

eddies of air which move forward with the storm, chiefly along the edge of it. An argument in favor of this is the precipitation of hail over comparatively narrow belts. Such eddies are formed by the sudden uprushing of overheated moist masses of air into the high very cold levels during thunder storms, and also during the general disturbance of atmospheric equilibrium when a cold wind from above passes over the hotter lower layers of the atmosphere. Similar eddies often pass along the surface of contact between hot and cold layers of air, the phenomenon often being repeated a number of times.

"Ferrel considers that hailstones are formed in very violent uprushing eddies of air having small cross-sections, and he assumes that the small hailstones are whirled upward repeatedly until their weight has become so great that they fall to the earth. The velocities called for in the eddies are not improbable ones when we consider the effects produced by local eddies, such as cyclones and tornadoes, even at the earth's surface." *Wilder D. Bancroft*

Dr. I. Frick's Physikalische Technik oder Anleitung zu Experimentalvortragen sowie zur Selbsterstellung einfacher Demonstrationsapparate. Siebente vollkommen umgearbeitete und stark vermehrte Auflage von Dr. Otto Lehmann. Zweiter Band. Erste Abteilung. 18 X 26 cm; pp. xvii + 762. Braunschweig: Friedrich Vieweg und Sohn, 1907. Price: paper, 20; bound, 22 marks.—As the title itself shows, this book is intended to be of service to the lecturer in physics both by showing just how certain experiments can be performed and also by telling him from what firms he can buy special apparatus for the experiments. The book is eminently successful in both aims. The experiments in this volume are grouped under the headings: electrostatics; galvanism; magnetism; induction. There is an extraordinary number of experiments and they are very well chosen. Some of them are distinctly interesting for reasons other than their merit as lecture experiments. Thus on p. 280 we find the statement that when lead is precipitated electrolytically from an aqueous solution, hexagonal crystals are obtained with a low current density and regular crystals with a higher current density.

There are several experiments on the behavior of isolated conductors in an electrolytic solution through which a current is passing; but they deal chiefly with the special case of no polarization at the surface of the interposed conductor. The reviewer has always liked the experiment of the precipitation of copper from a copper sulphate solution on a detached carbon rod the moment the fall of potential in the solution alongside of the rod exceeds a certain value.

Wilder D. Bancroft

Elementary Agricultural Chemistry. A Handbook for Junior Agricultural Students and Farmers. By Herbert Ingle. 13 X 20 cm; pp. ix + 250. London: Charles Griffin and Company. Philadelphia: J. B. Lippincott Company, 1908. Price: \$1.50 net.—In the preface the author says:

"This little volume is based upon the writer's long experience in teaching agricultural students, among whom there are, unfortunately, many who cannot devote the time necessary to acquire sufficient knowledge of pure chemistry to profitably read such works as the author's *Manual of Agricultural Chemistry*.

"It is true that any attempt to combine, in one book, instruction in the principles of general chemistry with the somewhat technical information concerning the chemistry of agriculture, must be in many ways a failure, and the author would strongly recommend the user of this work to read some good, modern text-book on the former; or, better perhaps, to ask his teacher to explain, at greater length, the very incomplete and sketchy accounts which are given of the principles of chemistry and of the properties of the elements and compounds important in agriculture.

"While fully realizing that a satisfactory knowledge of agricultural chemistry cannot be acquired without a previous training in pure chemistry, he is aware that there are many agricultural students and farmers who have, perforce, to do without this preliminary chemical knowledge, and it is for such that this book is mainly intended.

"Since the work is written for the agriculturalist rather than for the chemist, few references to chemical literature are given.

"The book was prepared while the author was in touch with many of the crops and agricultural practices of South Africa, and it was thought advisable to give some account of the products of tropical and sub-tropical agriculture in addition to the matters relating to ordinary English farming.

"In these days of frequent travel and emigration, such inclusions may be of service to many agricultural students who, in the future, may become Colonists, while it may render the book more suitable to the needs of the Colonial reader, and to all a comparison of tropical with temperate conditions, cannot fail to be useful.

"Every writer is apt to give undue prominence to the particular subjects upon which he has himself worked, and perhaps some examples of this weakness may be found in the present volume.

"The importance of the composition as well as the amount of the ash constituents of the food of animals, to which reference is made in chap. ix., though perhaps not strongly felt in Europe where diet is varied, is considerable in such countries as South Africa, where the usual food of draught animals is composed almost entirely of cereals.

"In chap. iii., a brief account is given of the main causes of the motion of water in a soil, intended to clear away the confusion which is apt to attend the usual "explanation" as to its being due to "capillarity."

Chap. x. deals with the variations in the composition of cow's milk in greater detail, perhaps, than the elementary character of the book justifies; but here again the popular interest at present shown in the subject must be the excuse.

"There are doubtless, other respects in which the work is "out of balance," but for these, the reader's indulgence is solicited.

"The author hopes, in spite of this, the book may prove of service to those for whom it is intended."

Wilder D. Bancroft

Cours de Chimie Inorganique. By *Fréd Swarts*. 16 × 25 cm; pp. 706. Paris: A. Hermann, 1908. Price: paper, 15 francs.—This book is based on the lectures given by the author at the University of Ghent. In some respects, the volume is very much up to date. The Birkeland and Eyde process for making the oxides of nitrogen is described at some length. It is interesting to note