water into two basins and to maintain them distinct, the one of which may be full of life and the other practically barren.

There is an important point, which should not be missed, in the similarity between what took place this summer at Marchais and what may have taken place in Caithness or Orkney in the Old Red Sandstone period. The fishes which buried themselves in such numbers in the mud this summer, though they were fortunately released, were in the strictest sense contemporaries, and were all buried in the mud within a few days of each other. Moreover, in ordinary circumstances, at least in summer, the mud is untenanted. If the fish were to migrate into the barren waters covering the marly bottom, and their return were barred while the water over the mud evaporated and the secular drought set in, this same mud-bed would be met with in later ages as an unfossiliferous stratum. *So that the fossil fishes which are found in these strata must be held to have gone into occupation only when the signal, intelligible to them, was made that complete desiccation was going to take place. Once in a way this desiccation turns out to be secular, and we have a rich bed of fossils.*

In conclusion, I think that the behaviour of the fish in the ditch at Marchais in the summer of 1911 adds one more fact to the body of evidence which goes to show that, in the production of geological formations, transportation of material has probably been the exception rather than the rule.

J. Y. BUCHANAN.

The Inheritance of Mental Characters.

I HAVE just read Dr. Archdall Reid's paper "Methods of Research," communicated to the Eugenics Education Society. Situated as I am in Scotland, it was impossible for me to attend the discussion which I understand took place recently, and I had no opportunity of reading his paper until he sent it to me. He makes certain statements with regard to a very controversial point; the inheritance of mental characters; and, having had no chance of criticising these, I should be much obliged if you would give me the opportunity of doing so.

Prof. Pearson, as quoted by Dr. Reid, says:—"We inherit our parents' tempers, our parents' consciousness, shyness, and ability, even as we inherit their stature, forearm, and span." This statement may be loosely expressed and open to misinterpretation; but no one has a right to assume, without further explanation, that more is meant than the inheritance of capacity or absence of capacity for making particular acquirements, whether Prof. Pearson actually had this idea in his mind when he wrote or not. At any rate, by ability he undoubtedly means capacity for making acquirements.

Dr. Reid says:—"Pearson's statement is utterly without significance, utterly devoid of all content. Founded with such an air of scientific accuracy on statistics and family histories which have such an appearance of scientific precision, it is so vague as to be quite nonsensical." This statement certainly does not err on the side of vagueness. If it is as true as it is definite it reduces the mental capacity of all men to that dead-level of competence or incompetence which is the apparent ideal of Socialists and trade unions; it necessitates the adoption of some other explanation than the action by selection upon the inborn variations for the evolution of man's capacity for making mental acquirements; and it leaves the undoubted existence of variations in mental capacity, including feeble-mindedness, unaccounted for.

Unless Dr. Reid believes that the intellectual development of man has been brought about by the action of some supernatural power or by the inheritance of acquired characters, he must believe that it has been due to the action of natural selection upon inborn variations. The term "mental character" is used by both Dr. Reid and Prof. Pearson in such a way that both inborn and acquired characters are included. The former classes the speaking of English, the latter temper, shyness, and ability, as mental characters. Many, perhaps most, of our mental characters, using the words in this loose sense, are acquirements; but these acquirements depend upon an inborn

capacity for making them, and this capacity, like all inborn characters, is subject to variations. Without this it is difficult to see how man's capacity for making mental acquirements could ever have been evolved. Apply the method, which Dr. Reid supports so strongly and explains so clearly, to his own examples and those of Prof. Pearson! All normal English children speak English. All normal French children speak French. The particular language spoken is an acquirement, dependent upon the environment. But it is impossible for Dr. Reid to maintain that, given precisely the same opportunities, all individuals are likely to attain the same degree of skill in the use of the language they have acquired. Moreover, they will vary in the facility with which they acquire skill in the different ways of using the language. Some may readily acquire an abundant flow of words in speaking; others may more easily attain a facile and clear style in writing. Does Dr. Reid believe that a great English orator or writer would not, *ceteris paribus*, have been a great orator or writer simply because his medium happened to be French instead of English? This variability in the capacity for making acquirements must apply to all acquirements. An individual may be able to acquire a high degree of development in music under comparatively unfavourable conditions, but be quite incapable of rising, even to the average, in mathematics under favourable conditions, and *vice versa*. Unless the existence of these variations in mental capacity and the possibility of their transmission from parents to offspring are admitted, it is impossible to account for the evolution of the human intellect by the action of natural selection upon inborn variations.

Now take Prof. Pearson's first example, as quoted by Dr. Reid—temper! I do not think that anyone will quarrel with the postulate that this word is used to express the control, or lack of control, over the emotions exhibited by an individual, the strength of the emotion being a variable quantity according to the susceptibility of the individual to the stimulus producing the emotion. This susceptibility will vary just as grocers' scales vary from a delicate chemical balance, though both respond in a similar manner to the same kind of stimulus. "Good-tempered" implies the possession of a high degree of control or a low degree of susceptibility, or a combination of both. "Bad-tempered" means a lack of control or a great susceptibility, or a combination of both. Dr. Reid might contend that the example of a bad-tempered parent might produce a bad temper in the child. On the other hand, it is at least equally probable that the exhibition of bad temper on the part of a child to a bad-tempered parent would bring swifter and greater punishment than would have been the case had the parent been good-tempered; and thus the bad temper in the child would be more than usually checked. In the absence of direct evidence of a comprehensive and conclusive nature we must assume, given identical environment, that the susceptibility to stimuli tending to produce manifestations of temper is different in different individuals, and is an inborn character; that the capacity for acquiring control over the emotions varies in different individuals, and is an inborn character; and that these variations are transmitted in an increased or lessened degree to their offspring by the parents. These inborn characters are, of course, susceptible to great modification by the environment.

Using, I believe, methods approved by Dr. Reid, I have thus come to the same conclusion that Prof. Pearson has arrived at by a different road, and hold that mental characters are transmitted from parents to offspring, though I fully realise the great extent to which these inborn characters may subsequently be masked by superimposed acquirements. If this conclusion be correct, then the consideration of the inborn mental characters of the parents is even more important, from the eugenic point of view, than that of the inborn physical characters, and far more serious than any question relating to education.

What has surprised me is that on all previous occasions Dr. Reid's opinions seem to have been in complete accord with the arguments put forward here. Hence I do not understand his unqualified condemnation of a statement which does not appear, on the face of it, to be at variance with his own views.

CHARLES WALKER.

Glasgow, October 12.