the author, but at the same time it must be said that more attention has been given to the details of certain controversies and experiments now largely of historical interest only than might be regarded as required in a book like this. This fondness for detail, however, does not detract seriously from the usefulness of the book to student and practitioner. The references to original sources are very abundant and will prove of great help, but they are not given according to any accepted bibliographic standard, the page being omitted in most cases. There are altogether but very few books that attempt to give a comprehensive summary of immunological knowledge of the same general scope as this one by Dr. Zinsser, but their number is increasing; for the present Dr. Zinsser's is the most serviceable.

LUDVIG HEKTOEN

The Norwegian Aurora Polaris Expedition, 1902–03. Vol. I.: *On the Cause of Magnetic Storms and the Origin of Terrestrial Magnetism.* By KR. BIRKELAND. Second Section. Christiania, H. Aschehoug & Co. 1913. 4°. Pp. x + 319–801, with many maps and plates.

Five years have elapsed since the publication of the first section of the present work, yet, in spite of incessant labor, this second section could not be sooner completed. This was due to the great number and variety of the computations and experiments necessary. The author considers that the results attained by the investigation of conditions during positive and negative Polar storms, and particularly the diurnal motion of the respective magnetic storm centers, are so valuable as to fully compensate for the exertions and personal sacrifices that the work has cost.

In order to make it clear whether his conclusions from widely spread observations in different parts of the world could be harmonized with his previous theoretic assumptions, he has carried out a long series of experiments with a "terrella" or magnetic globe suspended in a large vacuum-box intended for electrical discharges. He has thus been able to obtain photographic representation of the way in which cathode rays move singly, and group themselves in crowds about such a magnetic globe. Special study has been made of these groups of rays which produce magnetic effects analogous to those observed upon the earth during positive and negative magnetic polar storms. The photographic plates of these experiments are veritably fascinating.

The author holds that he has demonstrated that the magnetic storms on the earth, polar and equatorial, may be assumed to have as their primary cause the precipitation toward the earth of heliocathode rays, of which the magnetic rigidity is so great that the product $H.\rho$ for them is usually about 3×10^6 C.G.S. units. He discusses the objections raised to this theory by Schuster and Hale, and states that the experiments which were originally intended to procure analogies capable of explaining terrestrial phenomena, such as the Aurora and "magnetic storms," were afterward continued to derive information in regard to the conditions under which the emission of the assumed heliocathode rays from the sun might be supposed to take place. The terrella was made the cathode in the vacuum chamber and experiments carried on for many years. In this research there gradually appeared experimental analogies to various cosmic phenomena, such as zodiacal light, Saturn's rings, sun spots and spiral nebulæ. Whatever be the fate of the author's hypotheses the facts recorded in this work are well worthy the careful study of those interested in electromagnetism.

W. H. DALL

Physics of the Household. By CARLTON JOHN LYNDE, Macdonald College, Canada. 1914. 12mo. Cloth. Pp. 313.

Professor Lynde's book indicates that the author believes in teaching physics by consulting and describing, first, the student's own environment in information, experiences and appliances. These things are the fundamentals of this book. The reasons assigned in the preface for the teaching of physics to young students are, "First, that they may ob-

tain knowledge of the physical world about them; and, second, that they may gain through this knowledge the power to control the forces of nature for their own benefit, and for the benefit of others. In other words, we wish them to acquire knowledge which they will use in every-day life."

This work with other recent publications from a similar point of view represents a reaction against the prevailing formal text-books and formal treatment for beginners in the study of science. Those who consider fundamental things in physics to be the laws and generalization of the science will, perhaps, feel that the traditional logical development is very much neglected at some points. On the other hand, there is a growing demand among experienced teachers and critics of educational efficiency for a readjustment of text-book treatment. Where the strictly logical conflicts with what is considered profitable educational procedure the tendency is to defer logical organization of subject-matter till later. Experienced teachers, critics of education and the general public are demanding less drill work in abstraction and more practical work dealing with experiences and appliances such as one encounters in the world of reality. Lynde's book is a valuable contribution to the problem of teaching physics in a more practical way.

The first two chapters deal with a multitude of familiar mechanical contrivances, with discussions of the lever principle and other simple machines. This reminds one of the popular old text-books on natural philosophy of fifty or seventy-five years ago, and it is an altogether desirable revival. The chapter on mechanics of liquids is introduced with discussion of a city water supply, water supply for country homes, wells, etc. Following a chapter dealing with atmospheric pressure a variety of air appliances are discussed, including pumps, the pneumatic tank system of water supply for homes, the hydraulic ram, the air-pump, types of vacuum cleaners, the fire extinguisher, the siphon, the trap, the gas meter, etc. In the chapters on heat a similar list of important familiar appliances are to be found. As a rule the author presents a descriptive treatment of a series of practical physical situations in order to form a basis for discussion of the principles involved.

The chapters on electricity, light and sound follow more closely the customary treatment and contain less of the distinctive feature of the first half of the book. For the sake of consistency in the general plan there is much material of a practical and illustrative nature that should have been incorporated in these latter chapters. It is somewhat disappointing to find a commendable book with so many amateurish free-hand drawings.

F. F. Good

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THE FORSYTH DENTAL INFIRMARY FOR CHILDREN

This Boston institution, pioneer among charities for the adequate care of the mouths and throats of the children, poor or rich, of a large city, was dedicated formally by the Governor and others on Tuesday, November 24, and began its actual work the first of December. It is in the form of a splendid memorial erected by Thomas Alexander Forsyth and John Hamilton Forsyth to their brothers, James Bennett Forsyth and George Henry Forsyth, of whom, however, at present only the first-named is living. The amount already provided for this important work, it is understood, in the building and in endowment, is well along towards three millions of dollars.

Beautiful bas-relief bronze doors ("The Mother, giver of life and love" and "The Commonwealth, giver of health and learning") by Roger Noble Burnham, a bronze bust of James Forsyth by Bela Pratt and one of George Forsyth by Mr. Burnham, and charming Dutch and American tiling of elaborate design (A. H. Hepburn), are perhaps chief among the internal works of art of the beautiful white marble building, situated on The Fenway, north of the Museum of Fine Arts, although bronze doors ("Uncle Remus," "Bre'r Rabbit," "Alice in Wonderland," etc.), also ornament the entrance-way for the chil-