

The Constitutional Effect of the Ethics of Emerging Technologies

Brice Laurent

Centre de Sociologie de l'Innovation, Mines-ParisTech,
CNRS, Paris
brice.laurent@mines-paristech.fr

ABSTRACT

This paper discusses the ethics of emerging technologies by locating the political effects of its problematization. Building on Michel Foucault's analysis of the problematization of moral behaviors as a problem about the self, it identifies a problem about the stability of the democratic collective within contemporary problematizations of the ethics of science and technology. Defining the problem of ethics is also exploring the modalities of public expertise, the modes of democratic deliberation and the definitions of material entities. Accordingly, ethics is situated particular constitutional arrangements, which constrain the ways in which ethical issues related to emerging technologies are identified. The American and European examples of nanotechnology programs illustrate the constitutional effects of the ethics of emerging technologies, and the controversies they foster.

KEYWORDS

Constitutional arrangements, democracy, emerging technologies, Foucault

1. Introduction

In 2004, shortly after the U.S. Congress authorized the Nanotechnology Act, the popular magazine *The New Atlantis* published an article that criticized "nanoethics", a term that had become to be known as the domain of ethical reflection targeted to nanotechnology (Keiper, 2004). In this account, "nanoethics" was little more than an artificial construct aimed to satisfy the intellectual and financial interests of self-absorbed ethicists. This article compelled ethicists and social scientists interested in nanotechnology to argue for the need for specific approaches to nanotechnology, able to tackle the ethical issues related to the control of the atomic scale and the technological applications it implied. It directly raised the question of the need for a new ethics for nanotechnology. Whereas the article questioned the need for new ethical methods to deal with nanotechnology, others argued that the uncertainties about the health and safety of nanotechnology objects, and their potential applications in medicine and enhancement required expert interventions able to close what some of them identified as a gap in the policy landscape (Lin, 2007a).

This episode is an example of a wider debate about the need for a “new” ethics for nanotechnology, a “nanoethics” that would be characterized by specific approaches, different from bioethics or from other technology assessment methods¹. “Nanoethics” is a term that encompasses a variety of approaches (Ferrari, 2010), some of which have been critiqued from basing their contributions on “speculations” about future developments of nanotechnology (Nordmann, 2007). It is an example of attempts at developing ethical reflections on emerging technologies. As such, nanoethics is a component of a broader problem related to the ethics of science and technology in general, and emerging technologies in particular: how to define the ethical issues related to these domains and how to deal with them?

This paper argues that the problem of the ethics of emerging technologies is directly related to the constitution of democratic order. It will demonstrate this by examining the mutual relationships between the definition of ethics as a problem about contemporary science and technology and the organization of contemporary democracies. It first builds on the work of Michel Foucault about ethics in order to discuss the ways in which the ethics of science and technology is problematized as a collective issue (section 1). This will lead me to argue that the contemporary problems of the ethics of science and technology is also that of the democratic organization, and that problematizing ethics participates in the construction of the democratic order (section 2). Using American and European examples related to the ethics of nanotechnology, I argue that the problem of the ethics of emerging technologies is necessarily situated within “constitutional arrangements”, which this analysis can help describe, and possibly displace (section 3).

2. Analyzing the problematization of the ethics of science and technology

In his late works, Michel Foucault develops an analysis of ethics that revolved around the notion of problematization. By describing the ways in which certain behaviors were defined as problems for the individual, and the range of solutions that were proposed to deal with these problems, Foucault proposed to conduct a study of the genealogy of ethics, from classical Antiquity to medieval Christianity (Foucault, 1984). While originally centered on the history of sex and sexuality, the project gradually evolved towards ethics and the evolution of the self. Indeed, examining the instruments that problematize ethics in various periods of time, Foucault described various *techniques of the self*, such as personal notebooks or individual confessions, that made ethics a problem of truth about the self. He then accounted for

¹ For a review of nanoethics, see Ferrari, 2010.

intertwined continuities and discontinuities. Consider for instance the comparison he proposes between the Augustinian account of desire and purity with those one can derive from the Stoic thought (Foucault, 1981). While the first one considers that desire is to be understood in every detail of the self even before a single reprehensible act has been performed, the second one focuses on practical activities and their consequences. They are two techniques of the self, two ways of knowing the human subject. They are both about purity and truth. And while the Augustinian account builds on Greek philosophy, it also displaces central elements in the exploration of the human soul, so that the will (and its potential sins) cannot be examined at a distance anymore, but needs to be constantly re-questioned in every move of the soul.

For Foucault, techniques of the self are instruments and practices that define the problem of ethics for individual behaviors. The Foucauldian perspective on ethics draws the connections between moral problems and knowledge about the self. This acquires another dimension in the particular case of science and technology, where the making of scientific objectivity is also a moral matter, and relies on techniques of the self addressed to the individual scientist. Historians of science have described the historical evolution of scientific objectivity, and in particular, the gradual development of a “mechanical objectivity” characterized by the retreat of the human subject from the production of the scientific representation (Daston and Galison, 2007). These accounts are not just about the making of objectivity as a scientific practice of production of knowledge. They also provide a history of the making of the scientific subject. The birth of mechanical objectivity, indeed, goes hand in hand with the development of a male scientific self, able to control and limit his interventions in the depiction of nature. The knowledge making enterprise about nature requires that the biases and potential filters in scientific representations can be controlled and corrected. Knowing and controlling the scientific self thereby becomes a necessary condition for the production of scientific knowledge. Consequently, the techniques used to produce scientific knowledge in the mechanical objectivity era are techniques of the self, which developed with the technical apparatus through which the scientific self can delegate the production of scientific images. Mechanical objectivity problematizes the very nature of the human subject, and makes it a central issue for the production of knowledge about a nature in front of him, with a constant threat of misrepresentation.

In this account, the problem of the production of scientific knowledge is not different from other moral problems, and can be described as a problem of individual moral behaviors, to be dealt with thanks to techniques of the

self². But it acquires another dimension when one follows the moral problems raised by technological innovation, as voiced by scientists themselves after the second half of the 20th century. Consider for instance the case of nuclear energy. As historian of science Soraya Boudia showed, the early social movements against the use of nuclear energy for military purposes originated from scientists themselves. Nuclear scientists were “entrepreneurs of social mobilization” in developing a movement that would refuse the uncontrolled spread of nuclear weapons (Boudia, 2007). The life sciences offer another telling example. During the 1975 Asilomar conference on recombinant DNA, molecular biologists and chemists discussed the threats caused by recombinant DNA and the various precautionary measures that ought to be taken in order to avoid potential risks. It can be regarded as the first attempt, in the life sciences, of self-regulation by the scientific community of a technological innovation³. In both cases, scientists undertook a moral reflection about their research and their potential effects. They considered that their ethical role was to voice concerns about the impacts of technological innovation and explore ways of dealing with them. They associate the production of knowledge and the exploration of ethical issues in the definition of their role in society. Ethics, then, was not just a matter of individuals behaving in acceptable ways, but a question of collective good. In these cases, science and its developments are framed as a problem not just of the individual scientist facing the challenges of the quest for knowledge, but of humanity itself. Here, the problem of behaviors is not limited to the individual scientist and his sake as an objective producer of knowledge, but concerns the entire humankind.

In these two episodes, one can identify a problem of measure and self-limitation, as in the accounts of mechanical objectivity by the historians of objectivity. But the problem of ethics acquires, in these two cases, a collective as well as an individual dimension. The problem of ethics is here not so much a question of truth about the self as it is a matter of the stability of the human collective. Nuclear energy threatens to destroy all human life on the planet. Recombinant DNA, if artificial organisms with modified genomes get loose, might radically transform living conditions of all organisms. For the scientists involved, these threats were to be collectively addressed, possibly

² Foucault discussed briefly in an interview the connection between knowledge about the self and scientific knowledge as framed in Kantian ethics, which poses the universal subject as the common subject of knowledge and ethics (Foucault, 1982).

³ Numerous sociological and historical studies have commented on the Asilomar conference. For a recent comment on this body of scholarship, as well as a proposition to rethink the role of this event in the genealogy of the relationships between science and its “publics”, see Giesler and Kurath, 2011.

through moratoria of at least some technological domains (such as nuclear for military applications).

As it appears through these two examples, scientific and technologies issues transform the problem of ethics as it makes it a collective problem, for which specific techniques need to be implemented. In these two examples, these techniques rely on the delegation of ethical reflection to scientists: scientists (or a subset of them able to speak for the whole research community) are spokespersons of not only nature but also of the whole human specie, and possibly of the entire planet itself. These delegation operations have caused numerous debates about the role of scientists and the modalities of their political interventions (Callon et al., 2009). These debates extend the connection between the definition of ethical problem and the variety of questions concerning the democratic organization. Contemporary scientific issues are indeed defined as ethical problems in various ways, which all engage the stability of the democratic order. The next section discussed in what ways.

3. The problem of ethics and the democratic organization

In what way is the problem of ethics with science and technology a matter of democratic order? Below, I examine three intertwined dimensions of this connection. First, the problem of the ethics of science and technology is that of the role and accountability of expertise. Second, ethical deliberation about science and technology is also a problem of democratic organization. Third, the problem of the ethics of science and technology is that of the constitution of acceptable technological entities and programs of development.

The problem of the ethics of science and technology is that of public expertise

Professionals have developed a body of knowledge about ethical argumentation in technological areas, with the explicit purpose of systematizing the forms of argumentations and their values as public discourses. Their interventions directly connect the definition of the problem of the ethics of science and technology with that of the organization of public expertise.

The case of bioethics in America is particularly telling for that matter. It has become an expertise with known professionals and stabilized instruments that can be mobilized for the collective management of technology (Evans, 2002; 2006). The 1979 Belmont report defined an approach to bioethics that was supposed to answer concerns about the conduct of medical research, and which was grounded on four principles: autonomy,

beneficence, non malficence, and justice⁴. Accordingly, a school of thought in the bioethics profession then emerged as a body of specialists in philosophical argumentation based on these four principles (Evan, 2002). For instance, problems addressed by these experts consist in balancing “autonomy” and “justice” in the definition of the acceptable way of making particular technological innovation available.

This mode of argumentation is based on two separations. The first distinguishes the production of ethical advice and the production of scientific facts, as experts in bioethics need the latter for the former. The ethical argumentation is based on a moral evaluation of technologies, and thereby requires stable descriptions of them. The second separation draws a boundary between the production of ethical advice and decision-making processes. Ethicists are experts producing “moral” evaluations, which can then be used by policy-makers to ground “political” decisions. These two separations are not unproblematic: they relate to numerous issues about public expertise and its relations with wider scientific and political arenas (Jasanoff, 1990). This makes the problem of the ethics of science and technology also a problem of expertise organization, and a tricky one.

Consider for instance the case of the U.S. Human Genome Project, which allocated 3% of its funding to the study of “Ethical, Legal and Social Implications” (ELSI) of genetic research. The ELSI program funded studies of the “ethical implications” of human genome research. For all the enthusiasm of its initiators, the ELSI program was heavily criticized. A source of tension was the conflicting demands it was submitted to. The ELSI program was expected to provide ethical advice about a scientific domain with uncertain outcomes, which could also be directly translated into policy-making about research programs and the regulation of scientific innovation (US Congress, 1992). Yet the ELSI program was also supposed to ensure that it was not captured by political interest and based on sound scientific methods. Ethics then, and the two separations I mentioned earlier, could be a way of answering these demands, but in the same time made it more difficult to ensure the policy-relevance of the program’s outcomes. These competing expectations resulted in a complex institutional history, during which the program faced multiple changes of status, in order for the institutional body not to be absorbed by alleged political interests (McCain, 2002)⁵.

⁴ The Belmont report itself originated from the work of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research.

⁵ Critics of ELSI were the basis for the creation of the National Bioethics Advisory Commission (McCain, 2002), which institutionalized the principles of bioethics, as instruments for the functioning of the expertise of the advisory committee (Evans, 2006). This evolution occurred very much to the dissatisfaction of Eric Juengst, a bioethicist and the first

This episode is revelatory. The constitution of a body of professionals in ethics is connected to issues of political organization related to the nature of ethical advice. It faces challenges, which, in the American case, resemble tensions that other expert bodies have had to deal with, as they are caught between calls for objectivity and for political relevance⁶. In other contexts, the problem of the ethics expertise might take other formats. Take for instance the European Group on Ethics in Science and Technology (EGE). The EGE is conceived as an expert body that is supposed to inform public decision-making, notably about European funding for scientific research. Since the renewal of its mandate in 2005⁷, the EGE has been closely linked to the European Commission. The regulation defining the 7th Framework Program, which organizes European funding for scientific research, stated that the “opinions of the European Group on Ethics in Science and New Technologies are and will be taken into account”⁸. In the past, the opinions of the EGE have led to restrictions of European funding, for instance for human stem cell research. The EGE usually faces two opposite critiques. The first blames European ethics for getting into substantive questions, for instance by advising the Commission not to fund scientific research about human embryo produced within the Union, while it should stick to “general principles” in order to follow the subsidiarity principle (Plomer, 2008). It contends that the EGE is not “genuinely independent” from the Commission (Plomer, 2008: 846) and thus pushes for tacit regulation by advocating for the ban of new technologies. It then argues that the EGE should rely on general principles that allow the market to adequately function (e.g. “transparency”), without attempting to exercise “normative power” (which would fall outside the scope of its competences) for instance by recommending that research on European stem cells or nanotechnology for “non therapeutic enhancement” is

director of the ELSI program, for whom the role of ELSI was to generate knowledge and a community of specialists able to use it, with no formalized process of connection between the production of objective knowledge and that of policy-making (Juengst, 1991 ; 1994 ; 1996).

⁶ Such a tension was clearly at play in the case of the former Office of Technology Assessment (OTA), expected at the time of its inception in the 1970s to provide both “independent” and “policy-relevant” advice. This eventually caused its elimination in a later period marked by severe cuts in the federal budget, as it proved unable to demonstrate the link between its expertise and law making, precisely because of the institutional construction of its neutrality (Bimber, 1993)

⁷ Commission Decision of 11 May 2005 on the renewal of the mandate of the European Group on Ethics in Science and New Technologies (2005/383/EC), OJ L127/17

⁸ Regulation (EC) No 1906/2006 of the European Parliament and of the Council of 18 December 2006 laying down the rules for the participation of research centres and universities in actions under the Seventh Framework Programme and for the dissemination of research results (2007-2013), Article 30.

not funded. The second critique directly opposes the alleged shallow and general approach that European ethics would pursue, and which would ultimately base technology development on market rules. By sticking too much to the definition of general “European principles”, the EGE would take too small a part in the discussion about “ends”, and refuse constraining regulatory evolutions (Talacchini, 2006; 2009). These debates show that the problem of European ethics is also that of subsidiarity and of the ways of organizing the European expertise and its relationships with initiatives undertaken by member states.

Ethical deliberation is about democratic organization

The work of contemporary ethics committees related to science and technology takes the form of deliberations among ethics committee members, often based on hearings of external experts. Thus, the definition of ethical concerns strongly depends on the practical organization of the production of ethical advice. Membership in ethics committees is a crucial stake, as it has consequences on the conduct of deliberation, the competencies required to actively participate in them, and the outcomes of collective work (Memmi, 1996). The tension between the restriction of membership and the openness to diverse social groups is pervasive in this context, and makes the problem of the production of ethics advice that of the constitution of acceptable political representation. It is telling, for that matter, that the recent revision of the French bioethics law (currently discussed at the Parliament) was based on a nation-wide participatory process called Bioethics General Estates. The historical echo also points to the inherently political nature of who the acceptable participants in ethical deliberations are.

But the connection between the problem of the ethics of science and technology and that of the democratic organization is not just about the composition of ethics committees. It also relates to the actual practices of ethical deliberation. These deliberations raise questions that connect the nature of technological innovation and the modes of public deliberation in democratic society. Considered for instance the case of the U.S. Human Embryo Research Panel (HERP)⁹, as described by sociologist Susan Kelly. The HERP was in charge of consensus production, and navigates between a pluralist representation of social groups and the reference to universal categories from which consensus could be built (Kelly, 2003). Accordingly, the issues discussed by the members of the HERP were about the way of producing

⁹ The HERP recommended that the NIH fund research on embryos under regulatory oversight (e.g. criteria such as scientific importance, lack of commercial gains...). Yet this advice was not followed by the subsequent legislative decisions, which banned human embryo research for several years.

consensus, and the modalities of the representation of diverse opinion, including the most radical ones (which were eventually excluded in order “to operate as a consensus-oriented group” (Kelly, 2003)). This example displays the tension between the search for consensus (possibly based on common values such as the ones defined by bioethics) and the need to politically represent a diversity of opinions and moral positions in a pluralist society. In the U.S. context, this dichotomy echoes long-term debates about technical controversies, during which the call for scientific objectivity and the purity of “sound science” might contradict the representation (e.g. through adversarial processes in court) of opposed interests. This tension might result (as in the HERP case) in the failure of ethics committee to make their position heard. But it is the sign, in any case, that ethics bodies are places where norms of acceptable public deliberation in democratic society are debated.

This implies that the places where ethics advice is produced are also sites where these norms are questioned. This is particularly visible when the modalities of democratic legitimacy are not granted, as in the case of the European institutions. The uncertainty about the practices of European ethics (cf. above) made it necessary for the European Group on Ethics to release a report about the “European approach to ethics”. The 2000 report is a good introduction into the modes of reasoning of the European institutions regarding ethical issues. It presents a list of principles such as “human dignity”, “individual freedom”, “principle of solidarity”, “freedom of research”, and “principle of proportionality” (EGE, 2000: 11). Some of these principles, such as “safety”, “responsibility” and “transparency” are deemed “Europe specific”. The deliberation of the EGE then takes the form of discussions about these principles and their practical meaning for each technological domain. For instance, the case of nanomedicine required that the principles be re-worked in order to consider that non therapeutic human enhancement was ethically questionable¹⁰. Thus, ethical deliberations at the EGE are also about the nature and implications of the “European principles”, that is, about what them specifically European (as opposed, for instance, to American principles according to which converging technologies would be developed “for improving individual performances” (Roco and Bainbridge, 2003)) but also acceptable within a political entity where the concern for subsidiarity is central.

These examples explain why the sites of the production of ethical advice can be described as “experiments in democracy” (Hurlbut, 2010). They are about the exploration of acceptable ways of conducting collective deliberation in democratic societies. As such, their success depends on their ability to

¹⁰ Interview with Anne Cambon-Thompsen, member of the EGE

re-enact the acceptable forms of political legitimacy in particular national or international contexts.

Ethical issues are about the making of material categories

Ethics committees directly raise concerns about the nature of the objects they need to examine. A third connection between the problem of the ethics of science and technology and that of the stability of democratic order is that the former engages the construction of material categories.

Works in the domain of Science and Technology Studies have been particularly interested in the situations ethical normative objectives, at both the level of universal values and of democratic legitimacy, are intertwined with ontological interventions. Consider for instance Sheila Jasanoff's account of ethical deliberations about embryo research in Britain (Jasanoff, 2005: 152-155; Jasanoff, 2011: 63-66). In Britain, research on embryo is possible up to fourteen days after conception, under the supervision of a regulatory body. Before the fourteen-day limit, the embryo is not considered a human legal subject. Afterwards, it becomes a legal human member of the polity, with rights and protections. This "ontological surgery" – to paraphrase Jasanoff's expression - is the outcome of a long process of collective exploration of the nature of the early steps of human life. One of the central steps of this process was the work of a Commission headed by moral philosopher Mary Warnock, which, in 1985, argued that the fourteen-day limit was ethically acceptable. In doing so, the Warnock Commission performed an ontological work necessary for the stability of the collective, which translated in various regulatory measures necessary to implement it at the level of scientific research. The 14-day limit was the outcome of a process during which the problem of the ethics of embryo research was also a problem of the nature of the embryo itself, and of its inscription in a stable society.

Regulatory innovations about the human embryo were not limited to Britain. The European institutions for instance, had to face the diversity of positions adopted by the member states about human embryo research. The dual importance of subsidiarity and the definition of common European principles resulted in yet another ontological surgery. Following the advice of the EGE, the 5th Framework Program of the European Union (which organizes European public funding for scientific research project) banned European funding for research on embryonic stem cell produced within the E.U. (Jasanoff, 2005). This initiative distinguished stem cells produced within and outside the E.U. It acted at the level of European funding, saying nothing about research conducted with other sources of funding, and leaving Member States free to legally allow or not research on stem cells.

It is important to acknowledge the intertwined ontological and normative interventions of ethics bodies such as the Warnock committee, since it forces the analysis not to consider as granted the relationships between problems of ethics and problems of science and technology. As the discussions about the 14-day limit shows, ethical issues are not necessarily about the impacts of technological developments, but deal with their very characterization. Accordingly, considering that the problem of the ethics of science and technology is to perform a moral analysis of technological objects once their definitions are settled is a particular problematization of ethics, situated within particular political organizations (this is the case, for instance, of American bioethics, as discussed above). The Warnock Commission, by contrast, directly associated the problem of the ethics of science and technology and the problem of the making of technological objects.

For Jasanoff, the definition of the human embryo as performed by the Warnock Commission is a “constitutional moment”, that is, an episode during which the very stability of the polity is engaged, and the sources of political legitimacy explored (Jasanoff, 2011). It is “constitutional” in that it constitutes material entities (the human embryo itself), while also questioning the allocation of power, the modalities of political representation, and the forms of accountability for experts in ethics. One could describe the European example in these terms. Indeed, the decisions about European and non-European human embryos define the modality of political intervention of European institutions and member states in moral domains, the entities on which they can act, and the form of legitimate collective action.

4. Situating the problem of the ethics of emerging technologies within constitutional arrangements

The problem of ethics, as it is raised on issues related to science and technology, relate to the modalities of public expertise, to the form of democratic deliberation, and to the construction of new material beings. Accordingly, the problem of the ethics of science and technology, as it is defined in contemporary societies, is simultaneously a problem of constitutional organization. This does not mean that after historical forms of ethics practices (as described, for instance, by Foucault’s techniques of the self) that solely dealt with individuals, contemporary ethics would focus on collective issues and only them. Contemporary examples of regulated autobiographical practices (for instance in abortion procedures) show that the practice of ethics continuously re-invents techniques of the self (Memmi, 2003). But it is crucial to see that the sites where the ethics of science and technology is defined as a

problem in contemporary societies are also sites of exploration of democratic order. As the problem of the ethics of individual behaviors is, in Ancient Greece as in the Christian Middle Ages, a problem of truth about the self, so is the problem of the ethics of science and technology a problem of the stability of the democratic collective.

The Foucauldian approach brings more than a telling parallel though. Together with research perspectives opened by Science and Technology Studies, it also directs the attention to the performative effects of the techniques used to deal with the ethics of science and technology in the shaping of objects, individuals and collective orders. Following the discussions of the previous section, these effects can be grouped together in the description of “constitutional arrangements”, that is, of associations of techniques aimed to deal with the problem of the ethics in science and technology in ways that define the modalities of public expertise, the forms of public deliberation, and the ontological nature of acceptable material entities.

How does this perspective help rethink the problem of the ethics of emerging technologies, such as nanotechnology? First, it forces the analysis to situate this question within the constitutional arrangements in which ethics is problematized and which ethics contributes to stabilize. Second, it directs the attention to the sites and moments where re-configurations might occur. Following on some of the examples discussed above, I use the example of the U.S. and Europe nanotechnology programs in order to explore the re-definitions of the problem of the ethics of emerging technologies that an analysis focusing on constitutional arrangement proposes.

Nanoethics in the US: transforming ethics?

The problem of the ethics of nanotechnology in the U.S. is situated within discussions about the nature and role of the expertise in ethics, most notably in bioethics. The argument of the proponents of “nanoethics” (who created in 2003 a “Nanoethics Group” based at the California Polytechnic State University in San Luis Obispo) is that ethics had to permanently “catch up” with technological development. The way to do so is to mobilize a body of expertise based on skills in moral argumentation, using notably the bioethic principles. Ethicists involved in the creation of the “Nanoethics Group” have worked on bioethics, “computer ethics” and “space ethics”, and identify the same type of “policy vacuum” in nanotechnology as in these other domains (Allhof, 2008 ; Moor, 2001 ; Lin, 2006). While the ethicists of the Nanoethics Group argue for the novelty of the field, they also contend that their methods can travel from one technological domain to another, from biotechnology to computer ethics, from space exploration to nanotechnology. The problem of the ethical reflection consists in intervening

as soon as technology is available, and reflects on its potential ethical implications.

Nanoethicists, then, comply with the two dichotomies central for American bioethics – namely the dichotomy between expertise and decision-making, and between ethical advice and technological objects. Their definition of the problem of the ethics of nanotechnology is based on the novelty of the technological objects: nanomaterials might raise new risks, nanoscale brain implants might raise issues about individual autonomy or fair allocation of risks and benefits. But the methods of ethical reflection are unchanged: ethicists have to wait for these objects to be developed and scientifically characterized, in order to be able to mobilize a body of knowledge about ethical argumentation (which might consist in the call for the risk evaluation of nanomaterials, or for the fair distribution of medical applications of nanotechnology).

Framed this way, nanoethics reinforces the constitutional arrangement that American bioethics is based on, and contributes to stabilize it. It restates the boundary between scientific development and ethical expertise, and the separation between the mobilization of ethical advice and later political decisions (for instance about the regulation of chemicals or medical devices). But the problem of the ethics of emerging technologies is also displaced by critics of the Human Genome Project ELSI program, particularly by scholars who argue for a “real-time technology assessment” (RTTA) (Guston and Sarewitz, 2002). RTTA challenges the two dichotomies on which American ethics is based. First, it proposed to actively intervene in the production of science and values. Second, it claimed that it could propose an approach that would be directly “politically relevant” (as opposed to the ELSI program of the Human Genome Project, see above¹¹) and offered a renewed, more practice oriented technology assessment method associating “policy-relevance” and “quality research”.

The RTTA proposition led to the creation of a Center for Nanotechnology in Society funded by the National Science Foundation (NSF), where projects such as collective scenario writings about potential nanotechnology applications and laboratory studies coupled with active intervention of social scientists have been undertaken (Guston, 2007; see also Barben and al., 2008). In the work of CNS and the approach proposed by RTTA, there are indeed “new” approaches to develop about nanotechnology and its ethical implications. First, RTTA is supposed to act at the level of the construction of new socio-technical entities (e.g. nanodevices for targeted drug delivery in the human bodies) to which social scientists and engineers are expected to

¹¹ Bennett and Sarewitz used (Cook-Deegan, 1994). See also (Fisher, 2005) for a critique of the HGP ELSI program by a proponent of RTTA.

participate (for instance, through collaborative work in the laboratory or in the development of scenarios). Second, the organization of expert advice about the social issues related to technology is renewed by these initiatives, in that they attempt to integrate the work of social science in the innovation process itself.

Thus, RTTA proposes to reconfigure the constitutional arrangement within which ethical advice has been produced in the U.S. For the analysis of the problem of the ethics of emerging technologies, it means that it is crucial to understand the epistemological and normative dimensions of the problematization of ethics in order to understand the constitutional arrangements that the bioethics model and the RTTA alternative propose. One can then ask crucial questions about the sites where these arrangements are performed, the ways in which they stabilize, and the alternatives they eliminate. The bioethics model relies on the reproduction of a body of expertise and renders the intervention of ethics in the making of scientific objects impossible. The RTTA alternative aims to dissolve the distinctions between science and policy, and science and ethics. It is therefore included in the programs that explicitly aim to develop nanotechnology and directly contributes to their extension. Eventually, as the director of the U.S. National Nanotechnology Initiatives and scholars involved in RTTA wrote, “adopting an anticipatory, participatory, real-time technology assessment (...) for nanotechnology” will “prepare the people, tools, and organizations for responsible development of nanotechnology” (Roco et al., 2011: 3575). Thus, RTTA makes it impossible to question the very fact that nanotechnology ought to be developed in the first place. Accordingly, it proposes to participate in its very making, and makes it necessary for its proponents to explore the ways in which social scientific interventions in the making of nanotechnology objects might transform them.

Experimenting the ethics of nanotechnology in Europe: from “ethics” to “responsibility”

Public concerns of nanotechnology were framed as ethical issues as soon as the European institutions defined nanotechnology as a priority in the early 2000. The European Group on Ethics (EGE) released an Opinion on Nanomedicine in 2007, which was yet another example of experimental use of “European principles” in order to define a European approach to ethical problems that would not contravene subsidiarity (see above). For the members of EGE involved in the discussion about nanomedicine, the field was particularly difficult as there was no agreement about its exact definition,

nor about the objects and practices it was made of¹². Neither the exact definition of what a “nanomaterial” is, nor the way of deciding whether or not medical devices are meant to “non therapeutically enhanced” were available to the members of the EGE. Accordingly, the treatment of nanotechnology issues by the European institutions was not only about subsidiarity, but also about the ways of dealing about various ontological uncertainties about nanotechnology objects and practices.

The intervention of the EGE was complemented by innovative devices for the European research policy. A “Code of Conduct” (CoC) was released in 2008 and eventually became one of the main components of the “responsible” European approach not only to nanotechnology, but also to any scientific field with future and uncertain applications. The CoC was regularly presented by DG Research officials as the most visible attempt to define a “European approach to ethics”, which would both “promote dialogue” while “not imposing some forms of ethics rather than others” (von Schomberg, 2010). It refers to seven “principles”: “meaning”, “sustainability”, “precaution”, “inclusiveness”, “excellence”, “innovation”, “accountability”, while also introducing “prohibition, restrictions or limitations” regarding “non therapeutic enhancement of human beings” and “research involving deliberate intrusion of nano-objects into the human body, their inclusion in food, feed, toys, cosmetics”¹³. The code delegates to project coordinators and scientists the reflection on both the appropriate domains of research in nanotechnology, and the practical details of research practice, without introducing mandatory actions or constraining requirements. Therefore, the code negotiates the constraints of the subsidiarity principle by proposing a particular interpretation of the balance between the affirmation of general European principles and the definition of restricted areas of research for voluntary scientists (and, later, for scientists wishing to get funding from the European research programs).

The CoC is expected to foster the harmonization of national research programs of member states. Together with the Council, the European Commission recommended that member states “be guided by the general principles and guidelines for actions to be taken, set out in the Code of Conduct for Responsible Nanosciences and Nanotechnologies Research (..), as they formulate, adopt and implement their strategies for developing sustainable nanosciences and nanotechnologies (...) research.”¹⁴ In addition, it is used in

¹² Interview with Anne Cambon-Thompsen, member of the EGE.

¹³ European Code of Conduct: 9.

¹⁴ “Commission recommendation on a code of conduct for responsible nanosciences and nanotechnologies research & Council conclusions on responsible nanosciences and nanotechnologies research 2009”: 3.

the management of European projects: proposals need to refer to the code and define their objectives and methods in ways that do not contradict it¹⁵. Projects might then be encouraged to add research components in ethics, or a more formal “ethics board” expected to supervise the potential issues raised by the project.

Throughout these initiatives, nanotechnology appears less as a new entity that would require innovative ethical approaches than as a general research program of which moral concerns are inherently part. It was, for the European actors in charge of research policy, an opportunity to formulate an objective of “responsible research and innovation”, which then became a central component of European research programs (European Commission, 2012). Framed in the terms of “responsibility”, the moral issues regarding scientific development are dealt with through non-constraining instruments (such as the code of conduct) and participatory devices (such as focus groups conducted in science museums and meant to inform the definition of research objectives for European programs). For proponents of Responsible Research and Innovation, there is indeed a need for renewed ethics of nanotechnology: it is characterized by the extension of the experiments with European principles and subsidiarity that the EGE has been performing in order to realize an objective of “responsibility” according to which technologies could be developed in acceptable ways. This stimulates the development of various non constraining devices aimed to turn scientists, research institutions and member states into “responsible” actors. By contrast, the European Commission that the regulation of nanomaterials is considered adequately dealt with by the existing body of legislation, under a “case-by-case” approach according to which each separate nanomaterials would be examined within the existing regulation of chemical substances (European Commission, 2009).

This approach has been contested by the European Parliament (EP). The Parliament has argued for a regulation specifically targeted towards nanomaterials and for the “consideration of all nanomaterials as new substances”. This ontological stance was followed by a series of regulatory initiatives that required the labeling of cosmetic, novel food and biocide products containing nanomaterials¹⁶. In doing so, the EP had to define nanomaterials in a constraining manner and gather them into new techno-legal categories. For instance, the cosmetic regulation defined nanomaterials as such:

¹⁵ This is assessed through the review process of project proposals.

¹⁶ Regulation (EC) No 1223/2009 of the European Parliament and of the Council of 30 November 2009 on cosmetic products.

“nanomaterial’ means an insoluble or biopersistent and intentionally manufactured material with one or more external dimensions, or an internal structure, on the scale from 1 to 100 nm”¹⁷.

Contrary to the experimental constitutional arrangement of the European Commission, within which the existence of nanotechnology remains uncertain and responsibility is distributed through non constraining instruments, the Parliament proposes a liberal approach in which elected representatives of the European public constrain industries to make it possible for consumers to choose whether or not they want to buy nanotechnology products (Laurent, 2012). This opposition has to do with the definition of acceptable channels of democratic legitimacy as well as to the making of acceptable regulatory and market material entities. Accordingly, examining the problem of the ethics of nanotechnology in Europe leads the analysis to question the constitutional organization of the European Union.

5. Conclusion

The problem of the ethical issues of emerging technologies is raised by the actors involved in the definition of research programs. This is particularly visible in the case of nanotechnology, which has been construed as a scientific program comprising technological developments as well as social scientific explorations of its ethical, social and legal issues. This paper has argued that the problem of the ethics of emerging technologies cannot be considered without examining its implications for the constitution of democratic order. The way of doing so was to discuss the constitutional effects of the ethics of science and technology. As the problem of moral behaviors in Ancient Greek and Christian medieval times was about truth about the self, the moral problems of contemporary science and technology are about the stability of the democratic collective. The problem of ethics is also that of the organization of public expertise, of the rules of democratic deliberation, and of the making of acceptable material entities. Together, these three dimensions participate in the enactment of constitutional arrangements. It is within these constitutional arrangements that the problem of the ethics of emerging technologies is situated. The American and European examples of the development of nanotechnology programs and the ethical issues they raise display two dif-

¹⁷ Regulation (EC) No 1223/2009 of the European Parliament and of the Council of 30 November 2009 on cosmetic products: Art. 2.1, alinea k. Further regulatory texts introduced more sophisticated definitions, for a discussion of the controversies regarding the definition of nanomaterials, see (Laurent, 2013).

ferent ways of defining the problem of the ethics of emerging technologies, related to two different constitutional arrangements.

The comparative approach demonstrates that there is no single way of defining the problem of the ethics of emerging technologies, and, accordingly, the range of its possible solutions. But the approach that this paper has proposed has more to offer than a description of stable ethico-political constructs, among which one could possibly pick up and choose. When asked about the lessons one could draw from the problematization of ethics in Ancient Greece, Foucault was reluctant to “apply” Greek approaches to moral quandaries to contemporary times (Foucault, 1982). His approach precisely intended to account for the entanglement of certain practices (and techniques of the self) and the definition of acceptable problems. It would make no sense to dissociate some of the elements of these social arrangements in order to import them in contemporary debates. One can oppose the same argument to the problem of the ethical issues related to emerging technologies. As the problem is situated within particular constitutional arrangements, it cannot be easily dealt with using ready-made definitions of what is, for instance, a new method in ethics reflection.

But this does not mean that there is no critical power in the analysis. By describing the problematization of ethics, Foucault re-opened the techniques of the self, and the very making of the individual subject. He sought to displace the problem of ethics from that of compliance to general and unquestioned norms to that of the making of the human subject. This was both a way of accounting for the problematizing activities of the actors he was interested in, and a mode of intervention in contemporary problems, which were then situated within particular genealogies. In the cases discussed in this paper, the analysis questions techniques of the collective, and explore the sites where the making of democratic order is engaged. It grounds the ethical imagination in the practices of the actors involved, locates the sites where constitutional orders are re-stabilized and where they can be displaced. It is a way of opening up both the ethical reflection and the making of contemporary democracy.

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