

accurate, and precisely described. Gravimetric methods are given in nearly every case supplemented in many instances by volumetric. The chapter on oils is confined to the estimation of fatty acids in Turkey-red oil, and to the detection in linseed oil of mineral, resin, raw or boiled oils.

The book is an excellent compilation which will undoubtedly find favor in the laboratory. It has an index.

C. W. PARMELEE.

CHRISTIAN FRIEDRICH SCHÖNBEIN, 1799-1868. Ein Blatt zur Geschichte des 19. Jahrhunderts, von GEORG W. A. KAHLBAUM und ED. SCHAER. 2 vols., Leipzig, 1899-1901. Vol. I, 230 pp. Portrait; Vol. II, 326 pp. (Viertes und sechstes Heft Monographien aus der Geschichte der Chemie, herausgegeben von Georg W. A. Kahlbaum.)

These two volumes contain the life history of that remarkable man who will always be remembered as the discoverer of four notable things of diverse nature in their physical and chemical aspects, the Passivity of Iron, Ozone, Guncotton and Collodion.

The author, who occupies the chair of chemistry in the University of Basle, has enjoyed the best opportunities for gathering the data needed for his work; from the three living daughters of Schönbein, from his friends both in Germany and in England, he has had for study not less than 1600 letters, and through libraries and personal friends he has consulted 350 of Schönbein's printed papers. And with these aids he has portrayed the man in his scientific pursuits and social life.

Schönbein, who was born 18th October, 1799, in what is now known as the kingdom of Württemberg, inherited a love for chemistry from his father, who was a dyer and as such occupied with problems requiring chemical knowledge. At the age of twenty-one he entered the manufactory of chemicals of Dr. J. G. Dingler, in Augsburg, where his daily labor extended from 6 A.M. to 7 P.M., leaving him only from 4 to 6 A.M. and from 7 to 10 P.M. for private study and recreation. For this he received board and lodging and 200 to 300 florins a year. Dingler had just begun to publish his *Polytechnisches Journal*. (1820-1901).

After studying some semesters at the Universities of Tübingen and Erlangen, he secured a position as teacher of physics, chemistry, and mineralogy in the educational institution founded a few years before by Friedrich Fröbel, of kindergarten fame. In 1826 we find him a teacher in London, and in 1828 again on the con-

minent, teaching experimental chemistry at the University of Basle, where he was made professor of chemistry and physics in 1835.

We cannot in a book-review further follow his fortunes in such detail; suffice it to say that he made all his notable discoveries after he had reached the age of 36, and while holding the chair just named; he read his paper on the passivity of iron before the Natural History Society of Basle in 1835; he discovered ozone in 1839 and worked at it until 1860; and his discoveries of guncotton and of collodion were made between 1846 and 1853.

The long studied and puzzling problems connected with ozone and "antozone," that occupied so much of his life are here set forth with a minuteness not elsewhere found; the claims of others to the discovery of guncotton are dwelt upon fully, and it is significant to read that Schönbein reaped about \$20,000 from his discovery, while Alfred Nobel gained no less than \$10,000,000.

Schönbein enjoyed the friendship of nearly all his contemporaries in the physical sciences; his correspondence with Faraday forms a volume edited by Kahlbaum and Darbishire and published at London in 1899.

The volumes under review form so important a contribution to the history of chemistry that no library can well afford to be without them.

H. CARRINGTON BOLTON.

THE ELEMENTARY PRINCIPLES OF CHEMISTRY. By A. V. E. YOUNG. 12 mo. xiv + 252 pp. New York: D. Appleton & Co. 1901. Price, \$1.20.

The author of this book desires "that the first notion of a topic should come to the student through his own observation" and provides, with this end in view, a relatively large amount of laboratory work, more of which is quantitative in character than is usual in elementary courses.

In a pamphlet entitled "Suggestions to Teachers," which accompanies the book, Professor Young points out the advantages of the plan which, he advocates, indicates the amount of time required—eight hours per week for thirty-five weeks,—and gives helpful advice to teachers. The greater part of the time is, evidently, to be devoted to the laboratory work.

The introductory chapters discuss matter, energy, chemical and physical properties, the fundamental laws of chemical action, equivalent and combining weights and methods for obtaining