

nese trichloride, but does not confirm the isolation of manganese tetrachloride as described in the earlier paper. Some evidence is already at hand, indicating that a compound of manganese can be obtained richer in chlorine than is the trichloride, but until the subject is more thoroughly investigated, the statement of the existence of manganese tetrachloride should be withheld.

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NEW BOOKS.

Thermochemistry, by JULIUS THOMSEN. Translated from the Danish by KATHARINE A. BURKE. Ramsay's Text-Books of Physical Chemistry. Longmans, Green & Co., London, 1908. 495 pp. Price, 9s.

Fifty-five years ago there appeared in Poggendorff's *Annalen* a paper by Julius Thomsen entitled "The Foundations of a Thermochemical System." Here the author outlined the plan of that remarkably comprehensive investigation which he pursued with the utmost fidelity for thirty-five years in the University of Copenhagen. At the end of this period the results were published in the four volumes of "Thermochemische Untersuchungen," a work which has stood for twenty years as a classic. Now in his old age the author has wished to reproduce in a more compact and accessible form, and in his native tongue, the results of this monumental research and the views to which they led him. So, like another Rip Van Winkle, the book returns to us together with its shrewd but antiquated theories of chemical affinity. Since its last appearance new ideas have come into the science of chemistry. Through the influence of Gibbs and Helmholtz the second law of thermodynamics has found its widest application in the phenomena of chemical equilibrium, and we now accept the free energy, rather than the heat of reaction, as the driving force of a chemical reaction. No longer do we employ such esoteric principles as "The Right of the Stronger" or "The Maintenance of the *Status quo*." The ionic theory has come to dominate the field of aqueous solutions and affords a ready explanation of many of the striking phenomena obtained by Thomsen. In organic chemistry many of his speculations appear groundless in view of the modern theory of tautomerism, but his experimental data on the heat of formation of typical compounds are worthy of the careful consideration of any one who would attempt to elaborate the present theory of chemical structure.

The book presents, of course, a one-sided view of thermochemistry, containing as it does the results of the author alone. The work of such men as Berthelot and Stohmann is nowhere mentioned. A single datum is taken from an outside source, the heat of formation of calcium oxide as determined by Moissan. The values published in Thomsen's former book

for the mercury compounds were shown by Nernst to be incorrect. Thomsen therefore made a hasty redetermination of these quantities and uses in this book the results so obtained although the values of Nernst which have been corroborated fully by Varet are undoubtedly more accurate.

In the Danish edition of the book the experimental methods have been omitted. The English translator has, however, added a chapter on calorimetry which is abstracted from Thomsen's older work. The translation is entirely satisfactory, but whether the book itself is of such a character as to warrant its inclusion in Ramsay's excellent series of text books is an open question.

GILBERT N. LEWIS.

Jahrbuch des Vereins der Spiritus-Fabrikanten in Deutschland, des Vereins der Stärke-Interessenten in Deutschland und des Vereins Deutschen Kartoffeltrockner. ACHTER JAHRGANG. 1908. Ergänzungsband zur Zeitschrift für Spiritusindustrie. D. G. HEINZELMANN. Berlin: Paul Parey. Price, 28 M.

This report, like its predecessors, is intended, as its title indicates, as a supplement to the *Zeitschrift für Spiritusindustrie*, the official organ of the affiliated societies in Germany devoted to the production and utilization of starch and its derivatives. What is attempted in it is best set forth in a paragraph with the report of Mr. M. Student in the Jahresbericht upon the Zeitschrift and its work, in which he says "As a supplement to the *Zeitschrift für Spiritusindustrie* there is regularly published in Germany the *Jahrbuch des Vereins der Spiritusindustrie in Deutschland*, which contains a review of the activities of the leading society, of its various sections, as well as of the affiliated societies; stenographic reports of the general meetings of all the societies, annual reports upon the industries of dairying, distilling and starch manufacture, the annual report of the Zentrale für Spiritus Verwertung, and statistical material relating to all the branches of industry named. In addition to all this is a report of the results of experiments of the German Potato Culture Experiment Station and of experiments made at Hadmersleben to test the value of different varieties of potatoes.

"It is interesting to note that the work of the dairy industry has this year been included for the first time in the subjects treated in the Jahresbericht. The book is so broad in its scope and so thorough in its treatment that it must be both attractive and useful to every progressive agriculturist, dairyman, or manufacturer of any of the products named."

WM. MCMURTRIE.

Engine Room Chemistry. AUGUSTUS H. GILL, Associate Professor of Technical Analysis at Massachusetts Institute of Technology. Hill Publishing Co. 298 pages. Price, \$1.

This book will be especially welcome not only to technical chemists, but will be also useful to engineers in charge of boiler plants and engine rooms. Two chapters are devoted to description of chemical apparatus