THE NUCLEAR DISARMAMENT CHIMERA

Ron Smith discusses the prospects of achieving progress in nuclear disarmament at the start of the new millennium.

A replica of the bomb dropped on Hiroshima in August 1945 on display in the Atomic Museum in Albuquerque, New Mexico

Nuclear disarmament is at the top of the New Zealand security agenda. We are active through the government and through numerous peace and disarmament groups in virtually every international forum that debates this issue, whether official or unofficial. The New Zealand government makes a significant contribution to the deliberations of the UN Conference on Disarmament and in discussions surrounding the Comprehensive Test Ban Treaty and the Nuclear Non-Proliferation Treaty (NPT). We are particularly active in an informal grouping of countries that is pressing through the United Nations for an immediate commitment to the total abolition of all nuclear weapons — the so-called New Agenda Coalition. This is the subject of an annual resolution in the General Assembly that commands substantial support.

Notwithstanding the apparently wide consensus on this matter, it is plausible to argue that the existence of nuclear arsenals in various states around the world actually presents little threat to us in New Zealand. Indeed, they may even bring us security benefits (through nuclear deterrence[1]). Whether or not this is so, the evidence is overwhelming that nuclear weapons will not be eliminated in the near or even medium term and we ought to recognise this. This is partly because the nuclear weapon states themselves see their arsenals as essential to their security. They are thus unlikely to give them up until that perception changes. It is also a consequence of the brute fact that the knowledge of how to make nuclear weapons is available and cannot be abolished. For a technologically sophisticated state that has a civilian nuclear industry it only requires the appearance of need and the formation of an intention. For these reasons, prospects for general nuclear disarmament any time soon are not good. This ought not to be a reason for exaggerated regret.

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Impossible goal

Nuclear weapons cannot be uninvented. We know that nuclear weapons can be fabricated and we know (in principle) how it can be done. That knowledge cannot be made to disappear. Even supposing that agreement had been reached to dispose of all existing weapon stocks, destroy fabrication facilities and ban the production of fissile material for nuclear-weapon-making purposes, the weapons would still be (so to speak) waiting in the wings. Their reappearance would only require the perception of need. The other requirements — a sophisticated level of technology (including appropriate plant) and nuclear material — are likely to be widely available, and certainly in states that have a civilian nuclear industry.

Broadly speaking, any state that has a uranium enrichment facility has the capacity to produce highly enriched uranium to make an atomic bomb of the Hiroshima kind. Of course, under present circumstances almost all such plants would be under the full safeguard surveillance of the International Atomic Energy Authority, which would make such a thing virtually impossible to do without detection. An enrichment plant supplying the needs of the very common light-water reactor will be typically enriching to 3–4 per cent (natural uranium contains 0.7 per cent of the necessary uranium 235). To make weapons grade fissile material the plant would need to produce 90 per cent or better.

In principle there would be two ways to get around this problem. Given a perceived serious deterioration in its security situation, a state could simply end the IAEA surveillance regime and go ahead. It would then be a question of how long it would take to become nuclear capable. There are other variables here, including the time required for actual weapon fabrication and the availability of appropriate delivery systems. Both of these would depend on what provisions had been made in anticipation of the need and on the state of technology at the time.

Grave suspicion

Of course, such an attempt would be virtually impossible to keep secret. Indeed, there would be grave suspicion from the moment formal surveillance ended. This is likely to have the highly predictable consequence of beginning a nuclear arms race that the hypothetical state in question would have to consider that it might lose. In any case, such a development could hardly fail to further exacerbate the security situation. For this reason a state in the situation envisaged would attempt to get as far as it could before being detected. It would maintain IAEA inspection of its commercial reprocessing plant and set up a small,

The first British hydrogen bomb test on 15 May 1957, photographed by the author from HMS *Medina*

covert enrichment operation to provide weapons grade material. The possibility that such an operation could be kept secret is very dependent on the state of technology. The first generation of enrichment plants depended on the separation of the uranium isotopes by gaseous diffusion. They were enormous and consumed vast amounts of power. Second generation processes are still based on the difference in the atomic weights of the isotopes to be separated but the process now depends on centrifugal effects. The plants are more efficient, smaller and cheaper to run but still not easy to hide. What is now being researched by many of the major players is laser separation. The principle here is that a finely tunable laser will preferentially ionise one of the isotopes. Separation can then be accomplished in a single pass as ionised particles are removed from the residual un-ionised material. The likelihood is that laser separation enrichment technology, whilst very technically sophisticated, will be capable of being done in a laboratory room and without enormous power usage. In so far as this is the case, it would be very hard to detect. The only problem that a state might then have is to provide a covert supply of the basic uranium oxide starting material.

The other common route to nuclear weapons (as used by most recent proliferator states) is via the production and separation of plutonium 239. This isotope is formed in the fuel rods of commercial nuclear reactors and is present in spent fuel. It can be extracted from the spent fuel by ordinary chemical processes modified only by the fact that the material is very radioactive. In principle, such 'reprocessing' produces material that is suitable for fabricating a 'Nagasaki-type' bomb. In practice the plutonium from ordinary commercial reactors (reactor grade plutonium) is too contaminated with other plutonium isotopes to be really very useful for this purpose.

Three reasons

There are three reasons for this. In the first place, there is the problem of pre-initiation due to the presence of isotopes such as Pu-240, which give rise to a constant flux of neutrons. This will tend drastically to reduce weapon yield. Generally, the contaminating 'even' isotopes of plutonium, with their relatively short half-lives, give rise also to a much higher level of radiation and a much greater heat output (perhaps a six-fold increase in either case). This has enormous implications for would-be weapons fabricators and for the storage and handling of the devices themselves.

It should be acknowledged that there are technical answers to all three of these problems. The claim is that modern weapon design can overcome the pre-initiation difficulty and that there are ways of dissipating the excess heat and shielding the radiation. The fact remains, though, that no nuclear weapon state (or aspirant state) has based a weapons programme on reactor grade material. It remains a theoretical concept.

Weapons grade plutonium is usually made in dedicated reactors in which the necessary short burn-up of the fuel can be ensured. Some reactor designs are more suitable for this purpose than others since fuel rods can be removed whilst the reactor is still in operation. This would enable some short burn-up rods to be taken out. The Canadian CANDU reactor also has the advantage that it runs on unenriched uranium fuel. This said, it should be acknowledged that covert activity of the sort envisaged here would be very difficult to conceal in the context of an independent expert surveillance regime of the sort presently provided by the IAEA. On the other hand, where such covert activity was embedded in an extensive matrix of legitimate commercial activity with research reactors and nuclear laboratories, as well as commercial reprocessing operations, it might be hard to be quite sure that such things were not occurring.

Again, the progress of technology is likely to have a significant influence here. The laser separation techniques described above in the context of uranium enrichment will raise the possibility for technologically advanced states of turning reactor grade plutonium into weapons grade. In the context of large-scale reprocessing of spent fuel it might be very difficult to guarantee that some reactor grade material was not being diverted and up-graded for weapon-fabrication purposes.

In a world in which there are thousands of reactors and nuclear laboratories in dozens of countries it would be extremely difficult to be quite sure that someone, somewhere, was not engaging in the sort of activity envisaged above.

Global nuclear disarmament is a perennial theme of New Zealand foreign policy. This continues to be the case despite the evident impossibility of the enterprise. Nuclear materials and nuclear technology are too deeply embedded and too widely spread for their weapon-making potential to be securely eradicated. The major nuclear powers also show every intention of retaining their arsenals into the indefinite future and this may well contribute significantly to global stability at the highest level. In the end it raises the question: could our diplomatic energy be better spent?

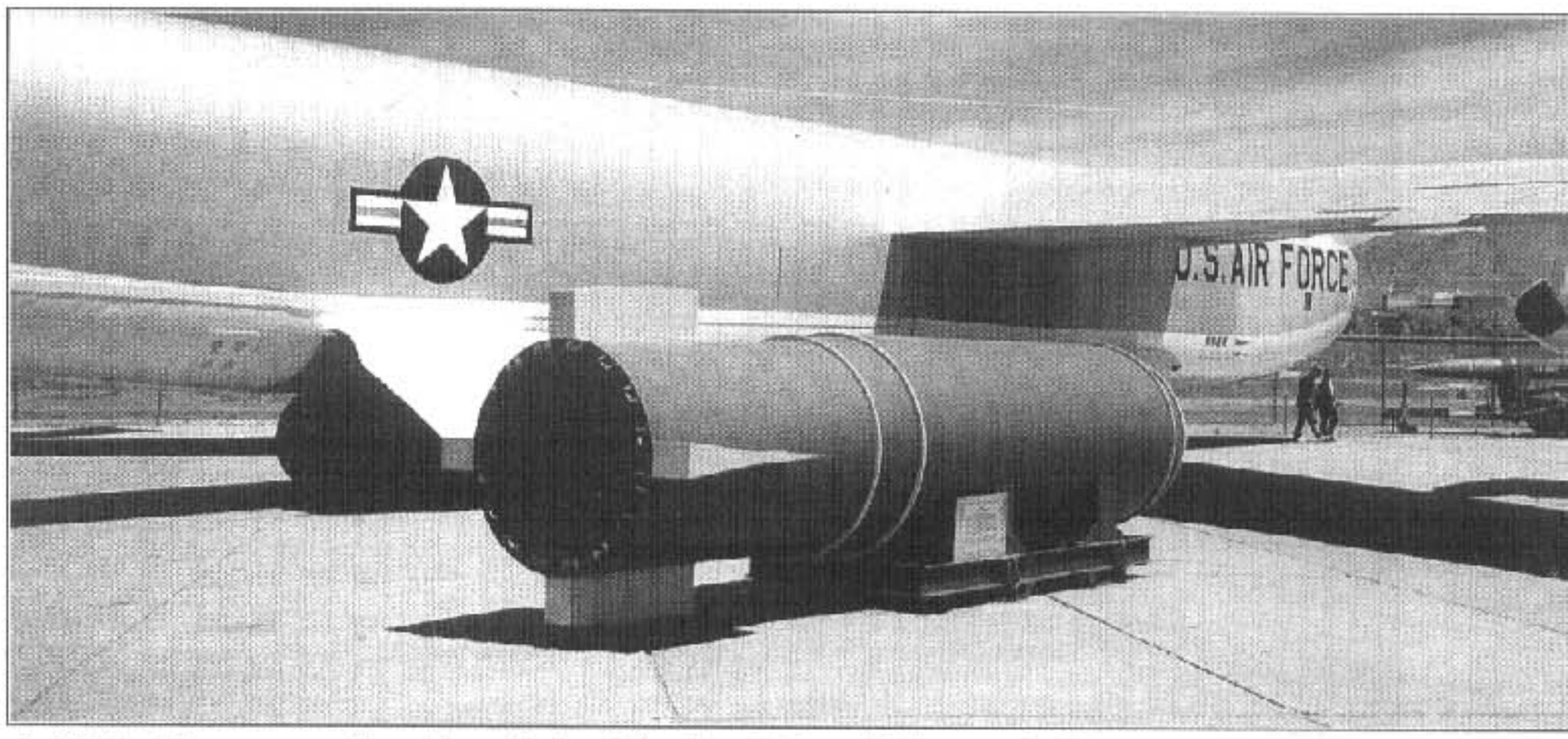
No possibility

There is no possibility of the present nuclear weapon states agreeing to eliminate their weapons in the foreseeable future.[2] This is partly a matter of guarding against the risk that someone else develops weapons covertly, as envisaged above. It is also partly a matter of deterrence. Of course, it is not difficult to assent to the proposition that, all things being equal, a world without nuclear weapons would be better than a world with nuclear weapons. It is in this spirit that the major nuclear weapon states signed the commitment to the ultimate abolition of nuclear weapons in the NPT. But all things are not equal. The security environment within which such a pledge would be honoured is not even on the horizon. The notion that global security can be enhanced by manoeuvring nuclear weapon states into an agreement to a certain form of words is ultimately an illusion.

The fact that none of the major players is likely to give up its weapons in the foreseeable future is amply demonstrated by the statements of policy analysts in the various countries and by the policies of the governments concerned (although official statements tend to be more guarded). Thus, for example, the report of a recent meeting of United States experts on national security and military affairs (and persons very close to the policy establishment):

> nuclear weapons will continue to play an indispensable role as a hedge against uncertainties, to deter potential aggressors who are both more diverse and less predictable than in the past, and to allow the United States to construct a more stable security environment.[3]

Arguably, there is an element of inconsistency (even hypocrisy) here. The United States asserts that nuclear weapons are essential to its own security but is strongly critical of others (like India or Pakistan) who make the same judgment. Of course, it is the case that if the existence of nuclear arsenals is a source of danger then the existence of more arsenals is a source of increased danger. This will be especially true if these additional arsenals are in states with less well-developed systems of control and where there are also nuclear-armed adversaries on the border. From the US point of view, nuclear weapons in South Asia do not add to American security and, in so far as they detract from it, they are to be deplored. On the other hand, states must do what whatever they judge to be necessary for their security and other states have to recognise this.



A Mk17 thermonuclear bomb beside the B52 which carried it

This said, few people think that the United States itself needs nuclear weapons for war-fighting purposes. It could reduce its strategic arsenals from the present tens of thousands to possibly fewer than a thousand and eliminate tactical nuclear weapons entirely. Whether this happens, and at what pace it might happen, will depend crucially on what other players do and how the security environment generally develops.

Russian approach

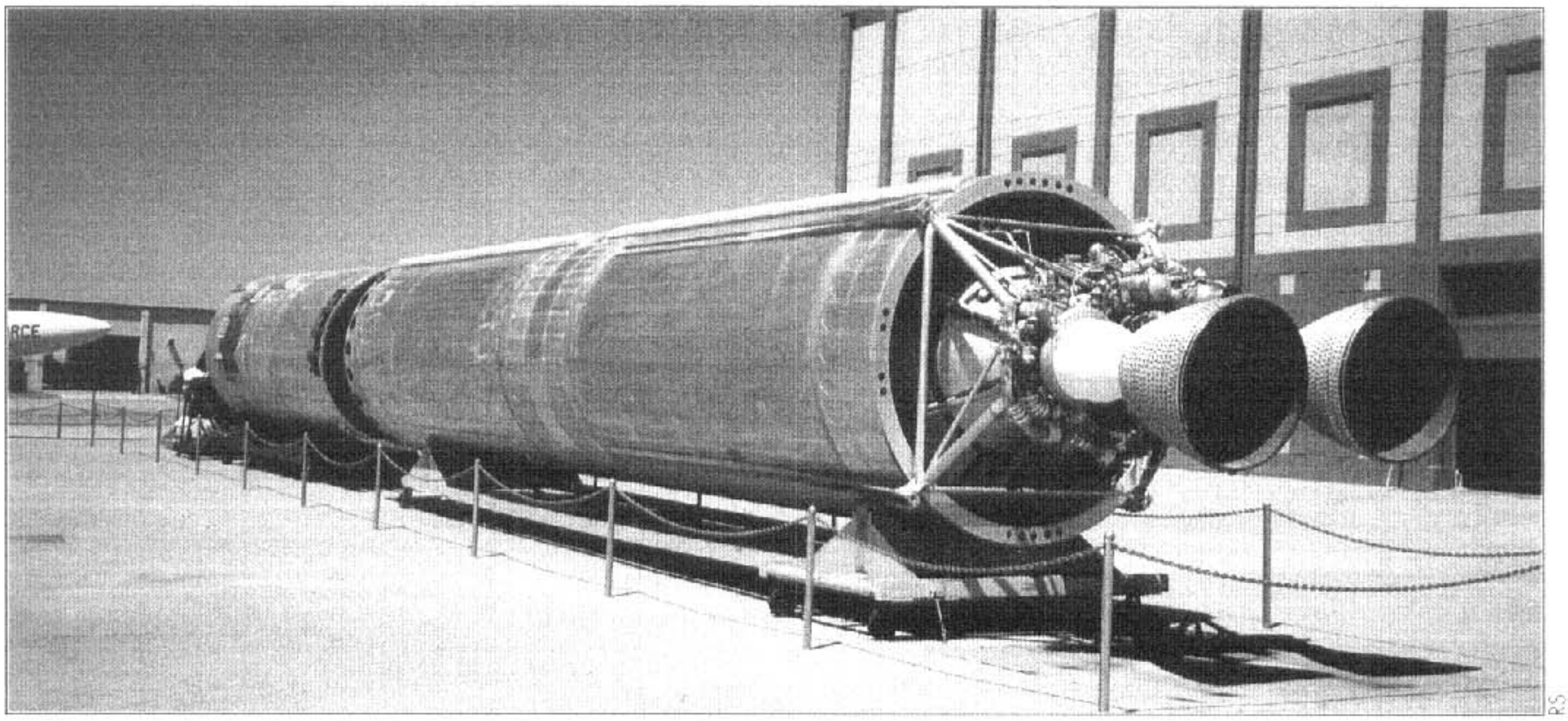
Of great significance here is what happens in the Russian Federation. It is clear from reports from Russia that, far from contemplating the elimination of its nuclear arsenals, it is now embarking on a large-scale programme to modernise them. This is clearly a response to the very apparent decline in Russia's conventional strength. The same reports refer to possible changes in strategic posture that would include 'the concept of using low-yield nuclear weapons as potential war-fighting means'.

America's very apparent edge in non-nuclear war fighting capability is having a profound effect upon strategic assessments around the world. For potential adversaries it raises the very serious question as to how this disadvantage is to be redressed. Like Russia, China is responding by modernising its nuclear weapon stocks and further developing the means for their delivery. Again, like Russia, it is contemplating the use of such weapons in a tactical role. This is evidenced by recent threats (July 1999) to use neutron bombs against Taiwan. In both cases new generations of nuclear weapons are being developed and policy settings are being adopted which envisage their use. These facts together suggest that neither country is likely to entertain a commitment to the elimination of nuclear weapons in the near future. This conclusion is supported by a recent joint security review by scholars from the United States and Japan: 'Whether virtual or real, nuclear weapons will remain a critical component of regional security in Asia for the foreseeable future.'[4]

Different case

The case of Britain and France is rather different. They presumably do not envisage themselves as potential adversaries of the United States and they are anyway firmly embedded in the NATO (nuclear) alliance. Both states are reducing their strategic arsenals but at the same time modernising what remains. Despite an apparently small strategic need, both Britain and France show every sign that they intend to retain their independent deterrent into the foreseeable future. In the case of France in particular, this policy setting may be based on a quiet determination that France, having been invaded three times in a hundred years, will not be invaded for a fourth time, whatever alliances may come and go. Both states may also have reasons of prestige for retaining the independent deterrent. Whatever the explanation, there are no good grounds for thinking that either of them is likely to give up its nuclear arsenal.

On the face of it, it is very evident why Israel would wish to retain its present nuclear capability indefinitely into the future. For all of the more than fifty years that the state has been in being, it has been under threat to its very existence. The Israeli scholar Martin van Creveld is in no doubt that what saved the country in 1973 was the threat (actual or implied) that Israel would use nuclear weapons.[5] This, he suggests, is what caused Syria



A Titan II inter-continental ballistic missile, in service from 1963 to 1987 and carrying a megaton warhead

to withdraw from a very strong position on the Golan Heights. More recently there has been some accommodation between Israel and its Arab neighbours that has involved (amongst other things) a disavowal of the long-standing commitment of the PLO and its supporters to destroy the state of Israel. Notwithstanding this, and whatever further progress may be made at the level of political compromise, it is hard to see forward to a time when Israel could be so confident in its security that it would give up its nuclear deterrent.

Indian policy

The Indian government issued a draft policy statement on 17 August 1999 which makes it very plain that India's nuclear arsenal is here to stay. India would not be the first to initiate a nuclear strike (the statement said) but it 'will respond with punitive retaliation should deterrence fail'.[6] Given that statement, there is little likelihood that Pakistan will contemplate relinquishing its weapon stocks. In fact, the expectation must be that both parties will continue to develop their weapons and sophisticate the various delivery systems. It might also be said that as long as India retains nuclear weapons there is no likelihood that China will give up its nuclear arsenal.

Looking generally at the prospects for nuclear weapon elimination, we need also to note the more vague category of nuclear 'might-bes'. As is well known, there are presently a number of states that are more or less actively seeking nuclear weapon capability. Obvious examples in this category are North Korea, Iran and Iraq. All are subject to strong anti-proliferation pressures, but this process may not succeed in all cases. Equally interesting is the possibility that states that have no present nuclear weapon aspirations and that have signed commitments not to seek such weapons, may in fact change their mind as their security situation changes. These include all those states that have developed civilian nuclear industries, as well as others that might do so in the future. This logic applies even to states that are presently part of the New Agenda Coalition. The Egyptian President, Hosni Mubarak, has been quoted (September 1998) as saying

> if the time comes when we need the nuclear weapon we would not hesitate . . . We do not at present think of entering the nuclear club . . . . Still peace needs power to protect it.[7]

This is really how things are. The nuclear genie cannot be put back in the bottle. We ought to accept this and the crucial security benefit it brings — insurance against war between the major states.

A backpack nuclear munition

NOTES

1. See my 'The abolition of nuclear weapons: possibilities and practicalities', *NZIR*, vol XXII, no 1, (1997). The point will not be further argued here.
2. This is accepted even by proponents of nuclear abolition. See, eg, Professor John Simpson (who spoke at the Otago Foreign Policy School in 1997), 'Achieving Nuclear Weapon Non-Proliferation and Non-Possession: Problems and Prospects', in Robert G. Patman (ed), *Security in a Post-Cold War World* (Basingstoke, 1999), p.144.
3. Robert Joseph and Ronald Lehman, *US Nuclear Policy in the 21st Century* (Washington, 1998), p.1.
4. The Atlantic Council of the United States Policy Paper, 'Building an Asia–Pacific Security Community: The Role of Nuclear Weapons' (Washington, May 1999), p.x.
5. Martin van Creveld, *Nuclear Proliferation and the Future of Conflict* (New York, 1993), p.101ff.
6. Associated Press release, 17 Aug 1999, 11.52pm.
7. Newsbrief, Programme for Promoting Nuclear Non-Proliferation, no 44, 1998, p.12.