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crisis. A clear and present danger is elucidated, if and when the SST is flown over our land areas. The author renders valuable service by assuming the role of the "Rachel Carson" of the sonic boom in advance of actual overland flights. Watchdog environmentalists will find useful the accurate and clear description of the physics of sonic booms and their influence on life. This costly and perhaps unnecessary projectile will produce a sonic boom about 50 miles wide over the entire length of its flight path. Perhaps no form of environmental ruination is more obvious than the sonic boom, which the author vividly illustrates with examples ranging from ophthalmologic surgery to wilderness vacationing. This enlightening book is highly recommended to all biology teachers.

Paul W. Richard
University of Northern Colorado
Greeley

EVOLUTION

POPULATIONS, SPECIES, AND EVOLUTION, by Ernst Mayr. 1970. Harvard University Press, Cambridge, Mass. 468 pp. \$10.00.

This is an abridgment of Mayr's *Animal Species and Evolution* (1963). The chapter headings are the same as in the earlier work but the text is shortened from 812 to 468 pages and some of the chapters have been completely rewritten. New material and references have been added, to bring the abridgment up to date. Condensation has resulted from the omission of some of the documented evidence and peripheral details. Careful editing and rewriting preserves the unity, logic, and readability of the text. There are frequent page references to more extensive discussions in the 1963 work. As in the earlier work there is an excellent glossary. I regret that the word "animal" was not retained in the title of the abridgment: plants are only mentioned in passing a few times.

Mayr's argument is that natural selection occurs at the species level; and, since species are populations of individuals and the phenotype of the individual is the result of the synergic action of its entire complement of genes, it is the expression of this total genotype that is the target of selection, not the individual genes. He believes that geographic isolation must be present for evolution to occur. He develops these concepts through the first 18 chapters of the book. In the 19th chapter he considers the role of the species in transspecific evolution, and the final chapter is "Man as a Biological Species."

Reviewing *Animal Species and Evolution* in *American Biology Teacher* (January 1964), Clarence J. Goodnight said, "It is certainly one of the most nearly complete and best documented studies

on animal species and evolution ever published. Dr. Mayr has spent a lifetime studying the process of animal speciation and brings to this book all his accumulated wisdom. It will certainly stand as a biological landmark for years to come." I would like to suggest that it is Mayr who must be considered to be the "biological landmark." His clear thinking and lucid writing in all of his works have established him as one of the most important contributors to evolutionary thought at the beginning of the second century of Darwinism. This abridgment, intended for possible class use and for the general reader, will broaden the impact of one of his major works. I believe that the specialist will want to own both volumes.

John M. Hamilton
Park College
Parkville, Mo.

GENERAL BIOLOGY

INVESTIGATIONS IN GENERAL BIOLOGY, by Kenneth B. Armitage. 1970. Academic Press, New York. 204 pp. \$4.95.

This manual brings to the college laboratory the inquiry approach of some recently developed courses in elementary and high school science. The author's intention is to have the student participate in open-ended investigations rather than verification in the laboratory of generalizations of a text. In the first laboratory session, the student observes paradise fish and fly larvae. He arranges his information in a qualitative description of behavioral events. Reports of the investigations are to be arranged in the form followed in scientific writing. Some students may be reminded of the first laboratory exercise in CHEM Study, where they were surprised to find how many observations can be made on a simple system, such as the candle.

Immediately after a very brief description of the use of the microscope, the exercises become more sophisticated. The student is introduced to the use and testing of models, the use of controls, and *in vitro* experimental analysis. Attention to functional organization of plants and animals is followed by very interesting exercises on plant and animal "unknowns." There is a strong emphasis on genetics and genetic problems. A good inorganic and biochemical background seems to be assumed.

After starting out to emphasize the processes of science—formulating and testing hypotheses, analyzing and interpreting data, accepting and rejecting hypotheses—the manual lapses into more orthodox laboratory procedures. Perhaps the title *Exercises* should have been reserved for the latter and *Investigations* for those that are open-ended. Literature surveys in the form

of suggested readings are included.

More headings for procedural steps and illustrations of laboratory setups would have made the manual easier to use. Many teachers would like to sponsor the inquiry approach. They may wish for more innovative inquiry experiences and less text material, however.

Frances L. Behnke

Teachers College, Columbia University
New York City

HISTORY AND PHILOSOPHY

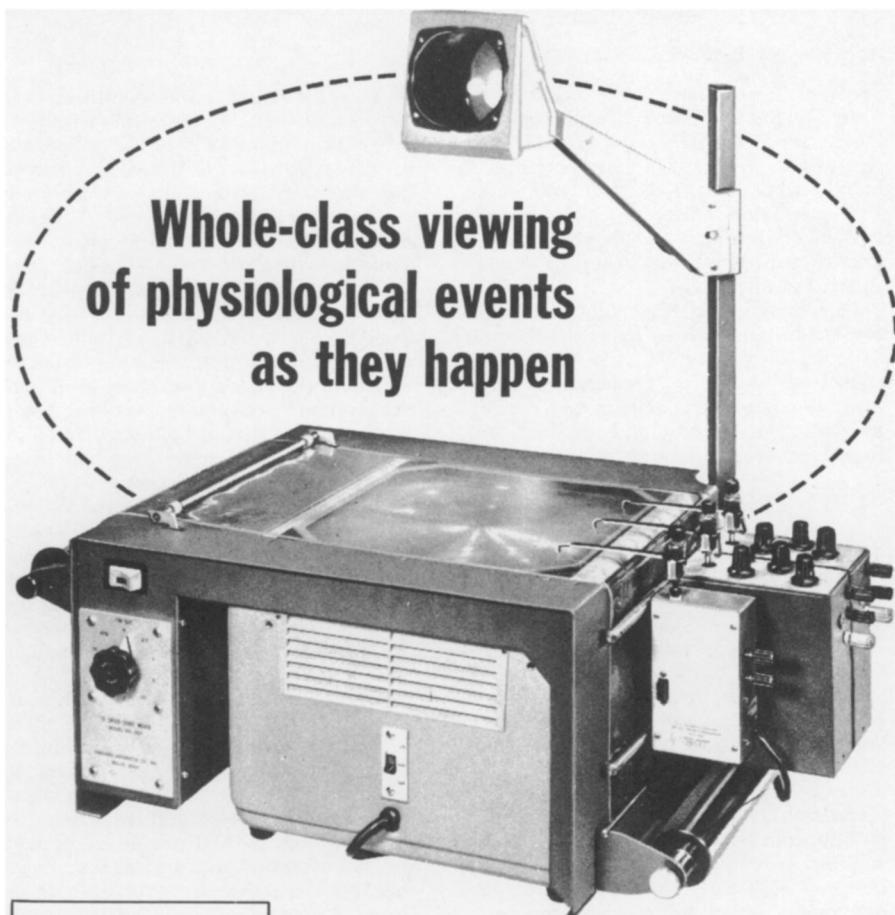
THE CHEMISTRY OF LIFE, ed. by Joseph Needham. 1970. University Press, Cambridge. 243 pp. \$9.50.

This is a collection of eight lectures on the history of biochemistry given (1958-1961) by research specialists at Cambridge University. The topics discussed, with reference to events from about 1800, are photosynthesis, enzyme systems, microbiology, neurology, animal hormones, and vitamins.

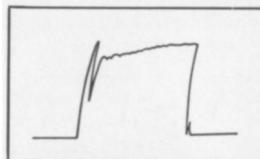
Joseph Needham, the eminent British historian of Chinese science, has an excellent historical introduction. In panoramic fashion he shows how ancient insights—*pneuma*, element, humor (in the medical sense), *krasis*, quintessence, elixir, conjunction, and ferment—may be traced in biochemical descriptions of the present day. He thus points out an essential continuity between the topics discussed in this book and the concerns of the Greeks, Arabs, Indians, and Chinese.

The most penetrating essay is "The Foundations of Modern Biochemistry," by Mikulas Teich, of Prague. Although seventh in the collection, it may with profit be read first, together with Needham's introduction. Teich perceptively reviews 19th-century ideas about vital force, organic and inorganic chemistry, physiology, and physiologic chemistry and biochemistry, and he tells how these ideas changed under the impact of biochemical discoveries.

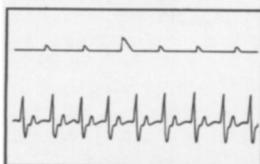
Disappointing and surprising is Robert Hill's essay on photosynthesis, in which he devotes only a few pages to the epochal experiments of Black, Priestley, Ingenhousz, and Saussure toward the end of the 18th century and the work that followed in the 19th. Very substantial is the essay on neurology, by Kendal C. Dixon, who examines the topic in depth. Useful to molecular biologists is Malcolm Dixon's essay on enzymes and biologic oxidations. General-biology teachers will profit by the essay on animal hormones, by F. G. Young (who treats but briefly, however, the gonadal hormones); on microbiology, by E. F. Gale; and on the discovery of vitamins, by Leslie J. Harris. Sir Rudolph Peters completes the collection with a discussion of some 19th-century British pioneers in biochemistry, such



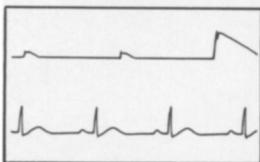
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