

ceases, the cork is removed and water added in order to carry all of the gas over. The tube is transferred to a cylinder of water, and when it has assumed the temperature of the water it is raised until the water level is the same without and within and the volume of gas is read. The temperature of the water is taken and also the reading of the barometer, corrected for aqueous vapor pressure. The gas volume is corrected for temperature and pressure to 0° and 760 mm., and its weight is computed. From this result the amount of zinc corresponding to 1 gram (or more accurately, 1.0076) of hydrogen is calculated. This is the hydrogen equivalent, and twice this is the atomic weight, of zinc.

The apparatus was made for me by Eimer & Amend of New York.

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NEW BOOKS.

DIE CHEMIE UND TECHNOLOGIE DER NATÜRLICHEN UND KÜNSTLICHEN ASPHALTE. EIN HANDBUCH DER GESAMTEN ASPHALT-INDUSTRIE FÜR FABRIKANTEN, CHEMIKER, TECHNIKER, ARCHITEKTEN, UND INGENIEURE. VON D. HYPOLYT KÖHLER, dirigierendem Chemiker mit Cyanidwerke der Roessler and Hasslacher Chemical Company, Perth Amboy, N. J., U. S. A., früherem technischen Director der Asphaltfabriken der FIRMIA C. F. WEBER, Leipsic-Plagwitz. Mit 191 in den text Eingedruckten Abbildungen. Braunschweig, 1904. Price, 15 marks.

This is the latest and most comprehensive work that has yet appeared on this subject. Without a full reading of the text, for lack of time, we have given the 400 closely and elegantly printed pages, of which the work consists, a very careful examination and have concluded that the work is a masterpiece of compilation. While it is of most value to the technologist, it is of much value to the chemist. The artistic excellence of the illustrations to the technology leaves nothing to be desired. While the references to the work of French, English and American chemists and technologists are very appreciative, the work of Germans is given most prominence, as, perhaps, might be expected. It is to be regretted, however, that in many instances reference is not made to the original papers of Americans, but to abstracts of those papers as they appear in German periodicals.

In some instances this serves to perpetuate error of both statement and conclusion, and does the authors injustice. It also serves to make the work more strictly German. This, however, in consideration of the large number and wide range of references is of only minor importance.

Another more serious occasion of criticism, and one which involves a fundamental source of error, is the almost total lack of systematic classification of sub-subjects. While the work treats of natural and artificial asphalts, their relation to each other as distinct classes is not made clear, nor is such relation kept distinctly before the reader in the arrangement of chapters and sub-chapters, but the discussion of the two classes is more or less confused. Lack of space prohibits extended illustration of this point, but attention is called to the paragraph on page 88 in which in the chapter devoted to the physical and chemical properties of *natural* asphalts, reference is made to the work of S. F. and H. E. Peckham, upon a residuum from which hydrogen had been removed by burning it out with sulphur. The experiments made by these authors were made upon a solid residuum from petroleum that was run out of a still while hot and fluid, and, after cooling, was again melted with sulphur at such a temperature as would insure the removal of the sulphur in combination with a part of the hydrogen. This residuum was wholly unlike natural asphalt in both physical and chemical properties, and the conclusions that were drawn from the experiments related wholly to the composition of the original *petroleum* and in no manner referred to any natural asphaltum.

The generic relation of naphtha, petroleum, maltha and asphalt or asphaltum, as forms of natural bitumen, is stated with sufficient clearness, but the fact that there are bitumens that never occur in nature in the solid state, others that always occur solid and still others that are found in every physical state from natural gas to asphaltum, if anywhere stated, must have escaped our notice. The fallacy that petroleum is the original product out of which the maltha and asphalt have certainly come forth, though opinions differ as to the cause of the different steps in the series of changes (dass das flüssige Bitumen das ursprüngliche Product genossen ist, aus dem die beiden andern in Folge gewisser Veränderungen, über deren Ursache die Meinungen noch aus Einander gehen, der Reihe nach hervorgegangen sind,

page 43) is a fruitful source of many other fallacies that injure the book and detract from a value that might have been well-nigh complete. This error leads to the assumption that petroleum residues, however made, are identical with natural asphalts; when, as a matter of fact, they are not identical among themselves when made by different methods from petroleum out of the same well, nor are any of them identical with natural asphalt. We believe these conclusions would have been reached by the author himself had his reading taken sufficient range to have included the original memoirs of Mabery, Warren, Hunt and other American investigators who have shown the great diversity of composition observed among the different varieties of crude petroleum and the great diversity of products obtained in their technology.

We have carefully read the chapter devoted to the chemistry of natural and artificial asphalts. While this chapter contains a large amount of information of great value to both chemists and technologists, the lack of systematic and orderly arrangement makes it necessary to read the whole chapter in order to ascertain its contents, and little, if any, discrimination is exercised with reference to the use of the many different processes described. This is to be regretted as it is often impossible for the chemist to select a process suitable to special needs, after trial of a large number, simply for lack of time.

In spite of the defects to which we call attention, the book has great merit and will be found, in the hands of discriminating investigators, extremely useful in the line of asphalt determination and research.

S. F. PECKHAM.

ASPHALT PAVING. REPORT OF THE COMMISSIONERS OF ACCOUNTS OF THE CITY OF NEW YORK. February 3, 1904.

That this report has a scientific as well as practical interest will be seen from an examination of the table of contents. The first, second and fifth sections cover the practical side of the subject, being devoted to a discussion of asphalt paving specifications in New York and other cities and comment upon the same by the Chief Engineer of the Commission, Otto H. Klein, and the chemist, Professor S. F. Peckham; the third and fourth sections cover experimental work of Professor Peckham on the proximate analysis