

- A Luminescence Study of the Adhesion Bonding of Polymers by N. A. Krotova and L. P. Morozova
- The Effect of Molecular Weight, Polydispersion and Polarity on the Adhesion of High Polymers to High-Molecular Substrata by S. S. Voyutskii, V. L. Vakula, V. E. Gul', and Ho Yun-tsu
- The Role of Surface Forces in Mica Crystals by M. S. Metsik
- The Double Layer at a Solid Surface Resulting from Acceptor-Donor Bonds by V. P. Smilga
- The Application of Infrared Spectroscopy to the Studying of the Interaction of Adhesive and Substrate (Polymer-Glass) by N. A. Krotova and L. P. Morozova
- Measurement of the True Density of the Double Electric Layer at a Metal-Dielectric Interface by B. V. Deryagin and I. N. Aleinikova
- The Physical Basis of the Fundamental Law of Surface Function by A. S. Akhmatov
- The Properties of Solutions of Organic Acids in Liquid Hydrocarbons at Solid Surfaces by G. I. Fuks
- Certain Considerations Concerning the Laws Applying to Type I Friction by D. M. Tolstoi
- New Experimental Data on External Friction by D. M. Tolstoi, R. L. Kaplan, Lin Fu-sheng, and Pan Pin-yao
- A Cinematographic Study of the Flow of Thin Films of Polymer Solutions by B. V. Deryagin, N. N. Zakhavaeva, S. V. Andreev, A. A. Milovidov, and A. M. Khomumov
- The Effect of Electrolyte Concentration on the Height of the Force Barrier for Adhesion of Platinum Wires by T. N. Voropaeva, B. V. Deryagin, and E. N. Kabanov
- A Radioisotope Study of the Movement of Moisture in Peats by M. P. Volarovich and N. V. Churaev
- Surface Effects in Soil Mechanics by S. V. Nerpin and B. V. Deryagin
- The Theory of Coagulation of Lyophobic Sols by Mixtures of Electrolytes by Yu. M. Glazman
- Studies on the Filtration of Solutions of Electrolytes Through Highly Dispersed Powders by B. V. Deryagin, N. N. Zakhavaeva, and A. M. Lopatina
- A Study of Slow Hydrosol Coagulation Using the Continuous Flow Ultramicroscope by N. M. Kudryavtseva and B. V. Deryagin
- An Experimental Study of the Filtration of Air Through Porous Bodies in the Region of Transition Pressures by M. V. Talaev, B. V. Deryagin, and N. N. Zakhavaeva
- A Metallic Apparatus for Determining Specific Surfaces of Powders and Porous Bodies by B. V. Deryagin, N. N. Zakhavaeva, M. V. Talaev, B. N. Parfanovich, and E. V. Makarova
- Diffusional Phoresis of Aerosol Particles by B. V. Deryagin, S. P. Bakanov, S. S. Dukhin, and G. A. Batova
- The Behavior of Small Aerosol Particles in a Nonuniformly Heated Gaseous Mixture by S. P. Bakanov and B. V. Deryagin
- A Differential Counter for Condensation Nuclei by A. I. Storozhilova
- A New Method for Obtaining Constant and Uniform Supersaturations by B. V. Deryagin, P. S. Prokhorov, M. V. Velichko, and L. F. Leonov
- Solution of the Kinetic Equation for Coagulation by G. A. Martynov and S. P. Bakanov.

American scientists interested in colloids in general, and aerosols and hydrosols in particular, along with fundamental studies on atomic and surface forces can only stand in awe and amazement at the tremendous advances this Institute has made over the past 25 years. Deryagin has been to Russian science what Irving Langmuir was to America. The Division of Colloid and Surface Chemistry of the A.C.S. would do well to invite Deryagin and some of his collaborators to visit us.

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The Pyrimidines. By D. J. BROWN, The Australian National University, Canberra. With an Essay by S. F. MASON, The University, Exeter, England. Interscience Division, John Wiley and Sons, Inc., 440 Park Avenue South, New York 16, N. Y. 1962. xxv + 774 pp. 16 × 23.5 cm. Price, \$40.00.

This book is a welcome addition to the library of monographs since the pyrimidine portion of heterocyclic chemistry is so large and is still growing rapidly in spite of its age (145 years). This monograph is an excellent critical summary of the synthetic organic chemistry of pyrimidines by an experienced worker in the field who is well qualified for this tremendous task. The biological, biochemical, and medicinal significance of pyrimidines is briefly discussed at appropriate places. Inclusion of the formation of the pyrimidine ring in fused heterocycles such as purines and pteridines provides a tie-in with the frequent use (not in-

cluded) of substituted pyrimidines as foundations for building up such ring systems.

The monograph comprises an introduction (30 pp.), two chapters on ring synthesis (85 pp.), nine chapters on substituted pyrimidines (348 pp.), a chapter on physical properties (36 pp.), a tabulated appendix of simple pyrimidines (with melting points, boiling points, and references, 175 pp.) and an index (98 pp.) of the book exclusive of the appendix.

The introduction provides a good perspective of general aspects, reactions, and physical properties and discusses five reactivity factors which form the basis of the chemistry of pyrimidines [and of other heterocycles]. Its general summary of reactions is partly by reaction types and partly descriptive so that electrophilic and nucleophilic substitutions are not all under these headings. The use of separate reaction headings "Direct Nucleophilic Substitution" [of hydrogen], "Nucleophilic Metatheses" [nucleophilic substitution of halo, methoxy, methylthio, or methylsulfonyl], and "Other Metatheses" [nucleophilic substitution of mercapto, amino, or trimethylammonio] is misleading. Quaternization and N-oxide formation would be preferably classified¹ as electrophilic reactions at ring-nitrogen rather than as "Addition Reactions." This discussion of reactions has useful cross references to the fuller treatment in subsequent chapters.

Ring synthesis is presented in excellent fashion with the scope and the validity of assigned structures evaluated. One chapter deals systematically with "The Principal Synthesis" (C-C-C plus N-C-N) which provides wide synthetic scope by variation of reagents. The other includes ring formation from alternative reagents (C-C-C-N plus C-N, N-C-C-C-N plus C, etc.) and from other ring systems as well as pyrimidine ring closures to give fused bicyclics. In these chapters and throughout, the practical aspects (time, temperature, solvent, yield, and side reactions) are discussed adequately enough to provide the "feel" of the subject without reference to the original literature.

The chapters on substituted pyrimidines are each subdivided into preparations, properties, and reactions. Interrelated preparations and reactions are cross-referenced and not duplicated. This wealth of material is written in a very concise but nonetheless readable style. Included in the chapter on physical properties is a valuable twenty-two page discussion by S. F. Mason of experimental and theoretical work on ultraviolet, infrared, and Raman spectra of pyrimidines.

Systematic Tables of Simple Pyrimidines in the appendix cover the literature "up to 1957, with addition of important compounds described up to 1960." This appendix comprises 8 tables covering compounds with one or more of a single kind of substituent [plus C-alkyl homologs], 19 tables covering compounds with one or more of only two kinds [21 possible combinations] of substituents [plus C-alkyls], and 7 tables of those with one or more of three or four kinds of substituents [plus C-alkyls]. An additional 3 tables result from the partial subdivision of pyrimidones into N-H and N-alkyl categories. Using these tables to locate a polyfunctional compound is complicated by the large number of subdivisions and by the author's concept of major (amino, oxy, and thio) and minor (all others) substituents. The definitions on p. 502 must be read carefully before using the tables. Some aspects of the definitions requiring attention are: amidino is in the Amino table but in the Carboxypyrimidine chapter; carboxymethylthio is in the chapter on S-containing pyrimidines but is in the Carboxypyrimidines Systematic Table. The latter also contains isocyanate, thiocyanate, and isothiocyanate but no other 1-carbon acyl derivatives of oxy or amino compounds. The publisher would have done well to (1) repeat the title on each continued page (about three-fourths of the total) of the tables to assist the reader and (2) locate the list of their titles (now rather hidden on p. xxiv) right with the 37 tables since referral to this list facilitates use of the Appendix. The content of the tables as far as examined was consistent with the definitions with two exceptions. Oxy and alkoxy compounds bearing in addition only C-oxy- or C-alkoxy-alkyl substituents are in both Tables XXV (eight compounds) and XXVI (three other compounds). On p. 573, 4-amino-5-carbamoyl-2-ethylthiopyrimidine occurs with the amino oxy compounds by mistake but is also included on p. 582 in its proper place.

A check of accuracy of 50 scattered references and of physical properties of 20 compounds in the Systematic Tables revealed one error in each category. Typographical errors are moderate in number and involve mainly incorrect spelling.

In a book of this size, the publisher should consider using an over-all list of references (total of 119 pp.) to save duplication from chapter to chapter and again in the appendix. If it were alphabetical, such a list could serve as an author index to the subject and would eliminate the author portion of the present index.

It might be of value for the author and publisher to consider a paper-back version of the book consisting of the text (about 500

(1) A. R. Katritzky and J. M. Lagowski, "Heterocyclic Chemistry," Methuen, London, 1960.

pp.) without appendix and index (about 300 pp.). The entire book would be accessible for reference use in libraries and such an edition could put the book in the personal libraries of many more scientists. This exhaustive, worthwhile appraisal of pyrimidine organic chemistry deserves to be widely owned by chemists without any restrictions due to its price.

ORGANIC CHEMICAL RESEARCH SECTION
LEDERLE LABORATORIES DIVISION
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Comparative Biochemistry. A Comprehensive Treatise. Vol. IV, Constituents of Life—Part B. Edited by MARCEL FLORKIN, Department of Biochemistry, University of Liège, Liège, Belgium, and HOWARD S. MASON, Department of Biochemistry, University of Oregon Medical School, Portland, Oregon. Academic Press Inc., 111 Fifth Avenue, New York, N. Y. 1962. XXIII + 841 pp. 16 × 23 cm. Price, \$26.00.

This volume of "Comparative Biochemistry," like its predecessors, makes a determined effort to examine the conventional segments of biochemistry from the viewpoint of the distribution among living systems of enzymes, metabolites, and cellular structural elements. In some instances, the author has undoubtedly been assigned a Herculean task because of the paucity in the literature of truly *comparative* information. As a result, one is confronted in this volume primarily with a series of reviews, each covering an area of contemporary biochemistry overlaid to a greater or lesser degree with information on the distribution in nature of the systems under discussion. Some of the chapters are conventional in scope, e.g., those concerned with cellulose, starch, and glycogen, nucleic acids, aromatic amino acids, porphyrins, pteridines, and carotenoids, and this, of course, tests the author's mettle to cover well-trodden paths in a new and interesting manner. In almost all of these cases, happily, the challenge has been met successfully.

Certain of the chapters are especially well worth reading because they consider somewhat off-beat topics or, even more to be commended, they deal with conventional topics in a novel manner. The opening dissertation, "The Optical Asymmetry of Metabolites" by T. L. V. Ulbricht, is an example of the former category. After a provocative introduction in which living systems are considered from the standpoint of optical activity (a theme which recurs at the end of the chapter), the author proceeds to describe in a straightforward and condensed manner: the concept of absolute configuration as related to L(-)-serine in the case of amino acids and D(+)-glyceraldehyde in the case of sugars; the natural occurrence of L-sugars and D-amino acids (in bacteria, in mammals, and in antibiotics); and the relation of optical asymmetry to protein structure. The author is on less certain ground, however, when he embarks upon a discussion of optical asymmetry and cancer. His speculation that carcinogenic substances might bring about a racemization of amino acids in proteins, while interesting, is not supported by the experimental data by Heidelberger and others on biochemical aberrations induced by chemical carcinogens. One is reminded in this connection of Kuhn's imaginative theory on the relation of optically active compounds to the aging process.

From the strict viewpoint of comparative biochemistry, the chapters on "Comparative Biochemistry of the Alkali Metals" by H. B. Steinbach, "Metamorphosis and Biochemical Adaptation in Amphibia" by T. P. Bennett and E. Frieden, and "Nucleic Acids" by G. Brawerman and H. S. Shapiro are each authoritatively written and show evidence of an exhaustive search of the literature. There is also a group of excellent chapters dealing generally with various aspects of protein structure, i.e., "Protein Molecules: Intraspecific and Interspecific Variations" by A. Vegotsky and S. W. Fox, "Structure and Chemical Properties of Keratin-Forming Tissues" by A. G. Matoltsky, "Sclerotization" by M. G. M. Pryor, "Silk and Other Cocoon Proteins" by K. M. Rudall, and "Blood Coagulation" by C. Gregoire and H. J. Tagnon.

In still another category is a group of chapters which of necessity treat conventional classes of biochemical compounds primarily from a chemical or metabolic viewpoint interspersed with such data as are available on the distribution of these materials. Included in this collection are the massive review (81 pages, 540

references) on "Metabolism of Aromatic Amino Acids" by L. M. Henderson, R. K. Gholson, and C. E. Dalglish, "Cellulose, Starch and Glycogen" by J. S. Brimacombe and M. Stacey, "The Biochemistry of Lignin Formation" by F. F. Nord and W. J. Schubert, "Porphyrins: Structure, Distribution, and Metabolism" by C. Rimington and G. Y. Kennedy, "Pteridines: Structure and Metabolism" by H. S. Forrest, and "Carotenoids: Distribution, and Function" by T. W. Goodwin.

Altogether, the editors are to be commended for having persuaded this knowledgeable and literate group of authors to contribute chapters for this volume. If one reads the book completely and critically, it is of course possible to detect the inevitable overlapping of material between chapters, factual errors, and pertinent papers that have been omitted. The thoughtful reader may also wonder whether the rationale governing the sequence of chapters in Volume VI, Parts A, B, and C was not dictated, in part, by the alacrity with which the authors submitted their manuscripts. But this sort of intellectual nit-picking is not for the prospective general reader of the book and, therefore, is cheerfully omitted by this reviewer. All in all, the book provides many interesting hours of reading and is recommended *inter alia* for a summer vacation in the mountains or at the beach when one wishes to refresh himself on what his contemporaries are doing or to prepare for next year's lectures under the heading of "Special Topics in Biochemistry."

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Radiation Effects in Physics, Chemistry and Biology. Proceedings of the Second International Congress of Radiation Research, Harrogate, Great Britain, August 5-11, 1962. Edited by MICHAEL EBERT, Paterson Research Laboratories, Christie Hospital and Holt Radium Institute, Withington, Manchester, and ALMA HOWARD, British Empire Cancer Campaign, Research Unit in Radiobiology, Mount Vernon Hospital and Radium Institute, Northwood, Middlesex. North-Holland Publishing Company, P. O. Box 103, Amsterdam, Holland. 1963. x + 510 pp. 16 × 23 cm. Price, \$14.00.

The organizers of the Second International Congress of Radiation Research used the rapporteur method for the presentation of about half of the papers submitted. This volume consists of the twenty-five review papers, covering about 300 individually proffered reports. Each of these reviews is accompanied by a brief summary of the discussion which followed the presentation of the rapporteur. Selected references to previously published work have been made by all rapporteurs. Most of the discussions are also accompanied by pertinent citations of the literature.

Of the twenty-five sessions, the following may have more appeal to chemists than to biologists: Primary Species in Water, Solute Kinetics, Radiation Chemistry of Macromolecules, and Chemical Protection in Chemical Systems. A session on Electron Spin Resonance in Biology, as well as two sessions on DNA and one dealing with effects on enzymes, cover areas of mutual interest to chemists and biologists. The presentations of chemical protection at the cellular level and in mammals should also be called to the attention of chemists. The balance of the sessions are of primary interest to biologists, although some individual reports deal with biochemical alterations in radiated animals.

This book provides an up-to-date and representative sampling of the research now being carried on in laboratories throughout the world in the area often called Radiation Biology. It is of primary interest, therefore, to active investigators in this field. Of necessity, the historical aspects of the topics considered receive less attention than is desirable in a book intended to introduce a student to the field. In each case, however, the rapporteur has attempted a synthesis of the material presented at a particular session. The book is well illustrated, and shows skill in both editing and publishing. The editors and contributors are to be congratulated for their promptness in presenting this material.

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