

during which time water vapor given off by the glass walls presumably oxidized the metallic deposit. A second clean-up run then showed a much more rapid disappearance from 210 cu. mm. to 35 cu. mm. in 2.5 minutes, with log pressure varying linearly with time. The evaporation of a fresh film from the Elinvar wire, covering up previous films, always reduced the rate of clean-up to a low value, and subsequent torching of the tube restored the high value. In one run enough hydrogen disappeared in the film to form a layer 20 atoms deep while the rate of clean-up remained undiminished.

When the tungsten filament was turned off the pressure started immediately to rise. In one experiment 10% of the adsorbed hydrogen reappeared in ten minutes at 25°, and 90% in two minutes at 450°. Owing to this tendency of the gas to leave the film at a slow rate, the net rate of disappearance diminished markedly as the pressure fell below 0.020 mm. If the lamp was cooled in liquid air, the clean-up stopped instantly, showing that the catalytic effect of the cold film caused recombination of all impinging atoms. If H was adsorbed at 25° and the lamp then cooled in liquid air, there was no escape of hydrogen on turning off the filament. It is known that hydrogen evaporates as atoms from glass surfaces at 25° but recombines on cold glass, so it probably diffused as atoms to the deeper layers of our film at 25°. The film never showed any tendency to adsorb molecular hydrogen.

The recombination of atomic hydrogen at a *tungsten* surface is promoted by cooling the lamp in liquid air, due probably to the removal of water vapor. The H generated by a filament at 2700°K. delivered 0.63 watt to a neighboring tungsten filament with the lamp at 25°, and 1.48 watts with the lamp in liquid air, although cold walls lower the concentration of H in the gas phase by catalyzing recombination.

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## NEW BOOKS

**The Life and Work of Charles James, 1880-1928.** Edited by WALTER C. SCHUMB, HAROLD A. IDDLIS, LYMAN C. NEWELL and AVERY A. ASHDOWN. Published by the Northeastern Section of the American Chemical Society, A. A. Ashdown, Custodian, Massachusetts Institute of Technology, Cambridge, Massachusetts, 1932. 26 pp. Illustrated. 15.5 × 23.5 cm. Price, \$0.50.

This memorial volume to Charles James contains, first, the Resolutions passed by the Northeastern Section on the occasion of his death; second, three essays, one on Charles James, the Man, by Melvin M. Smith, one on Charles James, the Teacher, by Lester A. Pratt, and one on Charles James,

the Chemist, by B. S. Hopkins; and third, a List of the Scientific Papers of Charles James. There are also included several excellent portraits of James, photographs of the famous gardens of the Jameses and a photograph of the new chemical laboratory at the University of New Hampshire that has been named in his memory the Charles James Hall.

This carefully edited and beautifully printed brochure is a fitting and graceful tribute from the Northeastern Section to the memory of one of its most distinguished members. The essays are excellent; together they give a vivid picture of James, his lovable personality, his high-minded idealism, his outstanding ability. The bibliography shows meticulous care. The book will be read with interest and pleasure by the many friends and admirers of Charles James.

ARTHUR B. LAMB

**Organic Syntheses.** An Annual Publication of Satisfactory Methods for the Preparation of Organic Chemicals. Vol. XII. By FRANK C. WHITMORE, Editor-in-Chief, ROGER ADAMS, W. H. CAROTHERS, H. T. CLARKE, J. B. CONANT, HENRY GILMAN, C. S. MARVEL, C. R. NOLLER, C. F. H. ALLEN, Secretary. John Wiley and Sons, Inc., 440 Fourth Ave., New York, 1932. vii + 96 pp. 15.5 × 23.5 cm. Price, \$1.75.

Volume XII gives methods for preparing the following compounds: acetyl benzoin, *d*-arginine hydrochloride, benzyl phthalimide, *p*-chlorobenzaldehyde, desoxybenzoin, desyl chloride, dibenzalacetone, 1,2-dibromocyclohexane, 2,6-diiodo-*p*-nitroaniline, 2,4-dinitrobenzaldehyde, 4,5-diphenylglyoxal, ethyl  $\alpha,\beta$ -dibromo- $\beta$ -phenylpropionate, ethyl-*N*-methylcarbamate, hippuric acid, iodothiophene, mercury di- $\beta$ -naphthyl, methyl isopropyl carbinol, *S*-methyl isothioureia sulfate,  $\beta$ -naphthylmercuric chloride, nitrobarbituric acid, phenylpropionic acid, phenyl thienyl ketone, propionaldehyde, succinic anhydride,  $\beta$ -thiodiglycol, thiophene, thiosalicylic acid, *p*-tolualdehyde, uramil, diethyl zinc.

The list contains many substances which are important intermediates, including some which are difficult to prepare without specific directions; it also includes a few that seem hardly worthy of a place in the collection. The name of the first preparation is misleading, because the substance is really benzoin acetate.

E. P. KOHLER

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## BOOKS RECEIVED

July 15, 1932–August 15, 1932

- R. ABEGG, FR. AUERBACH AND I. KOPPEL, Editors. "Handbuch der anorganischen Chemie." Eisen. Vierter Band, dritte Abteilung, zweiter Teil, B, Lieferung 2. Verlag von S. Hirzel, Königstrasse 2, Leipzig C 1, Germany. 210 pp. RM. 24.
- HANS JULIUS BRAUN. "Die Metallseifen." Verlag von Otto Spamer, Heinrichstrasse 9, Leipzig C 1, Germany. 83 pp. Rmk. 7; bound, RMk. 8.50.