

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 $H \cdot \rho$ 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 nebulae. 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-