

Graphite.—Dissolve one gram sample in 35 cc. nitric acid (1.13 sp. gr.) filter on asbestos, wash with hot water, then potassium hydroxide (1.1 sp. gr.) and finally with hot water. The graphite is then ignited as specified in the determination of total carbon.

H. E. DILLER, Secretary.

Analysis of Fuming Sulphuric Acid.—The following method of analysis for fuming sulphuric acid has given excellent results for both speed and accuracy. Put about 15 cc. distilled water into a small Erlenmeyer flask, and then introduce a piece of 6 mm. glass tubing with a narrow constriction as shown in the cut. Allow a few drops of water to



trickle down the glass tube. Now weigh the sample in a Lunge pipette, and introduce the sample through the glass tube. The acid runs down through the tube and is absorbed by the water without spattering. Some fumes remain in the tube. By allowing a few drops of water to trickle down the tube, these fumes are completely absorbed. The analysis of one acid was checked within 0.05 per cent. ten times in succession by this method.

T. J. BREWSTER.

E. I. DU PONT DE NEMOURS POWDER CO.,
Pinole, California.

NEW BOOKS

RADIOAKTIVE UMWANGLUNGEN. BY E. RUTHERFORD. Translated by M. Levin. (Die Wissenschaft, No. 21). Braunschweig: P. Vieweg and Sohn. 1907. IX. 285 pp. Unbound, Mark 8.00; Bound, Mark 8.60.

The Silliman lectures, at Yale University, for the year 1905, were delivered by Prof. Rutherford. These lectures were published, in English, under the title, *Radioactive Transformations* (New York: Charles Scribner's Sons, 1906). The present work is a translation, into German, by Dr. Max Levin. It is less comprehensive than the author's book, *Radioactivity*, the second edition of which appeared in 1905. The new work deals especially with the marvelous spontaneous transformations which are taking place continuously in radioactive matter.

After an historical introduction, in which a general resumé of the development of radioactivity is given, the transformations of the element thorium are discussed. With clear and convincing argument, the author presents the facts which lead to the conclusion that thorium is very slowly decomposing. The first product of the decomposition is radiothorium; this, in turn, yields another radioactive product, thorium X., etc. The successive changes which have so far been established are as follows: Thorium → Radiothorium → Th X → Th Emanation → Th A →

Th B→Th C. Each product has its own rate of change, which is independent of physical and chemical conditions. Radioactive phenomena are explained in terms of the Disintegration Hypothesis, proposed by Rutherford and Soddy. According to this hypothesis, an atom of any sort is a complex system; some atomic systems, those of radioactive elements, are unstable, with the result that a certain proportion of the elements break up or disintegrate per second; accompanied by the expulsion, with enormous velocity, of α or β particles or both. The properties of the α particles led Rutherford to suggest that they might be atoms of helium; the experimental confirmation of this prediction by the observation, by Ramsay and Soddy, of the production of helium by the transformation of radium emanation has, more recently, been greatly strengthened by Debierne's demonstration of the production of helium by actinium.

It is shown in the following chapters that the changes in radium, actinium and uranium are to be explained by analogous series of transformations. The slowly changing products of radium are especially interesting; these are almost certainly the active constituents of radiolead, radiotellurium and polonium. In the chapter devoted to the origin and life of radium, it is shown that this element is, without doubt, a transformation product of the element uranium.

The subject matter of the book is well chosen and admirably presented and constitutes one of the most interesting topics in physical science. Coming as it does from a leader in this special field of investigation, the book is authoritative and will naturally take a permanent place in the literature of the subject. Dr. Levin's translation, which follows the original closely, is supplemented by occasional footnotes on the newer developments of the subject.

HERBERT N. MCCOY.

THE BACTERIOLOGICAL EXAMINATION OF WATER SUPPLIES. BY WILLIAM G. SAVAGE, B. SC., M. D. (Lond.), D. P. H. and Professor of Pathology, in charge of the Bacteriological Department, University College, London. P. Blakiston's Son & Co., Phila., 1906. Price, \$2.50 net.

Water bacteriology, one time an obscure branch of medical bacteriology, later treated more fully in general works on water analysis and water supply engineering, has in the past few years established its just claim to recognition as an independent branch of applied science. This is well illustrated by the appearance of the present work, the third of its kind, devoted wholly to this special branch of bacteriology. The author states in his preface: "Unfortunately, many of the data upon which the bacteriological examination of water is based have not passed beyond the region of controversy, and on not a few questions—some of which are of much importance—each bacteriologist is, at present, a law unto himself." In such cases the endeavor is made to give the best available information and to draw definite conclusions therefrom. In this regard the author