EDITORIAL MATTERS

Of course, there had been warning enough; and no less a figure than Edward Shevardnadze himself had called out the loudest warning as he resigned so dramatically. Of course, in retrospect, Gorbachev blundered unbelievably in his choice of Communist Party hardliners with whom to surround himself. And of course the world struggled to catch its next breath as it appeared all too likely that the unthinkable was actually happening. And then we learned that contempt for the old enslavements - always as much shackles on peoples’ minds and attitudes as on their limbs, or physical limits to their movements - had indeed taken root; that even the armed services could no longer be speedily and confidently manipulated by the gangster-wills of a corrupt minority; that nowhere in the USSR were the people prepared any longer to let the government do their most important political thinking for them. So we went on a roller-coaster of horror and dismay, to joy and applause for the collective courage of so many - all in two days! And true wonder at the raw courage and steadfastness of Boris Yeltsin. So now the path to the political conditions that will afford true social justice, and better living in a freer, happier Soviet Union, or its successor states, may at last be opening up; at least the course of that path seems now less mysterious, and the first - faltering - steps have been taken. May the best wishes of all who have interests in peace and social justice ring out for all those who seek a better life, more fully realized expectations. They have come an enormous way, very, very quickly. And they still may have a long tortuous way to go.

So let us ask all those who believed they could see justification, even necessity, in a Gulf War what they now make of its results and long-term benefits. I mean, of course, benefits to set against about 100,000 war dead; a pulverized Iraq yet with a Saddam Hussein (the dictator worse than Hitler!) still in charge, still strangely, stubbornly defiant, still able to visit terrible devastation on the Kurdish people, still able to play an almost whimsical game of hide and seek over his possible future capability in the production of nuclear and other weaponry. Then there is the suffering civilian population of Iraq, short of food (finally, a year down the track, we see that the sanctions have bitten), short of medical and other necessary commodities. There is a Jordan, formerly a sort of ‘friend of the West’, now less stable than before. There is a frightening eco-disaster in the aftermath of oil fires and Gulf oil spills in Kuwait, and the re-establishment there of a still non-democratic, now vindictive, regime. Meanwhile, the struggle to bring genuine stability, social justice and peace to the turmoil of conditions, states and peoples that is the Middle East remains essentially on hold.

As for the various ‘world order’ scenarios to which we have been exposed in 1991, let us, please have none of them. That the USA was able to prevail upon its friends and those it could pressure to come together in Saudi Arabia in what later became known as a ‘United Nations initiative’ is now history - for better or worse. But a US which strongly signals that a United Nations led by itself and eventually, perhaps, by a re-consolidated USSR, could provide the backbone of a world peace and security force is something else again. As a US critic of the Reagan and Bush regimes recently pointed out, the US, pre-Reagan, was the world’s leading creditor nation. Since Reagan and now Bush - both of them gloriously unconcerned with the main social and economic issues within their own society - the US has become the world’s leading debtor nation. And that, of course, is what makes the US uncertain, even menacing, to the world as its self-proclaimed leader in morals, democracy and security.

Finally, as members of a participant nation in the ‘UN Gulf Force’, Canadians can everywhere feel relief that all our military personnel survived. For that matter, we can feel relief that so few of the
UN forces as a whole were killed or wounded. But we are nearing the end of a peculiarly bloody century and no matter how great the ill-feeling against Saddam Hussein’s dictatorship may have been, the world should be far beyond the time when a shocking loss of lives among our perceived enemies fails to produce widespread horror and revulsion in ourselves. Yet that, largely, is what seems to have been the case. It’s not good enough. For it’s the failure of all of us - of the whole social and economic order that drives the world - that allowed the phenomenon of the Hussein dictatorship to emerge. The cynicism, the duplicity, of all the major players, is the stuff of gothic drama - of legend. We are not the ‘goodies’. They are not the ‘baddies’. Even though we may all, from time to time, persuade ourselves that such is the case. We are, all of us, part of a contorted human family, our quarrels mostly due to inherited prejudices, economic mismatches, sound and fury. All hollow things. Legitimate interests? Defence of freedom? These are the amusing symbols we substitute for realities in thinking of the extraordinary inequities that bedevil our world. A strong dose of honesty - an old fashioned remedy - would do us all good.

The Role of NATURE

The weekly science journal NATURE is one of the world’s most authoritative and certainly the most widely read of all general scientific publications. In its pages have appeared first announcements of a staggering array of scientific subjects. Its editorials (if sometimes rather too oracular, at others bordering on the pompous) are nearly always worth reading, and are often trenchant, powerful, critical essays. Its pages have celebrated the dynamics of great scientific discoveries, and have enabled many recent notorious and troubling scientific ethical problems and other matters to be discussed openly. NATURE has discussed the state of the world on innumerable occasions and has in late years dealt with problems of definitive significance to members of Science for Peace - e.g. SDI, including ‘brilliant pebbles’; Chernobyl; the greenhouse effect; ozone depletion; the Gulf War; the Kuwait Oil well fires; nuclear arms in the Middle East, etc. etc. In this number of the Science for Peace Bulletin a few of the matters raised in the pages of NATURE in recent months are noted and considered. In no way should it be assumed that the opinions or positions expressed in NATURE are always to be applauded or deferred to. The virtue of NATURE articles is that they do reflect a great range of viewpoints which - naturally enough - should be available for our critical appraisal.

Problems Considered in NATURE

The Kuwait Oilfield Fires

‘The deliberate firing of the Kuwait oil wells by the Iraqis is an act of gross environmental vandalism. But the likely impacts on the climate have been exaggerated.’ This statement from R.D Small (‘Environmental impact of fires in Kuwait’, NATURE, March 7, 1991) is the first of such claims to appear in NATURE. Its broad conclusions were subsequently supported by two more NATURE reports – one by Browning et al. (‘Environmental effects from burning oil wells in Kuwait’) and another by Bakan et al. (‘Climate response to smoke from the burning oil wells in Kuwait’) – both in NATURE, May 30, 1991. With certain differences in methodology of data collection and modelling, these studies assert that damage will not be on a global scale. The abstract from the paper by Browning et al. essentially states the position arrived at:

Model calculations, constrained by satellite observations, indicate that most of the smoke from the oil fires in Kuwait will remain in the lowest few kilometres of the troposphere. Beneath the plume there is a severe reduction in daylight, and a daytime temperature drop of 10°C within ≈ 200 km of the source. Episodic events of acid rain and photochemical smog will occur within ≈ 1,000 – 2,000 km of Kuwait. But changes in the Asian summer monsoon are unlikely to exceed the natural interannual variability and stratospheric ozone concentrations are unlikely to be affected.

In a yet more recent report, by Johnson et al. in NATURE, October 17, 1991, fairly similar conclusions to the earlier ones were presented. This latest report is perhaps ‘reassuring’, since it means that in the 4 1/2 months since the earlier reports their broad predictions are holding up – notably that ‘although the effects may be significant on a regional scale, those on a global scale, including the Asian summer monsoon, are likely to be insignificant.’

Effects of the War on the Persian Gulf

Notwithstanding the above, M.B. Carbonell pointed out, in ‘Pollution and the Persian Gulf’, NATURE, March 7, 1991) that the ‘waters of the Persian Gulf are not well confined, despite the narrowness of the Strait of Hormuz, which links the Gulf to the Arabian Sea ... any environmental impact on the Gulf waters is rapidly exported to the Arabian Sea and then to the Indian Ocean’. For this
reason and because, as he stated, the Gulf War was producing 'increased pollution of Gulf waters and its impacts cannot be assessed directly', Carbonell recommended monitoring the discharge of Gulf waters in the Strait of Hormuz and in the western Gulf of Oman. 'If immediate action is taken, the first measurements will record pre-war conditions. Subsequent shifts in levels of contamination of the outflowing waters might be used to assess the environmental impact of the war on both the Gulf waters and those of adjacent seas.'

Chernobyl ... Again

The NATURE editorial of May 2, 1991 ('Facing up to the Chernobyl accident') asserted that 'The cause of the accident was an ill-planned and unauthorized experiment carried through incompetently in circumstances in which malfunctioning nuclear reactors would not have been considered more remarkable than, say, trucks that had broken down.' The editorial also claims that 'The remedy is glasnost, which means the technical publication of the details. What has happened to those evacuated from the site, what does cytology say about their exposure in the aftermath ..., where are they now and what arrangements have been made for their supervision and care? ... The only sufficient memorial to those who died is that it should be made public in exhaustive detail. However ..., 'the past five years have also emphasized ..., that good management can reduce both the risks of accident and their seriousness.'

In the same May 2 NATURE, Steven Dickman ('World researchers to take a closer look at Chernobyl') writes of WHO support of an international research programme to study the effects of Chernobyl and notes that the USSR itself has already begun to form a research centre at Obninsk, 100 km from Moscow, to coordinate research on the effects of the accident. Japan is already the first member state of the WHO to pledge a large sum ($20 million) to improve facilities at Obninsk. Other member nations are expected to follow the Japanese lead.

Another focus ... will be to assess the psychological and psychosocial effects .... Inspection teams from WHO and the Vienna-based International Atomic Energy Agency have reported that the largely rural local population blamed a variety of illnesses, especially among children, on radiation, even when this was clearly not the cause. The reported increase in children's illness, and in high blood pressure, anaemia and pulmonary disorders in the adult population are thought to be due more to feelings of depression and helplessness ... than to the effects of radiation.

Unfortunately, it is claimed that 'Western experts say there were very few data available from the region before 1988 to use as a baseline for the study.'

Still in the same May 2 NATURE, is an article by Peter Aldhous ('Five-year toll: 10,000 dead from Chernobyl?'), which examines the claim by physicist V. Chernousenko that 7,000-10,000 of the 60,000 brought in to clean up after the mishap have already died of radiation exposure. The official USSR death toll is 31! However, the UK Atomic Energy Authority 'estimates that Chernobyl will eventually cause 10,000 excess cancer deaths in the Soviet Union. This represents only 0.03 per cent of the natural Soviet cancer rate.'

Chernousenko's claims were rejected as grossly exaggerated by the Soviet Ministry for Nuclear Power and Industry, but some foreign scientists are concerned for the health and welfare of Soviet scientists, who still labour at Chernobyl, and who are even working inside the so-called 'Sarcophagus' that now encloses the destroyed reactor. It is claimed that Soviet physicists are 'working in primitive plastic oversuits in an area likely to be rich in plutonium, and seem to have no equipment to measure surface contamination with alpha particles ...'

Israel as Nuclear Power

In a NATURE editorial of June 6, 1991 ('Israel's nuclear weapons in the open') the extremely important question of Israel's status as a nuclear power were subjected to critical scrutiny. Some extracts from the editorial follow.

On one reading of the situation, Israel has the strongest possible reason to be a nuclear power. It is at least technically at war with most of its neighbours ... and evidently vulnerable to conventional attack ... So what better means of avoiding military catastrophe than to threaten the retaliatory destruction of the
perpetrator's capital and other population centres? This is classical deterrence. Moreover, it hardly matters whether the threat is open or implicit. Even as things are, any neighbour planning a serious attack on Israel would have to calculate the risks of nuclear retaliation.

The editorial notes that US President Bush has proposed an agreement among arms suppliers to decline to supply weapons of mass destruction to Middle East and North African states. NATURE suggests that the British proposal would remove some of the uncertainty in the Middle East, but that...

... ironically, Israeli commentators have already reacted by arguing that a freeze on nuclear weapons in the Middle East would be unfair to Israel when nuclear forces are the only valid counterpoise to the potential preponderance of conventional forces that it faces.

However, ...

... the need for nuclear retaliation has been eroded by the recent demonstration of the mobility of US conventional forces, likely only to be reinforced by the decision of the United States to base substantial stockpiles of military equipment in Israel ...

It is also claimed that...

... the United States is reconciled to becoming the de facto physical guarantor of Israel's continued existence if a regional peace settlement cannot be reached. There are many in Israel who will not trust that development, let alone welcome it. But they have no choice.

The US Energy Strategy

The NATURE editorial of February 28, 1991 ('Squaring circle of US energy') considers the factors that may influence the new Energy Strategy of the US, noting that...

... the administration seems to have set its face against increased taxes on (gasoline), hoping instead to rely on still tougher regulations to improve the efficiency of new cars (and encourage the disposal of older inefficient cars). The trouble is that the policy will not work or will do so only at needless economic cost - that of retiring old cars prematurely, for example.

Also,

Past energy strategy ... has not been to balance supply and demand by the price mechanism, but to help producers with tax incentives and, when seemly, to shield consumers from prices that reflect true costs. These devices stimulated both consumption and fears that supply would be exhausted, whence the designation of important oil fields as strategic reserves and the ban on exports of crude petroleum.

The editorial continues:

Yet oil consumption would be most simply and surely reduced by increasing its price, either by an import tariff (opposed by the oil companies) or by an excise tax (hated by consumers, many of whom are also voters).

Lastly,

On the complaint that higher gasoline taxes would hurt the poor ... first, if the cost of food and other necessities is a component in the calculation of welfare, why not have gasoline stamps as well as food stamps? And, second, why not soak the gas guzzlers in the cause of social equity?

This editorial demands several responses. In the first place it (correctly) indicates that despite the tendency of the US to deplore price-fixing arrangements such as subsidies and tax incentives in its trade partners and competitors, the US itself has little compunction about applying such practices where its own interests are to be served. Secondly, for that part of the population above the poverty level in societies in which there is wide car ownership, there is little sign that anything save a truly enormous increase in the price of gasoline would much reduce its use. I can recall when, on moving from Australia to Norway in 1973, I found that with cars about twice, and gasoline about three times, the Australian prices, neither per capita car ownership or distances driven per year were that much different from those in Australia. On remarking this to Norwegian friends, several of them answered that many Norwegians would deny themselves food rather than go without a car or the right to drive it as far as they wished. I believe this was largely correct and, so long as people have additional disposable income and, as with most North Americans, live in cities designed for the car, and poorly served by alternative transport systems, I believe it is still correct (Editor). Thirdly, perhaps gasoline stamps would be a good idea to keep the poor 'auto-mobile'. The real question is, however, how to redesign our cities and our transport systems so as to be able to reduce car use drastically in almost every country of the North. Or else, develop a drastically different car technology
dependent on other, non-polluting, energy sources. In a hurry ...

Science Education

The problem of declining interest in an education in science is linked to declining scientific job opportunities in many countries, and that is a thorny issue, being in turn, linked to changing economic times, and a general revulsion towards science and technology by the public at large. The same public nevertheless continues to use the products of science and technology as never before, and to clamour irritable for more breakthroughs.

In NATURE of May 2, 1991, in an editorial article (‘Shakespeare’s school’) the recent criticism by Prince Charles of the replacement of Shakespeare’s likeness on British £20 banknotes by that of Michael Faraday is taken as departure point for a critical appraisal of the British education system. Thus:

What is wrong with British school education outside Scotland (which has more liberal arrangements) is that it is not general education at all, but for many students an inadequate preparation for a life of specialism. It is commonplace that young people with an interest in science are required to commit themselves for, or perhaps against, when they are younger than sixteen; changing course later is difficult, often impossible ... the educational system is only now waking up to the need that courses in higher education should last for four years, not three ... Can anybody wonder that the recruitment of young people into science and technology remains a British headache?

Quite. Yet in Britain, as in other countries bewildered by a wide-scale falling off in interest in science among school pupils, the causes are no doubt more numerous than just a faulty secondary education system. There, as in Canada, the cries against science by many of the young are likely to include such familiar complaints as - science is ‘too hard’; girls can’t do it; science job prospects are lousy; financial rewards are meagre; as a scientist, you are always an employee with little say in major policy decisions; scientists are cold, unfeeling, inhuman; scientists are destroying the world.

What a contrast to those of us who entered the world of science forty years ago when, despite the technological and scientific involvements in World War II, there seemed almost endless public excitement over science and its ability to transform the lot of humankind. Were we naive, ignorant, or have we just been unlucky in the way history has unfolded? All three, no doubt.

Theatre Ballistic Missiles and SDI

D.C. Wright and L. Gronlund (‘Underlying “Brilliant Pebbles”’, NATURE, April 25, 1991) have calculated that the claims of the US Strategic Defense Initiative Office (SDIO) that ‘Brilliant Pebbles’, the proposed space-based anti-missile system, could be used to destroy theatre ballistic missiles such as the extended range Scud (the al Abbas) is fallacious. There is one simple reason: Brilliant Pebbles has been acknowledged by SDIO as being able to intercept missiles only above about 100 km, while missiles such as the comparatively crude al Abbas Scud and the more sophisticated Chinese DF-3 can be adjusted so that (though range will be reduced) they can easily underly the effective trajectory of Brilliant Pebbles. Although the DF-3 has a maximum range of 2800 km, with the drastically lowered trajectory required to get beneath Brilliant Pebbles, the DC-3 can still exceed 1500 km, a range that Wright and Gronlund declare as still ‘sufficient to threaten most targets in the Middle East. As they also point out, theatre ballistic missiles are not accurate weapons – the inaccuracy of the al Abbas is 3-5 km, that of the DC-3 2.4 (dropping by a factor of 2-3 at reduced trajectory to get it under that of Brilliant Pebbles). Neither weapon can therefore be thought of as other than a terror weapon. Lowered trajectories would not much alter their effectiveness in this respect.

Non Proliferation

In a NATURE editorial of September 26, 1991 (‘How to make a stronger NPT’), the questions are asked: ‘When will the next nuclear war break out? And how will it begin?’ The basis of these questions is the discovery of how far advanced Iraq was in developing nuclear weapons. Thus,

If Iraq (was) ... so far advanced on this sinister path, what can be said about Pakistan, whose ostensible nuclear programme goes back to the 1960s, about North Korea (which has announced almost publicly that it has a reactor in operation without safeguards), South Africa and, for that matter, Israel?

Also,

... it is now prudent to suppose that all of the countries which have not so far signed the ... NTP are intrinsically nuclear powers – as are even some of the signatories (among them was Iraq).

The NATURE editorial addresses a number of matters, not all strictly relevant to the title, but its main thrust is to consider how best to achieve a ‘modest tightening of the NTP, including some kind
of public register of supplies of nuclear equipment along the lines that the prime minister of Japan has been advocating for arms sales in general. The case for sanctions against illicit suppliers and their customers deserves hearing.'

However, the next recommendation is both a hotly disputable proposition and, in the present state of the world, would be absurdly difficult to achieve as well as being fraught with great global dangers (NATURE is far from infallible in its judgements): -

The more desirable end-point is more drastic; a general understanding within the United Nations that the novel development of nuclear weapons is an offense against the international community, and must be stopped (as will, eventually, be the development in Iraq). That would require a decision by the UN Security Council that non-signatories of the amended NPT must involuntarily submit their nuclear installations to international safeguards. If the Security Council decided as recently as a year ago that the invasion of Kuwait must be undone, why should it not take this further step in this direction?

Very chilling, this last sentence, with its implication of the use of more massive force by the US and its allies - several of whom (including, still, the US) are hundreds of millions of dollars behind in their financial promises to the UN.

The Future of India

All thinking persons ought to be concerned about the future of India. India is at once the world's largest democracy, a country of great internal restlessness and violence, a land of vast contrast between the rich and the poor, a country that cannot reliably feed its millions, where tens of millions are homeless, yet a state with the ability to manufacture even the high technology of today's world. India is also a country of nearly 900 million inhabitants, which increases by 17 million per year, and which possesses large, comparatively well-equipped and well-trained armed services. In noting many of these points the NATURE editorial of May 30, 1991 ('What will happen now to India?') poses the question of the fate of the subcontinent following Rajiv Gandhi's assassination. The editorial says that in India -

The contrasts are often shocking to people from elsewhere, puzzled that peasant villagers still limp along without elementary sanitary technology in a country that builds its own nuclear power stations and space orbital rockets. The justification of the persistence of the contrasts is a kind of trickle-down theory of social and economic development - crumbs spill from rich tables, people who cut their teeth on building nuclear power stations eventually turn their attention to village latrines. There has been some proof in the past few decades that the theory works, but not quickly enough to assuage regional passion and discontents.

Speaking of violence, regional quarrels and unified India the editorial goes on -

...the benefits of union are too often overlooked. Not the last of these is what union has done for India's intellectual life. Since Independence, the centre has created throughout provincial India universities in the image of India's best, both by the efforts of enlightened public servants at the University Grants Committee and by the private foundation of institutions as different as the Tata Institute at Bombay and the Raman Institute at Bangalore, both (among others in India) now research centres of international repute. In short, the centre has made possible the creation in India of a respected intellectual cadre whose chief misfortune is that so many of its members choose the brighter opportunities overseas.

Finally -

In a society still tolerant of the notion that there are leaders and the led, that is a challenge for the intellectual community of India. The goal must be to make the poor of India prosperous.

This is noble-sounding stuff, indeed, and the punchline about the poor being made prosperous has a goodly ring. But look, do nuclear station engineers really turn to constructing effective village latrines? Is it not a fact that the gap is widening, not narrowing, between the 300 million very poor of India who have to subsist on virtual starvation rations, and the small group of the affluent who are comparatively comfortably placed? What of the 64% of Indians who are illiterate? One needs a very optimistic imagination to see in these things major evidence of a trickle-down effect.

But there is more, much more. In a recent article, Badrinath Krishna Rao (Back to the Future', The Globe and Mail, August 15, 1991) takes an almost totally opposed view to the essentially optimistic one of the NATURE editorial. Thus she writes:

The birthday of every nation is an occasion for euphoria, and modern India - born 44 years ago today - celebrates its Independence Day with great gusto. This year, however, the fanfare should be somewhat subdued as the challenges that lie ahead for India are almost insurmountable.
Rao points to the weakness of India's economy and notes that 'the chronic problems of indigence, hunger and unemployment continue to defy solution. To more than 800 million Indians who survive on less than 20 cents and 1,200 calories a day, talk of independence is a cruel joke. Rao continues:

Jettisoning the idea of achieving economic self-reliance through state intervention, the Congress Party now speaks the language of deregulation, private initiative, competition and integration with the world economy. Suddenly, a free-market economy is considered the panacea for India's ills.

However, Rao claims that 'given the magnitude of India's other problems' such measures will not work. So much for trickle-down economics.

Rao is also highly critical of the intellectuals of India so far as their capacity or willingness to help the country is concerned.

Thus where the NATURE editorial sees the leadership of the Indian democracy as 'a challenge for the intellectual community' Rao sees 'the 10 per cent of Indians who make up the intellectual and creative elites (as seeming) scarcely interested in filling the bill. Most have become cynics or are so overwhelmed by the ruinous course of events in recent years that they have decided to look after themselves.' Rao's major hope for the future of India seems pinned on a revitalization of elements in the 'incandescent vision that has guided its civilization over the ages.'

But, except for mystics and visionaries who can keep their eye on some ineffable and distant future, such a prospect will seem both thin and remote.

Social and economic instabilities in so huge a population make India's future very uncertain. Rao claims that while India is still nominally and constitutionally a democracy its actual 'government differs little from an authoritarian regime.' Misery and social injustice beget violence, and violence is contagious and always apt to be exported or transported to other places.

India's tragedy is that it almost certainly cannot become a country whose affluence compares with those of the North. Even among these (e.g. Britain), much of their wealth, accumulated industrial plant, and ability to generate further wealth through production or manufacturing, are results not so much of greater sagacity or industriousness than is the norm in much poorer countries, but of historical circumstances in which a techno-industrial revolution occurred simultaneously with expanding literacy, markets, communications and the assured availability of abundant natural resources (including food, lumber, fibres, and minerals). It is by no means the case that in many instances of the transformation of peasant-based agricultural states to modern industrial states these natural resource commodities were available within the country whose industry boosted it to wealth and power (again Britain is an excellent example). But in such cases, ready access to such commodities had to be assured.

India of the present, with its poor natural resources, and lack of accessibility to such resources at prices it can afford, huge, largely unskilled population, is in a poor position to do the kind of bootstrap operation on itself that, for example, the US would recommend. Radically different approaches, more modest and realistic in scope and scale, are required if the basic problems of all Indians merely getting enough to eat are ever to be overcome. It is to this sort of end that the North should be attending, but not by assuming that the usual absurd exhortations to industrialise at all costs will or should be applied here.

'Terraforming' Mars

In a very long NATURE article by McKay et al ('Making Mars Habitable', August 8, 1991) the possibility of transforming Mars 'into a planet suitable for habitation by plants, and conceivably humans is discussed. The conclusions include the following:

Our main deduction is that on Mars a $CO_2$-rich, plant-habitable atmosphere would seem feasible to construct, given adequate reservoirs of $CO_2$ and $H_2O$, whereas an $O_2$-rich, human habitable atmosphere would be very difficult to construct and possibly impractical to warm.

... one could propose the following ... production of (chlorofluorocarbons) (or other greenhouse gases) starts on Mars and the surface temperature warms up by $\approx 20 K$. The regolith and polar caps release their $CO_2$ and the pressure rises to 100 mbar. One of two things could then happen. If there were large regolith and polar $CO_2$ reservoirs the pressure would continue to rise on its own. If these were absent, the $CO_2$ pressure would stabilize, and additional $CO_2$ would have to be released from carbonate minerals. At this point (perhaps between 100 and $10^5$ years) Mars may be suitable for plants. If there was a mechanism for sequestering the reduced carbon, these plants could slowly ... produce an $O_2$-rich atmosphere in perhaps 100,000 years. If sufficient $N_2$ could also be released from putative soil deposits, and the $CO_2$ level kept low enough, then a human-breathable atmosphere would be produced. Continued production of the (chlorofluorocarbons) that absorb radiation across the whole spectrum would be required to maintain the warm temperature. Destruction of ozone by these CFCs would probably require these gases
to be made in sufficient amount (considerably in excess of current terrestrial production rates) to constitute an ultraviolet shield. This proposed process for terraforming Mars relies only on processes that have been demonstrated, and in fact are current, on Earth.

What is one to make of this extraordinary stuff? Some readers may scoffingly dismiss programmes such as the above as the type of crude positivistic dreaming familiar in the early pioneering days of science fiction. But we should not be too flippant. In Vol. 9 No. 3 (p. 74) of Science for Peace Bulletin, the article ‘Life on Mars’ by Frederick Turner, published in Harper’s of August 1989, was noted. He proposed – very seriously – to ‘employ the beautiful and terrible heroic spirit of humankind, ready for suffering and sacrifice, when we no longer have war and nationalistic myth ... and the billions of dollars and rubles which employ millions of workers and serve as a fiscal and technological flywheel, to keep the economy going’ to – wait for it – ‘Garden Mars!’ And in the Vol. 10 No. 2 Bulletin (p. 9) – lest anyone think the NATURE article by McKay et al (American Scientists all) is too far-fetched to merit serious attention – it may be recalled that the ‘cost of a manned mission to Mars currently estimated at $500,000 million and rising ...’ has been given at least tacit approval by President George Bush: ‘the only footprints on the Moon are American footprints’ and ‘it is America’s destiny to lead’. Bush called for ‘a sustained program of manned exploration of the Solar System ... and the permanent settlement of space.’

Perhaps the US’s present economic problems will inhibit the actual implementation of such Faustian dreams. But, make no mistake, regardless of ‘greens’ in the US, many in positions of capital influence are still possessed by gargantuan ambitions that could readily contemolate such scenarios as the above. And there are plenty of folks around whose conception of the ‘greening’ of Mars is roughly akin to that of making green golf courses in the deserts of the US west – an ambition already fullfilled in innumerable actual examples. There is a kind of mind that, with ruthless positivism, insists that if something can be done it must and will be done. If the Moon can be mined, mine it. If Mars can one day, be farmed or ‘gardened’, get on with the steps that will allow this to happen. Perhaps we should take comfort from the fact that McKay et al’s NATURE paper is speculative and based on many approximations and surmises. But positivistic ‘visionaries’ never let such details really deter them – or prevent them from action. If eventually – allowing for the very optimistic guess that anything like humankind will still be around to have the slightest interest in gardening or inhabiting Mars – Mars really could be ter-

reformed to something on which humans could live, it would then be a bit late to decide that we never needed it; that as an object, and an aspect of the formation and evolution of the Solar System, Mars would have been far more informative to us as it used to be.

Then there is the other thing. At what point will human beings say to themselves: ‘with the mess we have made of this planet – our one true home – must we not keep our greedy simian fingers off all the other wondrous objects of the universe of which we comprehend so little?’ A pox on all the ‘pioneers’ who will try to go out and destroy Mars. They are not one jot more admirable than the morons who spray-paint rocks, and carve their names on trees. Indeed, they are a million times worse.

Let science divert its huge strengths from absurd adventurings in cosmic impiety.

FROM THE MEDIA

Notes and Matters Arising

In an article entitled ‘Canada’s high-tech defence disaster’ (Globe and Mail, September 24, 1991), Marcus Davies heavily criticises the Oerlikon Low Level Air Defence (LLAD) programme as ‘a disaster almost from the beginning’. He notes that

A U.S. government report released in May this year is nothing short of scathing in its review of the Oerlikon product’s performance ... translated from the defence vernacular, the report means, simply, that the product is a dog.

Yet, here in Canada, the Mulroney government seems handcuffed to the program. Unwilling to admit it was the mistake of a government new to office, the spending continues, even though the early promises of widespread job creation have not even remotely been kept.

Apparently, the project has been overspent ($261 million) in Quebec, but massively underspent in other provinces.

It is the overspending in Quebec that may be the ... government’s dilemma, especially now that Marcel Masse is defence minister. The prospect of saving $500 million (out of a project $1.2 billion) may ... be attractive, but in political terms, the thought of cutting loose more than 700 jobs in Quebec is daunting.

Davies ends: ‘One wonders when the whole charade will end. Probably not until the whole $1.2 billion intended for the project is gone!’

If this is not a classic case for the economic conversionists to practice their skills on, one would be hard pressed to find a better one.
On October 6 and 7, The Toronto Star and the Globe and Mail gave accounts of Mikhail Gorbachev’s response to George Bush’s announcement of ‘cuts in the U.S. nuclear arsenal’ announced ten days before. It was noted that Gorbachev’s proposals far surpassed Bush’s in magnitude. Bush’s promises had already been criticized in several quarters as essentially tokenism, or even a deceit, since they indicated phase-outs of obsolescent weapon systems which would have been unavoidable in any case as new state-of-the-art weapon systems came on stream. On the face of it, Gorbachev may have outperformed Bush in terms of significance of the cuts proposed, but overall the impression is of a game in which neither player has divested himself of particularly significant cards as yet. When can we expect an aura of genuineness and real progressiveness to permeate arms negotiations? Not at all until we can phase out the military industrial complex.

UNIVERSITY NUCLEAR TESTING: THE OLD ARROGANCE REMAINS

by T.W. Peter Bogden August 14, 1991

Way back in 1941, when nuclear weapons and nuclear power were first seriously proposed to the British and American governments, the order of priorities was bombs first, power production second, and concern about radioactive waste products a long way down the list. It is exactly fifty years since then, but this order of priorities has not changed, in spite of vastly different geopolitical circumstances and growing awareness of environmental concerns.

The discovery of nuclear fission had been made in the heart of the Nazi Third Reich, and a number of the scientific refugees who escaped to Britain and America in the late 1930s brought with them their very real concerns that Hitler’s government might develop a uranium fission bomb. The now-recognized limits to the earth’s ability to absorb the spoils of industrial development just did not seem real at that time, especially when destruction from air raids or invading armies was quite literally next door or just around the corner. This gives a reason, but not an excuse, for underrating the significance of public concerns about radioactive pollution in the quest for military superiority or near-limitless sources of electric power.

The Canadian Centre for Arms Control and Disarmament (CCACD), with support from the Canadian government, hosted a Symposium on Underground Nuclear Weapons Testing in Ottawa in late April of 1991. The main purpose was to get more facts established and publicized about the environmental effects of underground nuclear weapons testing. The USSR had recently announced that its future testing would take place on the Arctic island of Novaya Zemlya, and that the test range at Semipalatinsk would be closed. As well as Canada, the countries of Scandinavia have been concerned for many years about their neighbours’ testing, both in the atmosphere and underground, and they also strongly supported the Symposium.

In keeping with its policy of more openness, the USSR sent a large delegation, led by Dr. Viktor Mikhailov, the Deputy Minister for Atomic Energy and Industry, and its members are generally quite open in their descriptions of their underground testing practices.

On the other hand, the US Department of Energy (DOE) chose to boycott the event, on the grounds that though the symposium was originally restricted to testing in the Arctic, its scope had been broadened in February to include non-Arctic test sites. The US has had only had three test explosions in Arctic locations, and none since the early seventies. Though senior scientists from the weapons laboratories (Los Alamos, Livermore) had accepted invitations to come, they were directed by the DOE not to attend. Two independent US consultants (both prior employees of the DOE) did attend, but announced on their arrival that they could participate only if press representatives were excluded from the audience! To the author of this essay, who was attending as an official rapporteur to assist in the final proceedings publication, this ban on press representatives seemed utterly ridiculous, but fully in keeping with the successful manipulation of the press during the Persian Gulf War. As it turned out there were no questions at all about why testing is still being done, and most of the information presented and the questions asked were very technical.

The other confirmed nuclear weapons testing countries (France, UK, China, India) were not represented. If nothing else, these hi-jinks over media coverage of what was a very technical symposium indicated the extreme sensitivity of the nuclear testing countries to any possibility that embarrassing questions might be asked.

In fairness, it should be pointed out that the US Office of Technology Assessment (OTA) has published a comprehensive document about the DOE’s underground testing as recently as 1989. In fact, this report formed a comparative basis for the information provided by the Soviet delegates on details such as test approval procedures and safety criteria. Both the US and USSR admit to quite large unintended releases of radioactive fission products from several test explosions, such as the US ‘Baneberry’ test in 1970 (fallout detected in Southern Canada) and an-
other containment failure in Novaya Zemlya in 1987 (detected in Finland and Sweden). Dr. De Geer of the Swedish Defence Ministry listed eight of these technical violations of the 1974 Threshold Test Ban Treaty, which stipulates no releases of radioactivity across national boundaries, though, as he pointed out, it is hard to get fired-up about the actual quantities of radioactivity, which were so much smaller than the contamination due to atmospheric testing and the Chernobyl power reactor disaster.

A few weeks after the symposium, the International Physicians for the Prevention of Nuclear War in conjunction with the Institute for Energy and Environmental Research published a first report on their project to survey the consequences to health and the environment of all nuclear testing. The book is based on publicly available reports, and its contents, reflect the dearth of published information about French and Chinese testing. The Ottawa Symposium added a lot of detail to supplement the sections on underground tests.

From tables in the book showing estimated fatal cancers from atmospheric testing contamination (and supported at the Symposium), the most dangerous radioactivity is from Carbon 14, which is produced at the moment of explosion by neutron bombardment of nitrogen in the atmosphere. Its long half-life (5,800 years) ensures it gets distributed everywhere, and will be incorporated into living organic matter. When the nuclear explosion happens underground, there is no large amount of nitrogen present for Carbon 14 to be created. Between 85 and 90% of all fatal cancers caused by testing (excepting Hiroshima and Nagasaki, sometimes regarded as tests) will be because of the excess Carbon 14. The projected total of fatal cancers over the life of the excess Carbon 14 (ie. about 25,000 years) is between 2 and 2.5 million, spread over the world population. This translates into a few hundreds per year, which is practically not detectable among 5 or 6 billion people.

In spite of these seemingly insignificant numbers of deaths from cancer, popular objections to atmospheric testing did get it stopped, at least in the US, USSR, and UK. The Partial Test Ban Treaty (PTBT) was signed in 1963, and these countries took their testing underground. France and China continued atmospheric testing until 1980, but like the other three, have continued with underground tests. The cause of popular objections was strengthened by revelations of very slack health precautions at test sites, for example in Australia by the UK military personnel, the Lucky Dragon incident, and the evacuations and re-settlement attempts imposed on the Marshall Islands inhabitants. Campaigns organized around 1960 to collect and measure the content of strontium 90 from fall-out in childrens' milk teeth were very effective, because they literally brought home to everyone (including bomb designers) just how far contamination was spreading. Overall, I have got the feeling of thankfulness that the phase in our history is past when we acceded to military demands that our security was absolutely dependent on contaminating our planet with excess radioactivity and destroying the livelihood of the few but not unimportant people who lived in those remote locations that the testers took over.

However, by the act of going underground, the weapons testers have been able to hide nearly all of what they are doing. Sufficiently successfully, in fact, that for the Symposium's purpose of demonstrating how radioactive fission products from underground tests might spread, especially from that 10-15% of tests which leak or vent into the atmosphere, all the results presented had to come from much more intense sources. There has simply not been enough radioactivity leaked from underground testing to be able to follow the radioisotopes through groundwater, ocean or atmospheric distribution paths, or to see the effects of concentration in food chains.

By far the largest of the three principal sources for these studies was the lingering caesium 137 from the atmospheric testing years (1950-1963). This was widespread around the hemisphere, and its take-up into vegetation has been studied widely. Chernobyl showed the same effects, but to a lesser extent, and the intentional release from the reprocessing plant at Sellafield, UK, over several years in the mid-seventies was followed to the Arctic ocean. Dilution of the radioactivity through the atmosphere and oceans was reported on in detail, and also the concentration that occurs in food chains (eg. lichens-reindeer-man, lake water-fish-man). But in spite of the declared 'containment failures' by both the US and USSR, there was never enough radioactivity released from an underground nuclear test to provide scientists with an opportunity to follow through to a serious definitive statement about a health hazard. The nearest was Dr. De Geer's calculations that all the radioactivity leaked from all the underground tests to date might cause a fatal cancer in one fifth of one person in the total population of Sweden.

In retrospect, the arguments about world-wide contamination and destruction of livelihood which successfully brought about the 1963 PTBT were simple and obvious. Secrecy and cover-up had been the order of the day, and many bad mistakes were made in handling not only the tests, but also the weapons production process. The evidence of environmental degradation caused by underground tests is much more subtle and easily countered by those who want to build 'better' bombs. A more comprehensive measure of risk to human life than projected
fatal cancers must be devised or found, one that will include the very real aversion felt by many people to external, technocratic control over their lives. Unfortunately, it seems that scientific and engineering training, by its attention to detail, seldom allows us to stand back and ask more questions about the merits of what we are doing and why we're doing it. The bomb builders are covering their tracks too well, and different arguments are going to have to be used to put them out of business.

3. Radioactive Heaven and Earth, Ch. 5, pp. 69-88.

Democratizing the United Nations

by Ross Smyth

The theme of making the world more democratic through a reformed United Nations system prevailed at the Second Conference on a More Democratic UN (CAMDUN 2) held at the Vienna International Centre in Austria, Sept. 17-19. Over 125 delegates from every continent debated and discussed 60 papers.

The hope is that we are at a moment in history when the spirit of democracy and pluralism is sweeping through humanity. It is time for a reformed UN to play a vital role in a people's new world order based on human rights and common security.

A great gap exists between the idealistic vision of the UN Charter's preamble and its actual rules and procedures regulating the exercise of power. Over two-thirds of the nation states had no role in developing the original Charter. The victorious powers in 1945 created an organization they could control exclusively by means of the veto power ... not exactly sovereign equality. World democracy appears impossible without a restructured Security Council.

Most delegates in Vienna opposed the methods of legitimizing a disproportionate, excessive use of force in Gulf War II by some permanent members of the Security Council. UN Secretary-General Perez de Cuellar said: 'This was not a UN war. General Schwarzkopf was not wearing a blue helmet.'

The UN Charter was used selectively and questionably from a legal basis. The Security Council has 'primary' responsibility for international peace and security, but played a small role in its conduct. Its Military Staff Committee was not used. It failed to determine under article 42 the impact of sanctions. The General Assembly has no authority.

Respect for the clearly expressed will of the majority is a foundation stone of democracy, regardless of who wields military or economic power. Yet CAMDUN delegates felt we have seen this flouted often in the UN by an economically and militarily powerful minority. According to former UN official Erskine Childers, that minority has refused for over ten years even to enter into dialogue with the majority of members on the grave issues of grossly unequal international economic and financial relationships. He said the World Bank and International Monetary Fund are governed by weighted voting according to economic power ..., practices which the oldest democracies prohibited in their own countries nearly a hundred years ago. We must fight the old-fashioned maxim of 'might makes right' to develop the UN's credibility. The United Nations must not become an instrument in the hands of the North used for the domination of the South.

It is incorrect and dangerous to put the nation first in one's thinking. The state is simply an agency to serve the human being. The UN system now makes the citizens hostages to the power politics of their respective governments. The main elements of a new world order must be grouped around the sovereignty and dignity of the individual. Traditional international law places too much emphasis on state sovereignty. It should become inadmissible to propagate certain rules of law at home on the national level while excluding them from application abroad.

The United Nations Charter must be amended along democratic lines to protect the weak against the strong. Many felt the present Charter provides protection for those who are in least need of it. Others stressed the great poverty in three-quarters of the world.

One speaker, Margarita Papandreu, representing Women for Mutual Security, asked that female candidates be considered for the top UN spot. She had been to Baghdad to visit the Iraqi Federation of Women just before and again after the Gulf War. Their attitude there had changed from one of hope to one of bitterness, cynicism and fatalism. They believed persons of good intentions could do nothing.

Mrs. Papandreu was affected by the faces of babies and children sick and dying from dehydration and malnutrition. A doctor spoke to a Westerner and told him of the need for a particular medicine. 'But you'd need tons of that - we can't arrange that,' the visitor responded. 'But you sent us tons of bombs,' the doctor replied.

The key organizers of this Conference on a More Democratic UN (CAMDUN) were co-founders Jeffrey Segall of London and Harry Lerner of New York, and Hans Koechler of Vienna, convenor and president of the International Progress Organization. Among their many recommendations was an appeal to the UN General Assembly to approve an Inde-
pendent International Commission on Global Governance as proposed by 36 world leaders who signed the Stockholm Initiative in April. It should be open to submissions from NGO’s and the public.

A network of some 100 organizations support the proposal for a Second Assembly at the United Nations. A detailed motion prepared by Michael Meadowcroft of the UK, an ex-Member of Parliament who is chair of the Electoral Reform Society, was approved. It established a working party to prepare specific proposals for a UN Second Assembly for determination at CAMDUN 3 in India in 1992. Most delegates seem to prefer an elected Second Assembly which could be allowed under Article 22 of the present Charter as an advisory body.

In order to further the cause others are encouraged to organize speakers, conferences and seminars on a regional or national basis on democratizing the United Nations. The author presented a brief paper on the importance of gaining public support for UN democratization.

This CAMDUN conference was the follow-up for the first one held in New York in October 1990. The views expressed in this article were selected from the papers and speeches presented, and attempt to represent the majority viewpoints of those present.

The peace constituency should make democratization and reform of the United Nations an issue on the public agenda.

Note: Ross Smyth is past president of the United Nations Association (Montreal), past president of World Federalists of Canada, and presently chairman of the World Government Organisations Coalition.

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**Radiation - ‘The Most Important Subject in the World’**

**How radiation is defined**

*Radiation comes in many different forms. Some, like heat and light from the sun, are natural and can be seen or felt .... Ionising radiation cannot be seen or felt ... can result in serious damage to living matter ...*


*If only [ionising] radiation were red then these people would know what they are living in...*


*Radiation is the most important subject in the world, and it will be forever, because of the thousands of nuclear weapons and bombs, and the constant threat to civilization and the world.*


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**Radiation Can Be Lethal**

‘... these truly heroic firefighters extinguished the flames and conquered the blaze; but they were burned, many of them fatally, by another invisible flame, the flame of gamma and neutron radiation, of a kind that no water could possibly extinguish ...

‘... the two young trainees were slowly making their way past vast piles of debris to level 36 where the reactor hall was located. They could hear the crackling of flames, the shouts of firefighters ... At level 36 everything had been destroyed ... powerful nuclear radiation was ionising the air ... They found themselves shielding their faces with their hands as if the sun were too bright ... They stayed near the reactor about a minute more, carefully remembering what they had seen. That was long enough for them to receive a lethal dose of radiation. Both died in great agony in number 6 clinic in Moscow ...’


‘Even from the routine emissions you do get deaths. I did a study in Wisconsin around normally operating nuclear plants with no accident situation there, they’ve all been built since 1970. I looked at how birth weight infant deaths and the death rate increased downwind. At the same time I matched it with Nuclear Regulatory Commission measurements of off gas radioactive releases and just over a period of the first few years of operation of these plants there were over 100 excess immature infant deaths. ‘Now those infants did not die of cancer, they did not die of serious genetic diseases, so they are not counted; those are the two things that are counted. They most likely had a respiratory difficulty and they couldn’t cope with a radioactive gas, so they would get irritation of the respiratory tract and depressed immune system. So it would look like a pneumonia death, so they’re not counted as connected with the plant. And there are many such things; that’s why I object to this technology, it’s not life-compatible.’

Dr. Rosalie Bertell, at St. Paul’s University, Ottawa, 17 May 1986.
Radiation and serious health problems

‘In Canada an investigatory study showed a relationship between birth defects and death rates and emissions of radioactive tritium in cooling water from the Pickering nuclear power plant in Ontario. Officials down-played that study, but Greenpeace commissioned an independent assessment from a British researcher, Dr. Barry Lambert, a radiation biologist at St. Bartholomew’s medical school in London, England ...

[In his report Dr. Lambert commented]: ‘It is an interesting study, it has been well done, it needs some further investigation ... They found an increase in birth defects in Pickering, and they also found that the pattern of the increase in these birth defects correlated with the pattern of releases in tritium into Lake Ontario from Pickering power station ...

Tritium (he explained) is a radioactive isotope of hydrogen; it emits beta particles and normally is not a real hazard to anybody until it gets inside the body. You can breathe in tritium gas or tritiated water; once it mixes with your body water it irradiates you the same as external radiation does. The conclusion of the study was that this was too much of a coincidence and that therefore the two incidents must have been related. I am not absolutely sure that this is true, but it certainly indicates that further studies should be done. It is a timely indication that something may be wrong.’

CBC, ‘As It Happens’ program, 16 July 1990.

‘The cows had problems such as multiple fractures, blindness, chronic arthritis, anemia and something that looked like starvation and deficiency ... We’ve seen this problem for about two and a half years before the accident at Three Mile Island ... Some people lost all their calves ... Since the plant has been closed we haven’t run into this problem.’


‘I truly believe that there will be an increase in the medical consequences in this area from the accident, such as miscarriages and increased incidences of cancer and leukemia.’

Dr. Michael Gluck, General Practitioner, in ‘Voices from Three Mile Island: The People Speak Out’, pg 42.

‘In 1975 Dr. Thomas Mancuso asked Dr. Alice Stewart and her statistician, George W. Kneale, for help in reviewing data on workers at the Hanford nuclear reservation in Washington State. Within a year, the three discovered that plant radiation was causing unusual numbers of pancreatic, lung, and bone marrow cancers among workers.’


‘... the human cost of building nuclear bombs: Workers at nuclear weapons plants in the U.S. say they are the real victims of the bomb. For years they have complained of health problems, especially high cancer rates. Now Washington will make their health records public. Doctors and scientists will get a chance to study the charts of 200,000 workers from a nationwide network of bomb factories. If [an earlier study] is confirmed it would mean that about 2,000 of those 200,000 workers would die from cancer because safety standards were too low ...’

CBC Radio, news item, 18 May 1990.

Radiation experienced now may be lethal to future human generations

‘The main finding of this study is that the recorded external dose of whole body ionising radiation to fathers during their employment at Sellafield [nuclear reprocessing plant in Britain] is associated with the development of leukaemia among their children ... we interpret this finding to suggest an effect of the radiation exposure on germ cells producing a mutation in sperm that may be leukaemogenic in subsequent offspring ...’

‘These findings support the hypothesis, incorporated as part of this study, that exposure of fathers to ionising radiation before conception is related to the development of leukaemia in their offspring.’


Chernobyl’s radiation legacy

‘... at a distance of between 50 and 90 km from the Chernobyl plant the contamination of topsoil exceeds 80 Ci/km2. This makes the land unsuitable for agriculture, but local people have no choice but to continue dairy farming because centrally supplied “clean” food does not arrive in sufficient quantities. Despite health warnings, many people drink local milk and gather fruit and vegetables from their plots.’


‘More than 700 British farms are still subject to stringent anti-radiation rules, five years after the Chernobyl cloud swept over the country ... the restrictions, currently affecting more than half a million sheep, are likely to be in place well into the
next century ... rain laced with radioactive iodine contaminated pasture, then cattle, and then milk.

‘The milk was drunk by children, several dozen of whom are now expected to contract thyroid cancer over the next 30 years ... radioactive caesium from Chernobyl has rendered 2,000,000 sheep inedible in Wales alone.’


‘The majority of Ukrainian territory is affected by radioactive contamination. More than 1,500,000 of population is affected by radiation directly. Amongst those 1,500,000 people are 250,000 children, and the total territory contaminated by radiative elements is more than 36,500 square kilometres ... the consumption of meat, milk and other food products is restricted.

‘I think that the official information that only 32 people have died - this is some kind of a crime. In Ukraine today an average of 20 (babies with) birth defects are born per each 1,000 newborns, and 40,000 miscarriages are reported every year ... each year 14,000 children with congenital disorders are born ... 80% of all 18 year olds have chronic diseases ...

That is why we say we are living through a period of Ukraine’s genetic degeneration, why we must assume that the total number of deaths in Ukraine exceeds 10,000.’

Dr. Valery Ivasiuk, surgeon and member of Ukrainian Parliamentary Commission on Health, in ‘Chernobyl - Then and Now’, CBC Quirks and Quarks program, 20 April 1991.

Is future radiation disaster preventable?

‘Most statistical assessments call for another major accident in the next 10 years. No amount of engineering fine-tuning will eliminate the possibility of a catastrophic release. To cite one near-miss, the PanAm jumbo jet that was blown out of the sky above Lockerbie, Scotland, lunged into the ground a short 10 miles from the Chapelcross nuclear power station ... The director of nuclear safety of the International Atomic Energy Agency says that we can expect a major nuclear accident to occur roughly every 10 years.’


‘Both in this accident at Chernobyl and the accident at Three Mile Island, it was human error, people violating the rules deliberately that led to the accident, and then it was the technology that was not forgiving enough, that wasn’t able to cope with these errors, that led to the destruction of the power plants ... People violated the rigs, they thought they could get away it it, they may have done it before and in fact have gotten away with it, but in these two cases they didn’t.

‘You asked if there could be another Chernobyl - you certainly can’t preclude it. There is a series of accidents, for example there’s one called the “station blackout” which is the one of great concern in the States, and that is that if a nuclear plant is running along at full tilt, 100% power, it’s got all this radioactivity in it. Suddenly, say the power line is knocked over by lightning or something, at that time the plant loses its power, it has got to shut down instantly and it has to run its diesels in order to remove the decay heat. Well, if for some reason those diesels don’t work then the plant has no way of removing its heat, the station has effectively blacked out and the nuclear plant can melt down. Now, that had been deemed as totally unlikely, but within the last two years there was an incident in Georgia, U.S.A. The plant was shut down, thank heavens, but a truck backed in, knocked over the transformer and they lost off-site power and the diesels wouldn’t start. And they were very lucky the plant had been shut down and had very little decay heat, but you know it can happen, will happen eventually. And even those in the nuclear industry say you should be prepared for another accident. It’s just that they think it’s acceptable if they happen infrequently enough and are not damaging enough to public health.

‘So I think that - yes, the simple answer to your question is yes, it could happen again.’

Dr. James Mackenzie, senior Associate in the Climate, Energy and Pollution Program at the World Resources Institute, Washington, CBC program ‘Chernobyl - Then and Now’, 20 April 1991.

Excerpts selected, edited and arranged in order by John R. Ashon; present address: 3 Old Bakehouse Yard, Morpeth, Northumberland, NE61 1AS, England.

Preparing for a Subsustainable Society

A conference bearing the above title was held at Ryerson Polytechnical Institute on June 21-22, 1991. Several members of Science for Peace - Ursula Franklin notable among them - contributed papers to the conference. The thrust of the conference was perhaps epitomised in Dr. Franklin’s address entitled ‘What the future asks of engineers’. The topic of the conference ‘Preparing for a sustainable society’ may have been chosen with great deliberation - it was, in any case, a good topic, better than ‘sustainable development’ which we hear of so often, and
which inevitably seems to imply endless economic growth. True, some speakers referred to ‘sustainable development’ but many, very many, seemed to appreciate that, at bottom, such a concept is untenable, and to discuss instead how the world’s societies can, at best, hope to keep going without terminal economic crashes, final environmental degradation and eventual exhaustion of natural resources. Indeed, the general message was clear, and many speakers seemed to come to the same broad conclusion: the world and its human populations are in danger from centuries of economic over-exploitation, waste of resources, pollution, the population explosion and the cruel discrepancies between the material well-being of the nations of the North and of the South. As one attending and participating, I found this a really excellent conference, was greatly impressed by the humanistic attitudes and ‘raised consciousness’ displayed by the many engineers who took part, and also by the almost inevitable air of agreement about so many dire human and societal problems that arose, regardless of the different background positions taken by those attending. But I cannot claim the take-home message was an upbeat one. It was generally appreciated that the world is in many ways profoundly endangered, and that the hour is late.

The following is the text of a document which was signed by many of those attending the conference.

A. H. Weatherley

Preparing for a Sustainable Society

Call for Action

We, the undersigned, having considered a number of important issues related to the theme of preparing for a sustainable society, affirm the call of the World Commission on Environment and Development for all nations of the world to collaborate in creating a more sustainable way of life. It is evident to us that time is running out, and that we in Canada should greatly accelerate our efforts to make our way of life more sustainable. Our national and international efforts should be directed:

1. To reduce population growth through the creation of conditions (economic, social and political) which eliminate pressures for large families.

2. To create a sustainable economic world order which affords much greater justice and quality within the human family and reduces the abuse of the natural ecology.

3. To protect farmland and those who work it because we will need every square inch to grow enough food for the burgeoning population of the planet, expected to double between now and early in the next century.

4. To promote much greater efficiency in the use of materials and energy and to greatly increase the recycling and use of renewable energy sources.

This concerns all disciplines and it is a whole new frontier in engineering and science that is receiving far too little attention. We as engineers and scientists have to become more socially and environmentally literate, and must use this knowledge to adjust our theory and practice accordingly. We recognize that this is a necessary though not sufficient condition for a more sustainable way of life. There is no technological fix to our current challenges. Technological transformations must go hand-in-hand with socio-cultural, economic and political ones.

The Truth About the Serbo-Croatian Conflict

by Andrew Pakula

Yugoslavia is on fire. Since early summer a vicious war has been fought between the forces of the break-away Croatian republic and Serbian guerillas supported by the Serbian dominated Yugoslav army. The Croatian forces, faced with a far better armed opponent, are in retreat and approximately one third of the break-away republic’s territory is under Serbian control. Yet another cease-fire negotiated by the European Community is being broken by sporadic fighting. In addition to resulting in many deaths and injuries, enormous economic damage, and more than 100,000 refugees, the war has divided families and caused formerly peaceful neighbours to take up arms against each other. The armed conflict continues to escalate and threatens to spread to other regions of Yugoslavia and possibly cross its borders.

The conflict between Serbia and Croatia reflects a vicious escalating cycle of fear, ethnic hatred and violence. For reasons related to past and present realities, the 600,000 Srbs living in Croatia are afraid of an independent Croatian state. The Croats are afraid because the other side is more powerful and better armed. On both sides, these fears are manipulated and exploited by nationalist political elites for whom such actions represent a critical means of preserving power. State-controlled media reporting is one-sided and biased. These forces of influence are particularly strong given the lack of education, apathy and confusion of the people, as well as the lack of
accountability, democratic institutions, and community structures, all caused by decades of totalitarian rule.

The conflict is rooted in the complex geographic distribution of the different nationalities in the region and in its violent history. Serbia and Croatia were parts of two mutually hostile empires, the Ottoman and the Habsburg, and fought on different sides in both World Wars. As well, they are divided by religion, Eastern Orthodox and Catholic respectively. These divisions are further fuelled by historical untruths, exaggerations and diabolical enemy images born at least in part because historical truths have been suppressed and the resulting vacuum bred extremist mythologies.

Both within the warring republics and to a great extent in external media coverage and public opinion, ‘good versus evil’ images are critical in contributing to the escalation of the conflict. Each side presents itself as perfectly virtuous and the other as the devil incarnate. As reality is rarely that simple, truth is a casualty. And without truth and realistic understanding there is little hope for peace.

In an attempt to understand the truth, let us consider the two sides and their positions in the conflict. Serbia, the most populous republic and dominant in the Yugoslav army, is led by the communist government of President Slobodan Milosevic, recently renamed as the socialists. Milosevic came to power by inciting and exploiting Serbian nationalism. During its tenure, the government put forth the notion of aggressively protecting the rights of all Serbs wherever they may live in Yugoslavia. This was expressed through serious violations of the basic rights of Kosovo’s Albanian majority, through interference in the republic of Montenegro and in the autonomous province of Vojvodina, and through encouraging both fear and nationalism in the Serbian minority in Croatia.

In the latter case the appeal is rooted in both past and present realities. It is a historical fact that during World War II the Ustasha fascist regime in Croatia was responsible for the genocide of about 400,000 Serbs and tens of thousands of Jews and Gypsies. In recent months, gruesome images of the remains of the victims of the notorious concentration camp of Jasenovac are being frequently shown on Serbian television.

Through its emphasis on nationalism, the Croatian government frightened and alienated the Serbian minority, particularly given Croatia’s declaration of independence of June. Croatian and other human rights organizations have documented many cases of abuse against members of the Serbian minority. Some extremist elements in Croatia have minimized or denied the Ustasha atrocities, and even expressed nostalgia and support for the quisling regime. It is undoubtedly true that the Serbs in Croatia have legitimate reason to be afraid and are unwilling to live in an independent Croatian state and many have taken up arms to prevent this from happening.

The socialists won the last election in Serbia partly because of their nationalistic platform and partly because they had nearly total control of the media. When the students in Belgrade staged a peaceful demonstration in March against the authoritarian regime, tanks were brought into the streets but withdrawn at the last minute in consideration of world opinion. As the Milosevic government has a large majority in the parliament, the political opposition is marginal. Given Croatia’s declaration of independence on June 26, the Milosevic government’s position is that the break-away republic’s borders would have to be redrawn so that the Serbian minority can join Serbia. The claims that the Yugoslav army has been impartial in the fighting between the Croats and the Serbian minority in Croatia are simply not credible.

Croatia’s governing party HDZ (Croatian Democratic Communion), led by President Franjo Tudjman, came to power on the platform of nationalism and anti-communism. The move away from communism in Croatia represented a change of elites rather than a democratic transformation, giving almost unlimited power to the president. With only a marginal opposition and mostly state-controlled media, there are almost no checks and balances to the government’s power. While Serbia may be characterized as anti-democratic, the present regime in Croatia is certainly undemocratic. The official Croatian position on the current conflict is that border changes are not acceptable and that Serbia, together with the Yugoslav army, is attempting to take control of most of Yugoslav territory and create Greater Serbia.

There are elements on both sides more extreme in their nationalism than their respective governments. In Serbia they are the Chetniks, a recently revitalized organization of Serbian monarchists who during World War II fought both Tito’s communists and Croatian Ustasha forces. Although it is not clear whether the Chetniks have real power or are just being used by the Milosevic government, their extremist positions have been fuelling the fires of war. Recently, their leader called for Serbs to ‘cut the throats of the Croats with rusty spoons.’

An extremist nationalist member of the Croatian legislature recently ended his speech with a Nazi salute. The new Croatian constitution makes references to racial, national purity. In a statement often quoted in the West, Tudjman thanked God that his wife was neither Serbian nor Jewish. There is a growing nostalgia for the Ustasha regime and tendency to deny the atrocities they committed. All
these factors, further fuelled by the Serbian government, have driven the Serbs in Croatia to take up arms in their defence.

It is clear that neither side in the conflict can make legitimate claims of democracy, virtuousness and righteousness, while presenting the other as the sole villain. It is true that Serbia, more populous and supported by the powerful Yugoslav army, may be considered the aggressor, and Croatia the underdog. But it is equally true that the fears of the Serbian minority in Croatia are entirely legitimate and justified by past and present realities.

The Western press has mostly been taking the side of Croatia, at least implicitly comparing the situation, to say, the 1956 Soviet invasion of Hungary. While there is some validity to this image, particularly given the Yugoslav army’s unsuccessful attack on Slovenia following its recent declaration of independence, the reality of the conflict between Serbia and Croatia is far more complex and less clear-cut. Indeed, while Slovenia and Croatia declared their independence at the same time, their situations, although typically presented as similar in the media, are quite different. In comparison to Croatia, Slovenia is more democratic, more homogeneous in population, and far less burdened with a violent history.

The ‘good versus evil’ images of the situation have contributed greatly to the war and strengthened extreme authoritarian, nationalistic elements on both sides. The fact that Serbia tends to be presented as the sole villain contributes to their feelings of isolation and paranoia and strengthens the hand of the Milosevic government and its resolve to continue military action.

The current war is not between Serbian and Croatian people. Indeed, they are its victims. The conflict is between the forces of authoritarianism, chauvinism, and violence in both Serbia and Croatia on one side and the forces of peace, democracy and reason on the other side. Peaceful resolution needs to be built on a foundation of truth not propaganda, and must involve guaranteed protection of minority rights. In the task of resolving this violent conflict, even-handed analysis and realistic understanding, rooted in the values of truth, democracy, human rights and non-violence, are of critical importance.

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Editor's Note

The foregoing document is included in Science for Peace Bulletin because it appears to be an even-handed attempt to explain current tragic events in Yugoslavia from a historical standpoint, to defuse the bipartisan rhetoric that frequently confuses not only strangers, but also many of those actually caught up in the dispute. Such evaluations are important contributions to the settlement of violent conflicts. However, it must surely be confessed that the Yugoslav situation presents those of the international community, who would like a just and peaceful solution, with an enormous problem of how such a solution can be obtained. Questions of national sovereignty and the legitimacy of governments must come in for tortured scrutiny here and this is one of those many cases where no international peacekeeping body with legally-recognized standing appears to have the grounds for a lawful intervention. Even if it had such grounds, it is clear that here - as in Northern Ireland - the ingrained nature of the mutual societal mistrusts and immensely powerful political and pseudo-ethnic prejudices, would make imposition of peace and security by an outside body exquisitely difficult.

An extended, more comprehensive version of Andrew Pakula’s article is to appear in the November-December 1991 issue of Peace Magazine.

Introductory statement for the brief of Science for Peace as presented by Anatol Rapoport, a former President, Tuesday, October 8.

Remarks at a Citizens’ Inquiry into Peace and Security

The ever-tightening interdependence of all local economies, demographies, and security concerns has made all major human problems global problems. Awareness of this interdependence and a conviction that global problems can be solved only by global efforts could be called globalism. Globalism should not be confused with globalization, the name sometimes given to the activities of large corporations transcending national boundaries. Globalization is invariably associated with concentration of accumulated economic power, and therefore of power over populations, especially the destitute and helpless ones. Globalism, as I will use the term, implies a diffusion of power, among people who are directly affected by its application. Globalism implies democracy on the global scale.

Since globalism implies a certain scope of awareness, it can be proselytized. Canada is in a specially favourable position to be a proselytizer of globalism for two reasons: its position as a 'middle power' and its close ties to the United States.

The middle powers are in a favourable position to press for the establishment of a world order based on the rule of law rather than on force, and also on a
world order based on collective solidarity rather than on the anarchy of realpolitik. Middle powers should use all the influence they can muster to enhance the authority and prestige of the United Nations, in particular of the International Court of Justice. Not being 'great powers', the middle powers will ordinarily not be tempted to throw their weight around and to rationalize strong arm tactics by appeal to the prerogatives of the mighty. On the other hand, not being small and weak, they can hardly be accused of appealing to the rule of law simply as a matter of protecting themselves against the strong and ruthless.

Until last fall, Canada was a middle power enjoying a fairly justified reputation as a peace keeper and hence was in an especially favourable position to act as a proponent of the rule of law on the global scale. Unfortunately, Canada’s reputation as a peace keeper was seriously impaired when Canada immediately followed the lead of the United States in escalating the Gulf crisis. The horrendously destructive Gulf war broke out largely as a result of provocative actions by the US in the form of mounting threats which cut off ways of punishing Saddam Hussein’s aggression without shedding innocent blood.

There is a positive and a negative side to the tight US-Canada alliance. An alliance is a commitment to cooperation. If Canada is committed to globalism, the content of its cooperation with the US should enhance globalism. But the actions of the US have frequently been a major obstacle to solutions of global problems. The US has frequently flouted international law and its own treaty obligations, has participated in and, at times, deliberately escalated an arms race that for two generations diverted human and material resources into the bottomless pit of death technology. It is imperative that, while preserving the readiness to cooperate closely with the US on matters promoting genuine security and human welfare, Canada categorically and explicitly dissociate itself from the arrogance, callousness, and pugnacity that have characterized US actions throughout the Cold War and have, if anything, intensified after what the American establishment interprets as a ‘victory over communism’. The probability that Canada can induce the US to change its ways is slight. But by dissociating itself from power-oriented policies, Canada will contribute to the spread and prestige of globalism.

The demise of communism did not make the three cardinal global problems go away. On the contrary, it increased awareness of their urgency. The three problems are still: the threat of sudden annihilation by way of total destruction, the threat of a degraded environment no longer able to support human life, and the threat of new sources of global violence generated by the disparity between the affluent and the destitute worlds. Our recommendations to Canada are to come realistically and energetically to grips with these problems.

1. Now that no conceivable justification has remained for the continued threat of nuclear, biological, and chemical arsenals to the human race, Canada should mobilize all its prestige and diplomatic skills toward instituting immediate, concrete procedures with the aim of destroying all genocidal weapons and preventing their development and production for all time. Preferably the US should be induced to change its present stance on this issue. But if it refuses Canada should unequivocally oppose it in the United Nations and in all international efforts to implement this programme. In particular, Canada should not hesitate to expose the shabby rationalizations of the continuing threats and obstacles to global security.

2. Environmental protection and environmental recovery should be among the central goals of Canadian policies, foreign and domestic. In designing environmental policies, the tight interdependence of all the components of the environment should be kept in mind: the atmosphere, the hydrosphere, the geosphere, and the biosphere. Among these components is also a global fund of human resources. It, too, is threatened by degradation by being squandered on futile or destructive efforts and by being perverted by addictions to anti-human, self-destructive ideologies.

3. Even as the danger of war between countries of the developed world becomes remote, it should be kept in mind that the chronic violence in the Third World is likely to remain unabated in the immediate future. The roots of that violence should be clearly perceived. Among them is the continuing exploitative relationship between the affluent and the impoverished worlds. Partnership should replace both exploitation and paternalistic charity as the basis of the relationship between the developed and the developing worlds. The aim of aid to the Third World should be support of sustainable development. In the pursuit of this objective, the choice of partners should be decoupled from considerations related to commercial advantage and also from those related to geopolitics. The choice of partners should be consistent with the support of sustainable development and its goals - the development of a just social order. Countries with regimes genuinely devoted to these goals should be the preferred partners. Arms trade is a particularly vicious form of exploitation of the poor peoples. Canada should work tirelessly and uncompromisingly for total prohibition of arms trade. Its present role as a host of obscene international fairs of killing technology and as the world’s leading test area of this technology is totally incom-
patible with its reputation as a peace keeper. This (latter) role should not be abandoned.

4. All of us should work toward welding a broad coalition of Canadians determined to cope energetically and intelligently with the paramount global problems of our age.

Defence Conversion for the 90's: A New Security Policy for Canada

Science for Peace

Science is not a value-free enterprise. Its success depends on a respect for openness and freedom of enquiry, on an enthusiasm for creative ideas and on a willingness to abandon even the most treasured dogma whenever, under rigorous examination, it proves inadequate. These characteristics are just as necessary, we believe, in the search for peace and human justice.

The Global Context

The traditional presuppositions that underlay the 1987 Defence White Paper, Challenge and Commitment, have proved as dubious as critics claimed: they have little relevance to the realities we face. The political changes in Europe and in the Soviet Union have outstripped military doctrines, alliance structures, and defence policies in place since the end of the Second World War. The disintegration of the Warsaw Treaty Organization marks the end of the Cold War.

Meanwhile, events in the past year have challenged our image of Canada as a benign peacemaker. The decision to use the army to suppress the Mohawk protest at Kanesatake and Kahnawake – protests demanding legitimate and long-ignored aboriginal rights – has shamed and deeply disturbed many Canadians. Also, urgent questions are raised by the Canadian Government's precipitate dispatch of ships and CF-18's to the Persian Gulf – without Parliamentary discussion or approval – and their subsequent use as adjuncts to the US-led 'Operation Desert Storm' and the accompanying slaughter. In both cases the Government chose guns over negotiation, conflict over peaceful resolution. It is time for us to re-examine our motives and policies.

War as arbiter of international disputes has been rendered obsolete by weapons of mass destruction, for no possible gain by their use can outweigh the human costs. In any case, war and fighting have no place in the solution of the global ecological, economic, and social crises we face. In fact, a continued preoccupation with preparations for war steals the intellectual and material resources we desperately need to face the actual threats to the security of our future and those of our fellow humans.

These threats are daunting, for we live on a planet that may well be dying. The immensity of impending ecological disaster is only dawning on us; the time for action is frighteningly short. We face converging crises: of pollution, environmental destruction, a growing gap between rich and poor, intractable international debts, preventable poverty, disease and illiteracy, depletion of resources, runaway population growth. The problems feed on each other. The search for security must be set in this global context. It will take all our resources to deal with these real problems; we simply cannot afford to continue to waste time and money responding to artificial threats. New directions are needed.

These new directions emphasize the need for a re-vitalized and strengthened United Nations. The relinquishing of a leadership role by the UN in the recent Persian Gulf crisis enabled our government and others to mis-use and misinterpret the mandate of the UN. The result was a calamitous loss of life, horrendous suffering and dire environmental effects. The UN was set up to enable nations to settle disputes without resort to war. We must strive, in consort with other nations of the world, to enable it to uphold the promise of its charter.

Principles for a New Canadian Security Policy

For decades we have lived in fear. This has been the world of NATO and WTO, of 'brinkmanship' and 'mutual assured destruction', of depending on a deterrence principle that put the world at risk. Trillions of dollars have been spent on military devices that have held us in terror. Now the standoff of 'superpowers' by which this madness was rationalized has evaporated, and we feel a shred of hope again. Still we see the obscene arsenals of hideous weapons, enough to destroy all life; still we arm the nations of the world; still the budgets go to life-destroying ends.

There has to be a better way. We have to free the whole world of the fear of aggression, so that we can move on to facing the real problems that are overtaking us.

We speak here of the network of confidence-building measures known as 'common security'. The biggest threats we face are global: there can be no 'national' security without global security, and any attempt to secure national security that threatens other nations or people is self-negating. It follows that national defence must be non-provocative, and this is one of the themes in our reconsideration of defence policy. It follows too that our main hope of
security lies not in military preparedness but in seeking peaceful resolutions of conflict, in redressing injustice and in reversing environmental degradation.

For Canada, in particular, our security has little to do with defending ourselves militarily, but owes far more to an international order that recognizes and respects our autonomy. Our best defence lies in nurturing that order. It implies an even-handed and non-provocative stance towards all the other nations of the world. It is important that we not be dominated by another nation or bloc of nations: common security is the very antithesis of collective security by military alliances.

We in Science for Peace believe that, in light of these principles, a radically new approach is needed to protect security. In this document we propose: (i) a decisive reassignment of duties for the personnel of our present defence establishment, (ii) progressive elimination of military exports as an element of our economy, and (iii) several important modifications in our relationships with the other nations of the world.

I. Redesigning Our Security Forces

One outstanding fact must shape Canada’s security considerations: Canada faces no direct military threat to its territorial integrity. Because of a unique combination of geography and geopolitics foreign invasion is not a realistic fear. Canada may be unique in this freedom from direct military threat. It follows that our defence posture will be unique: it need not include all the traditional military elements of more threatened nations. It is relatively easy for us to be truly non-provocative and to make a significant contribution to world security. It is with such a perspective in mind that we propose a radical redirection of the priorities for our forces.

A. New priorities for Canada’s Forces

We have pointed out that Canada is under no direct military threat, and we argue below that we no longer have any valid role to play in military alliances such as NATO and NORAD. Yet there exists a trained and disciplined body of national servants in our Forces. Are there still vital roles to which the defence personnel and administration could turn their dedication and ability? We propose here three important tasks. Their adoption as the agenda of our defence establishment would enhance the security of Canada and the world, and be in line with our UN commitment to effective disarmament:

1. non-provocative defence of Canadian territory, air space, and coastal waters
2. peacekeeping under UN direction
3. emergency disaster relief.

The union of these roles upholds the principles both of sovereignty and of common security.

1. Non-Provocative Defence of Canadian Territory

Although there is no danger of military invasion, the length and loneliness of our coastlines invites incursions into our fisheries (already experiencing serious long-term problems), the misuse of our shores, the violation of our space and that of our aboriginal peoples. This argues for a much expanded and very well equipped Coast Guard Service.

Of particular interest in this regard is Canada’s special place in the Arctic. The interests of both Canada and the world are served by our greater attention to our North. The aims must be:

1. the protection of the indigenous peoples and of the region’s ecology, and thus
2. the clear assertion of Canada’s sovereignty in the North, coupled with increased cooperation with the circumpolar nations.

A key element is Canada’s taking the initiative in managing the region by establishing comprehensive regulations governing navigation and limiting economic activity; but such regulations require enforcement. In our view, extended Coast Guard operations are needed for both law enforcement and search-and-rescue capacity. Such operations imply a well-trained force equipped with powerful icebreakers, long-range reconnaissance aircraft and helicopters, appropriately designed ships, and a technology of remote under-water and above-ground automatic sensing systems.

Although this role of non-provocative defence needs the trained personnel now found in the Armed Forces, it is not a military task but rather one of policing. What we envision is a transfer of some of the personnel and equipment from our present Armed Forces into a reorganized and expanded Coast Guard Service; this should probably be managed under the Department of Fisheries and Oceans. It should be emphasized that we are speaking of an enormous task. We envisage a much expanded service, and one requiring the best equipment, much of it sophisticated technologically and much of it still needing development. We have failed for too long to treat this aspect of our security with the seriousness it deserves.

2. Peacekeeping

We are proud of Canada’s distinguished record in supplying a variety of contingents to help maintain treaty agreements and cease-fires. Ours is the only country to have participated in every one of the
UN peacekeeping operations. There will be need for more such service in the future. The role is military, but it does not imply aggressive weaponry or modern war-fighting training. It does require a highly professional force, either unarmed or with minimal defensive weapons, and the best technology for surveillance and communication (e.g. high-tech electronic and signalling equipment).

With the end of the Cold War, the UN may want to use military sanctions to enforce its decisions and those of the International Court. Canada should be considering the role it might play in such operations, which would represent a step beyond providing peacekeeping forces that merely stabilize bilateral agreements.

3. Emergency Disaster Relief

In a world where assistance in unpredictable emergencies is often not available, or is too late and inadequate, Canada could offer a significant gift to the world - an efficient emergency force trained for immediate response to events such as floods, volcanic eruptions, earthquakes, famines, etc. Disaster relief would be a worthy main task for our services, and for this armaments are not needed nor appropriate. As Dr. Robert McClure has said, we need to replace our warplanes with transport planes able to carry the bulldozers with which we have replaced our tanks. Then we could be a lifesaving force on the ground anywhere in the world within hours. A technology of prefabricated emergency housing and emergency food supplies should be developed. A greatly expanded engineering corps and a substantial medical corps would be central to such operations.

We would envisage that both the peace-keeping and disaster-relief activities could be managed under a single Ministry, e.g. a Ministry of Emergency Services. However in order to implement our recommendations, the work of this Ministry must be closely coordinated with that of External Affairs, Finance, Environment and Northern Affairs.

B. Pressing Concerns

We here direct attention to three matters requiring action that cannot wait for the major structural changes proposed above:

1. Chemical and Biological Weapons

Canada plays a part in CBW research through the Defence Research Establishment at Suffield, Alberta. When public pressure forced the Canadian government to reveal some of the research activities there, Albertans discovered that 1.5 kg of nerve gas had been released into their air in 1987, subjecting them to health risks.

We are absolutely opposed to the proposal to build a large-scale ‘containment facility’, classed as Bio-Safety Level 4 (the top category for CBW research), presumably adequate for testing the most dangerous pathogens in aerosol form, including perhaps genetically-altered organisms for which no cures are known. We note that the US army was forced by public outcry to drop plans for such a facility in that country.

The secrecy of the research activities at Suffield has aroused grave concern about Canada's role in this field. Canada must oppose all CBW development, and in that case there is no excuse for any secrecy surrounding research at Suffield. Such research should be terminated. This would contribute to peace instead of increasing the risks of devastation.

We endorse the work being done by the Conference on Disarmament (CD) in Geneva to develop a Chemical Weapons Convention (CWC). The current negotiations to construct a verification and compliance system of broad scope are encouraging. The treaty will provide for an international agency to administer the verification system but some nations are still reluctant to give such an agency authority to make judgements concerning compliance. We see the latter as an essential part of an effective CWC. So is a requirement that signatories enact national legislation ensuring compliance with the terms and the intent of the treaty. We take this position because the Biological Weapons Convention says little about verification and the modest step it took on national legislation is so weak that Canada and other nations have ignored it. We need the CWC to be truly effective in eliminating chemical weapons. "The system that is eventually adopted for the CWC will have further significance in that it will likely become a model for future multilateral treaties" and therefore we in Science for Peace are concerned that it be carefully done.

2. Scientists in Defence Research

The federal government funds six defence research establishments located in Dartmouth, Valcartier, Downsview, Suffield, Victoria, and in the National Capital Region. In 1987 these labs employed some 1800 staff at a cost of $121 million. The range of defence-related research is broad: from armaments, explosives, surveillance, and the human-machine interface, to microbiological warfare, anti-submarine detection, and fluid dynamics. Science for Peace does not condemn all research conducted at these labs out-of-hand. We do, however, urge the federal government to convert the defence labs to civilian research centres.

In their impact on Canadian science two aspects of Canada’s defence laboratories concern us most:
their secretiveness is contrary to the principles of scientific research, and they deplete the resources available for more accountable civilian research.

Accordingly Science for Peace calls for the conversion of the defence labs from military to civilian research. The mandate of these restructured labs should be to further the goals of common global security through research in areas such as arms control treaty verification technology and to further Canada's security within this broader context. The results obtained in these labs should be published in the open scientific literature, so that peers can carry out the analysis and criticism essential to any sound scientific activity.

3. Human Rights and the Environment

Canada claims to be a western liberal democracy that defends human rights. Yet Canada is denying these rights to the Innu, sacrificing this First Nation by imposing -- despite repeated Innu protests -- NATO fighter-bomber training on Nitassinan, the territory in Labrador/Quebec where the Innu have lived for 9,000 years and which they have never ceded.

We are deeply ashamed of Canada's participation in the practice of oppressing minority peoples. We find it incredible that in the thousand-page Environmental Impact Statement released by DND a year ago the Innu are mentioned only eleven times. Such is the denial by the DND of the very existence of indigenous people with inherent rights. We once more call on the government to end all fighter-bomber training over Nitassinan, honour Innu land rights, settle their land claims, and let them determine the uses to which their own land is put. The principle of taking account of the will and rights of the community involved in any military endeavour should also be applied in the case of four other corridors for flight training, in British Columbia, Alberta, Northern Ontario, and New Brunswick.

Numerous military activities are unacceptable to us not only because they are destabilizing to world security and violate human rights, but because of associated environmental destruction and risks. Some examples are: low level flights, which disturb humans, fauna and flora and create acid rain precipitation in the corridors used for training; craters and unexploded materials; Agent Orange tests in the Maritimes; port visits of nuclear-armed ships; war exercises, which use non-renewable resources and increase carbon dioxide emissions and thus the 'greenhouse effect'; uranium mining for nuclear weapons production; and the generally lax environmental and safety standards applied by the military.

Science for Peace recommends that policy changes correcting such activities be made at once. Were Canada to pursue a course of common security as recommended in the document the above and similar activities would be precluded. This would serve Canada's interests and be an example to other countries.

II. Arms Production and Trade

We are alarmed at the growing Canadian involvement in nuclear systems: 28 nuclear or nuclear-capable weapon systems are being built with Canadian components (e.g. the MX missile, Trident submarines, helicopters carrying nuclear depth charges). Nuclear weapons are a threat to global security. Few people know about the extent of Canada's commitment to the nuclear arms race.

Canada has ignored the UNSSOD II recommendation that each member state carry out a national conversion study on converting from military to civilian production without loss of jobs. We are opposed to the government's policy goals of expanding Canada's export-oriented and highly commercial military-industrial base and promoting arms exports as a purported engine of prosperity.

Present arrangements under the Defence Development and Production Sharing Arrangements (DDPSA) and the Defence Industry Productivity Program (DIPP) ensure the promotion of arms manufacture and sales for economic and commercial reasons. Under DDPSA, Canada purchases major equipment from the US, while DIPP involves subsidizing and encouraging military production. These policies are unsound from economic and defence points of view, ensuring dependence on US or Third World markets. Canada's close ties to the United States in these arrangements threaten Canada's autonomy by giving the US a direct lever to influence Canadian defence and foreign policy decisions.

These arrangements also lead to Canadian-made goods ending up, by either direct or indirect export, in countries known for human rights violations. By Amnesty International estimates, 60 percent of the 45 Third World countries obtaining Canadian military commodities in a recent period (1980-84) were cited on a regular basis for human rights violations. With US military expenditures on the decline, Canadian arms exports seem all too likely to increase. Our one percent share of this arms trade is usually discounted as insignificant. Science for Peace finds it reprehensible: in effect this share caused 200,000 of the 20 million deaths occurring in wars in the Third World since 1945, double the number of Canadians killed in 20th century wars.

The folly of spreading arms is manifest in the recent mid-East crisis. How ironical it is that Iraq received military helicopters and fixed-wing aircraft with Canadian engines -- a major component -- because Canada does not follow the rule of controlling the end-use of its military goods.
Science for Peace recommends the following guidelines for Canadian military production and spending:

- reversal of the present Government's policy to expand Canada’s military-industrial base; in the longer term, complete termination of military production for export.
- initiation of a national conversion study to prepare for conversion of the military industries not needed to supply the country's own, self-defined, legitimate defence needs
- in the meantime, full public disclosure of all military exports and an arms trade register, to increase public awareness of the dangers
- prohibition of nuclear-weapons-related production
- regaining control over Canadian military production arrangements by withdrawal from DDPSA
- elimination of DIPP and all government subsidies of military production for export
- use of funds formerly given to DIPP to assist in this industrial conversion.

III. Canada and the World

1. Canada's Role in Disarmament

To avert nuclear confrontation and work for the eventual elimination of nuclear weapons, Canada must use its skill in diplomacy and its technical competence in verification. We join the majority of Canadians in demanding that Canada push for a Comprehensive Test Ban Treaty (CTBT) and are disappointed that Canada did not support this position in the 1991 negotiations. The CTBT is by far the most effective means of stopping the 'vertical' proliferation of new weapons development. 'Horizontal' proliferation to new nations is inhibited at present by the Non-Proliferation Treaty (NPT). The NPT comes up for renewal in 1995, and it is unlikely to be continued by the non-nuclear nations unless the CTBT is in place by then, so achievement of the latter goal is now urgent. We think that Canada’s upgrading of the Yellowknife Seismic Array to detect underground nuclear explosions, and leadership in international committees on seismic verification are positive contributions to the establishment of arrangements to monitor such a test ban.

From its inception Science for Peace has emphasized the importance of getting rid of nuclear weapons. We agree with the position that all ground-based nuclear weapon systems should be removed from German soil and we applauded Mr. Clark's advocacy of this removal. Expert opinion in Science for Peace holds that risks of nuclear escalation and unintended nuclear war are inherent in NATO strategy as it still stands. Science for Peace has repeatedly called for an end to cruise missile testing on Canadian soil because it helps to create a destabilizing first-strike option for the US and is counter to the principle of non- provocative defence and common security.

We are convinced that now is the time for Canada to press for the greatest arms reduction measures possible. The Canadian-sponsored Open Skies initiative to secure a more open approach to verification was a laudable attempt. We regret that the US rejected the USSR proposal for equal sharing of information, equality of equipment, and UN involvement. However a parallel agreement to establish such a capability for the UN can be negotiated. As Walter Dorn, the UN representative of Science for Peace, notes, 'A UN [permanent and comprehensive] verification agency is the best means to develop an effective, treaty-specific, flexible and objective system of multilateral verification'. Such an agency, Science for Peace believes, would be a confidence-building contribution to progressive disarmament and a safer world.

2. The Arctic

The deployment of nuclear-armed cruise missiles on US and Soviet bombers and submarines operating in the Arctic and the continued interest in strategic missile defence and air defence systems are alarming. We note with dismay that Canada has participated in this militarization, instead of pressing for limits to it. To us, Canada’s announced participation in the Air Defence Initiative suggests that the government is open to allowing airborne strategic defence or interception forces on Canadian territory, a violation of our sovereignty and a threat to global security. Further, we find the deployment and production of cruise missiles intolerable, since these weapons are provocative and destabilizing. We encourage Canada to press for the reduction and ultimate ban of cruise missiles.

Canada must ensure that its territory is not used, and cannot be perceived to be used, to threaten any other nation. We strongly urge that Canada not permit its territory to be used for potentially provocative 'defence' systems such as the ground-based Excalibur X-ray laser Braduskill, or the interceptor rocket ERIS, or the forward basing of the Airborne Optical System. Canada’s geographical location means that it plays a key role in determining whether such systems are deployed and thus it has a significant disarmament opportunity. 'As a major Arctic power, Canada is in a strong position to give leadership in demilitarization and
in a fully co-operative approach to surveillance and verification.\textsuperscript{18}

We recommend effective surveillance of Arctic choke points by remote underwater and above-ground automatic sensing capabilities. We remain convinced there was and is no need for submarine patrol capabilities. Air and space surveillance above our Arctic can offer reassurance to us and the whole world. It is essential, however, that such activities not be seen as part of any nation's aggressive plans. For this reason it is important, in our opinion, for Canada to take sole responsibility for providing such surveillance, and to make its surveillance data freely available to all.

Since April 1988, Science for Peace, with other peace organizations, has urged the government to enter into negotiations with the USSR and other Arctic nations to stop and reverse Arctic militarization. In fact we propose that Canada pursue the establishment of a demilitarized zone in the Arctic. Canada should be collaborating with the rest of the interested northern peoples in protecting the fragile Arctic environment from military and other dangers. We have supported the call for a continuing conference on security in the Arctic. 'In association with others, Canada can develop the resources of the region, coordinate scientific research, protect the fragile northern environment, and bring into being a just and peaceful community.'\textsuperscript{18} To promote these goals, Canada should support the Finnish initiative for an international conference on protection of the Arctic environment. The recent recommendation of the House of Commons' External Affairs and International Trade Committee that parliament organize and host a circumpolar conference with the aim of creating a permanent Conference on Arctic Security and Cooperation thus seems timely. An important feature of security in the Arctic is an insistence on respect for International Law.

3. NATO

Given NATO's concentration on military confrontation and failure to fulfil its political and economic mandates, it cannot be the appropriate organization for the unifying tasks that lie ahead in Europe and the Soviet Union. Former External Affairs minister Joe Clark has acknowledged the limitation of NATO as a means of building peace and urged that the security issues of the new Europe should be addressed instead through other means. We note the importance of addressing these issues through a wider, non-military grouping such as the Conference on Security and Cooperation in Europe (CSCE).

The dismantling of alliance blocs has already begun with the disintegration of the Warsaw Treaty Organization. NATO should be dismantled as soon as possible. Canada should, in any case, give notice of its own intention to withdraw from NATO and remove our remaining troops from Europe, immediately. Withdrawal will contribute to creating a new political reality promoting progress in arms control negotiations. It would also free billions of dollars for more constructive ends.

4. NORAD

As currently structured, NORAD is increasingly integrated into nuclear weapons control and maintenance systems that serve US nuclear war-fighting strategies. Membership in NORAD entails abdication of our sovereignty: militarization of Canadian airspace without federal government approval. As George Ignatieff pointed out, the 'secret bilateral agreements under NORAD... in the event of an emergency would enable the USA to declare alerts for North America and deploy nuclear weapons into and over Canada, as well as into Canadian waters.'\textsuperscript{19} Canada should not renew its membership.

Instead we should establish the means for monitoring our own territory to provide reassurance to all nations that Canadian territory is not being used to mount an attack on or threaten any other nation.

What is needed is effective surveillance (e.g. through long-range reconnaissance planes and helicopters), and early warning capabilities to identify threats, which can reduce any incentives to attack. What is not needed, and is provocative, is combat preparedness. For these reasons, we oppose Canadian participation in the Air Defense Initiative, which is designed as an accompaniment to the Strategic Defense Initiative.

Epilogue

In a world heavily militarized and threatened with omnicide, we must realize that things cannot go on as they did for ages. With the end of the Cold War, the abolition of the institution of war can and must be put on the political agenda worldwide if we and other species are to survive and prosper in diversity and unity. In a book soon to be published by Science for Peace, Canada and the World, Anatol and Anthony Rapoport write:

Institutions imbedded in a society are systems often endowed with impressive viability potential, which enables them not only to withstand encroachments on their existence but also to resist attempts to change their character. Military establishments have acquired this immunity to a considerable degree. The threat of a cataclysmic end of civilization stems from this acquired autonomy and immunity.\textsuperscript{10}

The recommendations made by Science for Peace in the present paper – to restructure Canada’s
security policies so that they would rely on the principles of autonomy and common security — represent major steps towards realizing the eventual abolition of the institution of war.

References

1. University College Lectures in Peace Studies (UCLIPS), October, 1989, Toronto
5. Ernie Regehr, Arms Canada: the deadly business of military exports, (Toronto: Lorimer, 1987), xii

The above document was presented at a Citizens’ Inquiry into Peace and Security in Ottawa on October 31, by David Parnas, President, Science for Peace.

Notices

National Economic Conversion Network Formed

On Saturday, September 21, about one hundred people assembled in Ottawa at a conference organized by the Coalition to Oppose the Arms Trade (COAT). They heard a series of 15 experts address the timely issue of converting military factories and bases to socially useful and environmentally safe civilian production. Then on Sunday, forty activists from 5 provinces representing a total of two dozen peace groups, including several national peace coalitions, hammered out a campaign strategy to encourage the vitally important process of economic conversion.

Realizing that, for practical reasons, conversion strategies must be carried out on a base-by-base and company-by-company basis, efforts will be made in communities across Canada to form local conversion committees. These committees, to be composed of labour and community representatives, will carry out practical research into the most viable alternative uses for local military companies and bases. The importance of working with local labour representatives was recognized by all as a crucial requirement for the success of the campaign.

The address for further information is: Coalition to Oppose the Arms Trade, 489 Metcalfe St., Ottawa, K1S 3N7, (613) 231-3076.

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Science for Peace Members are warmly invited to participate in this 3-day Conference, hosted by CPREA which over the years has had close association with our organization.

The Theme of the Conference will be: "Free Markets and World Order: Conflict or Convergence" but papers will be entertained on any topic in Peace Research.

Send Abstracts (maximum one typed page): Barry Myers, Program Chairman CPREA, c/o Department of Economics, Algonquin College, Nepean K2G 1V8.
Tel: 613-727-7671, FAX: 613-727-7684.

Science for Peace Bulletin

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The editor welcomes letters on all science and peace matters for possible publication in future numbers of the Bulletin. When submitting manuscripts by computer diskette, it would help if the word processor produced the text as simple ASCII text (e.g., the Dos Text option in Word Perfect) without device-specific formatting control characters.

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