

Oxidations of vanillin have also been obtained with mercuric and auric oxides but, in these cases, the Cannizzaro reaction was inoperative.

The experimental details and theoretical con-

siderations of these investigations will appear in a forthcoming series of papers.

THE INSTITUTE OF PAPER CHEMISTRY
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NEW BOOKS

Physico-Chemical Methods. By JOSEPH REILLY, Boyle Medallist, Royal Dublin Society, Professor of Chemistry, University College, Cork, and William Norman Rae, Professor of Chemistry and Physics, Royal College of Surgeons in Ireland. Volume I and Volume II. Fourth edition. D. Van Nostrand Company, Inc., 250 Fourth Avenue, New York, N. Y., 1944. Volume I: ix + 610 pp. Volume II: vii + 585 pp. Illustrated. 16 × 24.5 cm. Price, \$17.50.

According to the authors, "No drastic alterations have been made in the present edition." Nevertheless considerable new material has been added to the comprehensive treatment of the previous edition. Some twenty-five new pages deal with surface area, thermopiles, the tensile strength of liquids, microfractionation, micro diffusion, the ultracentrifuge and artificial radioactivity. There are numerous other interesting additions of less significance.

The purpose of the authors, as stated in the first edition, is to describe laboratory procedures at a much more advanced level than is possible in a manual for undergraduate students and thus make it unnecessary for an investigator to go to sources which are often not readily accessible. This objective has been only partially realized. While it is possible in the case of many procedures to give complete instructions, more complicated apparatus, such as the ultracentrifuge, can only be properly constructed by reference to the original literature. In the discussion of these topics the work becomes more of a commentary, with references, than a laboratory directive. As such it will serve as a convenient starting point for one beginning a search of the literature.

Apparently most of the fourth edition is printed from the plates of the third edition. New materials have been introduced by the expedient of eliminating cuts in some places and using a decimal system of paging (*i. e.*, 18.1, 18.2, etc.) in other places. Chapter XIII has been omitted entirely for no obvious reason. This chapter entitled "Molecular Properties" in the third edition included the sub-titles of solubility, molecular weights, molecular weights—micro methods, partition coefficients, rates of reaction, mass action and stability of explosives.

The paper and binding are not up to the excellent standard of the third edition. While apparently less durable they are probably satisfactory except for the hardest usage.

H. E. BENT

Ultracentrifugal Studies on Serum and Serum Fractions. By KAI O. PEDERSEN. To be obtained through Almqvist and Wiksells AB, Upsala, Sweden, 1945. 178 pp. 16.5 × 24 cm. Price, 10 Swedish crowns (about \$2.50).

This thesis of Pedersen's has been long awaited by all who had seen preliminary reports of his work on the serum proteins in "The Ultracentrifuge" by Svedberg and Pedersen. A great deal of valuable information for anyone

interested in the serum proteins in general, or their ultracentrifugal behavior in particular, is contained in this volume.

The outstanding contributions reported here are undoubtedly his elucidation of the behavior of the so-called "X-protein" of human serum or plasma, first described by McFarlane in 1935, and the description of a new serum globulin of low molecular weight (*ca.* 50,000) called "fetuin."

The X-protein of human serum is found to have a sedimentation behavior in the ultracentrifuge highly dependent upon the density of the centrifuged solution. From studies of the dependence of sedimentation constant upon density, the specific volume of this component is calculated to be 0.969, a value remarkably large for a protein molecule. Certain serum fractions prepared by high-speed centrifugation or electrophoresis are shown to have sedimentation properties similar to those of this labile component of human serum. These fractions were found to be rich in β -globulin and lipid. Pedersen says that to date he has observed no components showing this "density effect" in sera other than human.

The low molecular weight globulin fetuin was first observed in serum from newly born calves. It has also been found in large quantities in the serum from the foal and from sheep foetus. Pedersen points out that these cases where fetuin is found represent animals where the antibodies do not appear in the serum of the newborn until it has received colostrum, whereas in rodents and man the antibodies are known to be transferred from the mother to the foetus.

A large part of this thesis describes ultracentrifuge studies of various fractions of serum obtained by ammonium sulfate precipitation, and of various "delipidated" sera. These experiments were made with the serum or plasma of the adult cow, calf, calf foetus, adult and foetal rabbit, foal, sheep foetus, normal adult human, pathological adult human, and human umbilical cord. This very ambitious program is well described in a series of about forty tables. Unfortunately, there is not much supplementary chemical or electrophoretic work upon these fractions, but this deficiency is very understandable when it is remembered that this large mass of data was obtained in connection with experiments primarily concerned with ultracentrifugal studies.

Some of the other conclusions of the author are of considerable interest. Observations concerning the isohemagglutinins of human serum are presented, but unfortunately there are few data presented in the form of quantitative immunological assay of the materials used. Several γ -globulin fractions were prepared and studied, and gave molecular weights from 153,000 for human γ -globulin, to 192,000 for a γ -globulin fraction from cow serum. Serum albumin from human and from cow foetus serum were also rather intensively investigated, as were several high molecular weight globulins obtained from pathological human serum.

This valuable contribution to protein and ultracentri-

fuge literature should be studied by everyone interested in these subjects, and the author of this thesis is to be congratulated on the completion of this comprehensive work.

J. L. ONCLEY

The Chemical Process Industries. By R. NORRIS SHREVE, Professor of Chemical Engineering, Purdue University. McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York, N. Y., 1945. xiii + 957 pp. Illustrated. 22.5 × 15 cm. Price, \$6.00.

The writing of an adequate textbook of chemical engineering technology is a task that requires an unusual breadth of information and very critical judgment in the selection of material. The rapid advances that are being made in many of the chemical industries and the lack of adequate published information on many of the new developments make the assignment even more difficult. The author has handled this difficult task very well indeed.

Following three introductory chapters that state the objectives of the book, define the terms "unit operations" and "unit processes," and discuss some of the fundamental considerations that are involved in all chemical engineering industries, is a group of four chapters dealing with industrial water, power, fuels and fuel gases. Next are fourteen chapters on selected groups of inorganic chemical industries. The last eighteen chapters discuss organic chemical industries.

In general, the selection of material is excellent, although the author has included some tables that are longer and more detailed than necessary and has spent some space in discussing special processes that are not in very common use.

In the chapter on plastics, some mention of the silicone plastics would have been justified. A little more space might have been devoted to the industrial uses of soaps, especially in paints and in lubricating greases. The author defines rye whiskey and bourbon, but ignores scotch; the justification for this discrimination is not apparent.

In many instances, the author has given some discussion of the market prices of the chemical products considered. Some information—even if it were only very approximate—on the range of costs of production for products that are not generally quoted commercial materials, as, for example, industrial hydrogen, would be useful in giving the student some conception of relative values.

In a few cases, a non-critical reader might get a false impression from the statements as worded. For example, the discussion on page 96 implies that the use of pipe stills for coal tar is a recent adoption from the petroleum industry. Pipe stills have been used successfully and rather generally in the distillation of coal tar for at least thirty

years. The statement at the bottom of page 195 that portland cement clinker *by itself* is a satisfactory lining for a cement kiln requires considerable elaboration. In the burning of normal portland cement, no real "melt" is formed (p. 194). Not all explosives give "much gas"; copper acetylide gives no gas, but it certainly is explosive (p. 439). *Propellent* nitrocellulose powder is usually perforated; the powder is usually run through a macaroni press and a blocking press before going to the graining press that extrudes the ropes from which the grains are cut (p. 448). The statement that vacuum-pau salt is a very pure product (p. 260) should be strongly qualified. The problem given on page 162 is going to distress some teachers of chemical engineering economics who have been struggling to impress the fact that the total cost of a product is not merely the sum of the cost of direct material, direct labor, and power.

It is not remarkable that a book as comprehensive and as difficult to write as this one should contain a few defects in its first printing; it is remarkable that the defects are so few and of such minor importance. The book is a really valuable addition to the literature of chemical engineering.

F. H. RHODES

BOOKS RECEIVED

July 10, 1945–August 10, 1945

RALPH S. BATES. "Scientific Societies in the United States." A Publication of the Technology Press, Massachusetts Institute of Technology, John Wiley and Sons, Inc., 440 Fourth Avenue, New York, N. Y. (London—Chapman and Hall, Ltd.). 246 pp. \$3.50.

HARRY N. HOLMES. "Qualitative Analysis. A Brief Outline." The Macmillan Company, 60 Fifth Avenue, New York, N. Y. 52 pp. \$1.10.

JAMES MURRAY LUCK, Editor, and JAMES H. C. SMITH, Associate Editor. "Annual Review of Biochemistry." Vol. XIV. Annual Reviews, Inc., Stanford University P. O., California. 856 pp. \$5.00.

LECOMTE DU NOÛY. "Studies in Biophysics: The Critical Temperature of Serum (56°)." Reinhold Publishing Corporation, 330 West 42nd Street, New York, N. Y. 183 pp. \$3.50.

EUGENE I. RABINOWITZ. "Photosynthesis." Vol. I. Interscience Publishers, Inc., 215 Fourth Avenue, New York 13, N. Y. 599 pp. \$8.50.

CHARLES THOM and KENNETH B. RAPER. "A Manual of the Aspergilli." The Williams and Wilkins Company, Baltimore, Maryland. 373 pp. \$7.00.