

Among details calling for notice are the following: (1) The consideration of the text of B.M. 13901, which goes back to the Hammurapi period, shows that it deals with the same type of problem as what the editor calls "Serientexte", which must therefore go back to the same period (1955-1913 B.C.), although the surviving examples of the series are somewhat later in date. Again, another B.M. text of the Seleucid period (321-64 B.C.) has an example exactly analogous to one which is more than a thousand years earlier. (2) The terminology for negative quantities (as such) can also be traced back to the earliest times. These things suggest that there was a continuous

tradition all through the interval. (3) There is a problem in Part 2 about compound interest, in which it is required to find the period in which a capital sum accumulating at 20 per cent interest will double itself. The answer was given, but it was not clear how it would be arrived at. The mystery would now appear (p. 63) to be perfectly cleared up. It would be seen from exponential tables that the period is between three and four years; it is now shown that the working is consistent with the assumption that the time by which the period falls short of four years was obtained by the process of "linear interpolation".

T. L. H.

Hydroxides and their Applications

Hydroxyde und Oxyhydrate

Von R. Fricke und G. F. Hüttig. (Handbuch der allgemeinen Chemie, herausgegeben von Paul Walden, Band 9). Unter Mitwirkung von H. Zocher und H. Saechtling. Pp. xx + 641. (Leipzig: Akademische Verlagsgesellschaft m.b.H., 1937.) 60 gold marks.

SINCE the time of Lavoisier, metallic oxides and their hydrates have played an important part in the development of chemistry, leading to the determination of atomic weights of elements by Berzelius and the enunciation of the periodic classification of elements by Mendeléeff and Lothar Meyer.

Metallic oxides either singly or in mixtures have been utilized as catalysts by Haber, Sabatier, Senderens, Bosch, Bergius, Mittasch, and others in ammonia synthesis, hydrogenation reactions and other industrial operations. In the chromatographic analysis for the separation of the plant pigments (Tswett), in the isolation of enzymes (Willstätter) and in the separation of carotinoids (Kuhn, Karrer), metallic oxides and hydroxides are being used. In the development of colloid science, sols and gels of oxides of metals and non-metals have taken a very prominent share. The adsorptive capacity of the silica, alumina and other oxides in the soil mainly controls the moisture retention and other properties of the soil.

Profs. Fricke and Hüttig, aided by Dr. Zocher and Dr. Saechtling, have done a useful piece of work in collecting and summarizing the literature on the subject in the work under notice. The book is divided into two main sections; in the first, the preparation and properties of almost all the oxides and their hydroxides (including those of rare earth metals) are described, along with the sols and gels obtainable from many of the oxides.

The colloid chemistry of the well-known sols of the hydrated metallic oxides is fully discussed.

In the second section, a general account appears of the X-ray analysis of several oxides and hydrates, their ageing with time both in the solid state and in the colloidal condition, their vapour pressures, the velocity of their hydration, their solubility in alkalis, their thermochemical, magnetic and dielectric constants. The X-ray diagrams are well reproduced in the case of several hydroxides, and a summary of the crystalline characteristics and constants of seventeen hydroxides as derived from X-ray analysis is tabulated. The investigations on the phenomenon of ageing, including X-ray analysis, diffusion measurements, dialysis, potentiometric titrations, etc., are ably summarized. The hydration and dehydration of several oxides and hydroxides have been studied, notably by van Bemmelen, Zsigmondy, Bachmann, Willstätter, Hüttig, Fricke, Hackspill, Patrick, and others, and this important subject has been dealt with satisfactorily from different viewpoints. The thermochemical properties, specially the heat of hydration of numerous oxides and hydroxides, are tabulated. An adequate account of the magnetic properties of the metallic oxides and hydroxides and a brief summary of the dielectric constants of some hydroxide sols and their change with time form the last two chapters of the book.

As is expected in the case of handbooks of this type, there is an extensive bibliography of original papers. The subject matter is of interest not only from the academic point of view, but also because it has considerable industrial and practical use. Since Profs. Fricke and Hüttig and their collaborators have themselves made important contributions to the subject, the book is authoritative, and should prove useful to senior students, research workers, and teachers of chemistry.

N. R. DHAR.