tive role of the early sensory environment in determining the stimulus objects that will evoke responses in later life is contrasted with the relative environment-independence of many motor patterns. The material here is also handled well. Marler himself has made distinguished contributions to the study of bird song development, and there is no better example than this of the complex range of genetic and environmental influences that contribute to the behavior of the adult animal.

The organization of this book is very different from that of many other texts on behavior. Topics (for example, the response of young game birds to an overhead predator) which are more usually dealt with as a single item here receive mention under several headings with different emphasis. There is inevitably some repetitiveness, but there are also advantages when one uses the book as a work of reference, which it undoubtedly will become. For subsequent editions I would appeal for a much fuller subject index, less species-oriented, in order to make this facility usable to the maximum.

In conclusion, I consider that this book has a great deal to offer both undergraduate and postgraduate students and is also an invaluable sourcebook for research workers. The authors are to be congratulated on a distinguished addition to the literature of behavior.

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Manual of Medical Virology

Diagnostic des Maladies à Virus. R. SOHIER. Éditions Médicales Flammarion, Paris, 2nd ed., 1967. 971 pp., illus. $32.

The reviewer is moved to wonder why the first edition of this encyclopedic reference book has escaped notice in the English medical literature. One can only attempt to amend the oversight by describing the handbook, which is a genuine enrichment of the literature of techniques that have proved valuable in the diagnosis of infections caused by viruses. The author is a well-known French virologist who, in collaboration with seven eminent colleagues, analyzes critically and describes in detail every step of the methods presently in use in human medical virology. After a brief discussion of the characteristics and classification of the viruses, the general procedures for the collection of suitable specimens and staining smears, the various methods of propagation and isolation in the embryonated egg, the choice and composition of tissue cultures, and the reactive cytology are painstakingly detailed. Under the headings enteric, respiratory, dermotropic, neurotropic, or hepatotropic, the systematic steps for accurate identification of viruses are described, then summarized in highly informative tables. The chapter on the use of indicator hosts suitable for isolation of viral material discusses not only the choice of animals and their humane housing and care, but also the importance of their physical condition and the various effective routes of infection. For example, a table on page 200 lists the best size and length of hypodermic needle for inoculating different species of animals by various routes. Certain methods, such as the safe infection of mice by the nasal route or of the embryonated egg, are illustrated by useful sketches. Equally complete and informative are the descriptions of immunological methods in vivo and in vitro, including the fluorescent antibody technique. An appendix is devoted to the conservation of viruses by lyophilization. In a special section comprising more than 620 pages the etiologic diagnoses of viral infections of the respiratory or enteric tract with and without cutaneous eruptions, as well as infections caused by arboviruses and, in special chapters, yellow fever, dengue, rabies, and other diseases, are discussed systematically according to epidemiology, clinical manifestations, pathogenesis, selection of specimens for examination, isolation and differentiation of the viral agent, and serodiagnosis. The presentation is remarkably clear and didactically very skillful, and the detailed tabulations assist in quick orientation. Those dealing with the arboviruses deserve particular consideration and study. Twenty-two plates illustrate diagnostically significant cellular and tissue alterations in light and fluorescent microscopic photographs. Each of the 13 chapters concludes with an extensive bibliography covering the relevant international literature to 1963. In this, the second edition, the chapters on Bedsonia, measles, and arbovirus have been brought up to date. Continued rejuvenation is provided for by the sturdy loose-leaf-binder format which permits the replacement of obsolescent material with newer pages of text or revised prescriptions or formulas for improved tissue cultures. With its detailed 40-page alphabetical index and table of contents this unique handbook is recommended to the linguistically equipped, both as a reliable reference work on biomedical methodology for the clinical pathologist and virologist and as an introduction and guide for the general biologist interested in the experimental procedures of virology.

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Sensory Functions

Animal Sonar Systems. Biology and Bionics. NATO Advanced Study Institute Symposium, Frascati, Italy, September–October 1966. R. G. BUSNEL, Ed. Laboratoire de Physiologie Acoustique, Jouy-en-Josas, France, 1967. 2 vols., 1233 pp., illus. Paper, 35 F.

The list of contributors to this volume reads like a Who's Who of animal sonar, and the topics discussed range from the expected echolocation in bats and porpoises through "facial vision" in the blind to the tracking of odorous targets by snakes and dogs. Almost anything you want to know about animal sonar, from the mode of transmission to the structure of the received echoes, is to be found in the two volumes, but will take a bit of searching—there is no index. Most of the book is written in English, but a few of the papers and some of the discussions are in French. Many of the formal papers are followed by informal discussion, much of it informative and provocative.

The book is divided into 11 sections, each comprising several papers. The first, consisting apparently of contributed papers, ranges rather widely and includes such topics as synthesizing the waveforms of bats' pulses, obstacle avoidance in bats and men, and the role of spatial memory. The remaining sections are entitled: Discrimination and Identification by the Animal's Sonar, General Features of Orientation Sounds and the Performances Achieved by the Animal's Sonar, Resistance to Interfering Signals, In-