

Reviews of Books

Advances in Enzymology, Vol. XXII. Ed. F. F. NORD. (Interscience Publishers, Inc., New York and London, 1960.) Pp. v+567. Price 105s.

This, the 1960 volume of what may truly be described as the standard review series in its field, contains the following nine articles: Genetically Controlled Differences in Enzyme Activity, by J. R. S. Fincham (43 pages, 135 references); The Active Site and Enzyme Action, by D. E. Koshland (53 pages, 203 references); The Induced Synthesis of Proteins, by H. O. Halvorson (58 pages, 274 references); The Synthesis of Nucleotide Co-enzymes, by J. Baddiley and N. A. Hughes (47 pages, 74 references); The Synthesis and Hydrolysis of Sulphate Esters, by A. B. Roy (31 pages, 168 references); The Biochemistry of Sulphonium Compounds, by S. K. Shapiro and F. Schlenk (44 pages, 233 references); The Biosynthesis of Cholesterol, by G. Popjak and J. W. Cornforth (55 pages, 118 references); Co-enzyme Binding, by S. Shifrin and N. O. Kaplan (79 pages, 374 references) and Säulenchromatographie von Enzymen, by F. Turba (75 pages, 150 references).

As with previous volumes in the series, all workers in enzymology will find this collection of authoritative reviews quite indispensable.

H. N. R.

Received 24th August, 1961

The Electrical Double Layer Around a Spherical Colloid Particle. By A. L. LOEB, J. TH. G. OVERBEEK and P. H. WIERSEMA. (M.I.T. Press, 1961.) Pp. 375. Price ?.

This book consists mainly of tables giving the numerical solution of the Poisson-Boltzmann (Gouy-Chapman) equation for the potential distribution in the diffuse layer surrounding a single spherical colloid particle. The contributions of the co- and counter-ions to the space charge distribution and the free energy of the electrical double layer according to the colloid stability theory of Verwey and Overbeek and Derjaguin are also tabulated. The work has been carried out on electronic computers at Amsterdam and M.I.T. and the numerical techniques are similar to those of Hoskin who made relatively few calculations and whose results are found to be slightly inaccurate at high surface potentials. The electrolyte treated most extensively is the 1:1 type and simple transformations permit the data to be applied to a $z:z$ electrolyte where $z > 1$. The other electrolytes covered in less detail are 2:1, 1:2, 3:1 and 1:3. The range of surface potential in the 1:1 case is 25-400 mV and that of κa is 1:20 where a is the particle radius and κ the Debye-Hückel parameter and it is convenient to choose different ranges for the asymmetrical electrolytes.

The tables will be very useful to those investigating various colloidal phenomena relating to spherical particles. There are two minor criticisms. One is the absence of any reference to the work of Guggenheim (*Disc. Faraday Soc.*, 1957, **24**, 53; *Trans. Faraday Soc.*, 1959, **55**, 1714; 1960, **56**, 1159), who solved the Poisson-Boltzmann equation numerically around a spherical ion for 1:1, 2:1, 2:2 and 3:1 electrolytes. The second refers to the statement on p. 18 that no expressions are available for the free energy of the double layer at a flat plate for 3:1 and 1:3 electrolytes. Such an expression in the 1:3 case has been given by Levine and Bell (*Can. J. Chem.*, 1960, **38**, 1346) and this can be transformed to yield the 3:1 case as well.

S. L.

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Gas Chromatography. (2nd Int. Symposium Held under the Auspices of the Analysis Instrumentation Division of the Instrument Society of America, June, 1959.) Ed. HENRY J. NOBELS, R. F. WALL and NATHANIEL BRENNER. (Academic Press Inc., New York and London, 1961.) Pp. xvi+463. Price \$16.00 or 114s. 6d.

This volume contains a record of the 34 papers presented at the symposium described above but no discussion is included. It seems unfortunate that publication should have been delayed until March, 1961, nearly 21 months after the symposium, because rapid advances in the subject are still being made and consequently one of the essentials to justify the production of volumes of this type is speed of publication.

A substantial fraction of the papers originate from industrial concerns and the two main aspects of the subject which receive the most attention are developments in technique and the applications of gas chromatography for the analysis of particular classes of chemical compounds. Under the first category, there are papers on detectors of increased sensitivity, e.g., the use of the principle of the ionization gauge; on the combination of columns in a four-stage system suitable for the analysis of most hydrocarbons in the range from C_1 to C_7 ; on the combination of gas-liquid chromatography with mass spectrometry; on the use of linear-programmed temperature columns and on the use of integrating devices and a number of other automatic devices. Most of these papers are well prepared and contain a considerable amount of useful material. The second group of contributions covering applications for particular classes of compounds include papers on halogenated hydrocarbons, oxygenated hydrocarbons, inert and permanent gases, water in hydrazine and trace analyses of impurities in hydrocarbons. Preparative gas chromatography also receives some attention in articles on the use of up to eight matched columns in parallel and an automatic fraction collector. One valuable contribution which deserves special mention is that of Scholly and Brenner which reports in detail comparative retention data for a wide range of different hydrocarbons on eight representative column liquids.

The usual author and subject indexes are included and also a comprehensive bibliography with 1533 references to publications in the field which appeared between the beginning of 1958 and June, 1960. No details other than the title and reference of each paper are given and so this bibliography is much less valuable than *Gas Chromatography Abstracts* published by Butterworths. One wonders whether the compilation of the bibliography delayed publication because this would add weight to the argument that international agreement is urgently required about the publication of such bibliographies to prevent the duplication of effort which is involved at present.

To sum up, this is a useful volume but it cannot be described as an absolutely essential purchase for those concerned with gas chromatography.

C. K.

Received 28th August, 1961

pH Measurement and Titration. By G. MATTOCK. (Heywood & Co. Ltd., London, 1961.) Pp. xiv+406. Price 63s.

There are few scientific concepts as widely used as that of the pH of a solution. Great virtuosity in instrument design has been brought to bear on its measurement and control, yet its precise significance is fraught with theoretical subtlety. The field abounds in pitfalls for the inexperienced. The present volume will be invaluable to those, whether professional analysts, biologists or technologists, who wish to know how best to make their measurements and what instruments are available to them. The backbone of the book is, of course, the glass electrode but other electrodes and colorimetric methods are not neglected. There are clearly written chapters on such matters as the definition of pH and pH scales, buffer solutions, reference electrodes, and temperature errors and their control. A readable chapter (by G. R. Taylor) which deals with pH meters includes a useful tabulated summary of commercially available models. Separate chapters deal with laboratory measurements of pH and its measurement and automatic control in industrial processes. The chapter on pH titrations is followed by a chapter on non-aqueous and automatic acid-base titrations. There is a good deal of repetition but self-contained chapters are an advantage in a book primarily intended for practical uses.

The literature has been well covered, the proof-reading carefully done and the reviewer has but few criticisms. He does not, however, believe that equations of the Debye-Hückel form are at all relevant at "very high electrolyte concentrations" (p. 7), that hydrogen ions are attached to water molecules by ion-dipole interaction (p. 8), that 0.01 M solutions of strong acids or base are properly regarded as buffer solutions (p. 39), or that the bond diagrams on pp. 132, 133, which purport to show what happens when aluminium or lanthanum replace silicon in a silicate lattice are meaningful; the basic dissociation constants for $BaOH^+$, $CaOH^+$ and $MgOH^+$ (p. 392) are wrongly defined. Why the monitoring of high-purity water in industry (p. 290) should be done by pH rather than conductance measurements baffles the reviewer. These, however, are minor blemishes in a book that will surely be widely used.

J. E. P.

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