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Conclusions: Towards ethically sound life sciences

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Introduction

Life sciences concentrate on life and death: this simple statement stands for most of the urgent ethical problems these sciences are confronted with. Apparently there is a strong connection between studying living organisms, the way they reproduce, age and die, and social and ethical considerations triggered by them. In whatever way their research results are published in scientific journals, however they propose to explain the theories on how plants, animals or humans become ill and can be protected against diseases, whatever their advise on crop improvement or health mechanisms, the life sciences cannot escape from ethical issues, controversies, dilemmas even, that require debate, consultation, guidelines, intuition, experiences and so on.

In this collection of papers we have intensively discussed the new, and often uncertain impacts of these sciences and their connected technologies, as well their wider (global) impact. It has become clear that many ethical issues are not only triggered by possible misconduct in the treatment of animals or humans, but also by these uncertain and wider impacts. So, the ethical chapters do not concentrate on wrongdoings of scientists at all, but on the identification of possible harm and disturbances in society that at least are influenced, and in many cases even directly determined, by these sciences. For example, genetic information can play a part in disturbing the traditional privacy regulations or in challenging patients and consumers to take their future into account (e.g., in the case of information on vulnerability to cardiovascular diseases).

After the systematic and concentrated effort on separate issues, it is now time to look at it from a more distant point of view. First, let us look at the tasks of ethics of the life sciences, secondly, at its role in the broader field of ethics and in that of philosophy in general, and thirdly, at its role in society. I will take this step of reflection by first summarizing the main issues of this collection of studies, then sketch some wider relations of ethics of the life sciences and pose some future questions and challenges.

Ethical issues of conducting research (internal to science)

We started this collection with issues internally related to conducting science, like the ethical role of scientists (professionals) in organizations. Subsequently, we tackled issues of research and the publication of research. Many of these issues circle around problems of integrity and how to prevent misconduct in conducting science. However,

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the management and access of scientific data have changed by, firstly, the new technologies of both information acquiring and information organization (digitalization of science), and secondly, the new private–public co-operations in the field of research.

Animal welfare and the treatment of human subjects, collegiality (not sexist, racist etc.) were all discussed. The need of attention for misconduct highlights the important ethical role of scientific integrity and corresponding types of responsibility as they are developed in the course of scientific practices (Harris, Pritchard and Rabins 2000; Maker 1994). So, good practices provide guidelines for scientists in cases of dilemmas and new moral challenges. On the side of the human subjects, either as subject to experiments or as subject to large-scale epidemiological observations, informed consent is often an important ethical regulatory device. However, the private–public co-operation very often leads to commercialization of academic interests, which means that more and more scientists are confronted with conflicts of interest. This becomes clear when questions arise on who owns the intellectual property (patents) and who decides the research agenda (research priorities). Also conflicts of commitment, like diminishing attention for teaching or for the public role of the scientists, can become disturbing complications of these new relationships.

All these new developments indicate that societal relationships with the life sciences are very dynamic and produce new controversies, dilemmas and ethical problems. This implies that indeed existing role models and best-practice guidelines are not always sufficient to give a transparent, honest and responsible answer. Most of the existing role models and best-practice guidelines concentrate on ‘informed consent’. However, because ethical issues of misconduct and catastrophes are surpassed by new, urgent ethical issues like that of embedding life sciences and technologies in socio-cultural contexts, and because of the restricted scope of ‘informed consent’, we have to look for other ethical perspectives. The need of attention for misconduct and for scientific integrity can, in this stage of the life sciences, no longer be answered by taking into account the (existing) role of responsibility of life sciences. Public consultations and intense communication with stakeholders can give some answers to these disturbing problems, whilst other ways of tackling ethical issues are yet to be experimented with. However, the challenge is to reconstruct the role of the life-science professional who will have to take these developments into account.

Science and societal problems

Besides the attention for misconduct of scientists, scientific catastrophes and disasters, ethics for life sciences should concentrate on the identification, analysis and evaluation of the most important uncertainties and disturbances that these sciences and technologies confront us with. It is a truism that modern life sciences, besides covering knowledge of the natural world, also cover knowledge of the social world, be it in naïve or sophisticated form, and do not only transform nature, but also maintain and amend existing systems of natural and social transformation. Conducting research on seeds, cows, harvesting machineries or genes, includes working on social organizations.

Life sciences and technologies are not just an instrument or a nice toy for researchers, because they change humans and their relationships as well. These changes concern both social and cultural aspects. The cultural influence can be seen in

the impact of these sciences on the way people perceive their lives and bodies; e.g. because of the increasing attention to genomics, people are becoming more and more aware of their genetic make-up affecting their behaviour and functions. The social aspects concern, for example, challenges to traditional versions of social responsibility of the life sciences and what their scope should be and how the relationship should be between individual, social and public responsibility. New forms of public participation and consultation are enacted, and the challenges are, *inter alia*, what the scheme of reference, the framework and the procedure will be, in order to be able to take into account all conflicting interests. Life scientists are no longer exempt from participating in public debates and no longer allowed to carry out research on their own. They should engage themselves in enhancing the quality of the public debate and learn from participation in public debates. This comprises what is often called co-evolution of science and society: all groups involved, even with conflicting interests and opinions, can try to develop new ways of understanding and interacting.

The most urgent problems in this regard concern the increasing disagreement between the food and agricultural professions and large parts of society on the way medicine, food and agriculture should be viewed, assessed and organized. This disagreement is partly internalized by these professions, which means that the professions are split up in rivalling parties that participate in sometimes radically different technological systems. However, for the professions in general it means, firstly, that they are confronted with a *lack of trust* from the side of their end users, society. Secondly, the food and agricultural science and engineering profession are confronted with a *split between two or more technological systems* that are partly at odds with each other and with which different types of science and engineering are connected. The challenge of the professions is to manage the peaceful coexistence of these two competing technological systems.

Let me illustrate these two radical theses. Although the recent criticisms started in the nineteen sixties with the alarming messages on the environment in Rachel Carson's book Silent Spring, it was the biotechnology wave, from the early seventies, that really sparked a booming wave of discontent with the general goals, standards, skills, research priorities and values of these high-tech professions. Damage to the environment in the form of pollution, or decrease in (agro-)biodiversity, deterioration of the aesthetic quality of the landscape and food, increasing animal-welfare problems (like broiler chickens or factory pigs) were attributed to a large-scale intensive technological system, in which agricultural and food scientists and technologists played a crucial role. Because of the gap between producers and consumers with respect to food production, it took some time before consumers realized what was going on in food production. Since the nineties, after several food crises, mass media paid attention to these circumstances, and made many consumers conscious of the material and immaterial costs of this large-scale intensive farming system. They questioned the aims, standards and competencies of a profession that contributed to these developments.

These criticisms became more or less standard in the nineties during frequent crises in the food-production chain, like swine fever, foot-and-mouth disease, BSE crisis, avian influenza and the dioxin scandal. The belief of consumers in the reliability of the people directly involved in the food chain, whether they were industrialists, government agencies or food professionals working for food industries, sunk to a record low. On the other hand, the belief in non-food organizations like Greenpeace has increased. Integrity, transparency, elsification (paying attention to

ethical, legal and social aspects [ELS] of science and technology), PPP (planet, people, profit), CRS (corporate social responsibility) are some of the reactions of business and science circles. Large scientific organizations, like Wageningen University and its alumni organization of agricultural and food professionals, are trying to rewrite their codes, and to pay attention to professional ethics. In teaching and education, agricultural and food engineers learn competencies to tackle societal and ethical dilemmas. All these developments make one thing clear: the values, standards and competencies of the food and agricultural professions are not sufficiently endorsed by society at large. What should agriculture, food, plant and animal technologists, engineers and scientists do? The relationship between these professions and society is under severe strain.

In reaction to these critical developments, many engineers took the criticisms seriously, and started to think in new ways. Small-scale agricultures, with tailor-made technologies in eliminating pests and viruses and enhancing yields with local participatory organizations were institutionalized. Both in the developing and in the developed world artisan ways of farming and food production (i.e. organic agriculture or slow food!) are transformed in this extensive way. In many developed countries these systems are a small minority, but in others still the dominant form.

These developments bring about my second remark, on the coexistence of at least two different agricultural and food systems confronting the professions. This coexistence is not always a peaceful one. Be it GM agriculture versus non-GM agriculture (and food) or intensive versus extensive farming systems, these systems have different types of crop protection and soil protection, different types of zoonoses (veterinary diseases that can also affects humans) and different types of what can be called 'contamination'. Non-GM crops can be contaminated by GM seeds; organic farming feels threatened by pesticides of non-organic farming, and non-organic farming is contaminated by organic technologies (there was a case of *Phytophthora* in The Netherlands in 2003). The use of *Bt* genes in maize or potato makes it more difficult for both systems to stay ahead in the race against bugs, because resistance is built up more rapidly. The struggle between ocean fishing and aquaculture (farm fishing) is another example of the difficult coexistence of different systems. These systems use all kinds of rivalling technologies, which exist simultaneously but often cause great social and natural conflicts. The EU has enacted special regulation on coexistence, but nobody understands exactly how to tackle these issues. At the end of the food chain we have similar subsystems connected to two different types of consumers: the obese with the fast-food and biotech sectors, the more conscious consumer with the others. Anyhow, the existence of two or even more agricultural and food systems is one of the most intriguing challenges for the professions, and it makes value conflicts the core issues of their undertakings (Charles 2001; Pollan 2001; Maker 1994). I hope that life scientists and engineers can contribute in making the warlike aspects of this coexistence into peaceful aspects and will learn from this controversy.

Because of the dynamics of technologies and the dynamics of societies in which these technologies are realized, we should look for new kinds of interactions between the agriculture and food professions and society. The relationship between the two will become more and more unclear and we need ethicists, but not only them, to map the grey zones and potential learning processes. It is not possible to fix, once and for all, what the aims and quality standards of a practice or a profession are. But we should look for new fluent and robust ways of rationally dealing with ethical-technological problems.

Both Professional Ethics and Applied Ethics have something to deliver in tackling these problems. So, let us look at elements we can use, like utilitarian and deontological reasoning patterns, value dilemmas, future scenarios with varying value–technology dimensions, ethical stakeholder analysis, public consultations and other deliberative methods of empirical philosophy. Core question should be how life-science and engineering practices should respond to societal values, and how technologies can contribute positively to values of the living world.

The status of ethics of life sciences

If ethics of life sciences can make a difference and has such an important task in contributing to the improvement of the interface between the life sciences and society, it is also necessary to reflect upon its methods, goals and status in general. To what extent does ethics for life sciences have an independent status, what can it learn from academic ethics or can this applied-ethics branch even act as a role model for the more formal and principled branch of ethics? What kind of impact can applied ethics have on academic ethics and what can academic, general ethicist learn from ethics of life sciences? More broadly viewed, what kind of social role should ethics for life science have?

Traditionally, applied ethics is seen as applying given principles from the mother discipline, fundamental ethics, to a concrete problem; some empirical facts are considered necessary to get the applicable conclusion. However, as early as the nineteen fifties, it became clear to many ethicists working on the field of medicine, that their applied work was different and that in applying fundamental norms, new insights with respect to these fundamental norms where acquired. Also new fields of application emerged that were not foreseen when the fundamental norms were formulated and justified. It turned out that many applied ethics were not applying existing norms but constructing new norms, whether as in English common law, by progressing from precedents, or more boldly, by proposing whole new norms and procedures. As a matter of fact, the first category was often confronted with the reproach that it only tried to adapt public opinion to the whims of scientists and technologists (or industrialists). However, it became more and more clear that ethics of life sciences could indeed point at new insights and was not only a kind of social ambulance service by producing order out of chaos and removing the rubbish for the triumphant march of the life sciences. It turned out that ethics of life sciences has some influence on societal views on the life sciences and on enhancing the ethical debate on the life sciences. It is clear that society is becoming more and more aware of the fact that the contemporary discussion on genomics has nothing to do with the discussion on eugenics sixty years ago.

The new insights of applied ethics that should be taken seriously by fundamental ethics are not connected with the committees and endless procedures that often are inaugurated without any sign of really improving the ethical debate, but in the alternatives for informed consent, like new types of public consultations, in debunking traditional distinctions of fundamental ethics like that between citizen and consumers (Korthals 2004), and in making clear the importance of our biological heritage and its role for future generations. Although recent acquirements are important, the main work is still to be done, and herein lies the most challenging work of applied ethics, in particular in the field of sound frameworks for debates with conflicting, often incommensurable interests and visions.

Conclusion

In the last decades the ethical issues within the life sciences have been widely discussed in journals and textbooks. Professional integrity, accountability and responsibility are outlined by prominent ethicists as important features of ethically sound life sciences, at least with respect to issues within science. However, the ethical issues that are connected with the interface of life sciences and society are not discussed to such an extent, often not even identified at all. The priorities of research, the impact of various life-science alternatives on society and the restoration of trust in the life sciences are usually neglected. If they are discussed, more often than not, a kind of societal consensus vis-à-vis the interface of life sciences and society is assumed. However, consensus and harmony cannot be assumed; we must begin with deeply conflicting, often incommensurable opinions on the future of this relationship.

How to start co-operation, taking into account this difference in interest and opinion? What should be the main issues? Who should be the main parties and stakeholders? Does everyone have a voice? How to deal with accountability and responsibility of the life sciences in this respect? What capacities should life scientists have in participating on the edge of this interface? How should the curriculum be modified to meet these societal demands? What criteria can help the consumer/citizen in his decision to trust new activities of the life sciences? What can ethics do to contribute to these trust enhancing measures? These are all questions that need to be answered.

Recommended literature

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