

SANA

SCIENTISTS AGAINST NUCLEAR ARMS

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. These findings were assessed by over 60 British scientists at a SANA seminar in Oxford on 14th January, 1984.

SANA has produced this information leaflet as a basic briefing for all those who share our deep concern at the increasing danger of nuclear war, in the belief that this information can and will be used to mobilise the people for survival.

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**. If there should be a nuclear war in which (for example) 5,000 Megatons (about a third of the nuclear arsenals of the USA and USSR) were exploded, with 20% of the explosive power on urban/industrial targets in the northern hemisphere, there would be the following effects:

The Conference findings

**** 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 per cent of normal, which would halt or severely limit plant growth. The consequences of this would cascade through the 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 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 severely damage virtually all crops in the northern hemisphere.

Most cultivated food sources would also be destroyed, as would most farm animals. Many animals (and people) 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.

**** 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 also sweep over wide areas, leading to catastrophic flooding and erosion during the following rainy season. **Urban fires would generate large amounts of deadly toxins**, such as dioxin, from the combustion of synthetic materials.

**** EXPOSURE TO RADIOACTIVE FALLOUT WOULD BE WORSE THAN PREDICTED BY PREVIOUS STUDIES** – because the drastic effects of

smoke and dust upon the atmosphere would cause fallout on an intermediate time-scale, extending over many days and weeks. In addition to the heavy short-term fallout downwind from ground-bursts, which will kill millions from acute radiation effects, the intermediate fallout would expose people in the northern mid-latitudes to radiation doses in the range of 100 to 200 rads over several months (equivalent to about 1,000 to 2,000 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.

**** 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 (100-1,000 Megatons). A scenario involving 100 Megatons exploded in the air over cities produced a two-month period of subfreezing 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 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 nuclear arsenals and those contemplated for the near future.

THE SCIENTIFIC PREDICTIONS DEMONSTRATE THE ULTIMATE ABSURDITY OF 'CIVIL DEFENCE'

The Home Office continues to try and justify its 'civil defence' measures by arguing that 'there will be millions of survivors' after a nuclear war and that measures must be taken for 'national recovery' within a framework of proper government and 'law and order'. No doubt many of the top political and military people imagine that **they** will be safe in their deep bunkers and can come out and rule the country in the aftermath. Well-to-do people, especially in rural areas far from known targets, who are providing themselves with elaborate and expensive nuclear shelters, may have similar illusions.

The real nature of 'the world after nuclear war' needs to be understood clearly, especially by Local Authorities that may be forced by Government legislation to take part in the misleading 'civil defence' exercises organised by the Home Office.

WHAT CAN BE DONE WITH THIS NEW INFORMATION?

Here are some suggestions for action by peace groups and by all concerned with human survival and therefore with the prevention of nuclear war:

* Make sure that your own members and friends are informed.

Give this information leaflet, or one derived from it, the widest possible distribution. Arrange for discussion in your local peace group or with friends.

* Write a letter to the local press, contact local radio and television and offer briefings, discussions, interviews, etc.

* Write to your MP – send him a copy of the Summary of Findings of the Washington Conference (available from SANA) and invite him to comment on them.

* Make sure that the Trade Union and other Labour Movement organisations in your area are briefed – especially those Unions directly concerned with the immediate effects of nuclear war – fire and ambulance services, medical services, welfare services, etc.

* **ORDER THE SANA INFORMATION PACKAGE** (or parts of it) and use it in public meetings, weekend schools, or wherever you can.

Do not imagine that it is not necessary to get across to people the realities of nuclear war and its aftermath – that 'everybody knows that nuclear war would be horrific and nobody wants to know any more about it'.

The fact is that, for a great many people, the direct effects of nuclear explosions are so far outside human experience as to be practically incomprehensible. Who ever saw a fireball brighter than a thousand suns? Radiation is invisible, mysterious and unreal. Even blast effects of a nuclear explosion are so different from those of any other kind of explosion as to be beyond the grasp of our imagination.

But to be cold, to be in the dark, to be without food or fuel – these things are more comprehensible. The impact of **this** aspect of nuclear war may well be clearer and more immediate than any others.

Many people say "if there's a nuclear war we'll all be blown up", but in their hearts there lingers a hope, even an assumption, that somehow or other the bombs may fall somewhere else and they will survive . . .

Knowledge of the realities of nuclear war does not automatically move people into action for nuclear disarmament, far from it. But so long as people are ignorant of these realities, they are not likely to do anything at all.

SANA is preparing an information package which will include:

- * a copy of the 5-minute video presentation used at the Washington Conference by Prof. Carl Sagan to present visually the impact of the predicted 'nuclear winter'.
- * a specially produced video presentation by members of SANA explaining the significance of the conference findings.
- * a short slide presentation (or tape-slide presentation) including slides presented in Washington by Prof. Paul Ehrlich.
- * A copy of the official summary of Findings of the Conference.
- * A draft text for a leaflet that could be distributed widely by local peace groups.
- * Copies of the Scientific papers presented at the Washington conference.

Those interested in receiving this information package or any part of it, should write to SANA for further details about prices and availability. (enclosing an s.a.e.!))

If you are a scientist (natural and social) or an engineer, or a science student, why not join SANA? Or if you would like to help us produce more information material like this leaflet and many other 'tools' for the peace movement – send us a donation!

To: SANA, 112 Newport Road, New Bradwell,
Milton Keynes, MK13 0AA.
Tel: (0908) 321283.

What is SANA?

Scientists Against Nuclear Arms (SANA) is an independent organisation of scientists, formed in response to the acute dangers of the continued escalation of nuclear armaments and the consequent risk of nuclear war. **The term 'scientist' includes natural and social scientists, engineers and technologists.**

Statement of Aims and Functions

The primary purpose of SANA is to promote and co-ordinate the activities of scientists aimed at assisting groups and individuals concerned with halting and reversing the nuclear arms race. SANA will do this through the provision of reliable and accurate information and of well-informed speakers, and by other means such as publications, contributions to the media, or to general and specialist scientific journals, and through promoting awareness amongst members of the scientific community of their special responsibility towards achieving disarmament.

SANA is concerned particularly with the provision of information to the various peace and disarmament organisations and to Members of Parliament, Church and Trade Union leaders, County and Borough Councillors and other individuals with influence upon public policy; and with informing the general public.

Though the title of SANA refers explicitly to nuclear arms, it is recognised that nuclear disarmament cannot be considered in isolation from other disarmament measures and that other weapons of mass or indiscriminate destruction, notably chemical and biological weapons, must not be overlooked.

SANA will supply relevant material to *all* sections of the peace movement. Recognising and respecting the good faith of all – irrespective of political or religious affiliation – who are striving in their own ways to end the arms race and secure world peace, SANA will provide them all, so far as it is able, with reliable and informed assistance.

Membership of SANA is open to scientists (including students) who support its aims and pay an annual subscription, the amount of which is determined from time to time by its members.

Recognising both the character of science and the necessity for international collaboration if disarmament is to be achieved, SANA will seek to communicate and collaborate with similar groups of scientists, both nationally and internationally, who have complementary aims.