

The nuclear winter theory and its strategic implications have reinforced the public's awareness of the risks involved in any large-scale nuclear exchange. It may well be that one result of this awareness will be a return to the concept of minimum deterrence. And in the end, the theory cannot help but reinforce the notion voiced on many occasions by many world leaders that "a nuclear war cannot be won and must never be fought."

## FURTHER READING

For those interested in the subject of nuclear winter and all its implications, the US National Research Council 191-page report<sup>6</sup>, the 382-page volume of the Royal Society of Canada<sup>7</sup>, and a recently published book (1985) called *Nuclear Winter* by Mark A. Harwell<sup>16</sup> provide a wide range of opinions and reference material, even though, like all encyclopedias, they are dated. The Canadian report contains some very important recommendations:

- Canada is especially vulnerable, notably in agriculture, forestry and ocean resources. It has to collect and evaluate more data that is particularly pertinent to the Canadian situation but Canada must also make use of special Canadian skills to contribute to the international debate.
- Canada should support fully any action by the United Nations to promote a better understanding of the implications of the nuclear winter hypothesis and its impact on strategic questions.
- Canada should continue to support the initiatives of the International Council of Scientific Unions.
- Canada must, through its various relevant organizations, promote discussion within the academic, scholarly, scientific and technical communities.
- Canada should, through its emergency planning agencies, re-examine its preparedness in the light of the nuclear winter hypothesis.
- Canada should consider the maximum possible hardening of essential communications systems against electromagnetic pulse and other damage.
- Canada should resist the argument that any move to improve social preparedness admits the inevitability of nuclear war.

The Committee makes numerous specific technical recommendations regarding areas of special vulnerability. Canada can, for example, do far more research on the behavior of forest fires, an area in which it has already made significant contributions. Canada possesses in its Atmospheric Environment Service some of the best facilities in the world for modelling atmospheric behavior and could make major contributions to the world knowledge. Canadian scientists need to learn much more about the effects that changes in climatic conditions do have and could have on the biosphere.

Most important of all, says Dr. Kenneth Hare, chairman of the Royal Society Committee, Canada must exert itself in every way possible to ensure that nuclear winter shall never occur.

In September 1982, the General Assembly of the International Council of Scientific Unions (ICSU) called upon its Executive Board to arrange for the preparation of an unemotional, non-political, authoritative and readily understandable statement of the effects that might be expected to result from even a "limited" nuclear war. That report, *The Environmental Effects of Nuclear War*, published in two parts by John Wiley Limited, England, under the aegis of the Scientific Committee on Problems of the Environment (SCOPE), one of the 10 scientific committees of ICSU, is now available in Canada.

The first volume deals with the physical aspects of the environmental impact of nuclear war. The second examines the biological impacts, including the ecological and agricultural effects. A third volume, to be published later in 1986, will spell out the story in non-technical language. The first two volumes do little to dispel the anxieties expressed in the earlier reports of the US National Academy of Sciences or the Royal Society of Canada. They do, however, underline the uncertainties contained in the assumptions on which any conclusions can be based. They have been described by the authors as "the first attempt by an international scientific group to bring together what is known, and what must still be learned, about the possible global environmental effects of nuclear war." It is intended as a point of departure, rather than a completed investigation.

See also the following:

- Dan Horowitz and Robert J. Lieber, "Nuclear Winter and the Future of Deterrence," *Washington Quarterly*, Summer 1985, pp. 59-70.
- Colin S. Gray, "The Nuclear Winter Thesis and U.S. Strategic Policy," *Washington Quarterly*, Summer 1985, pp. 85-96.
- *Nuclear Winter*, Joint Hearing of the Committee on Science and Technology and the Committee on Interior and Insular Affairs, US House of Representatives, 14 March 1985, US Government Printing Office, Washington, 1985.

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