filtered off and an attempt made to dry it, even at as low a temperature as 40° C., or at room temperature for some time, it became brown and resinous. Purification by recrystallization was resorted to with no better results, inasmuch as the purified substance always turned brown and gummy. The melting point could not be determined for the same reason. No difficulty was experienced in obtaining good crystals of sharp melting point from cottonseed oil (tetrabromlinolic acid) in a parallel experiment.

It is known that cottonseed meal when fed to hogs affects the lard (melting point, titer) and such lard also responds to the Halphen test. In the case of the six samples which we investigated, a negative result was obtained when the Halphen test was applied.

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NOTES.

Preparation of a Solution for Making Standard Solutions of Sodium Hydroxide.—Prepare an approximately 50 per cent. solution of sodium hydroxide by dissolving 50 grams of ordinary C. P. caustic soda sticks in 50 cc. of distilled water and leave tightly stoppered over night. The major portion of the impurities is insoluble in such a concentrated solution. The next day the proper amount of the clear supernatant solution is weighed or measured out, as most convenient, and diluted to the mark with freshly boiled, distilled water. Theoretically 8 grams or 5.25 cc. are required per liter of $N/10$ solution but, owing to the impurities which have settled out, it is safer to use 8.5 grams or 5.75 cc. per liter and then standardize against $N/10$ acid.

With such a standard solution, made up as directed and kept in an automatic burette with a potash bulb to purify the air that enters the apparatus, the strength is maintained indefinitely, while one drop of $N/10$ H_2SO_4 is more than sufficient to render 25 cc. of the solution, already neutralized to phenolphthalein, acid to methyl orange, showing that it is practically completely free from carbonates, etc. In proof of this, barium hydroxide gives no precipitate when added to 25 cc. of the solution. The remainder of the strong caustic soda solution, if kept tightly stoppered, will furnish material for the preparation of future supplies when needed.

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The Action of Hydrochloric Acid on Manganese Dioxide.—In a preliminary paper[1] by one of the authors, some of the products formed by the interaction of hydrogen chloride and manganese dioxide in non-aqueous solutions were described. Since that time a further investigation of this subject has been carried on. The work confirms the existence of manga-

[1] THIS JOURNAL, 29, 1277 (1907).

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