

## STUDIES ON IMMUNITY.

*Studies on Immunity.* By Prof. Robert Muir, in collaboration with Drs. Carl H. Browning, Alexander R. Ferguson, and William B. M. Martin. Pp. xi+216. (London: Henry Frowde, and Hodder and Stoughton, 1909.) Price 7s. 6d. net.

THIS book contains a record of original work on the theory of immunity carried out during the past six years by Prof. Muir, of Glasgow University, in collaboration with his colleagues, Dr. Browning, Dr. Ferguson, and Dr. Martin. Eleven original papers, all of which have already appeared in various scientific journals, are incorporated in the present volume, but, by judicious alterations and additions, the author has endeavoured to knit the subject-matter of these papers into one continuous whole, so that the volume serves as a connected account of the particular immunity processes (hæmolysis and opsonic action) with which the author deals.

A work which treats in strictly scientific fashion of questions so difficult and complicated as those of hæmolysis and opsonic action must of necessity appeal only to the expert, and it is unfortunate that Prof. Muir has not seen fit to bring the subject up to date by the inclusion of references to papers which have appeared since the publication of the authors' original researches. Had he done so, the book would have appealed far more forcibly to the present-day worker, who, one may presume, has been for some time familiar with these highly important researches of Prof. Muir and his collaborators.

The volume opens with an interesting chapter on the properties of hæmolytic sera generally, and the technique usually employed in the investigation of hæmolytic phenomena. There follow chapters on the mode of union of the immune body with the red corpuscle, and the relation of this union to complement action. With regard to this latter question, Prof. Muir finds himself in agreement with Bordet, whose view is that there is no direct union of immune body with complement, as Ehrlich supposed, but that the complement unites with the cell receptor, which has, so to speak, been sensitised by the immune body. "A complementophile group in the amboceptor is not proved, and the use of the term 'amboceptor' does not appear to be justified." Certain interesting filtration experiments performed by Prof. Muir and his colleagues showed very convincingly that at 37° C. a direct union of immune body with complement was highly improbable. The question of complementoids is discussed in great detail, and the author believes that Ehrlich's views with regard to these bodies have been completely confirmed.

Some interesting researches are described showing that complement may act as an agglutinin. Thus, if a certain amount of immune body (obtained by immunising an animal with the red cells of the ox) be added to ox corpuscles in the presence of ox complement, scarcely any lysis occurs, but marked agglutination of the red cells takes place. If guinea-pig's complement is employed, lysis, of course, occurs, and if the ox serum be now added, the stromata flocculate as before. Like complement, this agglutinating body in ox serum is thermlabile, and acts only in

cooperation with immune body. Whether this agglutinating complement and the ordinary lytic complement are one and the same, further research must determine.

Anti-immune bodies and anti-complements are treated at great length, and a considerable amount of space is devoted to the question of the deviation of complement, a process which forms the basis of numerous diagnostic methods of great practical importance. The delicacy of this reaction is compared with that of the precipitin method as a test for the presence of protein of human origin.

The concluding chapters of the book deal with the authors' experiments on the opsonic action of normal and immune sera. In view of their finding that the opsonic action of a normal serum could be almost entirely removed by saturating it with sensitised red cells or other combinations which absorb complement, they came to the conclusion that the opsonins of normal serum belong to the group of complements. This view, which attributes to complement an entirely novel property of acting alone, and takes no account of the presence of normal amboceptors, has not met with general acceptance, and a considerable amount of evidence has accumulated in the last two years, showing that in normal serum, as well as in immune serum, amboceptors cooperate with complement to produce an opsonic effect. One cannot yet say, however, that the question whether the opsonic action of normal sera is strictly analogous to that of immune sera is definitely settled, and in the last chapter of the book Prof. Muir brings forward evidence that in some cases normal bactericidal action may differ from that which takes place through the medium of an artificial immune body. Normal bactericidal action may, in fact, follow from the direct union of complement with the bacterium, and not necessarily from an indirect union through the medium of a natural amboceptor. All workers interested in these questions will find Prof. Muir's book worthy of careful perusal.

## THE SCIENCE OF EDUCATION.

*Psychologie de l'Enfant et Pédagogie expérimentale.* By Dr. Ed. Claparède. Second edition. Pp. viii+283. (Geneva: Librairie Kundig, 1909.) Price 3.50 francs.

THE second appearance of Dr. Claparède's book in a greatly enlarged form is an excellent indication of the interest which has been aroused by the effort of recent years to give a scientific basis to the practice of education. If further evidence were wanted, it will be found in the opening chapter, which gives a brief account of the development of the movement and of the literature of the subject. Child-study societies and child-study journals have an almost world-wide currency—from Japan in the Far East to California in the Far West. No doubt there is more zeal than science in much of the published work, but the critic is already at work, and we may hope that science will follow in his wake.

Dr. Claparède is a psychologist, and the interest of the book is mainly psychological. As a justification for the subtitle he makes certain pedagogic deductions, not, however, as tentative hypotheses upon which experimental inquiry may be founded, but rather