and very high shear rates. The latter situation arises in most work on turbulent flow of non-Newtonians. Accordingly, accurate experimental verification of any theory for the case of fully developed turbulence may prove to be very difficult unless non-Newtonian fluids of exceptional character are employed. Suggestions which readers may have along these lines may well turn out to be a major key to progress in this entire area and are earnestly solicited.

Correspondence with Professor Bird on these problems has been most stimulating and useful to the writer.

LITERATURE CITED

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2. Metzner, A. B., 'Non-Newtonian Technology-Fluid Mechanics, Mixing and Heat Transfer,' in "Advances in Chemical Engineering," Vol. I, Academic Press, Inc., New York (1956).

BOOKS

The Atomic Nucleus. Robley Evans. McGraw-Hill Book Company, Inc., New York (1955). 972 pp., $14.50.

It is rare that one finds a book that is well suited as a text at an early graduate level and can also be recommended as a reference book for the worker in the field. Evans's is such a book.

As one who has been teaching such a course for several years this reviewer finds that at last he can recommend a text which parallels the material taught and maintains an equivalent level. Further, with its wide and clear coverage and its many references it should provide stimulation and basic understanding and, in addition, sources for a more detailed study.

Emphasis is placed on specific sample experimental procedures and interpretations which then lead into a more general and unifying presentation of a given field. For example, the subject of nuclear reactions is introduced by presenting various experimental studies of the B^{10} (α, p) C^{13} reaction. A study of the fine structure of the protons serves to introduce nuclear-energy levels, whose decay is then discussed. Subsequently, evidence for the neutron, radioactivity, the compound state, and resonances is introduced with historical background, all within the framework of the initial reaction or its competing reactions.

Sufficient theory is presented to provide a basic and qualitative understanding of the various topics. The notation in general corresponds to that in Blatt and Weisskopf's "Theoretical Nuclear Physics." In many ways it can be considered "an experimentalist's guide to Blatt and Weisskopf." The treatment is simpler and more qualitative, places major emphasis on the experimental approach, and assumes less background knowledge on the part of the reader.

Among the subjects covered which are not yet standard are nuclear models, includ-

(*Continued from page 11S*)

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