and of Rhamnose and Fucose" and "The Methyl Ethers of D-Galactose," provided by G. G. Maher, bring previous surveys of these carbohydrate classes up to date. "Polysaccharides Associated with Wood Cellulose" by W. J. Polglase provides information on the carbohydrates associated with wood and wood cellulose preparations, and "The Chemistry of Heparin" by A. B. Foster and A. J. Huggard describes the history, isolation, purification, structural data and the chemical and physiological properties of this important anticoagulant.

Several desirable practices, instituted earlier in the series, are continued in the present volume. Extensive Tables of Physical Properties of pertinent derivatives are given at the ends of the several chapters where this is appropriate. A complete list of the topics covered in previous volumes is appended after the extensive index, and frequent references to these earlier chapters prevent undue duplication when certain of the material under discussion has already been surveyed. Another salutory policy is continued by E. L. Hirst and A. G. Ross, who provide a biographical sketch of the late Professor E. G. V. Percival, whose untimely death in 1951 deprived carbohydrate science of one of its most productive investigators.

The present volume meets fully the standards of excellence which have come to be expected of the series, and most assuredly belongs on the carbohydrate chemist's bookshelf beside its predecessors.

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Kinetic Theory of Liquids. By J. FRENKEL. Dover Publications, Inc., 920 Broadway, New York 10, N. Y. 1955. xi + 488 pp. 13.5 × 20.5 cm. Price, $3.95 cloth, $1.95 paper.

This book is very interesting reading and provides a great deal of food for thought. It was first published in 1946 by the Oxford Press and Dover deserves a great deal of credit for having reprinted it to sell for a modest price.

Frenkel, who died quite recently, was one of the greatest theoretical physicists of our generation. His books on electricity and magnetism and quantum mechanics are classics. He had a great deal of experience in the study of the structure and properties of crystals. At various times he worked on the optical, magnetic and electrical phenomena in crystals; the theory of fusion; order-disorder phenomena; lattice defects and their migrations; etc. Much of his theory of crystalline phenomena is included in the present book. He thought of a liquid as being essentially a crystal with long range disorder and used much of his knowledge of crystals to explain the parallel phenomena in liquids. This viewpoint is in sharp contrast to that of so many of the people who are currently working on the theory of liquids and regard a liquid as a very dense gas. Since a liquid is intermediate between a gas and a crystal, there will always be this conflict of viewpoints and the contrast is very stimulating.

I am amazed at the breadth of topics considered in this book.

Chapter I, Real Crystals at Elevated Temperatures: Evaporation; hole formation; dissociation; lattice distortions; diffusion of impurities; electrical conductivity and optical properties.

Chapter II, Perturbations in Mixed and Molecular Crystals: Order-disorder; distant and local alteration order; extension of Bragg-Williams theory; thermodynamical theory of order phenomena; order in dipole crystals.

Chapter III, Theory of Liquids and Mechanism of Fusion: Relation between solid and liquid states; mechanism of melting; local order in liquids; Kirkwood's free volume theory; temperature dependence of the rigidity of a crystal; relative stability of solids and liquids.

Chapter IV, Heat Motion in Liquids: Various theories of viscosity and rigidity of liquids; propagation of ultrasonic waves through liquids; the equations of hydrodynamics.

Chapter V, Orientation and Rotational Motion of Molecules in Liquids: Various theories of rotational Brownian movement with and without electric fields; flow by refringence; scattering of light; cybotaxis.

Chapter VI, Surface Phenomena: Mono- and polymolecular films; cohesion between molecules; orientation of molecules in the surface layer; dependence of surface tension on temperature.

Chapter VII, Kinetics of Phase Transitions: Vapor liquid equilibria; nucleation; crystal growth.

Chapter VIII. Properties of High Polymers: External and internal bonds; self-dissociation of dissolved substances; solutions of high polymers; statistics and kinetics of configuration of long chain polymers in solution; the mechanical and thermodynamical properties of rubber-like substances.

Each of these topics is discussed in a simple and yet deeply penetrating fashion. You may disagree with Frenkel, but it is not wise to disregard him. I believe this book should be particularly useful to a wide variety of chemists. The ideas which Frenkel has expressed will serve as seeds for a great many basic and applied developments in chemistry.

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Methoden der Organischen Chemie. (Houben-Weyl). **Physikalische Methoden.** Band III, Teil 1. By EUGEN MÜLLER (Editor). Georg Thieme Verlag, (14a) Stuttgart, Herdweg 63, Germany. 1955. xxix + 954 pp. 18 × 26 cm. Price, DM 162, —.

The old "Houben-Weyl" contained in the first of its four volumes a number of sections dealing with the determination of physical properties of organic molecules. With the appearance of the volume under review, the new "Houben-Weyl" completes its treatment of the same theme, to which two entire volumes are devoted, impressive testimony to the increased availability and popularity of physical tools for the organic chemist.

The volume begins with two sections of greatest importance for the chemist inclined toward theoretical considerations: thermodynamic methods and kinetic measurements. These chapters are followed by discussions of the determination of the usual physical properties: density, solubility vapor pressure, molecular weights, surface tension, and calorimetric data. A very useful and praiseworthy addition following these disquisitions is the introduction to statistics of errors, fiduciary limits, averaging of values, etc.

The rest of the volume is devoted to microscopy, study of liquid crystals, mass spectrometry and use of isotopes.

Whereas an American reader will have no difficulty in finding discussions of comparable excellence and, because of references to locally available apparatus, possibly greater usefulness, in the indigenous literature, he may find the volume under review unique in possessing a chapter by G. Briegleb devoted to the "Study of molecular shape with the aid of space models and to-scale atom models." Perusal of the material presented by one of the originators of the Stuart-Briegleb models is likely to enable the reader to make more intelligent and more fruitful use of his set of models.

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