Book Reviews

Population and World Politics. Philip M. Hauser, Ed. Free Press, Glencoe, Ill., 1958. 297 pp.

The Grassland and Fodder Resources of India. R. O. Whyte. Indian Council of Agricultural Research, New Delhi, 1957. v + 437 pp. Illus. $5.

Although these books were not intended for simultaneous review, I am fortunate in having both at hand. They complement each other well. Both deal with tensions arising from an unbalance without known precedent in the long course of biological history. Both agree that solutions are technically conceivable but point out that the fundamental obstacles are cultural, coming from human values and behavior. One thinks inevitably of the concluding words of Brown, Bonner, and Weir in *The Next Hundred Years*—"whether man can learn to live with man."

The 12 chapters in *Population and World Politics*, including an introduction by the editor, are the outcome of the Thirtieth Institute of the Norman Wait Harris Foundation, held at the University of Chicago in 1954. While the lapse of four years has produced some changes, notably in official Chinese population policy, the discussion is essentially fresh. It is grouped into three parts—"World population and resources"; "Population, levels of living, and economic development"; and "Population policy and politics."

Part I, by Durand, Notestein, and Woytinsky, fully documents the present population explosion. It makes clear the difficulties of long-range projection and the complication arising from the growing, widespread demand for better levels of living. Earth's resources are held to be capable of sustaining a larger population than they now do, if managed with proper skill and prudence. The prospects of anything better than limping progress are pictured as unlikely, however.

Part II, by Kuznets, Hagen, Thomas, and Spengler, is the most technical, but it is eminently valuable for the insight it affords as to practical operation in demography and economics. Available data leave much to be desired, and assumptions—presented with great candor—are necessary. Even so, it seems clear that no invariant relation between numbers and welfare—or progress—can be safely assumed.

Part III, by Davis, Lorimer, Taeuber, and Wright, is naturally the one of greatest interest to the general reader. It discusses the conditions in the free and Communist "worlds" and in the "underdeveloped" areas now being wooed by both. The phenomena of population are integral to this dynamic situation, but again not in any uniform or predictable way. That they cannot be ignored is certain, and meanwhile the situation is complicated by the absence of reliable information from important areas. Curiously, we are told that the principal population problem of the United States is the overpopulated countries. I doubt whether this rules out the probability that our skill and intelligence in distributing and planning for our own internal population may greatly affect our future position in international affairs.

The volume by Whyte, of the Food and Agricultural Organization of the United Nations, and his Indian collaborators deals with an area classically overpopulated by man and beast, both ultimately dependent upon the vegetable kingdom. Plant life, the source of sustenance, has been sorely punished by the resulting pressure. Besides the obvious effects on yield of overgrazing, the use of manure for fuel, and the accompanying soil depletion and destruction, nutrient values have suffered from changes in botanical composition of herbage.

India possesses what is essentially forest climate, grading abruptly into scrub and desert, without the intervening natural grasslands found in America and elsewhere. But human activity has resulted in the extensive development of secondary grasslands of various types. The forests that remain have, where they are accessible, suffered from uncontrolled grazing and other abuse.

While the ecological relationship of plant, animal, and man is clear and direct, its effective operation is thwarted by religious sanctions that had their origin under earlier and far different conditions of economic necessity. Existing taboos make it almost impossible to bring about any massive reduction in the numbers of substandard cattle. But until this is done and nutrient levels are raised, no efforts at genetic improvement can possibly succeed.

The botanical chapters show that India does have a great variety of indigenous and foreign plants which could afford excellent grazing under proper management. Even so, the monsoon climate is such that legume fodder must be available to carry through periods of low pasture production. But capital requirements to remedy mineral deficiencies, as well as the excessive subdivision of landholdings, render such a program exceedingly difficult, even were the cattle population to be streamlined.

Despite the clear evidence of what might be done through the application of existing ecological knowledge, the volume, with its vivid photographs, is as depressing as it is challenging. The potential richness of the great Indian peninsula lies helpless under the weight of cultural inertia whose very sophistication makes it almost proof against change. As an eminent Indian scientist expressed it to me, "The problems of my country are all but insoluble." I have heard much the same comment from an American who has registered great achievements in a troubled foreign land.

Yet this does not justify the abandonment of hope and friendly effort. Much as India might gain from the benefits of Western science and technology, I for one suspect that the West might learn much from her. A good teacher must know how to listen as well as expound.

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Electrical Discharges in Gases. F. M. Penning. Macmillan, New York; Philips' Technical Library, Eindhoven, Netherlands, 1958. viii + 75 pp. Illus. $3.

The subject of electrical discharge in gases, now generally denoted by the broader title *gaseous electronics,* received a renewed life in the early 1920's when techniques using pure inert gases and clean electrodes were initiated by G. Holst and E. Oosterhuis at the Philips Research Laboratories, Eindhoven, Netherlands. This work was ably carried forward after 1924 by the brilliant team of F. M. Penning and M. J. Druyvesteyn, who worked on its experimental and theoretical aspects, respectively. Though World War II diverted Druyvesteyn to other work, Penning continued until his retirement and death in 1953.

This book was written by Dr. Penning and appeared posthumously in 1955 in Dutch and has since been translated into French, German, and English; the latter

translation is under review. In a remarkably clear, lucid, and simple, but largely qualitative, fashion, the author presents the cogent factors of gaseous discharge from the basic processes involved through the various types of discharges, including as well a few technical applications. This book is written for the average engineer or person with a college degree based on the physical sciences, and presents in a comfortably readable fashion the elements of electrical discharge in gases, especially as developed during those years when Penning was the experimental leader in the field. This booklet is on a par in character with the monograph series published by Methuen, but is somewhat less technical and of broader scope. Obviously, when it is recognized that the more rigorous treatment of the subject in volumes 21 and 22 of the Springer *Encyclopedia of Physics* of 1956 covers the same scope of information, it is clear that Penning's coverage cannot be more than superficial. Because of its clarity and simplicity and the judicious choice of the most essential elements, this presentation represents a truly remarkable achievement in condensation. It will prove to be of interest and value to those wishing a quick, stimulating preview of this useful and interesting field of knowledge.

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Mathematics and Statistics for Use in Pharmacy, Biology and Chemistry. L. Saunders and R. Fleming. Published under the direction of the Council of the Pharmaceutical Society of Great Britain. Pharmaceutical Press, London, England, 1957. x + 257 pp. Illus. 27s. 6d.

In the words of the authors, this book provides students in pharmacy and other biological subjects with "a short course in mathematics and statistics which assumes very little knowledge of either topic." In reality, it touches upon so many complex subjects in such a limited space that it is not likely to give the unaided reader a working knowledge of either the mathematics or the statistics it covers.

Following two chapters on arithmetic and algebra, chapter 3 introduces analytical geometry, curve forms, and the graphical solution of equations. Chapter 4 covers arithmetic and geometric progressions, series, permutations and combinations, the binomial theorem, and natural logarithms. The next three chapters present the rudiments of differential calculus, the higher derivatives, partial differentiation, and rules of integration. These lead directly to a chapter on trigonometry including trigonometric identities and trigonometric integrals, differential equations of the type applicable to chemical reactions, radioactive decay, and diffusion. Chapter 10 treats equations and series for describing experimental measurements.

The remaining five chapters are statistical, in each case with a discussion of elementary theory followed by one or more applications in biology, chemistry, or pharmacy. Beginning with the probability concept, the authors discuss the binomial, Poisson, and normal distributions. Following this, in a chapter on the statistical analysis of repeated measurements, the mean, standard deviation, and limits of error are considered. In one chapter on tests of significance and comparison of data by statistical methods, the authors cover in rapid succession the normal deviate test, the t test, the variance-ratio or F test, the χ^2 test, least-squares regression, correlation coefficients, covariance, and the error of regression coefficients. Some applications of statistics to biological assay and bacteriology (in chapter 14) and to quality control in pharmacy (in chapter 15) complete the text. Derivations of the more important relations, constants, and reference tables are presented in a series of 13 appendices .

On the whole, the examples are well selected and lucidly explained. *Mathematics and Statistics* contains much fundamental material in a concise and well organized, but oversimplified, form—especially in the statistical chapters. It employs a consistent, mnemonic symbology, and appeals to the intuition of the reader. By bringing together in a compact volume many of the mathematical concepts which underlie basic statistical theory, the authors give the reader a better insight into the interrelations of these concepts than he would gain from the usual introductory text in statistics.

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The Brain and Human Behavior. Proceedings of the Association, December 7–8, 1956. vol. XXVI of *Research Publications, Association for Research in Nervous and Mental Disease.* Williams and Wilkins, Baltimore, 1958. xi + 564 pp. $15.

The student of neurological science will find in this volume a worth-while group of essays on various aspects of the human nervous system. The 21 individual contributions are by outstanding investigators drawn from such fields as physiology, psychology, pharmacology, electrophysiology, clinical neurology, and neurosurgery. The resulting mélange of vocabulary, constructs, techniques, and methodologies somehow permits the emergence of new and important findings bearing on brain-behavior relations.

The corpus callosum is no longer "silent" but appears to provide facilitation of sensory input to the two hemispheres. The frontal lobes, all important in mediating the higher levels of mentation, are apparently secondary in importance to the temporal and parietal lobes in mediating various personality functions, including the "body schema."

Of considerable medical significance is the fact that certain patients with uncontrolled psychomotor epileptic seizures may be benefited by unilateral anterior temporal lobectomy without serious loss in mentation.

Objective behavioral techniques have now been developed which define operationally a frontal lobe principle in the human brain. This principle is apparently redundant to some extent throughout the cerebral cortex and is disturbed by a 2 to 3 percent lesion (average brain weight is taken to be 1400 grams) or more, regardless of cortical locus. The possibilities of "chemical facilitation" in such cases are as yet unexplored.

The reader will search in vain in this volume for a compelling theory or model of brain functioning. Theory in this field cannot yet successfully integrate empirical fact. Nevertheless, he will welcome the continued sponsorship of such studies through its annual programs by the Association for Research in Nervous and Mental Disease, one of the very few remaining medical societies devoted to bridging the void between modern neurology and psychiatry.

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Physics of Nuclear Fission. Supplement No. 1 of the Soviet journal *Atomnaya Energiya.* Translated by J. E. S. Bradley. Pergamon, New York and London, 1958. vi + 182 pp. Illus. + plates. $9.

This book, entitled *Physics of Nuclear Fission,* is actually a translation of the first supplement to the Russian journal *Atomic Energy,* in which were published the papers read at a conference on the physics of nuclear fission, held in January 1956 at the Atomic Energy Institute of the Academy of Sciences of the U.S.S.R.

The conference appears to have been an excellent one, and a surprisingly wide range of material is presented in the