

Book Reviews

Chromatographic Systems. Maintenance and Troubleshooting. By JOHN Q. WALKER (McDonnell-Douglas Research Laboratory), MINOR T. JACKSON, JR. (Monsanto Central Research Department), and JAMES B. MAYNARD (Shell Research Laboratory). Academic Press, New York, N. Y. 1972. ix + 289 pp. \$8.95.

The preparation of a volume on maintenance and troubleshooting is always an intrepid undertaking since the material to be covered must of necessity be derived from the failures of the design engineer. It is difficult to achieve an orderly and systematic approach to the highly variable nature of the subject, especially if the publication is to be a first attempt at a comprehensive treatment. The three authors have, nevertheless, made an excellent attempt to compile a wealth of practical information in a logical fashion in this volume.

The book contains a section on liquid chromatography, a section on gas chromatography, and a number of appendixes on a variety of useful subjects. The section on gas chromatography also touches upon gc-ms, gc-ir, and gc-uv. Since gas chromatography is almost two decades older than modern liquid chromatography, it is not surprising that the latter only occupies one-fourth of the book. Each section contains a brief chapter on theory and describes the functions of the components in the chromatographic system. Maintenance suggestions are scattered around the book. The most important portions are the comprehensive troubleshooting sheets. These should be invaluable in assisting the chromatographer to diagnose the problems he may observe in his work. Some suggestions appear to be rather impractical, even though they may be basically sound. I wonder, *e.g.*, whether the authors actually steam-clean their detectors every week (I clean mine only when I have a problem) or have tried using boiling water at 212°F to rapidly calibrate the output of a thermocouple (pp 132, 144).

Considering the large potential applicability of this text, it is regrettable that the publishers have managed to produce an extremely sloppy book. A photo-offset process from typed sheets was used. There are numerous typing flaws. Proofreading of the galley appears to have been omitted. Two pages of errata are furnished, but many more errors, some of them quite serious, have gone by undetected. On pages 168-171 alone, I noticed 12 uncorrected errors and as many typing flaws. Another unsettling observation is that the authors do not appear to know the difference between "absorption" and "adsorption" (p 43) or between "phosphorus" and "phosphorous" (p 168). There is no index, which is quite awkward. A volume of this type is problem-oriented, and an index can save time, especially to confirm that a specific problem is not (adequately) covered. The introduction states that this volume is not intended to duplicate other excellent texts available. It would, however, be helpful if a more positive attempt was made to direct the reader to these publications.

The book is useful to have in a laboratory where gas and/or liquid chromatographic techniques are carried out. If this book can solve just one actual problem, the savings involved would already more than adequately justify the nominal cost of this book.

T. H. Gouw, *Chevron Research Company*

Polymer Science and Materials. Edited by ARTHUR V. TOBOLSKY (Princeton University) and HERMAN F. MARK (Polytechnic Institute of Brooklyn). Wiley-Interscience, New York, N. Y. 1971. x + 404 pp. \$21.50.

This book, the first of two volumes, is a broad survey of the polymer science field. The intended audience is the beginning student of polymer science or engineering. The sixteen chapters are authored by a number of well-known experts in the subject matter. The chapters are presented as separate entities with little attempt at continuity between the chapters. The style and format are fairly consistent throughout, however. The range of topics is not comprehensive, although the second volume in the series may fill in some of the gaps. Thus, molecular weight concepts, thermodynamic aspects, strength properties, etc., are covered, but other topics such as kinetics of polymer reactions are largely ignored.

In general, the book is a somewhat random but well-presented collection of survey material in the polymer science area by experts

in the field. The beginning student and perhaps some established investigators will find it informative and useful.

James L. Kuester, *Arizona State University*

Introduction to Phase Transitions and Critical Phenomena. By H. E. STANLEY (Massachusetts Institute of Technology). Oxford University Press, New York and Oxford. 1971. xx + 308 pp. \$9.50.

The problem of phase transitions is an old one, so old in fact that it may come as a surprise to some to learn that much of the recent exciting work in physics—especially in solid state physics—has been concerned with the nature of phase transitions. Particular interest has centered on the critical point, which has given rise to the new parameter $\epsilon = (T - T_c)/T_c$, where T is the temperature and T_c the critical temperature. Measurements of the heat capacity of liquid ^4He near its λ transition and of $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ near its antiferromagnetic transition, for example, have been carried out with values of ϵ approaching 10^{-5} . The purpose of this work has been to test critically equations of state.

As the ferromagnetic critical point is approached from above T_c , the zero-field isothermal susceptibility varies as $\epsilon^{-\gamma}$, where, for example, γ has been found to have the value 1.35 for Ni and 1.215 for CrBr_3 . The quantity γ is called a critical point exponent. This book reflects the physicists' current fascination with such critical point exponents, their determination at small ϵ , and their deviation from the results of simple classical models; though many comparisons are made between theoretical and experimental results, the book is written largely for the experienced theoretician.

The book is derived from a set of lecture notes and has the anticipated failings. In particular, it is a very personal book, rather than a monograph, concentrating on selected topics such as the liquid-gas and ferromagnetic critical points. The last fifth of the book concentrates on dynamic aspects, and the general tone places considerable emphasis on theoretical methods of analysis. Most chemists are still interested in phase equilibria occurring over a wider temperature region, a subject virtually ignored here. There is little mention of the recent work on magnetic ordering in either one or two dimensions, though the theoretical framework is presented.

Richard L. Carlin, *University of Illinois at Chicago Circle*

Organophosphorus Chemistry. Volume 3. A Specialist Report. By S. TRIPPETT, Senior Reporter, and R. S. DAVIDSON, N. K. HAMER, D. W. HUTCHINSON, R. KEAT, J. A. MILLER, D. J. H. SMITH, J. C. TEBBY, and B. J. WALKER. The Chemical Society, London. 1972. x + 292 pp. £7.

This volume summarizes the literature of Organophosphorus Chemistry from July 1970 to June 1971 under these headings: Phosphines and Phosphonium Salts; Quinquevalent Phosphorus Compounds; Halogenophosphines; Phosphine Oxides and Sulfides; Tervalent Phosphorus Acids; Quinquevalent Phosphorus Acids; Phosphates and Phosphonates of Biochemical Interest; Ylides and Related Compounds; Phosphazenes; Radical, Photochemical and Deoxygenation Reactions; Physical Methods.

This volume and the previous one (from July 1969) are indispensable to the specialist. They should also reach a wider audience because they contain lively, inquisitive, and provocative writing. Phosphorus chemistry has come of age and Dr. Trippett and his reporters are able to recognize many of the key developments. I find all the chapters quite good, and the following criticism is minor and based on personal prejudice; I think that the Reporters have not extracted as many unifying principles as is now feasible in matters pertaining to the correlation between the four-coordinate and the five-coordinate state of phosphorus. To a lesser extent this is also true concerning the mechanism of reactions of three-coordinate phosphorus compounds with carbonyl functions, where the broad mechanistic outlines are now clear although the details of many of the steps are still obscure. Undoubtedly, Volume 4 will be even more exciting than the present one.

Fausto Ramirez, *State University of New York at Stony Brook*