Development, **2004**, **47**(1), (50–57)

www.sidint.org/development

Thematic Section

At War with the World: Nuclear weapons, development and security

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ABSTRACT *Zia Mian looks at the ideas and practices and institutions of a nuclear age, one that is like development oriented towards the future, sees no limits and links state power, science and technology, national politics and the threat and use of violence. He argues that we are trapped in the nuclear age until we understand the fundamental links between development and nuclear weapons.*

KEYWORDS *total violence; Cold War; military; Pakistan; nuclear test sites; cancer*

We have had the bomb on our minds since 1945. It was first our weaponry and then our diplomacy, and now it's our economy. How can we suppose that something so monstrously powerful would not, after years, compose our identity? The great golem we have made against our enemies is our culture, our bomb culture – its logic, its faith, its vision (Doctorow, 1986: 330).[1]

Total violence

During World War II, nationalism, industrial capitalism, the bureaucratic state, and science and technology were harnessed to war in new ways and in new places. For the first time, the practice and experience of total war and genocide moved from the colonies to the political and economic centres of the modern world. The Holocaust, strategic bombing and nuclear weapons were the result. Separated from its wartime siblings by the simple fact that the bomb was built and used by those who won the war, and claimed as the 'winning weapon', it is nuclear weapons that have come to define for most people the subsequent phase of world history (Herken, 1982).

These three forms of total violence are different in some significant ways, but they shared important organizational and technical features. Among these were centralized authority, extensive compartmentalization of responsibilities, tasks and knowledge accompanied by strong organizational loyalty, along with scientific rationalization for the policy and technical ways of distancing perpetrators from victims (Markusen and Kopf, 1995:210–37). The capacity to mobilize people, resources and knowledge that this kind of organizational and technical structure showed to be possible has cast its shadow over and inspired other state projects. In many ways, these tragedies have been the hidden measure of things. They are also the stage on which history, and the pursuit of development, has unfolded for the past almost 60 years.

Ashis Nandy has argued that the explanation goes deeper than institutions, ways of organizing and individuals, and pointed at the need to examine widely shared presumptions about society and social change:

> We do not feel overburdened by the death of the millions we have killed in this century because in each case we have carefully chosen institutional and individual scapegoats, who, by themselves, are made responsible for the genocide: Hitler, Stalin, American hegemony, the military-industrial complex, capitalism, fundamentalism, Fascism, colonialism and neocolonialism, and so on. We do not feel that the blood of millions is on our hands because we do not believe that our ideas of social engineering, evolution, progress, education, and development are complicit (Nandy, 2002: 216).

Limitless violence

The US atomic bomb programme was a massive effort. Directed by General Leslie Groves, 600,000 people worked in facilities spread over 39 states (Norris, 2002: 226–7). The Manhattan Project, as it was called, seems to have inscribed its violence into the hearts of those who worked in it. In April 1943, physicist Enrico Fermi proposed that his newly invented nuclear reactor might be used to produce radioactive isotopes not just for the bomb, but in large quantities to poison German food supplies – it was an idea that Robert Oppenheimer, who was in charge of the design of the bomb, found 'promising' (Rhodes, 1986: 511). But, Oppenheimer cautioned Fermi that 'we should not attempt [such] a plan unless we can poison food sufficient to kill a half a million men', suggesting his concern was only one of scale (Rhodes, 1986: 511). It was, as Rhodes puts it, 'bloody-minded' in a new way.

Recognition of the forces being unleashed dawned on 16 July 1945, when the first atomic explosion burst over Jornada del Muerto (the Journey of Death), a desolate area in New Mexico. Robert Oppenheimer watching the mushroom cloud famously declared 'I am become death, the destroyer of worlds.' His colleague I.I. Rabi had a similar, prophetic thought:

> At first I was thrilled. It was a vision. Then a few minutes afterwards, I had goose flesh all over me when I realized what this meant for the future of humanity. Up until then, humanity was, after all, a limited factor in the evolution and process of nature. The vast oceans, lakes and rivers, the atmosphere were not very much affected by the existence of mankind. The new powers represented a threat not only to mankind but to all forms of life: the seas and the air. One could foresee that nothing was immune from the tremendous power of these new forces (Szasz, 1984: 90).

A couple of weeks later, Hiroshima and Nagasaki were destroyed. The nuclear age had arrived.

In August 1949, the Soviet Union detonated its first atomic bomb. There was a secret debate within the US government about whether it should respond by pursuing development of the even more powerful hydrogen bomb. The General Advisory Committee of the US Atomic Energy Commission, which included Oppenheimer, Fermi and Rabi, was asked to consider the matter. In its October 1949 report, the committee concluded that the H-bomb could probably be built within five years, but advised against it.[2] The committee argued that:

> It is clear that the use of this weapon would bring about the destruction of innumerable human lives… Its use therefore carries much further than the atomic bomb itself the policy of exterminating civilian populations (York, 1987: 51).

Having recognized an important truth, the committee went further, as if compelled to explain itself. In an appendix to the report, the majority of the members (including Oppenheimer) argued:

> The reason for developing such super bombs would be to have the capacity to devastate a vast area with a single bomb. Its use would involve a decision to slaughter a vast number of civilians. We are alarmed as to the possible global effects of the radioactivity generated by the explosion of a few super bombs of conceivable magnitude. If super bombs will work at all, there is no inherent limit in the destructive power that may be attained with them. Therefore, a super bomb might become a weapon of genocide (York, 1987: 52).

The minority view on the committee, signed by Fermi and Rabi, was that this statement of

opposition did not go far enough. They pressed their objections:

> The fact that no limits exist to the destructiveness of this weapon makes its very existence and the knowledge of its construction a danger to humanity as a whole. It is necessarily an evil thing considered in any light (York, 1987: 53).

The advice of the committee was rejected. The political, military and institutional pressures of the growing nuclear complex and the Cold War prevailed. On 1 November 1952, the United States tested the first H-bomb. It had an explosive yield of over ten megatons, hundreds of times more powerful than the bombs that destroyed Hiroshima and Nagasaki and more explosive power than all the bombs dropped by United States and British armed forces during the Second World War.

The United States, followed by the Soviet Union, tested H-bombs of very large yields, releasing massive amounts of radioactivity into the atmosphere as the General Advisory Committee had warned. The radiation spread across the world and its effects will continue to be felt far into the future. In 1958, Soviet H-bomb designer Andrei Sakharov estimated that the radioactivity released by every one megaton of nuclear yield would ultimately cause cancer, genetic disorder or other illness in about 10,000 people (Sakharov, 1990).[3] Nuclear testing by the United States, Soviet Union, Britain, France and China has released an estimated 545 Mtons (von Hippel, 1990: 186). This implies some five and half million people will eventually be sickened with cancer and many of them may die.

Public protests against the health and environmental effects of radioactivity from US and Soviet atmospheric testing spurred efforts to reach the first significant arms control treaty, the 1963 Limited Test Ban Treaty, forbidding nuclear explosive testing in the atmosphere, space and under water (Wittner, 1997). Nuclear testing went underground and public fears moved elsewhere. Arms control offered the promise of restraint, but it also served to institutionalize nuclear violence. One early arms control proponent explained that it was 'an open question whether we ought to be negotiating with our enemies for more arms, less arms, different kinds of arms, or arrangements superimposed on existing armaments', but the goal was always 'to preserve a nuclear striking power' (Schelling, 1960: 893). Marcus Raskin has drawn out this darker aspect of arms control, arguing that there is 'a necrophiliac quality to the technical expertise which calculates one missile against another, as diplomats become brokers in charred bodies' because arms control talks 'eschew essential moral, legal and criminal questions' (Raskin, 1982: 206).

The nuclear war plans of the United States and Soviet Union, and the smaller nuclear weapons states, were of genocidal scale. The United States nuclear war plan in 1960 involved using some 3,000 nuclear warheads and would have resulted in the deaths of between 360 and 525 million people (McKinzie *et al.*, 2001a). US Secretary of Defense Robert McNamara argued in 1962 that fewer weapons would suffice and proposed that a 'reasonable' goal for nuclear war against the Soviet Union could be 'the destruction of, say, 25 per cent of its population (55 million people) and more than two-thirds of its industrial capacity' (*ibid.*: 114). Arsenals grew far beyond this limit and introduced the world to 'overkill' (Cox, 1977).

Over a decade after the end of the Cold War, the United States still has over 10,000 nuclear warheads, while Russia has 18,000 warheads, China has 400, France has 350 and Britain has 200 warheads (Norris and Christensen, 2003). Israel has up to 200 nuclear weapons (Nuclear Notebook, 2002a), while India has 30–35 warheads (Nuclear Notebook, 2002b) and Pakistan between 24 and 48 warheads (Nuclear Notebook, 2002c).[4] The explosive power in current arsenals is close to 3,000 Mtons, or about 200,000 times the average yield of the bombs that destroyed Hiroshima and Nagasaki, and may still be sufficient to trigger a 'nuclear winter', in which 'vast areas of the earth could be subjected to prolonged darkness, abnormally low temperatures, violent windstorms, toxic smog and persistent radioactive fallout' (Turco *et al.*, 1984: 33).[5]

The peaceful atom

The nuclear age was more than just growing arsenals and the ever-present threat of nuclear

war. Within weeks of the atomic bombing of Hiroshima and Nagasaki, drawing on earlier ideas of the power of the atom, American newspapers and magazines were offering visions of a domesticated, peaceful atom at the heart of a technological, industrial and consumer utopia. There were excited reports of the possibility of 'fantastically cheap power', 'atomic-powered rockets, airplanes, ships and automobiles', in short 'a world of unlimited power, unlimited abundance – a world limited only by man's capacity to imagine new wants and needs' (Boyer, 1985: 111–3).

It is a small step from such visions of possible utopias to the dream of development that was offered by the United States, and others, to the elites in the states that came into being with the end of colonial empires, and to the poor everywhere. For the developed world, the future was a nuclear-powered society of 'unlimited abundance' while for the 'developing' world the future was to be like the 'developed'. Both meant looking forward.

These futures of the developed and developing worlds were linked together explicitly in a December 1953 speech made by President Eisenhower to the United Nations, in which he laid out a vision of Atoms for Peace. He held out a promise of nuclear science and technology in the service of development:

> Experts would be mobilized to apply atomic energy to the needs of agriculture, medicine, and other peaceful activities. Its special purpose would be to provide abundant electrical energy in the power-starved areas of the world (Williams and Cantelon, 1984: 110–1).

The promise was grand. Lewis Strauss, head of the United States Atomic Energy Commission, declared in 1954 that nuclear power meant 'our children will enjoy in their homes electrical energy too cheap to meter' (Makhijani and Saleska, 1999: xix).

Nuclear power has fallen far short of what was promised. The economics has never proved itself, even in the limited forms of accounting that ignore the enormous externalities associated with the nuclear fuel cycle from the mining of uranium to the disposal of radioactive spent fuel. The hundreds of near-misses at reactors around the world, the 1979 near-disaster at the Three Mile Island reactor in Pennsylvania and the catastrophic accident at Chernobyl in the Ukraine in 1986 have served to make nuclear energy synonymous with risk in the public imagination.[6] Nuclear energy has in fact become the primary example of 'high-risk technologies' with 'catastrophic potential' for which, it is argued, 'no matter how effective conventional safety devices are, there is a form of accident that is inevitable' (Perrow, 1984: 3–4). With accidents being a 'normal' consequence of such systems, there is no escape from failure.

Despite this, nuclear power, as throughout its history, is still presented for judgement by its proponents in the 'future tense', that is 'in terms of what it will bring rather than what it has already wrought or what it requires from society to maintain operation' (Byrne and Hoffman, 1996: 12). The nuclear future, like religion it seems, requires faith to bear and overcome the challenges and sacrifices and dangers of the present.

The case of Pakistan

Unlike fall-out, nuclear ideas, values and technologies did not diffuse around the world; they were hand-carried, traded and pushed. The process of exporting nuclear dreams, nuclear knowledge and institutions made it much easier for some states to develop their nuclear weapons capabilities. The evidence is clearest in the case of Pakistan.

The nuclear age was brought to Pakistan in 1954 and found eager disciples among Pakistan's scientists, economic development planners and its soldiers. The consequent Americanization of Pakistan's scientific, bureaucratic and military institutions was to have an impact perhaps comparable only with the arrival of European ideas and institutions during the colonial period.

In January 1954, Pakistan's nascent scientific community found its voice in Raziuddin Siddiqui, a prominent scientist and Vice Chancellor of Peshawar University, in his Presidential address to the Sixth Pakistan Science Conference. Echoing a common equation of science and technology with development, Siddiqui claimed science and education were a 'defence against ignorance and the consequent poverty and disease' (Dawn, 1954a). But with the Manhattan Project barely a decade

old, the Cold War arms race raging, and independence having come only six years earlier, Siddiqui proposed a more important reason to support the growth of modern science in Pakistan:

> It cannot be denied that in this age of power politics not only the security but even the free existence of the eastern countries is at stake, because of their backwardness in scientific and technical knowledge… Hence we must have a vast army of those trained in all the fundamental and important scientific and technical subjects (Dawn, 1954a).

The scientists found fellow-travellers in Pakistan's Economic Planning Commission. In February 1954, the Ford Foundation agreed to fund a programme whereby Harvard University would provide experts to assist the Planning Commission in, among other things, designing and drafting a multi-year economic and social development plan (Ford, 1965: 2). The vision of an atomic age seems to have figured large in their thinking. The opening page of Pakistan's First Five-Year Plan proclaims:

> … planning in the present stage of our society means the formulation of programmes and policies designed to lead it by a consciously directed and accelerated movement from a largely technologically backward and feudalistic stage into the modern era of advanced technology now on the threshold of atomic age (NPB, 1957: 1–2).

Pakistan's military was quick on the uptake too. General M.A. Latif Khan became the first Pakistani Commandant of the military Command and Staff College in 1954. On taking charge he decided:

> The time had come for us to start making a serious study of fighting the next war which would, whether we liked it or not, be fought with nuclear weapons (Khan, 1982: 139–40).

On 19 October 1954, Pakistan announced the creation of an Atomic Energy Research Organization (Dawn, 1954b). But Pakistan lacked the scientific, technical and economic resources to support its atomic dreams. Under Atoms for Peace, Pakistani scientists were sent to the United States to study nuclear science and engineering.[7] Young Pakistani economists were sent to Harvard and other US universities. Pakistan's soldiers received their share of the American experience and 'along with American equipment and training came American military doctrines, American approaches to problem-solving, and … American pop culture' (Cohen, 1998: 163). This included visits by American experts on nuclear war fighting that 'proved most useful and resulted in modification and revision of the old syllabus' at the military staff college (Cohen, 1998: 165).

Success came in May 1998 when Pakistan tested its nuclear weapons. Nuclear weapons scientists became national heroes, models of nuclear missiles and the nuclear test site were put up in public places as national monuments and nuclear nationalism was the order of the day (Mian, 1999). But the pursuit of a place in the nuclear age had taken a profound toll. The nuclear tests came at the end of decade when, as Akmal Hussain, a leading Pakistani economist, describes it 'the government faced financial bankruptcy, the real economy was in deep recession, there was an unprecedented increase in poverty, and the institutions of governance had eroded to a point where the structure of the state was threatened' (Hussain, 2003: xv).[8]

An endless nuclear age

It is a remarkable fact that while the most widely used justification for nuclear weapons for the past 50 years disappeared with the collapse of the Soviet Union in 1991, there has been no significant effort to eliminate nuclear weapons. There is a sharpening sense of gloom among advocates of nuclear arms control and disarmament. Jonathan Schell, the author of the classic warning about the dangers of nuclear weapons, *The Fate of the Earth*, observed that, 'ten years after the collapse of the Soviet Union, the startling fact is that nuclear arms control is faring worse in the first days of the twenty-first century than it did in the last days of the Cold War' (Schell, 2000: 27).

This concern is all the more significant given that the 1970 Nuclear Non-proliferation Treaty (NPT), signed by the United States, Russia, Britain, France and China, commits the nuclear weapons states 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'. But the fate of the Treaty in the past decade shows a determination on the part of some states to acquire nuclear weapons and for others to hold on to their nuclear arsenals.

The efforts of a handful of states that had signed the Treaty as non-nuclear weapons states to develop nuclear weapons – most notably Iran, Iraq and North Korea – are now well known. Their nuclear ambitions have been the cause of prolonged international negotiations, devastating sanctions, and in the case of Iraq they been used to justify (falsely) a war. What is less well known is the effort by the nuclear weapons states to keep their weapons. This became evident in 1995 at the conference of NPT parties to negotiate the review and possible extension of the Treaty (which had come with a 25-year lifetime).

The President of the Review and Extension Conference, Jayantha Dhanapala from Sri Lanka, observed that for most states the demand was for 'further commitments towards nuclear disarmament in terms of concrete action' by the nuclear weapons states (Walsh, 1995). The United States, the other nuclear powers, and most US allies worked for and achieved an indefinite extension of the NPT without conditions or commitments on disarmament. The nuclear weapons states prevailed.

In a series of interviews, diplomats described how this decision was reached: according to Indonesia's ambassador, the 1995 decision was arrived at 'simply by the use of pressure tactics against smaller countries… many countries complained to us about pressure with conditionalities and other types of pressure'. The Venezuelan ambassador explained 'there had been too much pressure… applied in all directions', adding 'Most of the developing countries are going through difficult times, including my own'. Iran's ambassador noted that 'a lot of pressures… promises and sometimes threats were put on non-aligned countries… by certain nuclear weapons states, in particular the United States, as well as certain western countries' (Walsh, 1995). Mexico's ambassador to the United Nations Conference on Disarmament observed that the final decision, indefinitely extending the NPT, 'was what the five permanent members of the Security Council wanted and secured in order to continue being the nuclear haves in a world of overwhelmingly nuclear have-nots' (Marin-Bosch, 1999).

Now US nuclear weapons designers and military planners are pushing for new weapons designs and missions. Stephen Younger, Director of the Defense Threat Reduction Agency and former Associate Laboratory Director for Nuclear Weapons at Los Alamos National Laboratory, has argued that the US needs new kinds of low-yield nuclear weapons because its continued 'reliance on high-yield strategic [nuclear] weapons could lead to self-deterrence, a limitation of strategic options' (Younger, 2000). In short, the US should have nuclear weapons it can use without conjuring up images of Hiroshima. Paul Robinson, the Director of Sandia National Laboratory and chairman of the Policy Subcommittee of the Strategic Advisory Group for the Commanders-in-Chief of the US Strategic Command (which has responsibility for nuclear weapons) proposes developing a special low-yield 'To Whom It May Concern' nuclear arsenal, specifically directed at Third World countries (Robinson, 2001).[9]

The United States is renewing and extending its nuclear arsenal in the post-Cold War world, knowing that this more deeply embeds nuclear weapons in national and international structures of political and military thinking and action. Jonathan Schell has argued that the perversity of this policy shows that the United States pursues these weapons not out of a profound fear of attack but for 'deep-seated, unarticulated reasons growing out of its own, freely chosen conceptions of national security' (Schell, 2001: 47). But the deep-seated reasons may lie in the bomb itself, once we see it as more than just a thing. E.P. Thompson may have been right in describing these weapons as 'political agents' that needed to be understood as constituting a configuration 'whose institutional base is the weapons system, and the entire economic, scientific, political and ideological support system to that weapons system – the social system which researches it, "chooses" it, produces it, policies it, justifies it and maintains it in being' (Thompson, 1982: 20–1). It is this configuration, dubbed 'exterminism' by Thompson (to mirror its similarities with militarism and imperialism), that works its way into so-

ciety, and in Arundhati Roy's phrase buries itself 'like meathooks deep in the base of our brain', showing no sign of change (Roy, 2001: 11). Until this exterminist configuration is changed it will keep us trapped in the nuclear age, denying the possibility of a peaceful and just future.

Notes

1 I am grateful to Martin Sherwin for this quotation.
2 On the members of the General Advisory Committee, the text of the October 1949 report on development of the H-bomb and the appendices, see York (1987).
3 A reassessment of Sakharov's 1958 analysis by von Hippel (1990) found the estimate of 10,000 people affected per megaton of yield to be more or less correct, after adding in the effects of fission products to the radioactive exposure due to carbon-14 (half-life of 5,700 years), changed assumptions about world population and new parameters for the cancer risk from radiation at low doses.
4 Recent calculations have shown that McNamara's criteria of nuclear sufficiency, that is, killing 25 per cent of the population, would require only a small fraction of actually existing arsenals; if applied to an attack on the United States, it would take 124 nuclear warheads to meet McNamara's criteria, only 51 warheads in the case of Russia and 368 warheads in the case of China (McKinzie *et al.*, 2001a). The calculation assumes warheads of 475 ktons yield, comparable to those in current arsenals in the nuclear weapons states.
5 There is little solace to be had in the relatively smaller arsenals of India and Pakistan, the newest nuclear weapon states. A war between Pakistan and India in which each used only five of their nuclear weapons (the yield is similar to the bombs that destroyed Hiroshima and Nagasaki) would likely kill about three million people and severely injure another one and a half million (McKinzie *et al.*, 2001b). Both states continue to produce material for more nuclear weapons.
6 The 1986 Chernobyl accident led to the deaths of 30 people, the evacuation of 116,000 and subsequent relocation of some 220,000, radioactive contamination of about 150,000 square kilometres of the former Soviet Union, in which about five million people reside; the fallout affected 'practically every country in the northern hemisphere' (UNSCEAR, 2000: 453–566).
7 A scientist trained under Atoms for Peace presided over the development of Pakistan's nuclear weapons programme from 1972 until 1991. Pakistan was, however, not alone in taking advantage of the training offered by the Atoms for Peace plan. Altogether, 84 countries sent a total of over 13,000 scientists for training in nuclear science and engineering between 1955 and 1977 (Comptroller-General, 1979).
8 In the 1990s, poverty in Pakistan doubled, with about one in three Pakistanis living below the poverty line at the end of the 1990s (Hussain, 2003: 23), and the national adult literacy rate was about 45 per cent (*ibid.* 11).
9 The new nuclear weapons being developed by the United States include earth-penetrating weapons intended to destroy deeply buried bunkers, and low-yield nuclear weapons that would aim to reduce 'collateral damage' (i.e. civilian casualties). But a recent memo from the head of the National Nuclear Security Administration, the agency responsible for US nuclear weapons design and development, urges weapons scientists to 'take advantage of the opportunity' offered by a November 2003 Congressional mandate and funding to consider 'novel nuclear weapons concepts' (Greg Mello, personal communication).

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