COMMENT AND REVIEWS

THE MULTIPLE MUTATION IN WHEAT

(1) If, as Lein suggests (*Heredity*, 5, 147-149), varieties of *Triticum vulgare* carry a considerable load of *sv* mutant genes, is it likely that no *sv* phenotypes should have been seen, striking as they are? Yet, as mentioned in my paper, none are on record. The three varieties concerned are respectively of North-Western European, Western Mediterranean, and Canadian (originally Eastern European) origin. Hence *sv* mutations would be either of ancient origin, or of high frequency; one of them is supposed to have arisen in the breeding experiment itself. Why is it then that not in one of the many thousands of wheat crosses made in the last sixty years or more should a *sv* phenotype have occurred either by segregation or by mutation?

(2) On the evidence produced in my paper, the mutant arose as a homozygote. This, according to Lein's assumption, requires not one mutation step, as he suggests, but two, viz., one in each allele of one gene.

(3) The deletion postulated by Lein need not, as suggested in his final sentence, be one of the entire BC arm; unevenly broken bridges supply deletions with a high frequency.

O. H. FRANKEL.

HEREDITARY GENIUS. By Francis Galton. London: Watts & Co. Second edition reprinted 1950. Pp. xxvii+379. 10s. 6d.

Just half a century has now elapsed since the Mendelian renaissance of 1900. The early promise of Mendelian genetics has been richly fulfilled and vast contributions have been made both to our theoretical understanding and to the solution of practical problems. In the sphere of human genetics important applications include the use of blood groups in paternity testing and in predicting the risk of hæmolytic disease of the newborn; also the use of knowledge about the inheritance of a variety of diseases and abnormalities both as an aid to clinical diagnosis and for purposes of eugenic prognosis. It is important to realise, however, that the greatest successes have been obtained with characters which are mainly controlled by single genes, or at most small numbers of genes. Thus the greater part of human genetics is at present concerned with characters whose practical repercussions, though of considerable importance, affect relatively few individuals.

It was Francis Galton who first effectively demonstrated that not only were quantitative characters like stature subject to heredity, but so also were intelligence, fertility and other more subtle and less easily quantified aspects of the human spirit. Galton's use of human data with its small families and doubtful ancestries, together with the emphasis on quantitative characters prevented a satisfactory understanding of the actual laws of inheritance. The statistical approach, initiated by Galton and further developed by Karl Pearson, produced a distinct school of biometricians. There was at first great rivalry and even antagonism between the

biometricians and the Mendelians. Gradually, however, a synthesis was achieved. R. A. Fisher's demonstration in 1918 that the correlation between human relatives could be derived from Mendelian premisses is a notable landmark. Later work in the 1920's and 1930's by Fisher, Haldane and Wright effected a further integration of the two approaches. More recent developments are exemplified by K. Mather's *Biometrical Genetics*, it now being possible to conduct an extensive statistical analysis based on the fundamental concept of a mendelising system of polygenes. If human genetics is to be able to contribute to the framing of general policies of positive eugenics, affecting the whole community, then these studies will have to be further extended to deal with the more insubstantial human characteristics.

In his *Hereditary Genius*, Galton was able to demonstrate that a variety of human faculties *were* inherited and that there were or had been in operation certain social processes, such as the marriage of newly-created peers with heiresses, or the widespread existence of celibacy amongst gifted individuals in the Middle Ages, which were strongly dysgenic in effect. Positive social applications of genetics would deal to a great extent with the kind of material discussed so clearly and brilliantly by Galton. It is to be hoped that this re-issue of *Hereditary Genius*, which contains much that is still interesting and pertinent, will act as a stimulus to new studies of Man using the methods of biometrical genetics now available. If it should be possible to re-work Galton's approach with modern techniques, we might expect this to have far-reaching consequences for the improvement of the human stock.

It goes without saying that Galton was subject to the limitations of his time, and this is scarcely worth dwelling on in detail. One important point is, however, worth mentioning. Galton makes extensive use of published biographies of eminent men, and does so with great discrimination and ability, but on the whole accepts them as they stand. A modern discussion of similar material would attempt to allow for the complication of ascertainment, which has been dealt with quite successfully in other problems. Families with many gifted individuals are more likely to be noticed and to find their way into the record and this will preclude a simple interpretation of the data. Some kind of artificial selection of this sort may well be responsible for the apparent " anticipation " involved in the view that " the sons of gifted men are decidedly more precocious than their parents "—a statement which is not easily reconciled with Galton's own studies on the " regression to the mean."

As Galton himself wrote in the conclusion to the Preface to the 2nd edition of 1892, " I wish again to emphasize the fact that the improvement of the natural gifts of future generations of the human race is largely, though indirectly under control. . . . It is earnestly to be hoped that inquiries will be increasingly directed into historical facts, with the view of estimating the possible effects of political action in the future, in gradually raising the present miserably low standard of the human race to one in which the Utopias in the dreamland of philanthropists may become practical possibilities."

NORMAN T. J. BAILEY.