India's nuclear capability, her security concerns and the recent tests

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India has taken a large number of initiatives aimed at nuclear disarmament, over the last fifty years. These have been ignored or spurned by the five nuclear weapon States. Summarizing these efforts, we delineate the dismal global environment in relation to the elimination of nuclear weapons, as also the deteriorating nuclear security environment in India's neighborhood. The response was India's nuclear tests in May 1998. The article advocates that, for the future, India should adopt the strategy of walking on two legs – working vigorously towards a nuclear-weapon-free world, and maintaining a minimum nuclear deterrence in the meantime. It also suggests decoupling the present political problems between India and Pakistan from any use of their nuclear capabilities.

INDIA'S nuclear programme may be said to date back to the dawn of Independence. When Homi Bhabha wrote to Sir Sorab Saklatvala on 12 March 1944, proposing the creation of the Tata Institute of Fundamental Research (TIFR), he was not thinking only of building 'a school of physics comparable with the best anywhere'. He also wrote, '... when nuclear energy has been successfully applied for power production in say a couple of decades from now, India will not have to look abroad for its experts but will find them ready at hand'. TIFR came into existence in 1945. When the atomic energy programme made its modest beginning some years later, it was natural for it to draw upon many personnel trained at TIFR in the course of fundamental research.

Self-reliance has been a creed in the atomic energy programme from the beginning. Though it drew upon foreign collaboration and assistance where possible (with the French for studies on possible use of Be or BeO as a moderator, with UK for APSARA, with Canada for CIRUS) such assistance was always meshed in with indigenous efforts. Expertise was thus built up on a broad front, by assigning tasks to young scientists, who learnt while carrying out those tasks and grew up with their successful completion. Expertise now exists over the whole range of the fuel cycle, from uranium prospecting and mining to the processing of spent fuel elements, separation of plutonium and waste management. It also includes the design and construction of heavy water plants, and nuclear power-stations. Embargos over the last 25 years have meant that most of this technology had to be developed indigenously. Sanctions cannot affect this process of capability-building.

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From the early days, India's concerns in the area of nuclear energy have been three-fold: (i) to build up an indigenous capability in the peaceful uses of nuclear energy in all its aspects, so that, in particular, India should be able to utilize its rich resources of thorium for energy production when the supply of fossil fuels dries up some time during the twenty-first century; (ii) to work towards a nuclear-weapon-free world (NWFW) in view of the threat to the very survival of mankind that hangs over our heads so long as nuclear weapons are not banned and eliminated; and (iii) while working for a NWFW, to keep India's nuclear option open in the interest of national security, until a treaty on a time-bound programme of elimination of nuclear weapons emerges, and to refuse to sign any treaty in which the obligations on the non-nuclear-weapon States are not matched by concrete steps by the nuclear weapon states (NWSs) to move towards a NWFW in a well-defined time-frame.

Regarding the last, India's President K. R. Narayanan[1] has recently quoted India's first Prime Minister Jawaharlal Nehru's statement in 1946: 'As long as the world is constituted as it is, every country will have to devise and use the latest scientific devices for its protection. I hope Indian scientists will use atomic power for constructive purposes. But if India is threatened, she will inevitably try to defend herself by all means at her disposal'.

Even so, though the Indian plutonium plant started functioning in 1964, and India would have had sufficient plutonium for a nuclear device to be exploded before the magic date of 1 January 1967, if she wanted to enter into a weapons programme, she did not do so. This was in spite of the fact that the first Chinese nuclear test took place in 1964.

India's disarmament initiatives

There has been a fundamental difference between India's approach to the problems arising from the existence of nuclear weapons and the approach of the NWSs. India has always been for the elimination of the nuclear weapons from national arsenals, whereas after about 1960, the proposals of the NWSs shifted from disarmament to containment – mutual control of the arms race between USA and USSR, and the control of the dissemination of nuclear weapons outside the charmed circle of the five NWSs, which are also the five permanent members of the UN Security Council, so as to maintain their monopoly with respect to nuclear weapons.

India has been at the forefront of the international efforts to get the nuclear weapons banned and eliminated. As Prime Minister Vajpayee observed in the Parliament on 27 May 1998, from the very early years of Independence, 'our leaders... realized that a NWFW would enhance not only India's security but also the security of all nations. That is why disarmament was and continues to be a major plank in our foreign policy'[2]. Some of the major initiatives taken by India may be mentioned briefly here[3]:

As early as 1948, in the context of the report of the newly-created UN Atomic Energy Commission, India proposed limiting the use of atomic energy to peaceful purposes only, and the elimination of atomic weapons from national arsenals.

In 1950, India made a proposal for the creation of a UN Peace Fund, through a progressive reduction of armaments and channelization of the savings to the fund; in doing so, she sought for the first time in the UN, to establish and give a practical form to the link between disarmament and development.

In 1954, Prime Minister Jawaharlal Nehru proposed a 'standstill agreement' (a 'moratorium' in today's parlance) whereby all testing of nuclear weapons was to be suspended immediately, pending progress towards the prohibition and elimination of nuclear weapons; India came back to this theme of suspension of nuclear tests in its proposals to UN in 1956 and 1959.

In 1960, along with 11 other States, India submitted a draft resolution to the UN General Assembly, adopted unanimously, which contained directive principles which could form the basis of an agreement on General and Complete Disarmament (GCD); Among other things, the Resolution called for a Treaty on GCD which 'would include the time-limits and schedules for the implementation of each successive step and phase of GCD'. The joint statement of Agreed Principles issued by the governments of the USA and the USSR on 20 September 1961, conformed to a large extent to the formulation submitted in the draft which was introduced by India.

In 1964, India proposed the inclusion of an item about Non-Proliferation of Nuclear Weapons in the Agenda of the UN General Assembly. This was followed the next year by a Resolution presented by India and 7 other nations, calling for an early reconvening of the Conference on Disarmament (CD) to consider this question, with a view to negotiating a Treaty based on certain important principles which it proposed. While the Resolution was adopted by the UN General Assembly in November 1965, with an overwhelming majority which included UK, USA and USSR, the Non-Proliferation Treaty (NPT) which emerged in 1968 did not respect these principles[4], and India therefore decided not to sign the NPT[5].

In 1978, at the 33rd session of the UN General Assembly, India presented a Resolution declaring that (i) the use of nuclear weapons will be a violation of the Charter of the United Nations and a crime against humanity, and (ii) the use of nuclear weapons should therefore be prohibited pending nuclear disarmament. The Resolution was adopted but could not lead to any legally binding commitment.

In 1982, Prime Minister Indira Gandhi, in a special message to the Second Special Session of the UN General Assembly devoted to disarmament (UNSSOD-II), proposed a 5-point Programme of Action which included the negotiation of a binding Convention on the non-use of nuclear weapons, a freeze on nuclear weapons (on which a Resolution was also proposed by India at this Session), the immediate suspension of all nuclear weapon tests, and negotiations addressed to the task of achieving a Treaty on GCD within an agreed timeframe; at this Session, India also tabled a draft Resolution requesting the CD to undertake, on a priority basis, negotiations with a view to achieving an agreement on an International Convention prohibiting the use or threat of use of nuclear weapons under any circumstances.

India's efforts continued unabated despite the negative attitude of the NWSs.

In the mid-eighties, India played an active role in the Six-Nation Five-Continent Initiative for Peace and Disarmament (1984–88), along with Mexico, Sweden, Greece, Tanzania, and Argentina.

In November 1986, Prime Minister Rajiv Gandhi and General Secretary Mikhail Gorbachev issued the Delhi Declaration on Principles for a Nuclear-Weapon-Free and Non-Violent World. This Declaration, apart from enunciating ten principles for building a NWFW, called for the complete destruction of nuclear arsenals *before the end of the century*, and an immediate conclusion of an International Convention banning the use or threat of use of nuclear weapons, pending their elimination.

In 1988, at the UN Special Session on Disarmament (UNSSOD-III), India made an important proposal in the form of a detailed three-stage Action Plan for ushering in a Nuclear-Weapon-Free and Non-Violent World Or-

der, wherein the target-date for elimination of all nuclear weapons was set at 2010 AD.

These proposals were all ignored by the NWSs

In the early 1990s, India was active in the efforts at the UN to get negotiations started on a Comprehensive Test Ban Treaty (CTBT), either at the CD itself, or in an Amendment Conference to the Partial Test Ban Treaty or in parallel in both. When the negotiations on CTBT were finally taken up at the CD for intensive negotiations in 1994, India tried to get the CTBT enmeshed into the matrix of a time-bound framework for elimination of nuclear weapons, as also to ensure that the CTBT became truly comprehensive by inclusion of sub-critical tests. When these attempts failed, India chose not to be a signatory of the CTBT, in view of her security concerns in the emerging nuclear order.

During the CTBT negotiations, the Group G-21 (which includes India) tried to get the CD to at least adopt the decision 'to establish an ad-hoc committee on Nuclear Disarmament to commence negotiations on a phased programme of nuclear disarmament for the eventual elimination of nuclear weapons within a specified framework of time'. Even this was not acceptable to the NWSs.

More recently (August 1996), India has renewed its efforts for a phased and time-bound programme of disarmament, through a proposal presented by some countries of the NAM, for a 'Programme of Action for the Elimination of Nuclear Weapons'[6]. This was made originally at the CD, Geneva, and later circulated as an official document of the UN General Assembly.

In 1997, India introduced a resolution at the UN General Assembly, calling for a convention on the prohibition of the use of nuclear weapons. It was adopted by 109 votes in favour, 30 against and 27 abstentions (UN document A/RES/52/39C). It again could not be followed up because of the block opposition of USA, NATO and their allies.

India's interest in nuclear disarmament measures through the UN has not diminished after Pokhran-II. In November 1998, India presented a Resolution at the UN General Assembly on Nuclear Risk Reduction measures to be adopted by all NWSs. The Resolution envisaged detargetting and dealerting of all nuclear weapons, as well as a no-first-use commitment.

India's compulsions to exercise the nuclear option

India demonstrated a certain nuclear capability by its Peaceful Nuclear Experiment (PNE), carried out in May 1974, at a time when the peaceful uses of nuclear explosions were the subject of hundreds of papers and of several international conferences[7]. Since then, for almost 25 years, India has unilaterally and voluntarily abstained from any test explosions until recently. India has been hoping against one hope that, with the efforts she and other States were making at the UN, and also the efforts that other bodies like Pugwash[8] and more recently the Canberra Commission[9] were making towards the elimination of nuclear weapons, there would be no need to exercise her nuclear option and carry out any test explosions related to weapons.

On the contrary, in recent years there have been an increasing number of negative factors in the nuclear environment – both globally, and in the immediate neighbourhood.

The deteriorating global nuclear security environment

The NPT was never intended to be an indefinite license for a two-tier world of nuclear haves and have-nots, but embodied a bargain in which while on one side, the signatory nuclear have-nots, agreed not to acquire nuclear weapons, on the other side, the NWSs undertook 'to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control' (Article VI of NPT). The NWSs, however, never kept their side of the bargain. Their 'solemn commitments turned out to be a sham' (ref. 10). For 20 years after signing the NPT, they competed intensively in developing new nuclear weapon systems. The total number of weapons tests made by them was over 2,000, and the nuclear weapon stockpile of the NWSs actually increased from what it was at the time when NPT was signed (about 38,000) and reached a staggering figure of close to 70,000 in the mid-eighties.

Nuclear disarmament is as distant as ever. Nearly 30 years after NPT, and nearly ten years after the end of the cold war, some 36,000 nuclear warheads still remain in the world[11]; this is about the same number as when the NPT came into force. The START (Strategic Arms Reduction Treaty) process has presently come to a halt, mainly due to the enlargement of NATO. Even if START-II gets ratified by the Russian Duma, and implemented, *USA and Russia will still retain about 20,000 nuclear warheads in the year 2007* (ref. 12).

Though it has been pointed out several times, e.g. by Pugwash since 1988, that the doctrine that nuclear weapons are necessary for the security of some States and not for the security of others, is an invitation to these other States to go in for nuclear weapons, this warning has been ignored by the NWSs.

The NWSs got the discriminatory NPT itself extended unconditionally and indefinitely in 1995, with arm-twisting and promises that never were meant to be kept; thereby, nuclear weapons were legitimized in the hands of a few States and the technological apartheid that accompanied nuclear apartheid was sought to be perpetuated.

Nuclear weapons have continued to be a part of the military strategy of the NWSs; e.g. the *USA envisages their need for its security indefinitely*, as expressed for example in the *Nuclear Posture Review of 1994* and the Presidential Decision Directive[13] of November 1997, which provides guidelines for maintenance of nuclear deterrence; and nuclear weapons continue to be a part of NATO doctrine and force structuring. The end of the cold war has not made a difference.

In 1993, Russia chose to withdraw from a no-first-use policy of many years, and brought its policy on the use of nuclear weapons in line with that of USA and NATO.

In 1995–96, at the International Court of Justice (ICJ), some NWSs argued for the legitimacy of the use of nuclear weapons.

The ICJ, in its advisory opinion (July 1996), was unable to conclude definitively whether the threat or use of nuclear weapons would be lawful or unlawful in an extreme circumstance of self-defence, in which the very survival of a State would be at stake.

The NWSs have shown utter disregard for the consequent unanimous opinion of the ICJ that there exists an obligation to pursue in good faith and bring to a conclusion negotiations leading to nuclear disarmament in all its aspects, under strict and effective international control[14]. In December 1996, the NWSs, except China, voted against a UN Resolution, based on the ruling of the ICJ, sponsored by Malaysia, which would have committed them to enter during 1997 into negotiations leading to an early conclusion of 'a nuclear-weapons convention prohibiting the development, production, testing, deployment, stockpiling, transfer, threat or use of nuclear weapons, and providing for their elimination'.

The five NWSs once again expressed their unwillingness to initiate immediate negotiations on progressing towards nuclear disarmament, in the recent second Prepcom meeting for the next NPT Review Conference, that ended in failure in Geneva on 8 May 1998.

USA, France, UK and Russia have shown little interest in the views of the non-nuclear-weapon States. They have been obstinately refusing to put the issue of nuclear disarmament on the agenda of the CD in Geneva[10]. The USA voted against convening a Special Session on Disarmament at the UN (UNSSOD-IV) in the year 2000 (ref. 15).

This situation has led Frank Blackaby, a former Director of The Stockholm International Peace Research Institute (SIPRI), to advocate what he calls 'a peasants' revolt' – a warning to be issued by a sufficient number of States party to the NPT, that given that NWSs are in violation of the NPT, they, the non-nuclear-weapon States will withdraw from the NPT within two years, unless the NWSs agree to start genuine negotiations designed to ultimately rid the world of nuclear weapons. He adds: 'It is time to think about rejecting a US-imposed treaty unless that treaty can be made to work as intended' (ref. 15).

As mentioned in the previous section, several Indian initiatives aimed at nuclear disarmament – e.g. Action Programme presented at UNSSOD-III, the Six-Nation Five-Continent Initiative, the efforts to get the CTBT enmeshed in a time-frame for nuclear disarmament – were ignored by the NWSs.

India's concerns during the CTBT negotiations were

(i) The loopholes in the Treaty which allowed the NWSs to develop new nuclear weapons through laboratory research and subcritical tests and computer simulation; the Treaty was not truly comprehensive, banning non-explosive tests also.
(ii) Though the CTBT was claimed to be non-discriminatory, it actually sought to perpetuate the existing discriminatory global nuclear order.
(iii) If this discriminatory order was to be removed, the NWSs must agree to a time-bound programme of nuclear disarmament.
(iv) If this was not done, the CTBT would compromise India's national security, especially in view of the indefinite extension of NPT in 1995, which legitimized nuclear weapons in the possession of the five NWSs.

Annette Schaper[16] has commented on the fact that during the CTBT negotiations, NWSs did not grant 'any single concession to India, such as acceptance of India's proposal on preamble language' and that India was called upon to sign 'a treaty which had been entirely dictated to it and reflected none of its demands'.

China conducted two nuclear tests in June and July 1996, at a time when the CTBT negotiations were drawing to a close. The Chinese Ministry of Foreign Affairs explained that the continued existence of huge nuclear arsenals and the threat of nuclear war caused by the policy of first use of nuclear weapons require that China conduct a 'minimal number of necessary nuclear tests' (ref. 17). Obviously, the same logic would be relevant for India.

The US has conducted sub-critical tests after the signing of CTBT. It has also earmarked $40 billion over a ten-year period for its 'Stock-pile Stewardship and Management Programme' which actually increases weapon-related funding to its three nuclear weapon laboratories at a time when the weapon stockpiles are supposed to go down substantially under the START

process[18]. William Arkin[19] has remarked that 'no new nukes' is a pretty elastic idea, and while the 'no new nukes' pledge helped achieve indefinite extension of NPT and the signing of the CTBT, a wide variety of new nuclear weapons are under development. Ambassador Douglas Roche[20] has also observed more recently that 'despite the indefinite extension of NPT and the signing of CTBT, a new technology race in the quest of far more innovative and lethal nuclear weapons has broken out'.

Several analysts have commented on the 'do as I say not as I do' style of the NWSs. There have been increasing US pressures on India to sign the CTBT, 'a treaty that it does not plan to ratify itself'[21].

There are also pressures on India to agree to a Fissile Materials Cut-off Treaty (FMCT) and before that to a moratorium on the production of fissile materials. FMCT is one more non-proliferation measure after NPT and CTBT. Its objective is clear from the remarks of John Holum, Director of the US Arms Control and Disarmament Agency: 'The fissile cut-off is our best hope of capping the nuclear weapon potential of countries outside the NPT, including India and Pakistan' (ref. 22).

There are discussions about transfer of French or British nuclear weapons to a politically unified Europe, and arguments that this would be consistent with the letter (if not the spirit) of the NPT. This is disturbing. Would it not be a breach of Article I of NPT? Or does it mean that sharing of nuclear weapon know-how is alright among Europeans but not when others are involved?

The NWSs and their allies have always voted against resolutions in the UN General Assembly which were aimed at banning the nuclear weapons or prohibiting their use. Surprisingly, Japan has been voting with them in spite of its professed abhorrence of nuclear weapons, as it also did when the NPT Review Conference extended the NPT indefinitely and unconditionally, thereby legitimizing nuclear weapons in the hands of some States for ever.

It has been difficult to avoid the conclusion that treaties like NPT, CTBT, and (proposed) FMCT have been or are being promoted only to cap (and then roll back and eliminate) the nuclear capabilities of threshold countries, with no intention on the part of the NWSs to eliminate their own stockpiles of nuclear weapons; and thus to acquire a legitimized excuse for intrusive inspections in other countries, so as to make sure that the NWSs (which are former colonial/expansionist powers) and their allies are in a position to do what they want in any part of the world, without even a remote fear of nuclear retaliation from these countries, which were subject to their colonialism until recently, and are increasingly subjected to neo-colonialism in various forms today. At the same time, the NWSs wish to retain indefinitely the option to use nuclear weapons when they feel that their vital interests are threatened in any part of the world.

The prevalent security doctrines and the fears often expressed about 'break-out' in a NWFW, continue to look at the security only from the point of view of NWSs. They do not address themselves to the security of the vast majority of non-nuclear-weapon States, for whom the 'break out' has existed for over fifty years.

The NWSs and their satellites always voted against resolutions at the UN General Assembly which sought to declare the use of nuclear weapons a crime against humanity. When the Statutes of the International Criminal Court (ICC) were being framed very recently (June–July 1998) Egypt and India proposed that the use of nuclear weapons be made a war crime. The NWSs, however, threatened to boycott a Court which had such a mandate. The proposal therefore got rejected at the meeting which created the ICC, to try individuals for genocide, aggression, war crimes and crimes against humanity![23] Surprisingly again, Japan voted against the Egyptian–Indian proposal, in spite of its experience of Hiroshima and Nagasaki bombing! This attitude of the NSWs and their allies is not calculated to inspire confidence in their intentions.

The Soviet nuclear weapon legacy is another aspect of the global nuclear security environment that must not be lost sight of. In an interview on the BBC on 21 November 1997, General Lebed stated that, as National Security Adviser, he came to know that a number of suitcase atomic bombs in the former USSR were unaccounted for. Some highly enriched uranium and plutonium of Russian origin had surfaced from time to time at places like Munich and Prague. Even more dangerous, as General Lebed said, was the spread of scientists who have the knowledge to make atomic weapons, after the retrenchment of scientists from the former USSR. This situation underlines the urgency of a nuclear weapons convention banning nuclear weapons and their use. Yet the NWSs continue to be unwilling *even to enter into negotiations in this regard.*

During the last 50 years, 'the use of nuclear weapons was explicitly threatened occasionally, implicitly threatened continuously, seriously contemplated more often than will ever be admitted, and narrowly averted more than once' (ref. 24). Philip Smith[25] has referred to a statement by former Secretary of State, Haig, that the fission and fusion explosives were tools used daily all over the world in US diplomacy. India has had some experience in this regard. It witnessed a modern version of gun-boat diplomacy in 1971, when there was a threat of US nuclear intervention as S.S. Enterprise sailed into the Indian Ocean during the Indo-Pakistan war which led to the liberation of Bangladesh.

'The Impasse in Nuclear Disarmament' was recently (October 1998) the subject of a Special Statement by the Pugwash Council (Annexure II).

The security environment in India's neighbourhood

India's concerns about the deteriorating nuclear security situation in its neighbourhood have to be viewed against the overall background of the five NWSs' attempts to maintain their hegemony by getting the NPT extended unconditionally and indefinitely, pressing for other nuclear non-proliferation (*not* disarmament) treaties like the CTBT and the fissile Materials Cut-off Treaty, and putting mounting pressures on India to join these Treaties. India showed a remarkable restraint for 24 years after its PNE in May 1974, and yet she has been subject to sanctions in the matter of technology – equipment, components, materials. *This has made it more and more difficult for India to have any confidence in the emerging nuclear order (and the neo-colonial world order of which it is a part) and feel secure in the face of it.* If the 5 NWSs and the quasi-nuclear States (i.e. States, which though members of the NPT, find their security under the nuclear umbrella of nuclear weapon States – e.g. the NATO countries and Japan) need the retention of nuclear weapons as an insurance against the uncertainties of the world, should India not acquire them in a world that is refusing to move towards the elimination of nuclear weapons? Can she close the options for future generations? – These are questions that have been raised often in recent years.

India has a long border with Tibet and Pakistan and a coast-line that is several thousand miles long. Across the land border are countries with missiles of various ranges, capable of carrying nuclear warheads, and some with nuclear weapons. Across the sea is the island of Diego Garcia with its nuclear base. The Indian Ocean has been infested with nuclear submarines armed with nuclear weapons, and during the Gulf crisis, there were many number of ships in the Indian Ocean, armed with nuclear weapons. Pakistan and China are therefore only one aspect of India's much wider security concerns.

The immediate nuclear environment of India has been worsening significantly in recent years with the connivance/active support of NWSs, in spite of the NPT and the embargos of London Club, Missile Technology Control Regime (MTCR), etc. There has been a total breakdown of the NPT in this region.

Successive annual defence ministry reports, for several years, have been expressing concern about the missile and nuclear technology exports from China to Pakistan, which might vitiate the regional security scenario.

There have been repeated reports, quoting the intelligence sources of USA, about the nuclear weapon (and missile) collaboration between China and Pakistan, going against the Article I of NPT.

This has been going on with the connivance of the USA which ignored this proliferation activity in the 1980s because it assigned a higher priority to Pakistan's support for the insurgency in Afghanistan. In the 1990s, the US has been conniving at the transfer of missiles and missile technology because of its commercial interests of trade with China. The Bush administration certified to the Congress that Pakistan had not acquired nuclear capability from 1987 to 1989, *even though US intelligence sources claimed otherwise*; and China's proliferation activity has not attracted any sanctions.

The US Senate Foreign Relations Committee Chairman, Jesse Helms, has recently denounced President Clinton's record of fudging on China's nuclear and missile proliferation activities[26]. He has traced the fudging back to 1995.

Zbigniew Brzezinski, National Security Adviser to President Carter, in a recent article[27] has remarked: 'US has never followed a genuine universal and non-discriminatory policy of halting proliferation. In fact, US policy all along has been that of selective and preferential proliferation....' The policy has been called hypocritical by Brzezinski. Moreover, the policy has shown no concern for the security of other countries like India.

An example is the Hank Brown Amendment in 1995, which allowed export of a billion dollars worth of military equipment to Pakistan, which could only be used against India.

And yet, US and some of the quasi-nuclear States have been indulging in preaching non-proliferation to India and pressurizing her to sign the NPT and CTBT and cap her missile programme. It was not only difficult to stand this pressurization but also one could not but feel concerned about the hidden agenda that may be involved.

Fears have been expressed in India that if the China–Pakistan collaboration in the area of nuclear weapons and missiles was going on in spite of the NPT, and with the connivance of USA, it could also go on with impunity even after CTBT and FMCT.

In the 1960s, when India's security concerns deepened, India sought security guarantees but the countries India turned to were unable to extend to India the expected assurances. As a result, India made it clear that she would not be able to sign the NPT[2].

Some years ago, India made a proposal to Pakistan that the two countries should agree not to use their nuclear capabilities against each other. This was not accepted by Pakistan.

To summarize, we may quote from India's statement at the CD on 20 June 1996. 'We cannot accept that it is legitimate for some countries to possess nuclear weapons while denying this right to others. Under such circumstances it is natural that our national security considerations become a key factor in our decision making.... Countries around us continue their programmes either openly or in a clandestine manner. In

such an environment India cannot accept any restraint on its capability, if other countries remain unwilling to accept obligations to eliminate their nuclear weapons'.

The tests of May 1998 represent India's determined effort to redress the deficiencies in her security, which have been increasingly felt over the years. In carrying out these tests, India has not violated any international Treaty to which she is a party.

In his recent article, Rotblat[10], after expressing shock and alarm at the nuclear test explosions by India and Pakistan, has observed that the events were predictable. Then he points 'an accusing finger at the main culprits, the NWSs, who pursue a policy characterized by hypocrisy and double standards'. He goes on to ask '... if the US, the mightiest country militarily, declares that it needs nuclear weapons for its security, how can one deny such security to States that have real cause to feel insecure?'

In view of the question sometimes raised in discussions of the May tests – 'where is the security risk that prompted the decision to carry out the tests *now*?' – one may remark that the assessment of security risk from the point of view of preparedness to meet it does not imply waiting till the risk factor(s) is right in front of you, stark and naked, but an assessment of the situation as it has evolved, as it is, and as it is evolving.

The future

The Prime Minister of India has reiterated[2], after the nuclear tests of May 1998, India's commitment to nuclear disarmament. He has also said that India is keen on a constructive dialogue for global nuclear disarmament. He has expressed readiness to discuss agreement on no-first-use with Pakistan, as with other countries, bilaterally or in a multilateral forum. India has declared a moratorium on her tests (so has Pakistan) and has expressed her willingness to explore ways and means for *de Jure* formalization of this moratorium. India has also announced her readiness to adhere to some of the undertakings of CTBT but has pointed out that such adherence cannot be in vacuum. India has also offered to join negotiations on fissile material cut-off. The NWSs have yet to react positively to these unilateral declarations of India. They have continued to harp on the need for India (and Pakistan) to join NPT and CTBT. USA has also been pressurizing India to join the fissile materials cut-off negotiations, and to observe a moratorium on fissile materials production with immediate effect. The attitude of the NWSs, led by the USA, continues to be: 'sign the NPT, sign the CTBT, join FMCT negotiations, stop missile development and testing, or else...'. They refuse to recognize that sanctions cannot be the answer to India's (and Pakistan's) tests. They only expose the hypocrisy of the NWSs and the quasi-nuclear States.

India has been, and continues to be, deeply interested in the elimination of the scourge of nuclear weapons, but it has to distinguish carefully between steps leading to a NWFW, and steps which are mere non-proliferation measures designed to perpetuate the present discriminatory and inequitable nuclear order. NPT, CTBT, FMCT[28] belong to the latter category. It is not in India's interest, therefore, to become party to these treaties unless they are modified and enmeshed in a well-defined process unequivocally and irreversibly leading to a NWFW. It is also not in India's interest to agree to a moratorium on the production of fissile materials unless it is a part of such a process.

The NWSs have to recognize that after the nuclear tests of India and Pakistan, a paradigm shift in the discussion of nuclear issues has become necessary, in fact imperative. And that it has become more than ever urgent to honour the commitments they made almost thirty years ago, under Article VI of NPT, and to take seriously the wise counsel of the ICJ, the Canberra Commission, and the generals led by Gen George Lee Bulter. India and Pakistan have now become nuclear, and the clock cannot be turned back.

India's tests have put the nuclear disarmament issues once again in the centre of global agenda. They could help revive movements like the Campaign for Nuclear Disarmament (CND), which were strong in the early eighties but have become moribund, and increase pressures within the NWSs for movement towards a NWFW. India's President K. R. Narayanan[1] has recently expressed the hope that, India's nuclear capability, demonstrated recently, will 'act as a catalytic agent in the international efforts to eliminate nuclear weapons from the face of the earth'.

The very first Resolution of the UN General Assembly (January 1946) drew attention of the world to the unprecedented threat to humanity posed by the existence of nuclear weapons and tried to create a mechanism which would ensure their elimination from national arsenals. Unfortunately the early move for elimination of nuclear weapons soon got hijacked by those interested in mere arms control and non-proliferation. It is time to bring it back to the original track of elimination of nuclear weapons.

It is still not too late to get rid of the nuclear menace before the next millennium begins. *The first requirement*, as the Canberra Commission[9] has emphasized, is for the NWSs to commit themselves irrevocably to the elimination of nuclear weapons, and to agree to start work immediately on the practical steps and negotiations for its achievement. *The steps that can be taken immediately, according to the Canberra Commission, and whose 'implementation would provide clear confirmation of the intent of the NWSs to further reduce the role of nuclear weapons in their security postures'*, include detargetting and de-alerting of all nuclear weapons and a

no-first-use commitment. India has recently (November 1998) presented a Resolution at the UN General Assembly, on Nuclear Risk Reduction, which proposes these three steps.

The commitment to the elimination of nuclear weapons will have to be solemnized by a Treaty banning nuclear weapons and agreeing not to use them and for this purpose to decommission them, as a critical move toward nuclear disarmament within an agreed time-frame, of say 10 years. Frank Blackaby has asserted that with only a small investment in new facilities, the whole world stock of nuclear weapons could be dismantled in seven years[12]. The Treaty could be negotiated and signed *within this millennium*, if there is political will. The actual physical elimination of the weapons and the final disposal of nuclear material in an agreed manner could take a little longer, so long as they are under the control of an international authority in the meantime.

Recently, the governments of Brazil, Egypt, Ireland, Mexico, New Zealand, Slovenia, South Africa and Sweden have launched what has been called the Middle Powers Initiative[29] (MPI) (Annexure III). Most of their observations and suggestions, which have a strong overlap with the recommendations of the Canberra Commission, are in the right direction. However, it is difficult to agree with their call on the three nuclear-weapons-capable States to adhere to the NPT and the CTBT 'without delay and without conditions'. As observed earlier, we consider these two treaties and the proposed FMCT to be mere non-proliferation measures, and not steps towards a NWFW, unless they are appropriately enmeshed in a Nuclear Weapons Convention. The Agenda of MPI itself agrees that the measures leading to a total elimination of nuclear weapons have to begin with the States that have the largest arsenals, and that States with lesser arsenals should join the process *at the appropriate juncture* (Annexure III, para 8).

The importance of a correct sequencing of the steps towards a NWFW cannot be overemphasized. As the Canberra Commission has observed:

> 'The process followed must ensure that no state feels, at any stage, that further disarmament is a threat to its security. To this end, nuclear weapon elimination should be conducted as a series of phased verified reductions that allow States to satisfy themselves at each stage of the process, that further movement toward elimination can be made safely and securely'.

A few words about sanctions. India has been subjected to sanctions in the form of embargos on various items of technology – equipment, components and materials for more than two decades. Additional sanctions–financial, as well as with regard to free circulation of scientists and free cooperation of 'entities' in India with institutions and industries in USA – have followed Pokhran-II. At this juncture, one may remember the Statement of Prime Minister, Indira Gandhi[30], in Lok Sabha on 5 April 1968, in the context of India's decision not to sign the NPT: '... I should like to warn the House and the country that not signing the treaty may bring the nation many difficulties. It may mean the stoppage of aid and the stoppage of help. ... I personally think that although it may involve sacrifice and hardship, it will be the first step towards building the real strength of this country and we will be able to go ahead on the road to self-sufficiency'.

Quite apart from the nuclear dimension of embargos and sanctions, which has become prominent recently, one must remember that for a large country like India, conscious of its past greatness, there is no substitute for self-reliance and a quest of excellence. Not long after Pokhran I (July 1976) at the Centenary Celebrations of the Indian Association for Cultivation of Science, Prime Minister Indira Gandhi had warned the scientific community[31]: 'As the demand grows for the redressal of the technological disparities between developed and developing countries, you may find some of your foreign friends moving away'. India has to be prepared for explicit and implicit technology denials for years to come. Self-reliance has therefore to be an important strand of its technology policy and industrial policy. This implies giving a boost to indigenous R&D, especially in-house R&D by industry, and an increasing accent on excellence and quality assurance everywhere.

No doubt a NWFW will demand radical changes in the way nations behave towards each other, and more importantly, changes in the economic and political order. But efforts towards and a commitment to a NWFW should set in motion the latter, rather than vice versa. Humankind has to get rid of the nuclear menace urgently.

And until that happens, India has to walk on two legs – working towards a NWFW, and maintaining a minimum nuclear deterrence in the mean time.

Indo-Pak relations

We have referred to the global security environment to which both India and Pakistan are exposed, and the risks that both India and Pakistan face from the hegemonistic proclivities of the former colonial powers and their allies. These risks outweigh the risks that India and Pakistan face from each other. It will therefore be desirable for India and Pakistan to delink their unfortunate present disputes from the possible use of their nuclear capabilities. There already exists an agreement between India and Pakistan, not to attack each other's nuclear installations. This should be extended to a mutual agreement on no-first-use of nuclear capabilities, as a measure of confidence-building and delegitimization of

the use of nuclear weapons in South Asia. This should not be impossible since both countries have had nuclear weapons capability for 8–10 years (though without testing them), and have not used it against each other. The *de facto* situation could be converted into a *de jure* commitment. Both countries should not, however, yield to the pressure of the NWSs, to create a NWFZ in South Asia, which can only make both countries vulnerable to nuclear blackmail by the confirmed nuclear powers.

Given the present tensions on the subcontinent, confidence-building measures are very necessary. Pugwash meetings played an important role in building confidence and mutual understanding between USSR and the West at a time when there were few channels of communication between them. Perhaps a sub-continental version of Pugwash, involving scientists, social scientists and other distinguished people from the two countries could play a similar helpful role on the subcontinent.

Annexure I. The Russell–Einstein manifesto, issued in London, 9 July 1955

In the tragic situation which confronts humanity, we feel that scientists should assemble in conference to appraise the perils that have arisen as a result of the development of weapons of mass destruction, and to discuss a resolution in the spirit of the appended draft.

We are speaking on this occasion, not as members of this or that nation, continent, or creed, but as human beings, members of the species man, whose continued existence is in doubt. The world is full of conflicts; and, overshadowing all minor conflicts, the titanic struggle between Communism and anti-Communism.

Almost everybody who is politically conscious has strong feelings about one or more of these issues; but we want you, if you can, to set aside such feelings and consider yourselves only as members of a biological species which has had a remarkable history, and whose disappearance none of us can desire.

We shall try to say no single word which should appeal to one group rather than to another. All, equally, are in peril, and, if the peril is understood, there is hope that they may collectively avert it.

We have to learn to think in a new way. We have to learn to ask ourselves, not what steps can be taken to give military victory to whatever group we prefer, for there no longer are such steps; the question we have to ask ourselves is: What steps can be taken to prevent a military contest of which the issue must be disastrous to all parties?

The general public, and even many men in position of authority, have not realized what would be involved in a war with nuclear bombs. The general public still thinks in terms of the obliteration of cities. It is understood that the new bombs are more powerful than the old, and that, while one A-bomb could obliterate Hiroshima, one H-bomb could obliterate the largest cities, such as London, New York, and Moscow.

No doubt in an H-bomb war great cities would be obliterated. But this is one of the minor disasters that would have to be faced. If everybody in London, New York and Moscow were exterminated, the world might, in the course of a few centuries, recover from the blow. But we now know, especially since the Bikini test, that nuclear bombs can gradually spread destruction over a very much wider area than had been supposed.

It is stated on very good authority that a bomb can now be manufactured which will be 2,500 times as powerful as that which destroyed Hiroshima. Such a bomb, if exploded near the ground or under water, sends radioactive particles into the upper air. They sink gradually and reach the surface of the earth in the form of a deadly dust or rain. It was this dust which infected the Japanese fishermen and their catch of fish.

No one knows how widely such lethal radioactive particles might be diffused, but the best authorities are unanimous in saying that a war with H-bombs might quite possibly put an end to the human race. It is feared that if many H-bombs are used, there will be universal death – sudden only for a minority, but for the majority a slow torture of disease and disintegration.

Many warnings have been uttered by eminent men of science and by authorities in military strategy. None of them will say that the worst results are certain. What they do say is that these results are possible, and no one can be sure that they will not be realized. We have not yet found that the views of experts on this question depend in any degree upon their politics or prejudices. They depend only, so far as our researches have revealed, upon the extent of the particular expert's knowledge. We have found that the men who know most are the most gloomy.

Here, then, is the problem which we present to you, stark and dreadful and inescapable: Shall we put an end to the human race; or shall mankind renounce war? (Joliot-Curie wishes to add the words: 'as a means of settling differences between States'.) People will not face this alternative because it is so difficult to abolish war.

The abolition of war will demand distasteful limitations of national sovereignty. (Joliot-Curie wishes to add that these limitations are to be agreed by all and in the interests of all.) But what perhaps impedes understanding of the situation more than anything else is that the term 'mankind' feels vague and abstract. People scarcely realize in imagination that the danger is to themselves and their children and their grandchildren, and not only to a dimly apprehended humanity. They can scarcely bring themselves to grasp that they, individually, and those whom they love are in imminent danger of perishing agonizingly. And so they hope that perhaps war may be allowed to continue provided modern weapons are prohibited.

This hope is illusory. Whatever agreements not to use H-bombs had been reached in time of peace, they would no longer be considered binding in time of war, and both sides would set to work to manufacture H-bombs as soon as war broke out, for, if one side manufactured the bombs and the other did not, the side that manufactured them would inevitably be victorious.

Although an agreement to renounce nuclear weapons as part of a general reduction of armaments (Muller makes the reservation that this be taken to mean 'a concomitant balanced reduction of all armaments'.) would not afford an ultimate solution, it would serve certain important purposes. First, any agreement between East and West is to the good insofar as it tends to diminish tension. Second, the abolition of thermo-nuclear weapons, if each side believed that the other had carried it out sincerely, would lessen the fear of a sudden attack in the style of Pearl Harbour, which at present keeps both sides in a state of

nervous apprehension. We should, therefore, welcome such an agreement, though only as a first step.

Most of us are not neutral in feeling, but as human beings, we have to remember that, if the issues between East and West are to be decided in any manner that can give any possible satisfaction to anybody, whether Communist or anti-Communist, whether Asian or European or American, whether White or Black, then these issues must not be decided by war. We should wish this to be understood, both in the East and in the West.

There lies before us, if we choose, continual progress in happiness, knowledge, and wisdom. Shall we, instead, choose death, because we cannot forget our quarrels? We appeal, as human beings, to human beings: remember your humanity, and forget the rest. If you can do so, the way lies open to a new Paradise: if you cannot, there lies before you the risk of universal death.

Resolution

We invite this Congress, and through it the scientists of the world and the general public, to subscribe to the following resolution:

'In view of the fact that in any future world war nuclear weapons will certainly be employed, and that such weapons threaten the continued existence of mankind, we urge the Governments of the world to realize, and to acknowledge publicly, that their purpose cannot be furthered by a world war, and we urge them consequently, to find peaceful means for the settlement of all matters of dispute between them'.

Signatories

Max Born
P. W. Bridgman
Albert Einstein
L. Infeld
J. F. Joliot-Curie
H. J. Muller
Linus Pauling
C. F. Powell
J. Rotblat
Bertrand Russell
Hideki Yukawa

Annexure II. The impasse in nuclear disarmament

A special statement by The Council of the Pugwash Conferences on Science and World Affairs 4 October 1998.

Nuclear disarmament is at an impasse. START II remains unratified by the Russian Duma. US–Russian efforts to improve and expedite the management and disposition of fissile material stocks have slowed down. Both NATO and Russia keep the option open of being the first to use nuclear weapons. In the Middle East, no progress is being made towards the establishment of a zone free of weapons of mass destruction. The dispute over North Korea's nuclear programme has not yet been solved. The second preparatory meeting for the upcoming Review Conference of the Non-Proliferation Treaty (NPT) was a failure.

Conscious of this impasse, we view the testing of nuclear weapons in India and Pakistan with alarm and frustration: alarm because of the potential risks of proliferation and nuclear war; frustration because of the continued refusal of the nuclear weapon States to move unambiguously towards the elimination of nuclear weapons. What should have been a wake-up call to impress on all governments that a radical change in approach to international security and nuclear weapon issues is needed, passed without any such reconsideration. As much as we deplore the testing in South Asia, so far we find the reactions of the other nuclear powers to be grossly inadequate. Thirty years after the NPT was opened for signature, they have not implemented the disarmament clause of the NPT, and have shown no renewed willingness to do so.

However, noting the possession of nuclear weapons by two more states, we deem it important to draw them into the international arms control regime. While welcoming the announcements by India and Pakistan that testing has been put to a halt, we urge them to sign the Comprehensive Test Ban Treaty (CTBT) before the next review Conference in 1999, and to participate in good faith in the upcoming negotiation of a fissile material cut-off treaty (FMCT). We furthermore ask them not to help others to acquire nuclear weapons (NPT Art. I.); to comply with the rules guiding international nuclear transactions (NPT Art. III.2); and to dedicate themselves to nuclear disarmament (NPT Art. VI). Such commitments would be tantamount to behaving 'as if' they were parties to the Treaty. Successful conclusion of an FMCT, involving full-scope safeguards also in the nuclear weapon states, should give India and Pakistan access to nuclear technologies on par with states parties to the NPT.

To reduce the risk of unauthorized use and war by misunderstanding or accident all nuclear weapons should be taken off alert status. Another important step would be to take all warheads off the delivery vehicles and store them separately. If the five nuclear weapon powers would adopt safer postures of this kind, the argument that India and Pakistan should refrain from putting warheads on their delivery vehicles would become a strong and consistent one. We commend the United Kingdom for being the first nuclear power to put its entire nuclear force effectively off alert, since it is now stated that it will take 'days' to make its submarine-based systems ready for use.

While our ultimate goal is a nuclear-weapon-free world, as an intermediate step Pugwash advocates the negotiation of a Treaty on No-first-use of Nuclear Weapons involving all states that posses such weapons, realizing that in some cases, conventional force rearrangements and big power security guarantees may be necessary to achieve this. Unambiguous no-first-use commitments, clearly expressed and reflected in military doctrines and force postures, would provide security assurances to non-nuclear-weapon states, and facilitate nuclear disarmament. If the role of nuclear weapons were limited to deterring their use by others, no state would need them if no state possessed them. As a step in this direction – building on the long-standing Chinese and the recent Indian pledges of no-first-use – a trilateral no-first-use commitment between India, China and Russia is certainly desirable and may now be feasible. We furthermore urge NATO to adopt a no-first-use posture: its reasons for maintaining a first use option have long since disappeared.

In 1995, when the NPT was extended indefinitely, the five nuclear weapon states reaffirmed their commitment to the elimination of nuclear weapons. Unfortunately, there is little or nothing to suggest that they have in mind to live up to it. After a period of reductions and adaptations following the end of the cold war, the nuclear weapon countries seem determined to keep enough nuclear weapons in their arsenals to inflict unacceptable damage, should they ever be used in combat. Actually,

their policies seem to be based on the indefinite retention of nuclear weapons.

If this is what we are in for, the NPT will be unsustainable. For the distinction between states permitted to have nuclear weapons and those proscribed from having them was meant to be a temporary, not a permanent, condition. If the United States, the mightiest power in the world, resolves that it needs nuclear weapons for its security, how can one expect states that have real cause to feel insecure to forgo such weapons? Today, multilateral talks and negotiations on nuclear disarmament are blocked. Neither the Conference on Disarmament nor the strengthened NPT review process have been able to deal with these issues in a business-like fashion. This is intolerable.

We therefore urge all states having nuclear weapons to act in ways that are consistent with the objective of a nuclear-weapon-free world, and to agree on specific steps that will lead to that goal.

To reduce the reliance on nuclear arms and pave the way for their elimination, we call on all political leaders of the world to adhere to the principles and goals of the United Nations Charter and to promote a global collective security regime based on non-aggression, peaceful adjudication of disputes and the rule of law. We ask nations to act in ways that will reduce the motivations of others to develop, acquire and deploy nuclear weapons. As a matter of urgency, we ask the Security Council to reaffirm its Presidential statement of January 1992, declaring any proliferation of weapons of mass destruction to be a threat to international peace and security, and to do so in the form of a Security Council resolution:

We urge all governments and non-governmental movements to mobilize their moral and political power to put nuclear disarmament back on track.

Annexure III. New agenda coalition joint declaration of 9 June 1998

Towards a nuclear-weapon-free world: The need for a new agenda

1. We, the Ministers for Foreign Affairs of Brazil, Egypt, Ireland, Mexico, New Zealand, Slovenia, South Africa and Sweden have considered the continuing threat to humanity represented by the perspective of the indefinite possession of nuclear weapons by the nuclear-weapon States, as well as by those three nuclear-weapons-capable States that have not acceded to the Treaty on the Non-Proliferation of Nuclear Weapons, and the attendant possibility of use or threat of use of nuclear weapons. The seriousness of this predicament has been further underscored by the recent nuclear tests conducted by India and Pakistan.
2. We fully share the conclusion expressed by the commissioners of the Canberra Commission in their Statement that 'the proposition that nuclear weapons can be retained in perpetuity and never used – accidentally or by decision – defies credibility. The only complete defence is the elimination of nuclear weapons and assurance that they will never be produced again'.
3. We recall that the General Assembly of the United Nations already in January 1946 – in its very first resolution – unanimously called for a commission to make proposals for 'the elimination from national armaments of atomic weapons and all other major weapons adaptable to mass destruction'. While we can rejoice at the achievement of the international community in concluding total and global prohibitions on chemical and biological weapons by the Conventions of 1972 and 1993, we equally deplore the fact that the countless resolutions and initiatives which have been guided by similar objectives in respect of nuclear weapons in the past half-century remain unfulfilled.
4. We can no longer remain complacent at the reluctance of the nuclear-weapon States and the three nuclear-weapons-capable States to take the fundamental and requisite step, namely a clear commitment to the speedy, final and total elimination of their nuclear weapons and nuclear weapons capability and we urge them to take that step now.
5. The vast majority of the membership of the United Nations has entered into legally binding commitments not to receive, manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices. These undertakings have been made in the context of the corresponding legally binding commitments by the nuclear-weapon States to the pursuit of nuclear disarmament. We are deeply concerned at the persistent reluctance of the nuclear-weapon States to approach their treaty obligations as an urgent commitment to the total elimination of their nuclear weapons.
6. In this connection we recall the unanimous conclusion of the International Court of Justice in its 1996 Advisory Opinion that there exists an obligation to pursue in good faith and bring to a conclusion negotiations leading to nuclear disarmament in all its aspects under strict and effective international control.
7. The International community must not enter the third millennium with the prospect that the maintenance of these weapons will be considered legitimate for the indefinite future, when the present juncture provides a unique opportunity to eradicate and prohibit them for all time. We therefore call on the Governments of each of the nuclear-weapon States and the three nuclear-weapons-capable States to commit themselves unequivocally to the elimination of their respective nuclear weapons and nuclear weapons capability and to agree to start work immediately on the practical steps and negotiations required for its achievement.
8. We agree that the measures resulting from such undertakings leading to the total elimination of nuclear weapons will begin with those States that have the largest arsenals. But we also stress the importance that they be joined in a seamless process by those with lesser arsenals at the appropriate juncture. The nuclear-weapon States should immediately begin to consider steps to be taken to this effect.
9. In this connection we welcome both the achievements to date and the future promise of the START process as an appropriate bilateral, and subsequently plurilateral, mechanism including all the nuclear-weapon States, for the practical dismantlement and destruction of nuclear armaments undertaken in pursuit of the elimination of nuclear weapons.
10. The actual elimination of nuclear arsenals, and the development of requisite verification regimes, will of necessity require time. But there are a number of practical steps that the nuclear-weapon States can, and should, take immediately. We call on them to abandon present hair-trigger postures by proceeding to de-alerting and de-activating of their weapons. They should also remove non-strategic nuclear weapons from deployed sites. Such measures will create beneficial conditions for continued disarmament efforts and

help prevent inadvertent, accidental or unauthorized launches.

In order for the nuclear disarmament process to proceed, the three nuclear-weapon-capable States must clearly and urgently reverse the pursuit of their respective nuclear weapons development or deployment and refrain from any actions which could undermine the efforts of the international community towards nuclear disarmament. We call upon them, and all other States that have not yet done so, to adhere to the Non-Proliferation Treaty and take the necessary measures which flow from adherence to this instrument. We likewise call upon them to sign and ratify the Comprehensive Nuclear Test Ban Treaty without delay and without conditions.

An international ban on the production of fissile material for nuclear weapons or other nuclear explosive devices (cut-off) would further underpin the process towards the total elimination of nuclear weapons. As agreed in 1995 by the States parties to the Non-Proliferation Treaty, negotiations on such a convention should commence immediately.

Disarmament measures alone will not bring about a world free from nuclear weapons. Effective international cooperation to prevent the proliferation of these weapons is vital and must be enhanced through, *inter alia*, the extension of controls over all fissile material and other relevant components of nuclear weapons. The emergence of any new nuclear-weapon State, as well as any non-State entity in a position to produce or otherwise acquire such weapons, seriously jeopardizes the process of eliminating nuclear weapons.

14. Other measures must also be taken pending the total elimination of nuclear arsenals. Legally-binding instruments should be developed with respect to a joint no-first-use undertaking between the nuclear-weapon States and as regards non-use or threat of use of nuclear weapons against non-nuclear-weapon States, so called negative security assurances.
15. The conclusion of the Treaties of Tlatelolco, Rarotonga, Bangkok and Pelindaba, establishing nuclear-weapon-free zones as well as the Antarctic Treaty have steadily excluded nuclear weapons from entire regions of the world. The further pursuit, extension and establishment of such zones, especially in regions of tension, such as the middle East and South Asia, represents a significant contribution to the goal of a nuclear-weapon-free world.
16. These measures all constitute essential elements which can and should be pursued in parallel: by the nuclear-weapon States among themselves; and by the nuclear-weapon States together with the non-nuclear weapon States, thus providing a road map towards a nuclear-weapon-free world.
17. The maintenance of a world free of nuclear weapons will require the underpinnings of a universal and multilaterally negotiated legally binding instrument or a framework encompassing a mutually reinforcing set of instruments.
18. We, on our part, will spare no efforts to pursue the objectives outlined above. We are jointly resolved to achieve the goal of a world free from nuclear weapons. We firmly hold that the determined and rapid preparation for the post-nuclear era must start now.

Narayanan, K. R., *The Times of India*, Mumbai, 30 July 1998. One may also refer to the observation of the well-known French chemist, Bertrand Goldschmidt in 1983: 'In the '50s, Pandit Nehru had been a leading crusader for stopping nuclear tests and for nuclear disarmament; but in 1955 when the eminent physicist Homi Bhabha, leader of Indian nuclear effort, suggested to him a solemn unilateral renunciation of nuclear weapons, the prime minister had asked him to speak to him about it again when India would be ready to fabricate a bomb' (ref. 32).

Statement by Prime Minister Atal Bihari Vajpayee in Parliament, on 27 May 1998.

For details of Indian initiatives up to 1988, see *Disarmament: India's Initiatives*, External Publicity Division, Ministry of External Affairs, Government of India, 1988.

These principles included: (i) the treaty should be void of any loopholes which might permit nuclear or non-nuclear powers to proliferate, directly or indirectly, nuclear weapons in any form; (ii) the treaty should embody an acceptable balance of mutual responsibilities and obligations, of the nuclear and non-nuclear powers; (iii) the treaty should be a step towards the achievement of general and complete disarmament, and more particularly, nuclear disarmament; (iv) there should be acceptable and workable provisions to ensure the effectiveness of the treaty.

For a critique of the NPT, one may refer to Udgaonkar, B. M., *New Quest*, November–December 1993.

Programme of Action for the Elimination of Nuclear Weapons, CD/1419, 7 August 1996.

One may note that there is a clause about the potential benefits of PNEs, in the NPT (Clause V), and that this clause remains unaltered in the NPT as extended in 1995. The CTBT, adopted in 1996, also has a provision relating to possible permission of PNEs (Article VIII).

8. Pugwash is an international Non-Governmental Organization (NGO), which has been active, since 1957, in bringing together scientists, social scientists, other academics and distinguished people covering a wide spectrum of ideological and geographical groupings, 'to appraise the perils that have arisen as a result of the development of weapons of mass destruction and to discuss a resolution', a call given by the Russell–Einstein Manifesto (1955) [Annexure I]. Pugwash has been influential in maintaining a continuous focus on global issues of peace and security raised by the developments in science and technology. Pugwash's preoccupations during the cold war period were largely with arms control rather than disarmament, and correspondingly with non-proliferation rather than concrete steps towards elimination of nuclear weapons. Its thinking has been largely North-centric (a very large majority of Pugwashites – i.e. persons who have participated in at least one of the 241 meetings organized by it since its inception in 1957 – are from the countries of the North), but it has sometimes been amenable to persistent suggestions from other cultures, e.g. with regard to a NWFW. Pugwash started moving slowly and haltingly toward the promotion of the concept of a NWFW, only after the end of the cold war, around 1988. By 1993, it came out with its first monograph on a NWFW (ref. 33). The publication of the Pugwash monograph can be seen as the start of several serious studies on the concept of a NWFW. As a direct outcome of the Pugwash monograph, the Australian Government set up the Canberra Commission[9] to propose practical steps towards a NWFW. Pugwash was awarded the Nobel Peace Prize in 1995. It took some more years for Pugwash to realize the need to call for

a time-frame for achieving the elimination of nuclear weapons. This it did with its Quinquennial Statement of Goals, in 1997, when a period of not more than twenty years was mentioned for the first time. In recent years, it has organized several workshops on the theme of a NWFW, in particular the one in Delhi in March 1998.

9. *Canberra Commission on the Elimination of Nuclear Weapons* was set up by the Australian Government in November 1995. Its 17 distinguished world figures included Nobel Peace Prize winner Joseph Rotblat, General Lee Butler, USAF (retd), Robert McNamara, Field Marshal Lord Carver, UK Chief of Defence Staff, 1973–76, and former French Prime Minister Michel Rocard. Its report, published in 1996, is a powerful exposition of the urgent need to rid the world of nuclear weapons, and of the feasibility of doing so.
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11. Global Nuclear Stockpiles, 1945–97, *Bull. At. Sci.*, Nov–Dec. 1997.
12. Frank Blackaby, *Bull. At. Sci.*, November–December 1997.
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15. Frank Blackaby, loc. cit.
16. Annette Schaper, Proceedings of the 47th Pugwash Conference, Lillehammer, Norway, 1–7 August 1997 (to be published).
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23. *The Times of India*, Mumbai, 19 July 1998.
24. Hiroshima Declaration of Pugwash Council, 23 July 1995.
25. Smith, P. B., Proceedings of the 47th Pugwash Conference, Lillehammer, Norway, August 1997 (to be published).
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27. Zbigniew Brzezinski, *The Times of India*, Mumbai, 16 May 1998.
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29. Green, R. D., *Fast Track to Zero Nuclear Weapons*, Middle Powers Initiative, Cambridge, Mass, 1998. pp. 50–51.
30. Prime Minister Indira Gandhi's Lok Sabha Speech, 5 April 1968, India and Disarmament External Publicity Division, Ministry of External Affairs, Government of India, 1988.
31. As reported in the *Indian Express*, 30 July 1976.
32. Goldschmidt, B., *Physics News*, Sept. 1983, p. 69.
33. Rotblat, J., Steinberger, J. and Udgaonkar B. M. (eds), *A Nuclear-Weapon-Free World: Desirable? Feasible?* Westview Press, 1993.

REVIEW ARTICLES

New insights into the multiple functions of Sp1, a ubiquitous transcription factor

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The eukaryotic transcription factor Sp1 is a sequence-specific DNA-binding protein that binds to GC-rich sequences in a large number of promoters. Despite its ubiquitous nature, Sp1 (and related factors) can modulate transcription of specific genes through interactions with cell type or stage-specific transcription factors. Sp1 can also directly influence formation of the transcription initiation complex. Furthermore, binding of Sp1 at distal promoter elements can affect formation of active chromatin structures. Thus the Sp1 family of proteins plays a crucial role in gene regulation in higher organisms.

THE patterns of gene expression in cells of higher organisms require thousands of genes to be turned on or off in specific cell types in a temporally regulated manner. This regulation most often occurs at the level of transcription. The transcription of nuclear genes is catalysed by three distinct RNA polymerases (I, II and III). RNA polymerase II (pol II) is required for the transcription of genes encoding mRNAs and certain small nuclear RNAs. Although pol II is a multisubunit enzyme, it also needs a set of additional proteins known as general transcription factors for promoter recognition. Prominent amongst these factors is the TFIID complex, of which the TATA box binding protein is an essential component. In addition to the core or basal promoter elements such as the TATA box, pol II promoters also contain essential promoter proximal sequences (within 200 bp of the initiation site) and distal enhancer sequences. Specific protein–DNA interactions are required at each of these elements for precise initiation of transcription of a particular gene by pol II. Transcriptional activators bind to promoter proximal elements to modulate transcription