GUEST EDITORIAL

Modern Weapons and the Environment

Environmental effects of military actions in principle are no different from the effects of other, non-military assaults on the environment—such as radioactive contamination and chemical poisoning. But they do tend to be much more intense, of greater magnitude, and far more catastrophic. Given the power, numbers, and sophistication, of modern weaponry, and the savage abandon with which it is apt to be used in war, these facts are obvious.

Although damage to the environment is hardly the most severe impact of warfare—the 'traditional' objectives and consequences still being the most generally important—the environmental consequences of war have been too little emphasized, whether by environmentalists or by those working for peace. War and environment are, however, two inseparable questions—concern for one implies concern for the other. Recent experiences related to the wars in Viet Nam and the Middle East have been coupled with a profound and growing public interest in the environment, and have been amplified by a widespread understanding of the possible consequences of the seemingly eternal nuclear 'arms race'. These circumstances have led to the realization that war—or anyway a modern great war— poses by far the largest, and what could turn out to be the final, threat to the human environment, at least as we know it.

It is interesting to note that two of the main modern targets for environmental concern, nuclear power and pesticides, both stem basically from military research activities during World War II. Today, increased ecological knowledge and research in the civilian sector have further augmented our understanding of the environmental consequences of the use of weapons that are already stockpiled, as well as made developmental work possible on new types of weapons which are explicitly aimed at utilizing environmental destruction as a means of warfare. The greater our knowledge about the environment becomes, the better can we predict the 'side-effects' of military actions.

The results of such increased environmental knowledge, when applied to the consequences of war, are becoming increasingly unpleasant and indeed quite shockingly horrific. However, it is clear that the military usefulness of the so-called 'environmental weapons', such as weather modification or induced geophysical disturbances, is almost non-existent. On the other hand, the potential environmental consequences of, especially, the use of the nuclear arsenal, has clearly emerged as one of the major threats to the human environment, in both the short and long time-scales.

It is virtually impossible to imagine the extent of destruction and human suffering that would follow even a 'limited' nuclear war, not to speak of a global war involving many thousands or even tens of thousands of detonations. For example Western Europe, where currently some 8–10,000 nuclear weapons are deployed, has fewer than 150 cities with populations of 200,000 or more each, yet holding more than one-third of the region's total population. Only a minute fraction of the current total European nuclear arsenals, which in turn is only a part of the world's total, would thus be sufficient to destroy all of Europe's major cities.

An all-out nuclear war would no doubt kill, by blast and fire, the bulk of the urban population in the Northern Hemisphere. A large proportion of the rural population would also be killed, though in their case more often by radiation from radioactive fallout which would be distributed over large areas. In addition, a major nuclear war would certainly have extremely profound long-term consequences. The expected effects of possible changes in the global climate and weather patterns, of a possible destruction of the ozone shield in the upper atmosphere, and of the genetic damage caused by radiation, are not known in detail, but are likely to be large or even drastic. The political and economic consequences for the poor nations of the Southern Hemisphere, of any total destruction of the economies of the Northern Hemisphere, would also be likely to be very severe. At the same time we should admit that practically nothing is known about the social and psychological consequences, on survivors, of the destruction of all kinds of social, medical, and technical services, or of the effects of severe long-term shortages in food supplies, destruction of livestock and crops, disruption of many types of communication, contamination of water, etc.

In fact, such 'secondary effects' could indeed be far more severe than the primary effects of blast, heat, and radiation. The question of whether, or in what form, human civilization would be able to survive in the long run would likewise be an open question in the event of a nuclear war involving a significant fraction of the existing warheads.

Naturally, the actual scale of destruction would depend on the scale of the war, on current missile-targetting principles, and on weather patterns, etc. In recent times several serious attempts have been made to convey the grim human and societal implications of a nuclear war to a wider audience, e.g. by the US National Academy of Sciences. Here I would like to draw attention to another project that is to be carried out by *Ambio*, the international environmental Journal which is published by the Swedish Academy of Sciences. As a follow-up of an earlier (1975) special issue on 'War and Environment', *Ambio* is now preparing another major issue within the same theme, called 'Environmental Effects of a Global Nuclear War', to be published in the Summer of 1982, the year of the next UN Disarmament Meeting.

The planned issue will be specifically aimed at providing a better understanding, in both scientific and general terms, of the environmental consequences of modern nuclear warfare. This is to be done not only in terms of specific environmental systems such as freshwater systems, agricultural systems, the atmosphere, etc., but also in terms of the human and societal environment. The latter part will involve in-depth studies *inter alia* of the consequences for human health (including mental health), for the global economic systems (including food and energy supplies), and for social services. Case-studies of selected countries are being included in the form of fictionalized scenarios. In order to facilitate comparisons and to provide a framework for quantitative conclusions, all the different parts will be based on a common 'reference war' scenario, outlining the number and power of warheads exploded, their distribution, etc.

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The special issue of *Ambio* is being edited by Dr Frank Barnaby (formerly Director of SIPRI), Jan Prawitz (adviser to the Swedish Ministry of Defence), and myself. Our hope is to provide a generally useful and factual basis leading to a more realistic conceptualization than is currently widespread of this extremely frightening and complicated matter. I am sure that this problem will also be of special interest to the world-wide readership of *Environmental Conservation.*

No effort should be spared in working, all of us everywhere, and together, to avoid a nuclear holocaust. Even if this might not mean the end of mankind, it would almost certainly mean the end of civilization, at least as we know it now in the regions involved—which, for all we can foresee, could well consist of the whole Earth. Both environmental issues and peace issues have recently caught the interest of a growing number of thinking people in many countries. Let us hope most ardently that full realization of how war and environment are inseparable questions, will also help to ensure that concerned people throughout the world will join forces in working for a redirection, towards worth-while goals, of the current catastrophic trends.

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OPEN LETTER

Disarmament and Preservation of The Biosphere

In December 1979 the United Nations General Assembly adopted a resolution on strategic economic development based on due protection of Nature and the environment, and in a special letter in March 1980 UN Secretary-General Dr Kurt Waldheim solemnly announced the beginning of such a long-range strategy in cooperation with Member States of the United Nations, UN agencies, and scientific institutions concerned with optimal utilization and preservation of the world's natural resources.

The period of 1982–92 is destined to be 'The World Decade of The Biosphere', uniting the systematic efforts of all nations and peoples of the world in the protection, sound utilization, and where possible improvement, of The Biosphere of the Earth—the only planet of our galaxy that is known to support Man and other living forms, and to have conditions favouring the existence of life.

End the Arms Race

Prevention of wars—particularly atomic or nuclear ones—as well as measures for cessation of the 'arms race' and ultimate disarmament, must occupy a paramount position in the general strategy of mankind's progress, which in turn is dependent on due biospheric preservation.

Modern war-linked industry, the manufacture of ammunition and weapons, their testing and storage, together with the millions-strong armies of soldiers and their servicing, bear responsibility for a substantial proportion of the pollutants and toxicants that infiltrate air, water, soils, living organisms, and finally Man. Many hazardous effects of such pollutants as sulphur, mercury, lead, cadmium, etc., on the general environment, on soils, and on Man, are only too well known. The geochemical mechanism of their migration and action is clear, and preventive measures have been found. However, the industry of war, with world economy answering the demands of a potential war, is in principle foreign to the care of Nature and Man.

Cessation of the arms race, of war tension, and of war manifestations, should make an instant and positive contribution to the anxiety-causing build-up of CO_2 in the atmosphere and would, hopefully, reduce materially the sulphuric acid and nitric acid precipitation on soils and waters. It should also reduce smog formation and the regional soil and drinking-water pollution with heavy-metals, nitrogen compounds, and oil products.

Massive financial means, freed in this way, would make possible urgent work on the actual introduction of waste-free and low-waste technology, on 'ecological' renovation of industry and transport, on utilization and recycling of many wastes, and on large-scale organization of compost production to use organic and some mineral wastes as fertilizers. Thus disarmament would provide a powerful organizational and financial basis for international work for Biosphere protection, whereby engineers, technicians, and other workers, could switch over to modernization and reconstruction of world industry, thus reducing or even eliminating unemployment and inflation.

Threats to The Biosphere and to Man

We referred above to the forthcoming World Decade of The Biosphere: its primary objective will be to educate people throughout the world about The Biosphere and Man's ultimate as well as intimate dependence on it as his only life-support system.

Yet The Biosphere and Man are threatened not only by pollution with industrial and municipal wastes. Deforestation, depletion of grass pastures, water erosion and wind deflation of soils, growing salinization of irrigated fields, and many other circumstances and situations, threaten destruction of the leading set of mechanisms of The Biosphere, namely the soil–vegetational ecological systems that photosynthesize the necessary biomass, fixing cosmic energy, generating oxygen, and removing CO_2 from the atmosphere. Very substantial investments will be needed to secure effective research on these phenomena, work out and realize projects of reafforestation and restoration of productive pastures, and control erosion, depletion, and salinization, of otherwise productive soils.