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"MAN TOMORROW"

AN INTERVIEW RECORDED AT DUBROVNIK
WITH PROFESSOR LEO SZILARD

110/1 PETER: Professor, do you think we shall ever get rid of the biological ..... ?

SZILARD: The amazing discoveries that may occur in biology in the future are not predictable. Therefore you must not ask me to predict what is not predictable. But when you ask me what may be the major implications resulting from advances in biology, then I think I am quite willing to speculate.

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One of the intriguing problems, intriguing to me at least, is the problem of sleep. Nobody knows what sleep is. We know remarkably little about the phenomenon which is so general as sleep. However, it is easy to guess why we are all forced to sleep. During evolution there was nothing much that a mammal, like man, might have ~~had~~ been useful, from the point of view of evolution, to construct a mechanism in the brain of the mammal which forced the mammal to sleep, a mechanism that paralysed the body during a time when nothing useful could be performed by the body in darkness. However if this is true, then it should be possible, once we understand something about this mechanism, to destroy the mechanism and thereby free man from the necessity ~~sonsity~~ of sleeping.

Since we are spending on the average maybe eight hours a day asleep, we would add eight hours to our daily life if we got rid of sleep. This is really one way of prolonging human life, and is a very useful way of prolonging it because you don't just add twenty years between eighty and a hundred when you are old, but you are

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extending life during a period of time when you are young and middle-aged. Because so little is known about the nature of sleep, we do not know how difficult it will be to accomplish the goal of getting rid of it. ~~This, I believe, is all I can say on this particular subject of sleep.~~

111/1 PETER: Professor, do you think artificial insemination will become normal practice?

SZILARD: I believe it is quite likely that major advances can be achieved in human life provided that artificial insemination becomes accepted practice. This will require of course a change in social customs. However, it is quite easy to see how such a change may come about. Today I believe there is about one-seventh of the married couples who are in a position that they cannot have children because the male is not fertile. These couples today either forego children or they adopt children, or they practice artificial insemination. But so far the donor was usually selected by the gynaecologist which is rather a cruel practice. It would be much more satisfactory if the woman could select the children of the father from a catalogue where the donor would be described to the point where she could exercise her judgment whether or not she wants this man as the father of her children. Starting from the need for artificial insemination in the case of childless couples where the male is not fertile, you could imagine that artificial insemination will become general practice and that it will be no longer, it will be a fashion not to have children from your own husband, but either from a suitably selected donor. How the selection would be, would depend

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on the tastes of the women. However, one thing is almost certain , women would not choose deliberately unsuccessful man as the father of their children. And because of this selection which women would exercise something very important would I think be produced in human society.

What I have in mind is the following. It is very likely that in a very large number of mutations affect the structure and functioning of the nervous system. Most of these mutations are . Each of these mutations have a very small effect only. But if you have no selection against these mutations because in our society today it does not take any kind of excellance or of really great competitive strength to be able to procreate, then gradually these mutations will accumulate and a larger and larger fraction will become feeble minded. If we want to avoid this, we will have to invent something to select against these mutations. Now you know there is something called an intelligence test. And if we had a real intelligence test we might even hope to breed for more intelligent human beings. This I believe however is not possible. I believe that what is called an intelligence test is really a stupidity test and what we discover by applying this test, or that we hope to discover, is who are the willing individuals who carry genetic which reduce intelligence below the normal. You do not discover the indidivuals who carry some particularly valuable mental traits which could be inherited. However, I think if we could fight off mutations we would have done enough to preserve the human race, at least at the level at which it is now.

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We could hope to go further and perhaps extend human life, say by fifteen years. Once artificial insemination becomes general practice and what is yours is sperm which has been preserved in liquid air, it might become possible to say that we will not market sperm except if the donor has lived to a high age, say 95, 96, 97 years of age. Now the question is suppose we did this. Suppose we did this for a number of generations. Would we thehy substantially increase, extend the life span of human beings? Nobody really knows the answer to this question because we do not know whether the scattering of the ages of death which we observe in the population is largely substantially due to defective genetic which shorten life and these have accumulated in the human population.

Now, there is no doubt that if we really put our minds to it we will be able to discover and to predict in advance, and to predict in advance whether by practising the kind of selective breeding which I just described, namely excluding from the sperm of man who did not live to a high age, we could substantially extend human life, say, extend it by fifteen years. Fifteen years would be indeed a substantial change because productive life today, a prolific period of life today is between twenty and sixty-five. Adding fifteen years to this would be I think one-third to this period. And this is indeed quite a lot. ~~Particularly this would be~~ a lot if one would not by eliminating these defective genes, if by eliminating these defective genes one would not only postpone the age of death but also have the people who are free from these genes age more slowly. Whether or not one

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may count on this depends on what kind of ageing theory you think is correct. And the particular ageing theory which I favour would indeed predict that one could not only postpone death but slow down the rate of ageing by eliminating a number of defective genes which seem to be present in the human population.

112/1 PETER: Would you like to tell me what you feel ..... sex ratio?

SZILARD: Well, if artificial insemination really becomes socially accepted practice this would open up the way to a completely new phenomenon, namely, it might enable parents to choose the sex of their children. The spermatozoa are of two kinds, those which carry one x chromosomes, and those which carry two x chromosomes. If an egg is fertilised by the sperm which carried one x chromosome..... stops .....

If artificial insemination becomes a socially accepted practice, for men, then this would open up another very interesting possibility. It would open another possibility that parents may choose the sex of their children.. Spermatazoa fall into two classes. Half of spermatazoa carries one x chromosomes, the other half of the spermatazoa carries no x chromosomes but carries the y chromosome instead. If an egg is fertilised by the spermatazoa which carried the x chromosome, the offspring is female. If an egg is fertilised by spermatazoa which carries the y chromosome ~~the offspring is a male~~. It is my guess that if they have a choice today, most parents would want more boys and fewer girls.. This indeed would lead to a rather interesting possibility.

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The number of children will be necessarily limited. The number of children per family will be necessarily limited if we want to avoid a population explosion. If no children die, and if each child marries and has offspring, then on the average parents can have only— a couple can have only two children, one boy and one girl. Otherwise the population would go on increasing beyond the bounds which are tolerable. However, if it were the general custom -5 boys & 1 girl- ~~a couple~~ have five boys and one girl, this would be perfectly all right. The rate at which the population increases is determined by the number of girls born to a family and not by the number of children born to a family. This would enable people to have many children, which is very pleasant. It is my guess that the girls would like the situation very much, and I think that the men would not mind. The girls would like it because they could pick and choose their husbands, and the men wouldn't mind it because it would greatly lessen the pressure on them on the part of the girls to get married. Now, other people might judge this differently— This is my own evaluation of the value of this development of men, but whatever another value may be, it may come.

~~Of course, the problem of separating x sperm and y sperm~~ is not easy. It has been tried in the past, and so far without success. But it has been tried not because of what I just told you about the possibilities in the case of man, but it has been tried because a great economic value that could be obtained if say, in daily cattle production, you could have all calves, female calves, belonging to calves which would give milk and have very few of the calves only provide the male because, after all, you need only a very few bulls, and you need many calves. And because of the incentive

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this has been the separation of sperm into male and female producing sperm has been tried. I do not know why no-one has succeeded. I do not know why no-one so far succeeded, but I am quite confident that if we put our minds to this problem will we solve it.