

Anatomy of Nuclear War

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The date August 6, 1945. The Place - Hiroshima, Japan.

"NO one could understand what had happened. Thousands began to flee the city. Most of them seemed to be hurt or maimed. Eyebrows were *burned off*, skin was hanging from faces and hands. were vomiting. Almost all had their heads bowed, looking straight ahead, were silent and shared no expression whatsoever. In general, survivors that day assisted only their relatives or immediate neighbours, for they could not comprehend or tolerate a wider circle of misery.

Towards evening the streets became quieter; "Now not many people walked in the streets but a great number sat and lay on the pavement, vomited, waited for death and died." Even now there was no organised help masses were dead, masses were dying. "They all felt terribly thirsty and they drank from the river. At once they were nauseated and began vomiting and they notched the whole day." There were a few people who were capable of helping others. Survivors that evening noted that the asphalt on the streets was still too hot to walk on with comfort. Two men noticed "a pumpkin was roasted on the vine", which was eaten. Potatoes under the ground were found to be baked and were gathered for food. Many desperately ill survivors found their way to the sand pits on the river deltas. The tide was coming in. Many were too weak to move themselves but were helped by exhausted survivors. "He reached down and took a woman by the hands, but her skin slipped off in huge glove-like pieces." Others were moved up the sand pit but the following morning they had gone as the tide had come higher than expected.

During the first day, Father Kleinsorge was asked to help some soldiers. "When he had penetrated the bushes, he was there were about 70 men and they were all in exactly the same nightmarish state; their faces were wholly burned, their eye sockets were hollow, the fluid from their melted eyes and run down their cheeks. This was the result of having their faces upturned when the bomb exploded." (Based on the book *Hiroshima* by John Hersey).

Not long afterwards during the Korean War, the American Pentagon devised what it called the 'Hiroshima Death Function' (HDF) to calculate what would be the effect of using nuclear weapons in a selective manner. This HDF was an algorithm to calculate mortality as a function of distance from ground zero of an airburst nuclear explosion. The HDF is

$$D(r) = 0.93 \text{ Exp } \{-0.693^2 [(r - 800)/850]^2\}$$

where D = Deaths and r = slant distance in yards from point of burst for r greater than 800.

Despite the evil of nuclear weapons and the widespread revulsion at what happened in Hiroshima and Nagasaki, the contingent use of nuclear weapons has never been far away from the minds of nuclear warmongers. Certainly, these warmongers have few doctors or medical practitioners in their ranks. Most of them are defence personnel, politicians, strategists, academics and so on. But how many medical

practitioners are aware of what a nuclear war means? And how many are actively opposed to such a war breaking out and to the nuclear weapons powers or potential nuclear weapons powers army themselves with such weapons?

Today, with the "live" experience of Hiroshima and Nagasaki a great deal is known about the medical consequences of a nuclear attack. A nuclear bomb explosion involves blast effects, heat effects, and the effects of ionising radiation. The proportions of these effects can vary depending on the size and nature of the bomb. For example, in the neutron bomb (the 'capitalist' bomb which kills people but does not damage property) the blast and heat effects are greatly minimised while the radiation effect is greatly enhanced. But in the 'normal' nuclear explosion, some 50 per cent of the energy goes as shock waves or other blast effects, 35 per cent as heat and 15 per cent as radiation. The range of these effects will be different if the bomb bursts in the air blast and heat range will be greater than if it bursts on the ground (radioactive deaths, fall out etc, will be greater) or whether it explodes underground or underwater.

A sufficiently high overpressure (blast effect) on the human body will lead to rupture and haemorrhages in the lungs, air embolism and rupture of the gut and ear drums. In addition blast effects on buildings etc, will indirectly create many more human casualties through flying projectiles and falling debris etc.

The fireball of a nuclear explosion (small one) will look brighter than the sun at noon to anyone within a 50-mile radius of the explosion. To anyone looking at the fireball there is great likelihood of retinal burns leading to permanent blindness. The intense heat of such a fireball will raise flash burns of the skin. A partial thickness burn leads to blistering which can become infected. A full thickness burn is where the skin is completely destroyed. In both cases loss of crucial body fluids through the surface of the burn can lead to death. In addition, the explosion will create fires on the ground leading to flame burns which will cause lung damage through inhalation of smoke from a variety of burning materials especially plastic.

After a nuclear explosion comes the radioactive fallout as radioactive isotopes condense on debris and dust to produce the radioactive dustcloud. In the first 24 hours some 60 per cent of radioactive products fall to the ground. This is the early fallout. The 40 per cent which remains can take much longer to fall and can be dispersed over a wide area depending on weather, winds etc. This is the delayed fallout. This radiation causes damage to rapidly dividing cells such as those of bone marrow and the lining of the gastrointestinal tract. When the whole body is exposed one can get radiation sickness which is often fatal. One unit of dose i.e. energy absorbed per unit mass is called a rad and a dose of 450 rads will kill 50 per cent of young, fit adults. A dose of 150 rads will kill 50 per cent of elderly, already ill and children.

In the first form of radiation sickness/the bone-marrow

form requires only an exposure of 150 rads. The first symptoms are lethargy and nausea, then nothing for 10 days. Towards the end of the second week there is maximum depression of the white blood cells and platelets which reduces the blood's capacity to clot and stop bleeding or protect against infection. Spontaneous haemorrhages often develop. By the fourth week many of the victims will die.

If the radiation exposure is high enough then there will be gastrointestinal damage where the cells of the small intestine are damaged. This leads to massive diarrhoea with loss of body fluids, to greater risk of getting septicaemia from bacteria emerging through the damaged living. If exposure is higher still, then the central nervous system of the body is damaged leading to convulsions, coma and death in a few hours. If the victim survives, there will be gradual loss of mental and physical faculties which then results in death in a few days.

Where radiation sickness does not lead to death, it can destroy, or damage fetuses in pregnant women. Brain damage was found in many children whose mothers were less than 15 weeks pregnant in Japan when the bombs fell. Small skulls (microcephaly) occurred in 44 per cent of surviving children and 16 per cent were severely mentally retarded. The frequency of stillbirths and post-natal infant deaths rose dramatically.

The longer term effects of radiation through delayed fallout affect those not directly affected by the explosion. In these cases, radioactive isotopes are ingested through contaminated foodstuffs and fluids, by inhalation and occasionally through the skin. Radiation-induced cancers apart from leukaemia (which occurs more quickly) can emerge after a latent period of 20-25 years. Genetic abnormalities and defects can take a number of generations before emerging since gene mutations are recessive.

Even a single bomb of the kind used on Hiroshima and Nagasaki would completely overwhelm medical resources. Quite apart from the psychological damage or the direct/indirect effects of the explosion, there would be a great deterioration in public health standard with sanitation facilities wrecked and incapable of coping with sewage clearance, providing clean drinking water and so on. Thus diseases like dysentery, infectious hepatitis and salmonellosis would be promoted. There would be diseases of overcrowding, meningococcal meningitis, diphtheria and tuberculosis, diseases associated with dirt and vermin such as typhus and in Indian conditions, even plague. Common infections like pneumonia and septicaemia would become killers.

All this would be the effect of a few explosions. The effect of a nuclear war is simply unimaginable. The indirect effects would be far greater than the direct effects and impossible to calculate. As far as the environmental damage e.g. to the earth's ozone layer, leading to worldwide and devastating ecological damage e.g. freezing of the temperate regions, submergence of large land masses under water, destruction of a large part of the world's agriculture, excessive ultraviolet radiation as atmospheric protection is eliminated—these are all part of what is now called the "nuclear winter" scenario which could become a reality, even

if there was a "limited" or "small" nuclear war in a remote part of the world.

In sum for *purely* medical reasons *alone*, nuclear war must never be allowed to occur. No government should contemplate it and it should never be allowed to happen no matter what the circumstances.

Why Nuclear Arsenals?

Why then do countries go in for building nuclear arsenals? Why then the insane nuclear arms race between the superpowers? Why then the attraction that going nuclear has for bomb lobbies in countries like India and Pakistan, which have nuclear weapons capability but have not as yet crossed the nuclear rubicon of openly deploying a nuclear weapons system?

Nuclear war is mind-boggling but precisely because it throws into the dustbin older preconceived notions of war and its possible purposes, so many governments revert back to older forms of thinking in order to cope with the mind-boggling character of nuclear weapons. That is to say, these governments or these nuclear politicians or nuclear strategic experts try to treat nuclear weapons in much the same way as they try to treat and cope with conventional weapons—they try to make nuclear weapons into *viable instruments of a country's foreign policy*. Since the uncontrollable dimension of nuclear weapons means that the use of nuclear weapons for political purposes is not viable (what possible political purpose can be justified by the use of such weapons?) what has become viable is not the use but the threat of its use. This is what is called deterrence. Having nuclear weapons becomes a way of assuring nuclear peace. Despite the universal character of nuclear weapons—its universal effects and the universal horror at its use—this way of assuring nuclear peace is not the least universal in character or orientation but is strongly nationalist. Deterrence becomes a way in which a nation prevents nuclear war breaking out between itself and another nation having nuclear weapons by *intimidating* it. Thus the foundation of nuclear peace is nationalist intimidation and distrust.

The great importance given to deterrence is ultimately a reflection of the bankruptcy of those who have power in our societies. Nuclear weapons, as Einstein pointed out, should and must lead to a new way of thinking among human kind. Instead, very little has changed in the thinking of power elites. The best way to have nuclear peace say our tough-minded "realists" is to prepare for a nuclear war. What is more, if deterrence is to be credible, the possibility of a nuclear war at least a retaliation of nuclear attack must also be real. Thus, when governments say they do not believe that there can be any circumstances which justify the launching a nuclear weapons, they are either wilfully lying or caught in an insoluble contradiction. If nuclear deterrence for a country's government is to be meaningful and credible, its willingness to launch nuclear weapons must be real in certain circumstances.

Deterrence, then, is a justification for the proliferation of nuclear weapons. There is both horizontal proliferation (more and more countries becoming nuclear weapons powers) and vertical proliferation (the superpower arms race

and the other weapons powers adding to their nuclear arsenals). Both kinds of proliferation must be curbed. Such has been the insane logic of deterrence that both superpowers in the name of "national security" and "detering the enemy" have embarked upon such a fast moving escalator of arms development and deployment, that both of them have enormous "overkill" capacities. The end result of this search for nuclear security "has been ever greater insecurity vis a vis each other, and for the world". This is the historical balance sheet of all these years of nuclearly arming in order to keep the nuclear peace.

Finally, with the coming of Gorbachev in the USSR, there seems to be a chance (after three and a half decades of complete barrenness) of the possibility of the superpowers agreeing to a partial and limited disarmament in Europe. But if there is to be an escalating momentum of disarmament then public pressure and mass mobilisation on issues of disarmament must be maintained. The dangers of a new and more dangerous escalation of the arms race in space (star wars) is very much there. There is a vicious circle between the two superpowers that must be broken by external forces such as mass peace movements impinging themselves on the Kremlin and the White House. The superpowers keep on nuclearly arming themselves because they don't trust each other; they don't trust each other because they keep on nuclearly arming themselves.

For various reasons, however, the biggest danger of a nuclear war is not in Europe or the USA or Russia but in the third world where a nuclear war between the superpowers might erupt as a result of an escalating conventional war between allies of both superpowers e.g. in the Korean peninsula between north and south. Incidentally in the demilitarised zone, there are atomic mines and tactical nuclear weapons are available to the American-backed forces of South Korea.

Furthermore, rival countries with a history of mutual antagonism, such as India and Pakistan could also develop nuclear arsenals which would greatly add to the terrorism that already exist. There is already an ever growing lobby in this country demanding that India go in for the bomb now that there is growing evidence of Pakistan having a "bomb in the basement" with the "last wires unconnected". What this lobby wants other people to forget is that India exploded its bomb in Pokharan in 1974 and very likely has its own "bombs in the basement" with the "last wires unconnected". But having some bombs in the basement and openly deploying and progressively expanding one's nuclear weapons system are two different things. It is still possible to step back from the brink as far as avoiding a regional nuclear arms race is concerned. There are thus two levels at which the struggle for disarmament must continue—the global and the regional levels. One must endeavour to halt and reverse both vertical and horizontal proliferation. In the case of India and Pakistan the safest thing to do is not to get into an arms race in the first place i.e. to mutually abstain from going nuclear. This is what the establishment of a Nuclear Weapons Free Zone (NWFZ) in South Asia would mean. Of course, such a thing is feasible only if both countries want it, whether for the same or for different reasons. Pakistan has expressed

its willingness to consider such a zone if India would, because Pakistan equates itself with India and realises that the burden of maintaining "balance" on a constantly escalating regional nuclear arms race would be much the greater for it. Thus it is in its self-interest and not because of altruistic or "peace-loving" reasons that Pakistan is willing to jointly foreclose the nuclear option.

But India and its bomb lobby is not willing to accept such an "insulting" equation between itself and Pakistan. Thus it is opposed to such regional steps at denuclearisation preferring to argue that unless there is a halt to decline in vertical proliferation of nuclear weapons, there won't be a halt or reversal of horizontal proliferation. This is wrong. Both kinds of disarmament efforts must be pursued and expanded. Limited and partial efforts at disarmament at one level help such efforts at the other level. Both India and Pakistan should forego the nuclear option so that tensions between the two will never threaten a holocaust.

What about "nuclear blackmail" then by other weapons powers? This is a false question. There are three countries that might practice such blackmail. In the case of USSR and USA, the disparity between them and India, even if the latter had a rudimentary weapon system deployed is so great that there is no adequate nuclear riposte or counter threat to nuclear "blackmail" by the superpowers. It is not enough to have a few piddling bombs or missiles. India would have to have a much more powerful and "credible nuclear deterrent" against the superpowers, which it can never have. This is not to say that either the USA or USSR can easily nuclearly blackmail others. In fact one of the biggest problems with nuclear weapons is that their unique nature makes it almost impossible to use them effectively as political weapons. For example, how does the USA use its nuclear might to down Nicaragua and Cuba?

So the only other country from which India might have to fear "nuclear blackmail" is China, which has never been tempted to try any such uncertain process. To establish a "credible deterrent" against China, India would have to embark on a crash programme of nuclear weapons development to make up the 15/20 year technological and deployment gap between the two countries as quickly as possible. Success in such an endeavour is by no means assured. But what can be assured is that such Indian efforts would greatly perturb China and make it more willing to consider nuclear action or the threat of it against India. Such a move would also lead Pakistan to try and nuclearly "match" India and thus enhance the momentum of a regional arms race. There would be greater interaction distrust and hostility and above all, greater nuclear insecurity for the countries in the region—more and more insecurity in the name of the search for security. Nuclear security has to be a *common security* based on the virtues and strengths of disarmament not armament. It is the search for ways to disarm that hold the promise of a safer world not the search for how to use nuclear weapons in the service of national real politic. The greatest tragedy of the nuclear era is the contradiction between the regionalisation/internationalisation of effects and dangers of nuclear war and nuclear arms races and the nationalised

(Continued on p 134)

is also a particular example of the point raised earlier, i.e., whereas in other states of India one should not expect women to take the initiative to run their own community development programmes, and hence a government administered programme might perhaps act as a focus for initiation of such activity, the opposite is the case in Kerala. In Kerala women do have the confidence and initiative to run these programmes, perhaps borne of their better literacy and exposure to media, and as such the programmes should be sufficiently flexible to allow their participation. This would be expected of a demand-based approach, and would simultaneously ensure community participation.

Goals for beneficiaries and goals for functionaries: The point is again related to the first two. When a programme becomes centrally administered with a fixed pattern and permanent staff, it is inevitable in the long run that the executives of the programmes, on the whole, put their own personal goals first. This is a folly to which it is particularly susceptible in Kerala with its large number of educated unemployed. While it should not be grudged that such programmes have provided jobs for a number of youth it should not also be forgotten that furthering their career opportunities is not the primary aim of the programme. This point has been at the back of many recent incidents in Kerala. This is an area of conflict, which, unless resolved, effectively blocks people's participation in the programme.

Not identifying priority needs: Sometimes a community may be badly in need of a service, like protected water supply, or irrigation facilities, which, while not directly linked to child health needs, can act as a rallying point from which child development services can reach the people. Unfortunately, this aspect of community development has not been given its true importance in the programme. This is another obstacle on the way to better community participation.

Emphasis on technical aspects: There is a tendency on the part of the experts concerned with planning and implementation of the programme, especially medical personnel, to see it as exclusively a technical programme. Doctors connected with the programme should be disabused of the idea that it is a medical programme. On the other hand it should be seen as a non-medical programme with health returns. From the side of beneficiaries, there is a tendency, at least in Kerala, to view the ICDS as a formal preschool education. This is to be expected in a state where mothers put such a high value on formal education even at the pre-primary level. Here again, it is an instance of demand conflicting with need, and unless people are properly appraised of the objectives of the programme, there is a danger that they shall be disillusioned and this will effectively block their participation.

Using the programme for political leverage: It is inevitable in a highly politically-conscious state like Kerala, with political fortunes see-sawing, that programmes like the ICDS are used for political advantage. If this should happen, it alienates a large section of the community and this works contrary to the spirit of community participation.

In summing up, I should point out that child development

programmes indeed have a large potential for community participation in their design and execution. In our experience, a large part of this potential is fulfilled. In fact, it would not be wrong to state that the ICDS is one programme in the state with a large element of community participation even as it stands now. I have only tried to point out areas of conflict, the resolution of which is a must if we are to go further.

Coming back to conceptual basics, community participation in child development programmes fails if community participation itself is not seen as a primary objective. Participation should not be a means to facilitate reaching other goals. On the other hand, maximising community participation should be the primary objective, subject to the constraints. If this approach is adopted, reaching the other goals will be much faster and automatic.

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[Paper presented at the conference of SAARC parliamentarians on Child Survival, Development and Population, held at Colombo, Sri Lanka, September-October 1986.]

(Continued from p 115)

nuclear mind-set of those who are in a position to take crucial decisions concerning nuclear war and the arms races.

While local and regional peace movements can play a vital role in promoting the *process of disarmament and sustaining its momentum, a world completely and permanently safe from the fear of nuclear weapons cannot be created by movements against nuclear weapons alone. Such a world requires transcending nationalism and national elites in the name of the universal interests of human kind. In short the struggle to create a truly and permanently nuclear free world is an intrinsic part of the struggle for socialism. Without a nuclear free world there will be no socialism. Without socialism there will be no nuclear free world!*