

## On the concept of eugenics: preliminaries to a critical appraisal

Sobre o conceito de eugenia:  
preliminares à uma avaliação crítica

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**Abstract** *This paper's main issue is linked to what can be foreseen as the increasing capability of medical genetics to modify the genetic composition of the human species through direct interventions in the human genome for medical and non-medical purposes, i.e., the 'risk' of a resurgence of eugenics. In current discussions on the topic (briefly presented in the first section), the 'phantom of eugenics' is raised several times, but there is a great deal of confusion on what counts as eugenics, partly because of broad conceptual disagreement over the notion itself. Furthermore, according to some scholars there is no hope of overcoming this unsatisfactory conceptual uncertainty. Partly challenging this opinion, the second and third sections of this paper attempt to identify some basic features which could be seen as intrinsically linked to the notion of eugenics, with the aim of reducing the range of conceptual disagreement as a preliminary step in bringing into focus what exactly is wrong with practicing eugenics. The subsequent sections deal with the substantive issue of whether or not to practice eugenics from the point of view of the interest of future generations in the human species' genetic composition. The main moral arguments for and against eugenics are examined from the point of view of our obligations towards future generations, and the conclusion is in favor of a cautious 'open-door' position.*

**Key words** *Eugenics; Genetic Engineering; Bioethics*

**Resumo** *O ponto principal desse artigo está vinculado ao que pode ser antevisto como a crescente capacidade da genética médica de modificar a espécie humana por meio de intervenções diretas no genoma humano com propósitos médicos e não médicos, isto é, o risco do ressurgimento da eugenia. Nas atuais discussões sobre o tópico, o fantasma da eugenia é levantado diversas vezes, mas há grande confusão no que se refere ao que é considerado como eugenia, particularmente em razão da ampla discordância sobre a noção em si. Procura-se identificar algumas características básicas que podem ser vistas como intrinsecamente vinculadas à noção de eugenia, com o propósito de reduzir a amplitude de distância conceitual como um passo preliminar para trazer à luz o que exatamente está errado em práticas eugênicas. Aborda-se a questão substantiva ligada ao dever praticar ou não a eugenia considerando-se o interesse das futuras gerações na constituição genética da espécie humana. Os principais argumentos morais favoráveis e contrários à eugenia são examinados do ponto de vista de nossas obrigações em relação às futuras gerações, e a conclusão é favorável a uma posição cautelosa de "porta aberta".*

**Palavras-chave** *Eugenia; Engenharia Genética; Bioética*

## Medical genetics and the ghost of eugenics

In 1945, during a lecture at Cornell University, the American geneticist Laurence Snyder observed that the knowledge achieved in the field of human genetics had allowed some practical applications to develop, while their importance had already induced some medical schools in the United States to offer courses on medical genetics. Snyder summed up in five points the agenda of medical genetics: “[F]irst, *genetic prognosis, that is, the furnishing of genetic advice in prospective marriages and prospective families; second, diagnosis, on the basis of genetic data, of conditions difficult to identify by other means; third, instituting of preventive measures against certain diseases and abnormalities, on the basis of specific genetic background; fourth, determination of nonpaternity and other medico-legal problems [...]; and fifth, recommendation of eugenic programs for the protection and improvement of society, a problem which can be scientifically approached only with a broad understanding of the interrelation of heredity and environment*” (Snyder, 1947: 114).

When Snyder wrote these words, medical genetics was still in its infancy: the first important textbook had been published in 1940 (Roberts, 1940) and one of the first (if not the first) university courses, to which Snyder himself was appointed, was inaugurated in 1932 at the State University of Ohio. It would take 60 years before the American Medical Association recognized medical genetics as a specialty area. Meanwhile, the agenda of medical genetics has dramatically enhanced each of the points mentioned by Snyder. Genetic counseling has become a more and more widespread practice and, thanks to the increasing capacity to test several genetic conditions, the diagnostic aspect is expected to become increasingly disseminated in medical practice. In fact, if it is true that it is difficult to think of a disease without a genetic component, then all other medical specialties will be infused with medical genetics. A more and more careful understanding of the deep mechanism of the pathogenesis of diseases and susceptibility to them will allow not only more precise diagnoses, but also diagnoses of different quality than in the past (McKusick, 1993). The central question will no longer be ‘What doesn’t work?’, as in traditional diagnostics, but ‘Why didn’t something work?’. We will also be able to answer another question, ‘Why will something not work in the future?’. In the words of Watson (1992), medicine

can no longer ignore genes: it would be like a detective trying to solve a murder case without looking for the murderer.

As for the third point, unfortunately (but this is a traditional feature of medicine) there is still a gap between diagnostic ability and therapeutic capacity. Preventive measures are still very poor: ordinary medical therapies or interventions (diet, drugs, transplant) aimed at minimizing or controlling the severity of the expression of diseases or, when the condition is detected early, abortion. Nevertheless, the future therapeutic potential of medical genetics is very promising: for example, some speak of a new pharmacology able to develop ‘individualized drugs’ (Gilbert, 1992), while of course the big promise is gene therapy in both the somatic and germ cell lines (Caskey, 1993).

Leaving aside the fourth point (the use of genetic means for non-medical but widely accepted goals), we come to the last point, where we find a radical change: medical genetics has stricken from its agenda the recommendation of eugenic measures for the protection and improvement of society. Especially since the beginning of the project of mapping and sequencing the human genome, scientists and medical geneticists have taken pains to substantiate the paramount importance of the potential medical applications of this ‘big science’ project and, at the same time, to firmly dissociate human genetics and medical genetics from eugenics.

Roughly speaking, we could say that scientists and medical geneticists have succeeded in stressing the potential beneficial impact of the clinical applications of research in molecular biology and human genetics. The attention to and investments (both public and private) in the field are increasing and, for example, the interest of the National Institute of Health (NIH) in the Human Genome Project is founded on its institutional task of fostering research aimed at improving health care.

However, they appear to have failed in the effort to eliminate some eugenic ‘shadow’ from their work. It is said that the name has been erased from the agenda of medical genetics, because of a bad reputation acquired from the Nazi experience, but not the thing itself. Some cast doubts on the sincerity of scientists, holding that medical genetics is part of a more general eugenic conspiracy hatched by eugenic societies, which succeeded in involving in their crypto-eugenic programs not only medical professionals, but also institutions like Unesco, WHO, etc. (Cavanaugh-O’Keefe, 1995).

But even those who do not believe in plots wonder if part of what medical genetics is do-

ing and will be able to do is intrinsically eugenics, regardless of the sincerity and beneficial intentions of the professionals involved; and if human genetics itself is 'disguised eugenics' (Paul, 1994); or, at least, if it is possible to draw a clear-cut line between eugenic and non-eugenic applications of human genetics.

### Methodological issues

What appears to accompany both those who recall the ghost of eugenics and those who try to exorcise it is the (acritical) assumption that eugenics is a morally bad thing and that human genetics and medical genetics have to be wary of it. On this ground, the International Ethical Committee of Unesco (whose population policy is often charged with eugenism: it is worth remembering that the first general director of Unesco in 1948 was Julian Huxley, a fervent eugenicist) in the first version of the Preliminary Draft of a Universal Declaration on the Human Genome and Human Rights, while recognizing that genetic research opens up vast prospects for progress in improving the health and well-being of individuals and of humankind as a whole, stated that "*the application of genetic research must, however, be regulated in order to guard against any eugenic practice that runs counter to human dignity and human rights*" (Unesco, 1996: 332). This statement gives credit to the ghost of eugenics, but at the same time indicates a rather weak barrier against it: whoever in fact can be in favor of something which infringes human dignity? In a later version of the Draft this inconclusive statement was dropped because, as Lenoir explains in presenting this new version, "*eugenics is a controversial notion, and yet there is little consensus on its precise definition. Practices that some consider to be eugenics, others may not*" (Lenoir, 1996: 33).

According to Lenoir, the controversy is only conceptual (what is eugenics), while the moral problem seems to be considered settled: whatever can be labeled as 'eugenics' is a bad thing. This is a commonplace in the present debate. For example, in the article quoted above, Paul (1994: 67) contends: "*While almost everyone agrees that eugenics is objectionable, there is no consensus on what it actually is.*" Statements like this seem very unsatisfactory, if not internally inconsistent: if it is true that there is no consensus on what eugenics is, then it cannot be true that everyone agrees that eugenics is objectionable. Rather, we can only say that there is a series of 'who disapproves what', but

the series as a whole can hardly be interpreted in terms of nearly universal disapproval of the same thing. At any rate, that statement is the starting point of an interesting psycho-sociological approach which, taking seriously the anxiety about a resurgence of eugenics, tries to evaluate which of the scenarios people actually fear when they fear eugenics are likely, which are possible, and which are improbable. I do not deny the usefulness of Paul's approach from the point of view of social psychology. My point is that this approach leaves untouched and unanswered the issue of knowing why it seems sufficient to label something as eugenics in order to conclude that it is morally wrong. For example, in one of Paul's scenarios the use of genetic tests will become increasingly routine, and it is 'feared' that people could be 'obliquely' (i. e., by the health insurance system, policies, physicians) pressured to make particular reproductive decisions. Paul (1994: 75) writes: "*That would qualify as eugenics by most definitions. It would in any case be a very unhappy development.*" But why? Only because of the charge of eugenics?

It seems to me that in this way the debate about the real problems of genetic tests is obscured, while I think that this is precisely the goal of those who raise the ghost of eugenics: as every respectable ghost should do, it goes around terrorizing people, keeping them from thinking, clarifying issues, or making distinctions.

The conceptual issue, even before the moral one, is then unavoidable. I agree with Paul and many others that the notion is controversial: but which of the notions commonly used in moral discourses (think about the case of the notion of euthanasia) is not? An important part of debates on bioethical issues is absorbed in the attempt to reduce the range of conceptual disagreement in order to individuate the moral disagreement as well.

I do not think that this analytical work is 'fruitless', as Paul believes. After all, unless we hold a Humpty-Dumpty theory of language (where each of us, like the famous character from Lewis Carroll's novel *Alice's Adventures in Wonderland*, is entitled to say that 'words mean what I want them to mean'), words do have a proper semantic sphere, determined by history and usage, and I think it possible to offer a definition of the concepts they express, which can be construed through the method of linguistic analysis of the contexts in which they recur and the clarification of the features linked to the notion under examination. To be sure, definitions do not express the 'essence' of the thing

in a somewhat metaphysical fixed sense: indeed, even after the most careful analysis it is likely that some vagueness will remain. But this, since Aristotle, should not worry us too much: in moral discourse one cannot have the precision required in mathematics.

In the following pages I would like to make a small contribution to this work, attempting to outline some features of the notion of eugenics and, with more detail, to discuss one of the most important issues: the relationship of eugenics to future generations.

### Towards a definition of eugenics

To begin with, the notion of eugenics contains the general idea of the improvement of mankind, with the specification that this improvement can be best achieved through interventions in its genetic composition. Here I set aside the nature/nurture controversy and the issue of genetic reductionism. Doing eugenics does not necessarily require holding that everything depends on genes, but only the weaker assumption “*that different genes could give us different characteristics*” (Glover, 1984: 26). I shall return below to the question of moral permissibility to ‘manipulate’ the human genome. If, as I think, there are no convincing arguments for a ‘hands-off’ position, then we could say that it is difficult to believe that the idea of improving the human species genetically is in itself morally deplorable. Considered in itself, this idea looks very attractive and can be seen as a sort of progressive Utopia, thoughtful of the well-being of mankind and eager to put science at its service. Recently, Daniel Wikler and Eileen Palmer, recognizing the basic humanitarian impulse of eugenics, wondered why it is difficult to find defenders of eugenics among responsible leaders of science, bioethics, and health policy. “*Perhaps,*” they added, “*a cleaned-up eugenics would have a chance of winning adherents*” (Wikler & Palmer, 1992: 107).

Cleaned up of what? Clearly, of some of the features which the idea of eugenics assumed when, at the beginning of our century, it was proposed as a social practice: elitism, class discrimination, racism, and coercion. One can certainly say that all these features have been degraded versions of the idea and, historically speaking, it is true that only a minority current of eugenicists (proponents of the so-called reform eugenics) have denounced them and, even after the end of World War II, continued to propose the need for ‘cleaned-up’ eugenic measures. Good historical reconstructions of these

trends exist (Kevles, 1985), and I need not dwell on the subject. However, it is important to stress a point. Besides refusing an elitist and racist drift, reform eugenics also insisted on the need to avoid any kind of coercion, relying on voluntary acceptance of eugenic measures. This is all the more necessary today, when respect for individual liberties and individual autonomy in making choices on crucial questions has taken deep roots, at least in our Western societies. My point is that I think it very difficult to avoid any form of coercion in proposing eugenic measures, because it seems to me that this very unpleasant feature is linked to some intrinsic characteristics of the idea itself. Let’s see why:

a) The notion of eugenics involves the principle that the interest of the human species must be considered overriding the interest, hopes, and needs of individuals. The goal of eugenics is to benefit the species, not the individuals, though in the case of positive eugenics individuals who accept to be means to the realization of future mankind do receive some benefits.

b) In speaking of ‘the goal of eugenics’, I do not refer simply to the mere intention to produce eugenic effects. The intention to do (and, conversely, not to do) eugenics does not count; what counts are the effects, and it is necessary to demonstrate that the chosen means are scientifically effective in producing eugenic effects, i. e., long-term effects, statistically evident at the population level, ideally on the species as a whole. When I say ‘scientifically effective’ I mean something different from ‘let’s do that and see what happens’. This is not at all easy, because means have to satisfy the temporal dimension required by a eugenic project.

c) Though someone has enthusiastically thought of the possibility of a rapid improvement through the “*conversion of all the unfit to the highest genetic level*” (Sinsheimer, 1992: 138), it is likely that those who want to do eugenics should be able to think in terms of centuries, if not of millennia. Both negative and positive eugenics require a desperately long time to produce beneficial effects at the population level. This is certainly true for positive eugenics, while programs of negative eugenics, targeting limited and identifiable groups on the basis of careful genetic epidemiological research, can have beneficial effects in the course of a few generations.

d) The coercive aspect is linked to these three characteristics of eugenics, and it particularly affects positive eugenics. Without discussing in details what counts as coercion and

what kinds of coercion or pressure can render the means effective to the goals in the long run, I want only to say that a society which decides to invest in eugenics is not likely to leave the project to individual spontaneity. It is likely that this society desires to secure the long-run development of the project. Even granted the initial voluntary participation, it is necessary to think of some kinds of pressure in order to ensure that reproductive choices be at least consistent with the goals of the project. Moreover, any means of pressure must be able to maintain their effects on individuals belonging to subsequent generations: otherwise the advantages of the project would be inevitably destined to vanish. In his *Wonderwoman and Superman*, proposing the project of creating a new breed, J. Harris discusses all this in detail, but at the end it seems that if we want to avoid coercion, as Harris does, then we cannot but hope that volunteers develop a sort of “*cult, if not of strenuousness and self-denial, at least of circumspection and self-denial*” (Harris, 1992: 201). The idea would have pleased Galton, but I think that it would be a poor assurance for a society which can afford the high costs of such a project.

However, for the sake of argument let us suppose that this very controversial and unpleasant feature could be cleaned up, too, perhaps through the development of a sort of secular eugenic religion. Let us suppose then that a eugenic project is technically feasible, that we find a way to reconcile the interest of the species and that of individuals, and that, in the long run, too, it could be implemented without infringing individual rights and liberties. A final question remains: why should we do eugenics? As it is clear that future generations are the target of the benefits of a eugenic program, the notion of eugenics must encompass 1) the indication of what kind of interest we can reasonably attribute to future generations regarding the genetic composition of the human species and 2) the kind of obligations, if any, this interest imposes on us. The first question is not difficult to answer (although we will see that some problems arise anyway). The answer to the second question is more complicated.

### Eugenics and future generations

The issue of our responsibilities towards future generations is one of the most difficult challenges that moral thinking has to face. It is a relatively new challenge, linked to the growth of our knowledge and above all to the dramatic technological progress which has incorporated

the whole biosphere of our planet into what we are responsible for (Bayertz, 1987). In this paper I must take the theoretical complexity of the issue for granted. I only wish to recall that environmental philosophy has made us aware of the need to take the interests of future generations into account, although there is a wide discussion on what these interests are, to what extent we have to take them into account, and lastly how we can balance them with those of the present generation. What is clear is that in deciding a certain course of action (perhaps everyday action) or a certain public policy, we can no longer behave as if we were the last generation in the world.

So what kind of interests can we attribute to future generations in relation to what is commonly called the ‘genetic endowment’?

a) First of all, we can reasonably suppose that future generations are not interested in inheriting a genetic endowment (which of course evolves naturally and is subject to mutations) made worse by our actions or omissions of what, thanks to the development of science, we are able to do. On the basis of the principle of non-maleficence, this creates obligations for us, both in terms of environmental policies (pollution, radiation etc.) and health care policies, to avoid, as far as possible, the worsening of genetic endowment. The wording ‘as far as possible’ means that in case of conflict we have to balance the interests at stake. For example, future generations could have an interest in our not curing people with genetically based diseases using traditional medical therapies, in order to avoid their reaching reproductive age. Few of us are prepared to satisfy this hypothetical request: the obligation to cure real individuals overrides any interest of possible individuals. As Callahan (1980) observed, future generations can require that we refrain from a surplus exercise of rights, but this is not the case of the right to (I would say the need for) life-saving health care.

If we leave aside this type of case, I think that we could say that negative eugenics, aimed at avoiding the worsening of genetic endowment, falls within our obligations to future generations. We actually implement such programs, but we prefer to call them as it sounds in the title of a WHO report (1996) *Control of Hereditary Diseases*. Probably institutions and professionals involved would protest that they do not have any intention to do eugenics, but the results are eugenics. I prefer to call things by their proper names.

b) The notion of eugenics also contains the idea of the improvement of the genetic endow-

ment, and we can suppose that future generations will be interested in this, if it is possible and safe. This idea was virtually a foolish aspiration in the past, when the only means was the control of reproduction. At present it is theoretically possible, and many think that in the future, if and when germ-line gene therapy is safe, it will be practically feasible too. What kind of improvements can we imagine? First, protective and preventive improvements, like those listed by Anderson (1985), to which Harris (1992) adds, for example, the protection against infectious diseases like malaria, hepatitis, and AIDS or against the aging process. Of course a regular eugenicist would add the improvement of quantitative traits like intelligence. Though this is very difficult, some scientists have not despaired of succeeding in identifying the 'genes for intelligence' and then modifying them (Holmes, 1997).

As I said at the beginning, in my opinion it is difficult to find a moral principle or argument which renders absolutely morally impermissible the manipulation of the human genome. The well-known argument of 'playing God' works under specific theological assumptions, but does not hold up under others, where indeed it seems to allow (if not to require) genetic engineering. Moreover, many of us are not willing to endorse any theological assumptions at all in moral discourse.

Another argument is that the human genome is inviolable because it is sacred in a secular vein, in the sense that it is central to the image of man, and that mankind has an ontological responsibility to the preservation of the image of man (Jonas, 1974); or, in other words, in the sense that tampering with the human genome implies altering humanness at its core, to modify precisely what renders us human (Kass, 1972). In this consecration of the genome as 'the essence of humanness' I find the same kind of genetic reductionism that is very often rightly disapproved in certain manners of presenting the research on the human genome: to find the 'Holy Grail', to decipher 'the Book of Life', etc. In his public lectures on gene sequencing, Walter Gilbert used to draw a compact disk from his pocket announcing to his audience. "*This is you.*" These rhetorical strategies used by scientists in search of support and funding could certainly have helped create what has been called the 'DNA mystique' (Nelkin & Lindee, 1995), where the genome has become the equivalent of the soul. However, it seems risky to me to draw from these rhetorical strategies the idea that we are our genome, so that to modify our genetic endowment means to alter

what renders us human. It is true that the genome is the biological basis of life, but our life is not our biology and we cannot think of it as the mere deterministic decoding of a fixed program. What renders us human is the result of an inextricable intertwining of nature and history, biology and biography.

If there are no further arguments, we could say that the idea of improving our genetic heritage (as an important but not necessary or sufficient condition for a higher human flourishing) through direct interventions on genes is not, in principle, impermissible. However, since this does not imply that it is morally required, the implementation of eugenics (ignoring here the argument of 'long-term negative effects') will depend on weighing advantages and disadvantages. In the book quoted above, starting from the general obligation of the state to provide health care and on the basis of a careful comparative analysis of advantages and disadvantages, Harris (1992: 195) holds that we have "*to accept a high priority for the distribution of the resources necessary to create a new breed*", equipped with some of the genetic modifications listed above. I am not convinced that this "*high priority*" is well founded. First of all, it seems to me that in weighing advantages and disadvantages Harris neglects their temporal distribution. If it is true that advantages are superior to disadvantages, it is also true that the former redound to individuals of future generations, while the latter affect our generation. Moreover, germ-line gene therapy will probably be a very expensive procedure, at least initially. The costs of such a project will be very high and it is likely that it will absorb resources from other fields of our health care system, while expected savings will redound (again!) to future generations. Lastly, a real-world consideration: it is a common principle of every theory of responsibilities to future generations that costs deriving from our taking their interests into account must be distributed equitably in the present, with special regard for those presently least advantaged, individuals as well as classes or nations. Our world is far from ideal, and I suspect that costs will be paid only by the disadvantaged. One can say that this is an argument for trying to change the world: but while we struggle for this new world, why should we exacerbate current inequalities with all the load of suffering they entail? Perhaps a massive genetic engineering program in the interest of future generations, but our generation as a whole has no sufficient reason to accept and implement such a project.

## What does the future have in store for mankind?

A final issue remains. What if an outcome like that imagined by Harris could be obtained not as the result of a state-supported program, but 'by default' (to use an expression by Paul), i.e., as the collective effect of individual, not coordinated, actions? This is one of the scenarios illustrated in Paul's article, the one feared by people speaking of 'back-door' eugenics (Duster, 1990). The process begins in a quite reassuring way, namely using gene therapy (the somatic/germ-line distinction is irrelevant here) for strictly therapeutic purposes. However, it is not at all easy to draw the boundaries of a therapeutic application, partly because medical genetics itself is already modifying our perception of what disease is, partly because within the field of therapy new possibilities are opening up: for instance, to use gene transfer for enhancement purposes as part of a treatment designed to tackle a severe pathology, as in multidrug resistance protocols (Torres, 1997); or, more generally and effectively, to enhance genetically species-typical human health maintenance functions, for instance, the immune system (Walters & Palmer, 1997). Many medical professionals hold that these uses would fall within the proper goals of medicine, namely to cure people in the most effective way, preventing the occurrence of diseases whenever possible. But it is clear this will make it more and more difficult to establish a clear-cut division between therapy and enhancement. As Juengst (1977) says, this would only be possible by returning to a 'robust' concept of disease as 'ontological entity': however, he concludes, this would not bar the path to the influence of changing cultural and social values on the medical reasoning about diseases.

This is a further complicating factor. It is likely that pharmaceutical companies will be ready, as they already are in relation to genetic tests, to invest in a field that could have enormous financial returns, and it would be very difficult to control the market through controversial conceptual distinctions. These prospective developments are briefly captured by the image of a genetic supermarket, where prospective parents could go to purchase competitive advantages for their children with respect to intelligence, height, or other socially desirable characteristics. It is thus imagined that eugenic effects could derive from the choices of consumers (of course, only rich classes of rich countries) in the presence of (and perhaps induced by) a commercial supply of 'ameliorative

genetic modifications'. If these advantages work and benefits become evident, some fear that people could get accustomed to the idea of genetic improvement and could voluntarily accept a macroeugenic project.

As is well known, this is the empirical (psycho-sociological) version of the slippery slope argument. Generally speaking, I think that the slippery slope is a rhetorical argument whose predictive value (in almost catastrophic versions) is far from proven. Nevertheless, let us suppose the plausibility of that scenario. What is the problem? The argument works if and only if it can be demonstrated that the finishing line is morally objectionable. But for whom? Certainly not for the society in which eugenics will be accepted because it will be considered beneficial: it is normal that societies change customs, mind sets, and ways of life and thinking. Science plays an important role in all this.

I think that our generation has no interest in adopting a eugenics program: if one of the future generations will have such an interest and will be able to afford the costs, this is a problem regarding that generation. Wait and see, we can say: we have simply not to plan nor to hinder, nor to favor the creation of the conditions in which such a decision could eventually be assumed. Those who hold, on the basis of this very weak argument, that we have the obligation to stop research on the human genome (this is what is at stake!) are simply transferring their own personal uneasiness to the future, captured by expressions like 'I do not want to live in a world in which genes are given such an importance.' It is a respectable opinion, but there is no reason to think that it holds true for everyone or forever.

## Conclusion

We live in what has been defined as the age of the biological revolution. Thus far we have been a species that creates its own environment. Now we may become a species that creates itself. Faced with this perspective, it is almost inevitable that people experience a feeling of uneasiness, which however has accompanied mankind every time it has found itself in periods of deep innovation in scientific, political, and socioeconomic fields. All things considered, thus far mankind has succeeded in mastering these changes and, notwithstanding the prophets of doom who from time to time rage against every innovation, the world in which we live is a better world than in the past.

There is too much at stake today, and it is of paramount importance that the debate on present and prospective applications of genetic research get rid of ghosts and develop at the rational level, the only level fit for a world in which one can no longer contend to be the repository of the (sole) truth. I think that the anti-scientific catastrophism of those who want to stop research must be refused in principle. To do this, however, does not mean that we have to become hostages to the technoscientif-

ic paradigm. Bioethical reflection cannot be interpreted as the Hegelian Owl of Minerva, which flies at nightfall, when the processes of reality end and all it can do is to accept and rationalize them. I think that the best attitude is that recommended by Baruch Spinoza towards the reality of passions: do not limit yourself to condemning them (which is futile), but apply as much rationality as possible to know them in order to be able to govern them for the best.

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