

The egg-laying powers of poultry have been improved much in the same way as the amount of milk given by cows. The singing of canaries tells much the same story. The differences between the breeds of horses, with the cart horse and the pony at the two extremes, are with little doubt due in some measure to different wild animals having been caught and tamed in bygone ages. But the differences between these wild animals have been immensely increased by man. In the case of pigeons, the existing breeds, including such apparently different birds as the pouter and the fantail, have all descended directly from the one wild form, the rock dove. Why they now differ so greatly is because in breeding them the fancier had no useful purposes in view, and had only his fancy to guide him. A study of pigs, sheep, duck, and even bees, would also illustrate the wonders that can be accomplished by care in breeding.

Those who live in towns have not as good opportunities of studying animal life as have the farmers of to-day or as had their ancestors. Farmers learn much by their own personal experience. They may have learnt even more in consequence of the traditional knowledge acquired in their families in times gone by having been passed on to them by their fathers when they were lads. Farmers are not always right when they try to explain things; but when they talk about the advantage of attending to breed they are talking about what they know. It is not the business of farmers as such to apply to their fellow citizens their knowledge as to breed. But should not we ask ourselves why we should not try to improve mankind by somewhat the same methods as those which have worked such wonders with domestic animals? Is it not folly altogether to neglect the experience gained by breeders when we are thinking of the needs and the shortcomings of our own nation? These are the questions which eugenics aims at answering.

CHAPTER II

Man's Ancestors

SOME persons will reply to what has just been said by declaring that man is not an animal. They will add that it is, therefore, worse than useless to look to the breeding of pigs and sheep when seeking for guidance in our own affairs. A word or name is, however, in many ways, like a label. You can tie it on to anything or tear it off again, almost at your pleasure. If you choose to attach the label of "animal" only to what are generally called the lower animals, then you may say if you like that man is not an animal. You will, however, learn nothing whatever about man merely by considering the name you give to him. We must look at things themselves, and not at the labels attached to them. What we want to know about mankind is whether it is likely that the human race would be benefited in the future by care being taken in regard to breeding; that is, in the same way that domestic animals have certainly been improved in the past. This is the question to be asked and answered.

As to the lower animals, all students of science now believe that if we could trace their ancestry backwards, offspring to parent, generation after generation, for an immense time, we should see that they were all descended from some common stock. All the lower animals are, in fact, very distant cousins. And, being thus related, it is natural that they should all be improved in like manner by care being taken in the selection of the individuals that are allowed to breed. Is man their cousin also? There is no good reason why he should be excluded from this great family group, and he is not so excluded by those who have looked into the matter carefully. We are of

common descent with the lower animals, and with us, as with them, wonders could be effected by breeding.

The existence of this blood relationship between man and the lower animals was, it is true, nearly universally denied but a short while ago. Many who have not studied the question deny it still. Then what has brought about this wonderful change of opinion amongst the students of science? Many reasons can be given in favour of this belief in the common descent of all animals; but these reasons can be thoroughly understood only by reading some of the many books on the subject. In these works it can be learnt that it is in the oldest rocks that the remains of the most simple or primitive creatures are found. It is only in those parts of the ground beneath us which were laid down in more recent times that there exist fossil remains of creatures at all like those which now surround us. Living things have evidently appeared on earth in such a way that what we call the highest came last. Then, again, animals which are found living near each other when wild are more like each other than animals that live far apart. If the body of the unborn babe is examined, it is found to contain parts which seem likely to develop so as only to be useful to animals living in water. These useless parts are like relics indicating the kind of life lived by our remote ancestors: they cannot have been put there merely to puzzle us.

When studying all the living beings we see around us, students of science have, in fact, been at work at a kind of great jigsaw puzzle. They have found that the pieces will fall into their places only if it is assumed that a blood relationship exists between all animals, including man. In this way hundreds of previously unexplained facts, such as those above mentioned, can now be explained. It can, therefore, no longer be denied that man has descended from some ape-like ancestor. We must accept this as a fact in framing our social policy. And this change in our beliefs has no doubt amounted to a revolution in thought. All such revolutions must have some effect on our actions.

The strongest opposition to this belief in the lowly ancestry of man is based on religious scruples. All such scruples must be treated with respect, provided we do not flinch from stating what we ourselves believe to be true. Every man who condemns this belief in the evolution of his race should remember that he himself unquestionably has developed from a small jelly-like object, very like some of the simplest creatures now living on earth. From such an apparently simple germ each one of us developed before birth into something shaped like an animal which could not be distinguished from a pig or a sheep when at that same early stage of development. After birth we were for a time far more helpless and far less intelligent than a monkey. As children we had little self-control. Every individual man has gone through a process of development which in some respects resembles the way in which the race of man has sprung from some lowly kind of living beings. Since no one can deny his own development, no one thinks of being ashamed of it. Why should we be any more ashamed of the somewhat similar descent of our race from some bygone race of primitive ancestors? Should we not rather rejoice at the thought that we have been so long on the upward march?

Granted that all the different kinds of animals which have appeared on earth in the past were descended from some older kinds by the ordinary methods of reproduction, we next must ask what it was which brought about this slow change in their appearances and habits. Here again the story is too long to tell in full. Only a few main points can now be mentioned.

When food is short the numbers of any kind of animal will be reduced by starvation. When food is plentiful, on the other hand, there will be an exceptional increase in numbers. But, generally speaking, the numbers of any kind of wild animal do not alter greatly as time goes by. Now, when numbers are not changing, and when one couple die, they must be replaced by one other couple, no more and no less. If each couple had two offspring,

and if both of these offspring grew up and in time also reproduced their kind in like manner, numbers would be kept just even. As a rule, however, every animal has more than two offspring, generally many more. And when, in the past, numbers have not been increasing, all the offspring over two must on the average have been got rid of before pairing, somehow or other. How has this been brought about?

This keeping down of numbers has been the result of what has been called "the struggle for existence." This is not a very good name; for the killing off of animals in fights with other animals has not been the most important way in which their numbers have been held in check. Many more have died as the result of accident, disease, and want of food. Some have failed to get a mate, and have consequently left no progeny behind them. The result of these innumerable deaths and failures has been that the numbers of the different races of animals have been kept from altering greatly. Now, some of these animals were slightly superior to their fellows in some way which gave them an advantage in this so-called struggle for existence. It was these slightly superior animals who had the best chance of survival and of reproducing their kind, and who most often did so. They were picked out by what has been called "natural selection."

Life has existed on this earth for perhaps a thousand million years. During all this time the best or the fittest animals have been selected, as it were, in this way for breeding purposes. We have seen how our savage ancestors, without always giving the matter any thought, generally bred from the dogs who actually succeeded best in the chase. The result of this partly unpremeditated selection was that in the course of a few thousand years a wolf-like animal slowly changed into a dog something like our greyhound. The survival of the beings best fitted to their surroundings during an unthinkable long period of time has led in a somewhat similar manner to some lowly animal gradually giving rise to man.

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This is the process which has been called "evolution by natural selection." This is how, in my opinion, the changes which are known to have taken place in animals in the course of past ages have been brought about. Some scientists do not attach quite as much importance as this to natural selection: all of them, however, hold that it has had great effects in the past. And all agree, therefore, that if selection can now be applied to the human race, in a somewhat similar manner, it will have wonderful effects on future generations. A belief in evolution opens out before our eyes possibilities of almost unlimited improvement in the lot of mankind in the distant future. We are also thus led to see that those who care for the future welfare of their country should make it one of their main aims to attend to the breed of their race. And eugenics tells us in what ways we can do this.

permanently one from another. Probably no two human beings would ever remain exactly alike, even if the germs from which they all sprang were identical. And these differences between men, which result from differences in the surroundings to which they had been exposed, may be called acquired differences. If one man had been exposed to the sun more than another, the resulting difference in appearance between them would be an acquired difference.

When we study any particular difference between two men, we shall nearly always be led to believe that it is due partly to a difference between the germs from which they sprang, and partly to differences in their past surroundings. It is generally, therefore, very difficult to say what part of any human quality or character is acquired and what is inherited. It is, nevertheless, very important that we should get clear ideas as to the differences in the behaviour, so to speak, of these two kinds of differences. With this object in view, we shall discuss acquired differences in this chapter, leaving inherited differences for consideration in the following chapter.

Now, the first question we have to ask about those differences between human beings which we have described as being acquired, is whether they are passed on by natural inheritance to succeeding generations. Do good surroundings and good training tend to improve the actual breed of man? Will the descendants of well-cared-for and well-educated human beings show any *natural* superiority in consequence of this care and education? This is known as the question of the inheritance of acquired characters, and it is still one which is to some extent in dispute.

In the first place, it is universally agreed that the results of accidents or mutilations are not inherited. The soldier who lost a leg in the war, or who sustained any other injury, need have no fear that his children will be in any way inferior because of his misfortune.

As to the more general question, the following is the kind of enquiry to which an answer is needed. If one of a pair of identical twins becomes a blacksmith and the other a

CHAPTER III

Our Surroundings

WE have seen that if animals showing good points are selected for breeding purposes, generation after generation, the result will be an improvement in the breed. This is because any good point noted in a parent as a rule will reappear to some extent amongst its descendants; or, in other words, it will generally be inherited. We have thus far accepted this as a fact merely because it is a matter of common knowledge. Doubts and difficulties are, however, constantly being raised when it is proposed to apply this knowledge in human affairs. Something must, therefore, be said to make this certainty doubly certain.

As we have seen, every human being is developed out of a minute germ. These germs are at first quite indistinguishable from each other in appearance. Nevertheless, putting aside the case of twins, who resemble each other closely, now often called identical twins, no two germs are ever exactly like each other. And the differences between the germs are such as to give rise to differences between the individuals developing from them. Since no two germs are alike, no two human beings are alike either. And the differences between men, which result from differences between the germs from which they originated, are known as hereditary differences. If one man has blue eyes and another brown, this is as good an example as can be given of an hereditary difference.

These are, however, not the only kind of differences which exist between human beings. Men meet with different surroundings as they are developing from their originating germs and, indeed, during all their lives. The surroundings to which men are exposed may leave an indelible mark on them, and may thus make them differ

clerk, will the son of the blacksmith be more likely to have good muscles than the son of the clerk? Or again, if one twin becomes a criminal after having been brought up in evil surroundings, whilst the other, coming under no such harmful influences, commits no crime, will the son of the criminal, even if removed from bad surroundings at birth, be more likely to become a criminal than his cousin whose father remained honest? The answer given to-day by the majority of scientists is that neither the strength of the blacksmith nor the criminality of the criminal will tend to reappear in their descendants *merely because* the one exercised his muscles to an exceptional amount, whilst the other failed in consequence of being exceptionally tempted. The descendants of the blacksmith will be no stronger, and the descendants of the criminal no worse, than the descendants of their identical twin brothers, whose muscles and morals had not been thus exceptionally affected. It is true that some scientists hold that there will be very slight inherited effects in such cases. It is generally agreed, however, that those inherited effects will be so small that they may be safely neglected when considering practical human affairs. And this, therefore, may be our final verdict with regard to the inheritance of acquirements.

This conclusion is no doubt contrary to the beliefs of the man in the street. Here, then, we must decide whether we should place our trust in those scientists who have studied these questions for years, or whether we should be guided by men who have never given the matter any systematic thought. If we decide to trust to science, the care and education which are being given to-day to our fellow citizens must not be relied on as practical methods of improving the actual breed of our nation in the coming generations.

Then why is it, we may be asked, that drunkenness, for example, is to be noted so often generation after generation in the same family? Is not this obviously because the man who first gave way to drink passed on this evil habit by inheritance to his descendants? This sounds

common sense, but it is not the true explanation. Two other explanations have to be considered. In the first place, a son is apt to imitate his father, and the mere fact that a father drinks is likely to increase the chances of his son doing so also. In the second place, the first drunkard in any family of whom we have any record may have inherited from his ancestors some hereditary weakness which made him especially ready to give way to this amongst other forms of temptation. He may have passed on this weakness to his descendants; a weakness which made them also in their turn especially liable to become drunkards. These are the real reasons why drunkenness sometimes runs in families.

We have said that care in regard to the surroundings of man will not improve the breed of his race. But let there be no mistake. This does not mean that our surroundings are of little importance to us. Training, education, health, housing, culture, recreation, etc., are obviously of the greatest importance; because it is only by paying attention to them that those now on earth can be made to lead happier and nobler lives. Moreover, the benefits resulting from education will to no small extent be passed on by tradition to future generations. All that is here to be noted about these admirable methods of improving the lot of mankind is that the label "eugenics" is not attached to them. They can, however, be pursued just as well without that label.

It may be said that to improve the surroundings of the people is the quickest way of benefiting them, and that this, therefore, should be our first aim. There is no doubt some truth in this. But experience should teach us how difficult it is to improve surroundings at all quickly. In any case, the possibility of doing good in one direction is generally the worst of all arguments against trying to do good in another direction. Steps can be taken which will result in an improvement in the breed in future generations at the same time that improvements in surroundings of those now on earth are being promoted.

Thus, when studying the effect of surroundings we are not studying eugenics. But such studies, as we shall see, have important indirect bearings on our subject. When groups of men have free dealings or intercourse with each other, this we may describe as social contact. Now social contact is never a one-sided affair. When a group, which is morally or mentally superior in any way, comes in contact with an inferior group, that inferior group will be benefited by that contact. The superior group generally realizes this quite sufficiently. But it is equally certain that the inferior group tends to drag down the superior, and this is a fact which is often overlooked. Social contact, no doubt, tends very slowly to bring all the groups affected to a common level or condition. And that level will be above the bottom and below the top. Social contact always has a levelling effect.

Now, persons living in poor homes cannot have the same opportunities of improving their minds as have the well-to-do. As a rule, the children of the day labourer, for example, must be at some disadvantage as compared with the children of the skilled artisan. No doubt all that is practicable should be done to put the different classes on an equality as regards such opportunities; provided that the results would be on the whole beneficial and not demoralizing. But reforms of this kind often do good but very slowly; and we may ask whether some other methods of improving the lot of all classes cannot be simultaneously set in operation.

Families appearing in poor homes are at the present time larger than those found amongst the better paid classes. As compared with the parent generation, the children born in better-equipped homes are, therefore, outnumbered by those coming from worse surroundings. The result of social contact between the classes must in consequence now be a downward drag on the nation as a whole in regard to all qualities thus affected. Ought we not to try to reverse this state of things? If the well-to-do had the big families and the poor the small ones,

those children with superior opportunities would outnumber those less fortunately situated. In such circumstances, social contact would continually tend to raise the level of the whole nation.

Moreover, if the families of the poor were to be smaller, other good results would follow. Much misery would thus be saved. Taxation would be lessened because there would be less pauperism. On the other hand, larger families amongst the well-to-do would result in a wider and, therefore, more even distribution of wealth. For all these reasons, there would be less discontent and less political animosity. This again would improve the industrial situation, and consequently lead to a higher standard of living all round. Thus we see that, when looking only to the more immediate effects of human surroundings, all the advantages mentioned in this and the preceding paragraph would be felt if, for example, day labourers had smaller families and artisans and the well-to-do generally had more children. And in the following chapters we shall see that it is also in this direction that we should move if we wish to improve the actual breed of the race. All social reformers ought to be able to co-operate in the promotion of reforms aiming at these results.