

the two-thirds power of its molecular volume is roughly the same for all liquids.

Eötvös was clearly a man of great ability and energy, whose work has been too little known. Einstein, for example, remarks that when he first thought about the equivalence of gravity and acceleration he knew of the experiments of Newton and Bessel on gravitational and inertial mass, but not of those of Eötvös. It is to be hoped that the publication of these papers will make his work more widely known.

The book includes an interesting life of Eötvös by Paul Selényi. The delicate task of writing a foreword deriving a suitable ideological lesson from the fact that the greatest Hungarian physicist was a baron has been undertaken by K. Novobátsky.

E. C. BULLARD

TREATISE ON INORGANIC CHEMISTRY

Comprehensive Inorganic Chemistry

Edited by Prof. M. Cannon Sneed, Prof. J. Lewis Maynard and Prof. Robert C. Brasted. Vol. 2: Copper, Silver and Gold. By J. W. Laist; pp. x+248; 35s. net. Vol. 3: The Halogens. By Prof. Robert C. Brasted; pp. x+250; 35s. net.

(New York: D. Van Nostrand Company, Inc.; London: Macmillan and Co., Ltd., 1954.)

THE editors of this series of volumes on inorganic chemistry state that their aim is to emphasize "chemical properties and relationships and their interpretation in terms of theoretical concepts". This provides us with a canon of judgment. It is the range and depth of such interpretations that distinguish the inorganic chemistry of to-day from that of even a quarter of a century ago. Valency theory, thermodynamics and other disciplines help us to digest what used to be a great mass of unrelated facts. How far, we are entitled to ask, do these two volumes, the second and third in the series, assist our digestions?

Vol. 2, on copper, silver and gold, commences with a useful table of the physical properties of the elements in question, followed by a brief introduction in which electronic structures, valencies, etc., are discussed, and the stable and radioactive isotopes are tabulated. It then deals with each Group IB element in turn. Nearly half the pages are concerned with the extraction metallurgy and with the alloys of the elements—a somewhat high proportion. These sections, however, are quite well done, though one wishes that the treatment was less purely descriptive and more physico-chemical; there are, too, inaccuracies in the section on the concentration of copper ores.

The remainder of the volume consists of a compilation of facts about the chief compounds. It certainly does not go very far along the road of theoretical interpretation, and though accurate enough, it is distinctly haphazard. For example, the heats of formation of CuF_2 , Ag_2S and AgF_2 will be found, but not those of any other compound, let alone any systematic discussion of the thermochemistry. Again, the radius of the cupric ion does not seem to be quoted anywhere, though that of the cuprous ion is; yet ionic sizes are fundamental to the understanding both of crystal structure and of complexes in solution. In short, although this

volume contains much quite recent information, it is disappointingly old-fashioned in outlook.

After an introduction like that of Vol. 2, Vol. 3 proceeds first to the elementary halogens, including astatine; then in turn to the hydrohalides; the oxycompounds of the halogens; positive halogens, interhalogens and polyhalide anionic complexes; and finally to the pseudohalogens, such as cyanogen. It is more successful than Vol. 2 in carrying out the editors' programme of "interpretation in terms of theoretical concepts", and the choice of data seems more systematic. The much larger number of tables is a sign of this. There is good coverage, too, of the interesting new features of halogen chemistry that have been brought to light in recent years, such as the existence of positive halogen ions in solution and the solvent properties of bromine trifluoride. Technological developments—for example, in the handling of fluorine—are well described, though mention should have been made of the fact that anhydrous fluorine can be handled in glass apparatus.

The volume is unfortunately not free from blemishes. For example, it is a little sad to find the following sentences about hydrochloric acid in a modern text-book. "The equivalent conductance of a 0.001 *N* solution is 377 and is 300.5 for a 1.0 *N* solution (at 18°C.). This variation represents a change in apparent ionization from 99 to about 79 per cent". The word "apparent" may justify the letter of this statement; but in spirit it is pre-Debye-Hückel.

Nevertheless, Vol. 3 is an attractive one on the whole, and, like Vol. 2, it is well produced and remarkably free from printing errors.

H. A. C. MCKAY

FUNDAMENTALS OF PHYSICAL METALLURGY

Theoretical Structural Metallurgy

By Prof. A. H. Cottrell. Second edition. Pp. viii+251. (London: Edward Arnold (Publishers), Ltd., 1955.) 25s. net.

DURING the seven years that have passed since the appearance of the first edition of Prof. A. H. Cottrell's book, activity in the field of physical metallurgy has been considerable. The greatest progress has been in the study of the structural defects occurring in solids, such as grain and twin boundaries, vacant lattice sites, and dislocations, and the effect of these defects on diffusion and deformation. Important work has also appeared dealing, for example, with theories of metallic cohesion, the distribution of electrons in alloys, ferromagnetism, and the electronic structure of transition metals. In order to accommodate much of this material in a book of approximately the same length, Prof. Cottrell has rewritten the entire text, and has included an extra chapter. Naturally, some of the original has had to be condensed or rearranged, but this has been accomplished without loss of clarity, and is offset by an increase in the number of illustrations from 96 to 132.

In the first five chapters, which lead from the structure of the atom, through interatomic forces, to the zone theory, increased emphasis has been placed on quantum mechanics in order that the band structure of metals might be more fully understood. Since these chapters lead logically to the applications