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19 Ethics and Medicine: Philosophical Guidelines for a Responsible Use of Nanotechnology

Corine Pelluchon

19.1 Definition of Ethics

Ethics is not an isolated discipline, standing aloof from science, economics, and politics. And neither is it an authority devoted to censure, for it is not the philosopher's role to set up as an authority of any kind, nor to dictate to others what is good or bad in itself on the basis of some personal morality. Ethics is that part of philosophy that allows us to acquire the tools that serve to elucidate actions and assess them critically. The aim is to identify principles, that is, notions that are taken as fundamental and must guide our actions in medicine, in business, or in the application of biotechnology. However, these principles are not empty of content, and part of the philosopher's work in the field of applied ethics is to elucidate the values underlying the notion of autonomy and distributive justice, and to determine the relationship between the latter and the notion of equality. Likewise, the ethicist must consider the implicit and explicit norms belonging to some narrowly defined community (a group of professionals) or a broader community (a country), or even the international community.

Finally, there are three levels of judgement in ethics, according to Ricœur [1]:

- The first level deals with the relationship between particulars. It refers to those qualities or virtues which help one to make the right decision in a completely novel situation which is not without uncertainty. Ethics exists precisely because the right action and the sensible decision are not obvious and do not follow from some simple rule, as they might in mathematics. As Aristotle reminds us in Book II of *Nicomachean Ethics*, angles are not straight lines. This is why prudence, or practical wisdom, is the virtue of deliberation, and involves a particular management of risk.
- The second level concerns norms, that is, the universalisation of maxims or precepts discovered by practitioners in the individual pursuit of their profession. This is the deontological level of ethical judgement. Here one finds the main tools of applied ethics (medical ethics, bioethics, environmental ethics, business ethics). These norms, validated by professional associations and set down in deontological codes, charters, or declara-

tions, give content to the principles used, and at the same time reaffirm the importance of human rights.

- The third level of ethical judgement is the teleological level. This concerns society's ends and choices. The philosopher's task here is to articulate the first two levels at the third, which means to say that the questions raised by the various fields of applied ethics require a move from moral philosophy to political philosophy, whence one may pose the problem of what kind of society, and even what kind of human being, we wish to advocate.

However, such an investigation presupposes that we first ask whether nanotechnology raises *specific* problems. Are these problems radically different from those encountered in medicine when we reflect upon the use of biotechnology, or nuclear energy?

19.2 Exacerbation of Problems Inherent in Conventional Techniques

Nanotechnologies are based on the physics, chemistry, and physicochemistry of matter, but what is specific about them is the length scale used here by researchers. As discussed in the previous chapters, nanotechnologies manipulate matter on the scale of the nanometer. They thus involve characteristics that are specific to this range of sizes, and that bestow particular properties upon them, and even a certain unpredictability. This type of technology therefore necessitates an assessment of sanitary and environmental risks relating to the use of nanoparticles. The problem is all the more important in that some nanoparticles, as has been demonstrated, are able to cross biological barriers in living organisms and can cause cancers, in an analogous way to those induced by asbestos particles. We must therefore give careful consideration to their potential risks and carry out adequate tests before accepting large volumes of materials or objects containing nanoparticles on the open market. The political authorities thus have a duty to organise detailed studies of their potential impacts, and to inform the public of the results obtained.

However, the central issue is not the question of risk. The specificity of nanotechnologies is that they can be combined with other 'sensitive' technologies, such as biotechnologies, in the context of genetic manipulation. Likewise, they boost the potential of any interaction between living organism and machine. Nanotechnologies can increase our control over matter, life forms, and even the human brain, and their use is accompanied by a degree of uncertainty which makes risk assessment unavoidable. On the other hand, the ethical and political problems that can be attributed to them are not completely new. Some of the problems are raised quite generally by all forms of contemporary technology. To be precise, their future potentialities, both po-

sitive and negative, are likely to *exacerbate* the problems we encounter when we reflect upon the relationship between science and current technology.

In other words, just like science and technology in general, nanotechnologies have come about in a given social context. What is important is to identify the problems characterising this context, such as unequal access to technology, information, or health care. Nanotechnologies, so promising in the field of reparative and predictive medicine, will clearly aggravate these problems or, at the very least, make them more acute. The question of environmental justice, which refers to the equitable access to a high quality environment, and which requires us to ask how the benefits and burdens of manufacturing technologies and product recycling will be shared out among the world's populations, also lies at the heart of any philosophical reflection on the use of nanotechnologies. In order to answer these questions, we need to formulate our priorities and decide what kind of society we wish to live in. We must also reflect upon the decision-making authorities, and the place of ordinary citizens in public deliberation. Not only must we establish the very meaning of a responsible use of nanotechnologies, but in addition this process of reflection must be carried out upstream. This implies that citizens must be properly informed and trained, and they must in all respects be given the means to take part in the decision-making process.

We already possess the means to pose the ethical and political questions relating to these forms of technology and to take them into account in public policy. We can set up guidelines for the use of nanotechnologies and for the promotion of policies that privilege one kind of research over another. This does not mean that policy should have *total* control over research, which, since it concerns knowledge, is an end in itself, but what is at issue is to decide what we want to do and what we do not want to do, and why. Decisions must be linked to our choice of society and assessed in the light of the ends and ideals that we continue to honour. Now, one of the main problems lies in the fact that such an investigation is ruled out from the start. It is said to be impossible or vain. Ethics becomes a trapped authority, a mere guarantee, or conversely, it is taken as an instrument of censure, as though its purpose were to introduce virtue in a world that did not want it. But, on the contrary, the task of the political philosopher is to identify ways of posing the central question: what constitutes a responsible use of nanotechnologies?

19.3 The Use of Nanotechnologies and Society's Purpose

This question requires an investigation of society's final causes. As noted by Ronald Sandler [2], professor at the Northwestern University in Massachusetts, technology must contribute to human happiness and social progress in a fair, realistic, and sustainable way as regards the environment. Now many would agree that technology should have this aim, and yet it is not clear that all forms of technology currently on the market or benefiting from huge

investment on the part of public or private organisations will allow us to achieve it. In any case, such a claim presupposes that ethics has meaning insofar as the idea of a responsible use of nanotechnologies is accepted. Indeed, the problem here is to identify the obstacles to achieving these objectives (and there are plenty, especially when one considers the inequitable access to technology and environmental justice). Finally, we need to specify what is meant by human happiness and social progress.

If we talk about human happiness and the question of sustainable development, then we are compelled to clarify the responsibilities of current generations with regard to future generations who may be required to pay for decisions which in some cases may have dramatic and irreversible consequences. In this context, the issues relating to nanotechnologies are not without parallel in the questions raised by nuclear energy, or indeed by any technique which confers such tremendous power on the decision-makers, and as a consequence, a much greater responsibility. Likewise, going back to the statement made above, the relationship with other species must be taken into account. This broadening of the scope of our responsibility to future generations and other species suggests a move from a negative definition of freedom (freedom from) which is still that of human rights to a consideration centered on the capabilities that allow humans to use certain goods and resources [3], and even to a reflection on the limits of our rights. Can the source of what we consider to be legitimate refer exclusively to the person who thinks of this right as an instrument of his own power [4]? Should we continue to base human rights on the moral agent and on the individual considered as an empire within an empire? This question was asked by Claude Lévi-Strauss, who suggested a reformulation of political principles wherein humans would be treated as a species whose rights come to an end at the precise moment when their exercise puts the existence of another species in danger. When we think of the responsible use of technology and everything that comes under the heading of sustainable development, if it is not just to be a pious hope, does this not presuppose a reflection on the relationship between peoples of different cultures, between humans today and future generations, and between humans and other species, or nature as a whole?

19.4 What Criterion Can Distinguish Between Legitimate and Illegitimate Uses of Bionanotechnologies?

The philosopher does not pronounce on which technique is good or bad in itself, but instead will examine its impact on institutions, the family, the arrangements, and the traditions which up to now have made democracy possible [5]. If we consider the example of the interaction between nanotechnology and gene therapy with a view to improving the sensorial, physical,

intellectual, and cognitive abilities of a human being, then it belongs to the philosopher to ask whether this application is compatible with the values upon which our institutions are founded. Likewise, the question as to whether there is a contradiction between certain practices and the ideals underlying our institutions can serve as a guideline for the philosopher's enquiry. For example, one may ask whether it is acceptable to manipulate an individual's genotype, that is, the genetic heritage specific to that individual, while at the same time claiming the equality of all individuals. The freedom of those who wish to endow their future offspring with superior capabilities threatens the freedom of individuals whose children have not been 'improved' and who will thus find themselves bottom of the class at school, last in competitive sports, and so on. Likewise, one should stress the contradiction between this ideal of total control, which finds an ally in bionanotechnology, and the worship of singularity in culture and art.

So in contrast with what might be thought at first glance, the criterion whereby one may distinguish a legitimate use from an illegitimate one is not simply a distinction between therapeutic use and one which aims to 'improve' the individual. For example, there are predictive tests for the prevention of cancer which are perfectly legitimate, showing that the aim of medicine is not merely to cure. Furthermore, this distinction presupposes a fixed definition of what is normal, considered as an average to be attained with regard to size, IQ, or behaviour. But it is hard to distinguish between hyperactivity and being dynamic, social anxiety and being shy, as Leon Kass has reminded us [6].

A practice or usage is illegitimate when it debases the very meaning of an activity. Doping in sport is a good example. It is contemptible because it corrupts the meaning of competition. The doped athlete reduces the race to its outcome alone. In addition, he uses his body as a machine and debases the intrinsically human meaning of physical effort which manifests the phenomenological unity of mind of body. So the discriminating criterion we seek must not be based on any rigidifying vision of nature, an ideology banishing artifice and technology. The problem here is *to question the impact of science on our social practices and to examine the compatibility or incompatibility between habits (among which there are induced habits) produced by certain technologies and values underpinning the way we live together and the exercise of democracy*.

The emergence of nanotechnologies and other contemporary forms of technology compel us to ask just how far we are ready to evolve, and why. To make this enquiry, we must first clarify the content of certain notions often used as principles, such as autonomy, solidarity, and justice. But we must also reflect upon the human condition, the meaning of mortality and birth, and unpredictability. As pointed out by H. Arendt in *The Human Condition*, the newly born introduces something new into the world, and this is an essential safeguard for the creativity of a society. But this creativity becomes

less obvious if, by constantly extending the human lifespan, we keep the same people in power and maintain young adults in a state of adolescence [7]. And nor can we disregard the need for an ontological consideration of the relationship between man himself and what is not man, or of responsibility which is, even more than the possession of reason, what is specific to humans as compared with other living beings, a responsibility that scientific knowledge emphasises.

19.5 International Norms and the Political Community

One of the tasks of the political philosopher would be to identify the common values which underlie a political community and are expressed through its institutions. These values are also bound to its traditions and its moral stances, what Rousseau called "this fourth kind of law which maintains a people in the spirit of its institutions" in *The Social Contract*. The results of this description of the 'strong evaluations' which reflect the sources of morality and politics in a community should also be subjected to deliberation. The philosopher, by contextualising notions and reflecting upon the contents attributed to the notions of solidarity and justice, would make explicit the implicit values that govern our practices and are reflected in our laws. This would be a task of translation, with all that must remain unfinished about that. This attempt to view a community in its own terms and to express rights and morals in a relatively immanent way, by basing itself on what constitutes the narrative identity of the community [8], implies that there cannot be a valid international ethics for all problems and in all contexts.

For sure, there are international norms that could serve as points of reference to contain or even prohibit certain practices. However, a political community cannot escape the need to undertake this reflexive examination of itself, because words do not have the same meaning from one country to another, and the content of principles serving as ethical guidelines must be specified. While the working rules of procedural justice are common to all liberal democracies (transparency, publicity, revisability and rationality of norms, participation), the question of usage begs the question of ends, which themselves depend on the sources of morality and politics, the traditions, and the ipseity of a country.

In this sense, we may say that the industrial emergence of nanotechnology is an opportunity to go beyond the post-modern credo which required political philosophy to abstain from any substantial vision of what is good, and even to refrain from any reflection upon the common good in order to abide by the procedural rules. It might even be thought that the national and international commissions set up to consider these technologies and the proliferation of public information meetings on their potential and their risks are a sign that we are aware of the urgent need to pose these questions and to find new forms of governance that are more rigorously democratic.

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