Background Paper

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NUCLEAR WINTER

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In the 40 years since Hiroshima, most of the concern expressed about the possible further use of nuclear weapons has focussed on fire, blast, resultant injuries, immediate and delayed effects of radiation, and on the likely collapse of social regulatory systems.

With the recent development of sophisticated computer systems for simulating weather, climate and atmospheric transport of pollutants, an additional burden of concern is the possibility of devastating climatic disturbances that may follow the use of nuclear weapons, especially if cities are included among the targets.

The term "nuclear winter" has been used by many scientists to describe what they have come to believe could be the inevitable consequence of any major exchange of nuclear weapons. The expression nuclear winter is disliked by some of the strongest proponents of the theory, because they find it "too sensational" even though, if the theory is correct, it could herald consequences a billion times worse than any single murder that makes banner headlines in a newspaper. The phrase has, however, acquired growing acceptance, because of its use in many respected scientific journals.

THE THEORY

In 1983, two important papers regarding the effects of nuclear explosions appeared in *Science*, the prestigious print rostrum of the American Association for the Advancement of Science. The first,[1] now generally referred to as TTAPS (the initials of its five authors) spelled out what the writers, all eminent in their own fields of scientific specialization, believed could be the awesome global climatic consequences of any widescale use of large nuclear weapons. The second,[2] bearing the names of no less than 20 scientists, described what those authors considered could be the potentially horrendous biological consequences of such climatic changes. One author common to both papers was Dr. Carl Sagan of Cornell University, whose name has probably been the one most commonly associated with the nuclear winter hypothesis.

The conclusions were that, if cities were attacked, either because of their nearness to important military or industrial targets or to achieve political objectives, hundreds of millions of tons of smoke and soot produced by fires might obscure sunlight that is essential to life on earth for weeks or months. The result could be to create, in the critical combat latitudes of 30° to 70° North which are among the more densely populated zones of the earth, day-long darkness with attendant temperatures of minus 10 to minus 40 Celsius. The entire harvest of some of the world's most important food-producing areas, including those of the United States, Canada, the European Economic Community and, of course, the Union of Soviet Socialist Republics, could be wiped out.

Imagine the plight of frightened survivors, attempting a life below ground, devoid of telephones and electricity — for grid systems would be among the first casualties of nuclear war — without pumped water, gasoline or fuel oil, without mobile police and ambulance services and, probably, without hospitals. Add to this the spectre of frozen lakes and reservoirs. Widespread famine and death by starvation, if not from dehydration, would be inevitable.

The seeds of this concern are not new. In 1965, Professor Robert Ayres, after three years study at the Hudson Institute, a strategic "think tank", produced three volumes that portended such a situation.[3] It suggested that global climate could be seriously affected by nuclear war.

The attention accorded to any new scientific or technological development is too often, and nearly always, determined by the political climate at the time and by competing events: the Vietnam War was the focus of media attention from 1965 until the early 1970's. Dr. Ayres' predictions collected dust on shelves.