estrogenic activity in rats than diethylstilbestrol. Further tests are in progress.

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RECEIVED JANUARY 19, 1948

STREPTOMYCIN, VII. DEGRADATION OF O-TETRAMETHYLSTREPTAMINE TO D,L-DIMETHOXYSUCCINIC ACID

Sir:

N,N′-Diacetylstreptamine (1,3-diacetamido-2,4,5,6-tetrahydroxycyclohexane)[1] was converted with dimethyl sulfate and sodium hydroxide to O-tetramethyl-N,N′-diacetylstreptamine (m. p. > 300°; *Anal.* Calcd. for $C_{14}H_{26}O_6N_2$: C, 52.81; H, 8.23; N, 8.81; CH_3O, 39.07. Found: C, 52.99; H, 8.28; N, 8.67; CH_3O, 40.1), which on hydrolysis with hydrochloric acid afforded O-tetramethylstreptamine dihydrochloride (m. p. > 300°; *Anal.* Calcd. for $C_{10}H_{22}O_4N_2 \cdot 2HCl$: C, 39.09; H, 7.87; N, 9.12; Cl, 23.08. Found: C, 38.76; H, 7.71; N, 8.98; Cl, 23.4). The free base (m. p. 83–84°; *Anal.* Calcd. for $C_{10}H_{22}O_4N_2$: C, 51.26; H, 9.46; N, 11.96. Found: C, 51.18; H, 9.38; N, 11.71) was oxidized with neutral potassium permanganate at room temperature. The methyl ester mixture formed from the oxidation products with methanolic hydrogen chloride yielded on distillation several fractions which were treated separately with methanolic ammonia or methylamine. From the lower-boiling fractions there were obtained D,L-dimethoxysuccinic acid diamide (m. p. 266–268° (dec.)[2]; *Anal.* Calcd. for $C_6H_{12}O_4N_2$: C, 40.90; H, 6.87; N, 15.90; CH_3O, 35.2. Found: C, 41.14: H, 6.76; N, 16.19; CH_3O, 35.0) and D,L-dimethoxysuccinic acid di-N-methylamide (m. p. 188–189°; *Anal.* Calcd. for $C_8H_{16}O_4N_2$: C, 47.04; H, 7.90; N, 13.72; CH_3O, 30.4. Found: C, 47.46; H, 8.05; N, 13.96; CH_3O, 30.5). Synthetic specimens of these hitherto undescribed amides, prepared from D,L-tartaric acid, showed the same melting points, undepressed by admixture of the degradation products. The diamide[3] and di-N-methylamide[4] of *meso*-dimethoxysuccinic acid melted at 255–257° (dec.) and 210–210.5°, respectively. The *meso*-diamide strongly depressed the melting point of the diamides derived from streptamine and from D,L-tartaric acid.

If, as appears highly probable, streptamine and streptidine are *meso* compounds, it follows from the above results that the 5-hydroxyl group is oriented *trans* with respect to the 4- and 6-hydroxyl groups (*xylo*-configuration), a spatial arrangement also encountered at the corresponding positions in *meso*inositol. This would limit the number of possible *meso* forms for streptamine to four.

Furthermore, there was isolated from high-boiling ester fractions prior to amidation a compound $C_{10}H_{17}O_6N$ (m. p. 109–110°; *Anal.* Calcd C, 48.57; H, 6.93; N, 5.67; $4CH_3O$, 50.1. Found: C, 48.74; H, 6.87; N, 5.65; CH_3O, 49.2) which should be either the 2,6-lactam of a 2-amino-3,4,5-trimethoxyadipic acid-1-methyl ester, or the 3,6-lactam of a 3-amino-2,4,5-trimethoxyadipic-1-methyl ester.

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RECEIVED JANUARY 19, 1948

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(1) R. L. Peck, C. E. Hoffhine, E. W. Peel, R. P. Graber, F. W. Holly, R. Mozingo and K. Folkers, THIS JOURNAL, **68**, 776 (1946).

(2) All melting points reported are corrected.

(3) W. N. Haworth and E. L. Hirst, *J. Chem. Soc.*, 1858 (1926).

(4) W. N. Haworth and D. I. Jones, *ibid.*, 2349 (1927).

NEW BOOKS

SMALL WONDER—The Story of Colloids. By GESSNER G. HAWLEY. Alfred A. Knopf, New York, N. Y., 1947. 220 pp. Price $3.50.

The author certainly deserves full credit for his courage and, as many parts prove, skill in attempting to explain "to those who have the curiosity but lack the time to study more erudite treatises" what the term "colloid" implies. In his preface he also states, however, that "there is such a thing as having an embarrassment of subject matter" and "it is easy to become bewildered and get lost in it all." That has happened, and it is unfortunate because the reader who takes many of the written words at their face value will not get a more general, but often a wrong, understanding of colloids. This refers specifically to the author's definition of colloids, the history of this branch of science, to the explanation of their electrical properties, to the discussion of how natural rubber is obtained, or synthetic rubber produced.

The discussion of the electron microscope is by far too extensive for a book of this type, so much the more since its use in attempting to pry deeper into the structure of lyophilic colloids is becoming more and more questionable. It would have been far more appropriate to explain to the reader the tremendous developments of ultramicroscopic techniques and what has been achieved by their use.

The author has made a few serious mistakes which must be corrected. Plate XV is a cut-away view of a Sharples *super-* and not ultracentrifuge. The statement that the first periodical given over exclusively to colloid chemistry is the "Journal of Colloid Science," which appeared for the first time in January, 1946, is incorrect; the Germans have had the periodicals "Kolloid Zeitschrift" and "Kolloidchemische Beihefte" since 1906, the French have had the "Revue Generale du Colloides" since 1923, and we in the United States have had the "Colloid Symposium Monographs," also since 1923. The fact that no credit was given to many of the most outstanding colloid chemists, like Freundlich, Weiser, Holmes, v. Weimarn, Duclaux and Houwink, only to mention a few, is unfortunate.

Despite these criticisms, the reviewer hopes that this book will accomplish its purpose: namely, to arouse more general interest in this world of dimensions which has been overlooked for too long. Then it will be up to us colloid chemists to keep the ball rolling.

ERNST A. HAUSER

Thermodynamics for Chemists. By SAMUEL GLASSTONE, formerly Research Associate of Princeton University, and Professor of Chemistry in the University of Oklahoma. D. Van Nostrand and Co., Inc., 250 Fourth Ave., New York, N. Y., 1947. viii + 522 pp. Illustrated. 15.5 × 23.5 cm. Price, $5.00.

This is a typical Glasstone book, a mosaic of pieces shaped and fitted together with skill. When the individual pieces can be made from adequate reviews the result is excellent, but when the best literature is out of date or highly specialized, it may not be so good.

The proof reading seems to have been very carefully done. The only typographical errors I found were omissions of the bar denoting a partial molal quantity in a few cases where the omissions are relatively harmless. There are more important errors which the instructor will need to correct if the students are to grasp the subject. Some of the more striking are:

"Energy is defined as *any property which can be produced from or converted into work*, including, of course, work itself" (p. 6).

The partial molal volume of a component of an ideal gas mixture is defined as RT divided by the partial pressure of that component, instead of by the total pressure (pp. 219, 261).

"The general conclusion to be drawn, therefore, is that *upon mixing two liquids which yield a system exhibiting positive deviations from Raoult's law there is an absorption of heat*" (p. 331).

The author has even succeeded in copying two errors from Lewis and Randall; there are not many more.

The limit at zero pressure of $d\alpha/dP$ [$\alpha = (RT/P) - V$ for a gas] is taken as zero. Figure 17 of Glasstone is not so unreal as the figure on page 195 of Lewis and Randall, but it is still misleading, as is the discussion on pages 253 and 255.

"TABLE XXXII. ACTIVITY COEFFICIENTS OF THALLOUS CHLORIDE IN PRESENCE OF VARIOUS ELECTROLYTES AT 25° C." is given as experimental evidence for the "ionic strength principle." The first three of the seven rows, which are the ones which show agreement, are in the range where there is neither added salt nor measurements. The fourth is only 25% above the solubility of pure thallous chloride.

There is more from Lewis and Randall which was good in 1923 but is not so good in 1947. For example, the chapters on electrolytes would be greatly improved if the author had made up his mind how much of the Debye theory he trusted, and had started with that. This would permit presentation of the limitations of the ionic strength principle, Brønsted's specific ion attraction theory and at least a qualitative discussion of the treatment of the higher terms in the expansion of the Boltzmann exponential.

The following topics might well have been included: *p*H and single ion activities with appropriate reservations; the Donnan equilibrium; the vapor pressure of a liquid in a capillary; and particularly, the effect of gravitational, centrifugal and electrical fields on thermodynamic properties and on concentrations.

In the preface the author claims three points of distinction which give a good indication of the character of the book.

(1) There are more than a hundred illustrative numerical problems solved in the text, and about three hundred and sixty exercises to be solved by the reader. These vary from drill in the relative magnitudes of various units to derivation of some of the general equations. They seem to be very well chosen, and should serve the author's purpose of making thermodynamics a live subject to the chemist.

(2) The theory of corresponding states as developed by American chemical engineers has been used "whenever feasible" under the name "generalized procedures." It is an excellent idea to present the method as an approximation which is valuable when specific data are lacking, but the emphasis here is much greater than the accuracy of the approximation warrants.

(3) The use of statistical methods is emphasized. The partition function is introduced early and often and its relation to the classical thermodynamic functions is clearly shown. This is one of the best features of the book.

The author does not tell the maturity of the reader for whom he wrote, but there are few chemists who cannot profit by this book.

GEORGE SCATCHARD

BOOKS RECEIVED

December 10, 1947–January 10, 1948

D. E. H. FREAR. "Catalogue of Insecticides and Fungicides." Vol. I, "Chemical Insecticides." The Chronica Botanica Company, Waltham, Mass. (Stechert-Hafner, Inc., 31 East 10th Street, New York, N. Y.). 203 pp. $6.50.

PAUL KARRER, translated by A. J. Mee. "Organic Chemistry." Third English Edition. 957 pp. $8.50.

OTTO L. KOWALKE. "Fundamentals in Chemical Process Calculations." The Macmillan Company, 60 Fifth Avenue, New York 11, N. Y. 158 pp. $2.50.

JOSEPH MICHELMAN. "Violin Varnish." Published by Joseph Michelman, 5050 Oberlin Blvd., Cincinnati, Ohio. 185 pp. $3.75.

R. V. V. NICHOLLS. "An Introduction to Practical Organic Chemistry." Sir Isaac Pitman and Sons (Canada) Ltd., Publishers, 381–383 Church Street, Toronto, Ontario, Canada. 187 pp. $2.25.

R. L. SHRINER, EDITOR-IN-CHIEF. "Organic Syntheses." Vol. 27. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 121 pp. $2.25.

ROLAND M. WHITTAKER. "Rudiments of Chemistry. The Chemist's View of the Nature of Matter." The Roland Press Company, Publishers, 15 East 26th Street, New York 10, N. Y. 310 pp. $3.00.

"Nordisk Cerealkemist-Forenings. Kongress I Stockholm." Uppsala, 1947. Appelbergs Boktryckeriaktiebolag, Publishers. 258 pp.

"Research. A Journal of Science and Its Applications." Published by Butterworths Scientific Publications Ltd., 4, 5, 6 Bell Yard, Temple Bar, London, W. C. 2. 96 pp. $10.00.