VI. The last two chapters deal with the physiological aspects and some more general applications of solubilization. Appendix I gives a concise theory of light scattering, and Appendix II discusses briefly the behavior of polysoaps.

There are relatively few shortcomings in this book. It is somewhat surprising that no mention is made of potentiometric studies of colloidal electrolytes, although such data provide valuable information on the properties of colloidal electrolytes. The section dealing with emulsion polymerization (p. 129) is disappointing and very weak; no mention is made of the important theory proposed by Ewart and Smith in 1948.

Fittingly the book is dedicated to the late James W. McBain, the pioneer in the field of solubilization, who has contributed so much to its development. Some statements made by him are reproduced in the introduction.

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Bibliography on Hearing. S. S. Stevens, J. G. C. Loring, D. Cohen, compilers. Harvard University Press, Cambridge, Mass., 1955. 599 pp. $7.

This bibliography is an enlargement of an earlier one, *A Bibliography in Audition,* by G. A. Miller, R. Galambos, W. A. Rosenblith, and I. J. Hirsch. It contains more than 10,000 titles listed alphabetically by author and includes a scheme of subject classification.

The procedures used in the compilation are not specifically outlined in the preface, nor is there a listing of the particular fields intended to be covered, although it is mentioned that, in comparison with the former edition, this one places added emphasis upon deafness, ultrasonics, the effects of drugs on hearing, information theory, and the psychological and acoustical effects of music.

A necessarily sketchy examination of the titles themselves indicates that there is extensive coverage of general and theoretical aspects of hearing, of the phenomena of pitch, fatigue, and masking, and of the special fields of speech and music. There appears to be somewhat limited coverage of historical material, of the anatomy of the ear, of hearing in animals, and of problems of deafness. Other topics, such as the physics of sound, the effects of noise, auditory testing, and the phenomena of beats, combination tones, and sound localization, seem to have an intermediate status, with a fair degree of coverage.

The subject classification, which is at the back of the book, consists of a division of the field into 315 topics and then under each of these a listing of the names of the authors whose relevant works are included in the bibliography. A person interested in a particular topic will look up the listed names and, when several articles appear under one name, must discover for himself which ones are concerned with his topic. This system is serviceable, despite its indefiniteness, but doubtless will evoke certain expressions of annoyance from its users.

It is made clear in the preface that the titles were assembled largely from secondary sources, and the usual errors from such a procedure are to be expected. I noticed only a few errors, mostly of a minor nature. Somewhat surprising is the listing "Tyndall, J. *Der Schall*" and the omission of this famous book in its original English. Errors noticed in the subject classification are of two sorts: some names listed are not to be found in the bibliography, and others are inappropriate. An amusing instance of the latter sort is the reference to articles by Cooseman on "Hearing in beetlers" under the topic "Animal studies; frequency range: invertebrates"; for beetlers are people who work in cotton mills—not members of the order Coleoptera.

This bibliography represents a great deal of exacting, routine work and will be of considerable service to students in the auditory field.

E. G. WEVER
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Integers and Theory of Numbers. Abraham A. Fraenkel. Scripta Mathematica, Yeshiva University, New York, 1955. 102 pp.

This volume, the author explains in the preface, is essentially a translation of the first part of his earlier book, *Mavo LeMathematika,* which was written in Hebrew and grew out of talks given by him, over a period of many years, as part of the adult-education program in Israel. It is to be followed by two more volumes of a similar nature, one on the fundamental concepts of modern algebra, the other on the theory of sets.

The four chapters are entitled "Natural numbers as cardinals," "Natural numbers as ordinals," "Theory of numbers," and "Rational numbers." The first, second, and fourth present a construction of the number system through the rationals. Many results are proved, but there is no attempt to provide a step-by-step development, such as is found in Landau's *Grundlagen der Analysis.* The third chapter discusses some of the well-known results and unsolved problems of classical number theory. Throughout the book there are numerous references to more detailed treatments of various topics.

The foregoing remarks do not, however, do justice to the book. It is an attempt by a mathematician of wide and deep learning to give the intelligent layman some understanding of the nature of our number system and of mathematics in general. It will prove to be a difficult book for such a person, and I shall not try to predict how many there will be who will devote the necessary effort to the task. Those who do, however, will find it an enlightening and stimulating experience.

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The Nitrogen Metabolism of Micro-organisms. B. A. Fry. Wiley, New York; Methuen, London, 1955. ix + 166 pp. Illus. + plates. $2.

In this little Methuen monograph B. A. Fry has achieved his aim: "to survey as comprehensively as possible the nitrogen metabolism of microorganisms and . . . to reflect current trends in modern biology." This book is a survey, and, like a surveyor, Fry covers a vast area going from one well-defined point to another with brief attention to the details between. The area of nitrogen metabolism has been covered well; if any major points have been omitted I was not aware of them. Those who might wish to get more details will find the list of references very complete. "Current trends in modern biology" are reflected especially in chapters on absorption of amino acids and on the mode of action of chemotherapeutic agents.

This monograph, for a modest cost, will provide all but a specialist in the field with a fine introduction to nitrogen metabolism.

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Biochemistry and Physiology of Protozoa. vol. II. S. H. Hutner and A. Lwoff, Eds. Academic Press, New York, 1955. xiv + 388 pp. Illus. $9.

By virtue of their favorable characters as compared with other microorganisms and with a growing number of forms cultivable *in vitro* free from other organisms, Protozoa are becoming increasingly popular as "biochemical tools." Therefore, the appearance of the second vol-

ume of this series is highly timely. The present volume is composed of 10 articles written by 12 contributors, four British and eight American, each of whom has been engaged for a number of years in work related to the topic he deals with.

In the introduction, the background and general picture of Protozoa as biochemical and phylogenetic tools are discussed interestingly. "Comparative biochemistry of flagellates" reviews the nutritional requirements and chemistry of some of the organelles of certain mastigophorans. The third article brings to light all available information on the synthesis of starch in *Polytomella*. Nutrition and metabolism of free-living ciliates are discussed in the fourth and sixth chapters, while the relationships of the rumen ciliates to ruminants and of xylophagous flagellates to termites and woodroach are reviewed in the seventh article. The ninth chapter deals with the present state of our knowledge of the chemotherapy of malaria and other diseases caused by hemozoic protozoans. The last article on comparative studies on amebas and amebicides considers free-living and parasitic amebas with special reference to *Entoamoeba histolytica*.

The organization and presentation are excellent. References are abundant and up to date. Typographical errors are remarkably small in number and of minor character. For example, "*A. quadrimaculatus*" (the genus name should have been given fully) following "*Aëdes aegypti*" (p. 228) appears in the index as "*Aëdes quadrimaculatus*" (p. 363). This book is an excellent summation of the present state of biochemistry in relation to certain protozoans. It, like the first volume, makes a highly useful reference book and guide for those who are or intend to be students of protozoology and biochemistry.

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Ciba Foundation Symposium on Chemistry and Biology of Pteridines. G. E. W. Wolstenholme and Margaret Cameron, Eds. Little, Brown, Boston, 1954. xiv + 425 pp. Illus. $8.

The Chemistry and Biology of Pteridines is an account of a symposium on pteridines sponsored by the Ciba Foundation. This symposium consisted of 29 participants who had been invited by this foundation both to present formal papers and to contribute to informal discussion on the chemistry and biochemistry of this interesting class of compounds. This volume represents the first printed account of a symposium of this type, and the 28 papers contained in it are indicative of the wide scope of work involved. The book is divided into two parts: the first part contains 16 papers on the chemistry of pteridines, and the second part has 12 papers dealing with the biological aspects.

The reader will find the book to be interesting partly because of the wide variety of subjects covered and the interesting nature of the informal discussion. The section on the chemistry of these compounds may not prove to have as wide an interest as those dealing with their biochemistry. The biochemical subjects discussed will be of interest to all students of biochemistry in view of the fundamental role that is played by folic acid and its derivatives in metabolism.

This book will prove of value to the biochemist, because it gives an over-all picture of the occurrence of these compounds, which are widely distributed in nature both as pigments whose functions are unknown and as essential parts of enzyme systems. The biological importance of many of these compounds remains unknown, and it is reasonable to expect that this book will stimulate more research on this interesting class of compounds.

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Chemisorption. B. M. W. Trapnell. Academic Press, New York; Butterworths, London, 1955. vii + 265 pp. Illus. $6.80.

During the past 15 years there has been a great deal of important new work concerned with chemisorption on solids. As the author explains, this monograph was written to fill a gap in the existing literature on the subject in which neither a selective nor an exhaustive treatment is to be found. The happy result has been a lucid and concise exposition on chemisorption which is a delight to read and a model for scientific writing.

Particular effort appears to have been made to discuss numerous recent developments. The thoroughly up-to-date character of the book becomes immediately evident on examination of the literature references. More than half of all the scientific papers drawn upon in the text have appeared since 1940. Such topics as the application of the field emission microscope to investigations of the mobility of absorbed layers, the relevance of Pauling's new theory of metals to the interpretation of their catalytic activity, and the role of the semiconductor properties of several oxides in the decomposition of N_2O are touched upon.

By an admirable economy in style and in organization, the abundant material on chemisorption is compressed into 10 chapters requiring fewer than 300 pages. Yet very little seems to have been omitted, and a nice balance is maintained in the presentation of experimental detail and theory. Space is even found to illustrate the bearing of chemisorption on heterogeneous catalysis, as is evidenced by the last two chapters on catalytic specificity and on the mechanisms of catalytic reactions. There is hardly a doubt that this attractive little book affords an excellent introduction to chemisorption for the nonspecialist reader. For the specialist, this work will be important because a leading investigator in the field attempts to summarize the position today of our understanding of the chemical interactions of atoms and molecules with solid surfaces.

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The Skin, a Clinicopathologic Treatise. Arthur C. Allen. Mosby, St. Louis, 1954. xv + 1048 pp. Illus. + plates. $25.

The purpose of this book, according to the author, is to effect a better understanding between dermatologists and other practitioners of medicine. For those interested in dermatology and sufficiently familiar with histopathology, A. C. Allen certainly presents an extraordinarily well-prepared treatise and this in a field where unanimity of opinion is the exception. He chose the atlas type much like his monograph *The Kidney* in 8½ by 11½ in. format. Every chapter has an ample bibliography—in all there are more than 2000 references. Wherever systemic changes occur, aside from those in the skin, Allen describes and illustrates them lavishly, in this way linking the experience of the dermato-histopathologist with that of the general pathologist. He also gives excellent group discussions of entities in which his experience as a pathologist will stimulate dermatologic thinking.

His criticism of dermatologic terminology is shared by dermatologists. Correcting it will take much study and international cooperation, for which there has been no opportunity during the past 15 years. He offers no suggestions himself.

The field of allergic and eczematoid eruptions is not clearly presented, and at times Allen's remarks are at variance with generally accepted terminology and conceptions.

In covering therapy, the author is sometimes adequate. Frequently he confines himself to the newest and least tried medications that have not been generally