

The Population Explosion, Aldous Huxley

The Population Explosion

Today I want to pass on to what is happening to the human species and to think a little about what our philosophy and our ethical outlook on the subject should be. This lecture is essentially about human numbers and their relation to human well-being and human values in general.

Needless to say, any accurate estimation of human numbers is very recent, but we can extrapolate into the past and come to what seem to be fairly good conclusions. Although there are some fairly wide margins of difference among the experts, the numbers they come to are roughly in agreement. They agree that in pre-agricultural days, for example in the lower Palaeolithic times, when man was a food-gathering creature, there were probably not more than twenty million humans on this whole planet. In later Palaeolithic times, after organized hunting had been invented, the number probably doubled. We can make a rough estimate of what an organized hunting people could do because we know how many Indians were present in North America when the white man arrived—not more than one million in the entire North American continent east of the Rockies—and this gives one an indication of the extremely low density of population possible in a hunting economy.

The Great Revolution came about 6000 b.c. with the invention of agriculture, and the creation of cities in the next millennia. By about 1000 b.c., after five thousand years of agriculture, there were probably about one hundred million people in the world. By the beginning of the Christian era, this figure had a little more than doubled: it was somewhere between two hundred million and two hundred and fifty million—less than half the present population of China. The population increased very gradually in the following years; sometimes there were long periods of standstill and sometimes there were even periods of decrease, as in the years immediately following 1348, when the Black Death killed off 30 per cent of the population of Europe and nobody knows how much of the population of Asia.

By the time the Pilgrim Fathers arrived in this country, it is estimated that the population of the world was about twice what it had been on the first Christmas Day—that is to say, it had doubled in sixteen hundred years, an extremely slow rate of increase. But from that time on, from the middle of the seventeenth century, with the beginnings of the industrial revolution and the first importation of food from the newly developed lands of the New World, population began rising far more rapidly than it had ever risen before. By the time the Declaration of Independence was signed, the figure for the human population of the world was probably around seven hundred million; it must have passed the billion mark fairly early in the nineteenth century and stood at about fourteen hundred million around the time when I was born in the 1890s. The striking fact is that since that time the population of the planet has doubled again. It has gone from fourteen hundred million, which is already twice what it was at the signing of the Declaration of Independence, to twenty-eight hundred million. And the rate of increase now is such that it will probably double again in rather less than fifty years.

Thus the rates of increase have been increasing along with the absolute increase in numbers. The net rate of increase did not reach 1 per cent per annum until the beginning of this century. It has now risen to an

average of 1.6 per cent per annum for the world at large, and there are considerable areas of the world where it exceeds 2 per cent and even reaches 3 per cent or more. Now, a 3 per cent increase when compounded annually (population increases as money increases, by compound interest) doubles the population in about twenty-five years, and a 1.5 per cent increase doubles the population in about fifty years; thus a 1.6 per cent increase will double the population in somewhat less than fifty years. The fact that the rate of increase never reached 1 per cent until the twentieth century, and that in the short time since about 1905, when this point was reached, it has already reached the figure of 1.6 per cent, is extraordinary. It indicates very clearly that we are living in a world for which there are no historical precedents whatsoever and that we have to resign ourselves to thinking in entirely new ways about a problem which our fathers never had any occasion to think about so intensively.

I indicated that, at the present time, there are large differences in the rate of increase in different parts of the world. Western Europe had its great increase during the eighteenth and nineteenth centuries. Although the rate never came up to even 1 per cent per annum, the increase was very rapid and startling at the time. The population in Europe has now reached about four hundred million and is increasing at less than 1 per cent per annum; it is thought that it will take about a hundred years at the present rate for Europe's population to double again. Meanwhile, in other parts of the world that were not increasing rapidly in the nineteenth century, populations have begun to increase at a great rate. We are now seeing the kind of thing that happened in Europe a hundred or a hundred and fifty years ago happening on an enormous scale in Asia, in Africa, in South America, in the Caribbean Islands. So we see that the increase is considerably less over the greater part of the Western world than it is in the Asiatic and the African worlds.

Let us now consider the reasons for the steps in the increments of population in the past. Primitive man was limited by his methods of collecting food. Food collecting—wandering about picking up acorns and snails and frogs and things—obviously can support an extremely small population. When hunting becomes organized—when you have flint arrows, when you have invented the bow, and when you have fire hunts and organize whole tribes to chase the game—then considerably more people can be supported. So the experts think that the population doubled at that time.

With the invention of agriculture, there is immediately a very great population increase, as it becomes possible to go on to a much higher level of production and to found cities, to create the division of labour, and to create what we call civilization. The proto-agricultural era lasted with very few changes until the later seventeenth century, when we got the beginning of the industrial revolution coupled with the first results of the exploitation of virgin lands in the New World.

Without the supply of cheap food from the New World it probably would have been impossible for Europe to industrialize as it did; but the historical accident by which vast lands were suddenly opened up made it possible to take a great many peasants off the land in Europe and put them into factories and keep them fed while they were building up the new industrial society. It was this extra supply of food which initiated the modern advance in population; all species live up to their supply of food and then are wiped out as the numbers outrun the supply.

A new factor based upon discoveries in physiology and medicine has entered the picture in recent years: the factor of public health. What is happening now is not that the birth rate is increasing—in fact in many

cases it has decreased slightly—but that the death rate has been lowered to a startling extent, mainly by public health measures. The change began in the nineteenth century, with people realizing, for example, that they had to have clean water. Even before Pasteur's discovery of bacteria, it had begun to dawn on people that it was a good thing to be clean.

It is interesting in this context to read about the early efforts of the disciples of Jeremy Bentham, the utilitarian philosopher, to clean up London. The rich, who lived in their own part of the town, had been entirely indifferent to the appalling conditions which prevailed in the eastern part of the City. But when cholera and other diseases like typhus, which raged in the East End, began to invade the smarter sections of the West End, they decided that something had better be done. Men like Sir James Kay-Shuttleworth succeeded in about forty years in transforming London from a pest-hole of the most revolting character into a relatively clean city. The result was a dramatic rise in the expectation of life: the average expectation of life in ancient Rome was about thirty years, as in modern Asia; the average expectation of life in the United States and Great Britain is now about seventy years.

Today, with the newest weapons in the public health armoury, the most amazing revolutionary changes can be brought about in an extraordinarily short time. The two most powerful weapons are the antibiotics and the insecticides—coupled with the discovery that malaria and yellow fever, for example, are insect-carried diseases and that other tropical diseases are also carried by small animals. Consider the case of Ceylon, where the population was held almost stationary by endemic malaria. After the end of the Second World War public health teams were sent into Ceylon with DDT, and malaria was completely stamped out in less than five years. In Europe, on the other hand, malaria had been endemic for centuries (you will find it referred to constantly in the plays of Shakespeare as 'ague'). In London it took at least three hundred years of draining soil and drying up the area all along the Thames estuary to get rid of the mosquito and thus get rid of malaria.

While it took about three centuries of hard work in Britain to get rid of malaria, it took only five years with modern methods in Ceylon! And what have been the results? We have saved people from the miseries of malaria, a large proportion of whom would have died in early life or in middle age from the disease. But while the death rate has fallen very nearly to European levels, the birth rate has remained what it was when three or four out of every five children regularly died and it was necessary to produce large families in order to preserve the race at the existing levels. The result is that the population of Ceylon is now increasing at the rate of 3 per cent per annum, which means that it will double in twenty-four years.

The land, however, is not elastic. Although some new land will come into production owing to the fact that it can now be ploughed under because of the destruction of the malaria mosquito, it will not be enough; and meanwhile, incredible problems have already arisen. It is more and more difficult to feed the population on local resources and the exportable crops such as tea and rubber do not suffice to buy sufficient foods. Capital is extremely difficult to come by because there simply isn't enough money circulating for people to save. And nobody quite knows what on earth is going to happen when the population doubles.

This same situation is particularly striking on many islands, where there is no possibility of expansion. It is very striking in Mauritius; it is very striking on some of the Mediterranean islands such as Sardinia and

Sicily; it is a fearful problem throughout the Caribbean. I was talking last year with the Prime Minister of the New Commonwealth of the Caribbean, Sir Grantley Adams (who previously was the Prime Minister of Barbados), and he was telling me about the state of his home island. Barbados now has a population of 1400 to the square mile with only one industry—sugar—and no other resources at all, and nobody has the faintest idea of how they are going to get on in the future; and Barbados is in only slightly worse condition than many other islands.

One has to confront the painful fact that this newly independent community is probably non-viable from an economic point of view, and the situation will probably become worse as time goes on owing to the increasing pressure of population upon resources. The same situation can be seen in Egypt, where at the present time something like 25 million people are trying to make a living off 5.25 million acres of arable land. Here one can put in, parenthetically, the fundamental reason why Egyptian policy has been so troublesome to the West in recent years: It is a biological reason; these people cannot live on their resources and they must throw their weight around so as somehow to get people who have capital to invest in their country. It is completely pointless to envisage the politics of such a country as Egypt, and indeed of many other countries of the world, from a purely political point of view. You have to think in terms of biology to gain any understanding and to formulate any sensible policy.

Let us now ask ourselves what the practical alternatives are as we confront this problem of population growth. One alternative is to do nothing in particular about it and just let things go on as they are, but the consequences of that course are quite clear: the problem will be solved by nature in the way that nature always solves problems of over-population. When any animal population exceeds the resources available to it, the population tends (a) to starve and (b) to suffer from severe epidemic and epizootic diseases. In the human population, we can envisage that the natural check on the unlimited growth of population will be precisely this: there will be pestilence, famine, and, since we are human beings and not animals, there will be organized warfare, which will bring the numbers down to what the earth can carry. What nature teaches us is that it is extraordinarily dangerous to upset any of its fundamental balances, and we are in the process of upsetting a fundamental balance in the most alarming and drastic manner. The question is: Are we going to restore the balance in the natural way, which is a brutal and entirely anti-human way, or are we going to restore it in some intelligent, rational, and humane way? If we leave matters as they are, nature will certainly solve the problem in her way and not in ours.

Another alternative is to increase industrial and agricultural production so that they can catch up with the increase in population. This solution, however, would be extremely like what happens to Alice in *Through the Looking Glass*. You remember that Alice and the Red Queen are running a tremendous race. To Alice's astonishment, when they have run until they are completely out of breath they are in exactly the same place, and Alice says, 'Well, in our country ... you'd generally get to somewhere else—if you ran very fast for a long time as we've been doing.'

'A slow sort of country!' says the Queen. 'Now here, you see, it takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!'

This is a comic parable of the extremely tragic situation in which we now find ourselves. We have to work, to put forth an enormous effort, just to

stand where we are; and where we are is in a most undesirable position because, as the most recent figures issued by the United Nations indicate, something like two-thirds of the human race now lives on a diet of two thousand calories or less per day, which—the ideal being in the neighbourhood of three thousand—is definitely a diet of undernourishment.

Furthermore, all observers in the food and agricultural organizations and other international organizations busy with this problem agree that the situation now is a little worse than it was thirty or forty years ago; the average individual has less to eat and fewer goods than he had in the past. Whereas thirty years ago something like 50 per cent of the world's population was definitely undernourished, almost 65 per cent is undernourished today. The reason for the steady worsening of the situation is clear: in a country such as Mexico or Guatemala or Ceylon, where the population is increasing by 3 per cent per annum, all production, both agricultural and industrial, must also increase 3 per cent per annum in order to preserve even the present low and unsatisfactory standard of living.

If there is to be any improvement, the increase in production must certainly be 4 per cent and preferably 5 per cent per annum. But it is most difficult to keep up an increase in agricultural production of 2 or 3 per cent per annum, much less 4 per cent. This was done in Japan for forty or fifty years by the most extraordinary effort and amazing industry of the Japanese, but it is extremely unlikely that it can be done in many other parts of the world, especially in underdeveloped countries where there is a prodigious lack of capital. Capital, after all, is the margin that remains when the fundamental needs of the population have been satisfied, but in most of the underdeveloped countries the fundamental needs of the population are never satisfied.

It is incredible how little capital a country like India can raise. The last figures I saw from the United Nations were that most Western countries have at their disposal about seventy times as much capital as the underdeveloped countries, while at the present time the underdeveloped countries need about seventy times as much capital as do the developed countries. The situation illustrates the terribly significant and painfully true statement in the Gospels, 'to those who have shall be given, and from those who have not, shall be taken away even that which they have' (Matthew 25:29).

Along with the shortage of capital in underdeveloped countries there are great shortages of trained manpower, which is just as necessary to increasing production as adequate supplies of capital, so that it seems extremely difficult to envisage the possibility of increasing production sufficiently merely to keep up with the increase in population, much less to outrun it. So much for our second alternative.

The third alternative is to try to increase production as much as possible and at the same time to try to re-establish the balance between the birth rate and the death rate by means less gruesome than those which are used in nature—by intelligent and humane methods. In this connection it is interesting to note that the idea of limiting the growth of populations is by no means new. In a great many primitive societies, and even in many of the highly civilized societies of antiquity, where local over-population was a menace, methods of limiting population were employed. The methods included some which we would certainly find extremely undesirable, although less fearful than the natural means.

The most common was infanticide—killing or exposing by leaving out on the mountain unwanted children, or children of the wrong sex, or children who happened to be born with some slight deficiency or other. Abortion was also very common. And there were many societies in which strict religious injunctions imposed long periods of sexual continence between the birth of each child. But in the nineteenth and twentieth centuries various methods of birth control less fearful in nature have been devised, and it is in fact theoretically conceivable that such methods might be applied throughout the whole world.

What is theoretically possible, however, is often practically almost impossible. There are colossal difficulties in the way of implementing any large-scale policy of limitation of population; whereas death control is extremely easy under modern circumstances, birth control is extremely difficult. The reason is very simple: death control—the control, for example, of infectious diseases—can be accomplished by a handful of experts and quite a small labour force of unskilled persons and requires a very small capital expenditure. In the case of Ceylon, malaria was stamped out simply by spraying swamps and pools with DDT and spraying the interiors of houses.

Similarly, digging wells for clean water is quite a cheap procedure. But when we come to increasing production, or to decreasing the birth rate, we find ourselves confronted with problems which can only be solved by the co-operation of the entire population. Increasing agricultural production requires an immense amount of educational work among millions of smallholders and peasants and farmers, and any policy of birth control requires the co-operation of the entire adult population. So the current state of imbalance is likely to continue for a long time.

The problem of control of the birth rate is infinitely complex. It is not merely a problem in medicine, in chemistry, in biochemistry, in physiology; it is also a problem in sociology, in psychology, in theology, and in education. It has to be attacked on about ten different fronts simultaneously if there is to be any hope of solving it. First of all, there has to be a great deal of fundamental research into biology and the whole problem of reproduction, in the hope of producing some satisfactory oral contraceptive which can be distributed easily and cheaply to masses of people.

I was talking last year with researchers in the Rockefeller Institute who told me that they think there is still a great deal of fundamental research to be done. We just don't know enough yet to be able to produce an entirely satisfactory oral contraceptive. And unfortunately very little money is going into this research; in general, far more goes into physical and chemical research than into biological research, and far more goes into other areas of biological research than into this particular area. Nevertheless, assuming that enough money and ability are put into this problem, it can probably be solved within ten years and something completely satisfactory produced and manufactured in bulk. But within ten years the population of the earth will have increased by five hundred million.

Then we have to consider the time it will take to get the new oral contraceptive accepted by countless millions of men and women all over the world. Some interesting research into this kind of problem was undertaken years ago by the English Fabians, Beatrice and Sidney Webb. They made an historical study of the average time it took for an idea which at its first enunciation seemed revolutionary and revolting to be taken for granted and to be acted upon by the whole population. They

concluded that the average time is twenty-eight years—roughly the length of a generation. It is very difficult to persuade adults to change their points of view; they have to die off before a new generation can accept new ideas. If it takes ten years to produce chemically, by basic research, what we want, and then another twenty-eight years to get the product accepted, by this time the population of the earth will have increased by about a billion and a half. Again, we are up against the awful Alice-Through-the-Looking-Glass parable, rushing on in order to stand in the same place.

Merely from a technical and temporal point of view, we are obviously in a very tight spot. But we have also to consider the political point of view. There would undoubtedly have to be either world-wide agreement or regional agreements on a general population policy in order to have any satisfactory control of the situation at all. But there is absolutely no prospect at the present time of our getting any such political agreement.

The trouble is that political leaders just don't think in biological terms. Here is a rather interesting speculation: What might have happened if the only man who had had considerable experience in practical biology, and who was in politics, had become President of the United States? I am referring to Henry Wallace. Henry Wallace was undoubtedly a very bad politician, but he did think in biological terms, and by helping to develop hybrid corn he had done something which was unquestionably and unmitigatedly good for the entire human race—which is probably more than can be said for any other man in public life that I can think of. Maybe if we had had such a man for President the whole thinking about these problems would have been pushed away from the field of politics, where they are completely insolvable, towards the field of biology, where they are possibly solvable.

We might have seen a policy which would have made a great deal more sense in the long run than the one which is now being pursued by all parties—from the long-range point of view, a kind of monstrously frivolous and irresponsible fiddling while Rome burns. We fiddle with the awful business of nationalistic power politics when our basic problem is whether the human race, expanding as rapidly as it is doing now, can survive in any decent condition—and what we are to do to preserve the world in any tolerable state for our great-grandchildren or even for our grandchildren. Unfortunately we missed our chance, and there has never been, at the head of a great State, a man who has habitually thought in biological terms.

Another problem which I think we must just briefly mention in regard to the increase in human numbers is the educational problem. The enormously rapid increase makes it almost impossible to realize the idea of providing a basic education for everybody. Immense efforts have been made, above all since the end of the Second World War, to provide elementary education throughout the world. But the fact remains—these figures were published just two months ago by UNESCO—that the absolute number of illiterates is greater today than it has ever been, in spite of all efforts. We have now eight hundred million children to educate, but we also have seven hundred million illiterate adults. In the underdeveloped countries (a) there is no capital for building schools, (b) there is no tax money to pay teachers, and (c) there are not nearly enough trained teachers.

Even in this country, the richest country in the world, grave complaints are heard that schoolrooms are overcrowded, that we don't have enough school buildings, and so on. Imagine what the problem is in countries

like Mexico or Brazil or Ceylon where there is a much higher rate of population increase and far fewer resources, both in money and in trained manpower. We are then confronted with the awful probability that we are just going to go on having more and more illiterate adults than we ever had before. And we have to remember that these adults will be illiterate, not within the framework of a traditional civilization—where it didn't matter very much whether or not they were illiterate—but within the framework of a traditional civilization which has broken down completely and which is being replaced by the worse features of our own Western civilization.

Now we have to ask ourselves what our attitude should be towards these problems. We come to the other end of the bridge. We pass from the world of facts to the world of values. What we think about all this depends entirely on what we regard as the end and purpose of human life. If we believe the end and purpose of human life is to foster power politics and nationalism, then we shall probably need a great deal of cannon fodder, although even this proposition becomes rather dubious in the light of nuclear warfare. But if, as I think most of us would agree, the end of human life is to realize individual potentialities to their limits and in the best way possible, and to create a society which makes possible such a realization, then we find ourselves equipped to think in a rational and philosophical way about the population problem. We see that in very many cases the effort to raise human quality is being thwarted by the mere increase of human quantity, that quality is very often incompatible with quantity.

We have seen that mere quantity makes the educational potentialities of the world unrealizable. We have seen that the pressure of enormous numbers upon resources makes it almost impossible to improve the material standards of life, which after all have to be raised to a minimum if any of the higher possibilities are to be realized: although it is quite true that man cannot live by bread alone, still less can he live without bread, and if we simply cannot provide adequate bread, we cannot provide anything else. Only when he has bread, only when his belly is full, is there some hope of something else emerging from the human situation.

Then there is the political problem. It is quite clear that as population presses more and more heavily upon resources, the economic situation tends to become more and more precarious. As there is a tendency in precarious situations for centralized government to assume more and more control, there is therefore now a tendency towards totalitarian forms of government, which certainly we in the West find very undesirable. But when you ask whether democracy is possible in a population where two-thirds of the people are living on two thousand calories a day, and one-third is living on over three thousand, the answer is no, because the people living on less than two thousand calories will simply not have enough energy to participate in the political life of the country, and so they will be governed by the well-fed and energetic. Again, quantity militates against quality.

Another (to me) very disturbing and painful result of quantity which affects the quality of human life is the fact that more and more of the increasing mass of people is being confined to gigantic cities, that more and more people are therefore living completely out of touch with the natural environment and are instead surrounded by an environment of unutterable dreariness and squalor. When one comes to think of it, there probably never has been a beautiful city of more than, say, two or three hundred thousand inhabitants, because a beautiful city is beautiful in relation to its natural surroundings.

You can have cities with magnificent central areas such as Washington, D.C.; but if you walk out of the central areas Washington cannot be said to be very beautiful, for you go through square miles of extraordinarily dreary slums and second-rate middle-class residential areas. The same thing is true of other, much larger, cities such as New York and London and Tokyo. There are mile upon mile of fearful dreariness, where the children never see any natural object at all and see only ugly human objects. This situation is a blight upon the world at the present time, and as far as I can see it is destined to get worse and worse. I cannot help feeling that this is a very deleterious state of affairs for the human spirit.

Finally, the unlimited increase in human numbers practically guarantees that our planetary resources will be destroyed and that within a hundred or two hundred years an immensely hypertrophied human species will have become a kind of cancer on this planet and will ruin the quasi-organism on which it lives. It is a most depressing forecast and possibility.

I think one can say from this last point that the problem of quality and quantity is really a religious problem. For, after all, what is religion but a preoccupation with the destiny of the individual and with the destiny of society and the race at large? This is summed up very clearly in the Gospel when we are told that the Kingdom of God is within us but at the same time it is our business to contribute to the founding of the Kingdom of God upon earth. We cannot neglect either of these two aspects of human destiny. For if we neglect the general, quantitative, population aspect of destiny, we condemn ourselves, or certainly our children and grandchildren, as individuals. We condemn them to the kind of life which we should find intolerable and which presumably they will find intolerable too.

There are no certain theological objections to population limitation. Most religious organizations in the world today, both within and outside the Christian pale, accept it. But the Roman Catholic church does not accept any method of population control except that which was promulgated and made permissible in 1932—the so-called rhythm method. Unfortunately, where the rhythm method has been tried on a considerable scale in an undeveloped country such as India, it has not been found to be very effective. The fact that the Church recognizes this problem was brought home very clearly in 1954 at the time of the first United Nations Population Congress, which took place in Rome, when the late Pope, in an allocution to the delegates, made it quite clear that the problem of population was a very grave one which he recommended to the consideration of the faithful.

Whether the present attitude towards the methods of birth control will be changed, I don't know. It is a matter of some interest that one of the main arguments against current and possibly future methods is their 'unnaturalness'. Precisely the same argument was used in the Middle Ages, and right up until 1515, against the taking of interest on money. It was an argument based on statements in Aristotle that money is barren and has no right to breed. A hint of this is found in the first act of *The Merchant of Venice*, where Antonio, talking to Shylock, speaks about 'barren metal' breeding and asks, 'Or is your gold and silver ewes and rams?' It was all right for living creatures to breed, but it was quite wrong for money to do so. This position was gradually modified, the last modification taking place at one of the Lateran Councils in 1515. I don't know whether a similar change may take place in the attitude towards 'unnatural' methods of birth control. Be that as it may, the fact remains

that everybody agrees in principle that over-population is a great danger, and the differences are now mainly questions of means.

We can conclude, then, by saying that over-population is quite clearly one of the gravest problems which confront us, and the choice before us is either to let the problem be solved by nature in the most horrifying possible way or else to find some intelligent and humane method of solving it, simultaneously increasing production and balancing the birth rate and the death rate, and in some way or other forming an agreed international policy on the subject. To my mind, the most important prerequisites to such a solution are first of all an awareness of the problem, and then a realization that it is a profoundly religious problem, a problem of human destiny. Our hope, as always, is to be realistically idealistic.

The end