

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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**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, Tonawanda, 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

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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**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