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NUCLEAR NON-PROLIFERATION AND DISARMAMENT

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Any increase in the number of countries possessing nuclear weapons increases automatically the risk that they might be used not to deter but to annihilate, or that a conflict could erupt by accident, or that preventive strikes could be launched against an other country, or that fissile materials could wind up in the hands of criminal groups. Those concerns about the future of mankind did not emerge immediately, and if the United States decided, as soon as 1942, to impose a complete and rigorous secrecy on any information about nuclear energy, it was to prevent nazi Germany from being the first to acquire the bomb. That decision remained in force after the war, to at least delay the research carried out by the Soviets. It became irrelevant after the USSR detonated its first thermonuclear device. However, in the 50s and even beyond, common wisdom was that each country had the right and even the duty, to protect its territory and its population by manufacturing any kind of weapons which it was able to produce. The policy of secrecy was thus exchanged, in 1954, not for a universal prohibition to manufacture nuclear explosive devices, but for the "Atoms for Peace" policy. It provided that the US would supply other countries with information, equipment or materials to develop their nuclear activities, provided that the recipient country commits itself to use the elements supplied only for peaceful purposes. That same country was not prevented from manufacturing nuclear weapons if it could produce all the components without external assistance. Due to the lack of a global international regulation, seven of the eight countries possessing at present a nuclear arsenal had acquired, in 1960, the elements necessary to build it.

TOWARDS A UNIVERSAL PROHIBITION

The necessity of a general obligation not to manufacture a nuclear explosive device arose after the Cuban missile crisis in 1962, after the two protagonists realised that if a third party had interfered in their dialogue, they would perhaps not have been able to monitor the crisis and could have been dragged into a conflict which they were willing to avoid. The Non-Proliferation Treaty was thus concluded on 1st July 1968. It provides that those countries which have exploded a device before 1st January 1967[1] should endeavour not to assist any other country in acquiring a weapon. All other signatories must commit themselves not to try and get an explosive device, and place their nuclear facilities under IAEA safeguards.

In order to be fully implemented, and to set a definitive ceiling on the number of nuclear weapons countries, the Treaty should have been signed and ratified by all

[1] There are therefore 5 « nuclear weapons States, the United States, USSR at present Russia, The United Kingdom, France and China. They are also the permanent members of the UN Security Council, but there is no link between the two notions : the composition of the Security Council was settled by the UN Charter signed on 26 June 1945 ; at that time no country had ever exploded a nuclear device, and the five permanent members of the Council were those victorious in the Second World War. The definition of the nuclear weapons States dates back to 1968, and is not connected to the War, it represents those countries which had experienced a weapon when the treaty was concluded.

States, verified through a fool-proof control system, and any violation should have been severely dealt with. In fact, for several years, it was considered by a number of countries as an unacceptable infringement on their national sovereignty and as an instrument in the hands of the superpowers to strengthen their control on their block. The most important States, technically capable of producing weapons, refused to adhere to it, in particular Germany, Japan, Italy. The Treaty however entered into force in 1970, after being ratified by 40 signatories, due in particular to a number of countries which did not imagine that they could one day have an independent nuclear programme : Iraq, Iran, Syria were among them.

A dramatic evolution occurred in the mid-seventies, due to the growing role played by anti-nuclear movements, and also to the first Indian explosion in 1974: public opinion was increasingly persuaded that nuclear proliferation was a major threat and had to be stopped. Most importantly, a number of countries became at that time convinced that their own security would be better assured if their neighbours did not get nuclear weapons than if themselves could acquire them. Thus, in 1980, the number of States adherent to the Treaty was over 100, and advanced industrial countries, such as Germany, Italy, Japan, Switzerland, Netherlands were among them. The trend continued and in 1995, there were 178 signatories, which decided to extend the Treaty for an indefinite period of time. At present there are 189 signatories, that is about every country in the world.

However, the most powerful States never made the effort necessary to persuade India, Israel and Pakistan, to join the Treaty, and those three countries were able to manufacture nuclear weapons without any infringement of their international obligations. Which means that eight, instead of five countries, are at present capable of launching a nuclear strike.

VERIFICATION AND THE IAEA

According to the Treaty, the IAEA is in charge of verifying the implementation of its provisions, but the safeguard system was not designed by the inspectors themselves, but by representatives of member States. They were eager to specify which instruments were necessary to carry out the task, but one of their main concerns was also to reduce to a minimum the burden of safeguards for themselves and for their nuclear industry. A large number of limitations were therefore included, for example on the duration of inspections, depending on the nature and quantities of nuclear materials processed in a plant, or on the access of the inspectors to various parts of a facility, or on the nature of data provided to the IAEA. The most important limitation derived from the assumption that a clandestine nuclear activity was totally inconceivable, and the only imagined fraud was assessed to be through diversion of materials from civilian to military activities. Inspectors could therefore verify only the facilities declared by each State ; they were even permitted to enter a facility only if it contained some nuclear material. They had not to check the possible existence of concealed facilities or activities. Their task was to verify that the quantity of nuclear materials flowing out of a plant was equivalent to the quantity which had been inserted into it.

Such restrictions were not completely unreasonable at the time, since the available techniques to produce or separate fissile materials required very large facilities, easily identified, and the enrichment plants required huge quantities of energy. In addition, nuclear activities were accessible, at that time, only to advanced industrial countries, which enjoyed democratic institutions, a close control of their budgets by Parliaments, and an open system of information : a large project to secretly produce nuclear weapons could hardly

remain undetected. In spite of its shortcomings and loopholes, the IAEA safeguards system has worked in a satisfactory manner : since 1945, not a single explosive device has been manufactured through a facility under the control of the Agency.

However, many things have changed over the last two decades, and after the Gulf war, in 1991, a large concealed nuclear programme was uncovered in Iraq : the clandestine production of weapons was not only conceivable, but it had almost been achieved. The use of new materials had made it possible to enrich uranium by centrifugation, a technique which can be used in much smaller and unremarkable buildings, demanding a much smaller quantity of energy, and very difficult to identify. Moreover, industrial globalisation moved advanced activities into countries which had no industrial experience twenty or twenty five years ago. Progress in transport and communications led to an international division of work by multinational firms, but also by networks of traffickers, who can thus elude national controls : between the early nineties and 2002, the network headed by the Pakistani Abdul Kader Khan supplied North Korea, Iran and Libya with data, and equipment, to develop a military programme. For Libya, the various components were procured from some 15 countries.

To try and cope with that new type of fraud, an "additional protocol" was added in 1997 to the existing IAEA safeguards system. It provides inspectors with widely extended possibilities, and has already demonstrated its efficiency[2]. It is a major improvement, but not a panacea : it applies only to those countries which have signed and ratified it. Above all, an international organisation cannot make use of the same methods as intelligence agencies to collect information or evidence. Inspectors can at best identify the existence of clandestine activities in a country, but except if they are very lucky, they will not be able to locate a concealed facility unless an intelligence service has traced it.

SANCTIONS

If the IAEA detects a breach of an obligation, the matter is referred to the United Nations Security Council, which has so far considered two cases, and that experience provides a mixed record. In 1991, after Iraq had been militarily defeated, and obliged to accept the terms of a UN resolution, the IAEA destroyed completely its illicit nuclear facilities and after that, contrary to what the Bush Administration claimed in 2002, Iraq never resumed any nuclear activity. Concerning North Korea, the Council simply stated in 1993 that the violations had to be solved through negotiations. The outcome was an incredible agreement between the US and the North Koreans, providing that the NPT would no longer be implemented in North Korea ; instead, South Korea and Japan would finance and build in North Korea two large nuclear reactors for electricity production, in exchange for a freeze of the two most important North Korean facilities. That agreement remained in force until October 2002, when it was cancelled by the US. Since then, the North Koreans withdrew from the NPT, expelled the IAEA inspectors, resumed the operation of their reactor and of the reprocessing plant. They may have at present enough plutonium for two to six bombs, they are continuing to separate larger quantities of fissile material, and they claimed that they possessed nuclear weapons. In addition, they have received from Khan's organisation at least the blueprints of an enrichment plant, and a few prototype centrifuges. None of those actions has been referred to the Security Council, and for two years, negotiations have been

[2] In 2004, the IAEA has demonstrated that in the past, South Korea and Taiwan had secretly made some research on uranium enrichment and on reprocessing.

conducted between six most interested countries, so far without results other than an agreement to go on discussing.

As for Iran, in which a large programme was uncovered in Summer 2002, due to the revelations of a group of political opponents, the NPT has not been violated in a narrow legalistic sense, and the matter has not been brought before the Security Council. Negotiations were under way with Germany, France and the United Kingdom, provided that all activities leading to uranium enrichment were frozen. They came to an impasse after Tehran resumed its conversion activities at the beginning of August 2005. If a negotiated settlement cannot be reached, the matter may be referred to the Security Council on political, rather than legal basis, but if in the end, Iran refuses to renounce its military ambitions, the only available solutions would be either to accept a flagrant violation of the Treaty and the nuclear armament of Tehran, or preventive strikes on its facilities. None of them is really attractive.

PROSPECTS

Since 1995, confidence in and support for the non-proliferation policy has sharply declined. American neo-conservatives are, as a matter of principle, hostile to any involvement of their country in any international agreement ; others in the US, claimed that the NPT was linked to the cold war, and after the end of the war, it should be abandoned for an anti-missile defence ; some others consider that proliferation by countries allied to the US is perfectly acceptable. Some critics were also aimed at the discrimination in the NPT between two categories of States, or at the refusal by the five nuclear weapons States to fulfil their own obligations of disarmament.

All those bitter controversies wounded up in the failure of the NPT review conference of June 2005, where signatories were unable to agree on anything. The practical consequences of that failure will be negligible, since the purpose of the conference was only to consider the manner in which the Treaty has been implemented since 2000, it was not supposed to reach operative conclusions. However, the failure is fairly important from a political viewpoint : the conference has shown a world divided, disorientated on non-proliferation, and the participants did not express a unanimous and strong condemnation of violations or breaches of the Treaty, which could be hoped for.

In fact, the most critical issue for the future might be the outcome of the current crises in North Korea and Iran. If both countries must, at the end, abandon their military ambitions, as several others have already done, those who might be tempted to imitate them should hesitate before embarking in an onerous and hopeless adventure. But if they succeed in manufacturing some weapons, a number of other countries may decide that if the international community proves unable to implement the regulations which it has set, the NPT is no longer their best assurance of security, and they better rely on their own capabilities. Moreover, if Iran and North Korea acquire nuclear weapons in violation of their obligations, other countries would be legally justified to withdraw from the NPT[3]. Egypt, Saudi Arabia, Syria, Turkey might wish to match the Iranian arsenal ; South Korea, Japan, Taiwan, may want to emulate North Korea. In addition, the recent examples of Pakistan, Iraq, North Korea, Iran, Libya, seem to demonstrate that nuclear weapons are frequently sought

[3] Article X provides that « Each Party shall, in exercising its national sovereignty, have the right to withdraw from the Treaty if it decides that extraordinary events, related to the subject matter of this Treaty, have jeopardized the supreme interests of its country.

after by brutal, dictatorial regimes, incompetent, corrupt, frequently linked to the military, and which consider that prestige and national pride can compensate for political, economic, and social failures. According to that pattern, countries such as Burma, even Nigeria, might be added to the previous list, and perhaps Indonesia, Malaysia (where the centrifuges for Libya were manufactured), and to a lesser extent, Algeria. In the least favourable circumstances, it cannot be ruled out that in a few years, 15 or 20 countries could be capable of launching a nuclear conflict whose consequences would be beyond repair.

DISARMAMENT

Dissemination of nuclear military capabilities would increase the risks associated to nuclear weapons, it would not create it : the same risks derive already from the existence of nuclear arsenals in eight countries, and the possibility of a collective suicide could be dispelled only through a complete elimination of all nuclear weapons. Malenkov, in the mid-fifties, Reagan in the eighties, considered as insane a defence policy based on the threat of mutual destruction. Gorbatchev, in 1986, proposed, the elimination of all nuclear weapons in 15 years, and at Reykjavik, Reagan and Gorbatchev were very close to an agreement to get rid of all nuclear weapons, before their aides convinced them that it was undesirable. George W. Bush, when campaigning to become president, declared in June 2000 that the US should unilaterally reduce its nuclear arsenal, and he added "…weapons that we do not need any longer are onerous relics of past conflicts…"[4].

Many people were convinced that nuclear weapons were the instruments of the cold war, and that they would be eliminated once it was over. And in fact, START I in 1991, START II in 1993, seemed to confirm that assessment : the number of weapons would be reduced progressively until the evolution would result in a complete disarmament. It was an error, in fact START are almost what they claim to be, a reduction in one category of armaments, and not at all what politicians and the press pretended, a route towards complete elimination of the weapons. As the name indicates, the treaties provide for a reduction in the number of strategic weapons, namely those designed for the confrontation between the two superpowers, and able to reach the territory of the opponent. Therefore, they do not affect shorter range armaments which could be preserved intact. The exact number of those tactical weapons remains undisclosed, but in the 1980s and probably the 1990's, it was supposed to be about 7000 for the US. In addition, both treaties provide for the reduction in the number of operational missiles and of their warheads, but while the missiles in excess must be destroyed, the same provisions do not apply to the warheads, which can be kept in reserve.

After 1995, the former enemies have been so bitterly divided that the prospect of a START III vanished, and since that time, no measure of disarmament or of armaments reduction has been adopted in the world, except for an agreement between George W. Bush and Vladimir Putin in June 2002, which reduces further the number of operational weapons, which should not exceed 1700 to 2200 on each side by 31 December 2012. However each country will simply remove the warheads from the missiles where they can be reintroduced at any moment, and the agreement can be ignored on 1st January 2013. Until June 2005, the Pentagon said that it intended to retain, by the end of 2012, a number of warheads in reserve such that the total, operational and in reserve, would be 10 000. At present, those figures have been brought down to about 6000. In addition, an undisclosed

[4] George W. Bush in the National Pen Club, Washington, 23 June 2000.

number of tactical weapons have been retained, 480 of them seem to be in Europe. In other nuclear weapon States, the armaments have been kept at a level roughly equal to that in the mid-seventies, except for the United Kingdom, where the arsenal has been drastically reduced.

In all countries, nuclear doctrines have recently been adjusted to the post cold war world, and the most impressive evolution occurred in the United States. According to the January 2002 Nuclear Posture Review, the gigantic American armies, of which the nuclear arsenal is a component, are designed to prevent any other country from ever challenging the overwhelming military superiority of the US. Nuclear weapons are no longer the instruments of a deterrence policy, they are a part of all offensive weapons, and can be used as any other weapons depending on the nature of the operation to be performed, including possible preemptive or preventive strikes. Measures will be taken to recruit a new generation of experts, new facilities will be built to manufacture enriched uranium and plutonium pits, and provisions will be made to prepare a new generation of intercontinental ballistic missiles (ICBM) in 2020, new submarines and sea-launched ballistic missiles (SLBM) in 2030 and new bombers in 2040. Which means that the nuclear arsenal is scheduled to remain as it is for an indefinite period of time, and at least until the end of the century. Those changes have gone unnoticed, except by a few specialists from Pugwash. Public media, after publishing beaming reports on a “three quarter reduction of nuclear arsenals”, scarcely mentioned the Nuclear Posture Review. In the five nuclear weapons States, whether authoritarian regimes or democracies, profound modifications in the armaments and in doctrines have been decided without any consultation of public opinion or of parliaments, as if the defence policy was a private property for heads of States.

It seems at present almost ridiculous to simply evoke nuclear disarmament, and the anti-nuclear weapons movements of the past do not exist any more except for Movement Pugwash. It must be added that, while the tests conducted by the French in 1995 had to face a very powerful wave of perfectly legitimate protests, the Indian and Pakistani explosions in 1998 were met by a dead silence, as if nuclear explosions were quite acceptable, if they are performed by developing countries.

The trend towards disarmament may be revived one day, hopefully through an evolution of mentalities, under the influence of opinion makers. That would require a very careful review of the matter, which would be an extremely delicate and difficult endeavour, if it is not limited to mere slogans.

Unless the decision has been made in extraordinary or dramatic circumstances, disarmament can only be progressive, and it can be assumed that every State involved will want to retain an element of deterrence until the very final stage has been reached. The discussions would therefore be long and delicate, in particular on the agenda and the modalities, since if all arsenals were proportionately reduced at each step, the smaller ones would at a moment loose any deterrence capability, while the larger ones would remain dissuasive. An equal treatment from a quantitative point of view would mean an unbalanced qualitative situation.

Still more importantly, a complete elimination of the weapons will never be accepted unless a reasonable assurance can be obtained that a clandestine acquisition of a nuclear explosive device is materially impossible. And in fact, the world would not be safer if a Saddam Hussein or a Kim Jong Ill were the only persons in the world in a position to use a weapon. In spite of the adoption of the “additional protocol” in 1997, the responsibility to detect the location of a concealed facility rests on intelligence services, and their task is particularly difficult, and perhaps impossible, in countries with a brutal regime and an absence of public information, namely those where clandestine activities would most likely be developed. For example, intelligence agencies learned of he acquisition of

centrifugation techniques in North Korea only after it was revealed by Khan, the Iranian activities were denounced by a group of opponents based overseas, and the Libyan programme remained uncovered before being revealed by the Libyan head of State. It will therefore be impossible to obtain any kind of assurance that there is no concealed facility unless a technical means is found to detect it from outside the country, even if it is a conversion or an enrichment plant. Further research seems to be needed in that field.

Although START does not mention their elimination, both the US and Russia have unilaterally decided to dismantle an undisclosed number of warheads. However, the recovered pits will not be definitively withdrawn from military activities until the contained fissile materials have become unfit for explosive purposes. But so far, most of the pits have been stored, in the United States, in conditions supposed to be very safe, in Russia in facilities where security is less than perfect. In 1993, the US bought 500 metric tons of highly enriched uranium from dismantled Russian warheads. To fuel American power plants, the uranium will be downgraded to 3,5 %, and at that moment, it can no longer serve for military purposes unless it is re-enriched. However, since 1993, only 250 tons have been downgraded and shipped to the US. The remaining 250 tons (which could make some 10 000 bombs) are stored in Russia, in facilities where the risk of theft or diversion to an other country or to a criminal organisation is not nil. In fact, the problem is still larger, since, in addition to the 500 tons sold to the US, the Russian arsenal seems to have released a very large quantity of highly enriched uranium in excess of the needs, although the exact figure is not available. The future of that uranium is not known, and it may be stored in the same unsatisfactory conditions. The 250 tons left could technically be downgraded in a relatively short time, which would eliminate the risk of their utilisation for explosive purposes, but so far that has not been done, for financial and social reasons. In the US, the enriched uranium from the warheads has probably been stored in conditions hopefully better than in Russia. There is no indication that it may have been downgraded.

As for plutonium, the total quantity contained in each arsenal is not known, but experts consider generally that it is over 100 tons. In the mid-nineties, both superpowers declared that 50 metric tons of plutonium were in excess of their military requirements. Later, the figure was reduced to 34 tons in the US, and the Russians found that it was also 34 tons for them. The problem with plutonium is by far more difficult than for enriched uranium, since apparently, only five techniques can be imagined : shot it to the sun, but nobody is prepared to take the risk that the rocket might fail. Pour it down to the centre of the Earth, but nobody knows how to do that ; or explode it, which is generally considered as not acceptable. The only two solutions left are to vitrify the material and store it underground, or burn it in reactors. Some anti-nuclear movements do not accept vitrification and underground storage, since it would also legitimate the vitrification and burial of nuclear wastes, and everywhere, the project faces the famous Not In My BackYard opposition. In addition, a number of people object to vitrifying a material which they view as an indispensable future source of energy. The use on plutonium as reactor fuel raises similar opposition and many more technical, financial, and political difficulties.

Neither solution would be totally definitive, but both would make it more difficult to recover the fissile material and use it to manufacture a weapon. Due to oppositions and obstacles, and in spite of commitments taken every year by the G8, nothing has been done so far, except for 180 grams of plutonium (out of 34 tons) shipped to Canada by the US and Russia for technical tests, and, recently, 143 kilograms shipped by the US to France to test if it can be used in mixed oxide to fuel power reactors. Here again, the bulk of the material is stored, and the Russians are completing a plant at Mayak designed to store 20000 pits. That might be a much safer place to avoid thefts and diversions, it is not, however, a completely definitive solution. It must be added that several projects have been considered

to use plutonium as a fuel in Russian reactors, and for a number of reasons, none of those projects did materialise. If it did, the process could be very long, since the most elaborate of the drafts provided for the use of 1,3 tons of plutonium per year, a long period to burn 34 tons, and still more to neutralise the more than 100 tons in each arsenal.

In all, the decisions taken since 1991 to dismantle some of the obsolete warheads finally wound up in both countries in the storage of huge amounts of fissile materials, where they are still extremely dangerous, and may be the current major threat to security in the world. As a general nuclear disarmament does not seem to be on the agenda in the foreseeable future, there is ample time for every one, public opinion, lawyers, diplomats, politicians, and primarily scientists, to consider all pending questions, and try to find in advance satisfactory solutions to a number of problems, which, if left unresolved, could jeopardise any prospect of disarmament.