

reading, the treatment is systematic and the approach often possesses a touch of novelty.

Chapter 3 gives a good account of the further theory involved in discussing collisions of electrons with hydrogen atoms, the basic problem. This account precedes a discussion of applications to elastic scattering and to excitation (chapters 4 and 5). Ionization is specifically excluded. Chapter 6 extends the analysis to collisions with helium ions.

After a further specialized chapter that deals with collisions with helium atoms, an important case because of the wide range of experimental tests available, the analysis is generalized in chapter 8 to apply to collisions with any atom or ion. This is exemplified in chapter 9 for sodium atoms, which are of special interest because of the very large contribution to the polarizability which comes from the 3p orbitals. Finally, in chapter 9 a short account is given of excitation of multiply charged ions, a subject of much interest in high temperature plasmas, whether in terrestrial laboratories or in the solar corona.

There is much of interest in this book for anyone who is concerned with theoretical atomic physics, but the fact that rather forbidding analysis is carried through in detail makes the volume of special use to workers in the specialized field covered. There is little attempt made to bring out the physics involved, but this is neither expected nor required of all review monographs. The translation reads well, and the format is pleasing.

H. S. W. MASSEY

*Department of Physics,
University College, London*

University Reviews in Biology

Reproduction in the Insects. K. G. Davey. Oliver and Boyd, London; Freeman, San Francisco, Calif., 1965. x + 96 pp. Illus. Paper, \$2.50.

Recently man has shown concern about the population explosion and is beginning to make a concerted effort to control human reproduction. For a somewhat longer period he has tried to control insect populations, but only within the past few years has he attempted to do this in certain pest spe-

cies by controlling their reproduction. A thorough knowledge of the fundamental aspects of reproduction is necessary before reproduction—insect or human—can be controlled. This book briefly summarizes various aspects of insect reproduction and by pointing out unsolved problems emphasizes the gaps in our knowledge of this important subject.

Despite its brevity, this volume covers the following subjects: the male reproductive system and spermatozoa; the female system and eggs; transfer of semen; ovulation; fertilization and oviposition; parthenogenesis; viviparity; polyembryony; alternation of generations; and hormones and reproduction. There are few errors. The ootheca of ovoviviparous cockroaches is first extruded and then retracted into a uterus or brood sac; it is not “. . . withdrawn into the ducts once more, . . .” (p. 60)

or retained “. . . in the genital ducts” (p. 81).

Davey probably completed the book in 1963 (the preface is dated January 1964), yet approximately 34 percent of the 136 references were written in the 1960's and almost 40 percent in the 1950's. There is considerable interest in, and research being conducted on, hormones and reproduction—so much so that, despite the up-to-date nature of this review, some of the conclusions mentioned here have since had to be modified.

“This little book” is lucid and does what Davey hoped it would—acquaint the undergraduate and the graduate with the physiology of reproduction in insects.

LOUIS M. ROTH

*Pioneering Research Division,
U.S. Army Natick Laboratories,
Natick, Massachusetts*

Rabbit Populations and Myxoma Virus

Myxomatosis. Frank Fenner and F. N. Ratcliffe. Cambridge University Press, New York, 1965. xiv + 348 pp. Illus. \$15.

Evolution is the greatest unifying theory in biology, but in only a few situations has man been able to study the process taking place with sufficient speed, and with sufficiently large animals, to observe its course. From this point of view the interactions of rabbit populations and myxoma virus have provided a grand experiment “in nature.” The stage for this experiment was beautifully set at its outset in 1950. On the one hand was an ancient population of cottontail rabbits (*Sylvilagus* sp.) in North and South America, in which host-parasite relations had reached a well-adapted equilibrium, a climax association, and on the other, populations of European rabbits (*Oryctolagus*) running into billions, without prior experience with myxoma, a virus not only new to them and to the continent of Australia, but also almost 100 percent lethal. The opportunity provided for study was fortunately recognized by Fenner and his associates from the start. Their book, therefore, gives a comprehensive and relatively complete picture of the way in which the rabbit has become genetically more resistant and

the virus less virulent, with the mosquito vector acting as a principal agent of natural selection.

It is apparent from their book, *Myxomatosis*, that Fenner and Ratcliffe had a well-conceived strategy for studying their continental problem and ways of measuring the step-by-step changes that took place. If one is interested in details of virology as well as in field studies, the book may be read *in toto*. A general reader, however, may find that a few chapters, especially those dealing with the pox viruses, are not too germane to the central theme. But the book can be read selectively, for each chapter is followed by a clear, readable summary that is sufficient to maintain the thread of the account between the chapters of more general and often absorbing biological interest.

Myxomatosis should appeal to at least three classes of readers. It will certainly appeal to biologists who are interested in evolution, for they will discover that this is one of the few published accounts that shows how powerful a selective factor an infectious disease can be; another class is those who are interested in wildlife management, for they will find many lessons here exemplified.

The book's greatest appeal, however, should be to those who are interested

in the natural history of disease. Without doubt man's own evolution has been greatly affected by racial experience with plagues of various types, ranging from malaria, typhus, and smallpox, to tuberculosis and other similar diseases; great die-offs in population create conditions favorable for evolutionary change. Nearly all virulent diseases, newly introduced, have

become attenuated with time by mutual adaptations of host and parasites. The Australian investigators are to be congratulated on providing such a lucid and well-documented account of how such modifications can actually take place.

LAWRENCE KILHAM
Department of Microbiology,
Dartmouth Medical School

An Inside View of Our Living World

Encyclopedia of the Life Sciences.

Albert Delaunay, Scientific Editor. vol. 1, *The Living Organism*; vol. 2, *The Animal World*; vol. 3, *The World of Plants*; and vol. 4, *The World of Microbes*. Translated from the French edition, 1961. Doubleday, Garden City, N.Y., 1965. 160 pp. each volume. \$9.95 each volume.

In the introduction, Max Perutz states the high objectives of this series. "Each volume is written by a panel of international experts. . . . This is not an encyclopedia of Natural History. . . . It tries to convey to the reader what plants and animals are made of, and how they develop and work, rather

than what they and what their different parts are called." Biology is blossoming and these books do much to convey this excitement. The numerous, large, and beautiful photographs are excellent. Many of them show close-up views of living things, both in and out of the laboratory, which will inspire even the scientist who works with the real stuff. The approach in the text is to present experimental biology, not just descriptions. Graphs and tables of data, experimental procedures, and results—all of these are presented in an artistic and meaningful format. Margins of most pages contain definitions of terms, key historical notes, small figures, and other relevant information which helps to fill in background material for the reader. Magnification of pictures or size of objects is often indicated in the figure captions, something which is desirable but not seen in most American books on biology, not even in textbooks.

The editors designed this encyclopedia for the layman, although it is admitted in the introduction that a basic knowledge of science will be an advantage for the understanding of many chapters. The editors are correct, and this is my only real criticism of the series. There is so much good material in these books, one can only wish that the writing were even simpler so that junior high school students could be challenged by the contents. But high school students who fared well in a BSCS biology course will find many familiar topics and much to interest them, and one can always settle for just looking at the illustrations. Probably any educated person can read these volumes and discover the fascinating roles that microbes play in society and experimental biology, get a feeling for the world as "seen" by plants and animals, and

be given a short course in molecular biology. Five titles from the 25 chapters in *The Living Organism* will illustrate the scope: "Barriers of the living world"; "Life-giving molecules"; "The culture of isolated organs"; "The immortal cells"; and "A giant-cell—the egg: The problem of bilateral symmetry." But this encyclopedia is not the "Gee whiz!" kind of superficial survey of biology written by a non-biologist editor; it is a serious attempt by experts to convey the excitement and fun they experience in doing biology.

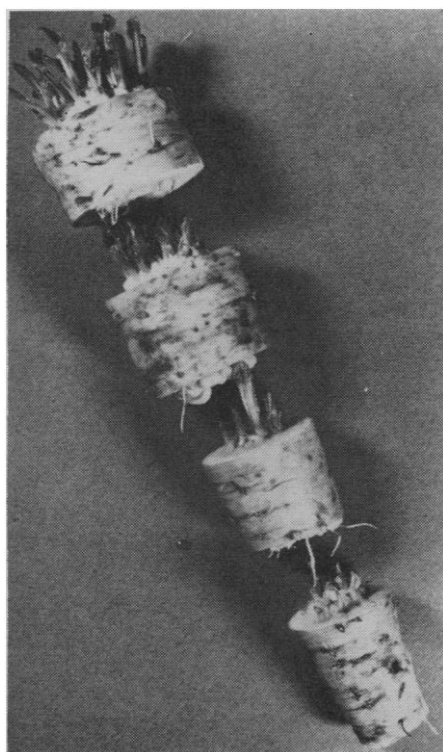
These beautiful books are part of an eight-volume series. Yet to be published are four books that center attention on man—*The Human Machine: Mechanisms* (vol. 5); *Disorders* (vol. 6); *Adjustments* (vol. 7); and *Man of Tomorrow* (vol. 8). If the 640 pages published so far are matched in quality by the pages on man, this should be a remarkable series which has something for all.

E. B. KURTZ, JR.
Departments of Biology and Botany,
University of Arizona, and AAAS

Soviet Chemists

Chemistry in the Soviet Union. John Turkevich. Van Nostrand, Princeton, N.J., 1965. x + 566 pp. \$12.

This book is an extension in the area of chemistry of Turkevich's earlier book, *Soviet Men of Science* (1963), to which has been added a historical discussion of early Russian chemistry. The first part of the book, which is arranged by historical periods up to the present with discussion of the chemical programs and staff of present-day research establishments, constitutes about one-third of the book. The balance consists of two major sections devoted to various lists—one section covers Soviet chemical dissertations and provides authors, titles, and dates, arranged by broad classification (1964 to 1930). The last section, which involves about one-half of the book, is a list of the recent publications of chemists who are members of the Soviet Academy of Sciences. In most cases citations from *Chemical Abstracts* as well as the original reference are given, and in many cases the reference to available English trans-



Cut-up pieces of stump of chicory root form buds at the apical pole and roots at the basal pole. [Photo Lod]