

As usual in these Wistar Symposia Monographs, the prepared papers are published along with the transcripts of the discussion of each paper by the other participants. In this symposium the discussions were heated and frequently erupted in the middle of a prepared paper as well as the usual exchange at the end. The published report also includes a group of preliminary working papers that were circulated prior to the meeting. One of these last was by Dr. Sewell Wright who did not attend the meeting.

Much discussion centered around two questions: first, has there been enough time for the necessary steps to have occurred for evolution by random mutation and natural selection, and second, is there a logical fallacy in the concept of evolution by natural selection? Discussion of these questions led in many directions, and raised new problems for discussion. There were extended attempts to agree on definitions of terms, and they were not always successful.

All biologists, regardless of their sophistication regarding Neo-Darwinism should find this a stimulating book. Let me reassure the mathematically timid by saying that there are no complex mathematical formulae in this monograph.

John M. Hamilton  
Park College, Parkville, Mo.  
and Inter American University  
San Germán, Puerto Rico

### BIOCHEMISTRY AND BIOPHYSICS

CONCEPTS IN BIOCHEMISTRY, William K. Stephenson, 222 pp. \$2.95, John Wiley and Sons, Inc., New York, 1967.

This is a programmed text prepared by a well-known NABT'er under a contract with the U. S. Office of Education. It is aimed for those in the biology course who have had neither college general chemistry or biochemistry.

The result is a type of publication in which information is given, questions asked, and answers given. A cardboard is inserted with which the student is asked to cover up the answer as he proceeds to the series of questions based on the previous informational material. This reviewer is not competent to judge the accuracy of the material presented, but there is some question whether this type of programmed text, valuable and important as it is for those students without chemistry, will do the job sufficiently. Obviously it is a great assistance to these students, but biochemistry being what it is, it may be that this type of approach, without lab, is about the only way that biology teaching today can be made understandable for such people.

A list of "behavioral objectives," confused this reviewer because the objectives listed are straight factual informative materials which the author wishes the student to have mastered by the end of each part of the text. The

word "behaviorial" does seem a bit out of place.

However, this should be of great assistance to the students in mind, but it probably will be of great usefulness to all biology teachers whose biochemistry background is nil or at best old.

A BRIEF INTRODUCTION TO BIOCHEMISTRY, Robley J. Light, 166 pp., \$2.95, W. A. Benjamin, Inc., New York, 1968.

Professor Robely J. Light should be applauded in his attempt to present a few basic principles of biochemistry to first-year college chemistry and biology students in the hope of interesting more students to pursue the subject in greater depth. Certainly it is a step in the right direction and should contribute much toward this goal. The book has much to offer as a supplementary source of information for students enrolled in a good, up-to-date beginning course in biology.

The choice of topics and the sequence of presentation is logical; viz., the living organism, catalysis, energy, metabolism, information transfer, control mechanisms, and perspectives. The presentation is reasonably simple yet accurate and adequate for this type of book. The book is up-to-date, well documented, and valuable as a ready source of information to the teacher of biology, especially those teaching courses with bio-chemical-physiological emphasis. The suggested reading lists provide excellent ready references for additional study in many specific areas.

Lester Heward  
Capuchino High School  
San Bruno, California

ELEMENTS OF GENERAL AND BIOLOGICAL CHEMISTRY, John R. Holum, 576 pp., \$8.95, John Wiley and Sons, Inc., New York, 1968.

The author states in the Preface that "the theme of this book is the molecular basis of life." While the book obviously deals with molecules basic to life, the theme, *per se*, appears in the body of the book so infrequently that I was unable to find it again. In other words the book lacks obvious thematic continuity. This, unfortunately, is true of most textbooks.

The author writes clearly, succinctly, and accurately, but uninterestingly. It is a pity that so many competent scientists write so dully; from the textbooks generally written about science, one would never suspect that science is a terribly exciting enterprise.

To an extent the book is unique, in the sense that it is one of the few that attempts to bring some unity out of all chemistry from general through biochemistry, for a particular audience, nurse trainees. I believe the author succeeds in doing what he set out to do. However, if his thematic continuity

were obvious and he could communicate what exciting things lay ahead in science, then he and his text could escape from that dull landscape of traditional science texts. High school biology teachers with a bent toward human physiology will find this book a useful reference; the general biologist or ecologist will not.

F. W. Smith, Jr.  
Los Altos High School  
Los Altos, California

BIO-ORGANIC CHEMISTRY, Melvin Calvin and Margaret Jorgenson, Eds., W. H. Freeman and Co., San Francisco, California, 1968.

Reprints of *Scientific American* articles organized around the topics of macromolecular architecture, biological regulators, and chemical biodynamics. It is a curious collection in that the articles have some organic chemistry flavor, but the thrust of many is on topics which at first glance are not of organic chemistry background. For example, there is a series of articles on drugs and their effects. Also, articles are included on insect attractants, odor, genetic code, radiation, fossils, etc., all indeed with an organic chemistry component, but seldom placed in this rubric.

This of course is incidental, for the effort is well worth the price and merits the reading, repeat or otherwise, by biology teachers. It is an important book for the biology teacher's collection.

MEN AND MOLECULES, John F. Henahan, 257 pp., \$4.95, Crown Publishers, Inc., New York, 1966.

The reports of the experimental work of some leading scientists presented on the American Chemical Society's *Men and Molecules* radio series are assembled in this lively and interesting book. John F. Henahan developed the scripts of the program from personal interviews with the investigators. In each thought-provoking chapter some of the previous work done in the field is reviewed, basic scientific principles on which the work is based are explained and its implication for mankind are explored.

Although non-mathematical, descriptive, and devoid of supporting data, the interpretive nature of the book can be useful to teachers. At the secondary level the problem of making the synthesis of proteins and the biosynthesis of nucleic acids less abstract can be partially overcome through the use of illustrative examples. For instance, different aspects of the role of DNA, the molecule common to all living organisms are considered by several investigators ranging from its role in viruses and the manufacture of proteins to our own hereditary makeup.

Similarly the elementary teacher, through the study of this material, will learn to more fully appreciate the

viewpoint of modern science through exposure to a realistic picture of scientific endeavor in various fields. She should develop a general feeling for it—its strengths, limitations and possibilities. Articles such as these that accurately portray the processes of science as practised by scientists in carrying out their work will give the newly developed curriculum materials, when they are adapted in every classroom, a familiar ring.

Layman parents reading in newspapers and magazines accounts of recent developments in science and technology may develop the feeling that the world is one big multimolecular blur. Perhaps they may be inspired by this volume to listen with their children to this continuing series on over 500 stations.

Although the author makes a point of considering the articles as entities, each to be read without relation to the other, a better arrangement might have been from the simpler to the more complex. This would have eliminated some repetitive material.

Frances L. Behnke  
Department of Science Education  
Teachers College  
Columbia University

**BASIC PHYSICAL CHEMISTRY FOR THE LIFE SCIENCES**, Virginia R. Williams and Hulen B. Williams, 382 pp., \$11.50, W. H. Freeman and Company, San Francisco, 1967.

This book is the one that many teachers of biochemistry have been waiting for. The book is rather short, but many important topics of physical chemistry are treated. The gas laws, thermodynamics and free energy, chemical equilibrium, electrolytes, electrochemical cells, kinetics, macromolecular solutions and nuclear chemistry are treated. The last two chapters (macromolecular solutions and nuclear chemistry) are particularly timely. Four appendices are present: mathematics, symbols and notations, fundamental constants, and atomic weights. The undergraduate chemist can benefit from seeing physical chemistry applied to the life sciences. The undergraduate biologist will benefit from any or all of this material. The authors of this volume are to be congratulated.

Thomas A. Cole  
Wabash College  
Crawfordsville, Indiana

**INTRODUCTION TO CHROMATOGRAPHY**, Bobbitt, Schwarting, and Gritter, 160 pp., \$3.95, Reinhold Book Division, New York, 1968.

The title of this paperback book is correct. There are more compendious and also more weighty volumes on chromatography and there may be simpler ones. But this is a good in-

roduction. It achieves its purpose by limiting its aims. After briefly outlining the field, the authors restrict themselves to three of its sectors: column chromatography, thin-layer chromatography, and gas-liquid chromatography. The presentation is direct and clear. The reader must have some acquaintance with general chemistry, but little that applies directly to chromatography itself is left unexplained. The emphasis is upon techniques and there is a minimum of theory. An abundance of data tables and of illustrations smooths the reader's path. The illustrations are nicely balanced between photographs and line drawings. A short bibliography and a list of supplies precede the index.

In high school biology, paper chromatography has usually been employed and sometime, column chromatography. Except for an occasional sophisticated science fair project, thin-layer and gas chromatography are not in the high school repertoire. There is little to indicate any imminent change in this pattern. Nevertheless, this book may be of value to the high school biology teacher, not merely as a reference for aiding a rare exploratory student but, more importantly, as background for understanding some of the technology that lies behind so many reports of current research.

Haven Klob  
Hereford High School  
Parkton, Maryland 21120

**NUCLEAR TERMS—A BRIEF GLOSSARY**, U. S. Atomic Energy Commission Division of Technical Information, 80 pp., Oak Ridge, Tennessee, 1967.

A free pamphlet of terms used in nuclear science with clear explanatory notes for each. Useful tables are also attached. The selection is good and goes beyond strictly nuclear terms.

**RADIATION, MAGNETISM, AND LIVING THINGS**, Daniel S. Halacy, Jr., 196 pp., \$4.50, Holiday House, New York, 1966.

Taking up the various environmental energies and physical fields of force, the author succeeds in presenting an absorbing story of how biological systems interact with them. All the subjects in this little book therefore have two aspects: a physics consideration and a biological involvement. Cosmic radiation, mineral radioactivity, geomagnetism, electromagnetism, the electromagnetic spectrum, sound waves, gravity, electricity, and the Coriolis Effect are all presented as they affect and influence animals, plants, and humans. Obviously such a broad coverage of very profound subjects is bound to be superficial; however, the elementary and abbreviated backgrounds for each chapter are surprisingly adequate for the kind of readership the publication is

intended for. As an example, when the Coriolis Effect is discussed, it is first explained and exemplified; later it is related to things biological, such as bird navigation or astronaut orientation. Some of the contents are straightforward, simple, and noncontroversial; others are quite polemical. Examples of the latter are extrasensory perception (ESP), water dowsing skin "seeing" or dermo-optical perception (DOP), mental telepathy, and mesmerism. It should be immediately mentioned after this observation, though, that the author is circumspect and restrained in his presentation of these debatable, emotional subjects. In each of these bizarre phenomena it is shown that there "may" be some actual physical basis—usually not nearly to the degree that many popular enthusiasts would like, however. The failures and the hoaxes are dutifully included so that a rational perspective is fostered. An example will make this evaluation clear. Mental telepathy is supposed to involve the transference of some energy or force from one brain to another brain. This idea may still be ridiculous and unverifiable, but examples of research cited in the book should cause the reader to be more open-minded about it when he learns that, for instance, an Air Force researcher has demonstrated that a lamp can be turned on and off by consciously altering the alpha rhythm of brain waves, or that Morse Code was sent by blocking alpha rhythms.

Who is the book intended for? It appears that this would make entertaining and informative reading for high school students and the general reading public. Certainly it is to be commended to those who like science fiction, for this is *not* fiction but is every bit as engrossing. Interesting examples being included from physics and biology, this book could be included in the high school library in the science section.

There are shortcomings and imperfections but they are of no great moment. The glossary of appended definitions is incomplete, and the individual definitions are often weak and nondiscriminative. The dubiety of certain facts, e.g., on page 173, "... radiation of 14 Mev penetrates only ... the skin;" and, page 50, "all (cells) possess the same general structure: a nonliving wall . . .;" and, page 83, "... electricity affects the cells of the cilia . . .," probably do not mar the overall accuracy very much. Some of the historical accounts and extraordinary facts and figures would be more palatable if there were documentations or citations for them.

Raymond E. Henzlik  
Ball State University  
Muncie, Indiana