

$\text{HNO}_3 \cdot \text{CH}_3\text{OH}$ : C, 62.42; H, 5.91; N, 10.96], and tetrahydrodeserpidine [perchlorate, m.p. 190–192° (found: C, 56.66; H, 5.67; N, 4.27)], respectively. However, *d,l*- $\Delta^{15(20)}$ -yohimbene (III),<sup>10</sup> m.p. 196–197° (found: C, 81.57; H, 7.72; N, 9.93), obtained by sodium borohydride reduction of sempervirine, is converted into a ring D dehydro product (IV) [nitrate, m.p. 305–306° (dec.),  $\lambda_{\text{max}}^{\text{EtOH}}$  223,320 m $\mu$  (log  $\epsilon$  4.58, 4.33),  $\lambda_{\text{min}}$  276 m $\mu$  (log  $\epsilon$  3.85) (found: C, 68.06; H, 5.60; N, 12.27)].<sup>11</sup> Mercuric acetate accomplishes the same

(10) For the chemistry of the  $N_\alpha$ -methyl derivative, see B. Witkop, *THIS JOURNAL*, **75**, 3361 (1953).

transformation. Sodium borohydride reduction reverts IV into III, while hydrogenation of IV, at *pH* 10, leads to *d,l*-alloyohimbane.<sup>12</sup>

(11) Professor Elderfield has kindly informed the authors that tetrahydroalstonine,<sup>7</sup> in essence also a  $\Delta^{15(20)}$ -dehydro compound, likewise undergoes ring D dehydrogenation, yielding alstonine.<sup>7</sup>

(12) The authors are most grateful to Sir Robert Robinson, and Drs. Aghoramurthy, Diassi, Huebner, Lucas and MacPhillamy for a generous supply of alkaloids and their derivatives.

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RECEIVED JANUARY 21, 1957

## BOOK REVIEWS

**Hydrogen Ions. Their Determination and Importance in Pure and Industrial Chemistry.** Volume II. Fourth Edition, Revised and Enlarged. By HUBERT T. S. BRITTON, D. Sc., London and Bristol, D.I.C., F.R.I.C., Professor of Chemistry and Director of the Washington Singer Laboratories, University of Exeter. D. Van Nostrand Company, Inc., 126 Alexander Street, Princeton, New Jersey. 1956. xix + 489 pp. 15 × 22 cm. Price, \$12.50.

This second volume of the revised fourth edition is devoted for the most part to applications of *pH* measurements. The author is to be praised for his courage in assembling under one cover selections from a literature that has become enormous.

The general nature of the coverage is indicated as follows. Four chapters are devoted to precipitations of hydroxides, basic chromates, borates, carbonates, silicates, sulfides and phosphates. One chapter, each, deals with reactions between weak organic acids and inorganic bases, complex ions, analytical processes, detection of metals with organic reagents, electro-deposition of metals, sugar manufacture, pulp and paper manufacture, brewing, milk, eggs, baking, water purification and sewage disposal (including corrosion by waters), soils, ceramics, the dye and textile industries, ore flotation, and miscellaneous applications. Four chapters deal with the manufacture and tanning of leather. Notably lacking are reviews of applications in broad fields of biology such as biochemistry, physiology and bacteriology (except here and there). Relatively few applications in the broad field of organic chemistry are reviewed.

Several of the chapters may be characterized as annotated bibliographies and as such the necessarily limited bibliographies and the perspective provided by the notes will be useful to those who set about collecting all the information available in the literature.

The first chapter on oxidation-reduction potentials could be considered to be somewhat out of place in that the theory can be economically developed in direct connection with that of the special oxidation-reduction system  $\text{H}_2$ ,  $\text{H}^+$ . However, it is used in connection with some important analytical methods. There are a few slips in this chapter but none of great importance except the lack of a comprehensive, systematic way of deriving the complex equations and failure to emphasize strongly enough the fact that two processes, which in the course of history were sometimes regarded to be distinct and separable, are often inseparably coupled. The reviewer, who was guilty of introducing the term *rH* for a strictly limited purpose, may be permitted to express regret that the author has used this term. It has become an unmitigated nuisance.

So far as a correlation between *pH* numbers and a given phenomenon is concerned it makes little difference how *pH* is interpreted theoretically. But one never knows

when further theoretical treatment of the phenomenon may become confused by failure to recognize what an experimental method cannot reveal as well as what it can reveal. Many of the applications reviewed in this book have been formulated in terms of the activity of hydrogen ions (whatever these may be). Because it is impossible to determine precisely the activity of ions of a single kind, a concession has been made to those who follow the current trend of theory by defining *pH* in terms of activity while a trend toward formulations in terms of operations, with elimination of artificial definitions, is revealed in the arbitrary standardization of the *pH* scale. Accordingly the reader of volume II will have to refer to volume I to find the author's justification for his use of hydrogen ion *concentration*, for some clarification of the chapter on non-aqueous solutions and the "*pH*" numbers thereof and for interpretations of measurements made in odd ways of which several are mentioned. From this point of view it is a pity that theory and practice have been separated by the covers of two books. Some compensation is found in the fact that the index lists subjects in both volumes so that one finds juxtaposition of *Activated sludge* and *Activity, Defecation of sugar juice* and *Degree of ionization, Eggs* and  $E_h$ , *Potatoes* and *Potentials*, etc.

The diagrams serve well particular purposes. However, one ordinate may be potentials referred to the normal calomel electrode, another potentials referred to the saturated calomel electrode, another potentials referred to the standardized, standard hydrogen electrode. The author may be excused because he takes over what he finds in the literature. There failure to reduce e.m.f. data to one standard is causing confusion in addition to that caused by the use of two opposing conventions regarding signs. It is to be hoped that in future editions Dr. Britton will help to unify the presentation of electromotive force data.

On the whole this book will serve well those interested in applications if only in providing annotated bibliographies.

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**Light-Scattering in Physical Chemistry.** By K. A. STACEY, Ph.D., Chester Beatty Cancer Research Institute. Academic Press, Inc., Publishers, 111 Fifth Avenue, New York 3, N. Y. 1956. viii + 230 pp. 14 × 25.5 cm. Price, \$6.75.

"In the past decade the technique of light-scattering has seen a rapid development and its use extended to many branches of physical chemistry. Although the time is not yet ripe for an exhaustive or authoritative monograph on all its aspects the author felt that an attempt to review the