

THURSDAY, SEPTEMBER 26, 1912.

SCIENTIFIC PEDAGOGY.

- (1) *Rationalist English Educators*. By Dr. G. E. Hodgson. Pp. 254. (London: S.P.C.K.; New York: E. S. Gorham, 1912.) Price 3s. 6d.
- (2) *The Montessori Method: Scientific Pedagogy as Applied to Child Education in "The Children's Houses."* With additions and revisions by the author. By Maria Montessori. Translated from the Italian by Anne E. George. Pp. xliii + 377. (London: W. Heinemann, 1912.) Price 7s. 6d. net.
- (3) *The Evolution of Educational Theory*. By Prof. John Adams. Pp. ix + 410. (London: Macmillan and Co., Ltd., 1912.) Price 10s. net. (The Schools of Philosophy.)

(1) **P**ROBABLY Miss Hodgson is by temperament incapable of entering sympathetically into the point of view of those of whom she writes in this volume—Locke, the Edgeworths, and John Stuart Mill. In any case she should show a more adequate acquaintance with the Edgeworths when she writes about them. In the first line of her essay she misquotes the title of the only book of theirs she refers to, and continues so to misquote it throughout her text. A competent reader will soon discover that she has missed the message of the book in her superficial *resume* of its contents. It is therefore scarcely necessary to examine her criticisms. The treatment of Locke is the most satisfactory performance of the three.

(2) Mdme. Montessori's work for young children in the slum districts of Rome had received widespread recognition before the translation of her chief pedagogical writing appeared. The ground had in other ways been well prepared, and now we are threatened with a regular invasion of Montessori machinery. This is not said to belittle what has been accomplished in the "Children's Houses" in Rome. The idea of a central nursery for children from three to seven in the great tenement blocks was admirable in itself, and it was made still more so by associating the parents with its management and by appointing *directrices* who should live on the spot amongst those whom they were trying to serve. As a great social experiment, there is much to learn from Mdme. Montessori's success, whether it is the little school societies themselves which we regard, or the whole social setting of the establishments which she set up.

From the point of view of scientific pedagogy, the book and the experiment are interesting because of the sources of Mdme. Montessori's inspiration. Primarily a medical woman, the author made a special study of psychiatry, and took up

the education of mentally deficient children. This brought her into touch with the pioneer works of Seguin and Itard, and led her to take courses in experimental psychology. For two years she was the working director of the State orthophrenic school. Her experience and her reading had led to the collection of a great quantity of didactic *matériel*, but, as she found at Bicetre and elsewhere, admirable *matériel* is of little use, even when used in ways that are technically accurate, unless the spirit of its inventor is present.

The idea of these "tenement nurseries" and of applying the apparatus designed for the mechanical exercise of defective neural apparatus to the education and training of young but normal children occurred to her. The volume before us is a simple and fascinating account of what has been accomplished on these lines. Obviously much more than the transference of the apparatus was involved. It had to be adapted to children in whom the power of self-direction and self-education was present. But the principle of "training the senses," &c., was preserved. It is an interesting reversal of the ordinary tendency which is to apply modified infant school methods to the defective schools, and another instance of the way in which the scientific study of the abnormal may react upon the treatment of the normal. Whether or not Dr. Montessori's methods will lead to a reversion to formal training—none the less soulless because it is derived from modern psychology—is perhaps debateable. That there is some danger of this nobody who knows the schools will be likely to deny.

(3) It is quite impossible to do justice to Prof. Adams's latest contribution to the literature of education within the limits laid down. It is the first volume of a series which is to appear under the general editorship of Sir Henry Jones—"The Schools of Philosophy." The task assigned to Prof. Adams was a supremely difficult one, and we know nobody who could have attempted it with greater chances of success. He had no predecessors in the field upon whose work he might have improved, as he necessarily abandoned the usual methods of presentation employed by historians of educational thought. Instead of a strictly chronological treatment he has given us a broad view of the development of educational concepts—of their interaction, of the recognition of their mutual implications, and of their relation to social and scientific advance. Thus many of the dangers implicit in the study of the history of education are avoided—there is no mistaking the external shell of teaching devices for the spirit and substance of the thought behind them.

It need scarcely be said that Prof. Adams's

method occasionally upsets the conventional sense of proportion. Some of the things that we had supposed really mattered are treated with indifference; a new sense of values is introduced. Whether these will bear closer examination remains to be seen, but in any case we may warmly congratulate the author on the successful completion of an arduous undertaking.

J. A. G.

ATOMIC DYNAMICS.

Prinzipien der Atomdynamik. By Prof. J. Stark. I. Teil: "Die elektrischen Quanten." Pp. x+124. (Leipzig: S. Hirzel, 1910.) Price 3.20 marks. II. Teil: "Die elementare Strahlung." Pp. xv+286. (Leipzig: S. Hirzel, 1911.) Price 7.80 marks.

IN this work Prof. Stark gives a systematic account of the experimental facts which throw light on the constitution of the atom, and develops a theory of the structure of the atom, mainly on the basis of optical phenomena. The work is divided into three parts. Part i. is intended as an introduction, and deals with our knowledge of the nature and properties of electrons, and of the energy and structure of the electromagnetic field. Little space is devoted to the description of the methods by which the experimental results were obtained, and more prominence is given to the discussion of the validity of the experiments and their value in elucidating the internal structure of the atom.

In chapter iii. the constitution of the atom on Stark's theory is described. It is assumed that electrons and positively charged entities (archions) which are endowed with mass form the constituent parts of an atom. On account of magnetic forces, the archions form a definite configuration in the atom, and cannot be separated without causing its disruption. On the other hand, the electrons which are attached to the archions can be separated without causing the atom to decay. This atomic system, which is more fully developed in part ii., is capable of explaining and systematising many of the experimental facts.

The second part is mainly concerned with electromagnetic radiation. After a discussion of the theoretical principles of radiation, the grouping of spectrum lines into series and the relations existing between the frequencies of the lines are considered. A detailed discussion of line and band spectra and similar phenomena exhibited by Röntgen rays is also given. The archion theory is then worked out more fully, and hypotheses are put forward to account for the origin of spectra. The band spectra are ascribed to the vibrations of the electrons which are attached to the archions,

while the archion itself, after losing the electron attached to it, is the elementary oscillator responsible for the line spectrum. The continuous spectrum is ascribed to the vibrations of the free electrons. These by frequent collisions suffer irregular accelerations, and thus give rise to a continuous succession of frequencies. A full and interesting account of the bearing of the author's theory on such problems as the Doppler effect in canal rays, the Zeeman effect, fluorescence, and allied phenomena is given. Also the results obtained with Röntgen and γ -rays are considered in relation to the theory.

The third part, which has not yet appeared, is, according to a statement in the preface, mainly intended for the chemist. It will deal with the structure of the electromagnetic field on the surface of chemical atoms, and with the forces which hold the atoms together in chemical combinations.

A work of this nature, which aims at a discussion of the principles of atomic dynamics, must to a large extent be of a speculative character. In this connection, however, it is important to remember that the work always distinguishes very clearly between experimental facts and speculative theory. Also, the reader who does not agree with the speculations put forward in the work will find in it a very useful record of all researches which contribute to the elucidation of the internal structure of the atom. Perhaps one misses a fuller discussion of radioactive phenomena, which are intimately connected with the problems discussed in this work. Stark's book, which deals with such a fascinating subject in an interesting manner, will prove very useful as a guide to further research.

H. G.

MODERN ROAD CONSTRUCTION.

Modern Road Construction: a Practical Treatise for the Use of Engineers, Students, Members of Local Authorities, &c. By Francis Wood. Pp. xi+137; illustrated. (London: Charles Griffin and Co., Ltd., 1912.) Price 4s. 6d. net.

THE conditions relating to the maintenance of roads during the last few years have undergone so much alteration, owing to the introduction of motor vehicles, that the publication of a practical treatise on the subject is fully justified.

The book now under notice cannot fail to be of great service to those having charge of urban roads. The author, who has the supervision of the roads in the Borough of Fulham, appears to have devoted a great deal of attention to observing and recording the wear and tear of different kinds of material used; and in obtaining statistics as to their cost and endurance. The book gives,