooperative effort to unravel the history and future direction of human adaptation. The concept of adaptation is taken to include both physiological plasticity and transgenerational evolutionary change. The reader of this work will be struck not only by its thoroughness, but also by the way it points up the ignorance which man displays toward his own biological heritage. The book points the way toward new and exciting research and demonstrates quite clearly that not all useful biological research lies within the domain of molecular biology.

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Mammalian Cytogenetics

An Atlas of Mammalian Chromosomes. Vol. 1. T. C. HSU and KURT BENIRSCHKE. Springer-Verlag, New York, 1967. 50 folios. Without binder, $9.40.

Cytogeneticists who have searched for information on the chromosomal constitution of some mammal, only to find that it was unpublished or presented in some unaccessible publication and perhaps inadequate in any case, will surely welcome this volume. Hsu and Benirschke have undertaken the monumental task of collecting karyotypes of mammalian species in one publication and in a complete and fairly standardized format. The first volume of their atlas covers 50 species, chosen more or less at random but including many common domestic and laboratory animals. The authors' intention is to issue a new volume containing approximately 50 additional species each year. The atlas employs a loose-leaf format with each species appearing as a separate "folio," a neat solution to the problem of organizing the collection as new species are added. Each folio gives scientific and common names, taxonomic position, and diploid chromosome number for the species, descriptions of the autosomes and sex chromosomes, notes on the sources of material, the number of specimens examined, the technique used, any peculiarities such as possible chromosomal polymorphism, and a list of references. Male and female karyotypes make up a full-page plate for each species. The 50 folios comprising volume 1 come boxed together with a brief introduction, table of contents, and an index of both scientific and common names. A new index covering all the species in previous volumes is to be provided with each succeeding volume. The publishers offer a special ring-folder for an additional $2.00, but the atlas fits a standard three-ring binder.

Most of the karyotypes in volume 1 were made by the authors, and the format used reflects their personal preferences, which may not be shared by all cytogeneticists. Subsequent volumes are to use a higher proportion of karyotypes prepared in other laboratories. One hopes that the authors will nevertheless succeed in preserving the relative uniformity of format which makes volume 1 so convenient. The quality of the reproductions in the atlas is generally only adequate, and I was able to find a few minor typographical errors. Nev-

ertheless, the volume is attractive, and its price is certainly not high, considering that it does contain 50 half-tone plates. Incomplete as it is at present, the atlas seems sure to become the standard reference on mammalian chromosomal constitutions.

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Statistical Analysis

Sequential Methods in Statistics. G. BARRIE WETHERILL. Methuen, London; Wiley, New York, 1966. 228 pp., illus. $5.50.

This book provides a brief survey of sequential statistical methods, with an emphasis "on methods which are of importance for making practical applications." As a rule proofs are not presented, but "the logical basis of the methods" is discussed. It seems doubtful that the applied statistician will find in this book solutions waiting to be applied. He will, however, find brief, lucid discussions of a variety of approaches to a large number of problems, which together with a detailed study of the relevant references should prove quite helpful. Likewise the theoretician or theoretically minded student should find in this book easy access to a broad perspective on sequential analysis. He must, however, be on guard. Proofs and derivations, when presented, must be scrutinized, and even statements of important theorems cannot be accepted unquestioningly (for example, the statement of the optimality of the sequential probability ratio test, SPRT, on page 22 is incorrect). Unfortunately the bibliography does not seem adequate for the needs of the theoretically inclined. For example, the failure to include references to other than the original paper of Wald and Wolfowitz on the optimality of the SPRT has, it seems to me, imposed an unnecessary burden on the student trying to fill in the gaps. This result, as well as most of the material in chapter 7 (on decision theory), would be more accessible to the reader familiar with the excellent paper of Arrow, Blackwell, and Girshick (*Econometrica*, 1949), which is not mentioned in the book.

The author has, it seems to me, been successful in arranging the presentation so that topics fit neatly into place with-

out imposing undue hardship on the reader who wants to refer to particular ones. The level of discussion, however, is somewhat uneven. The short section on Anscombe's asymptotic solution to the problem of finding a confidence interval of specified width for the mean of a normal distribution with unknown variance fails completely. On the other hand, the discussion of stochastic approximation, a subject which has received considerable theoretical attention in the last 15 years and has recently found applications in engineering, is easily understood and well documented.

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Logic for Computation

Logic and Algorithms. With Applications to the Computer and Information Sciences. ROBERT R. KORFHAGE. Wiley, New York, 1966. 206 pp., illus. $7.95.

This book is a survey of aspects of mathematical logic and the theory of algorithms which are considered by the author to be relevant to computer science. The treatment is extremely informal in nature and emphasizes the semantic rather than the syntactic aspects of formal systems. Proofs are mostly omitted or indicated by example. Approximately one-fourth of the book is devoted to exercises and their solutions. Topics touched upon include set theory, binary vectors, Markov algorithms, Turing machines, single-address digital computers, programing languages, Post languages, phase-structure (context-free) languages, and the history of computing. Covered more extensively are the minimization of Boolean functions with the use of Karnaugh maps and the Quine-Mc-Cluskey method, the propositional calculus and Polish notation, algorithms via flow charts, and the first-order predicate calculus.

In general, the author appears to have achieved a good portion of his purpose of bringing some understanding of logic to the nonlogician. The best chapter is the third, which develops the propositional calculus along conventional lines. However, the book is not without its uneven spots. In chapter 1 the definition of a 1-1 mapping in terms of the inverse relation seems overly formal. On the other hand, the term "ordered pair" is vaguely defined as a symbol with "a distinction between

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the first and second element." Two axiomatic systems for Boolean algebras are introduced in chapter 2, but their equivalence is not demonstrated and only one of them is used in subsequent discussion. In chapter 6 validity of a first-order sentence is correctly defined, but confusing examples are given which are "valid" only for a particular interpretation and not in the domain under consideration. In chapter 5 flow charts and Markov algorithms fare better than Turing machines. The existence of a universal Turing machine M is briefly mentioned and accompanied by the erroneous statement that "feeding the description of M itself into M leads to unsolvable problems." The unsolvability of the halting problem is mentioned, but not proved. Unfortunately, by not devoting two or three pages to a good informal proof of this important theorem, the author has missed a good opportunity to dispel much of the mystery regarding the nature of unsolvability results.

All in all, I think *Logic and Algorithms* could be used successfully in a sophomore course. The degree of rigor would probably not be adequate for more advanced students.

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Books Received

Advances in Cryogenic Engineering. vol. 12. Proceedings of a conference (Boulder, Colo.), June 1966. K. D. Timmerhaus, Ed. Plenum Press, New York, 1967. 804 pp. Illus. $25. Eighty-two papers.

Advances in Immunology. vol. 6. F. J. Dixon, Jr. and J. H. Humphrey, Eds. Academic Press, New York, 1967. 589 pp. Illus. $18.50. Seven papers.

Advances in Machine Tool Design and Research 1966. Proceedings of the 7th International M.T.D.R. Conference (Birmingham, England), September 1966. S. A. Tobias and F. Koenigsberger, Eds. Pergamon, New York, 1967. 708 pp. Illus. $34. Forty-three papers.

Advances in Organometallic Chemistry. vol. 5. F. G. A. Stone and Robert West, Eds. Academic Press, New York, 1967. 397 pp. Illus. $16.50. Six papers.

Advances in Plasma Dynamics. Proceedings of the Sixth Biennial Gas Dynamics Symposium (Evanston, Ill.) August 1965. Thomas P. Anderson and Robert W. Springer, Eds. Northwestern Univ. Press, Evanston, Ill., 1967. 341 pp. Illus. $15. Fourteen papers.

Antibodies to Biologically Active Molecules. Proceedings of the second meeting of the Federation of European Biochemical Societies (Vienna), April 1965. Bernhard Cinader, Ed. Pergamon, New York,

1967. 432 pp. Illus. $18.50. Thirteen papers.

Applied Naval Architecture. R. Munro-Smith. Elsevier, New York, 1967. 423 pp. Illus. $14.

ASTM Manual on Quality Control of Materials. Prepared by ASTM Committee E-11 on Quality Control of Materials. American Soc. for Testing and Materials, Philadelphia, 10th printing, 1967. 150 pp. Illus. Paper, $2.50.

Astrodynamics: Applications and Advanced Topics. Robert M. L. Baker, Jr. Academic Press, New York, 1967. 556 pp. Illus. $16.50.

Astronomicum Caesareum. Peter Apianus. Edition Leipzig, Leipzig, 1967. Facsimile (limited to 200 numbered copies) of the 1540 (Ingolstadt) edition. 122 pp. Illus. Calif. Commentary in German and English, 108 pp. Illus. 1950 MDN.

A Biologist Remembers. Karl von Frisch. Translated from the German (Berlin, 1957) by Lisbeth Gombrich. Pergamon, New York, 1967. 210 pp. Illus. $6.

Capital Punishment. Thorsten Sellin, Ed. Harper and Row, New York, 1967. 300 pp. Illus. Paper, $3.50. Readers in Social Problems Series. Twenty papers.

Carbanions in Synthesis. D. C. Ayres. Oldbourne Press, London; Davey, New York, 1967. 215 pp. Illus. $10.50. Oldbourne Chemistry Series.

Carbohydrate Chemistry. Eugene A. Davidson. Holt, Rinehart, and Winston, New York, 1967. 447 pp. Illus. $11.95.

Case Studies in American Industry. Leonard W. Weiss. Wiley, New York, 1967. 377 pp. Illus. Paper, $2.95; cloth, $5.95. Introduction to Economics Series.

The Coming of the Space Age: Famous Accounts of Man's Probing of the Universe. Selected and edited by Arthur C. Clarke. Meredith Press, New York, 1967. 315 pp. $6.95. Thirty-six papers.

Communication System Engineering Handbook. Donald H. Hamsher, Ed. McGraw-Hill, New York, 1967. Unpaged. Illus. $28.50.

Comprehensive Textbook of Psychiatry. Alfred M. Freedman and Harold I. Kaplan, Eds. Williams and Wilkins, Baltimore, 1967. 1692 pp. Illus. $24.75.

Computers on Campus. A report to the president on their use and management. John Caffrey and Charles J. Mosmann. American Council on Education, Washington, D.C., 1967. 221 pp. Illus. Paper, $3.

Constructive Real Analysis. Allen A. Goldstein. Harper and Row, New York, 1967. 192 pp. Illus. $9.25. Harper's Series in Modern Mathematics.

The Doctor Shortage: An Economic Diagnosis. Rashi Fein. Brookings Institution, Washington, D.C., 1967. 211 pp. Illus. $6. Studies in Social Economics Series.

The Dolphin Smile: Twenty-nine Centuries of Dolphin Lore. Eleanore Devine and Martha Clark. Macmillan, New York, 1967. 392 pp. Illus. $7.95.

Domestic Sources of Foreign Policy. A symposium (Princeton, N.J.), March 1965. James N. Rosenau, Ed. Free Press, New York, 1967. 356 pp. Illus. $7.50. Eleven papers.