*The Electron Theory of Matter.* By O. W. RICHARDSON, Wheatstone Professor of Physics at Kings College, London. Pp. vi + 612. Cambridge Univ. Press. 1914.

THIS is in many ways a very remarkable book. Its scope is broader than that of any book on Electron Theory which has yet appeared, and it has the unique merit of not following even remotely the outline of J. J. Thomson's epoch-making work in this field. The author himself has exhibited within the past fifteen years, an unusual combination of theoretical and experimental fertility, and the present volume represents his digest, from the beginning, of the whole field of electromagnetic theory from both the theoretical and the experimental side. It exhibits profundity of scholarship, breadth of knowledge, enormous industry and a commendable fairness and reasonableness of temper.

The first 216 pages contain mainly the author's own treatment of nearly all of the most important of the classical theorems of electromagnetism such as the various potential theorems and those growing out of the Maxwell equations. From this point on is found a very exhaustive and original treatment of practically all of the newer developments of physics the scope of which can best be seen from the chapter headings. There are eighty pages on the electrodynamics of a moving charge, including a full discussion of the Abraham and Lorenz theorems; sixty pages on relativity; thirty-five on radiation and temperature with Wien's and Planck's contributions; forty on the theory of magnetism with a full review of Weiss' work; seventy-five pages on the electron theory of metallic conduction, thermo electromotive force, and thermoionics; thirty-five pages on "Types of Radiation" corpuscular and ethereal, including recent X-ray theory; thirty-five pages on spectroscopic phenomena; forty on the structure of the atom with Thomson rather overdone and Nicholson and Bohr somewhat slighted; and sixteen on gravitation.

Altogether it is a book of large and permanent value and another testimony to the breadth and fecundity of British science.

R. A. MILLIKAN

RYERSON PHYSICAL LABORATORY,
UNIVERSITY OF CHICAGO

## SPECIAL ARTICLES

### A SYSTEM OF RECORDING TYPES OF MATING IN EXPERIMENTAL BREEDING OPERATIONS[1]

ALL Mendelian experimentation with bisexual forms implies a system of mating which in practical work is called line breeding. One starts any Mendelian experiment with two kinds of organisms which are crossed with each other to produce the $F_1$ generation. Then the $F_1$ individuals are either mated *inter se* or back-crossed to the parent forms. The $F_2$ individuals may be mated in a variety of ways *inter se* and with the parents or grandparents.

Many of those engaged in Mendelian work

*Diagram I*

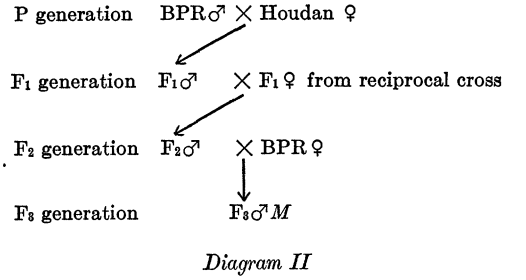
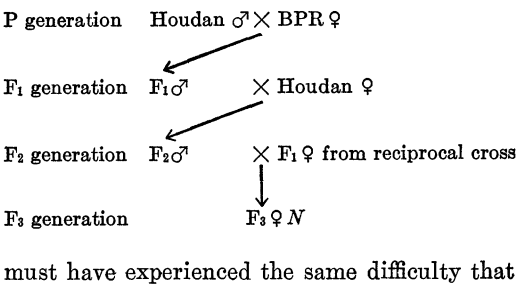



*Diagram II*




must have experienced the same difficulty that the writer has in recording experimental results, namely, that of expressing adequately and completely, and at the same time briefly and simply the general nature or type of the

[1] Papers from the Biological Laboratory of the Maine Agricultural Experiment Station, No. 88.