

logical has been the growth of our modern theories from the older ones.

This book cannot be too highly recommended to those interested in physical chemistry. The sane view of each question considered, the excellent exposition of each theory, and the clear, close reasoning with which the fallacy of often misunderstood points is exposed, together with the excellent English, make the book one that it is a pleasure to read. The chapter headings are as follows: Introduction—The use of theories; Old hypotheses in chemistry; Existence of hydrates in solution; Discussion of the validity of Dalton's law; Electrical force between the atoms; The law of Faraday; Chemical valency and affinity; The development of the doctrine of valency; Composition of the atoms.—Electrons; Theory of gases; Chemical kinetics and statics; The influence of temperature and pressure—Dissociation; Osmotic pressure—General laws for dissolved substances; Electrolytic dissociation; Problems to be solved—Objections.

J. LIVINGSTON R. MORGAN.

WELLCOME'S PHOTOGRAPHIC EXPOSURE RECORD. BY BURROUGHS, WELLCOME & Co., 45 Lafayette Street, New York City. Price, 50 cents.

A large amount of useful information for photographers, more especially in regard to exposing and developing, together with a diary; all this made up in an elegant little volume of practical dimensions to be carried in the pocket.

L. H. BAEKELAND.

HYDROMETALLURGY OF SILVER—WITH SPECIAL REFERENCE TO CHLORODIZING, ROASTING AND THE EXTRACTION OF SILVER BY HYPOSULPHITE AND CYANIDÉ SOLUTIONS. BY OTTOKAR HOFMANN. pp. V+345. 83 illustrations. Hill Publishing Co., New York, London: 1907. Cloth, \$4.00.

The author of this book introduced the Patera Process of leaching silver ores with hyposulphite solutions in 1868 in Mexico. Since that time he has been prominent in this branch of metallurgy and has won for himself the enviable position of an acknowledged authority.

The book under consideration is on the whole a record of personal experience based upon established principles. There is presented not a general treatise like that of H. F. Collins,¹ in which all that leading workers have accomplished is brought together in a most satisfactory manner, but a book resembling more the well known volume of the late C. A. Stetefeldt.² While Hofmann aims to bring out mainly the full details of practice and is antagonistic to the Russell modification of the Patera process, Stetefeldt lays more stress upon chemical conceptions and is the acknowledged defender of the late E. H. Russell. The three publications supplement one another and about cover the field.

In addition to the Patera process which, with chlorodizing roasting, takes up 255 of the 328 pages of text, the Augustin and Ziervogel pro-

¹ "Silver," Griffin & Co., London, 1900.

² The Lixiviation of Silver Ores with Hyposulphite Solutions, author, New York, 1895.

cesses receive each a passing notice of one page as is the case with the Freiberg method of leaching roasted silver-bearing copper matte, while the author's interesting modification of the last process is treated with considerable detail in 19 pages. Cyanidation, covering 41 pages, is represented mainly by a full abstract of the excellent paper of T. H. Oxnam¹ on the treatment of auriferous silver ores at Palmarejo, Mexico. Electrodeposition of precious metal from cyanide solutions, especially important in silver-metallurgy, is not touched upon.

To take up a few special features. The first 152 pages deal with chlorodizing roasting. After a brief general statement of principles and of behavior of the leading minerals, there is given an important chapter on the fine crushing of ore and how it has to be governed by the character of the component minerals with regard to subsequent chloridation and success in leaching. The discussion of the amount of salt required and the time of addition brings out many points as to chloridation and volatilization which are not generally known, in fact, will be new to most readers.

In the chapter on furnaces, the leading ones that have been proposed and used are assigned their proper places; the mode of operating is treated in its different aspects with the results to be expected and the results that have been obtained. The author's designs for dust-chambers with a special discussion of the correct manner of handling argentiferous zinc-lead ores and calcareous ores closes this chapter which stands forth preeminently as the most important one of the book. Tank-lixiviation with precipitation and working up of precipitate is taken up with working drawings of apparatus which give a clear conception of modern practice.

In studying the chapter on trough-lixiviation, the reader obtains the impression that this method, invented by the author, is an accepted improvement on tank-lixiviation, which it is not. The description ought to be read in connection with Stetefeldt's review of the method.

The critical remarks upon the Russell and Kiss processes, while brief, are a relief in view of the many laudatory papers that have been written about them.

While the Patera process has seen its best days on account of the encroachment of smelting upon leaching and of the growing importance of cyanidation, it will retain some of its former importance for a considerable time. The metallurgical profession is therefore under much obligation to the author for having brought together in book form some of the leading features of his wide experience.

H. O. HOFMAN.

BOTANY AND PHARMACOGNOSY. BY HENRY KRAEMER, Ph. B., Ph. D. Second revised and enlarged edition. J. B. Lippincott Company, Philadelphia.

The new edition is twice the size of the old one, the number of illus-

¹ Tran. Am. Inst. of Min. Eng., 1906, 36, 234-87.