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Nuclear War and the Fate of the Earth: The Role of the Scientist

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It is a great pleasure for me to welcome you to this session of the fourth United Nations University Tokyo Seminar. In addressing ourselves to the theme of this year's seminar on "The Nuclear Danger", we will give particular attention to the role of the scientist in shaping the fate of the earth. I approach this topic and the discussions to be held over the course of the next three days with a sense of both urgency and excitement, which I feel sure is shared by many of you on the panel and among the participants. For the ethical dilemmas that the scientist has confronted since time immemorial - think of the myth of Pandora's Box, the legends of Faust and the Sorcerer's Apprentice - have all come to a head in the nuclear age.

It has always been true that knowledge and power can be used for good and evil - and have been used for both. The problem is that in the Age of Science, the ethical questions that have arisen from humankind's slowly growing mastery of the forces of nature have been treated as residuals of progress. The failure to resolve these residual problems has not been permitted to stand in the way of further "progress" - even when the so-called residuals dwarf the intended effects of the results of scientific work. The ultimate manifestation of this effect is the development of nuclear weapons. The stated purposes of nuclear weapons, to deter aggression and in the event of war to achieve certain strategic objectives, is made absurd by the dawning realization, based on the work of groups like SCOPE, that the side-effects of nuclear war could mean the end of civilization on this planet, if not life itself. As scientists and laymen, we are now reaping the consequences of having failed to devise a scientific code of ethics, based on a broad consensus among scientists in all countries. There is a great deal of remedial work to be done on scientific ethics, and it is all the more difficult and urgent to do it now that science has mastered the fundamental forces that bind the particles of this universe together.

The search for a consensus among scientists is complicated by the fact that on many of the ethical questions of our time scientific opinion is honestly divided, or definitive evidence is lacking. But we cannot afford to wait to take action until the scientific jury gives its verdict; with the fast pace of current events, too many options are likely to be foreclosed by the time we have the ironclad evidence to say with certainty what, for example, the effects on the global climate will be if we destroy the tropical rainforests, or what the impact on future evolution will be of large-scale species destruction, or, most compellingly, what will be the effect of a major nuclear exchange on our planet's ability to support life.

Centuries ago, the medical profession, such as it was at the time of Hippocrates, devised for itself a code of ethical conduct, an oath whose fundamental principle was and remains "first of all, do no harm". Ideally, one might hope for a kind of Hippocratic Oath for scientists, a code of ethics that would allow the scientific community to demonstrate its commitment to humane and life-affirming values. Such codes have always been self-enforcing, and for that reason it is essential that they be based on a broad consensus that includes laymen as well as scientists.

The myth of the "mad scientist" working in isolation in his mountain-top laboratory on a weapon of horrible destructiveness is a totally unrealistic one. The modern scientist working on the cutting edge of research operates very much within a social framework. His or her creative impulse may be individualistic, but the infrastructure of advanced modern science requires a vast and costly support-system of human resources, equipment and finance. This is especially true of weapons research, and perhaps most true of nuclear weapons research. The required scale of the enterprise accounts for the fact that something on the order of 500,000 scientists in the world today are engaged in war-related research; military pursuits engage roughly one-quarter to one-third of all the scientists and engineers in the world.

It is not enough to deplore the fact that so much scientific talent is devoted to military research and development. We must ask why the political and civil constituencies for peaceful and constructive uses of science are so weak in comparison with the constituencies for aggressive and destructive uses. Are our societies so dominated by fear rather than the spirit of co-operation and the instinct for survival that we can tolerate the shadow that military science, particularly in its nuclear aspect, casts over the whole world?

Many people have a conspiratorial view of the military-industrial complex that sees it as beyond civilian, political control. I do not underestimate the difficulties of control, but I honestly do not believe that it is impossible. Indeed, I think that it is difficult for the military-industrial complex to flourish over the long term without a considerable degree of civil acquiescence, if not support.

But to point out the responsibility of civil society to hold the military establishment accountable for proportionality in means and ends is not to let the scientist off the hook. Indeed, the scientist has a crucial role to play, not only in his or her own conduct, but also in the education of lay society. Here, I think, it is important to emphasize the role of openness in the scientific endeavour. Secrecy is, in the first place, rather counterproductive for intellectual creativity. Furthermore, there are clear linkages between secrecy, which is a hallmark of military research, and the continuing momentum of the arms race. But openness is under assault from two directions today: from commercial interests and from national security interests. It is essential that we keep scientific research open and transparent to the public view, for two reasons: first, so that the non-scientist can pose ethical questions about ongoing work; second, so that

adversary nations will not harbour dark fears about the super-weapons that their enemies may be developing under the veil of secrecy, and so be tempted to lash out at shadows.

The SCOPE/ENUWAR Project on Nuclear Danger represents such an educative effort made by a representative part of the international scientific community to inform and arouse both scientific and public concern about the fatal consequences of a nuclear war. It is a message to which the United Nations cannot be indifferent. This is why the United Nations University has been happy to co-sponsor the SCOPE/ENUWAR meeting in Hiroshima and Tokyo, and this is also why we have asked the panelists of this public session to discuss in a broader context the question of collaboration between scientists and the UN System in face of the problems endangering the very survival of humankind.

There is a commonality of moral commitment to certain basic values between the world scientific community and the UN System; namely the values of human survival, development and welfare.

It is important to take note of the fact that the World Health Organization has taken the initiative in calling upon the scientific community to report on the consequences of nuclear war for human health and health services. Such efforts by the UN System itself are reinforced by the scientific community's own initiatives, such as the present SCOPE/ENUWAR Project of the International Council of Scientific Unions. The UNU will continue to serve both as a go-between for initiatives coming from either side, as well as a participant in such investigations.

In more general terms, the UN System has traditionally been deeply interested in scientific and technological development. All the specialized agencies have their own research sections. As you well know, the International Council of Scientific Unions is directly related to UNESCO. The UN General Assembly has held several special sessions on global issues, such as disarmament, environment and population, where scientific data and analyses were amply used as information bases. The UN also organized a special session on science and technology for development. Finally the UNU itself is concerned with science and technology and their social and ethical implications as one of its five priority areas of study. All these activities of the UN System are motivated by the fact that unless there is an adequate knowledge base about the pressing global problems the UN System is dealing with, appropriate policies cannot be formulated.

Collaboration between the UN System and the world scientific community may become more meaningful if a clearer sense of common purpose can be agreed upon by the two parties. This is why I feel that it is important for the scientific community and the UN System to collaborate across a broad front, into which the theme of the present seminar - the nuclear danger - should be a major entry point: that is, the problem of human survival. How can we turn science and technology to address the fundamental human problems: to overcome poverty, reduce inequality, protect the environment,

and promote peace? How can the UN System help to lead science and technology in this direction?

The values of human survival and human life are so essential that it would seem unnecessary to stress their importance. Yet, the sad reality of the past and present world predicaments makes it extremely hard to answer with certainty the two questions I have just posed. How much scientific effort has been and is devoted to means of destroying life rather than to means of saving and developing it? How much support has been given to the efforts of the United Nations to avoid lethal conflicts, and to overcome famine and other calamities? It is necessary to recognize the fact that the decisions of different actors, national and international, are often motivated by shortsighted, selfish interests which cause them to choose zero-sum survival strategies instead of strategies that reinforce each other's potential for development.

Science and technology have often followed the orientation laid down by such shortsighted leadership, for it is this leadership, in the main, that sets budgets and priorities for research and development. This tendency has been well documented by the researchers of military R & D. But I have the feeling that this is merely the tip of the iceberg. Even when scientific R & D is not directed toward improving the instruments of destruction, it is most often guided by principles of economic profit maximization rather than by attempts to maximize human dignity and the quality of life.

To cope with such tendencies, I would like to see the scientific community and the UN System collaborate in setting up ethical guidelines for scientific and technological research and development. As the medical profession has the Hippocratic Oath, there is a need for instruments through which scientists and engineers could commit themselves to engage in research not for the destruction, but for the development, of human life. We cannot develop these instruments until we have fully articulated and debated the ethical dilemmas that confront us in an age of vast destructive power and equally vast - and real - threats to the security of nations, cultures and peoples. The UN System, especially through its specialized agencies, could also study the feasibility of an internationally agreed-upon set of guidelines which would not only restrain research that is harmful to life, but would encourage scientific activities conducive to the security of human life and to the fuller expression of the human spirit.

I have the feeling that many groups throughout society are beginning to awaken to the ethical dilemmas raised by scientific advance, of which the nuclear danger is surely the most urgent. In some cases, scientists have led this awakening through just such activities as this workshop. In other cases, it has been the clergy, the educators, artists, or other citizens' groups who defined some of the central problems of our time in moral terms - and then have challenged the experts to come up with some better answers.

I very much hope that the United Nations University will be deeply involved in the search for ethical guidelines for science. I can think of few

more valuable contributions that we could make. I wish you a successful meeting and thank you in advance for your contribution to strengthening the ties between the world scientific community and the United Nations in the effort to secure peace and enhance the conditions of human survival, development and welfare.