EDITORIAL MATTERS

Troop Cuts and Open Skies

The ‘bonus’ at the recent ‘Open Skies’ conference in Ottawa was an unexpected agreement on troop cuts in Europe by the USA and USSR representatives. The cuts are of a magnitude to seem exciting, but a partial withdrawal is not a withdrawal. And it can only really be evaluated against what the USA perceives as the minimal force it needs to service and operate its weapon systems effectively and its current view of the present strength and threat of the USSR. However, signs can be portents and this step by the superpowers should be regarded as encouraging.

An Open Skies agreement – for some form of which the way now seems clear – is something to be celebrated unreservedly. It was an idea whose time seemed to have come way back in the Eisenhower years, but was destroyed by political events and forces. Since those days, the notion of national airspace being directly linked to national sovereignty has become so ingrained globally that it will be truly progressive if we actually see ‘a treaty that will allow members of one military alliance to fly over countries belonging to the other, under prearranged conditions.’ (Olivia Ward, ‘Deal Reached on Troop Cuts in Europe,’ Toronto Star, February 14). After years of satellite surveillance of each other’s territories –

All countries agreed that minimal restrictions to flights should apply, and that there should be a quota system that will allow smaller members of each alliance to have ‘equitable’ participation.

They agreed that the sensors gathering data from overflights will be able to operate in all weather, night or day.

And they left the door open to a Soviet proposal that negotiated naval and space surveillance of each other’s territory could follow.

The East Bloc countries also urged that all planes should be equipped with standard equipment, the data obtained should be processed by a multinational group, all Open Skies countries must have equal access to data, and that there should be a dispute-settling mechanism.

However, as news of the first round of actual negotiations comes to hand (Olivia Ward, ‘Superpowers Far Apart on Open Skies Treaty,’ Toronto Star, February 28) there appear to be many obstacles to overcome. Listed among the problems are –

- Flights over its nuclear and chemical plants and large population centres objected to by USSR
- The USSR wants to choose the type of plane to overfly its territory; the USA wants free choice of aircraft
- The USSR wants a limit of 34 overflights a year, NATO wants considerably more
- The USSR wants to share all data; the USA resists this
- The USSR wants overflights of ‘third countries’ that might be host to superpower military bases. The US insists …only …the 23 European and North American countries (are) included in the agreement.’

Let us hope something worthwhile will emerge and be coupled with presently emerging weapons site inspections on each other’s territories; then it can be said that the world is actually entering a time of better prospects for eventual disarmament than at any in recent world history.

The Budget, Canada’s Military-Industrial Complex, Overseas Aid

The immense rush of change in Eastern Europe and the USSR has dwarfed to insignificance most other international events of recent months. Everyone knows, at the level of daily news reports, what has happened – continues to happen. But what really interests those concerned with world disarmament and peace remains an enigma – I mean the significance of all these incredible events for prospects of a peaceful global future.

This issue includes –
Test Ban ........................................ 2
Quotes and Notes .................................. 5
Science for Good or Ill .......................... 6
From the Media – notes and matters arising .... 10
Technology for Peace ............................ 20
A Pleasing Announcement ....................... 24
Education and the Media ......................... 25
National ‘Peace from Science’ Award .......... 25
Book Reviews ................................... 26
Whatever the Canadian government’s perception of these tumultuous times, there seems as yet no clear commitment to a large-scale reduction of Canadian forces and their armaments. Certainly there have been some signs in recent years that the government might be contemplating change: the decision not to buy nuclear submarines indicated no great urge to expand. Now this has been echoed by the February decision not to proceed with the super ice-breaker. But otherwise, military spending, though down by $658 million from what had been projected for the next two years, has not been drastically cut, as many in the military and the arms industry had feared. The Government message is ‘steady as she goes’!

This, as military leaders already proclaimed, is some relief to them, and will, at least for now, postpone the necessity (which some had predicted might be unavoidable) of bringing home 7,000 Canadian Troops from Europe. From the peacekeepers’ point of view this sustained funding for Canadian forces is a problem exacerbated by the substantial withdrawal, under the new Federal budget, of support from universities and colleges. This sustained funding will delay any process of massive reduction in our military, with their consequent transfer into other professions or transformation into a national service to handle man-made or natural disasters, fisheries policing, smuggling, sabotage and terrorism, and to contribute to international peacekeeping with NATO forces. The further point is, that for these many new jobs, roles and responsibilities much re-education at post-secondary levels will be a vital need, and we had better have the means for this re-education if we do not want to lose people to better opportunities in other countries.

The new budget raises other, connected problems. Thus, it could logically be supposed that if troops were reduced, arms industry output would also fall. But the budget support for The Defence Industry Productivity Program and Canada’s contribution to the space program will, in fact, continue to rise by 5 percent.

One thing looks clear: the substantial Federal reduction of support for post-secondary education and for science and technology ($40 million less, mostly for the Strategic Technology Development Program, technology opportunity programs, and promotion of microelectronics development, according to the Globe and Mail, February 21, 1990), indicate that the Government is certainly not yet ready to absorb either military personnel or arms technologists into the non-military workforce. If they were seriously thinking of doing so, they would surely have the intelligence not to allow the post-secondary education systems, and the science and technology development, of Canada to slip still further into the doldrums.

Another thing that remains disturbing is the evident inability of either the Prime Minister, or the Minister of External Affairs, to match US President Bush’s expressions of approval or encouragement to President Gorbachev, or to offer ‘emergent states such as the new Poland more than paltry economic aid. It must be hoped that, behind the facade of non-rhetoric, there is some sort of appreciation of what is going on.

Indeed, those opposed to war realise that, in the end, peace will only be assured by greater economic equality between nations. An imperative in hastening progress towards peace must be substantially increased foreign aid by wealthy countries, such as Canada. External Affairs Minister, Joe Clark, has been modestly successful in ‘holding the line’ against reductions in foreign aid. But far more should be expected of this country, given its wealth and its international reputation as a society of global goodwill.

Alan H. Weatherley

A Total Nuclear Test Ban is the Best Way to Strengthen the NPT

by William Epstein

Five years of persistent efforts by the non-nuclear states to get international negotiations going for a total nuclear test ban now appear to have succeeded.

For more than a quarter of a century, with only a brief exception from 1977 to 1980, the three nuclear parties (the United States, Great Britain and the Soviet Union) who negotiated the 1963 Partial Test Ban Treaty (PTBT) and exploited its loophole permitting underground nuclear tests, refused or were unable to agree to undertake negotiations for a comprehensive test ban (CTB). Finally, the two superpowers agreed in 1987 to begin negotiations on a step-by-step approach to limit nuclear testing, but this approach would not even address a CTB until well into the next century.

The first step was to revise the unratified 1974 Threshold Test Ban Treaty (which permitted nuclear tests up to an excessive limit or 150 kilotons – more than 10 times the size of the Hiroshima bomb). After they reached agreement on much more intensive inspection and verification, the US would submit the treaty to the US Senate for ratification. Thereafter, the two parties would negotiate further limitations leading to the ultimate objective of a complete cessation of nuclear tests as part of the process of eliminating all nuclear weapons. American
officials freely admitted that this agreement was intended to remove the pressure in Congress and from the public for an early total test ban.

But late last month, the US reneged on even this slow motion step-by-step approach. On January 23, 1990, the State Department announced that, after the signature of the revised threshold test ban treaty at the Summit Conference in June 1990, they would not continue the negotiations for additional limitations on testing. As the Washington Post reported on January 24, 'The Bush administration has broken a longstanding US pledge to begin immediate negotiations with the Soviet Union aimed at further constraining underground tests.' The Washington Post also reported that US officials acknowledged that this move could anger both Moscow and the US Congress. The move, however, had been pressed for by the Pentagon who wanted to repudiate the pledge for further negotiations.

Frustrated by the endless arguments put forward by one or another of the nuclear powers as to why it was not possible even to begin negotiations for a CTB, the Non-Aligned countries finally (on August 5, 1988, the 25th anniversary of the PTBT) took advantage of a procedure set out in the Partial Test Ban Treaty and called for a conference to amend it and to convert it into a CTB treaty. They were supported in this effort by the Soviet Union, but opposed by the United States and the United Kingdom.

The Non-Aligned states insist that unless all nuclear tests are stopped, as promised in both the PTBT and the 1968 Nuclear Non-Proliferation Treaty (NPT), there is no way to end the nuclear arms race. Nuclear testing fuels that ongoing race by permitting the development of more dangerous modernized weapons or new third generation nuclear weapons. The latter include x-ray lasers for strategic defences (Star Wars) and 'decapitation' warheads to destroy underground command, control, communications and intelligence centers. Despite the undertaking in the NPT to pursue negotiations for a 'cessation of the nuclear arms race at an early date' there are now more than seven times as many strategic nuclear weapons as there were in 1968. Even if the START negotiations achieve a 50% reduction, the two superpowers would retain more than 11,000 strategic weapons. The US and UK, however, insist that so long as they must rely on nuclear deterrence for their security, they must continue to test to develop new nuclear weapons. In addition, they say that if the amendment conference is held before the NPT Review conference (in August-September 1990), it would have an adverse effect on the review conference and could damage the NPT which comes up for renewal or extension in 1995. In this respect, the Non-Aligned Summit Conference in Belgrade in September 1989, declared that a CTB is 'absolutely essential for the preservation of the non-proliferation regime embodied in the NPT.'

The three nuclear parties to the PTBT had stated that they would fulfill their obligations as depositories to convene the amendment conference. However, they embarked on a series of manoeuvres that would undermine the conference. They announced, without prior consultation with the other 115 parties to the PTBT, that they would convene the conference for two weeks in Geneva in January 1991. The US and UK also said that all participants should pay for the costs of the conference equally, which is unheard of in UN practice.

After consultations by the parties with the depository governments failed to achieve agreement, 57 states submitted a resolution at the UN General Assembly last fall calling for a preparatory committee to meet in New York at the end of May 1990, followed by a one week session of the conference at the beginning of June, with a second two week session in January 1991, also in New York.

The costs were to be shared on the basis of the UN scale of assessments, which is the standard practice, in order to facilitate the largest possible participation at the lowest cost. This historic resolution was adopted by the General Assembly on 15 December 1989 by a vote of 127 in favour, 2 against (the US and UK) and 22 abstentions (including Canada and other Western and neutral countries). The Soviet Union, despite the fact that it is anxious to improve its relations with the United States, voted for the resolution; China and France which are not parties to the Treaty did not participate in the vote. The US said that it would participate in a preparatory organizational session in June 1990 but not in a substantive session of the amendment conference held before the NPT Review conference. It also maintains that, if a CTB is the price for the extension or renewal of the NPT in 1995, it would abandon the NPT. It seems obvious that the US feels that the NPT is vulnerable because of complaints by the non-nuclear parties that the nuclear powers have not lived up to their promises in both the 1963 PTBT and the 1968 NPT to end all nuclear tests for all time. But the manoeuvres of the depository governments, instead of helping to preserve the NPT, are more likely to hasten its demise.

Most observers believe that the US position is contrary to its interests and is untenable. If it were to show a willingness to cooperate fully with the amendment conference, it would almost certainly ensure that the NPT Review conference in 1990 would be successful and it would improve the chances of preserving the NPT when it comes up for renewal in 1995.

Moreover, with the ending of the Cold War, the
need to continue testing is increasingly anachronistic. By stopping tests, each of the superpowers could be largely freed from the fear that the other might develop new or modernized weapons that would give it strategic advantage.

Furthermore, by approving and ratifying a CTB amendment to the PTBT, the nuclear powers could prevent the proliferation of nuclear weapons to additional countries, the fear of which is one of the excuses for continued testing. If the amendment is ratified by a majority of the parties (60), including the three depository countries, it would become automatically binding on all the parties. That would mean that such near-nuclear states as Argentina, Brazil, India, Israel, Pakistan, and South Africa, all of which are parties to the PTBT but not the NPT and have adamantly resisted all pressures to adhere to it, would be barred from testing. That would certainly be the most expedient way to strengthen the NPT and the non-proliferation regime.

It would also therefore seem to be clear that, by its obstinate opposition to a test ban, and even to the start of negotiations for a CTB, the US is not only failing to live up to its treaty undertakings, but is acting contrary to its interests and professed desire to preserve and strengthen the NPT.

The failure of the nuclear powers to carry out their obligations under the PTBT and the NPT has also made it more difficult, and perhaps impossible, for them to gain agreements to restrain the proliferation of chemical weapons to other countries. Measures to prevent proliferation are inherently discriminatory and are viewed by the countries at whom they are aimed as unacceptable. These countries now insist on total prohibition of such weapons rather than trust promises for their eventual elimination. In addition, they are particularly wary about efforts to prevent the proliferation of ballistic missile technology because of experience with the NPT.

Some allies of the three nuclear powers, with Canada in the forefront, have supported the step-by-step approach to a CTB, beginning with a declining lower-yield threshold treaty and a declining annual number of tests, but the US and UK are not prepared to accept such limitations. Those countries wanting an early CTB also reject this approach on the grounds that it would delay a CTB for many years, and would take too long to foreclose the development of third generation nuclear weapons.

Most countries, including some Western allies, show little or no enthusiasm for the prospect of early ratification of the 1974 Threshold Test Ban Treaty and the 1976 Peaceful Nuclear Explosion Treaty. They regard the threshold level of 150 kiltons as much too high to have any military significance. The non-aligned countries regard these treaties as tending to legitimize continued testing. A number of countries think that it would be better to negotiate the CTB in the Geneva Conference on Disarmament, although the US and UK have strongly opposed any such negotiations for years. Even if they should now agree, however, this would mean that, since that Conference operates only on the basis of consensus, any one of the forty members could bring the negotiations to an end. This could not happen in the amendment conference.

Some nuclear powers and their allies appear to believe that the NPT can be preserved without a CTB and argue that it is better to 'save' the NPT even if the CTB must be 'sacrificed'. They do not, however, have any new proposals for strengthening the NPT. On the other hand, a number of non-nuclear states that support both the CTB and the NPT believe that, without a CTB, the NPT cannot survive, and predict that by 1995 we shall have both a CTB and a NPT, or neither.

The amendment conference appears to be the only innovative approach that could lead to strengthening of the NPT by providing a singular opportunity to help achieve a CTB, the long-standing aim of the overwhelming majority of the world community. It therefore seems to be the best way, and perhaps the only feasible way, of strengthening the non-proliferation regime.

Now that the amendment conference is to become a reality, a concerted effort by the public and the US Congress might persuade the Administration to reverse its negative and self-defeating policy and adopt a more constructive and positive attitude toward both the conference and a CTB. If recent events in world affairs have demonstrated anything, it is that rising expectations and 'people power' can lead to unexpected and dramatic change.

Where does this leave Canada, a leading supporter of the step-by-step approach, who prides itself on being a most loyal ally of the US?

Canada has historically been a strong supporter of both a comprehensive test ban and of nuclear non-proliferation. But in recent years, Canada appears to have been 'taken in' by the US and has supported American manoeuvres to undermine the test-ban amendment conference in the mistaken belief that this would help to 'save' the NPT. Nevertheless, the Canadian Government did announce that, now that the amendment conference is going to take place, it would 'participate constructively'.

Since the US has now announced this latest breach of promise, and the step-by-step approach has fallen flat on its face, surely the time has come for Canada to announce its full support for an early total test ban and thus help to strengthen the non-proliferation treaty and regime. The best way to do this is to join the vast majority of the world community in backing the test-ban amendment conference.
That conference is the only diplomatic and political game that remains that can achieve progress towards a total test ban. If Canada does do so, and tries to persuade its NATO allies to join with it, then there is hope that in 1995 we shall have both a CTB and a renewed NPT.

William Epstein is a Senior Fellow at the United Nations Institute for Training and Research. He represented the Secretary-General at the negotiations that led to the 1963 Partial Test Ban Treaty, the 1967 Treaty of Tlatelolco and the 1968 Nuclear Non-Proliferation Treaty. The above text was the outline for a talk delivered to The Canadian Physicians for the Prevention of Nuclear War, on Feb. 3 at University College, University of Toronto.

Quotes and Notes

From The Defense Monitor, Vol XVII, No. 2, 1989, the following summarises a long article entitled 'The Global Network of United States Military Bases':

- The United States maintains 500,000 military men and women plus 450,000 civilian employees and dependents at 375 major bases and hundreds of minor installations in 35 foreign countries.

- US forces stationed abroad in peacetime plus those stationed at home but intended to fight in foreign countries account for about 70 percent of US military spending (over $200 Billion annually).

- US forces actually stationed in foreign countries in peacetime account for nearly one third of US military spending ($90 Billion a year).

- In recent years the US has increased its use of foreign bases, particularly in the Third World.

- The US has nearly 4,500 nuclear weapons deployed with its forces in foreign countries.

The article concludes that –

- The need for foreign bases to fight a nuclear war has been eliminated by the advent of intercontinental-range missiles and bombers.

- Many US bases are located in Japan, Korea, West Germany, and other countries which are capable of providing for their own defense.

- Host country opposition to the presence of US military bases is growing.

- The President as Commander-in-Chief has the authority to begin an overseas base closure which could eliminate all foreign US bases by the year 2000.


Andrei Sakharov lived a life that could only have been lived in the Soviet Union, a country with a cruel history but also with a small but defined place for the liberal humanist tradition. His science made him useful, his humanism and his suffering made him wise and together the two currents gave him an awesome reach within his society ... His gentleness of personal manner gave him a saint's aspect ... apparent not only in his luminous public pronouncements but also in his obsession with obtaining the relief and liberty of other prisoners of conscience.

He had a humbling capacity to speak to the anxieties of men and women everywhere and to care for state-menaced individuals one at a time.

From the Manchester Guardian Weekly, December 31:

As we entered the Eighties, Leonid Brezhnev was glorified in Russia and Andrei Sakharov was villified. Ten years on it is Sakharov who is glorified and Brezhnev who is villified.


... the United States (doesn't) have to agree (with) or even respect governments in order to do business with them - a position adopted by most presidents, with the notable exception of the great moralist, Woodrow Wilson. To the United States, the sovereign de facto was the sovereign de jure.

This is not the same, however, as articulating a body of denunciation for a bloody undemocratic regime, imposing sanctions on it and then swiftly reversing the position for no apparent good reason. That's what happened with China.

By its actions, the United States stands as a hypocrite espousing a double standard. Unless a better official explanation is forthcoming, the Bush administration richly deserves condemnation.

Quite so, and what about General Noriega who was a sovereign de facto and a past paid ally of the CIA? Does his removal, following invasion of Panama indicate a double double standard?

Indeed, on the topic of Noriega and the US invasion of Panama, in an article entitled 'Washington
still deluded that it can impose democracy’ (Manchester Guardian Weekly, January 7), we read —

... when something is happening in a country within your sphere of influence ... let it happen. Even if that something is evil and bloody — Romania until the Christmas revolution — the (new Gorbachev) doctrine holds. And yet America, in its own backyard, has absorbed none of the lessons. It still fails, bizarrely, to understand the nature of democracy. It is not some imported ideology to be imposed on a country. It must (see Czechoslovakia, see Hungary, see Romania) spring from within. It must, in the end, be what the people of Panama want and will themselves defend. It cannot be dumped on a country overnight by the US Army.

And, by Ian Aitken (‘One fine mess after another’, also from the same number of the Guardian) —

The perpetually astonishing thing about the foreign policy of successive United States Presidents is not so much that they lurch into blatant adventurism with such appalling regularity as that there is so little protest about it from American public opinion. Far from objecting, an overwhelming majority invariably supports whatever version of Ramboism is currently being deployed.

From the editorial (‘The Specter Haunting Europe is Still Communism’, Washington Post, January):

Given the weakness and fragmentation of the other parties now taking the political stage, the communists have an opportunity, if not necessarily to hold power, then to make themselves part of the new firmament ...

Unthinkable? ... To the extent that they play by democratic rules they can scarcely be kept off the playing field. The best check on their errancy is that the people of East Europe know who they are.


‘Social democracy, unlike capitalism, offers an alternative to Communism,’ Orwell wrote in 1948, ‘and if somewhere or other it can be made to work on a big scale — if it turns out that after all it is possible to introduce Socialism without secret police forces, mass deportation and so forth — then the excuse for dictatorship vanishes.’ Communism, Orwell wrote, would ultimately be upended by a reformist system that would provide ‘economic security without concentration camps.’ That is exactly what the countries of central and eastern Europe are searching for now.

From Disarmament Times, December 1989:

A new resolution on Education for Peace was passed by the UN General Assembly in December, 1989. The resolution invites governments and non-governmental organizations to submit reports to the Secretary-General on the question and for the S.C. to ‘prepare a report on the current state of education for disarmament.’

Science for Good or Ill

by Chandler Davis

Material extracted from the text of a talk given at Cleveland State University, November 1989

Those of us who raise the question of social responsibility of science are in an uncomfortable position. It’s considered quite bad form in our society to blow the whistle on any activity for which money can be paid. Nevertheless some of us feel even more uncomfortable at the thought that the scientific work which is central to our lives may sometimes do more harm than good.

One kind of objection we encounter is: ‘What are you, anti-science? anti-progress? Science is knowledge, knowledge is power. How could you be against knowing more?’

Another kind of objection is: ‘You can’t reverse progress. It might have been better not to discover nuclear fission, but you can’t undiscover it.’

A third objection takes the form: ‘There’s no such thing as responsibility in scientific research, because when you do the research you can’t foresee what its uses may be.’

Then there is the sort that goes: ‘You have no right to censor science anyway. What are we scientists? Just the employees who do the work. Decisions on what to do with the results of scientific work are made by society at large; it would be arrogance for us to claim exclusive rights to them just because we have this special role of generating the ideas.’

Finally, though not often stated openly, there is this — which may be the most important of all: ‘Those of you who don’t think you can conscientiously do scientific work certainly have a right to freedom of conscience. No need to mount campaigns, just vote with your feet. You can just change your field of science, or even change to non-technical employment.’

Indeed, in response to this last type of objection, many of my colleagues and students have switched from one ‘normal’ position to another to reduce their involvement with destructive technology or increase
the constructive utility of their work. And yet I wouldn't accept the notion that responsibility in science should mean only appeals to individuals to opt out. That would be an artificial limitation.

As an alternative approach (see also the Bulletin of November 1989), an organization called the Committee for Responsible Genetics, led by the MIT biologist Jonathan King among others, has been circulating this statement internationally:

We, the undersigned biologists and chemists, oppose the use of our research for military purposes. Rapid advances in biotechnology have catalyzed a growing interest by the military in many countries in chemical and biological weapons and in the possible development of new and novel chemical and biological warfare agents. We are concerned that this may lead to another arms race. We believe that biomedical research should support rather than threaten life. Therefore, WE PLEDGE not to engage knowingly in research and teaching that will further the development of chemical and biological warfare agents.

Bearing in mind the Hippocratic Oath traditionally taken by medical doctors, we might put such statements in broader terms. If physicians state their obligation to use their specialty only for the good of humanity, why not other professions?

Here's a simpler one, offered as a graduation pledge originally at Humboldt State in California in 1987, and subscribed to since then by large contingents at graduations there and at many other universities.

I, ............., pledge to thoroughly investigate and take into account the social and environmental consequences of any job opportunity I consider.

What is really meant by such pledges? Certainly, it may not be enough for those who feel that way to move to a different job. The reason we raise the issue in scientific societies, many members of which may already be doing clearly constructive work, and in graduating classes of students, and in general audiences, is that science and technology are social products. The technology of Zyklon-B for the Nazis' gas chambers, or of binary nerve gas for today's weapons, is a product of scientific lore built up by an intellectual community. The social responsibility of the biological scientist is not merely to get somebody else's name than one's own attached to the job! Just as the Hippocratic Oath should make each doctor repudiate Nazi-style experimentation on human subjects by all doctors, biological responsibility should mean that each biologist refrains from misuse of the science and gets others to refrain too. Responsibility should be applied collectively.

Unrealistic — sure. The level of mutuality I'm imagining here is unattainable now. The vision is of a process of deepening a community code of ethics over many stages. As the need is felt more widely, it can happen. Right now we see medical ethics being reworked, with great attention from thousands of specialists. Scientific and engineering ethics can be developed the same way: publicly, and world-wide. Only it is lagging way behind.

To this point, I've been speaking as if it were typically easy to see the difference between healthy and noxious science. As if the only thing lacking were good will and honesty. No, the big problems are really problematic. Answers aren't clear. And even when hard work makes them clear, there may still be battles to get the ethical thing done.

Sometimes those of us who are sounding wake-up calls, following the examples of Rachel Carson, give the impression that once we all wake up the way will be plain. We do that by emphasizing a glaring incongruity, focusing on it so everyone will see it is serious, at the cost of making it simple — whereas really its complexity is part of what makes it so serious.

One way to bring order into a confusingly complex problem is 'cost-benefit analysis.' Analysts try to weigh the power to be drawn from the Aswan High Dam or the proposed Sardar Sarovar Dam against the damage caused by flooding of farmland upstream, loss of sitting downstream, and destruction of river and sea ecosystems. In the case of British Columbia, they weigh the value of the aluminum smelted with the hydroelectric power against the value of the salmon fisheries destroyed. Dollar values on each item, and add up the balance. More ambitiously, one may calculate the dollar cost of revising power generation methods world-wide so as to restore the carbon dioxide balance (the total cost is in the trillions). Such computations have great potential, but keep in mind their limitations.

First, they are no more precise than the inputs, and it's very hard to know some of the numbers going in. I've never done such a labor of marshalling quantitative data to be synthesized, and I respect the audacity of those who do; my skepticism is not ungenerous to them, I hope; but every user of such analyses can see that skepticism is a necessary part of using them sensibly.

Second, I sometimes insist on asking, whose dollars. The aluminum company owns its refinery and makes a profit. If the analysis shows that the costs outweigh the benefits, does that mean the company owes the salmon-fishing coastal Indians damages for the fish they don't have any more? If not, why not? If so, then the refinery was a bad investment — or the aluminum was underpriced. (There's a can of worms! If the economic realities are differ-
ent from what the market saw at the time, then the dollar figures have to be revised throughout.) Similarly, we hear talk of whether ‘industry’ can ‘afford’ eliminating chlorofluorocarbons. Come now! If the physics of the ozone hole is as now believed, then cost-benefit analysis will show on the contrary that ‘industry’ – that is, the owners of Hoechst and the other producers of CFCs – can’t afford to produce another gram of them. Just let all the billions of people who will lose if the ozone depletion is allowed to continue claim damages, and the alleged profitability of freon refrigerant is sharply reversed. I’d better make it clear I’m not offering such a lawsuit as a practical course. The suit brought by victims of the Bhopal gas leak showed that the courts are not likely to be the agency of correcting this kind of abuse. I just say that the dollars can be added up with a view to exposing it as an abuse. If a corporation appropriated my land to build its factory, this would be recognized as theft in our culture, and its profits would not be sacred but could be attached to repay me for my property. If the corporation takes away a people’s livelihood or its air, this should be recognized as a crime in a new higher concept of economic justice.

Try applying these elementary notions to all instances of toxic wastes. Mines, chemical firms, and nuclear plants operate at a profit and pay dividends, without accounting for the great lakes of poison they spread around them. The wastes are costs of the original production, but they aren’t charged to those who profited while failing to account them as costs. Instead, when citizens demand they be cleaned up, government taxes the citizens to pay for a clean-up operation – on which the original polluter makes a profit.

A third reservation about the cost-benefit analysis is that some things don’t have dollar values. You may have seen the claim by René Dumont to have calculated that the present excess of greenhouse gases from modern industrial practices is causing deaths in the tropics, via drought caused by climatic change, at the rate of a million deaths a year. Now he would not claim much precision in his conclusion, and the chain of inference leading to it is rather long, involving subtle and recent atmospheric physics. His attempted calculation is not absurd, however, and its relevance is evident. My point is just that he was right to present his conclusion as he did, and not as a cost-benefit analysis. If the reason for deeming our energy usage destructive is measured in human lives, then by all means let us speak not just of dollars but of human lives.

So often we see scenarios of the same form: A way of life is built around some economic activity, and then unsuspected damage comes to light. Why are we so often caught unawares? If you have the impression there’s a pattern here, I think you’re right. Greed and opportunism, to be sure. The successful exploiter of resources can defend himself by the riches and the influence got from the very exploitation, to be sure. There’s another common thread in many of these cases: complexity. The science of the initial technology is less complex than the counting of its consequences.

The computation of yield from an ore, or of energy required to raise it and smelt it, is an easier kind of computation than the prediction of the ecological effect of the tailings fifty years later. The interaction of a hundred species at the edge of the desert may determine whether the desert advances into fertile land. Each species can be studied by ‘clean’ science, but study of their interaction is a ‘messy’ science, ecology. Messy sciences like geochemistry and sociology tended to be shoved aside in the first centuries of the scientific revolution, precedence was given to clean sciences because they worked. These days, messy sciences are much studied, and seeing this, you may get the impression that great advances are being made.

Now it is true that some big models of complex systems are being run on very fast computers. Some of them even work pretty well; for example, predicting the weather a week ahead is a fairly messy problem which seemed thirty years ago to be intractable but is now fairly successfully handled. Don’t confuse this sort of success with understanding. All messy sciences today are poorly understood, some of them much more poorly than meteorology. It’s good that some serious and resourceful people like working on them, because they are so important. But if those people are honest, they can hack it in these areas of study only by having great talent for getting satisfaction out of partial results. ‘For small blessings give thanks’ might be the motto of the worker in messy sciences. You probably remember that the very valuable projections of nuclear winter, which were rightly taken into account by policy makers (both the powerful and us ordinary citizens), left out of account most of the known complexities of atmospheric circulation. To say nothing of unknown mechanisms.

Ecology, however, will be a messy science for some time to come. Yet I confess to a bit of unprovable optimism. We may not always be as helpless before messy situations as we are now. Looking at the past fuels my optimism. Three hundred years ago, Newtonian mechanics gave it the feeling that the future could be predicted, but only to the extent that the present was known. It seemed the universe would be understood only by grasping at well-detemined causes. Yet, probability, which came upon the scene at about the same time, allowed indetermined causes to be part of understanding too. By the 19th century, they explained
thermodynamics as neatly as anything in the deterministic realm, and statistical physics is going on to new triumphs today. In the same way, physics of matter first concentrated on pure crystals because they were neat enough that you could get somewhere with them, and gases because they were simple and (with the aid of probability) you could get somewhere with them; yet later, glasses and liquids also became manageable. I venture to hope that we will find new ways of thinking about today's messy models, as different from the deterministic way and the probabilistic way as they are from each other. Am I referring to ideas of holistic science now being developed by followers of Prigogine? I don't know; I'm ignorant on the subject; but I don't think so, I think what I'm hoping for is something not yet clearly in sight.

Here's one more weak point to watch for, as important as any of the others: uncertainty. Criticism of science and technology often hinges on risk. The critic declares the risk unacceptable, the defender insists that the critic is impeding progress. A spectacular instance was—and still is—the guidelines for containing genetically engineered organisms. I'm going to use a less prominent example.

The space probe Galileo was launched by a space shuttle. Aboard Galileo was a small plutonium pile. You may have seen the criticism of this plan by Karl Grossman and others. They pointed out that the shuttle launch isn't perfectly safe (as some astronauts like John Glenn knew even before the Challenger exploded). Although they are exceedingly small, very real risks do exist that, if Galileo's nuclear reactor had been shattered during launch it would spray into the atmosphere a quantity of plutonium sufficient to poison millions of people (see also 'The Galileo Mission,' p. 16, Science for Peace Bulletin, Vol. 9, No. 3, November 1989). The planetologists, almost all of them, stuck by the plan. The launch took place, and the space-ship Galileo went safely on its way; but the issue is still current because more research space vessels with reactor power are planned, and because of Galileo's planned route to Jupiter. It's not going outward all the way. It's going step-by-step, picking up a little additional energy in each of a sequence of near encounters with planets. Do you know this trick? It wasn't in my mathematical astronomy course at university. A small object coming in at a planet may brush by either side, getting deflected—or, of course, it may come in between and crash on the planet. If it brushes by a large planet all alone in space, it will leave with as much energy as it came in with, only its direction will change. On the other hand, in the complicated system of planet and sun, a fly-by can send the small object off with a little more energy. Galileo is to get such boosts at each of its stepping-stones; and two of these boosts are from this planet, Earth. That's right. This little nuclear ship that Karl Grossman was trying to get us to worry about will come heading just about straight at us (remember these fly-bys have to be pretty near misses if the helpful change in orbit is to take place). Suppose there were a miscalculation? Some miscalculations will just put it onto a course which will spoil its mission, but some miscalculations will make it become a meteorite. Actually the issue is not primarily miscalculation but loss of control. The steering can't be corrected if communications with space scientists on Earth is lost, and we know that can happen because it did happen with the Soviet mission to Phobos this year.

I was saying this to some friends and they thought I was arguing against the Galileo mission. Not necessarily. The risk of Galileo crashing into Earth is tiny indeed; and maybe the next nuclear-powered space ship will be a little safer and be launched by a safer booster. I'm advancing this example merely as an instance of difficult risk evaluation.

Some important scientific experiments—interplanetary probes, genetic engineering—entail small risks of significant damage. How much do we have to want to know something in order to take such risks?

We really do need an analysis of the risks. Even when they're small. The basic decision to give Galileo reactor power was made by the US military, which wants reactors in space because it wants reactors in space. The US military let Ronald Reagan lie on its behalf about what its satellites were going to do up there, it wouldn't be above lying about this. I certainly don't entrust my risk analysis to these people, who have been playing their game of Mutual Assured Destruction for almost forty years and would be playing it still if they hadn't found ways to put the survival of the world at even greater risk from their weapons. Safe enough for the generals does not mean safe enough for responsible people.

But suppose we do get together a trustworthy team to do a serious risk analysis, say with the participation of the Natural Resources Defense Council. What should it consist of? A probability computation? But probability theory is regarded as applicable to situations where many repetitions of a random process are made or could be made. The only way decision theory is non-controversial is for the gains and the losses to be subject to addition and subtraction. Here we deal with small but unknown probabilities and unknown (perhaps large) penalties. We are in different conceptual territory, that of risk analysis, decision theory, and statistics with small non-random samples. This area is like the area of messy sciences: many people are working at it these days, its importance has received well deserved recognition, but I have to tell you that things
are not coming clear. Even an earth-bound example will do, it’s been with us for years: if your friendly nuclear power plant next door has a chance of 1 in a million of blowing up within a year causing hundreds of immediate casualties, plus fall-out, is that sufficient reason in itself for closing it down? 1 in a billion? If you have trouble answering such a question, this does not prove that mathematical education is floundering and you are a generation of innumerates. Nobody can answer such a question in a clear-cut way. I am not speaking against the study of decision theory, I am reporting that its present status is pretty primitive. Really, if anything I am speaking for studying it. Just don’t hold your breath waiting for definitive answers.

In short – I’m calling for fellow scientists to accept their responsibility for the future. I’m calling for those who aren’t scientists by job description to join in the effort. Science and technology are central to the problems I’ve been thinking about, but there’s no limitation on who can help solve them. I’m trying to communicate my feeling that seeking overall solutions – solutions that will stick – is even harder than the case-by-case solutions we usually think about.

We won’t make great improvements in a few years, perhaps. We may have to rely on theories and approaches not yet developed and on colleagues not yet born. That’s all right. The future has a right to a share of the action. But only some problems can be left for the future. Any species we allow to die off this decade will not regrow a decade later. The minimum we have to insist on is to leave the next generations a world they can live on. To give the future a chance.

From the Media – Notes and Matters Arising

The ‘Disarming’ of the United States

It may be a dream whose time will never come. But it is better to say ‘disarm’ than ‘arms control’ or ‘arms reduction’, if only because ‘control’ or ‘reduction’ tend to occur only when arms, or strategies for their use, are obsolete or obsolescent. Then, all their reduction will signify is the eventual deployment of newer and deadlier weapons systems. Anyway, it seems that all we can hope for from the USA for the foreseeable future is arms reduction, given that, for the moment, the US arms budget is supposed to run at a constant figure – though that figure is evidently going to be $180 billion less over the next 5 years than was formerly planned (Colin Norman, ‘Defense Research After the Cold War’, *Science*, Vol. 247, January 19).

Three recent articles provide useful information on the US military future. In the first of these, the report by Colin Norman referred to above, it is noted that

The issue, it seems, is not whether the Pentagon’s funding will shrink in the 1990’s, but by how much.

And,

...The Reagan administration rearranged the Federal R&D landscape, boosting defense R&D from $15 billion in 1980 to around $41 billion by 1989. By the end of the decade, military programs accounted for two thirds of the federal government’s R&D budget, up from half when Reagan came to power.

Norman goes on –

A growing number of defense experts are now expressing confidence that a pact to reduce conventional forces in Europe and a START Treaty limiting the number of US and Soviet strategic nuclear warheads will be completed soon, and that these should provide a framework for planning force structures in the 1990s.

Further –

The programs now being widely discussed as candidates for the operating table are mostly big weapons systems under development during the Reagan years, such as the B-2 ‘Stealth’ bomber, a mobile version of the MX missile, and the SSN-21 attack submarine.

Another prominent target is likely to be the Strategic Defense Initiative. SDI, in fact, has already begun to shrink, from $3.9 billion last year to $3.8 billion this year, and there seems to be a growing consensus that it will settle out around $3 billion a year in the early 1990s.

This is shrinkage? However –

Virtually every expert contacted ... expressed the view that, to hedge against a reversal of recent geopolitical trends the Pentagon’s budget for basic research and its support for critical technologies should be increased ...Lewis Branscomb, former chief scientist at IBM and now a professor at Harvard’s Kennedy School of Government (said): ‘You have to assume that there is some risk that the Cold War will reappear, or that in 20 years’ time, some future enemy will materialize and you will have to restore (defense) capability. If you don’t have the knowledge base to restore capability, you are in bad shape.’

The Pentagon, Norman goes on to explain, is now backing, through Defense Advanced Research Projects Agency (DARPA), various arms-related research/development projects to the tune of $100 million per year, and outside of DARPA will put
$175 million per year into the Defense Manufacturing Technology program ‘to stimulate the development of generic manufacturing technologies in a broad range of industries’. And it has a budget of $36 million to fund an incentives program designed to raise productivity in industries critical to defense. Norman concludes that –

The Pentagon’s rationale for funding these programs is that it is now relying more and more on commercially developed technologies in its weapons systems – in contrast to the situation in the 1950s and 1960s, when defense technologies were generally more advanced than those of the civilian side. The Defense Department therefore has a clear stake in keeping US industry at the technological cutting edge.

There is not much to be happy about in the foregoing, but it gives a feel for what those whose eventual goal is global disarmament may be up against.

George J. Church (‘How Much is Too Much?’, Time, February 12) has written an assessment of the savings that could be effected so that ‘the defense budget could be sliced by a third to a half … falling as low as $150 billion (in current dollars) by the year 2000 …’ Reductions could be made as follows: armed forces (halved, to one million); tanks, artillery pieces, etc; marine corps (from three divisions to two); most US forces stationed at home; Navy carrier fleet (reduced from 14 to 6); no new Trident submarine; SDI costs (reduced by one third); antisatellite weapons development (put on hold).

Church comments further on these and other proposals:

Military strategists complain that they have to shape plans for a decade in a situation that changes explosively from week to week. But that danger is no excuse for not beginning to draw up a strategic plan to guide the reductions that a budget crunch is forcing on the US no less than on the Soviet Union. Nor should it be allowed to obscure the happy prospects now beckoning Washington and Moscow alike.

An eloquent emphasis on the once-in-a-lifetime nature of the current circumstances was expressed last month by a career fighting man, General John Galvin, the American commander of NATO’s unified forces. ‘If you’re looking for the personification of the Cold War, here I am,’ he said. ‘I’m seeing now the possibility that we can bring all of this to a close. If we can get 35 nations to sign on the dotted line on something that is irreversible and verifiable, and bring down the levels of armaments to a mere fraction of what they are today, then we really have achieved something that’s worth all the sacrifices.’

It is not often that a General shows such passion about cutting the forces under his command. That is but one indication of the historic opportunity facing America’s political leadership. For once they should feel inspired to look ahead, not back at the last war.

There you have it. The article is hardly a disarmament manifesto, but it is representative of a change that seems finally beginning to penetrate the carapace of the world’s greatest military power, a change that could signify, perhaps under another Presidency, an eventual major shift in attitude. If the world is ever to disarm, that cannot happen without the eventual full participation of all the Superpowers. When people in the US – even those in the military itself – are prepared to consider seriously major reductions in arms and troop spending, it behoves those who have long been committed to such thinking to participate in whatever ways are open to them in helping to build the international confidence basic to really significant progress towards world peace and justice.

The third article is by Jack Beatty (‘A Post-Cold War Budget’, The Atlantic Monthly, February 1990). The thrust of Beatty’s thesis is to suggest how US militarists could drastically reduce arms spending and use the savings for peaceful projects. Thus, the money ($600 million per plane) for the Stealth bomber could be applied to medical insurance for the ‘30 million to 37 million Americans (who) fall into that category, and (the) approximately 15 million … denied medical care because they cannot pay for it.’ The costs of Trident II (submarine-based ballistic) missiles could be saved, and federal aid to education returned to its 1980 level. The Midgetman (mobile land-based) missile, if not built, could provide the funds ‘to help revitalize the Polish economy and give a fillip to Polish democracy. The Poles asked President Bush for $10 billion; he offered them $100 million. That pathetic response is a portent of America’s decline as a great power.’ The savings could also help cut cocaine production in Bolivia by 35–40 percent through financing of ‘a program of crop substitution and allied economic development.’ And the US ‘could end the Third World debt crisis.’ If SDI were not proceeded with, a new national Police Corps of 100,000 could be formed to combat US crime. With $20 billion saved from the $150 billion spent annually on NATO, America’s decaying infrastructure (well documented by Seymour Melman in ‘The Demilitarized Society’, Harvest House, 1988) could receive a first ‘down payment’ on its restoration.

With all these proposals, Beatty feels the necessity to reassure those whose doubts about global security remain unassuaged by recent changes. Thus:
The projected cost of Midgetman is a sobering $30 billion plus. This small mobile missile is supposed to remove from the minds of Soviet planners any idea of mounting a first strike. The question is, without the land-based mobile missile, are we vulnerable to such a first strike? Joshua Epstein, a defense analyst at the Brookings Institution, has calculated that even if the Soviets mounted a ‘perfect first strike’ – one that destroyed all the 1,000 land-based missiles we have deployed, all the bombers on all our bases around the world, and all the missile-shooting submarines in port – the 50 percent of our submarines that are always at sea and the 30 percent of our bombers that are always on alert could still unleash more than 4,000 warheads on the Soviet Union.

Having assumed the incredible in his worst-case thought experiment, Epstein goes on to posit the unimaginable. Suppose, he says, that the same Soviet air defense that could not stop a West German teenager from landing his Cessna in Red Square managed to mount a ‘perfect’ air defense, knocking out all our bombers and all the cruise missiles they fired. In the worst of worst-case scenarios, 2,800 warheads from our missile-carrying submarines at sea would still fall on the Soviet Union. Epstein has asked senators and congressmen to tell him why the certainty of 2,800 warheads falling on the motherland is not enough to deter the Soviets. ‘They can’t even name enough targets for the . . . warheads,’ he says, ‘yet they want to add more. We don’t need Midgetman to deter a Soviet attack. We don’t need it, period.’

These articles are very instructive because, overall, they illustrate that there are in the US as there have not been for 15 years, widespread concerns about America’s arms and troop futures and their financing – in the light of the incredible changes that are occurring in Europe. At the same time, none of these articles assumes that reductions, should they occur, will be rapid, and all of them find it necessary to indicate fears and counterarguments. For the peacemaker, they are valuable as examples of the thinking that is, perhaps, at last beginning to yield somewhat to the logic of global events and the fiscal results of an arms race, and they provide encouragement for those who see their role as clarifying and demystifying the causes of international tensions and disputes to keep trying.

**Agenda for Non-Proliferation**

This is the title of a leading editorial in *Nature*, Vol. 343, February 8, which begins by asking ‘What will recent events in Eastern Europe mean for the spread of nuclear weapons?’ (For) ‘There is a sense in which, on the issue of proliferation, events in the past few months have put the clock back 30 years.’ The editorial continues –

Then, many peaceful states, not to mention others more bellicose, seriously believed that nuclear weapons might be national necessities. Canada, Sweden and Switzerland, for example, encouraged by the examples of the Soviet Union and, more relevantly, of Britain and France, flirted with the notion that nuclear weapons might be a safeguard of neutrality. None of them thought of becoming a superpower; it would suffice, the calculation went, to be able to inflict on an aggressor damage commensurate with their value as military prizes – the doctrine of the French General Gallois that justified French nuclear weapons.

The extreme version of the Gallois doctrine, from time to time echoed by China (though not recently), that stability is best assured if every state is a military nuclear power, is unlikely to command support, but there are likely to be many governments itching to set off on the nuclear road. If the NPT was a bargain between nuclear and non-nuclear states, it will have to be remade. So why not dust off and redraw the US plan for the control of nuclear weapons put to the United Nations in 1946? The underlying theme, that sources of uranium should be owned internationally, predictably came to nothing then, but administrative control of nuclear materials must be a more reliable way of spotting illicit diversion, especially if, by then, the prospect of climatic change makes the resurgence of civil nuclear power essential.

Well, there are many issues here. Perhaps, realistically, none of them is likely to lead to fruitful outcomes.

But the questions need raising.

**Other Nature Editorials**

*Nature* continues to editorialise on matters related to global disarmament, peace and justice – a matter of some gratification to scientists interested in peace, in view of *Nature’s* prestige as a science journal.

In ‘Freedom and Its Obligations’, *Nature*, Vol. 343, January 4, the question is raised as to what the recent tumultuous months imply for future democracy in Eastern and Central Europe. Thus –

In the countries . . . (in which) . . . old style Communist governments were thrown out in the second half of last year, one of the reasons why people have ‘chosen freedom’ is that they have seen the previously hidden proof in
the West that a centralized state is a self-impeovered state. But there is not enough capital to create Western-style prosperity in Eastern Europe within a mere few years. If Romanians are still digging graves with picks and shovels a decade from now, will their taste of freedom then turn sour?

Without really suggesting how substantial capital is to be obtained, the article goes on to assert that

The obvious model is that of the European Communities, a device by means of which 12 Western European states have agreed to indulge their natural quarrelsomeness only at Brussels, but in the expectation of enhanced prosperity as a result ... A decade's moratorium on upheaval should allow the Eastern States to fashion something effective along these lines, especially if the European Communities' sensible plan for an investment bank turns out to be effective. Then there could be a deal between the two European economic blocks and the not inconsiderable states that are so far uncommitted.

In 'Death of a Secular Saint', Nature, Vol. 342, December 21, 1989, Andrei Dmitrievich Sakharov's death is noted as follows: 'In other times and places ... he ... would have been made a saint ... Like classical saints, Sakharov taught by example, often breathtaking example.' And

Sakharov's wider contribution to the new temper of Soviet life is the example of his disarming and, often, infuriating directness ... much of the turbulent Congress of Peoples' Deputies now in session has taken its cue from Sakharov. The benefit is that the Soviet people now know how desperate is their plight.

The rest of us have a more subtle debt to pay, arising from Sakharov's sense of professional rectitude. Sakharov was conscripted into military research during the Second World War and, by 1945, had become one of the small group of theoreticians canvassing the feasibility of both the peaceful and military uses of thermonuclear fusion ... But from the outset, Sakharov insisted on the dangers inherent in this enterprise. During his own exile to Gorky, he pleaded publicly the cases of others whose plight was even worse, urging that the international community of scientists, 'the one real worldwide community that exists today', should shoulder the responsibilities its privileges imply ... How well will the responsibility be discharged now that the prophet is dead?

More on Chernobyl

Chernobyl refuses to die - though it appears that many of its victims may indeed die at earlier-than-normal ages. A number of articles (e.g. 'Chernobyl Cover-Up', by Katya Glovev, Toronto Star, November 19, 1989) in recent months make clear how persistent is the radiation threat. There are regulations for the inhabitants of towns in the region that forbid strolls in the woods, swimming or fishing. Beaches are to be avoided and 'allegedly uncontaminated food is delivered once or twice a week.' When deliveries fail, a 25 percent bonus and 30 rubles extra are given for food. The locals term these 'grave rubles'. It is claimed that in the Narodichi region, radiation is in some places 'higher these days than in the cleared-up 30-kilometre zone around the stricken reactor.' It is reported that a local party secretary (Budko) stated that

We've been told it won't be dangerous to live here for another few years. There are 4,500 children in my district. Practically all of them are ill.

The boys and girls have swollen glands, anaemia, respiratory diseases. 'None of that is caused by radioactivity, the experts in Kiev tell us,' says Budko.

'Why isn't there a little more concern about people? Somebody surely wants to cover up the real results of the accident.'

Local veterinarians claim that many malformed animals are being born in the region and doctors claim that a crime is being committed by the authorities who deny the effects of the radiation.

To judge from the reports it sounds appalling. International agencies have established 5 rem as the maximum acceptable lifetime radiation dose for humans. But a commission headed by nuclear expert Leonid Il'in has established 35 rem as the maximum. If the lower dose were accepted 700,000 to 800,000 people would have to be resettled in Byelorussia alone. Il'in is quoted as saying –

I favour without reservation (a situation in which) nobody is burdened with radiation. But that would mean evacuating 2 million people. And I declare, with full responsibility, that such proposals have only one goal - to destroy our state.

It's quite horrifying, but it follows a tradition - a very common practice - of official down-playing of the effects on civilian populations of radiation risks following blunders or disasters: the Nevada bomb tests on troops in the field, Windscale, tests in the Australian desert, ENIETOK, Three Mile Island ... Chernobyl. There are many more. And Bhopal, of course, which was not radiation, but
equally deadly, pervasive – and another example of a failed responsibility.

What's it all say to us? Taken along with rising carbon dioxide levels in the atmosphere, massive pollution in our water, spillage of toxic wastes in urban areas, oil tanker disasters along coastlines, the inescapable conclusion that treating either people or nature as less significant than economic systems is pervasive and enduring. Our economic preoccupations have too long been with overproduction of consumer goods and weapons of defense (=war). We have now, perhaps, our last chance at a rational system overview and measures emerging that will allow us to deal ourselves a new hand.

'Public Opinion' and Democracy

Jay Rosen 'Phantom Public Haunts Nuclear Age', Bulletin of the Atomic Scientists, June 1989) has written an extremely penetrating article which argues that: 'The crippling of the democratic process began shortly after Hiroshima, and Truman's decision to develop the hydrogen bomb was greeted by silence.' Jay Rosen argues that –

Today opinion polls increasingly dominate discussions about politics. Major newspapers and television networks invest heavily in their own polls, which then become the basis for stories about the state of public opinion. The press and the pollsters take it for granted that there is a public and that it has opinions.

Forgotten is Walter Lippman's observation that 'public opinion' can have little meaning unless the public understands issues in some reasonably competent way ...

Rosen believes that polls 'produce the impression of an active and interested public no matter how little the citizens know or care about issues.'

Secrecy surrounds nuclear weapons and this is tolerated by public bemusement over their technological complexity. Public ignorance abounds; for example, a national poll in 1987 revealed that more than 90 percent of registered US voters did not know that the INF treaty eliminates all land-based missiles in Europe able to reach the USSR. Eighty-one percent of Americans believe, 'incorrectly, that US policy prohibits the first use of nuclear weapons.' This sort of ignorance makes it 'impossible for citizens to debate and help decide the matters that the 'secrets' involve.'

Examples of this sort of thing multiply in Rosen's article; he finishes as follows –

Even the campaign for a nuclear freeze, at its height a true mass movement, was unable to reverse the crippling of the public in the nuclear age. A May 1982 CBS/New York Times poll showed that, while most of the population said that it favored the freeze, only 30 percent knew that Ronald Reagan opposed it, and 59 percent thought that the issues involved in the freeze were too complicated for the public to decide.

A public that believes it cannot understand the issues has resigned its functions in a democracy, and a public realm that cannot even acquaint citizens with the president's position has broken down completely. Under these conditions, the machinery of politics may continue to operate - elections are held, the press is free, polls are published - but there is little reason to call such a politics democratic.

...Our difficulty now is to cope with a new, paradoxical form of secrecy, in which the majority of citizens remain in the dark about matters that have long since come to light.

Scientists, in particular, have much to lament about public ignorance and confusion concerning almost all matters of science and technology. Most citizens of developed societies today are living in a world of actualized magic - in that they take on trust, in a mood of bland (or blind) ignorance, the use and functioning of the multitude of machines, devices and systems in everyday use. Even scientifically educated people are generally remarkably ignorant of almost everything going on in science outside their own fields of specialization, and it is getting worse. What is the answer? A longer period in school and a broader base to all education? Probably not, for a whole range of reasons related to expense, student boredom, etc. But the general teaching of history, law, politics and science at levels intended to awaken in students their rights, expectations and responsibility as citizens might help. Clearly, something is needed.

Canadian Security Corps

Dr. Mary Wynne Ashford, M.D., argues that: 'For the past forty years, safeguarding Canadian security has meant maintaining armed defences against the Soviet military. Now, however, environmental disasters are more threatening to Canadians than foreign invasion. Canada is unprepared to deal with these threats.'

Dr. Ashford's solution is a separate force, a corps ('New Canadian Security Corps Needed', CPPNW Quarterly, Summer 1989) –

...a fourth paid service, under the Department of Defence, equivalent to the Army, Navy or Air Force. Response to disaster requires very clear lines of authority, highly skilled teams of workers, independent communications systems, specialized equipment and transportation vehicles located at strategic bases, as well as organized reserves of men and women with special skills. The Emergency Response Corps would
not be armed; a major distinction between it and the regular military forces.

The Corps' responsibilities would include response to a complete range of disasters and environmental challenges, both natural and artificial in origin. Dr. Ashford stresses, correctly, that –

At the present time, the army may be called in to help in time of civil disaster, but problems of jurisdiction, lack of preparation and specific training, and inappropriate equipment greatly limit their effectiveness.

And –

Equipment needed for military manoeuvres is not designed to safeguard the environment and would most likely wreak havoc in vulnerable areas. Furthermore, as one military officer commented: 'We are trained to defend our country, not to be garbage men.'

Dr. Ashford's suggestions are most apt; only a couple of points might be commented on. Thus, if we are interested in disarmament then we are also interested in alternative roles for the scores of thousands in the Canadian military. Therefore, we should enquire how large the Defence Corps is to be and, whether or not some military personnel are implacably committed to their role as soldiers, think of piecemeal voluntary transfers to the Defence Corps role – even if this calls for considerable retraining and redecoration.

History and Destiny of the Great Forest

There has been much international criticism in recent years concerning the destruction of the Amazonian rain forest in Brazil, but a lot of it is based on ignorance of what is really going on. An article by Alexander Cockburn and Susanna Hecht ('The Jungle and the Junta', Manchester Guardian Weekly, December 31) which describes and analyses the cause and character of the forest despoliation, also explains that the present problems originated in 1966 when General Golbery, 'chief theorist' among the 'generals who drove out President Joao Goulart – with active US connivance' in 1964, demonstrated to 300 of Brazil's wealthiest and most powerful tycoons his scheme for the agricultural conversion of the Amazonian forests.

The allusions offered ... sparked a speculative boom unmatched in Brazilian history as Amazonia began to see the transfer of more than 150 million acres of public lands into private assets. There were tragi-comic scenes as speculators fought by any means to establish titles to swathes of forest larger than Luxembourg.

The article gives a brief but valuable history of land use in the forest and clarifies the roles of natives, peasant land holders and rubber tappers in their mutual interrelations and in response to the contemporary land barons and speculative forest-clearers. It also makes several telling points for would-be interventionists from outside Brazil –

International pressure has been useful in buttressing local protests, but reversal of the destructive forces in the Amazon will never be accomplished by a programme hammered out in Europe or the United States. To suppose that they could is as unrealistic as to imagine that Brazilian environmental organizations or politicians could reverse the clear-cutting of old-growth forest in Oregon or persuade Margaret Thatcher to close Sellafield Nuclear Plant.

And –

The forest dwellers oppose a political economy that favours large owners who impose social and ecological ruin on their region ... They look to a redistribution of resources and power, and invoke a vision of development that uses their knowledge, their culture and their ideas.

If there is one word that is the keystone to their demands and hopes for the future, it is the single word on which all hopes for the Amazon rest: justice.

East-West 'Cooperation'

Barnett Danson (former defence minister and member of NATO Council) has suggested that NATO and Warsaw Pact countries should form 'a joint emergency response force ... to play a role in helping Eastern Europe adjust to democracy' ('East is east, West is west: why not get together?', Globe and Mail, December 15.) He believes that

If the two worked together, through careful pre-arrangement and joint training with clear terms of reference, confidence would be established between the alliances. The people and leaders of the beneficiary nations would know that neither East nor West was imposing itself on them. The joint force would operate to restore and maintain order and ensure that freely chosen governments could be established with their sovereignty respected.

Such a force would have to be linked with the United Nations, as already occurs with some NATO committees, and in some circumstances might replace either UN peacekeeping or disaster relief programs.

Such a scheme would seem to inspire little but foreboding. NATO is US-dominated, Warsaw Pact is USSR-dominated. Neither country has a clean
record in helping to establish or maintain democracies. It would be arrogant to think that the rapidly-changing East European States need the 'Great Collective Wisdom' of such an alliance. The more important thing is to get out of the way of peoples who are clearly in the business now of defining their own destinies and, at least in the case of Romania, are prepared to Underwrite their determination with their own blood. Let each country prescribe its concepts of freedom and human rights in terms of its own aspirations. Neither West nor East power blocs have shown that they have the right to moral leadership.

Canada's Forces - the changing scene

Recent stories in the Toronto Star and the Globe and Mail reveal the impact of the rapidly shifting scene in Europe - where the certainties are so hard to find. However, if trends are shown by deeds not words, the attitude of the Canadian government, expressed by such mega-cuts to the planned spending on the forces of $2.7 billion last May, and then the decision not to spend $8 billion on nuclear subs, says that, NATO and obligations to the US notwithstanding, Canada is entering a new phase of military funding (Murray Campbell, 'Military Beseiged by Doubts on Future', Globe and Mail, February 16). To those concerned to see the advent of world peace, this phase, whatever the apparently contradictory rhetoric that often surrounds it, is a welcome one.

The impact of it all is spelled out in the figures and projections. Of fourteen NATO countries, Canada, spends 2.1 percent of the GDP on defence, the same as Denmark. Only Luxemburg (1.2 percent) spends less. The USA tops the list, of course, with 6.6 percent. Greece (!) is next with 6.3 percent, then comes the UK with 4.9 percent, and so on. West Germany, with a booming economy and a large population spends only 3.0 percent. These facts, together with even earlier suspicions about the Canadian government's eventual intentions has resulted in predictions in the military that further savings will be effected by deep and direct troop cuts and NATO force withdrawals; the latter step has, however, not yet been taken, and Prime Minister Mulroney says that 'troops will remain ...until Canada's North Atlantic allies negotiate cross-the-board troop reductions with the Soviet Union and its allies.'

The scene is confusing - even to Defence Minister William McKnight who has said: 'To be honest, I can't find anyone who can write fast enough to keep up with the changes that are taking place in the world today.' (Amen! to that; ed.)

There are plenty of recruits, and they are better educated than they used to be, but they don't stay in the forces as long. As a consequence, average age is declining among troops, the proportion of officers is going down; women rose from 2 percent in 1972 to 10 percent in 1988 and francophones rose from 19 to 27 percent.

At national defence headquarters in Ottawa up to 15 percent of staff will be cut - that's as many as 1500 positions (Eric Beauchesne, 'Top Defence Staff Fear Job Cuts', Toronto Star, February 19).

All this is causing more and more people to consider the alternative roles that members of the forces may eventually play in relation to other parts of Canadian society.

The present mood is confusing, not only to the public no matter how well-informed, but to parliamentarians and to members of the military themselves. As Murray Campbell ('Deficit, Changing Europe Require New Role for Forces', Globe and Mail, February 19) says:

Canadians often display contradictory attitudes about defence - support for (NATO) is high but cuts in the defence budget also are popular. But as the threat of warfare in Europe seems to diminish ...people are saying the forces should be used for quasi-military roles and for United Nations peacekeeping, while the costly preparations for war should be left to other nations. (!)

Some of the ultimate problems that face Canada's forces even if/when they are reduced to a purely reactive defence role can be exemplified in the following -

The army (or mobile command) is the most vulnerable. The decision to postpone replacements for the Leopard 1 tanks (bought in 1978 but based on a design that dates from the 1950s) has weakened the armored regiment posted in Europe. Its armor is too light to withstand the guns of the newer Soviet tanks and its own 105 mm gun is ineffective for a frontal assault.

The choice will be to replace the tank (an estimated $2 billion for 250 vehicles), or to bring the troops home from Europe. The way would be clear then to fashion some sort of army that, stripped of its heavy artillery and tank corps, would be capable of being deployed rapidly to meet a crisis.

Guns, Butter, and Empire

by Philip Ehrensaft (Université du Québec à Montréal)

The economic elites of the United States are reversing their perception and evaluation of the role
of military spending and research in the US economy. From the 1950's through the 1970's, military spending was viewed both as an excellent way to prime the economic pump and as a primary vehicle for creating advanced technologies. Contemporary trade deficits, budget deficits, and technological competition from Japanese and European multinationals have shaken up the American economy and the worldview of its economic, political, and intellectual elites. Within this context, military spending is increasingly viewed as a source of problems rather than a solution.

Public discussion of the relative decline of the United States as the leading economic and military power has become respectable, even fashionable. The best-seller status of Paul Kennedy's scholarly book, 'The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000', is one index of the breaking up of the post-war American consensus on the US role in international trade and politics.

Overspending on the military sector and specialized military technologies is increasingly viewed as a major source of the loss of market leadership by US corporations. Business Week publishes graphs which purport to demonstrate expected increases in employment, gross national product, and exports for each one per cent cut in the military budget. Ten years ago, we expected to find these kinds of graphs in Seymour Melman's books, but certainly not in Business Week.

Paradoxically, just as it has become respectable to entertain the view of a long-term decline in US power and the key role of the military in provoking this decline, new work by researchers who can hardly be considered sympathetic to the Pentagon is challenging this 'pessimistic' view. Neo-conservatives such as Samuel Huntington have argued quite vigorously against the hypothesis of US decline and the negative role of military spending. A parallel questioning by researchers who are critical of US foreign policy is more surprising and likely to be more informative.

My intention here is to share some initial thoughts and doubts concerning the purported economic and military decline of the United States. The predominant view in the peace movement is that the United States' economic power is in decline and that over-investment in the military plays a basic role in this decline. I think that it is far from proven that the US economy is in decline. If the economy is in decline, it is far from proven that overspending on the military can be considered to be a prime mover in the process of decline.


The argument of the military role in the purported US decline is delivered with a one-two punch. Firstly, there is the proposition that modern military technology is highly specialized and generates relatively little 'technological fallout' for the civilian economy. Overinvestment in military technologies leads to diversion of resources from civilian research and development, and thus an eventual loss of market shares and leadership to national economies which invest less of their resources in the military. Secondly, the strength of this argument is reinforced by placing contemporary problems within the context of long-standing trends in economic and military history. Kennedy's book on the rise and fall of great powers brought this argument into general public consciousness, but this point of view had been previously elaborated in Immanuel Wallerstein's work on the modern world system (1974, 1980, 1989).

The first modern imperial system (modern in the sense of a system organized by markets as opposed to bureaucracies) was Holland's economic hegemony of the seventeenth century, succeeded by Great Britain's hegemony during the nineteenth century and then that of the United States after 1945. In each case, the rise and fall of imperial systems follows a common sequence. First, technological and organizational innovations make the nation in question the leader in terms of agri-industrial productivity. Translating this economic productivity into international market hegemony requires investment in state resources, especially military, which permit this superior productivity to be realized in international markets. Over time, however, investment in the military expenses of empire diverts investment, both in finances and human resources, from renewal of the productive apparatus. A loss of technological leadership then undermines the ability of the hegemonic power to maintain its military leadership.

The bloated Pentagon budget, and its negative consequences, would thus tread the path previously followed by the Dutch and British economic and military empires. In the present context, we must ask ourselves whether contemporary US military expenditures are, in fact, at a level which drain its civilian technological capabilities. Then we will ask whether the US economy is really in such bad shape.

2. How Much is Too Much?

Gordon Adams, a prominent and critical analyst of the military budget, has recently been voicing some reservations concerning the received way of thinking about the negative economic consequences of US defense spending. Adams shares the perception and concern that the American economy is facing some fundamental deficiencies in productivity and economic organization that can, in the long run, undermine the ranking of the US in world trade and politics. What he questions is whether the burden
of military expenses in the US economy constitutes a primary element in this risk of economic and political decline.

Partisans of major military spending point to the fact that this spending now only constitutes 6 per cent of the US gross national product and that this is unlikely to act as a crushing financial or technological burden on the American economy. Adams rightly dismisses this argument as insufficient: the question is how this six per cent impacts on investments and people involved in the creation and application of new technologies. Given the relative size of investment and savings flows, a diversion of several percentage points of GNP from butter to guns could, in principle, have damaging long-term consequences for civilian production and trade. The question has to be answered by specific and systematic reference to the range of technologies created by military spending, the range of technologies which may have been retarded by diverting resources from the civilian to the military sector, and the trade implications of these budgetary choices.

For the record, however, it should be noted that there has in fact been a secular decline in military spending relative to US GNP. The US defense budget shrank from 13 per cent of GNP during the Korean war to 9 per cent during the Vietnam war (1967) and then declined to 6 per cent by the end of the 1970's. (Kupchan, 1989:42-43) Reagan's military budget increases brought this proportion up to a level of over 7 percent during the mid-1980's, but the final years of his second term saw military spending move back towards 6 per cent of GNP.

Adams' central points and questions concerning the new received wisdom on the negative impacts of military spending can be summarized in the form of three propositions and responses:

- **Proposition 1:** Military expenditures divert a major proportion of scientists and engineers from fundamental work on technological innovation.

*Response:* Since 1972, the proportion of technical personnel employed by the military sector has fallen to less than 20 per cent of the total technically qualified labour force.

- **Proposition 2:** Military expenditures divert a major proportion of financial resources from commercial research and development in the private sector.

*Response:* While the proportion of US federal budget expenditures on military research and development increased relative to federal outlays on civilian R&D during the 1980's, the share of military R&D as a proportion of total national R&D expenditures, both public and private, declined from 60 per cent of the total during the 1950's to less than 40 per cent by the end of the 1980's.

- **Proposition 3:** Military technologies are nonproductive because they generate relatively little in the way of 'technological fallout' for the military economy.

*Response:* There is little in the way of systematic analysis of the complex relations between military and civilian technological development in the contemporary United States. In certain cases and at certain times, defense expenditures were a source of general civilian technological innovations, e.g., aeronautics, micro-circuits, fibre optics, lasers, and composite materials. On the other hand, it is plausible that a range of civilian innovations did not take place because of diversion of federal resources to the military sector. These sorts of negative consequences are inherently difficult to quantify. The debate over positive or negative technological fallout from the military sector has focused more on rhetoric than facts.

Adams' last point shortchanges, in my opinion, the quite serious work that has been done by Melman and others on the question of technological fallout. Even though military R&D spending as a proportion of total R&D spending declined from 1950 onwards from 60 to 40 per cent, this is still a large fraction of R&D. Relative economic decline takes several decades to work itself out. Spending roughly half of R&D budgets on the military during the 1960's and 1970's may have been a trigger for the problems we observed during the 1980's. It may take further cuts in the relative role of military R&D to restore and maintain the US relative ranking as a world technological leader during the coming decades. Nevertheless, I think that Adams' scepticism concerning negative fallout form military spending merits serious consideration.

3. Are Things Falling Apart?

Perception is a fundamental part of reality. A widening perception, both within the United States and from rival powers, that US technological and economic leadership is on the decline has concrete ramifications even if a more careful analysis of trends indicates that much of the purported decline may be mythological.

Michel Beaud's new, impressively researched book on the world economy of the 1980's advances the argument that much of the purported decline of the United States is, in fact, statistical artifact elevated into myth. Studies on the US decline frequently trace trends in productivity rankings and market shares by using the 1940's and the 1950's as the base period. This distorts measures of changes in
relative rankings since the near-absolute leadership of the US through the early 1960’s was temporarily based on the physical destruction and reconstruction of the European and Japanese economies. What counts is changes in relative rankings from the 1970’s onwards. Despite the deep deficits in the US budget and foreign trade accounts, the performance of the US economy during the 1980’s equalled or bettered that of the European and Japanese economies on a variety of measures such as growth in employment and gross national product or rates of investment. For example, US investment rates in constant prices were 4.5 per cent from 1972 to 1985 as compared to 3.2 per cent for Japan and 0.7 per cent for the EEC (Beaud, 1989:165).

More fundamentally, Beaud argues that the proper measure of the power and performance of the US economy is, precisely because of the multinationalization of US companies after 1945, the world market share of goods and services produced and exported by US companies both within US borders and by plants they own and control outside the United States. The share of world exports coming from US territory decreased modestly from 17.5 per cent in 1966 to 13.3 percent in 1977 and then rose to 14.0 per cent in 1984. At the same time, exports by foreign branches of American companies rose slightly from 17.7 per cent in 1966 to 18.1 per cent of world trade in 1984. (Beaud, 1989:198) This is hardly a sign of ‘deindustrialization’ or imminent decline of the leading role of the United States in world investment and trade. A list of the leading multinationals in seven high technology sectors confirms the continuing leadership role of US firms in key components of world industry (Beaud, 1989:195).

Beaud also cites other figures which might indicate a more uncertain future for US industrial leadership, such as the rapid rate of European and Japanese investment in the US which may, over time, come to surpass the level of US investment in the rival power blocks. The tables of contemporary relative rankings of multinational firms may be less important than a more detailed and microscopic examination of the generation and control of recent technological innovations that may, over one or two decades, result in a fundamental reordering of the world economic hierarchy.

Perhaps the most valuable lesson from Beaud’s research is that the evidence is far from final in the debate on the purported US decline. There is a distinct possibility, in fact, that the evidence may indicate the persistence of US economic and military power during the next quarter of a century.

4. Conclusion

It remains to be proven that US military expenditures are a primary element in the present economic difficulties of the United States, or whether these difficulties are as intractable as proclaimed by the ‘rise and fall’ hypothesis. The primary elements may well be the basic organizational and financial strategies of the major corporations which control the US economy and the business schools which train their managers. We refer to institutional phenomena such as a damaging preoccupation with short-term financial results or the control of manufacturing corporations by managerial elites trained in accounting or law, and nurtured on the myth that a ‘good manager’ can use his business school skills to efficiently run any company in any sector.

Japanese trade negotiators are becoming quite vocal about the need for the US economic elite to get its own house in order. I am not convinced that major military budget cuts and the consequent peace dividend, if it ever does arrive, will do very much to put the US economic house in order.

The institutional malaise of the US economy is deep-seated and may well, over time, undermine US power. It would be a mistake, however, to assume that US power has already been greatly undermined or that US society lacks the institutional flexibility to adapt to new circumstances and maintain its rank for some time to come. Cutting the military budget and then throwing new money at civilian institutions, however, is unlikely to make much of a dent in the long, hard problem of transforming outmoded economic practices.

Bibliography

Technologies for Peace: Canada Proceeds Cautiously

News and Views from Our UN Representative

It appears that the Canadian government is beginning along a path which Science for Peace has long recommended: the development of technologies (especially airborne and satellite surveillance) for UN peace-keeping and verification.

In his address to the UN General Assembly in September, 1989, the Secretary of State for External Affairs, the Right Honorable Joe Clark, said:

Mr President ... In April of this year, Canada completed a comprehensive study the purpose of which was to explore the utility of all forms of aerial surveillance to the peacekeeping tasks now before the international community. The conclusion of the study was that these overhead technologies - satellite or airborne - could significantly increase the efficiency of peacekeeping operations and related verification endeavors. This study will be submitted to the UN for its consideration ... It is the sort of pragmatic, concrete work necessary to allow the UN to handle its ever-expanding peacekeeping responsibilities more effectively. It also symbolizes one of the fundamental purposes of the Organization: harmonizing the wonders of modern technology to the tasks of peace-building and not war-making.

It would be timely to recall some of the statements and recommendations made to the Canadian Government by Science for Peace on this subject over the years.

The 1986 Science for Peace ‘Workshop on Peace-Keeping Satellites’ came out with a Statement which included the following remarks:

Airborne surveillance and Canada’s expertise in specialized sensing ... could be used to excellent advantage, both in the Canadian forces (UN) peace-keeping duties and in new roles of international arms control verification and crisis monitoring.

(We recommend that:) Canada, unilaterally, initiate the use of aerospace surveillance technology for supplying the Canadian UN ground force contingent with a day-night, all-weather aerial surveillance system capability.

Over the years, we encouraged the further development of Canadian capabilities in satellite monitoring. For instance, in 1986 we urged that Canada proceed with the RADARSAT satellite when the program was in doubt. RADARSAT is now scheduled for launch in 1994 and will be able to observe the earth day and night and in all weather conditions using synthetic aperture radar.

Along a similar vein, our second workshop (‘Satellite and Airborne Surveillance for Arms Control Verification, Peace-Keeping, Crisis Monitoring and Sovereignty Purposes’), held in 1987, put forward the proposal that

The mandate for research and development of technologies for arms control verification and crisis monitoring should be included as part of the mandate of the Canadian space agency.

We have also presented briefs to various parliamentary committees on the subject of UN monitoring. The following sections from our 1987 brief to the Standing Committee on Research, Science and Technology were quoted in the Committee’s final report (entitled ‘Canada’s Space Program: A Voyage to the Future’, June 1987):

Canada possesses outstanding technical capabilities in remote sensing and surveillance instrumentation which, with a certain amount of political will, could be put to excellent use in the fields of international airborne and satellite surveillance for peace-keeping and arms verification.

The need for this technology is now coming into international prominence as more arms limitation treaties are expected to be made and as the United Nations is being called upon more and more to undertake peace-keeping and arms-verification activities.

In their final report the Committee also recommended that

... should an alternative to the Space Station Project become necessary, the Federal Government should consider expanding the RADARSAT program to incorporate an arms-control surveillance and verification role in collaboration with other interested and appropriate countries.

In 1982 a delegation from Science for Peace (consisting of Eric Fawcett, Franklin Griffiths, T.C. Clarke, John C. Polanyi and the late George Ignatiiff) submitted a brief to the Standing Committee on External Affairs and National Defence (SCEAND). They spoke about developing a United Nations satellite monitoring capability:

We urge the government of Canada to seize the opportunity afforded by the proposal for a United Nations Satellite Monitoring Agency (ISMA) and to bring to bear all Canada’s diplomatic and technical skills to further the crisis prevention and disarmament capabilities of the United Nations through this means ... We understand a Canadian reluctance to disagree
with such an important ally and trading partner as the United States. But in so important a matter as world security, we would hope Canada would speak to the greater benefit of the larger number of nations.

Members of Science for Peace (including Professors John Polanyi and Lynn Trainor) met with officials at External Affairs as early as 1981 to press upon them the opportunities for satellite monitoring and forms of international verification. Articles in the Globe and Mail were written by John Polanyi (including 'Arms Monitoring by Satellite - Will Canada Lead?'). Government officials, as well as representatives from industry and the peace movement, attended all our workshops on the subject.

To its credit, Canada is now leading the development of an Open Skies regime for aerial observation. This plan was the main subject of discussion at a February meeting in Ottawa of the foreign ministers of the NATO and the Warsaw Pact countries (an unprecedented occasion in North America). Under the plan, unarmed planes from the two alliances would be allowed to fly over and photograph any part of each other's territory. A trial flight was conducted in January, 1990, with a Canadian Forces plane flying a huge figure-8 over Hungary, viewing Hungarian and Soviet military bases. A Warsaw Pact plane is expected to fly through Canadian airspace soon. Perhaps, the Warsaw Pact would like to fly a plane behind a US stealth cruise missile in its next test over Alberta?

The Open Skies proposal was first made in 1955 by President Eisenhower, and had its origin in a non-governmental arms control session in Cambridge, Massachusetts. This shows how non-governmental proposals can be adopted by governments but must sometimes require a bit of time to be realized. The official 1955 proposal was given an immediate and cold rebuff by Khrushchev, who called it a 'bald espionage plot.'

A completely different response was given by Soviet Foreign Minister Shevardnadze to the more recent Open Skies proposal; he said he would like to expand the idea to include 'open land, open seas and open space.' But at the moment the US will not discuss naval disarmament and still harbours plans for weapons in space.

The Soviet Union's chief disarmament official, Viktor Karpov, recent said: 'We know Canadian scientists have many ideas about verification. Why not a bilateral Soviet-Canadian project that could study ways to verify arms reductions in outer space?'

The Soviet Union also proposed that the UN operate the fleet of aircraft required for Open Skies, but this idea was immediately and flatly refused by the United States. It seems we will have to wait for political will to mature in the West until these countries can agree to such a good idea.

In short, the remarks by Joe Clark, the studies by the Canadian government, and the development of an Open Skies regime are most laudable. They represent a significant step to the ends that Science for Peace has been promoting since its inception. However, we have asked for even more and we must continue to do so.

As East-West relations are being remodelled and as a new international climate develops, it is essential that the United Nations play a central role, be strengthened as an effective international security body and be given the tools to carry out its important work. This is the best, and perhaps the only, way to build a peace that can last throughout the twenty-first century. We now have an opportunity not seen since the end of the Second World War.

The involvement of the peace movement and concerned citizens is as vital as ever. It is no longer the Soviet veto in the Security Council and other fora that is holding back the development or operation of an effective world-wide security system, but a reluctance on the part of the NATO countries to create new UN capabilities and organs (such as a UN verification agency and a UN capability to implement Open Skies). Now that the Warsaw Pact is not the menace it was once proclaimed to be, it is the UN, not an outmoded NATO, to which we now must turn to build global security. I sincerely hope that Canada displays more boldness and leadership, commensurate with this new era which we are now entering.

Two decades ago, people used to sing 'give peace a chance.' Now peace has a chance and we have to do our best to make sure that it succeeds. - A. Walter Dorn

Science for Peace is accredited with the United Nations as a Non-Governmental Organization (NGO). Walter Dorn, our UN representative, makes bimonthly visits to the United Nations to attend meetings of UN bodies, to speak with delegates and to work with other NGO representatives in the field of international security and disarmament.

Low-Level Flying: Québec/Labrador

As reported in the Bulletin, Vol. 9. No. 3, one of the projects initiated at the November retreat in Ontario was 'Militarism and the Environment'. Initial focus has been on the NATO low-level flying in Québec/Labrador, and the possibility of a NATO Tactical Fighter Centre being established at Goose Bay.

An Environmental Impact Study has been done by consultants for the Department of National Defence and a statement has been circulated by an
Environmental Assessment Review Panel. A compilation of comments on the statement from technical experts has also been made public. The Panel received written comments on the Statement until mid-February. A decision is now being made on whether the Study is acceptable. If it is judged acceptable, public hearings will be called. If it is not, the Panel will ask that the Department of National Defence address the deficiencies and public hearings will not be held until the revised statement is made public and reviewed. Following public hearings, the Panel will prepare a report of its conclusions and recommendations which will be submitted to the Ministers of the Environment and of National Defence.

Science for Peace activities to date have included sending a telegram from the Toronto Chapter to the Prime Minister's office on Nov. 27, to coincide with a NATO meeting in Brussels, asking that no decision on the Goose Bay Centre be made by Canada until public environmental hearings have been completed.

Several members of the Toronto Chapter and some members from Guelph have collaborated to review the Environmental Impact Statement and a written commentary was submitted to the Assessment Panel over the signature of the national vice-president of Science for Peace.

A statement on the proposed NATO base at Goose Bay, prepared by Project Ploughshares, which they intend to distribute to some key media, is being co-signed by the Toronto Chapter.

There have been several recent reports in the media suggesting that Turkey, not Canada, get the proposed Tactical Fighter Centre, and that a final decision is to be made May 22-23 in Brussels. Even if this turns out to be true, we remain concerned about the low-level flying already taking place in Quebec/Labrador, which can continue until 1986 under the present Multi-national Memorandum of Understanding agreement with several NATO member countries.

Robena C. Weatherley

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Letters-to-the-Editor:

The end of a war is often a dangerous time because accelerating military technology outruns decelerating military need. The use of nuclear weapons at the end of World War II is a good case in point.

From November, 1944, the US was able to bomb Japan from air bases in the Mariana Islands. Strategic bombing destroyed a total of 64 Japanese cities, not counting Hiroshima and Nagasaki. US submarine forces were also effectively destroying Japanese merchant shipping. According to the US Air Force’s ‘US Strategic Bombing Survey Summary Report (Pacific War)’ Japan would have surrendered in a few more months as a result of this destruction and economic strangulation. Military historian H. Michel (‘The Second World War’, 1975, p.767) writes that the US Navy reached a similar conclusion. Nuclear weapons were not necessary to end the war.

To the contrary, the development of nuclear weapons may have hindered the military campaign against Japan and even prolonged the war. Four Japanese cities had been selected as targets for nuclear attack: Hiroshima, Nagasaki, Kokura, and Niigata. These preselected cities were indeed strategic military targets. Hiroshima was a military command centre, with 150,000 troops. It was the major port of embarkation for Japanese forces being shipped south into the Pacific. It had oil refineries and munitions factories. Nagasaki was a military shipyard. Kokura was Japan’s largest arsenal. Niigata was the biggest port on the Japan Sea and an industrial center with rich energy resources. These cities, with their military operations and strategic industries, were not among the 64 cities destroyed by conventional bombing. They were spared. It seems that the new nuclear bombs had to be used against intact cities, otherwise it would be difficult to see the effects of the nuclear blast. For example, prior to its nuclear destruction, Hiroshima was attacked only twice, once on March 19 by a squadron of bombers and once on April 30 by a lone plane. That was at a time when other Japanese cities were being bombed by hundreds of planes.

To some undetermined degree, US casualties in the Pacific during the last 10 months of the war may have been caused by by the decision to save Hiroshima, Nagasaki, Kokura, and Niigata for nuclear destruction. Ships, fuel, troops, and ammunition killing US service men were coming from cities that would have been attacked if the nuclear program had not had priority over military operations.

There was no military necessity to use nuclear weapons, and certainly no hurry. Rather, the US had the luxury and the confidence to preserve major Japanese military targets for its nuclear experiment. And that is what it was. An experiment. Hiroshima and Nagasaki were not so much victims of war as they were victims of military technology. When military scientists went to those cities as soon as they could, they went to examine destroyed structures. For example, a bent iron fence, photographed from 6 different angles. Those photographs, and many like them, have been retrieved from US military archives and are now on display in Hiroshima’s atomic bomb museum. To see them, makes one realize how calculated and clinical was the first use of nuclear weapons.
I do not wish to argue that death and destruction by conventional bombs is somehow more acceptable than that by nuclear bombs. The March 10, 1945, fire bombing of Tokyo was indeed horrific and caused more death and destruction than the nuclear bombing of Hiroshima or Nagasaki. However, it needs to be understood that nuclear weapons did not serve to defeat Japan. Nuclear weapons did not save lives. They were used when the war was essentially over. The war was an excuse, an opportunity, to try out nuclear warfare. Accelerating military technology had overrun decelerating military need.

For our present safety and our future well-being, it is vital that we understand this and that we now create the political will to decelerate our military technologies in step with the deceleration of military need. If we do not learn the lessons of history, we may well repeat them. In 1945, the Pacific War was over and we had Fat Man and Little Boy. In 1990, the Cold War is over and we have cruise missiles, Trident submarines, and Star Wars.

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March 31, 1990

Members of Science for Peace should be aware of a sinister military development near the US-Canadian border, 80 miles south of Ottawa. It is called Fort Drum, and is very near a former centre of US military activity during the War of 1812 and subsequent US-Canadian hostilities such as the Oregon Crisis. It has 90,000 full-time and reserve troops and is ‘the largest Army construction project since World War II’ (Watertown Daily Times, May 29, 1987). It is strategically located near Canada’s national government at Ottawa, right at the juncture of Canada’s major ethnic fissure between English Ontario and French Québec, and is in a position to sever Canada’s central highway, railway, seaway and communication lines between East and West. Its light infantry troops ‘would be most useful in quick, offensive operations against an ill-prepared foe. They are surprise-attack specialists. Light infantry creates a shock effect by the suddenness and fierceness of their attack and always relies on surprise achieved through stealth, deception, silence and maneuver on foot’ (Scott R. McMichael, Military Review 65.9, 1985, 22-28). Canada’s undefended border is an ideal site for deployment of such a force.

The troops at Fort Drum can, moreover, only be used for rapid attack against a nearby undefended area, because the Fort Drum garrison possesses only helicopter airtransport. It has neither the airfield nor the aircraft for overseas deployment. Furthermore, the troop contingent is equipped and trained solely for the winter conditions of the surrounding US-Canada border area.

All this is reported with meticulous documentation by Floyd Rudmin in his revealing article, ‘Defensive Light Infantry Forces at Fort Drum: Why should Canadians care?’ (Queen’s Quarterly 96.4, Winter 1989, 886-917).

Canada’s current government, as we well know, has recently signed a free-trade agreement with the US which provides the US with essentially unrestricted access to Canada’s vast energy supplies, corporate ownership and markets. That is, it provides the United States with escalating incentive to use military force, as we know it does, to ‘protect its vital interests.’ Canada is increasingly the US’s major external economic interest.

Why then would Canada’s External Affairs and Department of Defence establishments allow such a potential military threat as the Fort Drum invasion-force right next to its capital city? Canada’s former Ambassador for Disarmament, the Hon. Douglas Roche, has publicly acknowledged that US control of Canada’s External Affairs ‘operates at every level, and it operates in varying degrees from subtlety to crude threats’ (Kitchener-Waterloo Record, Oct. 28, 1989). Canada’s air defence is already under US NORAD command. Moreover, Canada’s military policy is, as Mr. Roche also observes, ‘acquiescing in the US escalation of the arms race, under the camouflage of supposed disarmament.’ Note that the Canadian government has just raised its military budget for use against US-designated enemies by 10% over the next 2 years - at the height of the Warsaw Pact’s radical demilitarization, and while making major cuts to federal budgets in education and other civilian sectors.

It is a well-established fact that military forces the world over are most frequently deployed these days against their own people. We should not underestimate the extent to which the US military establishment is now geared for use against Canadians, with Canada’s military establishment well trained to maintain its accustomed subordinacy. Given a free-trade prime minister with the current support of only 17% of the population and a rising majority of Canadians opposed to free trade, and given that with this free trade agreement especially, the US has immense and growing economic interests inside of Canada’s borders, the US Fort Drum garrison at the most strategically vulnerable point of our undefended border cannot be sensibly ignored.

It is not reassuring in this context to know that ‘during the US negotiations with Mexico ... the inclusion in the (free trade) agreement of an American promise not to use military intervention to en-
force any trade disputes, the United States refused to agree' (Rudmin, p.906).

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March 30, 1990

A Pleasing Announcement followed by A Plea for Your Assistance

The Facts

We are delighted to announce that, as of February, Marion Dove has become SFP’s first Coordinator/Secretary, in charge of the National Office and of communications in our organization. Already our operation has become immeasurably smoother and more efficient. Marion is a daughter of John and Lois Dove, who gave so much of themselves to Science for Peace until their tragic deaths in an auto accident last June.

Marion’s position is for the moment only half-time, and the funds for it are guaranteed for only six months. So this is only a start, because we absolutely need a staffed National Office if our activities and influence are to continue to increase. So it is up to us as members, with Marion’s help, to see that by the Summer we are in a position to establish this on a full-time basis. As we note below, we are looking for your help in this growth.

The Story

Soon, you will be receiving a copy of a brochure which some of us put together for public relations purposes; it is a sort of ‘profile’ of Science for Peace’s activity. We were quite impressed! It seemed to us that for a small and essentially volunteer-operated organization we’ve been doing pretty well; I hope you’ll agree.

On the other hand this has depended on rather heroic organizational efforts by a few dedicated volunteers, who are painfully aware that the lack of central coordination has made their efforts very inefficient — this couldn’t go on being the pattern without complete burnout. At the same time we’ve been recognizing that, while our traditional disarmament issues remain to be solved, the rapid changes in the world require a far broader perspective on Peace and the role of Science in its preservation. This led to the gambut of new projects proposed at last Fall’s SFP retreat (reported in the November Bulletin) and adopted by the December meeting of the Board. So Science for Peace is at a crossroads. Even to maintain our present momentum, and certainly if we are to expand our activities to meet the challenges we perceive, we must have an efficient National Office run by a full-time Coordinator/Secretary.

We’ve taken a first step by the interim appointment of Marion Dove as announced above. This was made possible by a ‘start-up’ grant from the Walter and Duncan Gordon Foundation. The Foundation will usually not give grants for administrative purposes (as opposed to specific projects) so we are especially grateful for this sign of its ongoing confidence in SFP and its recognition of our situation.

Now we must make use of their assistance to put ourselves in position to carry on our expanded activities after the grant runs out next Summer. We hope that we can count on your help in doing so. What we need is evidently a somewhat larger base budget than at present.

The most attractive way to achieve this is undoubtedly by increasing our membership. This would not only increase our income, but also provide a larger pool of people to draw upon for participation in our projects (and, by the way, increase our weight when we advise governmental and other bodies). Yet we have not seriously sought to expand the membership for a long time. Partly this has been because we didn’t have the administrative backup to do so — but now Marion Dove can give us that organizational assistance.

There is an important first step in this that all of us can easily take: that is for each of us to invite one or two acquaintances to consider joining. Likely all of us know a few people who would be appropriate members, but we don’t normally think of approaching them; now there is good reason to do so, and the fact that you have the ‘profile’ brochure makes it a lot easier than before to approach people and tell them about us. (Just let Marion know if you want more copies of the brochure, or of the membership application forms.) If we each found just two more members it would provide the bulk of the extra income we need. Will you please have a shot at this? Now? It will make a big difference if we all undertake to do so.

In addition, local groups or Chapters could now easily try less personal but larger-scale recruiting attempts. The materials for doing so — ‘profile’ brochures and application forms, for example — can be obtained from the National Office. A few projects of this kind are already being launched by mailings to staff and students of certain University departments, and to some secondary school science teachers and technical schools. (These mailings include, besides the brochure, simply an appropriate form letter for the target groups, inviting individuals to consider joining.)
Please help now in this growth of our organization and its work! You can contact Marion for materials or advice by writing her at the National Office, by phone at 416-978-3606, by electronic mail to SFP@UTORPHYS.BITNET, or by FAX to Science for Peace at 416-978-8775.

We're on the move. Essentially we are planning to bootstrap ourselves, in the course of the next few weeks, into a still more active and effective organization — with your help. Please DO help! Now!

Report on the status of the project, Education and the Media

Peter Brogden, Eric Fawcett, Shirley Farlinger, and Jean Smith have prepared a list of some of the members of Science for Peace as a resource for the print media. We want them to recognize Science for Peace as an organization made up of informed, involved and concerned people who are willing to make comments or give information on matters related to peace and science. It is hoped that in this way the public will come to know about Science for Peace as a source of enlightened opinion.

We have not had time to contact every member but our aim is eventually to list all those willing to be included. We are sending in the partial list because we felt it was important to establish Science for Peace as a good resource as soon as possible. Members are not expected to act as spokespeople for the official view of SFP since there isn't one, but rather to give their own personal opinion on a subject. Neither are they expected to make comments regarding a subject if they do not feel able to do so adequately.

If we have not contacted you and you wish to be on the list please write to Jean Smith, c/o Science for Peace National Office, University College, University of Toronto, Toronto, M5S 1A1. We need the following information: name, work address, work and home phone numbers, position, languages, area(s) of concern and/or expertise on which you would be willing to express an opinion as a member of Science for Peace.

A copy of the complete list will be sent to those of you who are on it. Revisions will be made as more names are added and will be sent to you at appropriate times.

Jean Smith

National 'Peace from Science' Award

This award, sponsored by Science for Peace and administered through Youth Science Foundation (YSF), was first offered in 1987, when it was won by a project on Nuclear Winter. The co-winners, two high school girls from Ottawa, were taken to the opening days of the UN-sponsored Disarmament and Development Conference in New York in August.

The following year few of the nominated projects seemed to be specially aimed at our award, and none were judged to be both suitable and of a calibre to warrant an award. Although there was a feeling then that a nationwide student awareness campaign might be warranted, no action was taken other than the standard fliers from the YSF.

In 1989 action was unfortunately delayed on the National Award because of reorganizations at YSF and in Science for Peace. The message that both Angelo Mingarelli and Jim Neelin, respectively President and former Secretary-Treasurer of the Ottawa Chapter of SFP, would be on sabbatical leave and replaced by Ron Shigeishi, was overlooked and the nominations sat all summer.

Nevertheless, one of the nominated projects was deemed by the jury, consisting of the above-named three, to be worthy of an award. This is a well documented and well illustrated project entitled 'How Space Technology Can Help Mankind' by Valerie Olmsted, a 17-year-old, grade 11 student (in early 1989) at Selkirk Secondary School in Kimberley, B.C., where she resides. She was nominated by the Chairperson of the East Kootenay Regional Science Fair. Because of the lateness of our decision, Valerie was offered a trip to Vancouver to receive a cash prize of $500 rather than a trip to a peace conference. The award was made at an awards banquet at Science World in Vancouver, and Valerie's hosts were Stella Atkins and Vera Webb.

About the time of the selection of the 1989 National Award winner, we learned that YSF is making major changes in the administration of its award programs, with important consequences for our sponsorship. Firstly all sponsors of awards will have to be members of YSF. For Science for Peace, with fewer than 600 members, this would cost $200 per year; in fact I have recommended membership to Science for Peace before, since YSF provides us with expensive services, including countrywide publicity. Secondly there will no longer be National Awards independent of the Canada-wide Science Fair (CWSF), but rather, Special Awards at these fairs 'for excellence in a project done in an area specified by the awarding organization'. Such awards must be for a minimum of $250 or equivalent and henceforth must be offered for a minimum of three years. Thirdly, sponsors must provide highly qualified judges at every CWSF, held in different centres across Canada each year. Fourthly, sponsors must pay a participation fee of $200 annually to cover the costs of administration and a brochure. There is as well a fee for participation in the 94 Regional Science Fairs through the YSF; although we have never
done this, it might be one way of increasing awareness of the ‘Peace from Science’ Award, if we continue it. The deadline for accepting these new terms and participating in 1990 was not later than December 1 (when agreements were sent out to potential sponsors). Obviously we could not meet this deadline with its major implications for our commitment, both financial and organizational.

When I learned of these plans, I informed the Executive of Science for Peace and recommended that we not sponsor a Special Award in 1990. Meanwhile, we can consider whether we wish to institute a new form of award in the future. If so, I suggest that we explore co-sponsorship with an organization with similar goals to help defray the expense and to spread the workload, even though it will doubtless lead to more complicated administration.

J.M. Neelin, Ottawa Chapter

Publications

Journal Review


The first edition of this excellent new journal covers the following topics: ‘Verified Elimination of Nuclear Warheads’, ‘Verification of Limits on SLCM’s’ and ‘Space Reactor Arms Control’.

This is certainly a science journal containing as it does original properly reviewed contributions with a wealth of technical detail including tables, illustrations, flow-charts and equations, not to mention substantial notes and references for each article.

Having said this, the writing is of a high standard, which I believe would allow the non-technical reader to grasp the essential points without necessarily having to get embroiled in the more technical passages.

The issues this journal addresses are clearly meant to be of global significance and its international flavour is enhanced by the joint US and Soviet editorial board. There are contributions from US and Soviet scientists in the first issue, but no doubt contributions will in time emerge from other countries (like the UK) where scientists believe ‘that the future of civilisation depends on the way in which their expertise is used’, and who feel part of that ‘growing community of scientists ... trying to extend ... openness to discussions of the technology’, if I may borrow the words of Frank von Hippel in his Co-Chairman’s Foreword. Indeed he states:

The initial focus of the Journal will be US-Soviet arms control, because that is where our cooperative research agenda is furthest advanced. We hope soon, however, to publish work by scientists in Europe and elsewhere and to extend our coverage to include global energy and environment policy issues.

If you cannot afford the quite reasonable individual subscription price of £24 per volume (4 issues), then I would strongly recommend that (if you are at a university/polytechnic/college) you lobby to get a library subscription of £60 per volume organised.

Richard Erskine

Book Reviews


This is a valuable book. Its author is an internationally recognized researcher in quality of life and social indicators, and brings his analytic expertise to bear on the world’s greatest enemy to quality of life and social development, the armed-force system of war and defense. The result is a crisply clear and quantified critique of Canadian military expenditures and armaments production and export, in the context of federal government expenditures in other sectors.

The monograph has seven chapters: I, an introduction grounding the book on two UN General Assembly recommendations for public education on the costs of military preparations and the benefits of reallocating them to civilian use; II, an overview of the comparative social well-being of Canada and the US related to their military expenditures; III, a comparative review of Canadian federal military and social expenditures from 1974-86; IV, a summary of available information on Canadian production and export of armaments; V, arguments against Canada’s production and export of arms; VI, replies to arguments for such production and export; and VII, a brief summary on the ‘legitimate role of Canada’s military establishment.’

The argument is concise and systematic with a useful survey of the relevant facts and works in the areas analysed. Those who keep files of such things will find this a very convenient integrator of information. They will also find the capsule summary of pro-and-con arguments on Canada’s military expenditures the best available in Canadian political discourse. It is required reading for all those loyal NATO lovers still living in clouds of Cold-War glory, and a compendious resource for the rest of us.
Here are some of the more illuminating points in the book. In 1984 figures, Canada was 'better off than the United States in socioeconomic standings generally and in military expenditures' (p.4). Canada's military expenditures rose almost 400% between 1974 and 1988 (p.7), and armed-force spending is 'typically greater than 13 of the 16 substantive functional areas (of federal government spending') (p.10). Defense production generates 'considerably less than 1% of employment in almost all provinces, and never more than 1% (p.12). Total Canadian exports of arms 'has consistently exceeded domestic demand by large amounts' (p.13). 'There have been more than 150 wars since 1948 fought in the developing countries, resulting in more deaths than the Second World War' (p.18). (This figure, estimated at 20 million on p.34, surely understates the death count of the Second World War, which exceeded 20 million for the Soviet Union alone.) Canada's share of arms sales to the third world may have accounted for about 200,000 of those deaths (p.34). 'Fifty percent of all natural scientists work directly or indirectly for military purposes' (p.18). 'Canada's Department of National Defense has seen steadily increasing funds for research and development directed contracts in Canadian industry ...In the last ten years the expansion has been sevenfold' (p. 19 - a direct quotation from former Defence Minister Perrin Beatty).

Arms production and purchase are characterized by high costs, relatively low productivity, inflationary effects, economic slowdown in civilian sectors, international indebtedness for purchasers, reduction of social services provided by governments, and undermining of democratic political processes (pp. 19-23, 38). 'Ninety-eight percent of the members of the (US) National Academy of Sciences in fields most relevant to SDI research believed that SDI could not provide an effective defense of the US civilian population' (p.24). In a 1988 North-South Institute survey, only 6.2% of the Canadian population thought that 'increasing the size of the armed forces' would be 'most effective in increasing Canada's influence internationally' (p.27). The much-vaunted recent Federal government plan for purchasing nuclear submarines to patrol Canadian Arctic waters was, in fact, 'to participate in the United States Navy's Forward Maritime Strategy' (p.32). Canada's 'relatively insignificant involvement in the production and export of arms' is, in fact, about the same as 'the country's expenses on community colleges' and '6 times the Federal government's expenditure on the environment' (pp. 34-5). 'There is a correlation between increases in the numbers of conventional weapons in Third World countries and wars' (p.36). Canada's export of arms to the US involves a 'net drain on the balance of payments' because US parent firms in Canada take much of their profits back to the US, and have a much higher tendency to import machinery and parts than do domestic Canadian firms (p.37). Military spending by the Canadian government creates only two fifths as many jobs as education spending, and only one quarter as many jobs as expenditures on urban transit (p.39). There is an 'inverse relationship between military expenditures as a percent of GNP and annual rates of manufacturing growth' internationally (pp. 40-1). Finally, 'we should not allow ourselves to be increasingly militarized in the interest of feeding American paranoia or an irrational military-industrial complex' (p.44) - most plainly, one might add, in these times of sweeping Warsaw Pact demilitarization. Yet despite all these facts demonstrating the absurdity of Canada's military spending, against what is ever more obviously an invented enemy, the government has just raised its planned military expenditures by 10% over the next 2 years while cutting back post-secondary education spending by the equivalent of the total support of three Universities over the same period.

So there is no shortage of need these days to prod the Canadian government into demilitarization. Perhaps starting with the $1 billion it spends in keeping troops on another continent where the enemy they are intended to deter no longer exists.

John McMurtry


Almost everyone is against war or at least says so. Conceptions of war, however, differ widely and generate different ideas about how wars can be prevented. Some of these ideas are complementary, some incompatible. Sorting out these ideas, analysing them, weighing them against each other, and evaluating them in terms of what we know or can learn about the history of humanity and its present condition should constitute a major part of peace education.

Many people deeply devoted to the cause of stable global peace believe that the main difficulty in achieving it lies in human nature. They may not share the defeatist attitude that aggressiveness is an irremovable component of the human psyche and that therefore there will always be wars. But they do place the problem deep within the human individual. Stable peace, in their estimation, can be achieved only if individual human beings become more peaceful.

The present paper does not challenge the idea that pacification of individuals may be a sufficient
condition for a stable peace; but it implicitly challenges the idea that it is a necessary condition. The main thrust of the paper is embodied in the idea that stable peace can be achieved by deflecting human aggressiveness (if, indeed, it is an important component of human nature) from human enemies to other enemies. Enemies can be either naturally given or created. The argument here is that there are no naturally given human enemies. Rather, those who are perceived as enemies have become enemies because they were perceived as such. On the other hand, naturally given enemies of humanity are easily identifiable. They are pestilence, destitution, degradation of the environment and, of course, war. It is against these enemies that human aggressiveness should be mobilized. Such mobilization would enhance the chances of establishing a lasting peace, because nothing brings people together more than the perception of a common enemy.

War is an easily identifiable enemy of humanity (along with pestilence, destitution, and degradation of the environment) in view of the obvious threat of literal extinction posed by already existing and soon to be created weapons of total destruction. However, a war against war is incomparably more problematic than a war against the other enemies. To launch a war against pestilence, degradation of the environment, etc. requires a great deal of political will but not a radical restructuring of deeply entrenched beliefs. Much technical knowledge is available that is known to be effective against pestilence or stopping the degradation of the environment, and methods of obtaining more knowledge of this sort are already in use. Waging war against these enemies does not require a demolition of superstitions. When it comes to action making an impact on the physical environment, humans rely on science and think in the problem-solving mode. Such action and such mode of thinking are not paralyzed by entrenched dogmas and rhetorical shibboleths. Launching a war against war, on the other hand, requires not only a formidable political will but also a demolition of pervasive superstitions, which have consistently blocked efforts to mobilize such political will. Among these superstitions are the identification of national security with military potential, the belief in the effectiveness of ‘deterrence’, the belief that dismantling military institutions must lead to economic slump and unemployment, the belief that military establishments perform a useful social function by ‘defending’ the societies on which they feed, and so on. All these beliefs qualify as superstitions by the usual definition of a superstition as a stubbornly held belief for which no evidence exists. If anything, historical evidence tends to support the opposite view, namely, that highly militarized states are rather less secure from the ravages of war, that ‘deterrence’ has often been a rationalization of aggression, and that a war economy eventually leads to impoverishment rather than to prosperity. Above all, the claim of military establishments that they serve to ‘defend’ a country is belied by the uses to which these establishments all too often have been put, namely, to intimidate or to perpetrate violence against their own populations. And surely the weapons of total destruction cannot possibly ‘defend’ anything or anyone. They can only destroy everything and kill everyone.

All of these points, forcefully brought out by John McMurty, contribute to the enlightenment of all who are willing to give serious thought to these matters.

Another formidable obstacle to be overcome in launching a war against war is the tendency of humans to see other humans as a source of threat. Throughout history, social organization was stimulated not only by the advantages of cooperating in coping with the environment but also, perhaps predominantly, by the necessity of cooperating in protecting one’s own against marauders, as well as by the advantages of cooperating in engaging in similar enterprises against vulnerable outsiders, that is, exterminating, plundering, enslaving, or exploiting alien populations. This sort of cooperation reflects the tribal principle of social organization. It has persisted to the present day in the organization and internal cohesion of modern states.

Thus, the basic problem is that of erasing all the dichotomies: kin versus non-kin, believers versus non-believers, those who look alike versus those who look different, and so on. The stubborn persistence of such dichotomies, however, suggests that they fulfill some need. Perhaps the need to belong is fully satisfied only if it is made clear who does not belong. In launching a war against war, a natural dichotomy suggests itself. It has been drawn by Freeman Dyson in his book ‘Weapons and Hope’. The dichotomy is between warriors and victims. It cuts across all racial, ethnic, economic, and ideological boundaries. As McMurty most emphatically points out, however, the dichotomy separates roles, not persons. In fact, the persons in the role of warriors are also in the role of potential victims, since weapons of total destruction do not differentiate.

The warrior roles are played not only by the uniformed professionals but also by their counterparts in war industries, in think tanks, in research institutes, in lobbies, in short by all having a stake in institutions engaged in the preparation of war and in nurturing the global war machine. A war against war entails an attack on the role of the warrior. It is to this attack that the Clausewitzian principle of ‘total war’, that is, a war aimed at destroying or incapacitating the opposing force, is most applicable.
The object of this war is to destroy the institution of war and thus to instigate the atrophy of the global war machine by cutting off its nourishment.

A war of this sort can be waged by victims with a clear conscience, since it entails no violence perpetrated on human beings. Only the roles of the warrior are to be destroyed, just as the role of the executioner is destroyed when capital punishment is abolished without the erstwhile executioner having to be harmed, not even by employment, since the abolition of capital punishment may well entail finding an alternative employment for the hangman. The abolition of the institution of war may incur an analogous obligation.

Anatol Rapoport

_The above comprises the Foreword to Dr. McCutcheon’s book_


This book is a stunning (in more than one sense) assemblage of facts on the world’s predicament. There are numerous useful graphs, charts and tables; e.g., ‘Military control and repression in the Third World 1988’; ‘Wars and war-related deaths 1945-1989’; ‘Battlefields of 1989’, which complement the array of statistics and the analysis contained in the text. This edition also features a comprehensive section on the state of the world’s health, plus an extensive statistical annex including comparative human resources and public expenditures for 142 countries. Although Sivard introduces a note of cautious optimism in the summary, (‘For the first year in 31 years no new wars started’) she amply demonstrates that the world is still in an appalling state. (‘World military expenditures are still at record levels.’) This book is one of the most important reference works for peace workers.


_‘Peace-keeping Satellites’, Walter H. Dorn, Peace Research Institute, Dundas, Canada, 1987, 182 pp., $8.00._

This book sets out the case for international surveillance and verification by satellites. A peacekeeping satellite is defined as an observation satellite operated under the aegis of the international community which could be used for one or more of the following functions: (i) verifying international treaties, in particular arms control and disarmament treaties; (ii) monitoring conflicts or crises; (iii) supporting peace-keeping operations, such as those performed by the United Nations; and (iv) predicting and managing natural catastrophes.

Walter Dorn, a Canadian science graduate, has long been associated with peace research activities. This book is an excellent overview of the current state of the debate. Indeed, in terms of finding a comparatively short and yet detailed study of the current issues, I think this is the best book available.

Interest in satellite verification has emerged with increased information about the capacity of the military satellites. Satellite surveillance is one of the most sensitive areas of the military use of outer space. The average person would be stunned by the progress made in satellite capabilities. It has been claimed that it is even possible for a satellite to photograph the headlines of this morning’s newspaper; the United States is able to monitor telephone calls from outer space.

It seems a waste that so much expertise and hardware should be developed for superpower purposes of preparing to launch a surprise nuclear attack on the other side, or at the very least of monitoring whether or not the other side intends to attack. Consequently, for well over a decade, various proposals have been made for some form of international satellite monitoring agency.

As Dorn points out, various people can claim to have initiated the idea of using satellites for peace. For example, Colonel Howard Kurtz and his late wife the Revd Harriet Kurtz in the USA set out proposals in the 1960s – they could see even at that time that there should be alternatives to the military developments of satellites. In 1978, France proposed an International Satellite Monitoring Agency (ISMA) at the United Nations Special Session on Disarmament – a friend of the Kurtz family had been able to bring to the attention of the French Government the Kurtz’ research on this matter. In this subject, science is running well ahead of politics. It is clear that the satellites can already be used for peaceful purposes. The problem, however, is one of generating the necessary political will. One of the values of this book is that it encourages people to campaign for the creation of an international surveillance and verification system. Additionally, the Canadian Government has itself developed satellites for peaceful purposes; it is not necessary for progress to be made only through the UN.

In short, this is a very stimulating and encouraging book. It has caught the new mood within the peace movement: to move away from setting out the problem to presenting some of the solutions. The book is written in a style which is suitable for the
concerned lay person; it is itself a model for other scientists to follow as a way of communicating ideas to the general public.

Keith D. Suter,
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INTERNATIONAL COMPREHENSIVE ARMS CONTROL AND DISARMAMENT PROCESS – AN EXPLORATORY STUDY’,
Arnold Simoni, Centre for International and Strategic Studies, York University, 1990, Canada.

The central premise in Simoni’s paper is that the whole question of arms control and disarmament has become extremely complex and is likely to become much more complex due to a number of factors, such as proliferation of the possession of nuclear weaponry, destabilization of national governments (as in Eastern Europe), growing scarcity of natural resources, etc. From this perspective the likelihood of some crisis arising, such as an accidental exchange between superpowers or perhaps even a pre-mediated attack of a smaller nuclear power on a neighbour or on a perceived implacable enemy, is very substantial, and the extent of such a disaster is likely to be very great if its occurrence has not been anticipated, in principle, and its consequences and resolution assessed beforehand. Simoni believes it is essential to be realistic about such risks and to study the situation objectively before a crisis happens rather than trying to deal with it in the panic of the crisis itself. To this end he proposes that an international project be initiated, using expertise from many countries and organized into special study groups to search for ways in which problems can be anticipated, resources harnessed and methods developed for resolution. An essential point according to Simoni is that these problems should be thought about from an international perspective.

One point in Simoni’s thesis is that if, despite efforts to secure the peace and avoid crises of major proportions, a crisis actually occurs, it would be wise to treat it as as a learning situation, but to do so it is necessary to have thought its nature and consequences out beforehand to minimize the disadvantages and maximize any advantages that might accrue. A concern with this point of view is that recognizing that some advantages might accrue from a fairly major crisis might in itself tend to insure that such a crisis will in fact develop. There are two sides to the argument: whether a time of crisis correlates with fluidity in thinking so that it is a time of opportunity or whether it correlates with frozen attitudes that ignore opportunity. Perhaps Simoni’s point is that the fluidity is more in the realm of experience and that the thinking must be done ahead of time, which is what he proposes in his project.

A problem with Simoni’s project is that it would be rather slow in unfolding, typical of many academically oriented projects, whereas the time scale of events could be rather short. Nonetheless, a project can be fulfilling useful objectives simply as a process without stressing too much specific final outcomes. We are into a rather new and different era in human relationships at all levels from individual to national to international, so that history alone may not give us much guidance. Peace is not just the absence of war in the modern context, but carries with it connotations of survival with justice and dignity and in harmony with nature. It is a time for new visions of what is necessary and what is possible. Simoni’s proposal does not obviate the need to pursue peace and justice through present channels and forums, but should be regarded as a complementary activity which at a minimum would help to provide information and examine options and consequences. The essential thing is that there is a great need for creative thinking and for some degree of realistic planning at the global level. A preliminary to action is consciousness raising. The present concern with environmental issues provides an informative example. Internationally commissioned studies on such questions as the limits to deterrence, the value of regional control over security measures, non-offensive defense, the economics of military technology, and military to civilian conversion, cannot help but increase our chances of survival, both in their own right and in the broader sense of consciousness raising at both local and global levels.

Lynn Trainor,
Physics Department,
University of Toronto.

New in April: Accidental Nuclear War. Proceedings of the Eighteenth Pugwash Workshop on Nuclear Forces, eds. Derek Paul, Michael D. Intriligator, and Paul Smoker (Science for Peace/Samuel Stevens, 1990) $10. (from SIP office) This book is the first publication by Science for Peace that is a collaboration with the Pugwash Conferences on Science and World Affairs. We are also offering a special pre-publication price of $120 for 20 copies.
Science for Peace Bulletin

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Letters
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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