Space is lacking to go deeply into the question. Suffice it to say that the book indicates an approach to communism which leads the enquirer, almost abruptly, to the crux. The relation of technical education to the more general educational questions is understood by communists in a special sense: and the form of that relation gives communist thought its character. Mr. Crowther has, perhaps unintentionally, set up a train of thought which is not banal and may be useful.

MONTAGU SLATER.

## EUGENICS AND EVOLUTION

## THE CAUSES OF EVOLUTION, by J. B. S. Haldane, F.R.S. (Longmans, 7/6d.).

America has just been the host for two International Congresses, the first a Congress of Eugenics and the second a Congress of Genetics. Eugenics is the study of Genetics as applied to man and it is obvious from a study of the papers read before the two meetings that the applied science has far outgrown her parent in her ideas. Perhaps it would be more accurate to say that the parent, as is often the case, cannot endorse the ideas of her offspring. Eugenics seeks to improve the human race by selective breeding, but as eugenists themselves have not yet decided what are the desirable characters to select for, any concerted plan for positive eugenics must necessarily hang fire. Evidently the traits which are desirable are, for the most part, not inherited in a simple way. They are, in addition, so many that a few controlled matings would not produce the super-race that the idealists have in mind.

A saying so true that it has almost become proverbial is that it takes three generations to found a family and three to founder it. I suppose the eugenist would say that no foundering would occur if the family matings were made with due regard to the germ plasms brought together. But so many of the desirable characters

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are recessive in their inheritance that in the masses of the people we have an almost unlimited supply of desirable hereditary characters which produce good individuals as the recessive genes come together. This is becoming more and more evident with the improvement of environment, in other words of opportunity, now less and less a matter of being born into the right family.

In the same way the masses of the people represent a great reservoir of undesirable recessive characters and the reproduction of individuals more or less pure for these factors is already being controlled by segregating them in asylums.

The geneticist sounds a note of warning by pointing out that genes or hereditary germ units do not, as was at one time believed, affect one part of the body only. They may manifest themselves in other ways than in the merely superficial characters by which they are detected. An instance is to be found in the fruit fly the classic laboratory animal of the geneticist. In this insect certain genes, easily detected by their effect on eye colour and wing shape, when inherited separately, lessen the life span of the individual considerably. But if they are inherited together, the insect possessing them all has a normal life span. This illustration points out the danger of controlling matings with regard to individual traits until we know far more than we do at present of the physiological action of the genes we are selecting. The ideal race cannot be created tomorrow, and by injudicious experiment our last state may be worse than the first.

Professor J. B. S. Haldane takes a much longer view of life than the eugenist. Instead of dealing with a few generations he deals mathematically with generations of the order of  $10^6$  and with time of the order of  $10^9$  years. He begins with a discussion of what is meant by Darwinism. Briefly his thesis is that evolution is a fact but that the causes of evolution are unknown. Darwin's general theory is that evolution takes place because the undesirable specimens of a varying species are weeded out by failing to survive. The survivors then vary about the mean which they themselves establish. But this does not fit in very well with our present experimental knowledge. The mean in continuous variation is not as a rule affected by selection, at any rate not for more than a few generations, as ' pure lines ' with a relatively fixed mean become isolated. Natural selection does act on the products of evolution but it cannot be regarded as the cause of evolution. It is a policeman removing the offenders rather than a moralist improving them. Some animals, such as *Lingula*, a small shell fish, have remained remarkably constant for four hundred million years. This animal shows a small continuous evolution, while other animals such as the mammals have proceeded by a series of jumps, some of their genes becoming drastically altered from time to time. Occasionally the number of genes is altered by rearrangement of the germ plasm. Why some forms should be so stable and others so unstable is unknown. The large discontinuous variation may occasionally produce new forms which are fitted to the environment and hence have a high survival value.

In the case of man, the subject of one of Darwin's ' special ' theories, evolution is proceeding along a peculiar channel. During the last few years intermediate forms have been found in China and elsewhere which, according to Professor Haldane, have puzzled the most ardent opponents of the descent of man from the monkeys. They cannot agree amongst themselves whether to class these forms as apes or as men, so that they must form an admirable ' missing link.' Man shows a curious reversion to the childhood of animals. He has a much longer relative period before reaching adulthood than any other animal and consequently a much longer period of educability. The brain also has a larger ratio to body weight than in any other animal-a condition similar to that found in the embryos of other species. This, together with other characteristics has led the scientist to speak of this type of evolution as foetalisation. If evolution in the human race continues along these lines we may find a further retardation of maturity and a persistence of character now regarded as childish. This view suggests the possibility that the time available for reproduction of the individual may become so short that the race of man may evolve itself to extinction, a fate which in other ways has involved innumerable species.

S. A. ASDELL.

THE MORAL JUDGMENT OF THE CHILD, by J. Piaget (Kegan Paul, International Library of Psychology, etc. Pp. x 418, 12/6d. net).

This admirable book presents a fully documented account of the changes that occur with increasing age in children's modes of evaluating and ordering their conduct. The data collected relate to the ways in which children regard the rules of their games, to their judgments on lying and stealing, and to their ideas of justice. The standardized interviews, by means of which the information was obtained, appear to have been excellently planned and carried out, and to have avoided the danger of distorting the facts through artificiality in the way they were elicited.

The two main stages of moral development which Piaget distinguishes are: first, the acceptance of adult injunctions as unquestionably valid and as deriving their cogency purely from having been promulgated by adults; second, co-operation with other children on an equal footing and consequent obedience to certain injunctions because their necessity to group activity is recognized. This gives a more critical attitude to rules, which, nevertheless, are in practice obeyed more carefully than are the younger children's magically sacred rules. Similarly with justice: whereas in the early years anything done by an adult is just, later on justice demands the recognition of equality among children of the same age. As a result of this development the childish conception of punishment changes: what is at first expiation for an infringement of the mystically powerful rule becomes (when co-operation has been reached) a redressal of the social balance, this having been disturbed by the individual aggression that is being punished. In this way there emerges 'the rather shortsighted justice of those children who give back the mathematical equivalent of the blows they have received.' This one might suppose to be the final development of a system of judgments founded entirely on the maintenance of equality in social relationships. Some other principle would appear necessary in order to explain any further advance.

Piaget however is completely committed to the view that all morality arises from the social interaction of equals. 'Morality presupposes the existence of rules which transcend the individual, and these rules could only develop through contact with other

308