THURSDAY, MAY 25, 1911.

MENDELISM AND BIOLOGY.

Mendel's Principles of Heredity. By W. Bateson, F.R.S. Pp. xiv+396. (Cambridge: University Press, 1909.) Price 12s. net.

THE time has come when a preliminary attempt may be made to forecast the position which Mendel's discovery will occupy in the history of biology, and when the widely divergent attitudes which have been taken up towards Mendelian principles may be profitably considered.

The reviewer is in the present case relieved of the duty, which usually falls to his lot, of indicating the nature, scope, and value of the contents of the book before him; for, whether we agree with Mr. Bateson or not, sceptics and adherents alike consider that his book is the fullest and most authoritative exposition of the results which have been achieved by those who have worked on the lines laid down by Mendel. These results may throw no light on the nature of heredity or on any problem which it has pleased the imagination of biologists to invent; but, be this as it may, the book before us is the source from which the fullest and most trustworthy information in regard to these results is to be sought, and no attention need be paid to the criticisms of those who are not intimate with its contents. Whatever the Mendelian doctrine is, here it is, for better or for worse.

To estimate the significance of this book we must, therefore, assign this doctrine to a place in the scheme of biology. The degree of success which will attend the efforts of any given person to perform this task will be inversely proportional to the faculty possessed by him of imagining that he may be mistaken. If he lacks this faculty altogether, complete success, so far as he is concerned, is assured, and the Mendelian hypotheses will either be set down as the correct picture, drawn now finally, once and for all, of the hereditary processes underlying the phenomena which they were invented to explain, or as the fantastic imaginings of unfortunate biologists who are unwilling or unable to take the whole of the available evidence into account. To us, who foster and preserve some of the attributes of childhood, these two extreme views appear no more than naïve and elementary, the utterances of men who, in the current phrase, "know their own minds." We cannot believe that in every department of the Mendelian hypothesis the explanation offered does more than approximate to that picture of the underlying processes which will ultimately be agreed upon as representing them as accurately as they eyer can be represented. Still less can we believe that the Mendelian hypothesis is wide of the mark altogether, and bears no relation at all to the phenomena which it attempts to explain. How true a representation it is, can only be determined by subjecting its component hypotheses to rigorous experimental tests. Our own opinion, to which, however, we attach little weight, inasmuch as the experiments designed by us to effect this test are only, as yet, begun, is that the majority of the hypotheses will stand these tests well.

We may now pass from the question as to the truth of the Mendelian principles to that of the bearing of these principles on those products of the imagination which we agree to name "great biological problems," such, for instance, as the "nature of heredity" and the "origin of species." The former question must, we suppose, be regarded as a real one, but, of course, not one any answer to which will ever be regarded as the final one. But the latter involves so many notions, only remotely representing phenomena, and so many generalisations which are manifestly *interim* ones, that the discussion of its relation to Mendelian principles becomes a mere exercise in dialectic offering no prospect of ever so slight a progression in the direction of a clearer vision of actuality.

Let us deal first with heredity. The problems of heredity which are debated at the present day exist only for those who adopt that view of life which insists on the disparateness and circumscription of the units to the succession of which the continuation of the stream of life is due. To those, on the other hand, who think that the cutting up of this stream into individuals (which, so far as we can see at present, do certainly appear to be discreet) is an unwarrantable insistence on a secondary feature; and who think that the difference as regards the livingness of the objects of their several interests between a man who is not satisfied with observing less than, say, ten consecutive generations of a living thing and a man who dissects a rabbit, is as great as, and of the same nature as, the difference between a man who dissects a rabbit and a man who collects stamps—to these the favourite problems of heredity do not exist at all, though the material out of which these problems have been constructed is the chief object of their attention.

With regard to the light thrown by Mendelian results on the question of the origin of species. The idea that the process of specific differentiation is akin to that of Mendelian segregation will doubtless serve as a fertile incentive to investigation for years to come. But to suppose that evolution is due to causes which can be compared to the shuffling of marbles in bags seems to us to be an idea which throws no light on any problem, save on that of the value of the insight of those who are not ashamed to confess that they entertain it.

The strictly phenomenal or impressionist aspect of specific differentiation must be attacked by means of the instrument which Mendel has put into the hand of biologists—the analysis of the organism into its constituent characters by experimental breeding. But to suppose that the Mendelian method does any more than indicate the lines along which the attack on this particular problem is to be made betrays, in those who make this supposition, a high degree of that naïve sanguineness as to the powers of the human intelligence which constitutes, at the present day, the most formidable obstacle blocking our approach to a true vision of life and evolution.