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ing brief discussion of the collective model; stripping reactions, but only briefly; and a rather more-than-average-detailed discussion of the radiations associated with moderate energy synchrotrons, such as bremsstrahlung, interactions of electromagnetic radiations with matter, and the stopping of electrons. Among the subjects not included are coulomb excitation, reactor physics, and meson physics.

WALDO RALL

Estimation of Critical Properties of Organic Compounds by the Method of Group Contributions. A. L. Lydersen. Engineering Experiment Station Report 3. College of Engineering, University of Wisconsin, Madison, Wisconsin (1955). 22 pages.

This short report is a very appropriate companion to Report 4, reviewed below. Tables of incremental values for various atoms and atomic groups, to be used with equations revised by the author, are presented by which the critical temperature, pressure, and volume of a compound may be estimated. The only experimental value required is the normal boiling point, when T_r is calculated. Comparison of calculated and experimental results with a large number of compounds shows an arithmetic average deviation of less than 1 and 3.8% for T_r and p_r respectively. An equation is also presented by which z_c may be estimated from the molal latent heat of vaporization at the normal boiling point. This is a very useful and easily understood empirical study.

R. H. M. SIMON

Chemical Engineering, Volume II: Unit Operations. J. M. Coulson and J. F. Richardson. McGraw-Hill Book Company, Inc., New York (1955). 588 pages, $9.00.

The second volume of this work comes up to the promise of the first. The first volume was devoted to the fundamentals of transfer of momentum, heat, and mass, with specific attention to engineering factors in flow of fluids, heat transfer, and humidification. The second volume deals with subject matter organized in the following interesting fashion: flow of fluids past particles (flow through granular beds and packed columns, filtration, the centrifuge); systems involving relative motion between a fluid and particles (sedimentation, fluidization, conveying, gas cleaning); applications of mass transfer (leaching, distillation, absorption of gases, liquid-liquid extraction); evaporation, crystallization, and drying; size reduction and classification of solids; mixing.

The work as a whole may be characterized as a well-coordinated presentation, somewhat broader in scope than other works covering the same kind of material and well-balanced in the division between theory and practice. It is understandable by virtue of good composition and the effective use of line drawings and photographs.

As a reference book we should suppose that many practicing engineers would like to consider this volume for addition to personal libraries. Granted that much of the subject matter is well presented in other sources, the somewhat different viewpoint of these authors will be interesting and helpful.

As a textbook for undergraduate students the book has limitations imposed by its breadth. The instructor choosing this as a text must realize that only a fraction of the material in it can be covered in undergraduate work. The student will be confused at times by the wealth of material available but he will at the same time develop some familiarity with a work of broad scope. Whether this is a better approach to undergraduate instruction than using texts of more limited scope depends largely on the instructor.

The volume seems well suited to serve as a basis for graduate instruction in the unit operations. Much of the basic material for such courses is here in well-organized form.

CHARLES A. WALKER

Generalized Thermodynamic Properties of Pure Fluids. A. L. Lydersen, R. A. Greenkorn, and O. A. Hougen. Engineering Experiment Station Report 4. College of Engineering, University of Wisconsin, Madison, Wisconsin (1955). 99 pages, $3.50.

This work represents an important step in refining the law of corresponding states so that it may be used to predict the pVT behavior and thermodynamic properties of fluids more accurately than was heretofore possible.

The authors introduce the critical compressibility factor, z_c, which in addition to reduced temperature, T_r, and reduced pressure, p_r, defines the compressibility factor, z. This additional parameter helps to account for variations in chemical structure and thereby improves the correlations based on the law of corresponding states.

The experimentally observed properties of up to eighty-two elements and compounds of varied structure and composition were

used to construct tables of z as a function of p_r and T_r for values of z_c of 0.23, 0.25, 0.27, and 0.29. In addition, other tables of considerable utility were compiled on the basis of these values of z_c over suitable ranges of p_r and T_r. Among these are the thermodynamic properties of saturated liquids and gases, reduced densities of gases and liquids, deviations of enthalpy, entropy, and internal energy of gases and liquids from ideal-gas behavior, fugacity coefficients, and vaporization-equilibrium constants.

The entire development, from the choice of the third parameter to the methods of obtaining the tabulated values, is carried out with admirable clarity and verbal economy. The use of the tables for constructing thermodynamic charts and for solving problems involving the Joule-Thomson effect is effectively explained. The text contains many helpful figures and illustrative problems which should make it particularly attractive to those not continually in touch with thermodynamics.

The authors present an extensive bibliography and a large quantity of data comparing experimentally determined with calculated generalized values of various properties. The use of the added parameter, z_c, is shown to improve the correlation significantly, particularly around the critical point and in the regions of saturated liquid and vapor. At higher values of p_r and T_r the beneficial effect of this added parameter diminishes.

An errata sheet is included which accounts for almost (but not quite) all the errors in the text. The editing leaves something to be desired, but this deficiency becomes insignificant when the value of the work is considered.

This report should definitely be on the bookshelves of our teachers and students, and anyone in the field whose work is concerned with the application of the law of corresponding states.

R. H. M. SIMON

Distillation Literature, Index and Abstracts, 1953–54. Arthur and Elizabeth Rose. Applied Science Laboratories, Inc., State College, Pennsylvania (1955). 412 pages, $12.50.

The 1953–54 volume has been preceded by similar volumes, the first covering 1941–45 and the second 1946–52. Arthur and Elizabeth Rose also contributed Chapters I and IV to "Distillation" (published by Interscience Publishers, Inc., in 1951), which includes bibliographies and a wealth of references on distillation from the earliest reports to 1950. Taken together, this is a unique accomplishment by the Rose team as well as a tremendous job, similar to Hercules' labors, in so completely and exhaustively abstracting all the reports in the technical literature of many languages on the important subject of distillation. In fact, there is nothing else available even remotely approaching the completeness and precision of the distillation abstracts by Arthur and Elizabeth Rose. It is noted that the 1946–52 volume of this series was judged by the American Library Association to be the best bibliography on sciences related to agriculture published in 1953–54 and was the basis for the presentation of the Oberly Award to the authors.

The present 1953–54 volume is nearly two-thirds the size of the 1946–52 volume,