

of experiment phosphorus pentachloride changes zirconium dioxide to the corresponding chloride. Thorium dioxide was subjected to a similar treatment. The temperature, however, at which the reaction seemed to proceed almost to completion was about 240° C. Exactly the same course was pursued in subsequently eliminating the excessive phosphorus compounds. The product analyzed showed the presence of a little phosphorus, not enough to establish the existence of a double chloride, therefore its quantity was deducted from the quantity of material used in the analysis. The thorium found equaled 62.23 per cent. and the chlorine 38.37 per cent., while the theoretical requirements for thorium tetrachloride are 62.23 per cent. thorium and 37.77 per cent. chlorine.

Our experiments supplement the investigations of Weber and justify the general inference that the dioxides of all the metallic members of Group IV are changed to tetrachlorides when heated under pressure with phosphorus pentachloride.

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NEW BOOKS.

A TEXT-BOOK OF CHEMISTRY INTENDED FOR THE USE OF PHARMACEUTICAL AND MEDICAL STUDENTS. BY SAMUEL P. SADTLER AND HENRY TRIMBLE. Octavo, pp 950. Philadelphia: J. B. Lippincott & Co., 1895.

The title on the cover is "Pharmaceutical and Medical Chemistry," from which it is to be regretted that the authors did not omit the word "Medical," as its use compels a remonstrance against the view which they apparently entertain, that the needs of the medical student in the department of chemistry do not extend beyond the study of the properties of drugs and the methods of chemical manufacture. Physiological, hygienic and toxicological chemistry are almost utterly ignored. A mere outline of the chemistry of urea is compressed into less than a page, while more than two pages are devoted to alizarin. Serum albumen is dismissed in four lines, without a word about the testing of urine for albumen. The discussion of the degrees of purity of natural waters is barely hinted at in a few lines, without any reference to the methods of examination of water, even

in the part devoted to analytical chemistry. The space allowed to the toxicological chemistry of arsenic is only three-quarters of a page, while the metallurgy of iron occupies four and three-quarter pages. To designate such a work as a "Medical Chemistry" is, to put it mildly, a misnomer.

Viewed, however, as a text-book for the use of the student of technical chemistry or the manufacturing pharmacist, the work is, in most respects, well arranged and, in the main, up to the times, although in some points somewhat too conservative. Such terms as acid potassium sulphate, copper sulphate, calcium phosphate, sodium sulphate, acid calcium phosphate, either have the ring of antiquity or lack precision. The orthography endorsed by the A. A. A. Sc. has not been adopted.

The work is divided into five parts. Part I contains, in 90 pp., a brief outline of elementary physics, which is rather popular and general than chemical or medical. The laws of Dulong and Petit and of Raoult are not mentioned, absorption spectra are merely referred to, and the description of the errors of refraction of the eye is not only fragmentary but misleading.

Parts II and III (182 and 243 pp.) treat of mineral chemistry. The elements are classified into "non-metals" and "metals," a division which widely separates nitrogen and phosphorus from their close relations to arsenic and antimony. Methane, ethane, acetylene, and the oxides and sulphides of carbon are treated of as universal substances in Part II. Descriptions of the methods of preparation of the elements and their compounds, and statistics of industrial production are detailed and illustrated by numerous familiar cuts of furnaces and other forms of manufacturing plants. Pharmaceutical references are in accordance with the last revision of the U. S. Ph.

Part IV (280 pp.), devoted to organic chemistry, is admirably written. The arrangement is logical and scientific, and the matter is abreast of the advances in this most important division of chemistry, and as full as is desirable or possible in a work of this size. But in this division, also, it is to be regretted that the space occupied by pictures and details of manufacturing apparatus and processes was not devoted to medical chemistry.

Part V (94 pp.) contains the analytical portion. The reac-

tions of bases and acids are given with conveniently arranged tabular schemes of qualitative analysis. There are also a few examples of quantitative methods, and descriptions of the more important processes of drug assay. The work concludes with an appendix containing useful tables. R. A. WITTHAUS.

JOHN DALTON AND THE RISE OF MODERN CHEMISTRY. BY SIR HENRY F. ROSCOE. New York and London. Macmillan & Co., 66 Fifth Avenue, New York City. Price, \$1.25. pp. 216; 12 mo. Portrait and facsimile. The Century Science Series.

This is an unusually satisfactory book; it is a pleasure to read the biography of one eminent man written by another distinguished in the same branch of knowledge, who appreciates and sympathizes with his subject and his subject's labors.

Materials for a history of John Dalton and his contributions to chemistry were not lacking. W. C. Henry's "Memoirs" (1854), R. A. Smith's "Memoir and History of the Atomic Theory" (1856), Charles Clay's "Reminiscences" (1884), and Lonsdale's "Worthies of Cumberland" (1874), supply the necessary details of the uneventful, quiet life of the Manchester schoolmaster, and accounts of his momentous researches in chemical philosophy. Besides these sources of information, Sir Henry could refer to his own lecture delivered in the Town Hall, Manchester, in 1874. In this volume we find a summary of Dalton's parentage, school days, and teachers, his experience as a school teacher when only twelve years of age, his first attempts at scientific investigation (meteorological), his connection with the Manchester College, and his pains-taking researches on the relative weights of ultimate particles. The text is pleasantly anecdotal, clearly describing Dalton's personality. The volume is illustrated with a portrait of Dalton, facsimiles of letter and leaflet containing the atomic symbols. One remark of Sir Henry's greatly surprises us; speaking of decimal fractions he says they are "a snare and a stumbling-block even to some great men of the present day." Can it be that calculations in \mathcal{L} , s , and d . are so deeply impressed on the British mind that they prevent comprehension of decimals familiar to every American school-boy? The book contains an excellent index.

H. CARRINGTON BOLTON.