

## NEW BOOKS

**Analytical Processes, a Physical-Chemical Interpretation.** By T. B. Smith. 22 × 14 cm; pp. viii + 373. London: Edward Arnold and Co. Price: 12 shillings, 6 pence. The days when quantitative analysis was treated purely empirically are rapidly passing, more and more interest being taken in the underlying theory upon which all analytical processes rest.

It is most desirable that all instruction in analytical methods should include adequate theoretical explanations of the experimental procedure. The book under review should materially assist in this. It should be very useful to teachers for it is interestingly and thoughtfully written and covers the whole range of the subject very thoroughly. Most students, except the very advanced ones, will probably find it rather beyond them. In the reviewer's opinion it is better, for the student, to incorporate theory and practice in one volume and not to deal almost exclusively with theory as is done in the present book. The book is well produced and is very free from misprints and other errors. Only one of the latter has been noticed. The name "Silver ammonium ion" which is used frequently by the author for the complex ion  $[\text{Ag}(\text{NH}_3)_2]^+$  is very undesirable and misleading. It is true that the cations of the metal amines are formed by a similar process to that by which the ammonium ion is formed, but they cannot be regarded as being substituted ammonium ions as the above name would imply—nor do these amines contain ordinary ammonium ions which some readers might infer from such a name.

The book is divided into two parts:—Part I. The theoretical foundations of some typical processes and Part II. A critical examination of some theories employed—but this subdivision does not seem really necessary and has led to a good deal of repetition.

A number of useful literature references are given throughout the book but it is a curious fact that nowhere, not even in the preface, is any reference or any acknowledgment made by the author to other books on similar lines. It may be deduced from the general lines followed that he has made considerable use of such books and he should have referred to them.

H. Bassett

**Aluminiumoxyd als Katalysator in der organischen Chemie.** By W. N. Ipatiew. Translated by Carl Freitag. 21 × 15 cm; pp. vi + 91. Leipzig: Akademische Verlagsgesellschaft, 1929. Price: 6.60 marks. This is an interesting little monograph to show that aluminum oxide is very nearly the universal catalyst. Everybody knows that it converts alcohol nearly quantitatively into ethylene and water; but it is not so generally known that it will convert dimethyl trimethylene into trimethyl ethylene, and this latter into isopropyl ethylene; cyclohexane into methyl cyclopentane; unsymmetrical dimethyl allylene or isopropyl acetylene into isoprene. Ethylene glycol is converted into acetaldehyde, presumably after passing through ethylene oxide as an intermediate stage.

Alumina causes the condensation of ethylene into polymethylenes and also into unsaturated hydrocarbons, such as amylene and hexylene. Acetylene and ammonia give a mixture of pyrrol, picoline, and collidine; while acetylene and hydrogen sulphide give thiophene. Acetaldehyde and ammonia give the pyridine bases. Ethylene and acetone apparently give hydrocarbons of the terpene series, while methyl alcohol and acetone give hexamethyl benzene. This same product is obtained from phenol and methyl alcohol at atmospheric pressure, whereas, at high pressures, anisol, o-cresol, and xanthene are obtained. Aniline and alcohol benzyl an eighty-one percent yield of benzyl aniline.

Alumina splits off hydrogen chloride completely from isobutyl chloride at 350°. In diffused light hydrous alumina causes chlorine to form hexachlorobenzene from benzene. With hydrogen under pressure and in presence of alumina, cyclohexanol goes over almost quantitatively at 430° into cyclohexane.

The weak part of the pamphlet is the theoretical discussion which should be skipped by the sympathetic reader.

Wilder D. Bancroft.