

# BIOTECHNOLOGY AND THE ENVIRONMENT: FROM MORAL OBJECTIONS TO ETHICAL ANALYSES

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Rights can be founded in a variety of ethical systems—e.g., on natural law, on the duties postulated by deontological ethics, and on the consequences of our actions. The concept of risk we will outline supports a theory of rights which provides at least individual human beings with the entitlement not to be harmed by the environmental impacts of biotechnology. The analysis can, we believe, also be extended to the rights of animals as well as ecosystems, both of which can be harmed by human actions. We argue that further examination of these harms and rights would be the best way to proceed from emotional moral objections to truly ethical analyses in the context of biotechnology and the environment.

**I**n American television series involving lawyers, clashes between their moral beliefs and their ethical commitments frequently occur. The typical situation is that defense advocates know their clients to be guilty of some hideous crimes, but cannot, due to the ethical rules of their profession, reveal this to anybody, although they themselves feel that their clients ought to be punished for their deeds. The conflict arises, because the lawyers know that their ethical standards serve, as a rule, the best interest of the members of their societies, but also that their moral feelings reflect views which are widely shared in their communities. As the solutions to these conflicts are in the series often reached through breaches of confidentiality, or by other acts which violate the professional code, we, the viewers, are left with the impression that moral demands should in difficult situations always override ethical norms.

This impression is, however, deceptive, if ‘moral demands’ are defined as our unreflected reactions to thorny issues, and ‘ethical norms’ as rules or principles which are designed to make human life in ideologically fragmented societies tolerable to everybody. The reason why we accept the solutions given in the television courtroom dramas is that we regard the guidelines of the legal profession as subordinate to *better* accounts of social ethics, not necessarily that we see the immediate moral responses of individuals or groups as normatively binding.

If the—admittedly fragile—conceptual distinction between ‘morals’ and ‘ethics’ is applied to the questions of biotechnology and the environment, the claim can be made that the majority of popular and philosophical responses are, at the moment, founded on the same faulty logic as these television series. This is the methodological starting point and hypothesis of our paper. Because of the relative obscurity of the distinction between ‘morals’ and ‘ethics’, however, we do not employ it systematically in the following, but use, instead, the terms more or less interchangeably.

### IMPACTS OR ATTITUDES?

Many forms of modern biotechnology can have an impact on our natural environment. These impacts range from the possibly beneficial to the potentially harmful, and they can be felt either by human beings, other living beings as individuals, entire species, or by more abstract entities like ecosystems or the biodiversity of certain regions or of our planet as a whole. Due to these impacts, it would seem reasonable that at least critical philosophical responses to questions concerning biotechnology and the environment would be centered on, or guided by, the harms and benefits produced by genetic engineering, and by their moral acceptability or unacceptability. But philosophical responses in this field are primarily generated by emotional reactions and inapplicable ethical theories rather than by any facts regarding the consequences of our actions. This may not be particularly amazing in the frameworks of virtue-based and duty-based ethics, but our contention is that the observation is valid even in the context of traditional utilitarian moral thinking. Our own proposal is that we can render moral analyses sensitive to the impacts of genetic engineering on our natural environment only by employing a lighter conceptual machinery, which takes into account both the consequences of our actions, or what we can know about them, *and* the attitudes we have regarding their acceptability.

### THREE TRADITIONAL APPROACHES TO NORMATIVE ETHICS

There are three traditional approaches to normative ethics in the West, namely the teleological, deontological, and consequentialist models. These views all provide different answers to two basic questions, namely, 'What is human nature like?' and 'How should individuals behave in order to be moral?'

The proponents of the *teleological* model hold that all beings have a *telos* or goal towards which they are inclined to move or to develop. The *telos* can be secular, as in the ethics of Aristotle, who thought that the natural goal of human beings is a good life in a just society, and beyond that, an elevated state of intellectual contemplation.<sup>1</sup> The ultimate end can also be defined theologically, in which case the most likely candidates include an afterlife of everlasting joy, and some other states of being that transcend our earthly experiences.<sup>2</sup> Within the secular reading of the teleological model individuals should live their lives according to the rules of a just society, to be virtuous and to pursue the complicated pleasures of social life and intellectual perfection. The theological version can state, in addition, that we should adjust our life-styles to the received wisdom handed down to us by our parents and religious authorities.

The basic *deontological* view of human nature is that our actions are guided by two competing motives—desires and a sense of morality. This view is open to two main interpretations when it comes to defining how people should find the guidance they need for their lives. In the intellect-based version, *reason* commands us to obey the moral law, usually against our own desires. Immanuel Kant's theory is the paragon of this doctrine.<sup>3</sup> The emotion-based reading states that *feelings* tell us what to do in each particular situation.<sup>4</sup>

The way proponents of *consequentialist* thinking see human nature, people want to obtain pleasure, happiness or well-being, and they want to avoid pain and suffering. Individuals are equally capable of egoism and altruism, that is, of promoting only their own self-interest *and* of taking others into consideration. According to the normative part of this doctrine, individuals should aim to be universally altruistic, either by trying to maximize the happiness of humankind ('positive utilitarianism') or by trying to minimize suffering ('negative utilitarianism').<sup>5</sup>

### VIRTUES AND DUTIES

What, then, could be the most typical responses of the different ethical doctrines to our present issue?

To begin with the Aristotelian tradition, it is not easy to apply the teleological model in its original secular form to the questions of genetic engineering and the natural environment. The link between recombinant DNA-techniques and the human good, not to mention the good of the planet as a whole, is obscure, and it seems that an accurate view of the consequences of genetics would be required to support an adequate analysis of the connection. Otherwise all judgements will inevitably be based on the attitudes we already have toward biotechnology, and appeals to virtues and the rules of a good society remain unsupported by the theory.

Similar remarks can be extended to Kant's original views. The fundamental duty postulated by him is our obligation to treat humanity in ourselves and in other persons always also as ends, never as a mere means.<sup>6</sup> This obligation, which we owe to our fellow humans but not to the members of other species, is based on our nature as rational agents. The way we ought to treat animals, plants and other life-forms is determined by our duties towards ourselves and other persons, not by their (nonexistent) worth as ends in themselves.

The difficulties of applying Kant's views to the manipulation of nonhuman beings by recombinant DNA-techniques include the fact that he did not clearly specify what our duties as regards animals, plants and other nonhuman organisms are. He believed that violence and cruelty towards animals set a bad example to our treatment of other people, and that not even inanimate objects should be wantonly destroyed because that would prevent others from making use of them. But how these remarks should be interpreted in the context of genetic engineering in a purely non-consequentialist analysis remains an unanswered question.

It seems that Aristotle and Kant are in and by themselves unhelpful as regards the issues of biotechnology and the environment, because the application of their ideas leads us either to ideological choices which have nothing to do with their models, or to the consequences of our actions which have no legitimate place in them. But traces of more theologically-inclined readings of the Aristotelian teaching and of Kantian ethics can be found in many popular objections to biotechnology, especially in the claims that what genetic engineers do is *unnatural*, or an instance of *playing God*.

## UNNATURALNESS

The strand of thought in the Aristotelian tradition since Thomas Aquinas which is relevant to the first claim is the reliance on the notion of *natural law*. Natural law, according to Thomistic thinkers, is based on our

genuine being and good as persons, and it defines certain restrictions to our actions and our ways of life.<sup>7</sup> When this doctrine is given its secular reading, its main methodological message is that we ought to act upon the precepts of reason and oppose our inborn inclination to submit to our passions and desires. Kant's formulation of the same idea was that we should always act in ways which we can accept in the light of our practical reason as universal modes of human behaviour.<sup>8</sup>

Depending on the concept of 'reason' employed in the formula, it is presumably possible to argue within these views that genetic engineering is unnatural, because it is a violation against the untampered order of things in this world, or a practice which we cannot universally condone. But this argument, if it is an argument somebody would seriously wish to put forward, is problematical on two counts. First, its acceptance would imply that all present and future technological advances should be banned because they go against reason, or the natural order. Secondly, its theoretical tenability requires that we subscribe to the particular definition of reason which forbids us to alter the environment in any way. Both demands seem rather excessive.

### PLAYING GOD

Another line of argument teleological and deontological moralists can employ is that the prohibition of genetic engineering stems from the fact that there are *limits* to what we can do as moral agents, and applied biologists are overstepping these limits, or 'playing God', by trying to create new forms of life against the dictates of the natural or moral law. This argument has been thoroughly examined by Ruth Chadwick.<sup>9</sup>

According to Chadwick's analysis, the crux of the argument in the context of new technologies is that actions describable as 'playing God' can lead to disastrous and unpredictable consequences. But where should the lines of these actions be drawn and by whom? Chadwick considers many possibilities, one of which is particularly relevant here. The playing-God objection in the context of new technologies can, namely, be meant to state that the natural environment as a whole sets certain limits to our actions. Humankind has during the last few decades acquired powers which could be used to destroy most of the biosphere. Many people seem to think that genetic engineering is one of these powers, and they fear that, for instance, the release of genetically altered organisms into the environment may have irreversible ecological consequences.

Assuming that we are interested in the preservation of the biosphere, this objection against genetic engineering does indeed have some moral relevance. But the problem is that the appeal to consequences, which gives this argument its weight, also deprives it of its categorical disguise. It would, no doubt, be pragmatically unwise to destroy the only environment where we can live at present, but this does not amount to a teleological or deontological rejection of genetic engineering. The wrongness of the activity remains conditional upon the consequences.

### DISGUST

An alternative, emotion-based deontological approach to ethics is provided by Patrick Devlin, who in his influential essay “Morals and the Criminal Law” argued that activities should be reproached and banned by law if they provoke strong feelings of disgust even in individuals who are calm and appreciative of the demands of reason and common sense.<sup>10</sup> Devlin recognized the fact that feelings can vary from one location to another, and confined, accordingly, the prescriptive power of any given set of feelings to the community where it is prevalent. He also explained the moral force of disgust by maintaining that it indicates the boundaries within which the public morality must remain in order to keep the society viable.

Applied to our present case, the Devlinian argument would be that biotechnological activities which can have an impact on our natural environment ought to be banned, because they would evoke strong negative feelings in Western societies *and* damage their moral foundation. But the difficulty with the emotion-oriented model is that it is exceedingly relativistic. In most cases there is no consensus concerning feelings, and many questions remain unanswered. Whose feelings should be respected? Should genetic engineering be banned only if *everybody* feels that it is bad? Or is it sufficient that the *majority* feel that way? Or perhaps prohibitions ought to be employed if a significant *minority* nurtures these feelings? Or should we say that if *anybody* feels this way, biotechnology ought to be rejected? Furthermore, the question also remains as to how the damage to the moral foundation of societies can be verified. There seem to be no good responses to these queries either at the general level or in the context of biotechnology.

## CONSEQUENCES

As we noted at the outset of this paper, it is not all that surprising that the responses of teleological and deontological moralists rely either on ethical presuppositions which ignore the impacts of biotechnology on the environment, or on ill-defined considerations of the consequences of our actions. What is more amazing, however, is that the situation is similar as regards standard utilitarian models of moral thinking, which should be centered on the advantages and disadvantages of the practices we accept or reject. This is because there are two stories which can be told about these, and the choice between them has very little to do with the actual or expected consequences of our actions.<sup>11</sup>

The advantages of genetic engineering, as seen by its proponents, include many actual and potential contributions to medicine, pharmacy, agriculture, the food industry, and the preservation of our natural environment. The applications of genetic engineering to agriculture include the development of plants which contain their own pesticides. As for other food products, gene technologies can be applied to manufacture substances like vanilla, cocoa, coconut oil, palm oil, and sugar substitutes. And biotechnology can even provide an answer to the problems of pollution, as genetically engineered bacteria can be employed to neutralize toxic chemicals and other kinds of industrial and urban waste.

The disadvantages of biotechnology, as seen by its opponents, are in many cases closely connected with the alleged benefits. One problem is that, despite the undoubtedly good intentions of the scientists, the actual applications of genetic engineering are often positively dangerous. Consider the case of plants which are inherently resistant to diseases, or which contain their own pesticides. Although there are no theoretical obstacles to the production of such highly desirable entities, corporations—who also sell chemical pesticides—might prefer to market another type of genetically manipulated plant, which is unprotected against pests but highly tolerant to toxic chemicals. The result of this policy would be an increase in the use of dangerous chemicals in agriculture, particularly in the Third World—which is to say that the outcome is exactly opposite to the one predicted by the proponents of biotechnology.

An oft-used criticism against agricultural biotechnology is that the introduction of altered organisms into the natural environment can lead to ecological catastrophes. Scientists working in the field of applied biology have themselves noticed this danger, and set for themselves ethical guidelines which are designed, among other things, to

minimize this risk. But as the opponents of genetic engineering have repeatedly pointed out, not all research teams follow ethical guidelines if the alternative is considerable financial profit.

Thus, although the expected advantages and dreaded disadvantages of genetic engineering are fairly well publicized, it is difficult to assess objectively what the actual consequences of employing the techniques would be. The results of assessments depend more on the optimism and pessimism of those evaluating the situation than on the consequences themselves.

### Risk

A possible way out of these dilemmas is, we suggest, to concentrate only on the negative consequences of genetic engineering, or *risks*, as people perceive them in the light of the facts available to us.

'Risk' can be defined as the possibility or probability of a loss, an injury, an unwanted outcome or an undesired result. Some of the potential harms involved in genetic engineering are the following. The *release* of genetically altered organisms in the environment can increase human suffering when medical measures are concerned, decrease animal welfare in experiments or through the use of recombinant DNA-techniques in breeding, and lead to ecological disasters. The *containment* of biotechnological material in laboratories and industrial plants involves two dangers: first is the possibility of an accidental release and second is the increased probability with which uncontrolled releases can produce undesired results. A risk that lies between these 'scientifically controllable' dangers and the more indirect political hazards of biotechnology is the probability of *inadequate* containment and *irresponsible* releases, which can be prompted by the economic self-interest of research groups and industrial corporations.

Given that 'risk' can be defined as the probability of harm, then, how should we define the concept of 'acceptable risk', on which analyses of the morality of risk-taking often center? Our own view is that the assessment should in each case be left to those who can be harmed by the decision in question. Economic risks are acceptable, if they are condoned by the biotechnological corporations and governments who take them. The risks imposed on laboratory personnel by the containment of dangerous materials ought to be evaluated by the laboratory personnel themselves. All other risks involved in genetic engineering are more or less universal, and should therefore be assessed—and eventually accepted or rejected—as democratically as possible.<sup>12</sup>



Scientists, industrialists and autocratic political decision-makers can argue against democratic risk assessment by claiming that their expertise enables them to predict with greater accuracy the consequences of different policies. What this objection overlooks, however, is that the acceptability of a risk for a given group is not determined exclusively by the facts of the matter, but also by the way the members of the group perceive the facts, and by the way they evaluate them. People cannot fully commit themselves to decisions which are based on epistemic and moral values they do not share. If anything goes wrong with the predictions of the experts, people feel, and are, entitled to resent the consequences of the authoritarian choices. The risks taken by experts on behalf of others are therefore unacceptable. But if risk-taking is based upon the considered choices of those who can be harmed by the consequences themselves, the situation is different. Even if the undesired outcome is realized, the risk is acceptable, because it is embedded in their own system of ethical and epistemic values.

## RIGHTS

In conclusion, let us add a few words on *rights*. Rights can in ethical analyses be founded on any of the systems we have discussed in this paper—on the natural law, on the duties postulated by deontological ethics, and on the consequences of our actions. The concept of risk we have outlined supports a theory of rights which provides at least individual human beings with the entitlement not to be harmed by the environmental impacts of biotechnology. The analysis can, we believe, also be extended to the rights of animals and possibly ecosystems, who can be harmed by our actions as well as human beings. The further examination of these harms and rights would probably be the best way to proceed from emotional moral objections to truly ethical analyses regarding the possible impact of biotechnology or the environment.<sup>13</sup>

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## NOTES

1. Aristotle, *Nicomachean Ethics*.
2. There are germs of this line of thinking in the *Nicomachean Ethics*, bk. X,

chap. 8, and the idea has been further developed in the works of Thomas Aquinas and his followers.

3. Immanuel Kant, *Grundlegung zur Metaphysik der Sitten* (1785). Page references are to Kant, *Ethical Philosophy*, 2nd ed., trans. J. W. Ellington (Indianapolis and Cambridge: Hackett Publishing Company, 1994).

4. The best defence of emotion-based deontological ethics is probably Patrick Devlin's "Morals and the Criminal Law" (1959), reprinted in *The Philosophy of Law*, ed. R. M. Dworkin, (Oxford: Oxford University Press, 1977), 66-82.

5. On the many faces of utilitarian thinking, see, for instance, M. Häyry, *Liberal Utilitarianism and Applied Ethics* (London and New York: Routledge, 1994).

6. Kant, op. cit., 36.

7. For a detailed analysis of the natural law tradition, see, e.g., J. Finnis, *Natural Law and Natural Rights* (Oxford: Clarendon Press, 1980); J. Finnis, *Fundamentals of Ethics* (Oxford: Clarendon Press, 1984).

8. Kant, op. cit., 30.

9. R. Chadwick, "Playing God," *Cogito* 3 (1989): 186-193; see also M. Häyry, "Categorical Objections to Genetic Engineering—A Critique," in *Ethics and Biotechnology*, edited by A. Dyson and J. Harris, (London and New York: Routledge, 1994), 202-215, esp. 205-209.

10. Devlin, op. cit., 80.

11. This point has been made and thoroughly defended by Heta Häyry in her "How to Assess the Consequences of Genetic Engineering," in Dyson and Harris, eds., op. cit., 144-156. The following paragraphs have been borrowed from M. Häyry and H. Häyry, "Genetic Engineering," in *Encyclopedia of Applied Ethics*, vol. 2, ed. R. Chadwick, (San Diego: Academic Press, 1998), 407-417, esp. 408f.

12. A more detailed analysis of 'risk', and a more comprehensive account of our views regarding its acceptability, can be found in M. Häyry and T. Takala, "Genetic Engineering and the Risk of Harm," *Medicine, Health Care and Philosophy* 1 (1998): 61-64.

13. Our thanks are due to Professor Robin Attfield, University of Wales Cardiff, whose invitation to prepare this paper for the Twentieth World Congress of Philosophy gave us a welcome opportunity to apply the main theories of ethics to the questions of genetic engineering and our natural environment.