Book Reviews

EMULSIONS: THEORY AND PRACTICE by Paul Becher, New York, Reinhold Publishing Corporation. Second edition, 1965. 440 pages, illustrated and indexed. Price $22.

Most cosmetic chemists who deal with emulsions must be familiar with the first edition of this book, which was published in 1957. This review may therefore concern itself principally with the amount of useful new material in the second edition. First, let it be said that the new edition, like the original, is a well organized, concise, and incisive treatise by a physical chemist who has made distinguished contributions to both theory and application in this field.

The second edition is organized almost identically to the first, but Appendix B, which listed commercial emulsifying agents, has now been omitted because of the transient nature of such information. The new edition contains 93 more pages than did the old one minus Appendix B.

Appendix A of the first edition, covering tests for emulsion properties, is now the last chapter of the text and is lengthened by ten pages-the references cited here have increased in number by 77%, the larg; est increase in any chapter. Several new sections appear, including one on determination of HLB and of required HLB.

Chapter 7 on techniques of emulsification has also grown notably in the elapsed eight years. Its section on mixing time and general technique contains much new material, and the following sections have been added:

Emulsion type
Orifice mixing
High shear
Ultrasonic methods
Spontaneous emulsification
Microemulsions
Homogeneous emulsions.

Several new pieces of emulsifying equipment are pictured.

In Chapter 4 on theory of emulsions: stability, considerable new material is found, including:

a new section on viscosity of the interfacial film, and one on spreading coefficient and stability;

a new section on electrophoresis and zeta potential;
extensive reorganization of the material on double layer and potentials.

Chapter 2 contains more material than before on micelles, and Chapter 5 presents several new figures on emulsion inversion, new sections on the mechanisms of coalescence and of rupture, and several new sections on other phenomena of emulsification.

Chapter 6 includes the phosphate esters, fluorinated nonionics, and silicone nonionics in its treatment of emulsifying agents. It also contains a new 11-page section on the theoretical significance of HLB. The particle-size material of Chapter 3 is reorganized, and more material on viscosity has been added to this chapter on physical properties of emulsions.

Elsewhere, the newer data and concepts have been fitted into the framework set up for the first edition. The importance of the new material fully justifies the new edition, which cites 40% more literature references than the old and thus provides full and up to data coverage of material highly useful to the cosmetic chemist.

Under "Terminology" on page 2 we still find the arresting statement: "The disperse phase may also be referred to as the *nondisperse* or *discontinuous* phase." On the whole, however, errors are very few, and the paper and typography combine with the clarity of style to make the book easy to read.—PAUL G. I. LAUFFER—Chesebrough-Pond's, Inc.

THE STRUCTURE AND PROPERTIES OF BIOLOGICAL SYSTEMS, ADVANCES IN CHEMICAL PHYSICS, Volume VII, edited by J. Duchesne, Interscience Publishers, New York. 1964. 754 pages, illustrated and indexed. Price $27.50.

With this volume, this series ventures into the field of biology for the first time. It treats the field from the viewpoint of modern physics. A wide international array of authors have submitted chapters, and where necessary excellent English translations have been provided. The book is divided into a theoretical part and an experimental part, the over-all goal being to utilize quantum mechanics to try to establish quantitative relationships between biological activity and certain electronic and energetic molecular indices of biological molecules.

The theoretical chapters 1 to 4 deal with the properties of DNA, RNA hemoproteins and coenzymes. The other 14 chapters deal with a variety of experimental approaches to attempt to understand various biological molecules or systems. For example, the effects of ionizing radiations, hydration, and thermal responses are used to elucidate molecular structure. Model systems are subjected to careful measurements of their electrical and magnetic properties to explain the properties of more complicated biological compounds. The possibilities of modern spectroscopic methods are examined in dealing with complex biological systems in their natural aqueous environments. The detailed ex-

planation of the operation of biological mechanisms is attempted, using enzyme kinetics and physicochemical methods.

Over-all this book provides a very interesting review of a number of topics of great interest in current biological research by specialists in these fields. However, for the reader not directly involved with these particular topics, the treatments are usually too detailed and require too much effort to follow. Nevertheless, this volume gives the flavor of a field growing rapidly and making important contributions to our understanding of biological systems.—PAUL FINKELSTEIN—Gillette Medical Research Institute.

DERMATOLOGICAL FORMULARY AND PRESCRIPTION MANUAL by Morris Dauer and Irwin I. Lubow, International Professional Publications, Inc., Flushing, N. Y. 1964. 143 pages, indexed. Price $4.

The two authors have combined their efforts and experience in compiling a formulary which may serve to acquaint the medical student, resident, physican and specialist with medications commonly prescribed for the treatment of skin diseases. Furthermore, this manual can serve as a guide to the medical student in correct prescription writing.

This formulary is a compilation of old and new remedies collated from the various reference books, textbooks and medical journals. It is divided into six main sections. The first five consist of prescription items listed according to their generic or common name along with their respective tradename, name of the manufacturer and the available dosage forms and potencies. General precautions to be observed during the administration of these drugs are included for each section. These, however, are too concise. Before prescribing any of these products, the physician should acquaint himself with the therapeutic action, uses, administration, dosage, contraindications and possible side-effects.

The last section consists of extemporaneously prepared formulations and lists the individual components, concentrations, method of preparation, and, whenever necessary, packaging instructions. The therapeutic indications for groups of formulations are also included.

This book should prove to be a handy reference book to the medical profession and an aid for proper prescription writing to the medical student. However, this manual is of little or no value to the chemist or pharmacist. — M. STOLAR — Dome Chemicals, Inc.

THE PROTEINS, COMPOSITION AND FUNCTION, 2nd Edition, Vol. II, edited by Hans Neurath, Academic Press, New York. 1964. 840 pages, illustrated and indexed. Price $26.

The writer had an opportunity to review Vol. I of this three-volume series, and there is no question that Vol. II continues the excellent and authoritative treatment initiated with the publication of Vol. I.

This book contains five rather extensive chapters. The first (chapter 7), "The Conformation of Polypeptide Chains in Proteins," and the last (Chapter 11), "X-Ray Analysis and Protein Structure," are concerned primarily with structural features of proteins in solution and in the solid state. Chapter 7 probably suffers from overemphasis on optical methods; that is entirely understandable because recent progress in the field of conformation of polypeptides in solution has been sparked by the technique of optical rotatory dispersion. On the other hand, the chapter by Dickerson on X-ray analysis is a comprehensive treatment of X-ray analysis as it pertains to proteins. Although the reader of Chapter 11 will be confronted with Fourier transformations and Bessel functions, this chapter still contains much descriptive material which should be of value to the uninitiated. Dickerson justifiably emphasizes the importance of the contributions of Astbury, who is well known to cosmetic chemists for his pioneering studies of keratin, and the importance of the technique of isomorphic replacement, which has borne fruit in the elucidation of the structure of globular proteins. In the text, Dickerson clearly subscribes to the $9 + 2$ arrangement of α-helices in keratin without reference to the cogent argument by Sikorski against this arrangement.

A third chapter (Chapter 10), "Polyaminoacids as Protein Models," is actually also concerned with the structure and configuration of protein-like materials. This chapter is primarily descriptive and touches on many features and techniques which have been used to study proteins and protein-like materials.

The shortest chapter (Chapter 9), "Interacting Protein Systems," is concerned with interactions between two proteins. The rates of formation, the classification of products, and techniques for the study of these products are discussed.

The outstanding chapter of this volume is probably Chapter 8, contributed by Steinhardt and Beychok, "Interactions of Proteins with Hydrogen Ions and Other Small Ions and Molecules." A careful study of this chapter will be most rewarding to all who are concerned with proteins in one form or another. The many features of this chapter include a clear and concise introduction to the definition of pH and to the thermodynamics of the chemical potential. In addition, this chapter includes discussions of techniques and descriptive data on the combinations of small ions and of unionized molecules with proteins.

This volume is not designed for casual reading but represents a massive and comprehensive document, the value of which to the practicing chemist and biologist will become apparent only after careful study. In addition, this volume should serve as an authoritative reference and introduction to specific areas of protein chemistry and protein physics. —MARTIN M. RIEGER—Warner-Lambert Research Institute.

HANDBOOK OF CHEMISTRY AND PHYSICS, 45th Edition, edited by Robert C. Weast, The Chemical Rubber Co., Cleveland, Ohio. 1964. Price $15.

The Rubber Handbook in its old format has been a trusted and steady companion of chemists in all laboratories for many years. It is likely, therefore, that the 45th Edition in its revised format will carry on the established tradition. Aside from the change in size, the enlargement of the tables of Organic and Inorganic Compounds and the extensive Description of the Elements are particularly noteworthy. Most chemists will also welcome the inclusion of the rules for nomenclature as adopted by the I.U.P.A.C.

It is understandable that the publishers of a work of this type and size (about 1500 pages) are anxious to utilize existing plates in order to be able to produce the volume at a reasonable cost. As a result, the mathematical tables and many other tabulations appear in the size which has for many years been the trademark of the Rubber Handbook.

This reviewer spotted one error in the Index which gives the ionization constant of amino acids on page D76 whereas, in fact, this information appears on page C667. The reviewer was also disappointed to find that the section on definitions and formulas has not been revised and that such items as the Mossbauer effect and the principle of parity are not covered.

Despite these minor defects, there can be no doubt that the Handbook of Chemistry and Physics is one of the soundest investments that any chemist can make.—M. M. RIEGER—Warner-Lambert Research Institute.

ENZYME NOMENCLATURE, Recommendations 1964 of the International Union of Biochemistry, Elsevier Publishing Co., Amsterdam-London-New York. 1964. 219 pages indexed. Price $2.50.

This volume presents the recommendations of the International Union of Biochemistry on the nomenclature and classification of enzymes together with their units and symbols of enzyme kinetics which were approved during the meeting of the International Union in Rome in February, 1964. The booklet contains seven relatively short chapters and a list of lengthy appendices. The chapters are devoted to a discussion of enzyme units, rules for nomenclature, symbols of enzyme kinetics, and classification of specific enzyme groups. The major portion of this volume is devoted to a list of enzymes (Appendix E). This tabulation includes the accepted systematic name, the trivial name, specificity, and the catalyzed reaction for each enzyme. This effort to correct and up-date the earlier report (1961) of the International Commission on Enzymes will be appreciated by biochemists throughout the world.

It is obvious that this volume is not meant for pleasure reading but that its main purpose is to serve as a handy reference and useful dictionary.—M. M. RIEGER—Warner-Lambert Research Institute.

SURVEY OF PROGRESS IN CHEMISTRY edited by Arthur F. Scott, Vol. I (1963) and Vol. II (1964), Academic Press, New York, N. Y. Price $7.95 each.

A recent ad for one of the well-known national magazines questioned whether the education of a college graduate stops when he is handed a piece of the skin of a dead sheep. It appears that the editor of this series hopes that these and succeeding volumes will answer this rhetorical question. In the preface to Vol. I the editor states that the primary target of the survey is the chemistry teacher, but he also hopes that the survey will meet the needs of many other chemists who would like to keep abreast of what is happening in chemistry outside of their own field of specialization. Generally, it appears that these aims of the survey are met, and it is hoped that the reception of these volumes will warrant the continuance of this series.

It appears rather futile to list the thirteen chapters of these two volumes, all of which have been contributed by experts in their field. The topics appear to be selected at random. Each is covered fairly thoroughly, stressing especially developments during the last ten years, although basic information gathered during earlier years is also discussed. It is obvious that most chapters are directed at readers who already have some knowledge of the subject under discussion. The emphasis on progress during the period since most working chemists have left school makes this survey particularly welcome. In contrast to the Annual Reports published by the Chemical Society in London, the treatment of the various subjects is more thorough and detailed and requires little or no reference to the original literature, although each chapter is provided with numerous literature references.

It is unlikely that any specialist will find much of immediate interest in these two volumes. However, those interested in chemistry and those who would like to keep up with the progress of chemistry in areas outside of their own narrow field of interest will find these volumes most valuable. Their cost is reasonable, and leisurely reading of many of these chapters should prove rewarding and will bring up-to-date information to the reader.

It is hoped that the editor will continue to publish this survey without deviating from the existing format and keep the chapters relatively short and readable.—M. M. RIEGER —Warner-Lambert Research Institute.

PROGRESS IN INDUSTRIAL MICROBIOLOGY, Volume 5, edited by D. J. D. Hockenhull, Gorden & Breach, Science Publishers. 1964. 326 pages. Price $13.50.

This is the fifth annual edition covering various subjects pertaining to applied bacteriology. Each of the seven chapters is written by experts from England, Japan and the United States.

The cosmetic chemist or bacteri-

ologist is not too deeply concerned with the discussions in the chapters titled "The Selection, Improvement and Preservation of Micro-organisms," "The Microbial Production of Amino Acids" and "The Bio-Chemistry of Vitamin B_{12} Fermentation." The first article mentioned above concerns itself with selecting new organisms for producing antibiotics, their genetics, breeding technics and strain improvement. The second and third articles are self-descriptive and, while the end-products may—some time or other—be useful in the cosmetic industry, the bacteriological manufacturing procedures are not.

Aside from the physical, chemical and antimicrobial activity of Bacitracin, there is little of value to the cosmetic chemist in the chapter, "Bacitracin, Its Manufacture and Uses." In this respect, however, the information given under "clinical applications" and "miscellaneous uses" may give some cosmetic chemists ideas for new products.

The chapter, "Preparation of Alkaloids by Saprophytic Culture of Ergot Fungi," while interesting from a scientific standpoint, has no practical use for the cosmetic chemist. However, the chapters, "Modern Trends in Steam Sterilization" and "Microbiological Aspects of Radiation Sterilization," are of considerable interest to both the cosmetic chemist and the bacteriologist. The former chapter discusses all facets of steam sterilization, even to the design of various types of autoclaves, testing autoclaves, cooling autoclave contents after sterilization, automatic operation of sterilizers, faults of autoclave operation and overseas practice in sterilization. Most faulty autoclave operations have been traced to faulty installation, lack of adequate and correct maintenance and faulty instructions to the operators.

The field of radiation sterilization is relatively new and foreign to most chemists and bacteriologists. The chapter on this subject will help to overcome this situation as it is an excellent dissertation on theory and practical implications. Applications include the sterilization of vaccines, antisera, biological tissues, pharmaceuticals, plastic items, rubber gloves, sutures, etc.

Each chapter in this book is followed by pages of references extremely useful to those who wish to pursue these topics more fully.—JAMES H. BAKER—Gar-Baker Laboratories, Inc.