

the third sublimation as after the first, some of it must have been formed during sublimation. In the sublimation apparatus used for the preparation of standard benzoic acid on the large scale,¹ a small amount of the acid condenses upon the inside of the glass cylinder supporting the electric hot plate. It remains here day after day at a temperature somewhat elevated but lower than the melting point. Under this condition it gradually turns yellow, showing that the resinous compound is slowly formed at a temperature even below the melting point. When the acid is fused to remove moisture, it should, therefore, be kept at as low a temperature as possible and not allowed to remain any longer than is absolutely necessary. It should remain perfectly colorless after fusion. Any amount of decomposition which can be detected chemically imparts a distinct yellow color to the fused mass.

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NEW BOOKS.

Annual Tables of Constants and Numerical Data, Chemical, Physical and Technological. Published under the auspices of the International Association of Academies and under the direction of an international commission appointed by the VII International Congress of Applied Chemistry. Volume II, for the year 1911, xl + 759 pp. Chicago: University of Chicago Press, 1913. Price, paper, \$6.40 net, \$6.94 postpaid; cloth bound, \$7.20 net, \$7.76 postpaid.

The second volume of this important work will be eagerly welcomed by every chemist and physicist. The subject matter and arrangement are very much the same as in Volume I. The index for Volumes I and II which was announced to appear in the present volume is lacking. It will not be greatly missed, however, as the system of classification makes it very easy to find any desired datum.

E. W. WASHBURN.

Chemistry and its Relations to Daily Life. By LOUIS KAHLBERG AND EDWIN B. HART, Professors in the University of Wisconsin. 393 pp., illustrated. New York: The Macmillan Company, 1913. Price, \$1.25.

This is an elementary book, as far as chemical theory is concerned, and is intended primarily for students of agriculture and home economics in secondary schools. It contains a great deal of very useful information on a wide variety of topics, information which the boy or girl going out into the practical world will find helpful and worth holding. The presentation is clear, as it should be for young people.

The reviewer ventures the suggestion that if most of our *college* instruction in chemistry were concerned more with such topics as are handled in this book, and less with certain "modern" theories, the average student might be able to carry a little of it home with him, to last a month into the

¹ Morey, *THIS JOURNAL*, 34, 550-52.

vacation, at least. For the average student will never become a specialist, he should not become a specialist, he has not the brains to follow the specialist, yet he should know some chemistry. Besides, for him, as for the student of old, the words of Mephisto will always hold true:

"Grau, theurer Freund, ist alle Theorie,
Und grün des Lebens goldner Baum."

J. H. LONG.

Qualitative Analyse, vom Standpunkte der Ionen Lehre. VON DR. WILHELM BOETTGER, A. O. Professor und Oberassistent am Phys.-Chem. Institut der Universität Leipzig. Third edition. With 26 figures, a table of spectra, and separate tables for use in the laboratory. Leipzig: Wilhelm Engelmann, 1913. xvii + 565 + 21 pp. Price, unbound, 11.20 marks; bound, 12.50 marks.

The fundamental idea of the author in this book, which has now reached its third edition, is to present the modern theories of solution in such a way that the students will actually use these ideas in his laboratory work. He admits that some difficulties are met with in learning to use the book, but points out that in later independent work it will be much more valuable than a simpler and less exact book written for the benefit of beginners.

The treatment of the subject is the same as in the second edition (*THIS JOURNAL*, 30, 1796 (1908)), except that a brief discussion of microscopic analytical methods is introduced and the chapters on oxidation and reduction reactions are rewritten.

Many minor changes are also made as a result of the use of the book in the laboratory by the author and other chemists.

The reviewer considers that this is now the best standard book of reference in qualitative analysis.

W. C. BRAY.

Die Anwendung hoher Drucke bei chemischen Vorgängen und eine Nachbildung des Entstehungsprozesses der Steinkohle. By FRIEDRICH BERGIUS, Hannover. 58 pp., with 4 figures. Published by W. Knapp, Halle a/S, 1913. Price, 2.80 marks.

High pressure has been adduced by geologists as an "explanation" of many phenomena otherwise not readily accounted for; just as many chemists have attributed actions which they did not understand to colloids or to some assumed catalyst. There is considerable experimental evidence which, when rightly interpreted, shows that high pressure alone—uniform pressure, especially—is incompetent to produce many of the effects ascribed to it; that its effects have been much over-rated, especially in comparison with those produced by change of temperature. For instance, the influences of temperature and of pressure on solubility of solid substances are such that a pressure measured in thousands of atmospheres is required to equal the effect consequent upon a few degrees change of

temperature. In many cases—as, for instance, the system water-silicate at 400° – 450° —the main role of pressure is to ensure an appreciable concentration of the volatil component; whether its influence is in such cases subordinate to that of temperature or not depends, of course, upon the stability relations of the various substances involved. Existing knowledge of the domain of high pressures is confined almost entirely to qualitative generalities deducible from theoretical principles; its scope can be increased only by careful quantitative investigation which, it may be added, is certain to yield valuable results, technical and economic as well as scientific. The pamphlet under review is, therefore, to be welcomed, for the extension of knowledge which it brings as well as for its suggestiveness. It records work on the equilibrium relations of the system $2\text{CO}_2 \rightleftharpoons 2\text{CO} + \text{O}_2$ at temperatures ranging up to 420° and gas pressures up to about 140 atmospheres, and on the effects of water at 300° – 350° and the corresponding pressure on carbon, peat and cellulose. The main results of these investigations have already been published elsewhere (see *C. A.*, 6, 3322; 7, 740); but the following points are noteworthy: Water at temperatures of 300° – 350° and the corresponding pressure reacts with carbon according to the equation $\text{C} + 2\text{H}_2\text{O} \rightleftharpoons \text{CO}_2 + 2\text{H}_2$, no appreciable amount of carbon monoxide being formed. Under the same conditions it gives, with peat or cellulose, products which closely resemble natural coals, the type of coal produced depending mainly upon the duration of heating. This process goes on to a certain limiting composition only (corresponding to a soft coal); but it was found that the percentage of carbon can be further increased by exposing the product to stress, a fact which tends to show that natural anthracite was formed from a soft coal by the action of the stresses to which any deep-lying bed must have been subject. A rise of temperature of 10° doubles (as usual) the rate of formation of this artificial coal; whence it is calculated that the age of the natural coal beds is of the order of eight million years, an estimate which is no more uncertain than any of the existing estimates of the age of the earth. In conclusion, it may be pointed out that investigations similar in character to those described by Bergius may be counted on to contribute something towards the solution of the still moot question of the origin of petroleum.

JOHN JOHNSTON.

Die elektrische Entartungsreaktion. (The Electric Degeneration Reaction.) Klinische und experimentelle Studien ueber ihre Theorie. VON DR. EML REISS. Berlin: Julius Springer, 1911. 119 pages, paper, 4.80 marks.

This little book deals with the important phenomena of nerve or muscle degeneration, as the term is used in nervous physiology, and is dedicated to Professor Nernst in recognition of his important contributions to the physico-chemical theory of nerve stimulation. It contains nothing of

interest to the general chemist, but attention is called to it here because it contains a considerable number of experiments and observations which may appeal to those working in the neighboring field of physical physiology.

J. H. LONG.