

Studies in Eugenics and Human Heredity in South Africa.¹

THESE two papers by Dr. Fantham are welcome evidence of the earnestness with which he is pressing home the social applications of biology in the country in which his lot is cast. Whilst they reiterate to a large extent principles that are well known to readers of NATURE, these principles are exemplified by some interesting original observations made by Dr. Fantham since he began residence in South Africa.

The ultimate aim of zoological science is of course a thorough knowledge of the inner nature of animal life. The intense interest of this aim provides the spur which urges to zoological research in old countries like Great Britain, in which Nature has been thoroughly dominated and tamed, and in which we have to be up and doing if any traces of really wild Nature are to be allowed to persist. But in newer countries like the outlying portions of the British Empire the battle with circumambient wild Nature is at its height, and the ultimate victory is by no means assured, and so the light which zoology (and other sciences) can throw on the conditions which are likely to lead to success in this struggle constitutes their main passport to popular favour.

Now there are two main problems for eugenicists which emerge from the study of human heredity; one of these may be described as the problem of the Mendelian recessive; this problem is ubiquitous, and it is this question which especially faces social workers in Great Britain. The other is the problem of the crossing of different races: this, usually denominated miscegenation, is the really burning question in countries like South Africa and the United States of America. It would constitute a problem in Australia, also, had not the Australians adopted one particular solution of it which certainly is effective so long as it is maintained, but their power to maintain it for an indefinite period of time is, to say the least of it, exceedingly doubtful. It seems to us that Dr. Fantham has not kept these two problems sufficiently distinct in his mind, for we are convinced that they are entirely different in their nature. The term "Mendelian recessive" is meant to denote those defective individuals, constantly turning up amongst modern civilised men, whose defective characteristics are transmitted to posterity in a way which suggests that their inheritance follows the laws of Mendel.

The defects are, however, by no means always recessive. In fact, it seems to us that the importance of the contrast between dominant and recessive characters has been greatly exaggerated by Mendelian writers. What is usually termed a 'mutation,' that is, a sudden divergence from the type, almost always shows a peculiar character which bestows on these 'mutations' a family likeness wherever they may occur. This character is a constitutional weakness as compared with the type, and the question of dominance and recessiveness is merely the question of whether the weakness is or is not sufficiently marked to make itself felt in the F₁ generation where it enters the germ from one side only of the house. These defects show themselves in external marks of the most varied kind, such as brachydactyly (the shortening of the digits accompanied by the fusion of two of the joints), polydactyly (extra toes and fingers), hæmophilia (inability of the blood to clot), night-blindness (loss of the power to see in the dusk), and, most important of all, defective development of the brain or feeble-

mindedness. Dr. Fantham quotes some well-known pedigrees, but he also gives examples from his own observations of the inheritance through three generations of such defects as 'stiff fingers' (orthodactyly), permanently bent little finger, premature baldness on the crown of the head, white forelock, and supernumerary thumbs. The inheritance of this last case is very instructive, for the trait was first noted on the left hand and it appeared in the next generation on the right hand. This shows that the character was not due to a 'gene' or 'factor' which initiated an extra growth at a particular place, but to an interference with the normal processes of growth, and there is a strong suspicion that this interference was a too tightly-constricting amnion in the latest stages of development which impinged on and split the thumb rudiment into two.

The social detriment due to the breeding of the feeble-minded of course far outweighs in importance the minor detriments due to the transmission of the slighter constitutional defects. The more extreme cases are confined in asylums, but the less marked cases are at liberty and constitute the lowest stratum in society. They have just sufficient intelligence to secure intermittent employment in the least skilled occupations, though they are in frequent need of poor law relief; they often marry improvidently and reproduce recklessly, for they have no foresight or control of their passions. They give birth to numerous illegitimate offspring, and their children inherit their defects. In former times these children, defective in nature and badly cared for, died like flies; now modern philanthropy steps in to preserve them, they increase in numbers, contaminate the race, and are a danger to future generations. Dr. Fantham relies implicitly on this point on the results of the American workers Davenport and Goddard, Estabrook and others. Whilst these results in broad outline will doubtless prove to be correct, it is fair to add that they have been severely criticised. Feeble-mindedness is not a definite thing due to a 'factor'; it is a varying grade of germ-damage the origin of which is due to definite causes which ought to be more closely investigated. It is instructive to note that Tredgold has found that feeble-mindedness in a given generation is often preceded in the parental generation by milder symptoms such as epilepsy or even merely nervous instability.

Turning now to the question of miscegenation, we find that the hybrids between two different races such as the Kaffir and the Dutch show no evidence of clear and sharp segregation such as is found when a mutation is crossed with the type. These hybrids show combinations of the qualities of the parental races in every conceivable proportion, but the attempt to analyse these qualities into factors, when pushed into details, reveals itself as impossible, as we have previously pointed out in the pages of NATURE. The qualities of races are acquisitions won in the struggle with the environment, and they constitute an epitome of the evolutionary history of the race. Dr. Fantham points out that the negro race, left to itself, shows no tendency to produce a civilisation or indeed to undergo any progressive evolution whatever: that it is deficient in foresight and providence, and exhibits lack of persistence and initiative. The negro is in fact a tropical animal, evolved amidst the teeming life of the warmer and more fertile zones of the earth's surface; clothing is a superfluous, and the means to satisfy hunger are comparatively easily procured, and his qualities correspond with this environment. The Dutch and English are offshoots of the white Nordic

¹ "Heredity in Man: Its Importance both Biologically and Educationally," and "Some Factors in Eugenics, together with Notes in some South African Cases." By Prof. H. B. Fantham, University of Witwatersrand, Johannesburg. *South African Journal of Science*, vol. 21, 1924, and vol. 22, 1925.

race, which grew up under the cloudy skies and cold raw climate of the shores of the North Sea in post-glacial times. The members of this race had to develop boldness and perseverance to survive at all, and they won their food as a result of terrific struggles with the elements, and to this struggle they owe their good and forceful qualities. Dr. Fantham points out that hybrids between the two races lose the admirable qualities of the white and yet are not controlled by the tribal conventions of the negro. Further, as children of the same family differ in the colour of their skins, the whiter consider themselves European and despise their darker brothers and sisters as negroes. Dr. Fantham traced one such hybrid family through five generations. A joint meeting of the Eugenic and Anthropological Societies of London was told last spring that miscegenation was far more widespread than one would gather from Dr. Fantham's papers, and was slowly undermining the moral stamina of the whole of the white population of South Africa. What are known as 'coloured people,' that is, hybrids of the second and third generation, are increasing in number, and the whiter individuals are intermarrying freely with the pure white population.

We can only say that we trust that this view is an exaggerated one.

Dr. Fantham alludes to another matter of great importance, namely, the exhausting and weakening results of too frequent pregnancies not only on the mother but also on the children. We ourselves believe that the most fertile cause of human 'mutations' is to be found here. Dr. Fantham gives an example of the results of such pregnancies traced through three generations. In all three 'Mongolian idiots' appeared; this defect appears to be due to amniotic pressure on the developing brain.

Dr. Fantham's final conclusion is one which we can heartily endorse; it is that "the principles of animal [including human] biology put forward in simple interesting language and illustrated by living examples should form an essential short course in the curriculum of every University student as well as of every school child." This proposal has been pressed on our own Ministry of Education by the Council of the Eugenics Education Society, and when population and cognate problems in Great Britain become sufficiently acute to cause widespread discomfort, it will doubtless be given official attention. E. W. M.

Research in Illumination.

A SURVEY of the work of the Illumination Research Committee of the Department of Scientific and Industrial Research is given in a report issued recently by the Department. These investigations were also reviewed in a paper read by Mr. J. W. T. Walsh before the Illuminating Engineering Society on June 1. In the introduction to the Report the events leading to the formation of this committee are recalled, and attention is directed to the demand for information on lighting matters that has arisen since the formation of the Illuminating Engineering Society in 1909. On the Illumination Research Committee the medical and architectural professions are represented, and there are several members who are experts on illumination and also members of the Illuminating Engineering Society, the various British Engineering Standards Association committees, and other bodies concerned in research on illumination. Co-ordination of effort is thus facilitated and overlapping of work avoided.

The representation of the Medical Research Council on the committee is of special importance, as numerous problems before the committee have a physiological basis. This applies particularly to the study of 'glare,' and of the relation between intensity of illumination and speed and accuracy of fine work. Such fundamental researches necessarily require time. In connexion with the second problem, attention has first been devoted to printing as an example of 'fine work' readily adapted to investigations of relations between illumination and output. In this investigation valuable aid has been rendered by the Joint Industrial Council for the Printing Trades of the United Kingdom. The results are to be presented in a detailed report, but it appears that the relation between illumination and quality of work has been fully substantiated. This investigation will be extended to other forms of 'fine work.'

Other fundamental researches include a comprehensive record of daylight-intensities, now being made at the National Physical Laboratory, Teddington.

Among the 'special problems of urgency' may be mentioned the investigations of enamelled iron reflectors, which have contributed greatly to the framing of the recent British Engineering Standards Association's specification for reflectors used in industrial lighting. The design of picture galleries with

the view of the avoidance of troublesome reflections in the glazed surfaces of pictures has also been studied. Another series of researches deals with the effect of flickering illumination on vision and the brightness of glassware used in various lighting fittings (the latter another problem with which a B.E.S.A. committee is concerned). A series of experiments is in progress with the object of studying the effect of colour and distribution on the degree of comfortable illumination required for clerical work. The systems examined include: (a) Semi-indirect lighting with vacuum lamps; (b) Semi-indirect lighting with artificial daylight (blue bulb) lamps; (c) Artificial window lighting with vacuum lamps; and (d) Artificial window lighting with artificial daylight lamps. Numerous other investigations include the examination of transmission of light through window-glass, the effect of window size and the reflecting power of walls and ceilings, the relation between glare and visibility in street lighting, and the distribution of temperature in the glass and other parts of lighting fittings.

Mr. Walsh, in the concluding portion of his paper, mentioned that these investigations would be the subject of individual reports, to be issued by the Department in the near future. At the meeting on June 1, general recognition of the importance of the work being done by the committee was expressed. Mr. C. C. Paterson (chairman of the Illumination Research Committee), in opening the discussion, alluded to the services rendered by the Illuminating Engineering Society and its hon. secretary (Mr. L. Gaster) in paving the way for the creation of the committee and initiating these researches. Sir John Herbert Parsons, who presided, emphasised the important field presented for physiological study by artificial lighting, and commended the subject to the notice of ophthalmologists. Miss Wiggins mentioned examples of the valuable aid which the committee has rendered to the British Engineering Standards Association in connexion with its various investigations. Mr. J. S. Dow, in commenting on the relation between illumination and ease of work, pointed out that discretion is necessary in attempting to derive standards on the basis of natural illumination, and suggested that investigations should be directed to the effect on vision of the differences in the spectra of artificial illuminants and daylight. Mr. W. C.