

are considered by Stig Veibel. To conclude, one-third of the book is devoted to a discussion of divalent sulphur-based functions by J. H. Karchmer.

The compilation of such a volume is a gigantic task. In general, the book is well produced, but it is not completely free from errors; the proof reading has been very variable. In the space allocated to this review, criticism must be restricted to three general points: the book is already "dated"—very few references in any chapter refer to work later than 1963; some of the chapters tend to be too general, rather than analytical, in outlook; the price is such that private individuals should not contemplate its purchase.

D. M. W. ANDERSON

HANDLE WITH CARE

Chemistry and Technology of Explosives

Vol. 2. By T. Urbański. Authorized translation by W. Ornał and S. Laverton. Pp. xi+517. (Oxford, London and New York: Pergamon Press, Ltd.; Warszawa: PWN—Polish Scientific Publishers, 1965.) 120s. net.

THE second volume of Urbański's *Chemistry and Technology of Explosives* has now been published and the high standard set as a comprehensive source of information on explosives in the first volume has been maintained.

In twenty chapters the subjects covered are as follows: nitric esters—general outline, nitroglycerine, other glycerine esters, glycol esters, monohydroxylic alcohol esters, polyhydroxylic alcohol esters, polyhydroxylic branched-chain and cyclic alcohol esters, nitrocellulose, nitric esters of other polysaccharides, nitro-derivatives of lignin and abietic acid, esters of oxy-acids of chlorine, salts of nitric acid and salts of oxy-acids of chlorine.

Particular attention is given to describing the physical and chemical properties of, for example, the nitric esters and chlorates, as well as giving a considerable amount of information on manufacturing processes and plant equipment. Many of the chapters are introduced historically, and details on various Polish, Russian and Japanese processes and procedures are particularly interesting.

The book is very readable and clear and is well illustrated by photographs, diagrams and flow sheets and is adequately indexed. It will be useful to explosives technologists because it collects a great deal of otherwise scattered information, particularly concerning industrially important nitric esters such as nitroglycerine, P.E.T.N. and nitrocellulose. In addition, however, the book should also be helpful to chemists other than explosives experts as a comprehensive source of information on nitric esters generally.

There are, however, a number of criticisms that can be made. The increased sensitivity of a mixture of liquid and crystalline nitroglycerine is said to be caused by friction between the crystals and liquid. This explanation is scarcely tenable and the reason is more likely to be the aeration of liquid nitroglycerine that occurs on melting the solid. On the question of detonation breaks in nitroglycerine transfer lines three methods are described, none of which would be very reliable. These are: inclusion of bends in the pipeline, the use of 10 mm bore tubing, and a siphon arrangement. In discussing the detonation properties of aqueous emulsions of nitroglycerine it is not clear whether parts by weight or volume are intended, and in the case of nitroglycerine and water this distinction is important.

It is said in the text that spent acid from nitroglycerine manufacture is not used to prepare nitrating mixtures because the organic matter present would make nitration difficult to control. This is not correct and, in fact, this very operation of fortifying spent acid with fresh mixed acid is carried out in the NAB process—a process which is described in the text. The reason for denitrating nitro-

glycerine refuse acid is that the amount of water produced in the nitration reaction dilutes the spent acid to such an extent that fortification is uneconomic. It would be true, however, to say that nitric and sulphuric acids recovered by denitrating nitroglycerine spent acid need to be carefully purified before being used for nitroglycerine mixed acid preparation.

In the chapter on monohydroxylic alcohol nitrate esters it is stated that isopropyl nitrate can only be prepared from isopropyl iodide and silver nitrate. This is not so; two industrial processes have been disclosed which involve nitration of isopropyl alcohol, one using mixed acid at low temperature, the other nitric acid at elevated temperature in the presence of urea. Mention might have been made of the use of such alcohol nitrates as monofuels and as cetane improvers for diesel oil.

The seven chapters on nitrocellulose cover the field very well and manufacturing methods and equipment are given particular prominence. In the section on cellulose nitration, however, the main emphasis is on linters nitration and little is said about woodpulp nitration the conditions of which differ from linters. In the section on continuous methods of nitration it is said that no continuous method of cellulose nitration has yet been used commercially. This may well be true for Europe, but not for the United States, where a continuous industrial nitrocellulose process has been operated for several years. In the chapter on salts of nitric acid it is a pity for the sake of completeness that the various methods of manufacture of ammonium nitrate are not covered apart from some mention of prilled ammonium nitrate manufacture. R. S. Gow

SOURCES OF CHEMISTRY

Kingzett's Chemical Encyclopaedia

A Digest of Chemistry and Its Industrial Applications. Ninth edition. General editor: D. H. Hey. Pp. xi+1092. (London: Baillière, Tindall and Cassell, 1966.) 150s. net.

The Condensed Chemical Dictionary

Seventh edition, completely revised and enlarged by Arthur and Elizabeth Rose. Pp. xxi+1044. (New York: Reinhold Publishing Corporation, 1966.) 140s.

The Encyclopedia of Chemistry

Edited by George L. Clark and Gessner G. Hawley. Second edition. Pp. xxi+1144. (New York: Reinhold Publishing Corporation; London: Chapman and Hall, Ltd., 1966.) \$25; 200s.

REFERENCE books which aim at becoming standard texts for a subject should be of use to a wide spectrum of people from layman to specialists. Because the field of chemistry is so vast, attempts to produce a good standard book of reference in one volume are almost certainly doomed to failure unless the volume is of immense size. Alas, Kingzett's *Chemical Encyclopaedia* is not of immense size, and although it is pleasant to read and nicely presented it fails on sheer lack of information. Concepts such as bonding, valency and quantum theory are dealt with very briefly, if at all, and for the professional chemist the book is generally too elementary.

The *Condensed Chemical Dictionary* and the *Encyclopedia of Chemistry*, published by Reinhold, deal with the practical and theoretical sides of the subject, respectively. The two books complement one another well; while the encyclopaedia contains intelligible and authoritative articles, the dictionary has comprehensive lists of chemicals, chemical techniques and technical terms. Particular attention has been paid in the dictionary to trade names, and there is also a list of manufacturers from which the chemicals can be obtained. That the manufacturers cited are without exception American is regrettable, while the