sented by Gilman and Johnston as part of their continuing investigations of lithium fluoride crystals.

Section II contains papers which consider stress–strain curves obtained on single crystals of various materials and their correlation with the nature of slip in the region of plastic flow. Blewitt, Coltman and Redman present the results of deformation of copper at 4.2°K., at which temperature they find discontinuous slip and deformation by twinning.

Section III, being mostly theory of plastic deformation, is notable for the inclusion, after the conference, of an excellent extensive and well-organized treatment of the mechanism of glide and work-hardening by A. Seeger. In addition to work-hardening and recovery, this paper contains theoretical material applicable to all aspects of mechanical properties.

Section IV is concerned mainly with theories of "locking" and "pinning" of dislocations, as applied to deformation, yield, annealing, etc.

Section V contains three papers on the application of dislocation theory to damping and fatigue.

The papers in the rather short Section VI treat some aspects of the theory of dislocations, including their generation and motion. One would like to have found greater coverage here, particularly to the extent that this volume can be considered as a source book.

In addition to further information on the by now well-known high strength of whiskers, Section VII contains interesting results of Read and Pearson on deformation and fracture of silicon rods and whiskers and of Suzuki, Ikeda and Takeuchi on deformation of thin metal crystals in which an increase in strength is noted as size decreases.

Section VIII contains several papers on a few subjects from the complex and as yet little-understood phenomena of radiation damage. Koehler, Henderson and Bredt present a brief survey of annealing data in noble metals in which each of six stages of annealing is analyzed in terms of some atomic process. Blewitt, Coltman, Holmes and Noggle present the experimental results and analyses of some excellent data on the mechanism of annealing in neutron irradiated metals. Both articles show that, in order to understand the mechanism of annealing at all, the process must be followed through the full range of temperature up from the preferably low temperature of irradiation (just above liquid helium).

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A Manual of Paper Chromatography and Paper Electrophoresis, Second Edition, Revised and Enlarged. By RICHARD J. BLOCK, Boyce Thompson Institute for Plant Research, Inc., Yonkers, N. Y., and Department of Biochemistry, New York Medical College, New York, N. Y.; EMMETT L. DURRUM, Associate Research Director, Spinco Division, Beckman Instruments, Inc., Palo Alto, California; Associate Clinical Professor of Medical Microbiology, Stanford University School of Medicine, Palo Alto, California; and GUNTER ZWEIG, Associate Chemist, Pesticide Residue Research Project, University of California, Davis, California. Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1958. xi + 710 pp. 16 × 23.5 cm. Price, $12.80.

Chromatographic and electrophoretic separations on paper have been in use for over a decade. Their simplicity and general applicability have elicited almost as many techniques as there are workers in the field. Stabilization and organization of this development can only be performed by an extensive and practical survey of progress such as Paper Chromatography and Paper Electrophoresis.

The structure of the 1955 First Edition is maintained but expanded in both sections from 484 to 710 pages and the copious references are increased by fifty per cent. From the standpoint of providing a reliable survey of applications the book is the best available reference source and can be recommended as a laboratory guide. The authors have been generous in their recommendations of other reviews and books on the subject. It is the digestion of the tremendous volume of literature, however, which constitutes the major contribution of this volume. The bibliographies include about 1800 references on paper chromatography and over 2100 on paper electrophoresis. The authors include photographs of commercially available chromatographic equipment. In general these are far superior to the equipment shown in the first edition. The reviewer feels more of the older figures could have been discarded without detracting from the value of the book.

The divisions are introduced by understandable and helpful discussions of principles and theories. The individual sections which deal with separation of classes of compounds also include reviews of pertinent publications on properties of homologous and other series. Quantitation principles and methods are stressed wherever practical. In many instances micro methods are given for determination of eluted compounds. Methods of inorganic ionography are surveyed but not as exhaustively as amino acid chromatography and protein electrophoresis. The treatment of high voltage paper electrophoresis is unfortunately brief in view of the potentialities and growing interest in the method. Continuous electrophoresis of proteins is especially well described. Since electrophoretic migration parameters are arbitrary Durrum stresses the necessity for methods of standardization of densitometric techniques.

Authors of chromatography monographs tend to overlook a major attribute of the method. Partition chromatography and electrophoresis demonstrate intensive properties of substances which the chemist may use for their characterization and for structure determination. Unknown substances are so often first recognized by paper chromatography that discussion of the philosophy and techniques of identifying unknowns might be greatly expanded. This would involve comparison of chemical and chromatographic properties of the groups of compounds as they are presently classified. Such a correlation together with the present discussions of variations of properties with structure within a group or series could extend the usefulness of the chromatographic method.

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Theory of Dielectrics. Dielectric Constant and Dielectric Loss. By H. FRÖHLICH, Professor of Theoretical Physics in the University of Liverpool. Oxford University Press, 114 Fifth Avenue, New York 11, N. Y. 1958. vii + 192 pp. 14.5 × 22 cm. Price, $4.80.

The first hundred pages of text and thirty pages of appendices in this rather short monograph are devoted to systematic development of theories of dielectric constant and loss. The approach is largely based on classical statistical mechanics, and substantial parts are the results of investigations by the author. Applications to selected examples are taken up in the last fifty-five pages of text. The viewpoint is that of the theoretical physicist in much the same sense that "Dielectric Behavior and Structure" by C. P. Smyth deals largely with chemical implications, and "Dielectrics and Waves" by A. von Hippel is an exposition which puts more stress on engineering aspects.

The present second edition differs from the first only by the addition of several pages of appendix material to the text of the 1949 edition. Much of this is concerned with the author's approach to some rather subtle and recently disputatious points in the theory of the dielectric constant of substances with permanent dipoles and induced polarization; two final paragraphs outline recent dynamical treatments by Gross and Sack of dielectric loss when inertial effects must be considered.

A reader interested in becoming acquainted with statistical molecular treatments of dielectric behavior will find this book useful, with a considerable content for its small size. This reviewer's principal criticism is that except for the appendix material no developments since 1948 are mentioned. Of these there have been a considerable number of sufficient importance that to a significant extent the book now fails to "provide a background against which applications can be made" (the quotation is from the dust cover).

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