by former students and postdoctoral fellows of Purnell, another chapter was rewritten by him, and the remaining two are by British fellow workers. The result is a comprehensive but cohesive review of progress during the past several years, highlighting those areas in which we may expect future developments.

By now we have retention data compiled for many thousands of compounds, yet the identification of unknown peaks continues to plague the chromatographer. In the first chapter Leathard and Shurlock emphasize the danger of the usual reliance on peak coincidence (known and unknown), and have compiled and evaluated techniques based on retention data alone, and also on precolumn and postcolumn operations or modifications. No other single source gives as much information on what is perhaps the most important remaining problem in gas chromatography.

Each year new types of columns are introduced and hailed for their unique advantages to the point of confusion. Halász and Heine bring order to this chaos and tell us not only how to choose which type of column to use but how to operate it under optimum conditions depending on whether the objective is speed, resolution, or throughput.

The choice of the best liquid phase is the most critical decision the operator has to make. For the most part we have come to rely on empirical "polarity scales" as an aid in choosing the stationary phase. Although this procedure is adequate for easy separations, it overlooks the many selective interactions which can be exploited. Langer and Sheehan suggest that simple solution theory and our present knowledge of molecular interactions make it possible to choose or design a liquid phase for the most difficult of separations—for example, of diastereoisomers.

Purnell is, of course, well known as a physical chemist, and his theoretical interests are represented by chapters on liquid surface effects and physical measurements. In fact, sound theory pervades the entire work, yet, as Halász reminds us, "Gas chromatographic analysis is today partly a science but, to a greater degree, an art." This statement is amplified by a wealth of practical information in each chapter. Like Purnell's *Gas Chromatography*, this volume will be indispensable to gas chromatographers for years to come.

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The Bistable Model

Dielectric Relaxation. VERA V. DANIEL. Academic Press, New York, 1967. xiv + 281 pp., illus. $13.

This monograph, as the author calls it, is addressed primarily to the applied physicists, chemists, and engineers who wish to gain a physical picture of the nature and sources of dielectric loss at radio frequencies; microwave, infrared, and optical frequencies are mentioned only in passing. The author disclaims any attempt at a comprehensive review of the broad area of dielectric relaxation but instead aims to cover a number of selected topics from a particular point of view.

Dielectric loss is, of course, something to be avoided in most applications, and a thorough understanding of its microscopic sources should lead to insulating materials superior to those found by empirical methods. The truth is that these microscopic mechanisms are not well understood today even in elementary substances, let alone in practical insulators. In this situation one must be content with simple models. The author considers only the widely applicable bistable model, which describes the polarizable system by a symmetrical potential function with two minima. The extension to multiwell potential functions is straightforward. When a particle receives sufficient thermal activation energy it hops the barrier and contributes to the polarization fluctuations that appear as damping in nonequilibrium situations. The author enlarges upon the model throughout the book in connection with experimental results on a variety of materials. No mention is made of tunneling through the barrier, nor is anharmonic damping of resonant systems considered. The bistable model leads to a Debye susceptibility function which, however, can also represent the low-frequency behavior of a damped harmonic oscillator. The first half of the book takes up several other topics of theoretical interest in addition to the bistable model, such as equivalent circuit representations, thermodynamics and dielectric fluctuations, distributed relaxation times, and phenomenological representations of the dielectric function, including the Cole-Cole diagram. The author does a good job of providing the physical insights welcomed by experimentalists and often found lacking in sophisticated theoretical treatments. Most of the discussion is developed from basic classical principles and is within the grasp of first-year graduate students.

The second half of the book is meant to serve as a guide to some of the literature on relaxation in gases, liquids, and solids and requires considerable background of the reader. The solids include molecular crystals, glassy insulators, heterogeneous materials, hydrogen-bonded solids (such as ice), and ferroelectrics. Occasionally critical discussions are provided, but too often the coverage is sketchy and incomplete.

Anyone interested in dielectrics will find an examination of the book well worthwhile, for it contains a great deal of material not readily available elsewhere. The monograph also serves to underline the need for further reviews of other aspects of the dielectric relaxation problem.

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Books Received

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Analysis and Characterization of Oils, Fats, and Fat Products. Vol. 2. H. A. Boekenoogen, Ed. Interscience (Wiley), New York, 1968. x + 681 pp., illus. $26.50.

An Annotated List of Seed-Borne Diseases. Mary Noble and M. J. Richardson. Commonwealth Mycological Institute, Kew, Surrey, England; International Seed Testing Association, Wageningen, Netherlands, ed. 2, 1968. viii + 194 pp. Paper, 30 s. Commonwealth Mycological Institute Phytopathological Papers, No. 8.

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Chemistry of Amino Acids, Peptides, and Proteins. A Programmed Text. Terrell C. Myers and Jerome S. Allender. Harper and Row, New York, 1968. x + 384 pp., illus. $10.50.

Collective Models of the Nucleus. J. P. Davidson. Academic Press, New York, 1968. xiv + 238 pp., illus. $12. Pure and Applied Physics series.

The Elements of Digital Computer Programming. E. D. Reilly, Jr., and F. D. Federighi. Holden-Day, San Francisco, 1968. x + 221 pp., illus. $8.75. Holden-Day Series in Computer Science.

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