

ogy, and perhaps they are less subject to the vagaries of procedure and experimenter; but, as with so many studies of human interaction, the results do not seem to generalize much beyond the specific situations studied. We do not learn significant principles of individual behavior that permit us to predict the results for other simple social situations, even for other games. Some mathematical theories are suggested, but no careful attempt is made to test them and no clear understanding emerges of the mechanisms at work. The concluding chapter highlights the resulting quandary. A variety of similar studies is suggested, each as interesting as the next, and it is not difficult to amplify the list 10- or 100-fold; but, lacking a plausible criterion of scientific significance,

where does this end? Detailed studies of specific social situations may be justified when the situations are, themselves, of applied interest; however, when they are at best highly abstracted analogues, some guide other than curiosity is needed. Perhaps it is unfair to fault this book for failing to confront this widespread dilemma of research strategy, especially since the book is good within the terms of the problem formulated. Nonetheless, the question of which interaction studies are worth performing is rapidly becoming acute and, in my opinion, a high degree of scientific acumen is now needed to choose among the myriad possibilities.

R. DUNCAN LUCE

Department of Psychology,
University of Pennsylvania

AIBS-AEC Series on Radiation Biology

Although a vast amount of data has accumulated during the past 50 years on the response of mammals to whole-body irradiation and the sensitivity of the target organs that are responsible for the "so-called" lethality syndromes, most of the quantitative information on these key organ systems dates from the adaptation of specific metabolic precursors to biological research, of which one of the most important was tritiated thymidine. Of equal importance to the problem of cell population kinetics and the changes produced by irradiation has been the development and refinement of cell-culture techniques. Scientists at Brookhaven National Laboratory have been in the forefront of the development and utilization of these techniques, and the authors of the volume reviewed here, **Mammalian Radiation Lethality: A Disturbance in Cellular Kinetics** (Academic Press, New York, 1965. 356 pp., \$9.50), Victor P. Bond, Theodore M. Fliedner, and John O. Archambeau, were active participants in many of these experiments—in particular, in the investigations involving hemopoiesis.

In this book they deal with three syndromes—hemopoietic, gastrointestinal (G.I.), and central nervous system (C.N.S.)—but because of the amount and nature of the data they are concerned primarily with the hemopoietic and the G.I. syndromes. Cells of the C.N.S. are highly specialized, nonproliferative cells; therefore, the C.N.S. syndrome occurs (in most ani-

mals) after a high dose and is followed by death within a few hours. In treating the hemopoietic and G.I. syndromes, the authors review and bring into proper perspective most of the information gathered on these two cellular systems for both normal cell kinetics and the changes produced by whole-body irradiation. Death following both syndromes results from the depletion of mature functional cells, but it is the inactivation or destruction of the precursor or stem cells that brings about death. In neither case, bone marrow or intestinal crypt injury, can the stem cells be positively identified, and the current models used to explain the role of the stem cell in regeneration following irradiation are not completely satisfactory. Although the dose-survival curves of these cells resemble those of cells grown in culture, the *in situ* environment and the intricate feedback mechanisms of the whole animal make it somewhat tenuous, if not misleading, to extrapolate from one set of data to the other.

A discussion of animal data precedes the discussion of the effects of whole-body radiation on man. The sources of this information were (i) accidents in industry or laboratories, (ii) the Pacific testing-ground accidents involving exposure to fallout radiations, (iii) the experience at Hiroshima and Nagasaki, and (iv) medical exposure of patients to whole-body (or near whole-body) radiation for therapy of cancer or for other reasons. Although direct

extrapolation from animal data to man (or for that matter, from one animal species to another) may be misleading, the general sequence of events in both the bone marrow and G.I. syndromes is essentially the same in all mammals. It is also clear that death is not the result of damage to a single organ system but that in the lethal range of the syndrome (hemopoietic, G.I., or C.N.S.) death is associated with widespread damage to many organs. Death follows a terminal period that involves hemorrhage, infection, and fluid imbalance.

In general, the authors' treatment of the data shows that the primary consequences leading to the progressive signs and symptoms resulting in death, in days or weeks, to mammals (man or laboratory animals) exposed to large doses of whole-body radiation have their basis in a disturbance of normal cellular kinetics.

This book will be of great value to the advanced radiobiologist as a reference source for use in research and in teaching. It will also provide the clinician with possible guidelines for use in treating persons accidentally exposed to whole-body radiation, in treating cancer, and in making preparation for organ transplants. Heretofore, this information has been widely scattered throughout medical and biological journals and was not available in this form.

S. LESHER

Division of Biological and Medical
Research, Argonne National Laboratory

Flora of Turkey

A published flora often dominates our understanding of the vascular plants of its area long after the steady accretion of knowledge has rendered it obsolete. Nowhere has this been more clearly demonstrated than in the Near East, the source of many of our finest garden plants and a number of our most noxious weeds. More than three-quarters of a century has elapsed since the death of the illustrious Swiss botanist Edmond Boissier and the completion of his six-volume *Flora Orientalis* (1867 to 1888). Only in recent years has this classic begun to be superseded by other major works concerned with the plants of this huge region: *Flora U.R.S.S.* (1934–1964) for its northern and northeastern margins; *Flora Iranica* (1963–) for its eastern

third; and *Flora Europaea* (1965—) for its northwestern European portion. Now we have the splendid first volume of a flora of Turkey—**Flora of Turkey and the East Aegean Islands** (Edinburgh University Press, Edinburgh, Scotland; Aldine, Chicago, 1965. 579 pp., \$27.50), edited by P. H. Davis.

Turkey, a country of nearly 300,000 square miles which occupies most of the central region covered by Boissier's *Flora Orientalis*, is the meeting place of three vast phytogeographical regions, the Euro-Siberian, Mediterranean, and Irano-Turanian. Consequently, it has an exceptionally rich and interesting flora. In this volume, the first of eight scheduled to appear at 2-year intervals, 902 species are treated, suggesting that between 7000 and 8000 species of vascular plants may occur in Turkey. About a fifth of these seem to be endemic, with exceptionally rich concentrations of endemics in south and east Anatolia. Considerably more than a third of this volume is devoted to the 85 genera

of Cruciferae; *Alyssum*, the largest genus treated, has 89 species. Other groups included are pteridophytes, gymnosperms, and the following families of dicotyledons: Ranunculaceae (*Ranunculus*: 79 species), Paeoniaceae, Nymphaeaceae, Berberidaceae, Papaveraceae, Capparaceae, Resedaceae, Cistaceae, Violaceae, and Polygalaceae. The introductory pages of the flora provide a concise review of the topography, climate, and phytogeography of the country. Keys and descriptions for the included taxa, essential synonymy and references, critical taxonomic notes and illustrations, selected distribution maps, citation of types, ecological information, dates of flowering, and general distribution in Turkey are included to make this an impressive and useful flora. This book is virtually free of typographical errors. Systematic botanists will look forward with enthusiasm to further volumes of this work.

PETER H. RAVEN
*Division of Systematic Biology,
Stanford University*

ing. It is important, nevertheless, that people in general be clearly informed about the methods employed by ethnologists to obtain data and reconstruct tribal life patterns so that these basic anthropological techniques can be better appreciated and understood. Maybury-Lewis's book serves this purpose especially well, because of the author's contextual portrayal of the issues and because these techniques are epitomized in the very difficult research conditions usually necessary for the study of recently pacified tribes like the Chavante.

WILLIAM H. CROCKER
*Smithsonian Office of Anthropology,
Smithsonian Institution,
Washington, D.C.*

Life with the Primitive Tribes of Brazil

This fascinating contribution to our understanding of ethnological field work consists primarily of a series of personal episodes and observations. Some (made during 1954 and 1955) pertain to the Sherente, a tribe of Gê-speaking, semi-aculturated Indians on the Central Brazilian Plateau, and others (made during 1958) pertain to the Chavante, their recently pacified cultural relatives. This book, **The Savage and the Innocent** (World, Cleveland, Ohio, 1965. 270 pp., \$4.95), by David Maybury-Lewis, is written in a popular style and will be of considerable interest to readers of a variety of orientations.

The general ethnologist, for instance, will appreciate this skilled field worker's resolution of a number of unnerving tribal intrigues as well as the portrayal of the development of his insight into several highly abstract societal relationships. The ethnological specialist of the area will be substantially helped by the detailed descriptions of the pace and values of hinterland Brazilian and tribal life, but he should not expect to find an abundance of ethnographical materials. The author plans to publish these materials later. The general

reader is likely to find his own experiences with government red tape and transportation delays topped by the author's frustrations from these sources, and will marvel at the physical discomforts and hazards suffered by the author, his wife, and their 1-year old son, all for the sake of science.

The discerning reader will value incidents that illustrate a number of very crucial issues—for example, the issues associated with going native, handling feelings about the tribe, making difficult moral choices, "do-gooding," integrating ethnological insights, selecting workable roles, and running calculated risks with respect to life and health.

Although the hardship side is strikingly overplayed, the hinterlander mildly satirized, and many experiences amusingly exaggerated, the information and points of view are generally sound, but it should be realized that other approaches to field work are often practiced. Especially in the easier situations, many ethnologists incur fewer hardships, take smaller risks, and go native to a lesser extent. In any case, the quality of the results is mainly a function of personal skills and train-

Conference and Symposium Reports

Automation in Industrial Pharmaceutical Process and Quality Control (*Ann. N.Y. Acad. Sci.* 130). Harold E. Whipple, Ed. New York Acad. of Sciences, New York, 1965. 386 pp. Illus. Paper, \$9. Thirty-nine papers presented at a conference held in January 1965.

Biogenesis of Antibiotic Substances. Zdenko Vaněk and Zdeněk Hošťálek. Czechoslovak Acad. of Sciences, Prague; Academic Press, New York, 1965. 324 pp. Illus. \$14. Twenty-four papers presented in a panel discussion "Basic Research and Practical Aspects of Antibiotic Production" held during the Congress on Antibiotics, Prague, June 1964.

Congestion Theory. Proceedings of a symposium (Chapel Hill, N.C.), August 1964. Walter L. Smith and William E. Wilkinson, Eds. Univ. of North Carolina Press, Chapel Hill, 1965. 475 pp. Illus. \$14. Fourteen papers: "Concerning an analytic method for the treatment of queueing problems" by F. Pollaczek; "The role of Green's functions in congestion theory" by J. Keilson; "Computers and congestion problems" by E. S. Page; "Stochastic network flows: Advances in networks of queues" by T. L. Saaty; "Divergent single server queues" by C. R. Heathcote; "The heavy traffic approximation in the theory of queues" by J. F. C. Kingman; "Markovian queues" by R. Syski; "On priority type disciplines in queueing" by D. P. Garver, Jr.; "A survey of some recent research in road traffic" by G. H. Weiss; "Some problems of statistical analysis connected with congestion" by D. R. Cox; "Unified results and methods for queues and dams" by N. U. Prabhu; "Application of ballot theorems in the theory of queues" by L. Takács; "On the use of the method of collective marks in queueing theory" by J. Th. Runnenburg; and "Departure processes" by E. Reich.

(Continued on page 367)