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Focus On: The Uppsala Code of Ethics for Scientists*

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1. *Ethical problems in research*

What can we do to stop the armament race and promote peace? And in particular, what can we scientists do? The obvious risk for nuclear disaster makes it necessary for any scientist to scrutinize his/her own resources, and to try new unconventional ways to contribute to global disarmament and a reasonable future.

One of these resources is the scientist's own personal appreciation of right and wrong, i.e. our ethics. In the following we shall describe an attempt to mobilize this resource in order to affect the choice of research field and application of research.

At Uppsala University a small group of scientists has met regularly since 1981 to penetrate ethical problems of research. The variety of disciplines represented (natural sciences, medicine, social sciences, technology, law, theology) has greatly contributed to making the meetings fruitful. From an early stage, the seminar has attempted to formulate a code of ethics for scientists. A first proposal for such a code was circulated in late 1982 and, based on the debate that followed, the seminar published a final version of the code in early 1984 (see next page).

As scientists involved in this endeavour, we would like to present the code and discuss some questions of principle that have been repeatedly raised in the seminar, within Uppsala University, in the media, and in discussions with colleagues internationally (Gustafsson 1984; Tibell 1984).

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First, however, let us make clear that, to our knowledge, there exists no similar code of ethics for scientists. Obviously, there are a number of codes or similar statements concerning the ethics of research; they can probably be counted in the hundreds (Rydén 1984). None of them seems to correspond directly to the aims of the Uppsala seminar. The great majority of statements are research guidelines, that is, they refer to the ethics of conducting research, for instance, the use of human subjects in medical research. An early example is the Nuremburg Code prompted by the use of science in Nazi Germany (Mappes & Zembaty 1981). There are also codes of ethics or of conduct within professional associations. Mostly such codes refer to the professional in question and his/her relations to clients, for instance, the Hippocratic oath, which deals with the relationship between doctors and patients. In a few cases, a paragraph or a sentence in the preamble concerns the relationship between the professional and society at large. The statements are usually very general, such as 'Members should use their knowledge and skill for the advancement of human welfare' (Chalk et al. 1980, see also *Bulletin of Peace Proposals* 1975). Similar statements are found in proposed codes that have been published, for instance, in the general sections of interdisciplinary journals. In the work of the Uppsala seminar such general statements have not been found very useful. A code should give some details about the responsibility of the scientist and some advice on how to act when an ethical dilemma arises.

It is worth noting that we have not found a single code mentioning the ethical aspects of weapons development. The reason might be

Code of Ethics for Scientists

Scientific research is an indispensable activity of great significance to mankind — for our description and understanding of the world, our material conditions, social life, and welfare. Research can contribute to solving the great problems facing humanity, such as the threat of nuclear war, damage to the environment, and the uneven distribution of the Earth's resources. In addition, scientific research is justified and valuable as a pure quest for knowledge, and it should be pursued in a free exchange of methods and findings. Yet research can also, both directly and indirectly, aggravate the problems of mankind.

This code of ethics for scientists has been formulated as a response to a concern about the applications and consequences of scientific research. In particular it appears that the potential hazards deriving from modern technological warfare are so overwhelming that it is doubtful whether it is ethically defensible for scientists to lend any support to weapons development.

The code is intended for the individual scientist; it is primarily he or she who shall assess the consequences of his/her own research. Such an assessment is always difficult to make, and may not infrequently be impossible. Scientists do not as a rule have control over either research results or their application, or even in many cases over the planning of their work. Nevertheless this must not prevent the individual scientist from making a sincere attempt to continually judge the possible consequences of his/her research, to make these judgements known, and to refrain from such research as he/she deems to be unethical.

In this connection the following should particularly be considered:

1. Research shall be so directed that its applications and other consequences do not cause significant ecological damage.

2. Research shall be so directed that its consequences do not render it more difficult for present and future generations to lead a secure existence. Scientific efforts shall therefore not aim at applications or skills for use in war or oppression. Nor shall research be so directed that its consequences conflict with basic human rights as expressed in international agreements on civic, political, economic, social and cultural rights.

3. The scientist has a special responsibility to assess carefully the consequences of his/her research, and to make them public.

4. Scientists who form the judgement that the research which they are conducting or participating in is in conflict with this code, shall discontinue such research, and publicly state the reasons for their judgement. Such judgements shall take into consideration both the probability and the gravity of the negative consequences involved.

It is of urgent importance that the scientific community support colleagues who find themselves forced to discontinue their research for the reasons given in this code.

N.B. The code consists of both the introductory text and the four points. We shall be grateful if, in any publication, the four points are not separated from their context.

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understood from the experience of one of the working groups of Pugwash, meeting in Varna in 1978. Some members suggested that scientists should, in principle, refuse to work in military research, or even stop working in basic research that might one day have military significance. The proposal was not adopted since some military research was considered necessary for defensive purposes and because in some cases basic research has important peaceful applications (Rotblat 1984). Such remarks give some essentials of the arguments against a code restricting the development of weapons.

2. *The responsibility of scientists*

The idea that an individual is responsible for the (long-term) consequences of his/her actions as a basis for moral judgement has gained wide acceptance. But the Uppsala code of ethics goes beyond that. It rests upon the idea that the scientist is, at least to some extent, responsible for how his/her findings are put to use in society — by others. This view seems to be shared by many scientists (e.g. Hård af Segerstad 1984; Tibell 1984), although others keep to the more classical view that freedom of research is unduly hindered if individual scientists should take the possible consequences of their research into consideration.

An important objection to requiring such a responsibility is the difficulty involved in judging the consequences of research. The situation is different in basic and applied research, but even in the latter case it may often be impossible to foresee the consequences within, say, ten years after the research has been carried out.

Sometimes, however, important practical consequences become apparent quite soon after a discovery has been made in basic research. As an example one could mention the applications of the fission reaction discovered in 1938 by Hahn and Strassmann and published in *Naturwissenschaften* in early 1939. Only a few months later a French team, led by Frédéric Joliot-Curie found that in the process several neutrons were emitted, thus making a chain reaction possible. In a surprisingly short time these two discoveries led to the construction of the first nuclear reactor, in 1942, by Fermi and his collaborators. In another three years, the first nuclear bombs were made and detonated over Hiroshima and Nagasaki.

It is not probable that Hahn and Strassmann could foresee this development. Even Niels Bohr in 1939 gave 'fifteen weighty reasons why, in his opinion, practical exploitation of the fission process would be improbable' (Jungk 1958). If we go back another 20-30 years, Rutherford, the father of nuclear physics, is said to have mentioned that he believed that nothing of practical value would ever come out of his research (Kapitsa in Tibell 1984). One must remember, however, that the military goal would not have been reached in such a short time without the enormous concentration of brains and money in the lavishly supported Manhattan project.

To mention another area, medical research, it is conceivable that a scientist working, for instance, on diagnostic methods can predict that ethical dilemmas will appear for doctors and patients quite soon after a new method has been introduced. Just as was the case in the application of the fission reaction, so in the medical field, once the scientific efforts have reached the applied stage, it may happen that research will go on parallel with discussions on the moral consequences.

The Uppsala code assumes that scientists have a responsibility and that they should attempt to estimate the practical consequences of their research.

The Uppsala code has a number of additional features that we would like to comment on:

1. The code is intended for the individual scientist.
2. The code specifically addresses questions of ecology and war.
3. The code is largely based on negative formulations of the type 'thou shalt not..'.
4. The code explicitly specifies actions to be taken in case of ethically doubtful research, notably the duty to inform.

3. *Individual responsibility*

There are several reasons for confining the code to use by the individual scientist only. We consider the ethical dilemmas that the code addresses to be personal ones; they are matters of conscience. If the code were adopted by a university or a similar authority, it would fall into the category of laws enforced by governmental bodies. The individual scientist would no longer have the same obligation to take a personal stand. It would all be done *for* him/her, not *by* him/her. We ourselves do not feel competent to judge whether other people are unethical or not. Also, if judgements were to be made in court-like proceedings, details regarding the ethical rules would have to be worked out, which certainly would require considerable efforts. Finally, it would be a complicated process for any organization to adopt a code of ethics of this kind. An interesting example is the discussion at the University of Michigan, where an entire procedure was outlined for the scrutiny of research applications in order to restrict military-related research. The proposal gained considerable support within the university but was ultimately turned down by the Board of Regents (see, inter alia, Report from the Research Policy Committee 1983). The individual researcher is, at least in principle, free to disengage himself/herself from such research at any time.

4. *Ecology and war*

It is necessary to spell out some implications for research in two fields of particular importance. First, there are the ecological consequences. It very soon became evident in our discussions that the ethics of ecological consequences is a question of judgement. All research may have at least some ecological consequence for our environment. Which of these effects should be considered ethically acceptable? In most people's opinion it is not immoral *per se* to endanger the existence of a species, a life form. The extinction of the smallpox virus (which has been accomplished except for some frozen samples) was carried out with the help of science, and is probably beneficial for everyone except the virus. The extinction of the malaria parasite would certainly be considered a great accomplishment, if ever realized. We finally decided to suggest a formulation ('... do not cause significant ecological damage'), which leaves most of the burden of judgement to the individual.

The most controversial statement in the code concerns research for war preparations. However, this has been at the heart of the seminar's concern from the beginning. We agree with J.D. Bernal's statement that for scientists

> ... the application of science to war is the worst prostitution of their profession. More than anything else the question of science and war has made scientists look beyond the field of their own inquiries and discoveries to the social uses to which these discoveries are put (Bernal 1967, p. 186).

However, everyone wants to live in an autonomous or free country and as a consequence most people, whether scientists or not, consider armed defence necessary. If this is a higher value than that of not contributing to war, it may be immoral not to give the national defence the best possibilities and conduct research to achieve that. Our point is that the relative priorities of these two values should be affected by the fact that the world now has come to the brink of a globally destructive war. In the present situation additional armaments seem to enhance insecurity rather than promote security. If so, the situation prompts a discussion on finding solutions to achieve overriding aims (such as human survival) as well as questions of ethics.

Even if most scientists were to accept military research as such, their personal attitude to this activity would probably be ethically balanced. For instance, for ethical reasons, most researchers would abstain from developing chemical and biological weapons, even if these were to be very 'useful' for defending their own country in a war. Likewise many scientists would agree that further addition of nuclear weapons or new space weapons is not in the interest of their country (regardless what

country), while there was a nearconsensus on the necessity of developing the first atom bomb. One way to codify a balanced attitude to military research would be to differentiate between defensive and offensive wars. However, we have not found a simple way of doing this. It is not obvious what constitutes an offensive war or what could become such a war. Nor is it clear what would be a defensive weapon or if such weapons contribute to making our world more secure (Jervis 1978). The recently initiated debate on defensive force structures might, however, also result in new ways of making a distinction between offensive and defensive of relevance for the scientists' dilemma (cf. *Journal of Peace Research,* no. 2, 1984).

The seminar has chosen to retain in the code a paragraph regarding war, but again leaves the burden of judgement to the individual. Due to the gravity of the global situation our formulation ('... scientific efforts shall not aim at applications or skills for use in war') is rather categorical, but it may suggest that some aggressive intent has to be involved.

5. *Negative or positive code?*

A frequent reaction to the code has been that positive rules would be preferable: a code should state what scientists should do rather than what they should not. The seminar has, however, decided against positive formulations for several reasons. The fundamental one is that science is usually not driven by ethical convictions or rules. Rather, it is the autonomous search for knowledge and abilities that motivates research. The major part of research might not have identifiable ethical consequences, such as developing a new theory in mathematics or physics. What is required is a specification of the limits of scientific activity, not proposals to direct it. Furthermore, positive formulations that have been suggested seem to encounter many difficulties. Such is true for Hutton's recent proposal, which, having stated in positive terms what scientists should do, also includes the phrase 'scientists shall boycott the work on developments that seem to have negative consequences for man' (Hutton 1983). It seems more complicated to adhere to a positive code, and certainly such implications as suggested do have far-reaching consequences for all academic activity. A possibility would be to mix positive and negative formulations, as in a proposal from a Pugwash group meeting in Oxford 1972: 'I will not use my scientific training for any purpose which I believe is intended to harm human beings. I shall strive for peace, justice, freedom and the betterment of the human conditions' (Rotblat 1984).[1] The mixture, however, does not solve any of the problems.

6. *Duty to inform*

When a scientist finds his/her own work unethical he/she should interrupt it. The Uppsala code, however, also requires that the decision and the reason for it should be made public. Although a considerable fraction of the world's scientists work in situations where their work is secret, it is interesting to note that this requirement of the code has met with almost unanimous approval. Scientists in East and West have stated that they have special responsibilities to inform about research results, make them understandable to a wider public, and also explain their consequences (Hutton 1983; Tibell 1984). An instructive demonstration of how this could work out in practice was provided by the recombinant DNA case. The discovery of the possibility of artificial gene transfer from any organism to bacteria was made in 1972. It was followed by a moratorium of several years on major uses of this technique and a prolonged public debate. A lesson to be learned is that a public debate needs an informed public and that considerable efforts are needed to convey the important facts to the layman. Certainly, this also applies to other areas such as the nuclear arms issues.

Our aim in publishing the code of ethics is twofold. First, of course, we hope that it will be useful to many individual scientists as a guide, stimulating critical appreciation of their own activities, and as a support in case some of these are ethically unacceptable. Secondly, we hope that it will contribute to the debate

on the roles of science and scientists in our world. Perhaps these roles should be changed, as one of many changes that are necessary if we want to create a more satisfactory world.

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NOTE

1. The first sentence was proposed by Professor Harald Wergeland, Trondheim, as a suggestion for a pledge to be adopted by scientists.