

## THE WORLD AFTER NUCLEAR WAR

### a SANA Information Leaflet

In Washington D.C., on October 31 - November 1 1983, at an American scientific conference which included a live satellite TV link-up with Soviet scientists in Moscow, new and unexpected findings of the utmost importance to humanity and particularly to all concerned with nuclear disarmament were reported.

SANA has produced this Information Leaflet especially for delegates to the CND Annual Conference, because we believe that it can and will be used by CND members and supporters to educate and mobilise the people for survival.

Copies of the official Summary of Findings of the Conference can be ordered from SANA (address overleaf). SANA is organising a scientific seminar on the findings of the Washington Conference early next year. Meanwhile, here are some of the main points:

#### Origins of the Conference

In 1982-83, a group of scientists from three research centres in the USA made a series of new studies on the effects of nuclear war on the Earth's atmosphere, with particular attention to the effects of dust and smoke from fires caused by nuclear explosions. The preliminary results of these studies were of such dramatic significance that it was decided a) to form a Steering Committee to bring the findings, when further developed, to the attention of biologists and ecologists, who would be asked to assess the implications for planetary life and life-support systems; b) to provide a forum for peer review of the findings of both physicists and biologists; c) to make the findings as widely known to the public as possible.

In April 1983, five days of scientific preparatory meetings were held in Cambridge, Massachusetts, involving some 100 nuclear and atmospheric physicists and biologists. As a result of those meetings the physical and biological papers presented at the Conference were developed and refined.

At the Conference, the two main papers were presented, the first by Carl Sagan, Professor of Astronomy and Space Sciences and Director of the Laboratory for Planetary Studies at Cornell University, and the second by Paul Ehrlich Professor of Biological Sciences and Population Studies at Stanford University. Two panels of experts on atmospheric and biological sciences, including scientists from the Federal Republic of Germany and the Soviet Union, reviewed the main papers. It emerged that the basic work on the atmospheric effects of nuclear war had been checked independently by two other major research groups in the USA and by the two major centres in the USSR, with essentially identical results. These studies showed that:

If there is a nuclear war in which (for example) 5,000 Megatons (about a third of the nuclear arsenals of the USA & USSR) are exploded, with 20% of the explosive power on urban/industrial targets in the Northern Hemisphere:

\*\* An unbroken pall of darkness would cover the Northern Hemisphere

and might spread rapidly into the Southern Hemisphere as well, involving the entire planet in the after-effects.

Within a week after the war, the amount of sunlight at ground level could be reduced to just a few percent of normal, which would halt or severely limit plant growth. The consequences of this would cascade through all food chains.



\*\* A harsh 'nuclear winter' would prevail - there would be a rapid and dramatic drop in land temperatures to subfreezing levels for several months, large disturbances in global circulation patterns and dramatic changes in local weather and precipitation. Even if the war were to occur in the summer, many areas might be subject to continuous snowfall for months.

The subfreezing temperatures would substantially reduce the chances of human survival. A spring or summer war would kill or damage virtually all crops in the Northern Hemisphere.

Most uncultivated food sources would also be destroyed, as would most farm animals. Many animals that survived would die of thirst, as surface fresh water would be frozen over the interior of continents. Available food supplies would be rapidly depleted. Most of the human survivors would starve.

Nations that now require large imports of foods, including those untouched by nuclear explosions, would suffer the immediate cessation of incoming food supplies. These countries would be forced to rely on their local agricultural and natural ecosystems. This would be especially serious for many less-developed countries, particularly those in the tropics.

\*\* Exposure to radioactive fallout would be worse than predicted by previous studies.

This is because the drastic effects of smoke upon the atmosphere would cause fallout on an intermediate time-scale, extending over many days and weeks.

In addition to the heavy fallout downwind of groundbursts, which will kill millions from acute radiation effects, the intermediate fallout would expose people in the Northern mid-latitudes to a radioactive dose greater than 250 rads over several months (equivalent to about 2,500 medical X-rays!). Doses as large as this can affect the immune system and increase the probability of infectious disease, cancer and genetic and embryonic effects.

\*\* Fire would be a major problem with serious and unanticipated consequences

About one-sixth of the world's urban land area would be partially burned by 1,000 Megatons of nuclear explosions, and the remaining 4,000 Megatons could ignite wildfires and firestorms. Uncontrolled fires could sweep over wide areas, leading to catastrophic flooding and erosion during the following rainy season. Urban fires would generate large amounts of deadly toxins from the combustion of synthetic materials.

\*\* Ozone depletion would increase exposure to ultraviolet light (UV-B)

The smoke would absorb the UV at first, but after it cleared a few months later, UV doses roughly 1.6 times normal would be transmitted to the surface. (For a 10,000 Megaton attack, the UV dose would be 4 times normal). The immune systems of human and other animals are known to be suppressed by relatively low doses of UV-B. Given the conditions of increased radioactive fallout and other stresses, such suppression of the immune system leads to an increase in the incidence of disease. Protracted exposure to increased UV-B may also lead to widespread blindness among humans and other mammals.

\*\* Tropical forests could disappear

Tropical plants are less able to cope with even short periods of cold and dark than those in temperate zones. If darkness or cold, or both, were to become widespread in the tropics, the tropical forests, which are the major reservoir of organic diversity, could largely disappear. This would, in turn, lead to the extinction of a majority of the species of plants and animals on earth.



**\*\* Even a relatively small nuclear exchange could trigger severe after-effects**

\* The study covered a wide range of 'nuclear war scenarios', from a minimal  
\* attack of 100 Megatons on cities to massive exchanges of over 10,000 Megatons.

\* It was found that relatively large climatic effects can result from 'small'  
\* nuclear exchanges (100 to 1,000 Megatons). A scenario involving 100 Megatons  
\* exploded in the air over cities produced a two-month period of sub-freezing land  
\* temperatures, with a minimum near minus 23 degrees C. In this scenario,  
\* thousands of fires would be ignited and the smoke from these fires alone would  
\* generate a period of cold and dark almost as severe as in the 5,000 Megaton  
\* case.

In short:

In the aftermath of a 5,000 Megaton nuclear exchange, survivors would face extreme cold, water shortages, lack of food and fuel, heavy burdens of radiation and pollutants, diseases and severe psychological stress - all in twilight or darkness.

It is clear that the ecosystem effects alone resulting from a large-scale nuclear war would be enough to destroy civilisation as we know it at least in the Northern Hemisphere. These long-term effects, when combined with the direct casualties from the nuclear explosions, suggest that eventually there might be no human survivors in the Northern Hemisphere. Human beings, other animals and plants in the Southern Hemisphere would also suffer profound consequences.

The 5,000 Megaton nuclear war scenario is by no means the most severe that could be anticipated with present world nuclear arsenals and those contemplated for the near future.

\* A first strike would be suicidal, even if it were a hundred percent 'effective'

\* A very important point emerged from the discussion at the Washington Conference:  
\* Even if one side or the other were to obtain a fully 'effective' first-strike  
\* capability, so that the other side could not launch a single nuclear weapon  
\* in retaliation, the attacker would thereby commit suicide.