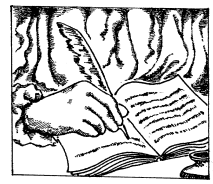

Introduction to J B S Haldane's 'Possibilities of Human Evolution'

It was not easy to make a choice among the huge number of pieces that J B S Haldane wrote for the general reader. 'Possibilities of human evolution' represents a compromise; it contains approximately equal measures of hard scientific speculation, polemic, opinion and irreverence.

The central idea of the article is simple: according to Haldane, the defining feature of evolution in the higher primates (to which group we belong) is neoteny, the progressive retention of juvenile traits in the sexually mature adult. Since evolution seems to be on to a good thing, he says, why shouldn't it carry the process further? What he adds to this general hypothesis, albeit not all that explicitly, is also interesting. He suggests that the stimulation of nerve cells may turn out to be such a desirable end in itself that men and women will try to carry it out at the cost of foregoing what is commonly known as higher mental activity. This idea has been referred to in recent years as the 'pleasure principle'. Or, one might say that selfish genes have been overtaken by hedonistic neurons. The extent to which the entertainment industry has come to fuel advances in technology is evidence in support of Haldane's line of reasoning. Curiously, he does not consider whether the mental exercises that constitute abstract mathematical thought (say) might also be no more than neuronal self-indulgence. The one omission that I find in his predictions is the possibility that a progressive decrease in the use of muscular movement might prove important for our evolutionary future. My own fantasy favours a picture of the descendants of *Homo sapiens* as networked brains (reproduction would be a problem but not an insuperable one).

Some readers may be taken aback by Haldane's fairly matter-of-fact discussion of eugenics – the improvement of the human stock by design. It might be useful to keep two points in mind before reacting to his proposals. One, this essay was written at a time of relative innocence, when science tended to be seen more or less as an unmixed good. Two, contemporary supporters of eugenics have left Haldane far behind. As evidence I offer a report on a recent symposium at the University of California in Los Angeles. At this meeting, a small but well-known group of US biologists (including the co-discoverer of the structure of DNA, James Watson) is said to have declared that a scientist of today should deem it a duty, no less, to 'improve' the hereditary endowment of human beings.

A few words about some of the people named by Haldane. Samuel Butler (1835–1902), a novelist and critic, at first embraced Darwinism unreservedly but later turned against it fiercely for its godless doctrine. G K Chesterton (1874–1936) was a committed Christian, later Roman Catholic, writer and essayist, then well-known for his use of paradox to make a point and these days more so as the author of the Father Brown detective stories. George Bernard Shaw (1856–1950), early socialist, dramatist, music critic and wit, famous as a character no less than as a literary giant, was an impassioned opponent of Darwinism. The preface to '*Back To Methuselah*', a set of five linked plays, is worth reading for the

violence of his attack on natural selection; but what it goes to show is that even brilliant advocacy cannot rescue lost causes. Shaw's Lamarckian fantasies are amusingly countered by the quotation from Anatole France (a French writer). H G Wells (1866–1946) was at one time a student of Darwin's associate T H Huxley and continues to be read today for his science-fiction. Along with Julian Huxley and his son G P Wells, he wrote '*The Science of Life*', a well-received popular account of biology. Another work, 'The Outline of History', was still praised highly 40 years ago.

Finally, the Piltdown Man was a notorious hoax, but Haldane was not aware of this at the time. These supposedly fossil remains of primitive man were 'discovered' in 1912 in a place called Piltdown in England. The forgery was exposed in the 1950s, and its essence was shown to consist of a modern human skull combined with an orangutan jaw.

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Possibilities of Human Evolution
J B S Haldane

The majority of educated Englishmen now believe that they are descended from lower animals, though very few of them, under cross-examination, could give valid reasons for their belief, unless indeed they had just been reading Wells, Huxley and Wells' *Outline of Biology*. If this belief is true, it follows that our descendants may be creatures as different from ourselves as we are different from apes. The probable nature of such a further evolution, if any, is an amusing theme for speculation, but our views on it must depend on our theories as to human evolution in the past. Among those who have recently written on human evolution are our leading humourists, Shaw and Chesterton. Unfortunately they did not confine themselves to being funny about it. Both Chesterton in *The Everlasting Man* and Shaw in *Back to Methuselah* gave what purport to be serious views on evolution. Chesterton is the more easily dealt with. He is greatly impressed by the fact that some prehistoric men drew pictures, and points out that they are presumably quite human from the psychological point of view, and quite different from animals. Now the earliest known art is of the Aurignacian period, probably not more than 50,000 years ago. The men who made it were anatomically human, and their skeletons had no ape-like characters. But worked flints and more or less human skeletons go back enormously further into the past. The Piltdown man lived somewhere round half a million years ago, and the flints from the East Anglian crag, which appear to be human products, are far older. Unless Mr Chesterton is going to regard these old flint-makers as intelligent pre-

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Adamite apes, he should admit that only for the last tenth or so of his career have we any evidence that man was an artist. That period is so short from a geological point of view, that the skeletons not only of man, but of most other animals, have hardly undergone any visible change during it. If anything our average brain size has diminished. Mr Chesterton has some claims to be our greatest living low-brow poet since Kipling has ceased to write verse. As I find it hard to suppose that our immediate posterity will mostly be high-brows, it is likely that his poetry will be read for some time after his death. Should I survive him I shall be one of his readers. [1] But the mere progress of education is likely to thin out the ranks of the readers of his non-fictional prose. May I take this opportunity to beg him to confine himself, in the future, so far as possible to Father Brown (whose chronicles even grace the railway bookstalls of Moscow) and poetry?

Mr Shaw is a slightly harder nut to crack. A biologist can read the whole of *Back to Methuselah* with amusement and occasional delight. But the author gives himself away in the preface. If he had written *Macbeth* (and I can pay him no greater compliment than to suggest the possibility), the preface would have been a treatise on the danger which witchcraft still presented to Britain. If he had written *The Winter's Tale,* in which Perdita is marooned on the desert coasts of Bohemia, he would have explained how the Czechoslovaks, hemmed in between the sea and the trackless waste, developed the ferocity which had enabled them to subjugate so many neighbouring nations. Shakespeare did not, one supposes, take either witchcraft or the Bohemian coast very seriously. Shaw, however, believes in Lamarckism, a doctrine supported by far less positive evidence than exists for the reality of witchcraft. The reason for this support is fairly clear. Samuel Butler was a better stylist and a more amusing writer than Charles Darwin. Shaw is therefore willing to take his word against Darwin's. Unfortunately, however, Darwin had a greater respect for facts than Butler. Moreover, Shaw finds the idea of evolution by natural selection quite horrid, though he is honest enough to admit that it cannot be disproved.

But he likes to think that if we want a thing hard enough, we or our descendants will get it. Like the Devil (whom, according to some of my correspondents, I resemble in several particulars) I can quote Scripture, and my favourite quotation for Lamarckians is 'Which of you, by taking thought, can add one cubit unto his stature?' For this would be an easier feat than adding two hundred years to one's life, like Mr. Barnabas. Several men are known to have measured nine feet, none to have lived three hundred years. Moreover, when animals or plants are induced to alter their structure by putting them in a new environment, such changes are not handed on to their children. Actually Shaw's

[1] This book was originally published in 1932.

knowledge of vital statistics is on a par with Shakespeare's of Bohemian geography. In *The Intelligent Woman's Guide to Socialism and Capitalism,* that interesting repository of nineteenth-century Socialist theory, he says that, thanks to Government regulations, the lungs of Sheffield steel-grinders, which used to be very unhealthy, are now as good as those of the average man. In 1921–1922, the date of the last available statistics, the death-rates of grinders in the cutlery trade from consumption and bronchitis, their two worst lung diseases, were each between seven and eight times that of the general population. A similar lack of contact with mere facts characterizes Shaw's somewhat bizarre opinions on medical research and science generally.

What would a biologist, given the necessary financial resources, actually do to create a race of long-lived beings such as Shaw has so brilliantly imagined? He would not rely on wishing. A doctor in one of Anatole France's novels has dealt well and truly with the influence of parental wishes. 'I often see children with strawberry marks', he says 'whose mothers say that they desired strawberries before their birth. I am waiting to see a baby marked with a pearl necklace.' Our biologist would go to the actual long-livers. At any moment in the world there are generally two or three men over a hundred and twenty years of age. One has recently left Constantinople for the United States, and another is said to be alive in the Caucasus. Old Parr, our last English long-liver, apparently lived from 1483 to 1635. These men are not in the least like the ordinary old man. They are generally capable of intense physical exertion during their second century. Old Parr did public penance in church for begetting a bastard at a hundred and one. The Caucasian Methuselah was, till quite recently, in the habit of bathing in glacier streams. They are perhaps representative of a new type of humanity rather than exceptional specimens of the ordinary kind.

Now from time to time new varieties of rabbit appear. One of the latest kinds has short fur, and is at present valuable because it is believed, on rather inadequate grounds, that their skins, without further treatment, will be transformable into coney seal fur coats. When a rabbit of a new type turns up, he or she is mated with a normal one. The progeny are usually normal, but when mated together, some of their young are of the new kind. By the time a long-liver reaches a hundred and twenty, he is generally at least a great-grandfather, often by several different wives. The millionaire human biologist would arrange marriages of convenience, with large family allowances, between as many as his grand-children and great-grandchildren as possible. About one in four of marriages between grandchildren might be expected to give rise to long-livers, since the laws of heredity are the same for man and rabbits. Thus in a few centuries a race of long-lived folk could be built up. I doubt if they would be as intelligent as Shaw's Irishmen of 3000 A.D.,

but once long life were established as a hereditary character it could probably be combined with intelligence, which is also hereditary, though not always very strongly so.

We do not know enough about the specially long-lived men to be able to say whether, like most of their fellows, they become incapable of learning from experience at an age which may be as low as fifteen, but is hardly ever greater than sixty. Unless they retain their mental flexibility for a greater period than the normal man, they would be a mere nuisance.

Actually length is one of the least important qualities which a human life can have. Jesus did not live long. But his ideas have done so. It is worth considering what inheritable qualities should be aimed at if man is to make the attempt to direct his own evolution in the future. The problem is not likely to be a practical one for a century or so, because we do not know the laws governing the inheritance of any but a few human characteristics, and the most that we could do at present would be to prevent the transmission of a few undesirable traits and to encourage desirable ones in a haphazard way. The immediate problem to-day is to create a social organization in which the majority of men and women as they are can be happy and useful. It is possible at least to imagine a society into which about 98 per cent of the population of most civilized countries would fit. There are, however, a certain small proportion of born misfits. Most of these suffer from serious physical and mental defects, but there are perhaps a still smaller minority who are not too bad, but too good, for life as it is to-day or could be made within our lifetimes. They are intensely sensitive to evils which most of us bear with little trouble, but which our descendants will perhaps find intolerable, and abolish. Some of these people are cranks, some live an externally normal but inwardly unhappy life. Many, I expect, end in asylums or suicides' graves. They may be representative, as far as sensibility is concerned, of humanity a thousand years hence, who will not, I hope, have to put up with many things that distress us. But it is as unfortunate to be born too soon in man's history as too late.

The great majority of us are quite capable of some kind of useful activity. The essential social problems of to-day, as they present themselves to a biologist, are to determine the abilities of different people, and to organize society so that the demand for various kinds of human ability should equal the supply. To-day these problems are not solved. As an examiner I have to gauge the capacity of students according to a system which is obviously inadequate, but I should find it difficult to devise a better; and the system of selection for scientific careers is vastly better than for most others. As regards demand, the maladjustment is still more obvious. There is an insufficient demand for the lower grades of ability, resulting in widespread unemployment. And at the other end of

the scale the demand exceeds the supply. There are not enough men and women available with the ability to run industries organized on a nation-wide or world-wide scale.

Russia is attempting the vast experiment of Socialism. The success or otherwise of this experiment depends largely on the ability of fifteen men who constitute the committee of Gosplan, the state-planning organization which is attempting to industrialize the nation. But the problem before other nations is essentially similar. If our civilization breaks down, it may be because modern industry and transport require organization on so vast a scale that human minds of sufficient reach for the purpose are not available. The problem appears most clearly in connection with the history of revolutions. The Dutch revolution against Spain in the sixteenth century was saved by the great engineer, Simon Stevin who, as Quartermaster-General of the United Netherlands, organized its defence by flooding. The same thing occurred with the French revolution. Lazare Carnot, who like Stevin was a mathematician, organized the supply of munitions to the revolutionary armies. He was the permanent feature of a number of successive governments whose more vociferous members such as Danton, Robespierre, and St. Just were guillotined. When the real history of the Russian revolution is written, which will not be for many years, it may prove that Karpoff's reorganization of the chemical industry in 1919 was as vital a factor in its success as the more showy activities of Trotsky.

The position is just the same in science, literature, and the arts. There is plenty of room at the top. In biology we need men with a knowledge not only of the biological sciences, but of mathematics, physics, chemistry and sociology. Without such supermen biology will break up into a group of isolated sciences divorced from one another, and from human life. Our needs in literature are essentially similar. The average novel-writer appears to know one or two sections of society only. He or she may produce a series of quite competent stories about farmers, high-brows, criminals, sailors, rich women, or what not. Very few serious attempts, however, are made to portray society as a whole, which it is. And such attempts generally fail because of the immense reach required in a mind which is to do the kind of thing which H.G. Wells has occasionally accomplished.

In many nations there are doubtless huge untapped reserves of talent. But in the United States the rising generation is pretty thoroughly searched for certain kinds of ability, and the supply does not equal the demand. No one can say at present whether the demand is likely to be better met in future. In the next generation it will probably not be met, for at present the stupider sections of society are breeding faster than the more intelligent in most civilized countries. There are, however, some hopeful signs. One is the eugenic movement in so far as it leads its intelligent and healthy adherents to produce large families. Another, at least in Europe, is the movement for family limitation. A

generation ago the people who limited their families were people who thought for themselves. The average couple produced a large family. Now the position is reversed in many countries. In England, for example, among the well-to-do, but also to an only slightly less extent among many sections of the working classes, there is a taboo against large families. To have seven or ten children is an eccentricity bordering on bad form. This is no doubt a good thing, as England at least is somewhat overcrowded.

And I suspect that its results will ultimately be eugenic. To-day there is mass suggestion in favour of family limitation, as there was mass suggestion against it in the past.

The man of independent mind
He looks and laughs at a' that.

So does the woman of independent mind. Such people will do their best to have as many children as they want, whether this number is more or less than that laid down by their neighbours. Among my own acquaintances, those who have families of six and over are, without exception, couples of whom one at least displays originality in other respects. Two of them go so far as to wear beards in middle life. So it may be that as birth control becomes fashionable the result in the future will be an increase in the relative number of children born to intelligent parents, just as in the past it has had the opposite effect.

Any political movements which diminish the importance of inherited wealth are, I think, eugenically desirable. So long as such wealth determines our social status it will continue to have two effects. First it will be an incentive to family limitation amongst those who have anything to leave. And secondly, it will cause members of small families to come into better social positions than people with many brothers and sisters. It was, of course, an Irishman who said that it was hereditary in his family to have no children, but there was some truth in the remark. Heiresses commonly acquire their wealth by being only children, and they often marry able men who have no capital, but have risen socially by their ability. But as infertility is strongly inherited, the result is that their husbands have fewer children than the average, and thus ability is to some extent sterilized.

There is thus at least a sporting chance that in the next century we may stop evolving downhill as rapidly as we seem to be doing at present, but that does not mean that we shall start evolving upwards. There is no evidence that the innate abilities of man have improved in the last 30,000 years, though of course his habits and knowledge have done so to an incredible extent. But the man who discovered the use of fire must have been a man of immense enterprise and intelligence, and would very possibly find out how to make petrol out of chalk, water, and wind power if he were alive today.

We cannot expect nature to start improving our innate abilities once more. The usual fate of a species in the past has not been progress, but extermination, very often after deteriorating slowly through long periods. The animals and plants alive to-day are the descendants of the few species which have escaped this fate. There is no reason to suppose that man will escape it unless he makes an effort to do so. And we do not at present know how to make that effort. Doubtless complete idiots should be prevented from breeding, but the effort to eliminate all sorts of 'unfit' human types is a very much more dubious proposition. When I hear people talking of the 'elimination of the unfit' I am always reminded of the crowd who shouted at St. Paul, 'Away with such a fellow from the earth, for it is not fit that he should live'. St. Paul was eliminated, and very possibly would be to-day. Many of the 'unfit' are unfit for society as it is to-day, but that is often society's fault. The attempt to prevent them from breeding really involves the appalling assumption that society as at present constituted is perfect, and that our only task is to fit man to it. That is why eugenists are generally conservative in their political opinions. It also goes a long way to explain the objection which many religious people feel for negative eugenics. They regard it as interference with God's will. I do not share this view, but still less do I regard the average medical board or bench of magistrates as qualified to direct the evolution of the human race. The great geneticist, William Bateson, expressed himself forcibly on the qualifications needed for the person who was to select those human types at which to aim. 'I would trust Shakespeare,' he said, 'but I would not trust a committee of Shakespeares.'

But even Shakespeare would be hard put to it to direct human breeding to-day. He would have been able, in a rough way at least, to answer one of the two great questions which will have to be answered before mankind can control its own evolution. He could have told us as well as any other man who has ever lived how a given human being would behave in given circumstances. But he could not have predicted what types would arise from a given union. Where he allowed his characters to discuss genetics, as in the case of Gloucester's two sons in *King Lear*, they often utter elementary fallacies.

Before mankind can seriously attempt to control its own evolution, there must be an enormous development of two sciences which are now in their infancy, namely individual psychology and genetics. Each of them is likely to have a bright future because they share the important quality of modesty. The art of successful scientific research is rather like that of successful cross-examination of witnesses. It consists of asking nature simple questions, one at a time. The individual psychologist does not ask what is the nature of the soul, but how the major differences between the behaviours of Mr Smith and Mr Jones may be accounted for. The geneticist limits his problems still further. He is only concerned with innate differences, and small ones at that. He does not ask what is the

nature of a dog, and he can as yet tell you very little as to what determines that a given embryo shall develop into a dog rather than a cat. But he can already to some extent answer the question why a baby dachshund does not grow up into a Newfoundland. He can also answer simple questions about man. He can tell you what it is in the negro that determines that his hair can be kinky, or why some men, but not others, are colour-blind.

But he can only answer similar questions as to the grosser kinds of psychological differences, such differences as cannot be affected by changes in the environment. No amount of training will cure certain types of idiocy, and the geneticist can sometimes discover why a given child was born a hopeless idiot. But environment counts for a great deal in determining most differences of behaviour. Here is a habitual criminal whom neither punishment nor kindness has reformed. The geneticist is quite as likely to be impressed by his persistence as his criminality. If he had been exposed to different suggestions at a susceptible age he might perhaps have been equally indefatigable in virtuous conduct. Clearly the geneticist cannot tackle the problem of the criminal until the psychologist has told him whether the innate difference which distinguishes him from the average man is one of obstinacy, lack of self-control, or some third factor. The geneticist can at least be certain that there is generally an innate difference. There are two different types of twins, dizygotic twins who differ nearly as much as ordinary brothers or sisters, and monozygotics, who have the same innate qualities. In a group of cases examined by Prof. Lange the odds on a man being a criminal if his monozygotic twin was criminal were three to one. But criminality of a dizygotic twin only led to a probability of one in eight. Clearly the environments were nearly the same in both cases. It was the inborn characteristics which mainly determined whether a man should be a criminal or not in that particular environment.

Before we can give a satisfactory account of the nature of human differences an amount of work must be done compared to which the entire body of science up to the present date will probably appear insignificant. Merely as tools in the investigation we shall need in the near future two new branches of mathematics, one new branch of biochemistry, and a new technique in microscopy. In order to calculate just what would happen if some of Darwin's views were correct I find myself compelled to embark upon vector analysis in many dimensional space, a task for which I am very ill equipped; and no adequate prediction of the probable results of birth control can be made, so far as I can see, without using functions of a complex variable, that is to say, what is vulgarly known as the square root of minus one. It is quite possible that the investigation may never be undertaken. Its results would clearly revolutionize religion, politics, and law, and thus be unwelcome to conservatives. But in all probability they would be quite equally damaging

to the various substitutes for these human activities which are being put forward to-day by 'advanced' thinkers. For example, the great political movement in Central Europe whose symbol is the swastika is associated not only with pantheistic views in religion but with certain opinions on human biology. These last have no serious scientific foundation, but are just sufficiently touched with science to make them plausible to those who have had an elementary education in biology. The same is true, though in a lesser degree, of much that goes under the names of eugenics and psychology in the United States. The tendency at work is the craving which most of us feel for certainty, the refusal to accept the fact that certain questions will not be answered within our own lifetimes. A favourite refuge with those who will not face this rather disconcerting fact is the Catholic Church. Dogmatism on human biology is psychologically a half-way house to Rome.

Hence the outlook for an unbiased investigation of human biology is perhaps darkest just in those countries where the largest number of people take it seriously. In England the greatest subject of general interest is sport, and such serious work as is being done upon human genetics generally passes unnoticed, largely because its results do not greatly flatter anybody. So far so good, but as a consequence very little research is undertaken. Perhaps it is unlikely that a civilization whose basic ideals resemble those of our own should offer favourable ground for such research. If so, it will presumably collapse like its predecessors, though with a more resounding crash, and the problem will, one hopes, be taken up by a more biologically minded race.

But if, in some remote and fortunate future age, man succeeds in controlling his own evolution, what may we imagine that he will be like? Before we answer this question it is worth pointing out the most fundamental biological difference between man and the apes and monkeys. Man is a creature of much slower growth than any other warm-blooded animal of his size. The slowing of growth has already begun in apes, which mature much less quickly than, for example, dogs or sheep of the same size. One result of this slowing has been that the apes, and to a still greater extent man, never develop certain characters of their adult ancestors but preserve those of the young or even unborn stage. For example, a puppy a month before birth has a relatively large brain, and its eyes, if it is placed on all fours, look downwards like a man's instead of upwards. Later on the growth of the puppy's brain slows down, and his face straightens out into a snout. In mice the eyes are still pointing downwards at birth. But in man this embryonic type of head remains. A gorilla is born almost hairless except for its head, and only becomes hairy all over as it grows up. An adult man is like a baby gorilla not only in being mainly hairless, but in having no bony-ridges, and in other respects.

Our mental superiority over the animals is perhaps largely due to the fact that we

never develop certain characteristics found in most adult animals. Our behaviour is less determined by instinct, that is to say inborn reaction patterns, and we are more teachable. A large proportion of mankind, after a more or less human childhood, become almost unteachable. They are sure of everything. They know what is right in politics, religion, art and human behaviour. They were the pillars of Church and State. Perhaps they are a social necessity. But they have grown out of a large part of their humanity. And I sometimes feel that it would be more appropriate if they were hairy all over.

Perhaps this evolutionary process of slowing down has gone as far as it can. But it is at least probable that any really progressive evolution in the future would take man further from the ape. If so, we should presumably drop a good many of the characteristics on which we pride ourselves, and which most of us even attribute to the Almighty, who is described as the Ancient of Days, not the Ever-young. Assuming that human evolution continues, I suspect that a man of to-day plunged fifty or a hundred thousand years into the future would say something like this:

'These weak, degenerate, childish creatures never seem to grow up. They are not even adult till thirty, and never reach what I should call maturity at all. Their technical achievements afford them plenty of leisure, which they fritter away in the most shameless manner. Their religions (if you can call ritual almost divorced from belief a religion) are a matter of "Let's pretend" rather than "I believe". Their science, where it is not mere technology, seems to be inspired by idle curiosity about trivial matters rather than a genuine desire for truth on fundamental questions. Their philosophy, so far as I can understand it, is a series of rather bad jokes which enable them to shelve the great problems that divided thinking humanity in my time. If they avoid war and some of the other evils of the past, it is largely because an innate instability makes them incapable of combining for any serious purpose. Such objection as they feel for war is not, as it seem to me, on moral grounds at all, but is due to a morbid hypersensitivity which would utterly unfit them for the real and earnest life of to-day.

'As for sexual morals, as far as I can see, they haven't got any, though they take a good deal of trouble to produce the sort of children they want, and their excessive squeamishness keeps them out of some kinds of mischief. They are healthy enough in the negative sense of not getting ill, but they coddle their bodies and are incapable of great exertion.'

'Undoubtedly they are more intelligent than we, but they make a very poor use of their minds. A man will give up a brilliant scientific career to write what I should call nonsense verse, and leave that after a year or two for administration or wood-carving. They seem to me to be a race of smatterers who do not take life seriously. In the course of evolution they have lost quite as much as they have gained.'

No doubt such an opinion would be unjust in many ways. A palaeolithic man placed

among ourselves would probably regard higher mathematics as no more serious than cross-words. Many of the activities of our descendants would no doubt be quite unintelligible to us. But for all that, I doubt whether even the most enlightened of us would approve of our descendants, assuming that evolution continues on the same lines as in the past. Fortunately we shall not be there to disapprove.

Mr Bernard Shaw in *Back to Methuselah* imagined an entirely different sort of evolution. He thinks that the development of the human race thirty thousand years hence will be greatly speeded up, so that they will be born talking; by the age of six they will have got over love, art, and other little weaknesses which for most of us make life worth living. After this they will devote most of their very long lives to pure thought. I hope he is wrong.

Another prophet, Mr. Stapledon, in *Last Men and First Men,* goes many millions of years into the future, and describes a humanity which takes nearly two thousand years to grow up, lives two hundred thousand years, but continues to indulge in love, art, and even sport, when fully adult, although vastly more intelligent than ourselves. He also depicts the failure of an earlier experiment in human evolution, which produced a race with great brains and diminutive bodies, in whom the intellect was developed to the exclusion of the emotions, as in Mr Shaw's ancients.

Such speculations as these are very far from idle. They are eminently desirable, because man does not generally even know what he wants, much less how to get it. A discussion of possibilities will have two effects. It will enable people to come to some opinions as to the possible goal of human evolution (not the ultimate goal, of course, but the furthest limit to which our desires and imaginations reach). And it will focus attention on the necessity for more knowledge before we can even suggest means of attaining that goal.

Pictures of the future are myths, but myths have a very real influence on the present. Modern political ideas are very largely the creation of the Jewish prophets, who foresaw the new Jerusalem in the future, at a time when their contemporaries of other nations had no particular hopes for the betterment of humanity. History has certainly been very different from what Isaiah and Daniel believed it would be; but they helped to make it what it is, and perhaps they would not be altogether dissatisfied with it if they could live to-day. Our greatest living mythologist, Wells, is certainly influencing the history of the future, though probably in ways which he does not suspect.

The time will probably come when men in general accept the future evolution of their species as a probable fact, just as to-day they accept the idea of social and political progress. We cannot say how this idea will affect them. We can be sure that if it is accepted it will have vast effects. It is the business of mythologists to-day to present that idea. They cannot do so without combining creative imagination and biological knowledge.