

Any attempt to correlate three such different disciplines as surgery, electrochemistry and engineering must of necessity result in a treatment which to a specialist in any of these subjects may appear as superficial. It might possibly be argued that a book of this kind would have been of more value had it been written with the collaboration of a chemist and an engineer. Such collaboration, however, might well have resulted in a treatment too long and detailed to be of practical use to the surgeon for whom, after all, the volume is intended.

The book is well illustrated, with many references to the original literature; and while the reviewer might point to a few minor blemishes such as the misspelling of his own name, such slips in no way detract from a work that should be of real value to those for whom it is written. E. G. C. CLARKE

## RHEOLOGY

### Rheology

*Theory and Applications*, Vol. 3. Edited by Frederick R. Eirich. Pp. xvi+680. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1960.) 21 dollars.

"EIRICH" is already a classic in rheological literature, even if it cannot be said to have brought about "a better understanding of the essential unity of rheology"; a hope expressed in the preface to Vol. 1.

The present volume contains little that will unify; rather it consists, like its predecessors, of a number of disconnected essays, differing somewhat widely in merit, on applications of rheology to various systems. It has still not been possible to establish an agreed set of symbols, even for the most widely used terms; but, unlike some of the chapters in previous volumes, each of these essays includes an adequate table of the author's choice of symbols.

Vol. 3 contains less material already published in book form by the same authors than did its predecessors; but there are still many pages of repetition of well-known classical treatments already available in other text-books. This reflects vestiges of the earlier idea, which can scarcely be maintained, that this excellent series of books would prove not only necessary but also sufficient for many rheologists.

Following these general criticisms, it is right to say that many of the essays are really admirable. Especially praiseworthy are the first three chapters: B. H. Zimm's essay on polymer chain models for dilute solutions; S. Oka on principles of rheometry; and B. E. Conway and A. Dobry-Duclaux's description of electroviscous effects.

Chapters 4-10 are concerned with the applications of rheology to different materials: latex, printing ink, pastes and paints, sand- and clay-water mixtures, inorganic glasses, concrete, and cross-linked polymers.

The "Atomistic Approach to the Rheology of Sand-Water and Clay-Water Mixtures", by W. A. Weyl and W. C. Ormsby, reflects the almost compulsive urge of some rheologists to insist on an 'atomic', as distinct from a phenomenological, explanation of all experimental data. Rheology, like all other branches of science, is concerned with generalizing, co-ordinating and relating diverse phenomena.

In many cases an 'explanation' in terms of molecular structure is both possible and desirable. Other phenomena, such as those dependent on the conditions of packing of large aggregates, do not readily lend themselves to an 'atomic' approach. The authors of this chapter seem almost ashamed that everything cannot be explained in atomic terms.

Chapter 11, by D. W. Criddle, is concerned with interface rheology, and the remaining five chapters deal with industrial processes in relation to lubrication, adhesion, moulding, spinning and screw extruding.

The volume is very expensive, but the production is excellent, and there appear to be few misprints. It is good to learn that it is likely that this will not be the last volume of "Eirich". So far, scarcely any mention has been made of biological systems. A volume, or at least a part of a volume, devoted to biorheology would now be useful, since it would seem to be about eight years since any text-book has appeared on this subject, and much work has been done meanwhile. G. W. SCOTT BLAIR

## CONSTANTS OF BINARY SYSTEMS

### The Physico-Chemical Constants of Binary Systems in Concentrated Solutions

By Prof. Jean Timmermans. Vol. 3: Systems with Metallic Compounds. Pp. xiii+1322. (New York: Interscience Publishers, Inc.; London: Interscience Publishers, Ltd., 1960.) 270s.

THE preparation of this volume was supported by a grant from the Union Minière du Haut-Katanga, which is especially interested in this kind of binary system. Although more than half this book is devoted to tables of the properties of binary systems of which water is one component, no solubility data as such are listed. Presumably the author did not wish to include information already collected elsewhere (for example, in Seidell's tables): but nevertheless solubilities do appear in a disguised form as freezing curves. However, the information on freezing curves is not as useful as it might be because the solid phase in equilibrium with the solution is not often indicated. These omissions are particularly unfortunate since freezing curves represent a large proportion of the data.

The notice to users claims that the same properties are tabulated as in the earlier volumes (see *Nature*, 186, 918; 1960); but in fact scattered information is included on other properties such as activities, lattice constants, Verdet's constant, X-ray absorption, osmotic coefficients and the compositions of isopiestic solutions. For some systems values of these quantities are given, but for others only the name of the author and a date are listed.

The compilation is not a critical one and there are considerable discrepancies among the tabulated values. The author in the preface ascribes these errors to inadequacies in the measuring apparatus as well as to the use of impure specimens. Considering the early date of many of the values included it is not surprising that there is some lack of agreement.

This volume is even more expensive than Volumes 1 and 2, and like them, it will probably not be purchased by many private individuals. Every science