m. p. 192°, *Anal.* C, 76.1; H, 10.0; benzoate, m. p. 229°, *Anal.* C, 78.2; H, 9.1. This material differed from tigogenin and sarsasapogenin by direct comparison. However, the authors failed to note its similarity to diosgenin. Thus, diosgenin isolated from *Dioscorea tokora* [Fujii and Matsukawa, *J. Pharm. Soc. Japan*, **56,** 408 (1936)] has the following properties: m. p. 200°, $[\alpha]^{19}_D$ $-119°$ in chloroform, *Anal.* Calcd. for $C_{27}H_{42}O_3$: C, 78.2, H, 10.2.; acetate, m. p. 190°, *Anal.* Calcd. for $C_{29}H_{44}O_4$: C, 76.3; H, 9.7.; benzoate, m. p. 237°, *Anal.* Calcd. for $C_{34}H_{46}O_4$: C, 78.7; H, 9.0.

We have obtained a sample of palm kernels identified for us as *Balanites aegyptica.* The sapogenin fraction contained diosgenin as its principal constituent. The identification was made by the melting point and mixed melting point determinations on the free genin, 206°; acetate, 200°; and benzoate, 238°. Catalytic reduction of its acetate gave tigogenin acetate, m. p. and mixed m. p., 202°. A mixture containing the latter and the original acetate melted 186°.

We thank Parke, Davis and Company for their help.

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RECEIVED APRIL 21, 1943

FURTHER REVISION OF THE CONSTANTS OF THE DEBYE-HÜCKEL THEORY

Sir:

In a recent note Stonehill and Berry[1] have published revised values for the constants h and g in the Debye–Hückel expression for the logarithm of the activity coefficient of a z_1,z_2-valent electrolyte in aqueous solution at 25°

$$\log_{10} \gamma = \frac{-hz_1z_2\sqrt{I}}{1 + ga\sqrt{I}} - \log_{10} (1 + 0.018\Sigma m_i)$$

On the basis of the physical constants tabulated by Childs[2] they find $h = 0.5103$ and $g = 0.3290 \times 10^8$. They indicate some of the possible implications of this change from the values $h = 0.5065$ (or 0.5056) and $g = 0.3287 \times 10^8$ (or 0.3288×10^8) based on the old values of the fundamental constants and used so widely by numerous authors.[3] The values of h and g established by Stonehill and Berry are, however, not final. The fundamental constants given by Birge[4] differ somewhat from, and supersede, those listed by Childs and used by Stonehill and Berry in their calculations. On the basis of the Birge constants $e = 4.8025 \times 10^{-10}$ e. s. u. (instead of Childs' 4.803×10^{-10}), $k = 1.38047 \times 10^{-16}$ erg/°C. (instead of 1.379×10^{-16}), $N = 6.0228 \times 10^{23}$ (instead of 6.028×10^{23}), $T_0 = 273.16$ (instead of 273.18) and on the basis of Wyman's[5] value 78.54 for the dielectric constant of water at 25° we find $h = 0.5091$ and $g = 0.3286 \times 10^8$. Calling d and t the ratios $D/78.54$ and $T/298.16$ we have, in general

$$h = \frac{0.5091}{(dt)^{3/2}} \text{ and } g = \frac{0.3286 \times 10^8}{(dt)^{1/2}}$$

The revised constant l for the osmotic coefficient formula

$$1 - G = lz_1z_2\sqrt{I}\cdot\sigma(ga\sqrt{I})$$

is 0.3908 for water at 25° and, in general

$$l = 0.3908/(dt)^{3/2}$$

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[1] Stonehill and Berry, THIS JOURNAL, **64,** 2724 (1942).

[2] Childs, "Physical Constants," Methuen, London, 1939.

[3] On the basis of the constants tabulated by Fowler in his 'Statistical Mechanics" (Cambridge University Press, 1936) Van Rysselberghe and Eisenberg (THIS JOURNAL, **61,** 3030 (1939), **62,** 451 (1940)) and Eisenberg (Thesis, Stanford University, 1942) used the values $h = 0.5059$ and $g = 0.3287 \times 10^8$.

[4] Birge, *Rev. Mod. Phys.*, **13,** 233 (1941).

[5] Wyman, *Phys. Rev.*, **35,** 623 (1930).

DEPARTMENT OF CHEMISTRY
UNIVERSITY OF OREGON
EUGENE, OREGON PIERRE VAN RYSSELBERGHE

RECEIVED FEBRUARY 19, 1943

CONSTANTS OF THE DEBYE-HÜCKEL THEORY

Sir:

In accordance with the revised constants of Birge quoted in the preceding Communication of Dr. Van Rysselberghe, the equations of Scatchard and Epstein[1] for the Debye–Hückel limiting-law expressions in terms of concentrations in moles per kilogram of water should also be revised to give

$$\ln \gamma_k/z_k^2 \sqrt{\mu} = 1.1244 \; [1 + 0.15471 \; (t/100) + 0.03569 \; (t/100)^2 + 0.02389 \; (t/100)^3]$$

$$\ln \gamma_k/z_k^2\kappa = 3.470 \times 10^{-8} \; [1 + 0.10194 \; (t/100) + 0.04269 \; (t/100)^2 + 0.00976 \; (t/100)^3]$$

$$\kappa/\sqrt{\mu} = 0.3240 \times 10^8 \; [1 + 0.05217 \; (t/100) - 0.00916 \; (t/100)^2 + 0.00888 \; (t/100)^3]$$

in which γ_k is the ratio of the activity of the k'th ion species to its molality, z_k is its valence, t the centigrade temperature, μ the ionic strength,

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[1] G. Scatchard and L. F. Epstein, *Chem. Rev.*, **30,** 211 (1942).

and κ has its usual significance in the Debye theory. The equations are valid for aqueous solutions at one atmosphere from 0 to 100°C.

In terms of the quantities given by Dr. Van Rysselberghe the first equation gives

$$2.3026h/\sqrt{\rho_0} = 3l/\sqrt{\rho_0}$$

and the third equation gives $g/\sqrt{\rho_0}$, if ρ_0 is the density of water at the temperature t.

CONTRIBUTION NO. 505 FROM THE
RESEARCH LABORATORY OF PHYSICAL CHEMISTRY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASSACHUSETTS GEORGE SCATCHARD

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NEW BOOKS

New Technical and Commercial Dictionary—Spanish, English—English, Spanish. Compiled by ANTONIO PEROL GUERRERO, Industrial Engineer, Escuela Central de Ingenieros, Madrid; Chief Editor, Editorial Tecnica Unida. The Chemical Publishing Company, Inc., 234 King Street, Brooklyn, New York, N. Y., 1942. ix + 600 pp. 15.5 × 23.5 cm. Price, $10.00.

Now when at last we are becoming conscious that from south of the Rio Grande to the Antarctic the population of this hemisphere speaks Spanish and that therefore we must learn this language to become better neighbors, the publication of Spanish–English dictionaries is especially welcome. The New Commercial Technical Dictionary of Spanish–English and English–Spanish compiled by Sr. Antonio Perol Guerrero has been written for the use of engineers, business men, and military men. It is undoubtedly a heavy task, that of writing a technical dictionary of so wide a scope. As a consequence, the dictionary is somewhat deficient in words related to industrial trades (metal smith, ship fitter, copper smith, pipe fitter, pattern maker, moulder, etc.). There are in the Spanish–English section some errors of spelling (*azurar* instead of *azuzar*, *cretaneo* instead of *cretaceo*, *húmico* instead of *húmido*, *reactico* instead of *reactivo*, *juga* instead of *jugo*, *respiradore* instead of *respiradora*) and repetitions, which may be corrected in the next edition. The third section of the book contains useful conversion tables of weights and measures.

E. S. GUZMAN BARRON

Preparacion de Productos quimicos y quimicofarmaceuticos. (Preparation of Chemical and Chemical-Pharmaceutical Products.) Volumes I and II. By Professor C. A. ROJAHN, University of Halle. Translated and considerably amplified by Professor Francisco Giral, Chief of the Departments of Organic Synthesis in the "Laboratorios Hormona," Mexico. Editorial Atlante, S. A., Mexico, D. F. xxxix + 1002 pp. 17.5 × 24 cm. Price, $11.00.

This book of preparations of chemical and pharmaceutical products was written by Professor Rojahn for the benefit of students of pharmacy; Professor Giral on translating the book from German into Spanish has also had the same aim in view. To make the book of practical use to Latin-American pharmacists, Professor Giral has used the prescriptions of purity given by the U. S. Pharmacopeia. In these two volumes, an imposing array of methods of preparation of inorganic and organic compounds is given, all of them described with simplicity and clarity. The author was well aware of the lack of explanation of the reactions going on in those preparations and has defended in the foreword his method of presentation. Professor Giral has remedied in part this lack by providing excellent notes, added when compounds of biological interest are described. The reader would welcome more of these notes. An interesting feature of the book is that the methods selected are those requiring the least amount of laboratory material. In the section on organic compounds, some preparations of biological importance could be added (*e. g.*, keto acids, phosphorylated carbohydrate derivatives), whereas in the section on inorganic compounds, a number of them could be dispensed with. If in the next edition Professor Giral eliminates those preparations of no practical utility and increases the number of supplementary notes, the quality of the book will be greatly improved.

E. S. GUZMAN BARRON

Quantitative Analysis. A Theoretical Approach. By WILLIAM RIEMAN, III, PH.D., Associate Professor of Chemistry, Rutgers University, JACOB D. NEUSS, PH.D., Research Chemist, Merck and Co., and BARNET NAIMAN, PH.D., Assistant Professor of Chemistry, College of the City of New York. Second edition. McGraw-Hill Book Company, Inc., 330 West 42nd St., New York, N. Y., 1942. xi + 496 pp. 66 figs. 15.5 × 23.5 cm. Price, $3.50.

According to the Preface, the revision of the first edition (reviewed in THIS JOURNAL, **59**, 1410 (1937)) has involved addition of some new procedures, the consistent use of the Brönsted acid–base concept, and development of the solubility product and related ideas using activities instead of concentrations. The theoretical material, explanatory mathematical parts and experimental procedures all are well written and readable; the book is well designed and executed from the mechanical side, being practically free from typographical errors and style faults (other than the omission of periods after some abbreviations and not others).

Although no longer than the average of such texts, it is composed of 29 chapters plus an appendix, and contains a