

The Harold Hatch International Lecture
on Longevity and Population Aging
2002

Intimations of Immortality

The Ethics and Justice of Life-Extending Therapies

John Harris



INTERNATIONAL
LONGEVITY CENTER-USA

An Affiliate of Mount Sinai School of Medicine



The International Longevity Center-USA (ILC-USA)

is a not-for-profit, nonpartisan research, education, and policy organization whose mission is to help individuals and societies address longevity and population aging in positive and productive ways, and to highlight older people's productivity and contributions to their families and society as a whole.

The organization is part of a multinational research and education consortium and includes centers in the United States, Japan, Great Britain, France, the Dominican Republic, India, South Africa, Argentina, and the Netherlands. These centers work both autonomously and collaboratively to study how greater life expectancy and increased proportions of older people impact nations around the world.

**The Harold Hatch International Lecture
on Longevity and Population Aging**

Intimations of Immortality

The Ethics and Justice of Life-Extending Therapies

John Harris

September 24, 2002
Hatch Auditorium, Guggenheim Pavilion
Mount Sinai Medical Center

Sponsored by

**The International Longevity Center-USA
Brookdale Department of Geriatrics and Adult Development
of Mount Sinai School of Medicine**

**John Harris,
F.Med.Sci., B.A., D.Phil.**

Dr. John Harris was educated at the University of Kent and at Balliol College, Oxford.

He is a member of the United Kingdom Human Genetics Commission and of the Ethics Committee of the British Medical Association. Dr. Harris was elected a fellow of the United Kingdom Academy of Medical Sciences in 2001, the first philosopher chosen to join this elite group of medical scientists.

Dr. Harris was a founding director of the International Association of Bioethics, a founding member of the board of the journal *Bioethics*, and a member of many other journals, including the *Journal of Medical Ethics*. He is the series editor of *Social Ethics and Policy*, published by Routledge, and is the founder and a general editor of a major series of books, entitled *Issues in Biomedical Ethics*, for Oxford University Press.

In 1994, Dr. Harris was elected a member of the Romanian Academy of Medical Sciences. He was a member of the United Kingdom Government Advisory Committee on Genetic Testing from 1996 to 1999. Over the last five years, Dr. Harris has directed four major projects for the European Commission under the Biomedical and Health Research Programme (DG XII). He also serves as director of EUROSTEM, a major project funded by the European Commission to investigate and monitor ethics and policy issues surrounding the progress of human stem cell research.

Dr. Harris has acted as ethical consultant to numerous corporations and national and international bodies, including the European Parliament, World Health Organization, Joint United Nations Programme on HIV/AIDS, United Kingdom Department of Health, Health Council of the Netherlands, and Research Council of Norway.

Dr. Harris has made a special study of the ethics of organ transplantation and organ and tissue retention. He is the author or editor of 14 books and more than 150 papers.

This lecture is based on a paper, "Intimations of Immortality—The ethics and justice of life-extending therapies," by John Harris, in Michael Freeman, ed., Current Legal Problems, Oxford University Press, 2002.

We are all programmed to age and die, but maybe it doesn't have to be that way.¹ If cells weren't programmed to age, if the telomeres, which govern the number of times a cell may divide, didn't shorten with each division,² if our bodies could repair damage due to disease and aging "from within,"³ we would certainly live much longer and healthier lives. From all over the world, research is being reported, which, if it comes to fruition, would not only constitute major contributions to the treatment of disease but could in principle lead to the indefinite extension of life, to the extent perhaps that we would begin to think of people who had received such life-extending treatment as "immortals."⁴

Cloned human embryonic stem cells (ES cells), appropriately reprogrammed, might be made to colonize particular tissue and organs, triggering constant regeneration.⁵ Precise combinations of growth factors injected directly into muscle or tissue might put the body into a state of constant renewal. If we can discover all the genes that trigger the aging process and switch them off in the early embryo, we could then, in Lee Silver's words, "write immortality into the genes of the human race."⁶

I. PRESENT AND FUTURE IMMORTALS

Before trying to imagine the ethical and social consequences of our being able to write immortality into the genes of the human race, we need to think for a moment about the

difference between trying to make existing people immortal and engineering immortality into future generations. If we tried to make existing people, you and me, immortal, we would have to make each cell that might be terminally damaged capable of regeneration. This would be a very comprehensive task, but there are various ways in which, in principle, it might be achieved. One strategy might be to attempt to put into the bloodstream many differently programmed ES cells that had targeting molecules attached that would cause them to colonize the different bodily systems that might be affected by disease—brain, cardiovascular system, and so on. Since no technology is 100 percent effective, repeated interventions would probably be necessary, but it might be possible in this way to extend existing lives indefinitely.

In the long term it may be possible to “switch off” the aging process and also to maintain a repair program in cells, by modifying the cells of the early embryo or even in the gametes prior to conception. If all the cells of an individual had their aging program switched off and were programmed to regenerate, then the immortality that this would confer on the cells would be passed on as the cells multiplied and differentiated, eventually affecting every cell in the body as it was formed. The resulting children would be truly immortal.

There is a long road between therapies that will result in extending life expectancy and the heady prospect of “writing immortality into the genes of the human race.” It seems safest to assume that we are likely to start with targeted therapies for particular conditions, which, because they involve tissue or cell regeneration, will result in longer life expectancy. Later we may learn how to combine such measures with the ability to switch off the aging process in genes. The road to immortality will be long and progress slow,

and of course we may never reach the destination. In the remainder of this discussion I shall talk predominantly of “immortality” and “immortals” and mean these terms to cover all stages from quite modest life-extending therapies to truly indefinite survival.

If we assume that life extension will be possible, and that people who will for practical purposes be “immortals” might be created, it is of some importance to know what we should think about such a prospect and what should, or could, we do about it. It is important to press this question for a number of reasons. The first is perhaps the intrinsic interest and significance of the question. Humans have up to now been defined in terms of their mortality. We mortals have seen this as part of our essential nature. Moreover, extending lifespan is far from unproblematically beneficial, and there are questions of justice, of social policy, and of sheer practicality to be resolved. Although the development of this technology may be far in the future, there is some considerable importance to addressing the moral and social issues raised by new technologies in advance of their development. There are many good reasons for this. Once a technology has been developed it acquires its own momentum and may be very difficult to stop or control. Equally, fears that are provoked in the panic that may follow dramatic developments may prove unfounded, and acting precipitately on those fears may cut us off from real and substantial benefits. This has, for example, clearly been true in the case of the reaction to the development of cloning technology.⁷ “Horizon scanning” is not simply voyeuristic; it can enable us to choose the futures that we want to experience and to prepare sensibly for those futures. Or it can forearm us against futures that, while undesired, are not such as we can legitimately or realistically prevent.

I believe that this latter “option” will prove to be the case for life-extending techniques, and that it is therefore important to think carefully about their consequences rather than delude ourselves that we can choose whether or not the technology will become available.

There is, of course, a sense in which we are all already immortal. We know that genes are “immortal.” The genes in each of us come from our earliest humanoid ancestors, and their genes came from the earliest forms of life on earth. The genes we pass on to the next generation, by whatever method of reproduction we use, may survive indefinitely into the future. This is certainly immortality of a kind. Those who find the thought of such immortality attractive can comfort themselves with the thought that their genes have always been immortal in this sense. If this sort of immortality answers the quest, then parts of each and every one of us are immortal and always have been. But, of course, it doesn’t. The quest is for personal immortality, and if and when that can be achieved many people’s individual prayers will have been answered, but humanity will face huge challenges.

Familiarity with Immortals

Increased longevity and its logical extension, some would say its *reductio ad absurdum*, immortality, have a long history. Certainly the human imagination is familiar with the idea of immortals and mortals living alongside one another and interacting. *The Iliad*, *The Odyssey*, the Bible, the Koran, the Ramayana and Shakespeare’s plays have all made such ideas familiar; even modern classics have taken seriously the possibility of immortality. In his celebrated five-part trilogy, *The Hitchhiker’s Guide to the Galaxy*, Douglas Adams imagines a man who achieved immortality by accident.

To begin with it was fun, he had a ball, living dangerously, taking risks, cleaning up on high-yield long-term investments, and just generally outliving the hell out of everybody.

In the end it was the Sunday afternoons that he couldn’t cope with, and that terrible listlessness which starts to set in at about 2:55 when you know that you have had all the baths you can usefully have that day, that however hard you stare at any given paragraph in the newspapers you will never actually read it . . . and that as you stare at the clock the hands will move relentlessly on to four o’clock, and you will enter the long dark teatime of the soul.⁸

Despite the apparent pessimism of this passage many people would be prepared to endure “the long dark teatime of the soul” in exchange for permanent remission of the death sentence under which we all are currently forced to live.⁹ Indeed there is much evidence both from literature and in the literature that suggests that many people are willing to trade off quality of life for longevity.¹⁰ From the pact of Faust, celebrated by writers from Marlow to Goethe, to Bram Stoker’s vampires,¹¹ to choices made by cancer patients with a terminal diagnosis,¹² the evidence is strong that people want extra lifetime even at substantial costs in terms of pain and quality of life, and even when outcomes are highly uncertain.

Immortality Is Not Invulnerability

We should note that immortality is not the same as invulnerability, and even “immortals” could die or be killed. Accidents, infectious diseases, wars and domestic violence would all take their toll; and although we might hope for progress in combating existing diseases, the development of new threats, as the HIV/AIDS pandemic and the emergence of variant

Creutzfeldt-Jakob disease have demonstrated, may increase rather than reduce human vulnerability over time. If we add to this the diminishing effect of proven therapies such as antibiotics through the emergence of resistant strains of bacteria, it is difficult to predict the likely levels of “premature” deaths in a future in which increased life expectancy was developing and spreading through the human population. Human generations would undoubtedly still succeed one another although possibly at a slower rate.

II. LONG LIFE GOOD, SHORT LIFE BETTER?

How should we view the prospect of “writing immortality into the genes of the human race” or even of the significant extension of individual lives, both for ourselves, for others, and for society? This is a question that is both of immense interest and, as we shall see, of considerable ethical, social, and practical importance.

Life Expectancy of 1,200 Years?

Steven Austad¹³ has calculated that an average life expectancy for “immortals” might be 1,200 years. This he bases on the supposition that immortals might die at the rate of current 11-year-olds. The idea is that 11-year-olds have stopped dying of childhood diseases and have not yet started dying of the diseases of old age. Extrapolating from the death rate of 11-year-olds thus gives a possible death rate for immortal but vulnerable adults. He raises an interesting question in connection with attitudes to risk. It is unclear what the effects on levels of risk aversion would be. It might be a safe bet that young males in particular would remain in high premium brackets for motor insurance but whether or not “supercenarian” citizens would be a menace on the roads or would have, perhaps through constant practice over a longish period,

developed superhuman skills would be an interesting question. Although since there is probably an upper limit to useful road skills, and traffic congestion would be a limiting factor, it is likely that immense experience would not add much to road safety.

We do not know when, or even if, such technologies could be developed and made safe enough to use. It might happen in ten, or a thousand years, or never, but many reputable scientists believe it to be possible.¹⁴ Of course it is also possible that even the substantial degree of residual vulnerability we have discussed could eventually be dramatically modified by techniques that might be developed that would enable a certain amount of repair and even rebuilding work to be undertaken on badly damaged or destroyed tissue. If progress were to be made in this direction, not only might generational replacement slow still further but average life expectancy of say 1,200 years might have to be revised substantially upward.

Global Justice

One thing we do know is that the technology required to produce such results will be expensive. For existing people with multiple interventions probably required, the costs will be substantial. To make modifications to the embryo or even to the gametes prior to conception, people will have to be determinedly circumspect about procreation and will probably need to use reproductive technologies to have their immortal children. Even in technologically advanced countries, therefore, immortality or increased life expectancy is likely to be confined to a minority of the population. In global terms the divide between high-income and low-income countries will be increased with low-income countries effectively denied access to the technology that might make some of their citizens immortal. The issue of the citizens of rich countries

gaining further advantages over the poor will rightly disturb many. Indeed, the major ethical problem with life-extending technologies is, I believe, to be seen in terms of justice. How are we to understand the demands of justice here?

Parallel populations

One feature of likely development of life-extending treatments, which has seldom been noticed, is the fact that as treatments become available we will face the prospect of parallel populations, of mortals and of immortals existing alongside one another.¹⁵ Thus the problems of global justice will be repeated in those societies able to implement life-extending therapies. Just as there will exist parallel societies, some able to provide immortalizing therapies and some not, so within those societies that have the technology and the resources required there will exist parallel populations of mortals and immortals. This, of course, is precisely the destiny for which the poetic imagination has prepared us, literally from “time immemorial.” While such parallel populations seem inherently undesirable, it is not clear that we could, or even that we should, do anything about such a prospect for reasons of justice. For if immortality or increased life expectancy is a good thing, it is doubtful ethics to deny goods to some people because we cannot provide them for all. And this unfairness is not simply contingent, a function of a regrettable but in principle removable lack of resources. There will always be circumstances in which we cannot prevent harms or do good to everyone, but no one surely thinks that this affords us a reason to decline to prevent harms to anyone in particular. If twins suffer from cancer and one is incurable and the other not, we do not conclude that we should not treat the curable cancer because this would in some sense be unjust to the incurable twin. We don’t refuse kidney transplants to some

patients unless and until we can provide them for all with renal failure. We do however have a clear ethical responsibility to ensure that the question of who receives the treatments should be decided according to some just principle of distribution.

But the “impossibility” of providing treatments for all admits of many different degrees. We don’t usually regard ourselves as wicked in Europe because we perform many transplants¹⁶ while low-income countries perform few or none at all, but perhaps we should. The solution however is certainly not to say that we will outlaw transplantation unless and until equitable distribution on some agreed principles can be guaranteed. The introduction of any new complex and/or expensive technology raises these problems. The impact on global justice or on justice within societies is important and must be addressed; it is a principled objection, but not an objection in principle to the introduction of life extending therapies. The principle requires that strenuous and realistic efforts be made to provide the benefits of the technology justly, not that the benefits be denied because of the impossibility of ensuring adequate justice of provision.

On the supposition that longevity is a good, there will be both personal and global injustice. However the principle of “no dogs in mangers” will probably be enough to stop any comprehensive prohibition of the use of life-extending treatments on grounds of a general policy denying palpable benefits to some so long as others cannot equally benefit. On the other hand if longevity neither confers advantages nor is desirable, then it is difficult to see how it might be unjust or wrongful for some to receive such “neutral” treatments but not others.

Immortality as the side effect of therapy?

Global justice and social justice concerns may seem to make the prospect of immortality seem unattractive. However, there is another reason that makes it unclear that ethically anything could be done to prevent the development and utilization of techniques for substantially increasing longevity and even engineering immortality. Remember that immortality is not unconnected with preventing or curing a whole range of serious diseases. It is one thing to ask whether we should make people immortal and answer in the negative; quite another to ask whether we should make people immune to heart disease, cancer, dementia, and many other diseases and decide that we shouldn't, because a "side effect" of the treatment would be an increase in life expectancy. We are then, unlikely ever to face the question, Should we make people immortal: Yes or no? We may rather be called upon to decide whether we should treat this disease when we know an effective treatment will extend lifespan.

It might then be appropriate to think of immortality as the, possibly unwanted, side effect of treating or preventing a whole range of diseases. Could we really say to people, "You must die at the age of 30 or 40 or 50, because the only way we can cure you is to make you immortal or let you live to be 200 or 300"? Faced with such a choice an individual might well say, "Let me have my three score and ten, and then let me die." Whether, given the quite pervasive and irrational hostility to euthanasia, societies would be willing to allow such bargains to be made is doubtful. However, the prospect of denying people the introduction of effective therapies for the diseases of old age on the grounds that old age would thereby be abolished is equally difficult to contemplate. Most probably it would be impossibly difficult to deny those

suffering from treatable disease the chance of a cure on the grounds that the therapy brought the individual too much secondary gain.

Here we should note again the different ways in which enhanced life expectancy might be achieved. Initially, relatively short increases in life expectancy may result from the treatments for particular diseases provided those diseases occur in old age. In the longer term the interventions are likely to be made more comprehensively in the embryo, protecting against the onset of such diseases and more substantially enhancing life expectancy. In either case the interventions would be therapeutic in the traditional sense as well as life extending. The impossibility of separating these two functions or consequences of treatment will make it impossible to isolate the ethics of life extension and treat it as if it had no further morally important consequences. Even if the technology improves so that instead of accessing therapies for diseases the side effect of which is life extension we develop life-extending treatments that have the side effect of preventing disease, we will unlikely be able to reject one and not the other effect.

If justice seems to demand some form of equalization of life expectancy, we will have to face up to the deliberate curtailing of lives that would otherwise continue with all of the additional moral problems that will entail. These will be discussed further below.

We have become used to, in recent years, not only the idea but also the reality of an increasingly aging population, but it is doubtful that this phenomenon will have done much to prepare us for the sorts of increases in life expectancy that may be in store. The new immortals are not likely to be "old"

in conventional terms (frail, with restricted mobility and susceptible to the mental and physical infirmities we associate with extreme old age). They may of course still have (relatively) short periods of decrepitude toward the end of their very long lives during which they will suffer from old-age infirmities. But in this they will not be different from the old to which we are used. We will not, however, be creating longer periods of “old age.” Moreover, facing a long period of life beyond conventional ages for retirement, both they and the societies in which they live might find it inexpedient to call on them to retire and forgo the income or the pension contributions that would sustain their technologically enhanced life expectancy. This brings us more generally to the issue of population policy, but we will return to the issue of global justice once some further necessary features of the landscape have been explored.

Population Policy

Many people addressing the question of life extension have assumed that such a possibility will have a disastrous effect on the world’s population with the present generation living indefinitely and a procession of subsequent generations adding to the congestion.¹⁷ However, this is by no means either a likely or even the most likely scenario. The effect of life extension on population will be a function of a number of different factors, the outcomes of which are all difficult to predict. The first is the degree of uptake, which itself will be heavily dependent on cost and availability of the therapies. Granting, as we have, that life-extending therapies will gradually become available, cost, risk, and uncertainty will mean that for a very long time the numbers of people availing themselves of such therapies will be a tiny proportion of the world’s population. It is likely that the impact on world

population will remain negligible for many hundreds of years after such therapies become available. The impact on particular societies might well be noticeable but again is likely to remain insignificant for very long periods after the introduction of such technologies. We have already noted a possibly increasing human vulnerability due to new infectious diseases or antibiotic-resistant strains of bacteria. Again it is difficult to predict the continuing effect of these on population or how the advent of some immortals would affect the equation. Disease may well continue to be an effective leveler, improving its own technology as we improve ours. And of course immortal but vulnerable people will continue to die in accidents and from injuries received, and the longer they live the greater is the probability of accidental death.

One very general experience is that in all societies in which life expectancy increases birth rate falls. The causes are hugely complex, the most likely being the increase in average life expectancy caused by a fall in infant mortality. One thing is clear: We do not know the effect of the introduction of life-extending therapies on population, partly because we don’t know what else will happen or what else will have happened.

We do not therefore need to foreclose the possibility of providing life-extending treatments for fear of the effects on population. We will need to consider effects as the therapies come on stream and monitor the various consequences of such therapies. If worst fears about the effect on population seem likely to be realized, there are a number of obvious strategies that might be adopted. One is a large “immortality tax” payable by those who would access life-extending therapies. Another would be to restrict the entitlement to reproduce for those seeking immortality, either making sterilization a condition of accessing the therapy or for those

who are “treated” as embryos, confining them to one child or (if technology permits) making reversal of the life-extending therapy a condition of procreation or excessive procreation. One possible scenario is brilliantly described by Tom Kirkwood¹⁸ and involves surrendering immortality on the birth of a second child.

The End of Reproduction

Of course these preventive strategies assume the necessity for, or desirability of, the creation of future generations. Is there a moral difference between a future that will contain x billion people succeeded by another x billion different people and so on indefinitely, or x billion people living indefinitely and replacing themselves on the (rare?) occasions when they are killed? Although, as we have noted, this is an unlikely scenario, posing the question in this stark form enables us to ask an important question. That question is whether or not what matters morally is that life years of reasonable quality exist or that different people with lives of reasonable quality exist. Put in this way the problem assumes a familiar form—should we maximize life years or individuals’ lives?¹⁹ From the life years perspective it ought not to matter how many new people the world will contain but simply how many life years of acceptable quality it will contain. Those who, like me, find the life years approach unsatisfactory will be inclined to think that individual lives matter. But even so, it could consistently be held that it is the individual lives of existing people that matter, not how many new individual lives there will be. For, if future generations will come into being, then we now have responsibilities to those future people. We must not now do things that will hurt future people when they come into being. We have as much moral reason not to put slow-acting poison into the water supply that will kill people 100 years

from now as we do to keep fast-acting poison away from our contemporaries. But if we simply choose not to produce future people there is no one who is harmed by this choice.

However, the argument for making sure that there will be new generations is not settled by the outcome of the debate between those who think that future lives count equally with existing lives and those who do not. There are other reasons why we should be in favor of the creation of new human individuals or, indeed, of a new kind of persons who may, if evolution has not finally stopped, eventually evolve; or if it has, who may be deliberately created by the germ-line modification of human individuals.

One group of such reasons has to do with the desire to procreate and the pleasures of having and rearing children. These I will not discuss further now, although in that they are fairly universal desires and pleasures they have some importance.²⁰

The second set of reasons has to do with the advantages of fresh people, fresh ideas, and the possibility of continued human development. If these reasons are powerful, and I believe they are, and if the generational turnover proved too slow for regeneration of youth and ideas, we might face a future in which the fairest and the most ethical course might be to contemplate a sort of “generational cleansing.”²¹ This would involve deciding collectively how long it is reasonable for people to live in each generation and trying to ensure that as many as possible live healthy lives of that length. We would then have to ensure that, having lived a “fair innings,” they died at the appropriate time in order to make way for future generations. Achieving this result by voluntary or ethical means might be difficult; attitudes to suicide and euthanasia might change but probably not overnight.

While, faced with a nonregenerating society, encouragement of suicide and euthanasia might seem increasingly attractive, it is difficult to imagine how it could be justified, at least if our time-honored ethical principles remain plausible. For how could a society resolve to deliberately curtail worthwhile life while maintaining a commitment to the sanctity of life?

The Reintroduction of a Fair Innings

If we cannot see our way clear to modifying our conception of the sanctity of life, there are other strategies open. For example, we might, if we could, do something that amounts to the same thing, namely program cells to switch off the aging process for a certain time (number of cell divisions or whatever) and then switch it back on again when a “fair innings” had been reached. This of course would be much like the system nature has in place, with the important difference that most people would live a full life or an enhanced lifespan rather than having to run the gauntlet of the genetic lottery.

Here the so-called fair innings argument is resurrected in a new form. Now, this argument has many difficulties, despite superficial attractiveness, and many notable adherents.²² There are two classic versions of the fair innings argument.

The fair innings argument says either that there is a period of lifetime that is either a fair share of life or a period sufficient to live a complete life. Let’s imagine that in each case the suggested span is the familiar “three score and ten,” or 70 years. The “fair share” version says that 70 years is a fair allocation of life and that people should be supported in their attempts or desires to live up to 70 years, but after that threshold is reached they should be considered to have had their fair share of life. The “complete life” version suggests that a certain period of existence is required in order to live

a complete life, experience perhaps “the seven stages of man,” have children and see them grow, and so on. If it is completeness that matters, whether or not a life is complete will be a question of fact in each case, and some lives will have their moral importance discounted prematurely. To take a prominent example, Nelson Mandela had had his fair innings (if length of lifetime lived is the criterion) before leaving Victor Verster prison, and had a fair innings been imposed, the long march to freedom would never have been completed. The conclusion is similar to that of the fair share version, namely, that once a complete life has been lived one’s entitlement to life is extinguished.

Now as the fair innings argument has been so far used in health care it suggests that the entitlement to life-saving or life-prolonging resources is extinguished once a fair innings has been reached. It has never so far been used as an argument to justify direct killing. In the case of treatments that would extend life indefinitely, however, the suggestion must be not simply that health care following accidents should be withheld but that the life-extending therapies should themselves be time limited, if this proves technically possible. This would mean that any entitlement to have one’s life prolonged or even protected is extinguished after a given quota of life.

In the case of life-extending therapies, the fair innings solution to the problem of immortality requires not simply that people’s lives are not further sustained once a fair innings has been achieved but rather we are asked to contemplate killing those who have passed their sell-by date. If this is not done only a few of the immortals will die when they “should,” only those, in short, who require life-sustaining measures in order to go on living. Even in the very science-fictional future case

where we might be able to switch off the aging process in cells of an embryo but program the aging to switch on again in, say, 1,000 years, we would be contemplating direct killing. This would be the equivalent of putting a delayed action poison into someone's body that would cause death at some given moment in the future.

The contemplation of the direct killing of people who wish to go on living is terrible indeed. Without this we must either abjure therapies that will cure or prevent the many terrible illnesses that cause premature death but only at the cost of extending life or find other ways of providing the therapies while avoiding the consequent increased lifespan.

The case of life-extending therapies draws attention to a problem about fair innings approaches to health care, and for that matter to other social welfare measures and indeed entitlements to community services more generally. It is that they beg the question as to where the value of life or the entitlement to life is located in a particular way. Fair innings approaches say that the right to life or the value of life is an entitlement grounded on life's value both consisting in and being exhausted by life having a particular size or shape. The value or purpose of life is to achieve that size or shape and once achieved the value is extinguished. It is like seeing the purpose of life as getting to the finishing line set arbitrarily at a particular point. If the runner continues beyond the finishing line, that is a pointless and wasteful activity viewed from the perspective of the point and purpose of the race. Or if shape is the issue life is viewed like the construction of a building according to the plans of a master architect. Once the realization of those plans is complete, then any further additions or modifications are destructive of that original conception and are self-defeating.

But for most people life is surely not like that and, for that matter, conceptions of the value, purpose, or point of life are not like that.²³ I will not here attempt to set out the various leading conceptions of the value, purpose, or point of existence. I will rest content with observing that most people do not see their life as essentially bounded by a particular finishing line nor, even if they do see it as an enterprise, which they are trying to shape and direct, do they see it as of a shape and form fixed in advance. They are more likely to see it as a constantly changing entity like a hamlet that grows into a town and then into a city and may begin to shrink again with different houses and districts constantly evolving and being replaced. Although fair innings conceptions of life may help with problems or scarcity, they do scant justice to the ways (most) people feel about their lives. Apart from convenience it is difficult to see how fair innings conceptions of the value of life or the entitlement to live could be imposed on those who don't accept them when such imposition means premature death, or what would be considered to be premature death, by those who do not share such a view.

Is Longevity a Good?

This brings us to the central issue: Would substantially increased life expectancy or even immortality be in fact a benefit or a good? There are people who regard the prospect of immortality with distaste or even horror; there are others who desire it above all else. In that most people fear death and want to postpone it as long as possible, there is some reason to suppose that the prospect of personal immortality would be widely welcomed. But it is one thing to contemplate our own personal immortality, quite another to contemplate a world in which increasing numbers of people were immortal,

and in which we and all or any future children would have to compete indefinitely with previous generations for jobs, space, and everything else. In order to understand what one might mean by the question “Is longevity a good?” we must consider the meaning of life extension or the postponement of death. And considering this question will help to clarify the requirements of distributive justice.

Just Distribution of Opportunities for Extended Life

If, as seems probable, life-extending therapies are both inevitable and morally defensible, how might we approach questions of individual and global justice in the distribution of such opportunities for extended life? Firstly we should consider whether just distribution of life extension differs from questions of just access to more familiar death-postponing therapies. It surely comes down to this: Either life-extending therapies are life saving or they are not, “life saving” being always simply a redescription (and usually a less precise description) of “death postponing.” Or life-extending treatments are to be considered not as life saving but as something less urgent and important, some sort of bonus, like a luxury car perhaps. The fair innings argument seems to imply this. But how could it be simply that? How could extinguishing a life that is valuable to the person whose life it is be simply like declining to fund a luxury car?

Suppose life extension happened by accident. Would it be ethical to curtail an accidentally extended life because it held out prospects attractive beyond the norm? Could we do this for any other accidentally achieved advantages? Could we kill the beneficiary of life extension once he had passed his sell-by date? Suppose by intervention in the germ line we could effect immortalization so that new children would be genetic immortals. They would inherit immortality, and for them it

would be perfectly normal and natural. Could we curtail their “natural” lifespan? Suppose, as Tom Kirkwood suggests,²⁴ that aging is neither inevitable nor necessary. It might then be true that mortality would rightly be considered an unnatural aberration, and immortality might in fact be the fair innings. Would our attitude be different? Would it make a scrap of moral difference? Perhaps we should think of life-extending therapies as the equivalent of the administration of folic acid in pregnancy. We do not think of children thus advantaged as having benefited from some unfair advantage. If it is not plausible to think of the advantages of folic acid or alcohol avoidance in pregnancy as unfair, why would we think of life extension performed to benefit children as an advantage that could be or should be rectified?

If life extension counts as life saving, then, unless we can find valid grounds to distinguish between lives, it would be mandatory, and we should do it for others if we can, both as individuals and as society; and where we can't afford to do it for all we should do it for as many as we can (fairly selected). If people wish to pay for it for themselves rather than wait on publicly funded measures, this would surely be unexceptionable. If on the other hand it is a luxury, like life beyond the fair innings, then there is no obligation to provide it, but what objection could there be to people providing their own luxury at their own expense?

III. THE IMPOSSIBILITY OF IMMORTALITY

We must now consider some of the arguments that have been adduced suggesting that whether or not immortality is ethical or desirable it is impossible, not because science might not eventually make our physical bodies indefinitely long-lived

but that the persons whose bodies they initially were would survive less successfully than their immortal coils.

The Argument from Successive Selves

The first such argument is about psychological discontinuity.²⁵ This argument suggests that problems with psychological discontinuity would result in successive selves rather than one very long-lived self. This suggestion has much philosophical respectability but has never been overwhelmingly convincing. The main support for it comes in the form of suggestions that without continuity of memory, continuity of personality and hence personal identity fail, or that it is impossible for the brain to integrate memory over very long periods because of its apparent need to suppress trivial memories. Suppose I have no memories earlier than age 5. Does it follow that my physical body is 5 years older than me? Secondly, even if scientific claims about the impossibility of the brain integrating memory and the need to suppress trivial memories are plausible, it doesn't follow that the long-lived individual could not supplement physiological memory with supplementary data of many sorts that would provide the appropriate backup. Video histories, photos, records of various kinds could remind even Methuselah of his earlier life even when physiological memory fails, and other Methuselaha could reminisce with him and fill in enough of the gaps. When I look at a photograph of myself at age 3 playing with a long-forgotten toy, I smile both in recognition of myself, age 3, and begin to remember that favorite toy. Of course I don't know whether or not my memory is partly determined by the photograph—but still I remember it in a sense.²⁶ Whether or not that “memory” is veridical is probably impossible to determine, but its role in giving coherence and continuity to existence does not depend on the memory being apodictic.

Successive Selves and Rational Prudence

It has been suggested that over a very long life of a Methuselah, personal identity must fail, giving place to successive selves, and that it follows that prudential or self-interested motivation for continued existence must also therefore fail.²⁷ Suppose Methuselah has three identities, A, B, and C, and that C can remember nothing of A's life. But suppose the following is also true: A will want to be B, who will remember being A; B will want to become C, who will remember being B but possibly not remember being A. It is not irrational for A to want to be B and not irrational for A to want to be B partly because he or she knows that B will be able to look forward to being C, even though by the time she is C she won't remember being A. Thus even if personal identity in some strict sense fails over time it is not clear that a sufficiently powerful motivation for physical longevity fails with personal identity. This would remain true however many selves Methuselah turns out to be.

To take a different example: I can have powerful personal interest in the survival of my children and grandchildren although their identities are different from mine. I know these are successive and different selves, but I have an interest in their existence, and in their well-being throughout that existence.²⁸ No argument has or could show the *irrationality* of wishing to be Methuselah even if Methuselah is a succession of selves and not a single personal identity. It would, of course, show that it was not personal survival that is at issue in such a case, but it could not show the irrationality of even a very strong and passionate interest in the existence of those future beings. So that when it is said that “there would not be good reasons to care about the future selves”²⁹ in such circumstances, this is surely disingenuous. This is no more

true than it is true that I have no good reasons to care about my great great grandchildren. It is only irrational (possibly) to think that this will be the self, surviving indefinitely, but it is not irrational to have an interest in creating those successive selves. Therefore, as an argument for the foolishness or psychological incoherence of bodily immortality, the argument fails.

Temporal discounting

Many people think that it is rational to discount the far future in favor of the present or near future, and that this shows that we cannot have an interest in ourselves far into the future. Even if this were true it would not follow that discounting events in the far future in favor of the near future entailed that the far future count for nothing.³⁰ Suppose we had to choose between five days of pain now or five months of pain in 1,000 years' time, it would not be irrational to choose to put off the pain for 1,000 years and that is probably what we would in fact do; that would not show that we had no interest in our future selves, it would merely demonstrate a recognition that there are other reasons why that future event may never occur, which makes it rational to go for postponement even at increased eventual cost. As Derek Parfit has noted, "It may often be morally permissible to be less concerned about the more remote effects of our social policies. But this would never be because these effects are more remote.... Most of our fellow citizens live closer to us than most aliens. But no one suggests that, because there are such correlations, we should adopt a Spatial Discount Rate. No one thinks that we would be morally justified if we cared less about the long-range effects of our acts, at some rate of n percent per yard. The Temporal Discount rate is, I believe, as little justified."³¹

Immortality is cost-effective

Before we leave the issue of temporal discounting we should consider the possibility, pointed out to me by Søren Holm,³² that immortality so far from increasing health costs per individual might actually dramatically reduce them, there might in short be an economic discounting argument for the public funding of immortality interventions.

If we assume the following:

1. For both mortals and immortals there is the same period of old age with increased health care costs (say ten years, but the length does not matter for the argument) and the same costs of treatment during those years (let's say £10,000 [\$20,137] on average).
2. The mortals will reach this period in 70 years and the immortals in 1,000 years.
3. There is a 1 percent per year rate of real economic growth.

Then the present day discounted costs of treating a person in 70 years' time will be £4,948 (\$9,960), whereas the present day cost of treating the same person in 1,000 years' time will be 43 pence (\$.87)! It thus makes economic good sense to invest now and postpone health care costs from 70 years into the future to 1,000 years into the future, and, as is evident from the figures, it makes sense even if immortals would have a much longer and more costly old age (because of the discounting, even a tenfold increase in costs would not matter).³³ Add to this the probability that a greater number of immortals would die as the result of accidents rather than long drawn-out illnesses and the economic arguments grow stronger still.

So far we have not challenged the assumption that it might indeed be both impossible for memory to permit a single self to survive over, say, 800 to 900 years and that an immortal body would therefore play host to successive mortal souls. I have suggested that even if this were true it would not be irrational to wish to be the first and possibly the second in such a series of selves and to wish the subsequent, successive selves long and happy continuance.³⁴ I could take as much if not more pride and interest in my “line” of genetically identical and bodily (spatio-temporally) continuous selves as many do in their “line” of descendents. However, I am far from convinced that I cannot have my cake and eat it, or rather have my descendents and be them, too.

Is being 42 boring?

Is there a limit to the number of projects that can sustain our interest in persisting as persons into the future? It has been suggested that there is, and that this is due to the limit in our cognitive resources of knowledge and imagination.

Bernard Williams³⁵ has famously argued along these lines. Williams suggests that even “frozen” at an ideal age of 42, one would eventually have done all that 42-year-olds can do and so become terminally bored. But that presupposes that all that 42-year-olds can do is all that 42-year-olds could do in, say, 1973. Since the 42-year-olds will live forever, they will be forever able to increase the ambit of even 42-year-old imagination. One might adapt the, probably apocryphal, story about Jane Fonda. When someone flatteringly told her that she didn’t look “40,” she allegedly responded, “Come on, this is the seventies—this is what 40 looks like now.” We might say, “Come on, Bernard, this is immortality, this is what 40-year-old immortals can find to do!” Whether eventually an immortal would have done everything possible so many times that

the future would be bleak and uninteresting is impossible to say. But since immortals would still be vulnerable, they would always have a way out if and when endless repetition became inevitable and unwelcome.

IV. THE VIRTUES OF MORTALITY

A number of writers have been forthright in extolling the virtues of mortality. We have already noticed some of these. Prominent among recent contributors to this debate has been Leon Kass, appointed by George W. Bush in 2001 to head up his new President’s Council on Bioethics. Kass identifies the core question as the following: “Is it really true that longer life for individuals is an unqualified good?” Kass gives four main reasons why we should not only think that it is not an unqualified good but rather that we should think of it as an evil. He starts however with a metaphysical observation. “For to argue that human life would be better without death is, I submit, to argue that human life would be better being something other than human. The new immortals, in the decisive sense, would not be like us at all. If this is true, a human choice for bodily immortality would suffer from the deep confusion of choosing to have some great good only on condition of turning into someone else.”³⁶ This is close to Glannon’s argument about personal identity and, insofar as it relies on claims about psychological continuity over time, it has the problems we have already considered. However, Kass’s argument seems to be suggesting a simpler objection: that since the (current) essence of being human is to be mortal, immortals would necessarily be a different type of being and therefore have a different identity. There is a sense in which this is true, but not I think in any sense in which it would be irrational to want to change identity to the specified extent. It would still be “me” in a new persona that would live longer

than before. Someone who had been profoundly disabled from birth (blind or crippled) and for whom a cure became available in midlife would become in a sense a different person. She would lead a different type of life in many decisive ways. It does not follow that the blind or crippled individual has no rational motive to be cured because she would then, in an important sense, be a different individual. Or take the case of a transsexual; gender is a deep issue of identity, but there is no “deep confusion” in imagining that someone born as a man would wish to change sex and become a woman. Certainly it would be odd to say to him, as Kass presumably would have us do, “It is deeply confused to want to change sex because then you will no longer exist.” He knows very well that he will continue to exist, but as a woman, and he hopes that the change will make him happier. It may not, of course, but we surely know who it is who will still be miserable.³⁷

Kass then offers his four benefits of mortality, and we will look at them in turn.

1. Interest and engagement

“If the human lifespan were increased even by 20 years, would the pleasures of life increase proportionately? Would professional tennis players really enjoy playing 25 percent more games of tennis? Would Don Juans ... feel better for having seduced 1,250 women rather than 1,000? What would there be to do for 15 years after being president of Harvard for a quarter of a century?” Unlike Kass I think I can see differences in the degree of reward between enjoying 250 more women or 15 more years at Harvard. Be that as it may, the sensible answer is surely “if more of the same does not appeal, there is always the opportunity to try something different”; that is, of course, always providing that one has world enough and time in which to do it.

2. Seriousness and aspiration

“Could life be serious or meaningful without the limit of mortality?” asks Kass, obviously expecting “no” as the answer. He has little to offer us by way of evidence or argument. He says “to number our days is the condition for making them count,” and the Psalmist is cited as authority. Then we get treated to the biography of some nonexistent beings—Zeus, Hera, Apollo, and Athena—who apparently lead frivolous lives on account of their fictional immortality. Interestingly, Kass does not wax eloquent upon the frivolity and vacuousness of the existence of the immortal Almighty. This may be because God, having an existence quite unlike our own and (necessarily?) beyond our ken, is better at finding meaning in existence than we are. But it is unclear why this should be so; if it were the limit that confers meaning, then God would seem also to need limits.

3. Beauty and love

Here things go from bad to worse. Kass quotes Wallace Stevens as saying, “Death is the mother of beauty,” and then Kass struggles unsuccessfully for two whole paragraphs to make sense of the quotation, producing only a procession of rhetorical questions. His last is “How deeply could one deathless ‘human’ love another?” I imagine one plausible answer might be “as deeply as any mortal but with the distinctly romantic advantage that they could be lovers for eternity.”

4. Virtue and moral excellence

Here Kass makes two points: that virtue and moral excellence require (sometimes?) the willingness to give one’s time, and perhaps one’s life, for good causes, “spending the precious coinage of the time of our lives.” Of course this coinage will still be precious even for immortals—one will simply have more spending power and hence more opportunity to do

good. And of course, as we have already noted, our vulnerability will remain so that it will still be possible to “give our lives” if necessary. Kass ends his thoughts with this resonant but vacuous passage: “Yet for this nobility, vulnerability and mortality are the necessary conditions. The immortals cannot be noble.” Here the gloss he offers on “nobility” is “doing virtuous deeds,” and of course these can still be done and, as I have indicated, in greater quantity. And as for the ultimate sacrifice, arguably it would be nobler since one would be giving up infinite rather than simply finite possibilities.

Kass’s final fling is to suggest that “simply to covet a prolonged lifespan for ourselves is both a sign and a cause of our failure to open ourselves to procreation and to any higher purpose. It is also an expression of a childish and narcissistic wish incompatible with devotion to posterity... It seeks an endless present, isolated from anything truly eternal, and severed from any true continuity with past and future.” If there is a sure sign of failure of nerve in argument it is when the words *true* and *truly* are introduced to qualify one’s own position. The issue of future generations as well as an eternal present is interesting and important. We have already looked at some of the issues concerning the impact of immortality on procreation. I have no doubt that new generations are important and that it is highly desirable that procreation continue. And not just procreation rather abstractly conceived but also parenting and having children.³⁸ But it is a long way from this to say that everyone must procreate or have children. As we have noted, one approach to the possibility of personal immortality might be to make the forgoing or limiting of procreation a price to be paid for personal immortality.³⁹ But this is likely to be a long-term “solution,” for in the short term the numbers of individuals able to access life-prolonging technology will be in global terms so small as to make the

impact on procreation undetectable. For the foreseeable future there will always be the fresh eyes and minds that both Kass and I think are desirable. It does not follow of course that everyone must “open themselves to procreation,”⁴⁰ and I am sure Kass doesn’t believe that those who cannot have children or those who choose not to have children, let alone for celibate religious orders, are entirely lacking in any “higher purpose.”

Immortality and Reproduction

Let’s look further at the perhaps superficially tempting way of dealing both with some of the inequities of producing and of formulating an appropriate population policy for immortals by attempting to deny them the right to reproduce, except perhaps posthumously or on condition that they sacrifice their immortality. The justification for this draconian measure would be that the immortal was occupying the space and resources needed for future generations and therefore could not herself create such generations without releasing the appropriate resources and space. This might, as we have seen, involve denying the chance of reproduction to immortals or severely limiting it. The next problem is that reproductive liberty is a powerful and widely accepted right protected by the major international conventions on human rights.⁴¹ Of course a society of immortals might never have attached such importance to procreation, and so the international conventions might have been or might come to be very different.⁴²

The second set of problems concern what is sometimes erroneously thought of as the interests of the child but is more appropriately addressed as the question of what sorts of conditions are best for children and the question of the extent to which we are entitled to try to ensure optimum conditions for children. Certainly it is far from optimum for children to be

born after the death of their parents. Would it be good for the children if mortals produced immortal children or if immortal parents produced mortal children? The answers to these questions are beyond the purview of this paper, but it is important to note that they raise significant issues.

Immortality and “Voluntary” Risk

In the spirit of justice some might think it appropriate to volunteer the immortal for especially risky occupations, perhaps once they had passed a normal lifespan of three score and ten. One effect of this might be to reduce their chances of living to enjoy immortality, and more of them than would otherwise be the case, resulting in a lifespan profile more like that of the generality of individuals. Despite the malicious, if superficial, attractiveness of such a scheme, it seems to involve two probably fatal difficulties. The first is that it is difficult to see how it would be ethically or indeed legally acceptable to coerce immortals into dangerous employment. Even if it had been made a condition of the conferment of immortality in the first place it is difficult to see how it could be acceptably enforced. Moreover, if immortality had been engineered into embryos or gametes prior to conception, it would be problematic to regard any such condition as binding on the emerging individual once they had become competent.

If the condition were nonetheless imposed, the effect might be less than satisfying. Since the immortals are likely to be among the richer and more influential sector of the community (having purchased their immortality or having had it purchased on their behalf), the effect might be to ensure that the risky nature of the occupation were reduced rather than that accidental mortality among the immortals were increased. This might be one of the advantages of such a policy on risk and immortality.

Health Costs

One last rather draconian way of attempting to inhibit the would-be immortals might be to insist that they bear all of their health costs after a fair innings or currently normal lifespan had elapsed. However, it is not clear whether the therapeutic advantages of vastly increased life expectancy would reduce or increase overall health costs for affected individuals. For although people might live vastly longer lives, they would certainly be on average more healthy throughout their lives and might have much shorter periods of health care dependency at the end of life. And we have already noted the positive effect of investing early and getting the benefit of economic discounting to offset the costs of health care late in life. Thus despite the greater “opportunity” to consume public resources the actual consumption might be reduced for immortals, and therefore economic arguments for penalizing such individuals might well fail. However, even if the reverse were true, it is not clear that it would be justifiable to distinguish between older and younger citizens in terms of the rights of access to health care.⁴³

V. IMMORTALITY IS THE RIGHT TO AN OPEN FUTURE

Joel Feinberg has elaborated what he calls “the right to an open future” in the context of child protection.⁴⁴ Such a right is a right held “in trust” for a child to exercise when he or she has the competence that makes the right relevant. This is how Feinberg explains the right:

When sophisticated autonomy rights are attributed to children who are clearly not yet capable of exercising them, their names refer to rights that are to be saved for the child until he is an adult but which can be violated “in advance,”

so to speak, before the child is even in a position to exercise them. The violating conduct guarantees now that when the child is an autonomous adult, certain key options will already be closed to him. His right while he is still a child is to have these future options kept open until he is a fully formed, self-determining adult capable of deciding among them.

And Feinberg concludes that all rights-in-trust of this sort “can be summed up as the single ‘right to an open future.’” Later in his essay Feinberg cites with approval a seminal court ruling that outlines the relevant principle encapsulating the right to an open future, confirming in Feinberg’s words that children must be “permitted to reach maturity with as many open options, opportunities, and advantages as possible.”⁴⁵ The judgment comes from the 1944 case of *Prince v. Massachusetts* in the United States Supreme Court.⁴⁶

*The healthy, well-rounded growth of young people into full maturity as citizens with all that implies [in a democracy] ... Parents may be free to become martyrs themselves. But it does not follow that they are free in identical circumstances to make martyrs of their children before they have reached the age of full and legal discretion when they can make that decision for themselves.*⁴⁷

This case involved the children of Jehovah’s Witnesses who distributed religious tracts on the streets, and while Feinberg notes that the principle was probably misapplied in this case he clearly endorses its substance. Clearly, Feinberg was not addressing himself to the issue of life-prolonging interventions. But a real question arises here, for if, as seems likely, the most successful and enduring life-enhancing modifications would have to be made on the embryo, the right to an open

future might well require parents to give their children the option of immortality in order to ensure for their child that such a “key option will not already be closed to him” when he reaches maturity. To be sure Feinberg had in mind a range of options that would present themselves “simultaneously,” so to speak, to individuals on reaching maturity, like a number of different doors on different possible futures between which to choose. However, extended lifespan will principally present options sequentially rather than simultaneously to future individuals. Even allowing for some discounting of future options they are nonetheless real options, and when (and if) the future becomes less problematic the discounting may seem less psychologically appealing and its absence of logic more obvious.

This raises the very interesting and vexing question of the extent and nature of parental duties to children. Whether parental obligations to children include trying to extend their life expectancy and how binding or enforceable such obligations might be is of great interest and complexity. Could the obligation to provide life-extending treatments to the embryo be greater or less than the obligation of mothers to take folic acid during pregnancy or to avoid smoking?⁴⁸

CONCLUSION

For the first time in human history we face the prospect of a truly open future, involving sequential as well as simultaneous opportunities and stretching open-ended before the individual in an unprecedented but truly liberating pathway to the vanishing point ... and beyond.

It is interesting to speculate on the long-term impact of long-term life on our cherished institutions. One possible consequence⁴⁹ of writing immortality into the genes of the human race might be the final extinction of religion. The promise of the afterlife, highly conditional in most religions, could be indefinitely postponed. Why take even a small gamble on the conditions being fulfilled in one's own case when the point of fulfilling them had been substantially eroded? Likewise the threat of the afterlife, usually much more unequivocal than the promise, would lose its sting, only the careless having to face the prospect of confrontation with a, by then, terminally bored deity. Fears that dwindling influence would provoke the deity into more frequent and more than usually disastrous interventions in human affairs might be a consideration for some, but if such interventions failed to materialize or were of doubtful provenance it seems unlikely that religion would survive. Just how comforting or how liberating this outcome might be only time would tell. Another interesting conundrum would be the effect on politics in general and the political process in particular. One accepted cliché is that people become more conservative as they get older. However, if the radical spirit of youth is connected with a long future stretching before the young we might expect a resurgence of radicalism from the immortals. Obviously these are unanswerable questions, as are questions about the effect of longevity on crime rates, divorce rates, sexual activity

productivity, creativity, and many other human activities. Without going into detail my own view is that there are reasons for thinking longevity may have many different and often incompatible effects on all of these things, some beneficial and others not.

To come down to earth, there is no doubt that immortality would be a mixed blessing, but we should be slow to reject cures for terrible diseases even if the price we have to pay for those cures is increasing life expectancy and even creating immortals. Better surely to accompany the scientific race to achieve immortality with commensurate work in ethics and social policy to ensure that we know how to cope with the transition to parallel populations of mortals and immortals as envisaged in mythology. As and when the numerical balance of these parallel populations seems set to shift dramatically toward significant and problematic numbers of immortals, some hard decisions will have to be taken. Eventually if justice can be done, and if we resolve the issue of an appropriate balance between existing and new generations, we will have also seen the emergence of a replacement species and will have passed from a world of mortals to, what would it be—demigods?

Notes

1. I have benefited from the incisive comments of my colleagues Neil Duxbury and Søren Holm.
2. A.G. Bodnar, M. Ouellette, M. Frolkis, et al., "Extension of life-span by introduction of telomerase into normal human cells," *Science* 279, no. 5349 (1998): 349–52; S.L. Weinrich, R. Pruzan, L.B. Ma, et al., "Reconstitution of human telomerase with the template RNA component hTR and the catalytic protein subunit hTRT," *Nature Genetics* 17, no. 4 (1997): 498–502.
3. B.A. McBrearty, L.D. Clark, X-M. Zhang, et al., "Genetic analysis of a mammalian wound-healing trait," *Proceedings of the National Academy of Sciences USA* 95, no. 20 (1998): 11792–7.
4. J.A. Thomson, et. al. "Embryonic stem cell lines derived from human blastocysts," *Science* 282, no. 5391 (1998): 1145–7; R.A. Pedersen, "Embryonic stem cells for medicine," *Scientific American*, April 1999; D.J. Mooney and A.G. Mikos, "Growing new organs," *Scientific American*, April 1999: 38–43.
5. R.P. Lanza, J.B. Cibelli, and M.D. West, "Prospects for the use of nuclear transfer in human transplantation," *Nature Biotechnology* 17, no. 12 (1999): 1171–4; R.P. Lanza, J.B. Cibelli, and M.D. West, "Human therapeutic cloning," *Nature Medicine* 5, no. 9 (1999): 975–7.
6. These possibilities were rehearsed in the BBC TV *Horizon* program "Life and Death in the 21st Century," broadcast January 2000.
7. John Harris, "Goodbye Dolly: The ethics of human cloning," *The Journal of Medical Ethics* 23, no. 6 (December 1997): 353–60.
8. Douglas Adams, *Life, the Universe, and Everything* (London: Pan Books, 1982): 9. For the record, the immortal's name was "Wowbagger."
9. And we should note that Wowbagger himself did find something meaningful to do through all eternity.
10. See for example Kenneth M. Weiss, "The biology of aging and the quality of later life," in *Aging 2000: Our Health Care Destiny, Volume 1, Biomedical Issues*, Charles M. Gaitz and T. Samorajski, eds. (New York: Springer-Verlag, 1985).
11. I am grateful to Simon Woods for insights into the undead.
12. See for example M.L. Slevin, et al., "Attitudes to chemotherapy comparing views of cancer patients with those of doctors and the general public," *British Medical Journal* 300 (June 2, 1990): 1458–60.
13. In a personal communication, April 8, 2000. See Steven N. Austad, *Why We Age* (London: John Wiley & Sons, 1997). Austad has also calculated that at this constant death rate about one person in 1,000 would live to be 10,000 years old, which is pretty close to the rate at which people live to be 100 years old today. There may be problems with these calculations however. Søren Holm has pointed out to me that 11-year-olds may not be at the normal risk for accidents, being somewhat protected by their parents and unlikely to be drivers of motor vehicles. These calculations are also almost only good for high-income countries.
14. BBC TV *Horizon* (see note 6).
15. See for example Lee M. Silver, *Remaking Eden* (London: Phoenix Giant, 1999): 282.
16. Although still many too few.
17. See Walter Glannon, "Identity, prudential concern, and extended lives," *Bioethics* 16, no. 3 (June 2002): 266–83.
18. Tom Kirkwood, *Time of Our Lives* (London: Phoenix, 1999): epilogue.

19. There is an enormous literature on this. See for example John Harris, “QALYfying the value of life,” *Journal of Medical Ethics*, September 1987: 117–23; “What the principal objective of the NHS should really be,” *British Medical Journal* 314 (March 1, 1997): 669–72; and John McKie, Jeff Richardson, Peter Singer, and Helga Kuhse, *The Allocation of Health Care Resources: An Ethical Evaluation of the ‘QALY’ Approach* (Aldershot, England: Ashgate Publishing Ltd., 1998): 151.

20. See John Harris, “Rights and reproductive choice,” in *The Future of Human Reproduction: Choice and Regulation*, John Harris and Søren Holm, eds. (New York: Oxford University Press, 1998), 5–37; and John Harris: “Clones, genes and human rights,” in *The Genetic Revolution and Human Rights: The Amnesty Lectures 1998*, Justine C. Burley, ed. (New York: Oxford University Press, 1999): 61–95.

21. I deliberately choose the term “generational cleansing” for its obvious unpalatable connotations.

22. See for example Dan Callahan, *Setting Limits: Medical Goals in an Aging Society*, (New York: Simon and Schuster, 1987); see also John Harris, *The Value of Life* (London: Routledge & Kegan Paul, 1985): ch. 5.

23. My own certainly is not; see my *The Value of Life* (above) and “The concept of the person and the value of life,” *Kennedy Institute of Ethics Journal* 9, no. 4 (1999): 293–308.

24. Tom Kirkwood (note 18): ch. 5.

25. See for example Walter Glannon, “Identity, prudential concern, and extended lives” (note 17) and my “Identity, prudential concern, and extended lives: A response to Walter Glannon,” *Bioethics* 16, no. 3 (June 2002): 284–91.

26. There is a mass of psychological evidence that our earliest memories are still with us because they have become part of a continuing

narrative, constantly reinforced by stories and other memorabilia. See for example Rita C. Naremore, “Making it hang together: Children’s use of mental frameworks,” in *Topics in Language Disorders* 18, no. 1 (1997): 16–31; and Allyssa McCabe, Earl Capron, and Carole Peterson, “The voice of experience: The recall of early childhood and adolescent memories by young adults,” in *Developing Narrative Structure*, Allyssa McCabe and Carole Peterson, eds. (Hillsdale, N.J.: Lawrence Erlbaum Associates, 1991): 137–73; Elaine Reese and Nicola Brown “Reminiscing and recounting in the preschool years,” *Applied Cognitive Psychology* 14, no. 1 (Jan–Feb 2000): 1–17.

27. See Walter Glannon (note 17).

28. See for example John Rawls’s discussion of the Just Savings Principle. *A Theory of Justice* (Cambridge: Harvard University Press, 1971): 284–93.

29. Ibid.

30. See for example Derek Parfit, *Reasons and Persons* (Oxford: Clarendon Press, 1984): 158–94, 480ff.

31. Ibid., 486.

32. In a personal communication. The calculations are those of Søren Holm.

33. Douglas Adams used a similar argument to show that the cost of traveling in time to eat at “the restaurant at the end of the universe” would bring the price of eating at the most expensive restaurant of all time easily within reach of the most humble budget. “All you have to do is deposit one penny in a savings account in your own era, and when you arrive at the End of Time the operation of compound interest means that the fabulous cost of your meal has been paid for.” See his *The Restaurant at the End of the Universe* (London: Pan Books, 1980): 81.

34. This is the familiar inconsequential differences paradox.

35. Bernard Williams, “The Makropoulos case: Reflections on the tedium of immortality,” in *Problems of the Self* (Cambridge: Cambridge University Press, 1973).

36. Leon R. Kass, “L’Chaim and its limits: Why not immortality?” *First Things* 113 (May 2001): 17–24.

37. Kass, of course, might say that this is not really a case of changing sex, merely tinkering with some external bodily features. However, we can suppose the operation could deliver *everything* the transsexual wishes.

38. For the record, being a father has been and continues to be the greatest joy of my life.

39. We have already pointed out Tom Kirkwood’s marvelous account of how this might play in some future world (see note 18).

40. At its worst this sounds rather like an inept teenage “chat-up” line!

41. See for example The United Nations *Universal Declaration of Human Rights*, Article 16, 1978; the *European Convention on Human Rights*, Article 8 and Article 12, 1953; also the *International Covenant of Civil and Political Rights*, Article 23, 1976. I defended this liberty, albeit in a somewhat convoluted form, in my *Wonderwoman and Superman: The Ethics of Human Biotechnology* (Oxford: Oxford University Press, 1992): ch. 2 and 3; and in my “Clones, genes and human rights” (see note 20). For a more explicit and more elegant defense of procreative liberty see John A. Robertson, *Children of Choice* (Princeton, N.J.: Princeton University Press, 1994), especially ch. 2; and Ronald Dworkin, *Life’s Dominion* (London: Harper Collins, 1993): 148.

42. I am grateful to Søren Holm for this point.

43. Such health costs might well be paid for on what might be called “the restaurant at the end of the universe principle” (see Douglas Adams, note 33). See also my “What is the good of health care?” *Bioethics* 10, no. 4 (1996): 269–92. “What the principal objective of the NHS should really be” (note 19), reprinted in *Rationing: Talk and Action in Health Care*, Bill New, ed. (London: BMJ Publishing Group, 1997): 100–6.

44. See Joel Feinberg, “The child’s right to an open future” in his *Freedom and Fulfillment* (Princeton, N.J.: Princeton University Press, 1992): 76–98.

45. *Ibid.*, 80.

46. *Prince v. Massachusetts* 321 U.S. 158 (1944).

47. *Ibid.*, 168, 170.

48. These are so-called “wrongful life” issues. See Joel Feinberg, *Harm to Others* (New York: Oxford University Press, 1984) and his *Harmless Wrongdoing* (New York: Oxford University Press, 1990), ch. 31; and John Harris, *Wonderwoman and Superman* (see note 41): ch. 4.

49. Ruth Deech put the idea to me; its detail as here expressed is my responsibility.

Hatch Lecturers

| | |
|--|--|
| 2007 Monica Ferreira President, ILC-South Africa Capetown, South Africa | 1998 Yuzo Okamoto, M.D. Kobe City College of Nursing Kobe, Japan |
| 2006 Sir Michael Marmot, M.B.B.S., M.P.H., Ph.D., F.R.C.P., F.F.P.H.M. University College London London, England | 1997 Joachim Wilbers, Ph.D. University of Trier Trier, Germany |
| 2005 Bernard Kouchner, M.D. Doctors Without Borders Paris, France | 1994 Alan Maynard, Ph.D. University of York York, England |
| 2004 Irene Higginson, M.D., Ph.D. Kings College London, England | 1992 Hideo Ibe, Ph.D. ILC-Japan Tokyo, Japan |
| 2002 Dalmer D. Hoskins International Social Security Association Geneva, Switzerland | 1991 Takako Sodei Ochanomizu University Tokyo, Japan |
| John Harris, FMed.Sci., B.A., D.Phil. University of Manchester Manchester, England | Tohu Furuse Japan College of Social Work Tokyo, Japan |
| 2001 Rosy Pereyra Ariza, M.D. Director, ILC-Dominican Republic Santo Domingo, Dominican Republic | 1990 Françoise Forette, M.D. Director, ILC-France Paris, France |
| 2000 Katharina Pils, Ph.D. Ludwig Boltzmann Institute Vienna, Austria | 1989 Kazuo Hasegawa, M.D. St. Marianna University School of Medicine Tokyo, Japan |
| 1999 Stephane Jacobzone, Ph.D. Organization of Economic Coopera- tion and Development Paris, France | 1988 James Williamson, M.D. University of Edinburgh Edinburgh, Scotland |
| | 1987 Alvar Svanborg University of Goteborg Goteborg, Sweden |

About the Harold Hatch Lecture

Some of the world's most distinguished scholars have participated in the Harold Hatch International Lectureship in Geriatrics.

A joint undertaking of the International Longevity Center and the Mount Sinai Brookdale Department of Geriatrics and Adult Development, the Hatch lectureship is supported by the Cobble Pond Foundation and the Margaret Milliken Hatch Charitable Trust. Since 1986, the lectureship has brought distinguished international leaders in the field of aging to Mount Sinai and the International Longevity Center. While here, the Hatch lecturers have the opportunity to give public lectures as well as participate in seminars and rounds with Mount Sinai faculty, fellows, and medical students. The goal of the Hatch lectureship is to foster an interchange of ideas between the United States and the Hatch lecturer's home country.

The lectureship was named after the late Harold Hatch, who founded the Cobble Pond Foundation to carry out international, scientific, educational, and religious activities. Mr. Hatch, who died in 1978 at the age of 102, also founded the Near East Relief Organization—later the Near East Foundation—which became one of the models for the Peace Corps. Mr. Hatch was a graduate of Yale University and a director of the Irving Trust Company.



INTERNATIONAL LONGEVITY CENTER-USA

60 East 86th Street, New York, NY 10028

212 288 1468 Tel

212 288 3132 Fax

info@ilcusa.org

www.ilcusa.org

HL02-2007-2K-JSP