

pendent not so much on "sending something to Washington" as on careful compliance with the requirements of the copyright notice, and the three elements of this notice are explained. In an appendix, one finds the regulations of the Copyright Office, a copyright registration form, and a list of some 46 countries which are members of the universal copyright convention.

In an interesting historical sketch of copyright protection, the authors mention that the United States Copyright Act is based on an article in the Constitution which states that Congress shall have power "To promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive rights to their respective writings and discoveries." Oddly, in current proposals for copyright revision, the goals of promoting science and education are offered as reasons for diminishing copyright protection.

The issue of fair use, one of the most troublesome in copyright law, is discussed with examples in two chapters. One deals with using the works of others in new publications, the other deals with photoduplicating of copyright material.

Although the scholar's special tax problems are not discussed, there is mention of other legal problems of special interest to him: the right of privacy, patents, defamation, academic freedom, and tenure. Writing of freedom, the point is made that "the basic issues in connection with academic freedom are not legal, but philosophical or social. . . . Academic freedom exists for the good of society and not for the benefit of a particular scholar. . . ." Writing of tenure, the authors conclude ". . . legal enforceability is probably not the most important element in connection with tenure. It is probably more important that there be a set of clear rules relating to tenure and obedience to those rules by responsible faculty and administration."

Although Hogan and Cohen give valuable suggestions on *Publishing Your Book* (Chapter 4), there is little in their book to suggest that an author's chief ground for dismay may lie in his assumption of the integrity of his publisher. There is mention on

page 45 that if the publisher "fails to proceed with the typesetting and production of the book within a reasonable time . . . and if the delay is not due to circumstances beyond his control—then the publisher may have defaulted under the contract and the contract might be cancellable by the author."

Personal experience, admittedly a very small sample, convinces me that an author in his contacts with publishers needs knowledge and protection not mentioned in Hogan and Cohen—despite their publisher's promise that their book contains "complete coverage of what you must know about publication. . . ." Very likely it is not additional laws that are required. Probably laws exist under which an author could sue a publisher for what he considers to be an injury. But isn't an individual author made helpless by pride and the belief that his limited resources will not make much headway in challenging a corporation?

Rather than a legal approach to the problem of author-publisher relations, what is needed, I think, is an approach similar to that suggested by Hogan and Cohen in the case of tenure: formulation of an acceptable code of publishing practice by such an organization as the American Institute of Physics, or the American Association of University Professors. The very existence of such a recognized code would probably minimize need for legal action. The code, I hope, would make authors less naïve and publishers more responsible.

Internal Factors in Evolution. By Lancelot Law Whyte. 128 pp. George Braziller, New York, 1965. \$4.00.

Reviewed by Eugene P. Wigner, Princeton University.

The author is a philosopher of science who has written with wit and insight on problems on the borderline between physics and philosophy. He ventures here into the domain of evolution. He claims that there is, in addition to the Darwinian selection of the "fittest", another type of selection: the internal one. This is because "organisms are so highly coordinated that only a restricted (and ultimately definable) set of variations

from any starting point are permissible" (page 97). Hence, only organisms with a restricted set of properties are possible and one should determine the properties of "any cellular organism capable of developing and surviving in some environment" (page 35). In addition, even if an organism with certain properties is realizable, this may be possible only without the faculty of replication.

It seems to this reviewer that Dr. Whyte's thesis amounts to an exhortation to determine by "a deliberate convergent attack" the possible properties of living and replicating organisms. This is surely a most desirable objective. Many puzzling phenomena (such as the widespread necessity of sleep) may find more detailed explanations as a result of such studies. However, whether one calls "selection" the fact that the sets of viable properties are selected from all possible sets of properties, or considers that "selection" is only the choice of those sets of properties among the viable ones which make for fitness, seems to be largely a matter of semantics. Hence, this reviewer cannot see a real issue between those who call only the Darwinian process "selection" and Dr. Whyte and some others who wish to extend the meaning of this term. The reviewer feels that much of the polemics of the book is somewhat pointless.

However, the reviewer enjoyed the book greatly. It abounds with quotable remarks such as "Expect surprises! [This] should be the watchword of all scientists who try to look beyond the fashions of the day" (page 13) or "naïve enough to think that the communication of ideas prospered in the age of Communication Theory" (page 20). I must not spoil the enjoyment of future readers by giving too many examples.

Excitons. By D. L. Dexter and R. S. Knox. 139 pp. Interscience, New York, 1965. \$6.50.

Reviewed by Joseph L. Katz, North American Aviation Science Center.

Excitons is intended as an introduction to this very rapidly expanding field. Although it is a small book, it will fill the need for such an introduction quite well. The first two chapters

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edited by P. A. Egelstaff

A Volume of *Pure and Applied Physics: A Series of Monographs and Textbooks*

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(E290) October 1965, about 530 pp., \$17.00

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by K. F. Herzfeld and T. A. Litovitz

Volume 7 of *Pure and Applied Physics: A Series of Monographs and Textbooks*

Review:

"...an excellent and detailed account of the present state of ultrasonic propagation in fluids and should be read by all who work in this field or wish to examine the latest theories of relaxation in fluids."

—*Nature*

(H650) 1959, 535 pp., \$14.50

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deal with physical aspects; Chapters 3 through 6 present a sufficiently detailed and exact mathematical treatment to allow the student to proceed directly to the original literature. Chapter 7 (labeled "Current Topics") mentions many of the results available prior to 1964, but so many new results are being published that a revised edition of this book will soon be necessary. Nonetheless, as an introductory work, it is a book that one can presently recommend.

The Direct Observation of Dislocations. By S. Amelinckx. 487 pp. Academic Press, New York, 1964. \$17.00.

Reviewed by Leonard Muldrew, Temple University.

Twenty years ago the dislocation was only a theoretical concept required to explain the strength of crystals, and many physicists were skeptical about its existence. Today we have an entire book devoted to the observation of dislocations, a subject which has mushroomed since 1956. This book is both a review and a text and should be very useful to those having any interest in dislocations. Dr. Amelinckx has contributed heavily to dislocation observation, and he has gone to great pains to produce an excellent and complete survey.

As is to be expected there are photographs resulting from the observations of the dislocations by various methods: electron microscope using transmission and replication, optical microscope, x-ray diffraction, moiré patterns, etc. These are superb illustrations and were impossible only ten years ago.

More than three-fourths of the book is devoted to the electron-microscope methods which are discussed in the chapter on thin films. The main sections of this chapter are on transmission theory, transmission applications, direct resolution, and moiré patterns. Chapters on surface and bulk methods take up about 50 pages each.

Theory, other than some dislocation theory, is supplied, with mathematical derivations often given in great, readable detail. Where dislocation theory is needed, it is skillfully presented so as to make the observations meaningful. The electron microscope theory of diffraction contrast and its appli-

cation to dislocation observation are presented fully with an intuitive discussion given first and then the kinematic and dynamic theories.

Among the minor blemishes we might include the lack of length calibrations and a failure to give the technique used in obtaining the photographs of Chapter 1, a slight confusion as to the chapter location of decoration etching (placed in Bulk Methods rather than Surface Methods) and the neglect of the Chapter 3 dislocation decoration when the subject is discussed in Chapter 2. These are truly minor and perhaps indicate the separateness of the chapters.

Generally speaking, the style is good and particularly so in the major sections dealing with electron microscopy. However, in the first chapter the writing is a bit terse as is often the case in reviews when a large number of papers is summarized.

There are useful tables (e.g., a ten-page list of etchants), subject, author, and substance indices, numerous line drawings among the 237 figures, and 462 references.

This is an excellent book for review and reference.

Ionized Gases. (2nd ed.) By A. von Engel. 325 pp. Clarendon Press, Oxford, 1965. \$8.80.

Reviewed by L. Marton, National Bureau of Standards.

Ten years have gone by since the first edition of von Engel's book on ionized gases, and in view of its popularity there is not the slightest doubt about the necessity of a second edition. The first edition has been a classic since its first appearance, and further praise of it would seem to be carrying coals to Newcastle.

The changes consist mostly in a considerably enlarged chapter on collision processes. This includes sections "dealing with the production and properties of excited atoms and molecules, photoionization including that by laser beams and kindred subjects." Another important addition is the inclusion of extensive tabulation of numerical data. I think many users of the book will welcome the new system of references which includes empty pages adjoining each reference page for addition of new references at the

choice of the reader. This is a clever idea, and I think it should be followed in many other books. Another innovation in the book is the addition of problems. These problems are quite numerous at the end of each chapter and excellently illustrate the problems raised in the text itself.

Oxford University Press has again done an excellent job in producing the book, and to the many friends of *Ionized Gases* it will be welcome news to find a revised edition.

Theoretical and Mathematical Biology. Talbot H. Waterman and Harold J. Morowitz, eds. 426 pp. Blaisdell, New York, 1965. \$12.50.

Reviewed by Joseph G. Hoffman, State University of New York at Buffalo.

The fundamental rationale of living matter is unknown. Hence, a book on theoretical biology deals with subjects that may possibly lead to an understanding of the basic mechanism, whatever it turns out to be. Some of the subjects here are: models and mathematical principles in biology (Rashevsky); thermodynamics and chemical kinetics (Eyring and Urry); molecular structure, biochemical function, and evolution (Bernal); theory, experiment, and the nerve impulse (Cole); cochlear mechanics (von Békésy); and genetic consequences of natural selections (Levins). There are several chapters on computer methods, cybernetics, and systems analysis. This book was developed from a course of lectures and discussions and can serve admirably as a guide for class work. It is among the first books devoted to the subject: it describes the best analytic tools one may use in a formulation of the obscure and tantalizing processes of life.

There are 17 chapters by 17 contributors, of which two chapters, the first and last, are by Talbot H. Waterman. He formulates The Problem of Biology in Chapter 1. The reader may have a hard time understanding what is meant by: "The ultimate scientific explanation of life must indeed be biological." The implication is that physical and chemical explanations of life may not be possible. Systems analysis may well be the best direction for basic biological research to take. The organismal concept has yet to be