

phosphinealkyletes, aldolization and aldol condensation, aldol-type condensations of carbonyl compounds with derivatives of carboxylic acids, aldol-type condensations of carbonyl compounds with active methylene compounds, Mannich reaction and related syntheses, as well as other topics.

According to the authors, the Friedel-Crafts reaction and organometallic syntheses, which in some respects may be considered to be related to aldolization reactions in the broad sense, will be the subjects of subsequent volumes of "Preparative Reactions in Organic Chemistry." The authors of "Aldolization and Related Reactions" estimate the number of papers dealing with some aspects of this type of synthesis at several tens of thousands. They have therefore attempted to give only a cross-section of references and to include those papers which are concerned with investigations primarily aimed at the elucidation and elaboration of reactions of the aldolization type. Nevertheless, the authors believe that their book contains enough references to papers describing merely preparative refinements of aldolization-type reactions to be of value as a fairly comprehensive work for the entire field.

The text abounds with discussions of reaction mechanisms and preparative details. Each chapter contains detailed directions for the laboratory synthesis of representative compounds.

Detailed indexes contain over 2600 literature sources (with cross-references giving page numbers in the book where each source is used), a list of authors, a summary of laboratory recipes and a detailed subject index. A very detailed table of contents also contributes to the ease with which the book may be used as a theoretical and practical reference work.

Although the authors have reviewed the literature through 1957, the broad scope of the book necessitated restriction of the number of references by emphasizing the papers which have appeared during the seven years from 1950 to 1957. Attempts were made to include all important references dating back to earlier years.

The broad scope of "Aldolization and Related Reactions," written with the unifying point of view of mechanistically related reactions and, at the same time, paying a great deal of attention to preparative details, makes the book very valuable as a reference work for any practicing organic research chemist.

It is hoped that a future updated edition of this conceptually original, painstakingly detailed, and clearly written book will be translated into other languages so that it will become available to a wider readership.

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Proceedings of the Symposium on the Chemistry of Coördination Compounds held during the Twenty-Eighth Annual Session at University of Agra on February 7 and 8, 1959. Convenor, DR. ARUN K. DEY, Department of Chemistry, University of Allahabad, Allahabad. National Academy of Sciences, India, Lajpatrai Road, Allahabad 2, India. 1960. Part One. 147 pp. 18 × 24.5 cm. Price, Rs. 15.00; Part Two. 203 pp. 18 × 24 cm. Price, Rs. 25.00; Part Three. 302 pp. 18 × 24 cm. Price, Rs. 35.00.

In recent years international chemical conferences have increased greatly in number and importance. Among the more significant of such gatherings has been the series of five conferences on Coördination Compounds which have been held in Welwyn, Copenhagen, Amsterdam, Rome and London (with the sixth to convene in Detroit in the Summer of 1961). Quite independent of this series, but of equal significance in some ways, was the Symposium on the Chemistry of Coördination Compounds which was held in Agra on February 7 and 8, 1959, under the auspices of the National Academy of Sciences of India. The proceedings of the meeting are recorded in the three volumes which are reviewed here. Although most of the conference participants were from India, the meeting was truly international in scope, with representatives from Austria, Canada, Czechoslovakia, England, Hungary, India, Japan, the Netherlands, Scotland, Sweden, the U.S.A. and the U.S.-S.R.

Professor Priyadarajan Ray's excellent presidential address "Recent Advances in the Chemistry of Coördination Compounds" opens Part One, which also contains Section I of the symposium: "General Survey." Part Two contains Section II, "Valence Bond Considerations, Stereochemistry and Structure," and Section III, "Techniques and Methods of Investigation." In Part Three are to be found Section IV, "Reactions, Stability and Thermodynamic Considerations," Section V, "Stabilization of Valence States," Section VI, "Analytical Applications" and Section VII, "Miscellaneous."

It is not clear why the symposium was published in three volumes rather than one, for anyone interested in owning this book will certainly want all of it, and would find it more convenient to use if it had one Table of Contents instead of three. This is particularly true since the arrangement of the papers into the seven sections seems in several cases to be somewhat illogical—a situation which is perhaps excusable in view of the difficulty of the problem of classification.

Altogether, this collection contains one hundred and thirty-two papers, some of which are printed in full, and others only in abstract form. The majority are reviews of various fields of coördination chemistry or of specific groups of workers. Several of the subjects reviewed (especially by the European speakers) have been discussed in other places, and are readily available to American readers. A. K. Dey's lecture "India's Contribution to Coördination Chemistry" and that of Kazuo Yamasaki "Recent Researches on Coördination Compounds in Japan" are of special interest in showing how greatly the chemists of these countries have contributed to the understanding and application of coördination chemistry. Many of the papers from the Asian countries (particularly India) reflect the lack of modern research equipment. In spite of this, most of them record valuable work. While it is difficult to produce worthwhile results without extensive equipment, even one well-selected piece of apparatus—for example, an infrared spectrophotometer, a polarograph or a polarimeter—can make possible a great deal of interesting and significant research.

It cannot be truthfully said that the symposium in Agra recorded many significant or new discoveries. It was important, however, in indicating that progress is being made in Asia in the study of coördination chemistry, and it must have been a great inspiration to those who participated in it, and through them, to the chemists of all of Asia. It is to be hoped that more such conferences will be held, and that they will furnish a meeting ground for chemists from the East and West.

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The Chemistry of Natural Products. Volume V. The Carbohydrates. By S. F. DYKE, The College of Technology, Bristol, England. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1960. 232 pp. 16 × 23.5 cm. Price, \$4.75.

This is an amusing little book. The best that can be said for it is: it is cheap and gives a better treatment of the subject than is found in any contemporary American general organic textbook, elementary or advanced. The author has no real familiarity with the field but struggles manfully with its intricacies and especially with the old problem of the two-dimensional depiction of three-dimensional objects—a problem which was long ago solved by the engineers and the crystallographers but still puzzles most organic chemists. Thus, formula XVI on page 39 is pictorially correct but its Fischer projection (VIII) on the preceding page is not quite so. On page 43 a Haworth perspective formula (XXXII) is stated to have been rotated 180° to give an identity (XXX-III) but the two formulas are not identical. On page 22 the fact that the configurational standard selected for the D-series is *dextrorotatory*-glyceraldehyde is not stated. Contrary to the text, the two isomers mentioned at the top of page 72 are predictable but are rarely found; D-glucose *does* form a bisulfite compound under the proper conditions (page 32); for some reason two-dimensional chromatograms are *not* customarily employed with the sugars (page 128); it is *always* possible to obtain selective reaction at the primary hydroxyl group with triphenylmethyl chloride (page 68). Carbohydrate nomenclature for the English

language has undergone a formal codification in recent years. In this respect the book utilizes a glorious mixture of the old and the new, albeit no more so than most biochemical papers currently appearing in the language of Shakespeare. Some umbrage could be taken at a complete juxtaposition of the old and the new such as the hyphen usage in the same sentence on page 82 or the "Fructan" and "Fructosan" in the headings of page 180. Along with many other writers, the author does not understand that the order of group arrangement on the anomeric carbon is the same for  $\beta$ -D and  $\alpha$ -L or for  $\alpha$ -D and  $\beta$ -L, a circumstance which requires the inclusion of the configurational symbol in the name. The diagrams are of the type one might find in the notes of a student possessing no modicum of talent in lettering; the one on page 217 is especially crude. On the whole this text does not meet current requirements for an introductory text in modern carbohydrate chemistry.

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of temperature itself, such as the meaning of negative temperature. The kind of interaction involved has a bearing not only on practical communication problems involving signals with very small energy content, but may open new doors for the study of "communication" in megamolecules, especially in organized channeled systems of a biochemical nature. These networks of signal and response hold the clue to problems of growth and interaction in many chemical systems; and any new means of measuring quanta of energy at the megamolecular level is bound to be ultimately important in future chemistry.

The editor of this volume is to be commended for assembling this series of reviews, well planned and written to summarize and correlate the selected fields, and presented in a pleasing volume that is bound to be both useful and stimulating.

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**Progress in Cryogenics. Volume 2.** Edited by K. MENDELSSOHN, D. Phil. (Berlin), M. A. (Oxon), F. Inst. P., F. R. S. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1960. vii + 280 pp. 16 × 25 cm. Price, \$11.50.

The year of publication of this second volume of reviews of progress in cryogenics is just one year beyond the fiftieth anniversary of the first liquefaction of helium and one year short of the fiftieth anniversary of the discovery of superconductivity. The contents of the volume testify to the remarkable expansion of cryogenics during this half-century. When Kamerlingh Onnes liquefied helium and discovered superconductivity, low-temperature physics was an esoteric branch of science in which less than a dozen scientists had any competence. The fact that this series of reviews is to a considerable extent devoted to cryogenic engineering makes clear the degree to which cryogenics has become a widely practiced field of technology due to the importance of low-temperatures not only for pure research in many branches of science but in many kinds of industry as well. This rapid expansion and wide application of cryogenic techniques makes this book especially welcome.

Following a brief preface by the editor, there are eight reviews varying in length from eighteen pages on deuterium separation to sixty pages on the *maser*.

The titles and authors are: The Storage and Handling of Cryogenic Liquids, G. H. Zenner, Linde Company, Touawanda, New York; The Gas Refrigeration Machine and its Position in Cryogenic Technique, Dr. J. W. L. Kohler, Philips Research Laboratories, Eindhoven; The Separation of Deuterium on an Industrial Scale by Low Temperature Distillation, M. P. Malkov, A. G. Zel'Dovich, A. B. Fradkov, I. B. Danilov, Institute for Physical Problems, Moscow; Low-Temperature Bubble Chambers, N. C. Barford, Imperial College of Science and Technology, London; the 1958 Scale of Temperatures for the Liquid Helium-4 Region, Dr. H. Van Dijk, Kamerlingh Onnes Laboratory, Leiden; Resistance Thermometers for Low Temperatures, C. R. Barber, National Physical Laboratory, Teddington; The Three Level Solid State Maser, E. O. Schulz-DuBois, Bell Telephone Laboratories, Murray Hill, New Jersey; Methods of Nuclear Orientation, Dr. E. Ambler, National Bureau of Standards, Washington, D. C.

The first three articles are of interest chiefly to cryogenic engineers; but if a low-temperature chemist or physicist is not lucky enough to have an engineer providing facilities for him, he may find here a number of helpful ideas for solving his own special problems of technique. The fourth article is of special note as it describes the development of the bubble-chamber technique that recently won a Nobel Prize for D. A. Glaser; it is a fascinating chapter in the imaginative marriage of two here-to-fore unrelated fields to produce widely influential progeny. The next two reviews on topics concerned with temperature scale and measurement are especially important for those working in the lowest decades of degrees. The review of research on the three level maser is of wider interest not only because of what it describes in covering past work but for what it implies as possibilities for future development. The theory of maser action raises significant questions concerning the concept

**Spot Tests in Organic Analysis.** Sixth, enlarged and revised English Edition by FRITZ FEIGL, Eng., D.Sc., Laboratório da Produção Mineral, Ministério da Agricultura, Rio de Janeiro; Professor at the University of Brazil; Member of the Austrian and Brazilian Academies of Science. Translated by RALPH E. OESPER, Ph.D., Professor Emeritus, University of Cincinnati. D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey. 1960. xx + 675 pp. 16.5 × 23.5 cm. Price, \$13.25.

The Fifth English edition of this book appeared in 1956. The rapid growth of spot tests applied to organic substances is indicated by the increase in the number of sections in the 6th ed.—32 preliminary (exploratory) tests in the 6th ed., 25 in the 5th; 70 tests for functional groups in the 6th ed., 49 in the 5th; 133 tests for individual groups in the 6th ed., 78 in the 5th; and 111 practical applications in the 6th ed., 62 in the 5th. Altogether about 600 tests are described and the necessary information for each test is given, including "successful and unique tests in synthetic fibers, plastics and rubbers."

A careful study by the author of "new or hitherto neglected methods in qualitative organic analysis, and the application of the experience gained along these lines, resulted in the discovery and development of so many sensitive and strikingly simple tests that there was every justification for issuing the new edition of "Spots Tests in Organic Analysis." Because of the mass of material available for the new edition, the previous text had to be pruned by deletions, abridgements and typographical simplifications in order to prevent the book from becoming too bulky. In this judicious way the author has held the 6th ed. to an increase of only about sixty pages. The style and arrangement of the material in the new edition closely follows that in the previous ones.

The book contains six chapters: Chapter 1, Development, Present State and Prospects of Organic Spot Test Analysis (33 pp.); Chapter 2 (by P. W. West), Spot Test Techniques (29 pp.); Chapter 3, Preliminary (Exploratory) Tests (96 pp.); Chapter 4, Detection of Characteristic Functional Groups in Organic Compounds (178 pp.); Chapter 5, Identification of Individual Organic Compounds (163 pp.); Chapter 6, Application of Spot Reactions in the Testing of Materials, Examination of Purity, Characterization of Pharmaceutical Products, etc. (98 pp.). The author directs particular attention to Chapter 6, "which illustrates the truly fascinating use of spot tests in the examination of commercial materials" (drugs, dyes, plastics, rubbers, synthetic fibers, etc.).

At the end of each chapter is an extensive list of references to the literature, the total being about nine hundred. Following the last chapter, there are addenda (12 pp.) to Chapters 3, 4 and 5, bringing them up to 1960. Then follows a tabular summary (24 pp.) of the limits of identification attained by spot tests for (a) elements, (b) characterizing orientations, (c) characteristic groups and (d) individual compounds. The limits of identification are given for the lowest and highest values obtained when different compounds are examined or different procedures are used. A macrodrop (*ca.* 0.05 ml.) is implied, unless otherwise stated. Author and subject indexes conclude the book. The index is