Carnegie Quarterly - *Spring-Summer 1996*

HEADING OFF A NEW NUCLEAR NIGHTMARE
Illicit Trade in Nuclear Materials, Technology, and Know-How

Contents:

Heading Off a New Nuclear Nightmare
Illicit Trade in Nuclear Materials, Technology, and Know-How

Nine hours by air and seven time zones from Moscow lies Vladivostok, the southernmost port city of Russia's Far East and home to its Pacific fleet. The naval ports around the city have certain features in common with major military installations in the West: nuclear powered surface ships and submarines, enriched uranium fuel stockpiles, and nuclear weapons. But to researchers at the Center for Nonproliferation Studies (CNS), an international policy research center at the Monterey Institute of International Studies in California, the Vladivostok region is the embodiment of a nuclear proliferation nightmare. Its ports are part of a politically unstable country, its nuclear material and fuel are inadequately safeguarded as a result of the degenerating economic situation in Russia, and it is a stone's throw from nations that already possess nuclear weapons or have nuclear ambitions.

At several naval bases around Vladivostok, an estimated twenty-four highly radioactive reactor cores cut out of dismantled nuclear powered submarines are either floating in bays or sitting in unsafe ground storage. The only waste depot in the former Soviet Union that once accepted such waste, the Mayak facility in Siberia, has closed its doors. Until recently, spent radioactive fuel from nuclear subs was overflowing into the water from two storage tankers docked southeast of Vladivostok (U.S. and Japanese foreign aid are now helping to alleviate the problem). Many of Russia's older nuclear submarines scheduled to be dismantled under START I (Strategic Arms Reduction Treaty) are located near Vladivostok. But the dismantling effort there is proceeding only haltingly. Similar if not worse problems are being faced at Russia's northern Severodvinsk naval facility, which also is dismantling nuclear submarines.

According to the CNS staff, base personnel and guards at the Vladivostok bases frequently go several months between paychecks, putting the job of protecting nuclear fuel second to daily survival. The harbors around the city host dozens of operational subs carrying nuclear weapons and fresh, highly enriched uranium (HEU) fuel. Refueling facilities where the HEU is stored sit within the region.

The area reveals other unsettling developments. With deep budgetary cuts from Moscow, Vladivostok these days often goes without electricity. Geographically isolated from the Russian capital, and of less strategic importance to the government than it used to be, the city has had to expand its trade in domestic goods and services with Russia's traditional rival, China, to gain new revenue. That in turn has drawn to Vladivostok thousands of Chinese traders and entrepreneurs from across the border, who now compete with Russians for housing and services, elevating regional tensions.

"With a lot of underfunded, poorly guarded nuclear facilities, the Pacific fleet is especially vulnerable to nuclear espionage," claims James Clay Moltz, research professor and assistant director of the CNS, who paid a visit to Vladivostok in early 1996. "You get the sense that if guards at the naval base were offered several thousand dollars to look the other way, they would be hard pressed not to do so."

Meanwhile, Vladivostok's closest geographic neighbor and one of the world's most insular nations, North Korea, has just built a multimillion-dollar consulate in the town, even though Russian-North Korean trade is a relatively paltry $60 million per year. Speculation among local officials about nuclear espionage is rife, particularly since seventeen North Korean "farm workers" were caught earlier this year lurking around the naval facilities.

The Center for Nonproliferation Studies, founded in 1989 by William C. Potter, a professor of international policy studies and longtime analyst of Russia, has grown into one of the United States' premier research and training centers focusing on nuclear proliferation issues. The premise of the center's myriad programs is that nuclear nations have a global responsibility to keep fissile material and technology under lock and key. With Corporation and other foundation grants, it has been trying to alert the international community and the general public to the dangers of real and potential illicit traffic in nuclear materials, technology, and know-how, mainly from the former Soviet Union.

One avenue the CNS is pursuing is to train a new generation of nonproliferation experts from the successor states of the USSR. The hope is they will bring their knowledge to bear in setting sound denuclearization policies for their home countries -- ensuring the physical security of nuclear material and technology and pushing for a firm worldwide commitment to nonproliferation.

Growing Risks

Although the collapse of the Soviet Union and the end of the cold war have greatly reduced the threat of strategic nuclear conflict, this development should not obscure the existence of other very real, and in some instances new, threats involving the spread and use of weapons of mass destruction, Potter believes. The risks include not only the theft, diversion, and illicit export of sensitive nuclear material, equipment, technology, and information (such as warheads from inadequately safeguarded storage sites) but imprudent state-sanctioned trade in nuclear goods and also in critical components of chemical weapons and missile delivery systems (such as gyroscopes that target missiles for both chemical and nuclear warheads). Other risks include acts of nuclear, chemical, and biological terrorism.

Alarming enough in Russia, the dangers may be even more pronounced in some of the fourteen non-Russian states that inherited nuclear power plants, nuclear research reactors, nuclear powered naval vessels, and storage facilities for nuclear fuel and waste. [1] During the cold war, Moscow often co-located its military and civilian nuclear installations, which included fuel fabrication and reprocessing facilities as well as research centers. Many of the technicians operating those installations were ethnic Russians who returned to their homeland after the breakup of the Soviet empire, robbing the successor states of experienced workers.

Also, the nature of the threat against those nuclear installations has changed. The Soviet dissolution presented the newly independent nations with international borders that were suddenly open to smugglers and other criminal elements. Not only were the civilian governments left with the loss of trained technicians, but they now had to deal with heightened security needs. In the three nations that still held strategic nuclear weapons after the Soviet collapse -- Belarus, Kazakstan, and Ukraine -- procedures for securing and accounting for fissile material were and still are rudimentary. (All have now relinquished the nuclear weapons in their territories for dismantling and storage in Russia.)

Compounding the lack of operational experience and technology for safely removing spent uranium is the dearth of both governmental and nongovernmental expertise on nuclear proliferation in the successor states, including Russia itself. "Under the Soviet system," says Potter, "very few individuals received any training in international security affairs, let alone nonproliferation policy. As a result, they are ill-equipped to remedy the current weakness in their nonproliferation and export control policies."

Effective border controls to prevent transfer or leakage of nuclear material and technology between post-Soviet states and through to unfriendly countries have yet to be fully implemented. Within the Commonwealth of Independent States (CIS), the loose confederation of twelve states that succeeded the Union of Soviet Socialist Republics, the Central Asian nations share borders with Iran, Pakistan, Afghanistan, and China and are just hours by auto from Iraq and India. India and Pakistan are undeclared nuclear states. Iraq's secret nuclear program has been disrupted for the present, but Iran is considered by the West to have nuclear aspirations. The proximity of these former Soviet republics -- in particular Kyrgystan and Tajikistan -- to the centuries-old smuggling and drug trafficking routes makes them prime conduits through which nuclear material and technology could be spirited abroad.

No Longer a Theoretical Possibility

Already, smuggling and leakage of fissile material have passed from the theoretical what-if stage to reality. Since the Soviet Union's collapse, Potter and his research associates at the center have identified at least four instances in which highly enriched uranium or plutonium was illicitly exported from the former Soviet Union and another three cases in which HEU or plutonium was diverted from Russian nuclear facilities, fortunately seized prior to export. (See sidebar on the center's information databases.)

A serious instance of nuclear diversion occurred in late 1993 when two former employees and a current worker at the Sevmorput shipyard near the northern port of Murmansk stole 4.5 kilograms of partially enriched uranium from the storage facility. Although Sevmorput is one of the Russian navy's chief storage depots for nuclear fuel, Potter quotes the chief Russian investigator of the diversion, Mikhail Lulik, as declaring, "Potatoes were guarded better than naval fuel."

Reassuringly, there have not been any confirmed cases of smuggling of nuclear material in or from the CIS in the past two years, although "some may have occurred but gone unnoticed because of the lack of inventory control," Potter ventures. The danger over time is that greater quantities of material will be diverted, possibly through the Caucasus and Central Asia. "The dam has not yet broken, but clearly the potential for additional diversions remains very significant because of the region's precarious social and economic situation and inadequate border controls."

From their investigations, Tariq Rauf on the center's research staff and his Canadian colleague Joanne Charnetski estimate there will be enough surplus plutonium from dismantled nuclear warheads in Russia to make nearly 40,000 primitive nuclear bombs by the year 2003. Their data indicate it would take only about fifteen kilograms of HEU, seven of reactor-grade plutonium, or five of weapons-grade plutonium to make such a bomb. Expanding stockpiles of civilian, reactor-grade plutonium in Western Europe and Japan would be sufficient for another 47,000 bombs. [2]

Among governments, the concern is not so much that terrorists will obtain a nuclear weapon. "What is more likely," says Rauf, who directs the center's International Organizations & Nonproliferation Project, "is that they will steal a small amount of nuclear waste or fissile material and explode it, spreading radioactivity across wide regions, or sabotage a nuclear power plant, causing similar widespread contamination."

Most diversions of weapons-grade nuclear material from the former Soviet Union thus far have involved current and former employees who knew the location of the material and what safeguards were in place but were caught before customers could be found. U.S. officials, however, are worried that political instability in the CIS could well accelerate such smuggling attempts, particularly if terrorists or criminals try to exploit the vulnerabilities of different states. For organized crime, the payoff is cash -- as much as $250,000 per kilogram of HEU or plutonium, a sum that nuclear aspirants such as Libya have reportedly offered to pay.

To date, there is no proof that Libya, Iran, or Iraq has acquired HEU or plutonium from any part of the former Soviet Union, although their attempts to acquire missile technology are well known. The United Nations Special Commission on Iraq (UNSCOM), for example, has uncovered documents indicating that Iraq received gyroscopes from dismantled Russian missiles. Observers are also on the lookout for missile contacts between Ukraine and Iraq as well as between Kazakstan and Iran.

"It would be a mistake to neglect the potential proliferation risk posed by the enormous quantities of virtually unguarded spent nuclear fuel," warns Potter. "It cannot be emphasized enough that this spent fuel containing so-called 'reactor-grade plutonium' can be used to fabricate nuclear weapons.

"Moreover, spent fuel from certain kinds of reactors may be especially attractive to would-be proliferants with access to reprocessing technology, because of the unusually large proportion of HEU or plutonium present. Spent naval fuel from nuclear powered surface ships and submarines, for example, typically will have a large HEU content, while that in fast breeder reactors may contain significant quantities of low irradiated plutonium."

The presence of inadequately protected nuclear fuel depots, reactors, and naval installations across the CIS seems to be drawing certain nations to within an arm's length of nuclear sites in Russian cities. The new North Korean consulate in Vladivostok is one example.

Another is Iran's apparently rising interest in the formerly closed Caspian Sea port city of Aktau, Kazakstan, home to one of only two fast breeder power reactors in the former Soviet Union.

Fast breeder reactors produce weapons grade plutonium during their energy producing process and, as such, have the potential to supply the key ingredient in bomb manufacturing. The Aktau fast breeder has been in operation for more than twenty-five years, storing much of its plutonium waste on site. Members of the CNS staff report that Iranian naval ships routinely call on Aktau, and Iran has attempted to establish a consulate there since 1993.

Building a Community of Nonproliferation Experts

Given the obvious threat that improperly safeguarded material and technology pose to the former Soviet Union and the rest of the world, a priority for the CNS has been to provide the current generation of opinion leaders in the former Soviet Union -- primarily parliamentarians, academics, scientists, environmentalists, and journalists -- with an intense grounding in nonproliferation issues, so they can push for measures in their home countries to prevent a nuclear nightmare from becoming a reality.

Prior to the failed August 1991 coup against President Gorbachev, nuclear nonproliferation was not a salient issue in the Soviet Union. As Potter notes, the Soviet Union adopted a "generally prudent approach" toward nuclear exports and was cautious about exporting nuclear technology to other states. "At the time, nonproliferation generated little attention in the mass media, in scholarly journals, among nongovernmental activist organizations, and among Supreme Soviet legislators. No Soviet journalists outside of the central governmental apparatus were professionally active in the field. It was only near the end of the Communist regime that the economic crisis began to undercut nuclear nonproliferation policy."

But the disintegration of central authority after the failed coup and the inheritance of diverse nuclear assets by a number of Soviet successor states found the region (outside of Russia) without a community of policy experts and specialists informed about nuclear export legislation, among other issues, or firmly committed to an international nonproliferation regime.

To the CNS's team of high-level faculty members and researchers, developing a "culture of nonproliferation" within the Soviet successor states is of paramount importance. Achieving it, they feel, will depend less on money or material than on an educational process that changes mindsets and behavior.

Explains Potter, "We're helping people in countries like Kazakstan appreciate how nonproliferation serves their interests and why it's important to upgrade the physical protection and accounting of nuclear materials. We're not evangelists here. We believe these nations have to make their own decisions, but they have to be informed decisions. Our hope is that as they gain access to more information the logic of the situation will prevail."

Under its CIS Nonproliferation Project, the center brings approximately ten fellows from the former Soviet Union to Monterey each year for two to four months of research and course work. More than thirty government officials, policy analysts, professors, journalists, and scientists from a variety of Soviet successor states have spent time at Monterey. They

include Temirbek Baicherikov, former head of the political analysis department of the Office of the President of Kyrgyzstan; Vladimir Shkolnik, Kazakstan's minister of science; Nikolai Steinberg, former chairman of the Ukrainian State Committee for Nuclear and Radiation Safety; Vladimir Orlov, a journalist with *Moscow News*; Anatoly Scherba, head of the Ukrainian Arms Control and Disarmament Directorate in the Ministry of Foreign Affairs; and Dastan Eleukenov, head of the division of international security and arms control in the Kazakstan Ministry of Foreign Affairs. In the first few years of the program, candidates for the fellowship were identified during visits by Potter and his colleagues to the former Soviet Union. "Now that we are well known and have an established base of alumni there, we've since moved to a more formal application process," says CNS project manager Emily Ewell.

Many visiting fellows have held prominent positions at home and, upon the resumption of their responsibilities, have started working to implement policies and actions that further the cause of nuclear nonproliferation. For example, following their studies at Monterey, two Kyrgyz government officials helped orchestrate Kyrgyzstan's accession to the Nuclear Non-Proliferation Treaty (NPT). After four months at Monterey, a Ukrainian fellow joined the Ukrainian Foreign Ministry and facilitated that country's adoption of the Missile Technology Control Regime guidelines.

After training at the CNS, Vladimir Orlov of *Moscow News* opened the Center for Political Studies, which publishes the news journal *Yaderny Kontrol (Nuclear Control)* in Russian. A visiting fellow from Belarus established the International Institute for Policy Studies in Minsk, which specializes in domestic and international policy studies as well as nonproliferation and arms control, and another fellow established Moscow's Committee for Critical Technologies and Nonproliferation.

Education for visiting fellows ranges across the field of nonproliferation. During a typical six-week period, visiting fellows receive a variety of in-depth lectures on such topics as Proliferation as a Component of the Current Global National Security Environment; the Nunn-Lugar (Cooperative Threat Reduction) Program as an Exercise in Nonproliferation; Regional Approaches to Nonproliferation; the North Korean Nuclear Problem; the NPT 1995 Conference & Decisions; U.S. Government Policy and U.S. Government Bureaucracy Regarding Proliferation; Nuclear Weapons-Free Zones; U.S. Perspectives on Proliferation Programs in the Countries of the Former Soviet Union; and a variety of subjects relating to conventional, biological, and chemical weapons.

During their course of study, fellows are also required to complete a research project relevant to the center's work. This past spring Alexander Tsvetkov, a visiting fellow from Uzbekistan's Institute of Strategic and Regional Studies, was preparing a report for his president on creating a nuclear-free zone in his country. He was also looking for ways to prevent nuclear material and technology from passing through Uzbekistan to nearby neighbors, Afghanistan and Iran.

"There are a lot of trade routes for smuggling of drugs," Tsvetkov affirms. "Our republic keeps our border strong, but we need technical assistance to improve [border controls] because of concern over nuclear materials. Through the Monterey Institute we have contact with the [Lawrence] Livermore Laboratory, and they have promised to come to Uzbekistan to discuss the problem with our scientists and government."

Fellows are encouraged to develop links with other independent organizations and foundations in the West and are taught the fundamentals of fund-raising in the hope that their projects will eventually become self-sufficient. Western groups supporting the work of

former visiting fellows include the Ploughshares Fund in San Francisco, the W. Alton Jones Foundation in Charlottesville, Virginia, the John D. And Catherine T. MacArthur Foundation, and the Ford and Rockefeller foundations.

A CNS program linked to the visiting fellows targets staff members from the Russian Duma, the lower house of Russia's parliament. "Ill-informed parliamentarians have proved to be an obstacle to the enactment of more effective nonproliferation measures in many of the Soviet successor states," says Richard Combs, Jr., former chief foreign policy advisor to Senator Sam Nunn (D-GA) and deputy chief of the U.S. Embassy in Moscow from 1985 to 1987, who is spearheading the fellowship program. "If Russia is going to have a meaningful legislative branch and to bring pluralism into its system, it must have a competent parliament.

"If the Duma evolves into anything similar to America's Senate or House of Representatives, then staff members will be responsible for three-quarters or more of all legwork and analysis. Developing a culture of nonproliferation among Duma staffers may pay long-term dividends if they help to craft legislation that improves nuclear safeguards."

CNS's Expert Staff

Helping to accomplish the CNS's aims in the former Soviet Union and in other parts of the world are a diverse and dedicated group of about thirty full-time nonproliferation experts recruited by Potter to the center. They include Combs, who also served as a staff member of the U.S. Senate Armed Services Committee; David Fischer, a thirty-year veteran of the International Atomic Energy Agency and its former assistant director general for external relations focusing on safeguards and nonproliferation policies; and Timothy McCarthy, who also serves as an UNSCOM inspector policing Iraq's weapons development programs.

All CNS key personnel seem to share a singular trait: the ability to work with intensity and dedication, yet quietly, in building cadres of nonproliferation experts. It is a style that has opened doors to them in the former Soviet Union, China, and the Middle East and in other areas of proliferation concern. In operating below the political spectrum, they can engage in discussions of nonproliferation with expert counterparts in countries where, at this time, government-to-government talks are generally ruled out.

The center's nonproliferation efforts in the former Soviet Union are being expanded to mainland China as well. China at this time is refusing to preclude the use of force to settle its territorial claims. It has shown its willingness to export missile technology. It tested a nuclear weapon as recently as September 1996, although it has agreed to stop testing henceforth and has endorsed the Comprehensive Test Ban Treaty. (See p. 17 of this issue.)

As in the center's work with visiting fellows from the former Soviet Union, the goal of the East Asian Nonproliferation Project is to begin a long-term process of engagement with counterparts and to educate and train a variety of Chinese scholars, journalists, and parliamentarians in nonproliferation concerns. Thus far, the center has developed ties with Fudan University in Shanghai, which has received approval from Chinese authorities to begin an experimental program on arms control and regional security. Initial joint CNS-Fudan studies are likely to focus on Sino-Russian nuclear cooperation, Chinese civilian nuclear power developments, and the prospects for a nuclear weapons-free zone in Central Asia. Two Fudan professors have agreed to study at Monterey within the next year.

The Center for Nonproliferation Studies is linked with the Monterey Institute's educational programs, which draw 750 students from more than fifty countries for professional training

in international careers. The institute offers master's degrees in business, public administration, policy studies, international trade and commercial diplomacy, environmental policy, foreign languages, and translation and interpretation. Currently about forty-five of the institute's students are engaged in nonproliferation training and research in the CNS.

Many of the institute's and center's former students have moved into influential positions in the U.S. departments of state, defense, and energy, the International Atomic Energy Agency in Vienna, the Organization for the Prohibition of Chemical Weapons at the Hague, and the United Nations Center for Disarmament Affairs in the U.S., where they have worked on nonproliferation issues.

For Information

William C. Potter, Director, Center for Nonproliferation Studies, Monterey Institute of International Studies, 425 Van Buren Street, Monterey, CA 93940. (408) 647-4154.

Notes

[1] The fourteen non-Russian states are Armenia, Azerbaijan, Belarus, Estonia, Georgia, Latvia, Lithuania, Kazakstan, Kyrgystan, Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan.

[2] Tariq Rauf and Joanne Charnetski, "Swords into Ploughshares: Canada Could Play Key Role in Transforming Nuclear Arms Material into Electricity," *Ottowa Citizen*, 22 August 1994.

The CNS Computerized Databases

To the Monterey Institute's Center for Nonproliferation Studies, nuclear proliferation issues cannot be addressed without first uncovering details of the problems and analyzing their significance. For this, the center depends on its extensive databases of nonproliferation information culled from publicly available, "open source," documents and publications. The databases include approximately 21,000 abstracts from more than 160 sources, and many at the CNS believe the material is as comprehensive and thorough as classified sources. An illustration of this is the center's highly respected database on nuclear smuggling incidents.

A well-documented database can be used for accurately tracking trade in nuclear technologies and can be invaluable in piecing together the existence of potential nuclear bomb programs throughout the world.

"If a country is importing bearings and certain metals, it could add up to a nuclear weapons program," says Tariq Rauf, director of the center's International Organizations & Nonproliferation Project. "No one gizmo in itself raises an alarm, but pieces can add up."

Adds scholar in residence David Fischer, "If you had followed the open source information on Iraq, you would have been able to put together a picture of the Iraqis' nuclear aspirations. A systematic literature search can give you a good survey of what's going on."

That is exactly what inspectors of the United Nations Special Commission on Iraq (UNSCOM) did recently when they turned to the CNS databases to provide fast and accurate data on Iraq's weapons-procurement activities during an interrogation of Iraqi military officials. "The

UN doesn't have focused, security-related intelligence," says Timothy McCarthy, a senior analyst who splits his time between the Monterey Institute and UNSCOM, where he serves as one of its inspectors. "UNSCOM can get information, but it takes time. Sometimes, though, we don't have time to go through government channels. In one case, we needed information on cooperative activities that Iraq had in the missile area with a particular country before the [Persian Gulf] war. In fifteen minutes we had a dozen papers faxed from the center to us on Iraq's agreements in that area."

Many international organizations access the center's databases for that reason. The databases are available on computer disk and on the World Wide Web. Subscriptions are sold for several thousand dollars to organizations in places such as Japan, South Korea, France, and Italy and are free to nations with limited financial resources. Subscribers in the U.S. include the Department of Defense, the Customs Service, the Arms Control & Disarmament Agency, and the Lawrence Livermore and Sandia national laboratories.

The CNS's nuclear-related databases geared toward the Commonwealth of Independent States (CIS) include:

- The CIS Nuclear Profiles Database, which surveys nuclear assets in each Soviet successor state, including civilian nuclear power capability, fuel cycle facilities, and nuclear weapons as well as export controls, disarmament activities, and key organizations.
- The CIS Nuclear Chronologies, which track illegal activities involving the transport of nuclear materials and the exodus of specialists from the commonwealth.
- The CIS Nuclear Library Annex, which offers a variety of publications from the commonwealth, the Carnegie Endowment for International Peace, and other organizations.
- The CIS Nuclear Import/Export Database, which tracks international commerce in nuclear technology.
- The CIS Environmental Abstracts, which address ecological problems associated with nuclear power and weapons and management strategies, legislation, and enforcement mechanisms to deal with them.

Using the Tools of Diplomacy to Stop the Spread of Nuclear Arms

In 1991, after secretly dismantling its arsenal of six nuclear bombs, South Africa signed the Nuclear Non-Proliferation Treaty (NPT). It was an extraordinary act of nuclear renunciation -- one that followed the decision by Argentina and Brazil during the 1980s to end their flirtation with nuclear weapons. Then, in 1991, Belarus, Kazakstan, and Ukraine all announced their intention to send the thousands of Soviet-produced nuclear weapons on their territory for storage and dismantling in Russia. For the present, North Korea's and Iraq's nuclear ambitions have been contained. Iran and Libya, however, are suspected of coveting the bomb, and nonproliferation efforts have failed to reduce the nuclear arsenals of the de facto nuclear states of Israel, India, and Pakistan. Meanwhile, the five declared nuclear weapon states -- Britain, China, France, Russia, and the United States -- have kept their nuclear arsenals, although Russia and the U.S. have cut the number of weapons sharply.

Iraq was a signatory to the NPT, but the hollowness of that commitment came to light after the Persian Gulf War when allied forces discovered Iraq's secret weapons-building program, abetted by legal and illicit trade in weapons equipment with European companies. Iraq was formally denuclearized under United Nations Security Council Resolutions 687, 707, and 715

mandating monitoring by the United Nations Special Commission on Iraq (UNSCOM) and the International Atomic Energy Association (IAEA). Then the defection in mid-1995 of a top Iraqi general revealed Iraq's persistent efforts to acquire uranium enrichment and missile technology from companies in Russia and Europe.

UNSCOM reported later that year that Iraq had continued to withhold information from inspectors and that blueprints and uranium enrichment components were still being hidden. In December 1995, Jordanian authorities seized within their borders missile guidance systems that came from dismantled Russian ICBMS. They were headed for Iraq.

Though Israel, India, and Pakistan have not admitted to possessing nuclear weapons, piecemeal disclosures about their programs and leaks of U.S. intelligence estimates indicate that they could deploy dozens of bombs or could quickly develop them in a crisis. These three countries are not parties to the NPT -- a situation that allows them to maintain their military nuclear programs without international intervention. India exploded a nuclear device in the Rajasthan desert in 1974. Fears are that if India explodes another one, a nuclear arms race could be sparked in South Asia.

So, even though the United States and Russia no longer have their missiles pointed at each other, like a remake of a Hollywood film noir the story is still dark and ominous, with added nerve-wracking uncertainties. U.S. appeals to international nonproliferation norms carry little weight in countries like North Korea, which display open hostility toward the West and remain isolated from the world community.

"As recently as mid-1995, the time of the indefinite extension of the Nuclear Non-Proliferation Treaty, it appeared that the rate of proliferation was slowing, that the geographic ambit of proliferation was shrinking, and that the norm of nonproliferation had become deeply entrenched in international affairs," wrote Leonard S. Spector, director of the Carnegie Endowment for International Peace's Nuclear Non-Proliferation Project, in a report for the Canberra Commission. [1]

"But evidence of powerful countervailing trends -- including the threat of leakage of nuclear materials from the former Soviet Union -- has become unmistakable, and it is increasingly difficult to judge whether proliferation is on the wane or on the rise and whether the norm against the spread of nuclear arms is anything more than a thin veneer."

Spector and his associates at the Washington, D.C.-based endowment have been using Corporation funds since 1984 to tackle the seemingly intractable problem of spreading nuclear weaponry, materials, and technology. As an independent source of information and analysis on the issues, their project has pursued a course of conferences, research, outreach, and publication to underscore the urgency of developing effective nonproliferation measures -- measures that take into account not only the supply of weapons and materials but the local security concerns that spur regional arms races. Project staff members periodically publish comprehensive surveys of nuclear programs around the globe and, before the advent of the World Wide Web, developed a computer-based network for nonproliferation specialists with whom they regularly consult.

In 1992 a group of experts whom Spector convened to discuss nuclear weapons and the security of the Korean peninsula visited North Korea and were the first publicly to report that the country had produced weapons-grade plutonium. In recent months, the project has begun to assess the workability of several strategies for strengthening the nonproliferation

regime. Among them are counter-proliferation, improved security assurances, incentives, and sanctions.

Counter-proliferation

In December 1993, the Clinton administration announced a major new Pentagon program for applying military resources to counter the proliferation of weaponaches to the problems.

But in fact, diplomacy continued to dominate U.S. efforts to meet the nuclear proliferation challenge, and gradually the two approaches began to work in harmony, as originally designed. The complementarity was clearly demonstrated in the case of North Korea.

Though North Korea has been a party to the NPT since 1985, the government at Pyongyang did not permit inspections of its civil nuclear sites by the IAEA until 1992, and then only grudgingly. At that time, the inspections uncovered discrepancies in the quantity of plutonium that North Korea claimed it produced and what it appeared to have. This prompted the IAEA in early 1993 to request a special, anywhere/anytime inspection of two 'undeclared' facilities near the Yongbyon nuclear complex suspected to contain waste from plutonium production. North Korea refused. There followed a year-long crisis in which Washington and the Vienna-based IAEA butted heads with Pyongyang, culminating in North Korea's withdrawal from the IAEA and a nearly implemented threat to withdraw from the NPT. When North Korea curtailed inspections at its declared sites, the U.S. responded with a mid-1994 proposal to the UN Security Council that the world body implement a complete economic embargo, to include oil, against North Korea -- a step that the latter declared would constitute an act of war.

It took threatened sanctions and a visit by former president Jimmy Carter to diffuse the crisis over North Korea. His assistance led to what is known as the "Agreed Framework" between North Korea and the United States, which called for an immediate freeze on operations and the eventual dismantling of North Korea's most sensitive nuclear plants, including a small nuclear reactor and a plutonium separation plant at Yongbyon. The agreement additionally called for full IAEA investigations of North Korea's past nuclear activities and for all plutonium fuel from the Yongbyon reprocessing plant, which Spector estimates is enough for at least four to five bombs, eventually to be transferred out of the country. (The exact date of the transfer, most likely to the U.S., is still being discussed.)

In return, Pyongyang was to receive two nuclear power plants that were less proliferation prone [2] by the year 2003 and a quantity of heavy fuel oil for heating and electricity production.

Only later, when Clinton administration representatives explained the diplomatic deal with North Korea to Congress, was the critical role of counter-proliferation fully disclosed. At the height of the crisis in June 1994, the Pentagon had moved a carrier task force to the region and was prepared to strengthen U.S. forces in South Korea, parrying Pyongyang's threat that sanctions would mean war and helping to bring North Korea's leader Kim Il Sung to the bargaining table.

Counter-proliferation proved its value in dealing with North Korea. Its effectiveness in this circumstance is acknowledged by Spector, who had placed himself squarely on the side of traditional diplomacy but who now calls himself a "diplomatic activist with increasing appreciation for the role of military preparedness."

On the other hand, counter-proliferation has had less to contribute on the Indian subcontinent, primarily because of the continued state of hostility between India and Pakistan over the long-disputed Kashmir. Here U.S. diplomacy has centered around the 1985 Pressler Amendment, which conditions U.S. aid and military sales to Pakistan on an annual "finding" by the American president that Pakistan does not have a nuclear weapon.

Since 1990, says Spector, when Pakistan apparently fabricated actual cores for nuclear weapons for the first time, the president has not been able to make this certification, and U.S. aid and sales of such military hardware as F-16 fighters has been denied to the government in Islamabad. Pakistan's purchase of short-range missiles from China, which are capable of carrying nuclear, chemical, and biological warheads, has led to additional sanctions -- for example, on exports to Pakistan's space agency.

Under these pressures, which were eased slightly in 1996, Pakistan has halted production of weapons-grade uranium and has not deployed nuclear arms, but it has refused to give up its de facto nuclear arsenal.

For its part, India is believed to have stockpiled components for 50 to 100 nuclear bombs since its first and only nuclear detonation in 1974 and has developed its own indigenous short-range, nuclear-capable missile, the Prithvi. Washington has imposed no sanctions on New Delhi other than a long-standing embargo on nuclear trade. In late 1995, however, when it observed India preparing for a second nuclear test, the U.S. threatened to impose sanctions on U.S.-Indian financial dealings and trade if New Delhi conducted the test. "In early 1996, it became clear that India had canceled the planned detonation," says Spector.

In dealing with friendly states on the Indian subcontinent, the U.S. has relied exclusively on traditional nonproliferation diplomacy, and there has been no occasion for using military force under the counter-proliferation program.

Security Assurances and Incentives

Writing in a Carnegie Endowment report, [3] Virginia Foran, director of the Spector group's Security Assurances Study, expresses her belief that "the richest progress on nuclear nonproliferation will depend less on increased vigilance on export controls or coercion by the nuclear-weapon states than on recognizing the right of the nonnuclear-weapon states to security in a proliferated world by addressing their need for strong collective security assurances and a stronger voice in nuclear disarmament."

As defined in the endowment's report, a security assurance is "any type of assistance a state receives or is promised to receive from an outside source that contributes to its security." There can be positive assurances, which contribute to a state's ability to defend itself against attack or threat of attack, such as participation in an alliance like NATO that offers a nuclear umbrella. Or there can be negative assurances, which are promises not to threaten another state, as in declarations of no first use of nuclear weapons.

The key to employing an effective set of security assurances and incentives that prompt countries to pull back from the brink of nuclear development (or deployment) is knowing which assurances and incentives work, which do not, and why. Many analysts believe, for example, that American guarantees to defend Taiwan and South Korea were critical to the decisions of these countries not to develop nuclear weapons. But in other cases the pattern is less certain. Was it the incentives of expanded space cooperation or threatened sanctions

that persuaded Russia in the early 1990s not to sell India cryogenic rocket engines potentially useful for ballistic missiles?

The Carnegie Endowment's Security Assurances Study is attempting to answer these and other questions in its historical study of security assurances, pinpointing their effect in reducing proliferation. The study is also examining how global security assurances may change since the mid-1995 indefinite extension of the NPT and the breakup of the Soviet Union.

The nonproliferation project staff plans to augment its Security Assurances Study with a program on Incentives Strategy, designed to examine the broader field of incentives as a nonproliferation tool. The goal of both the study and the program is to offer strategies that politicians and nongovernmental organizations could use to solve pressing nuclear proliferation problems.

In addition to their utility in dealing with North Korea, incentives proved essential in persuading Ukraine to give up custody of the approximately 4,500 nuclear warheads remaining on its territory after the collapse of the Soviet Union. Vocal factions within Ukraine pressed Kiev to retain the weapons. But it was a willingness on the part of the U.S. and Russia to link the goal of nonproliferation to Ukraine's economic and military security that convinced the country's leaders to return the nuclear weapons to Russia.

In exchange for returning the weapons and joining the NPT, Ukraine received debt relief from Russia as well as 100 tons of non-weapons-grade uranium for its nuclear power plants. Russia, the U.S., and Great Britain pledged not to make military threats against Ukraine, and the United States provided funding for dismantling and transporting nuclear weapons back to Russia.

Incentives -- in the form of U.S. aid programs and scientific collaborations -- have also been important in convincing Russian and Ukrainian scientists not to accept positions in foreign countries of proliferation concern. The "Lab-to-Lab" program, involving the U.S. National Laboratories and their Russian counterparts, as well as the International Science and Techno-logy Centers established in Moscow and Kiev, are providing millions of dollars to employ weapons scientists from the Commonwealth of Independent States in peaceful research projects at home. Some of these projects seek to improve the security of poorly protected nuclear materials.

The U.S. has also agreed to purchase 500 metric tons of weapons-grade uranium removed from Russian nuclear weapons over a twenty-year period. The deal gives Russia cash to meet its budgetary needs and lets it dispose of large quantities of unneeded fissile material. A portion of the proceeds will also go to Ukraine, Belarus, and Kazakstan.

The cost of the fissile material, which will be blended down to low-enriched uranium and used in civil power plants, has been set to provide a profit for the U.S. firm involved in the purchase. Even so, security assurances and incentives are usually costly in dollars and cents. The U.S. Congress has spent hundreds of millions of dollars to fund nonproliferation measures contained in the Nunn-Lugar Cooperative Threat Reduction Program. [4]

"It's my view that Congress supports incentives fundamentally," says Spector. "There are hurdles to overcome, but they have supported it as a good investment."

Just as security assurances and incentives can curtail nuclear proliferation, failure to offer such assurances can have the opposite effect. For example, many believe the failure of the U.S. to offer Israel sufficient security assurances in the 1960s led it to become a de facto nuclear state and to develop atomic weapons. The same argument can be advanced for India, Pakistan, and South Africa, all of which sought but did not receive security assurances from various superpowers, leading them to develop their own nuclear weapons.

Bright Spots

In contrast to the general bleakness of the situation in North Korea, Iraq, Iran, and Libya, the success in Ukraine is one bright spot in the nonproliferation regime. There are others as well, as highlighted in Spector's most recent survey, *Tracking Nuclear Proliferation*:

- Overall, the number of countries attempting to acquire or build nuclear weapons has dropped significantly since the 1970s, enabling nonproliferation efforts to be concentrated on a handful of recalcitrant countries.
- The IAEA has taken steps to prevent the type of inspections shortcomings that let Iraq develop an elaborate, clandestine nuclear program. Instead of inspecting only facilities that are officially "declared" by member countries (which let Iraq operate unhindered at undeclared sites), the IAEA can now use its authority to make anywhere/anytime, special inspections of suspected undeclared sites.
- The NPT was extended indefinitely by consensus in mid-1995, and membership is at an all-time high of 184 nations. Prospects for the worldwide Comprehensive Test Ban Treaty are promising. (See article three in this issue.) There is also likely to be discussion of a treaty banning production of fissile material for nuclear weapons at the Conference on Disarmament in Geneva.

In addition, important progress was made on three major nuclear-weapons-free-zone treaties in the past year. In December 1995, the seven members of the Association of South East Asian Nations (Indonesia, Malaysia, Singapore, Thailand, Brunei, Vietnam, and the Philippines) along with Myanmar (Burma), Cambodia, and Laos signed the South East Asian Nuclear Weapons Free Zone Treaty. When the treaty enters into force, it will prohibit signatories from manufacturing, possessing, testing, or threatening the use of nuclear weapons. The treaty also bans the dumping of nuclear waste in Southeast Asian waters.

In March 1996, the U.S., Britain, and France agreed to abide by the three protocols of the South Pacific Nuclear Free Zone Treaty (also known as the Treaty of Rarotonga). The treaty, now in force, includes Australia, Cook Islands, Fiji, Kiribati, Nauru, New Zealand, Niue, Papua New Guinea, Solomon Islands, Tuvalu, and Western Samoa. The treaty's protocols require the three nuclear powers to abide by treaty restrictions in their South Pacific territories and prohibit the use of nuclear weapons against the above nations. It furthermore will ban nuclear testing within the zone area.

The latest nuclear-weapons-free-zone treaty was signed in April 1996. When it enters into force, the African Nuclear Weapon Free Zone treaty, also known as the Treaty of Pelindaba, bans the acquisition, manufacture, and possession of nuclear weapons within the treaty zone. The U.S., Britain, France, and China have signed protocols prohibiting them from threatening the use of nuclear weapons against treaty parties and banning nuclear weapons testing in the treaty zone. Russia has withheld its signature because the treaty may still permit U.S. nuclear weapons at the Diego Garcia military base, located on an island in the northeast Indian Ocean between the Horn of Africa and the tip of India.

An Ideal Nuclear Nonproliferation Regime

If one were to design an ideal nuclear nonproliferation regime, what might it look like? To Spector, it would consist of the following:

- A universally accepted international treaty prohibiting, without qualification, the manufacture or possession of nuclear weapons.
- An iron-clad, treaty-mandated verification system to guarantee that parties were not engaging in prohibited behavior.
- A respected, politically powerful international verification organization with a large membership.
- Treaty provisions or regime rules penalizing nonmembers.
- A multilateral export control system that was integrated with the regime's verification system and that restricted transfer of materials, equipment, and technology usable for the production of nuclear weapons.
- At least one related treaty or international understanding that reinforced the basic regime by, for example, prohibiting use of the weapons banned in the regime's basic treaty, creating prohibited-weapon-free zones, or barring the testing of such weapons.

For Information

Leonard S. Spector, Director, Nuclear Non-Proliferation Project, Carnegie Endowment for International Peace, 2400 N Street, NW, Washington, DC 20037-1153. (202) 862-7900.

Notes

[1] "Nuclear Proliferation Outside the Nuclear Weapon States," report for the Canberra Commission, January 5, 1996. The commission, convened by the government of Australia, is made up of internationally recognized authorities on nuclear arms who are trying to make the elimination of nuclear weapons a long-term policy goal for the nuclear weapon states.

[2] The plants are considered less proliferation prone because of a design that makes removing spent fuel from the plants, which can be processed into plutonium, into a lengthy, complicated process, and because the fuel is of a special, low-enriched uranium type that is only manufactured in industrialized nations.

[3] Virginia Foran, "Security Assurances: Implications for the NPT and Beyond," Carnegie Endowment for International Peace, 1995.

[4] The Nunn-Lugar Cooperative Threat Reduction Program provides U.S. funding for nonproliferation and disarmament efforts in the Commonwealth of Independent States. Nunn-Lugar funding has been used to assist in the return to Russia of more than 5,000 nuclear warheads from Belarus, Kazakstan, and Ukraine as well as for the purchase and transfer of 600 kilograms of highly enriched uranium from Kazakstan to secure storage in the U.S.

The Carnegie Endowment's Moscow Center for Russian and Eurasian Affairs

The Carnegie Moscow Center for Russian and Eurasian Affairs is the first overseas presence of the Carnegie Endowment for International Peace in fifteen years. Opened in 1993, it

offers a variety of nonproliferation-related seminars, workshops, and conferences to advance official and expert understanding of nonproliferation issues within the country and in other post-Soviet states. It also fosters informed media coverage through a series of press briefings and roundtables for Moscow-based and other journalists.

"People knew there were others in the country working on nonproliferation and arms control, but no one knew what the other was doing," says Leonard S. Spector, whose Nuclear Non-Proliferation Project includes both work at the Carnegie Endowment's headquarters in Washington, D.C., and the Moscow Center. "The Moscow Center provides interested colleagues in Russia additional links to the international nonproliferation community and helps build a sense of common purpose. I hope that bit by bit we will enlarge the commitments of the nonproliferation communities in both countries to this goal."

The Moscow Center addresses eight broad programs,* of which the Moscow Nuclear Non-Proliferation Project is one. Recently the center launched the first periodical in the Russian language on nuclear nonproliferation. Published in conjunction with the Moscow office of the New York University Center for War, Peace, and the News Media, *Nuclear Nonproliferation* culls English-language articles and other documents, translates them into Russian, and distributes them free of charge to specialists and journalists. Work has begun on an electronic mail system, using the Internet, to provide news stories and documents to several dozen Russian journalists in hopes that it will serve as the beginning of an interactive, Russian-language network on nuclear affairs. The program also hosts the CIS-U.S. Nuclear Forum, a monthly seminar series, plus ongoing exchanges on Russian attitudes toward the START II treaty.

Note

* The others are politics and society in transition; economies of the post-Soviet states; conventional arms control; international migration; security and national identity; ethnicity and politics in the former Soviet Union; and post-Communist institutions.

Denuclearization as a Serious Policy Option

Assuming a posture of "do as I say, not as I do," the five declared nuclear powers of the United States, Russia, England, France, and China are attempting to keep the lid on nuclear proliferation while they themselves continue to develop, deploy, and, until just recently, test nuclear weapons. But doubts are growing that the strategy of exclusion can be maintained indefinitely.

"Our efforts to prevent the spread of nuclear weapons to other countries are affected by the signals we send to them about the nuclear weapons we have," maintains Cathleen Fisher, a senior associate at the Henry L. Stimson Center in Washington, D.C., and director of its Eliminating Weapons of Mass Destruction project. "A two-tier system in which nuclear weapons are sanctioned for five but outlawed for all others will be increasingly unacceptable over the coming years."

Fisher readily admits it will be a Sisyphean battle to get the nuclear five even to consider changing the status quo. There is still resistance to ending nuclear testing and to reducing nuclear warheads below the agreed-upon START I and II treaty levels.* The immediate task is to negotiate a START III "framework" agreement on deeper cuts to facilitate Russian ratification of START II.

The end of the cold war and the dissolution of the Soviet Union have offered an opportunity to raise anew the question of what good purpose is served by Russia still having 8,500 strategic nuclear warheads (before START I) and enough plutonium and highly enriched uranium to make tens of thousands more, or by the United States still possessing about 7,800 warheads (not counting START I reductions). As for France, Britain, and China, their nuclear armamentarium includes, respectively, about 510, 300, and 280 warheads. How safe can the world be under conditions in which all these terrifying weapons are still harbored, even under the tightest security?

"The nuclear danger is not just through purposeful use," explains Stimson Center president Michael Krepon. "The danger can also come from screwups, command and control glitches, theft, and acts of terrorism. People are beginning to ask fundamental questions again about why we have these weapons and why we can't get rid of them. The only good reason to have nuclear weapons is to deter their use until they are eliminated." (See *Carnegie Quarterly* winter/spring 1992 and summer/fall 1993 for previous discussions of the nuclear danger.)

There are other possible answers. Policymakers and military planners within Europe and the North Atlantic Treaty Organization are continuing their cold-war reliance on America's nuclear umbrella, because a new strategy has not developed in the several years since the collapse of Communism in the former Soviet Union. For Britain, France, and India, nuclear weapons allow them to "punch above their weight" on the international scene and bolster their political bargaining power. Other nations like Israel and Pakistan have constructed bomb programs to counter larger, more populous enemies.

Researchers at the Stimson Center, however, are convinced from their studies that only the phaseout of all nuclear weapons will enhance worldwide security. They argue that the risk of retaining nuclear weapons may now outweigh their benefits.

The Drive toward Zero

The Henry L. Stimson Center, founded in 1989 with Corporation support, specializes in research and public education on arms control and international security. One of the center's key activities is the Eliminating Weapons of Mass Destruction project, which is attempting to make a realistic assessment of the prospects for reducing the number of nuclear weapons in the world to zero.

As fanciful as it may seem, this idea has captured the support of a powerful group of former military leaders and arms control negotiators. The project's steering committee includes General Andrew Goodpaster (ret.), former supreme allied commander in Europe; General Charles Horner (ret.), former commander of the Air Force Space Command; former secretary of defense Robert McNamara; and former chief arms control negotiator Paul Nitze. The challenge is how to get to zero.

This group rejects specific deadlines for disarmament, endorsing instead an "evolutionary" approach that proceeds with other efforts to reduce the dangers posed by the proliferation of weapons of mass destruction. Members of the steering committee plan to release a report by February 1997 calling for the nuclear powers to begin negotiations to work toward worldwide nuclear disarmament. The report will offer an arms control agenda for the new administration, taking into consideration international developments such as progress toward ratification and implementation of START II and the evolving situation in East Asia.

Concurrently, the Stimson Center has commissioned three sets of papers, each consisting of four to six articles, that are intended to serve as a guide to researchers and politicians. They deal variously with regional obstacles to arms cutbacks, noted cases of nuclear rollback (such as South Africa and Brazil), and the development of verification controls and safeguards in a world free of nuclear weapons.

Next, the center will explore ways in which all five declared nuclear weapon states might join with Russia and the United States in multilateral nuclear arms reductions. In addition, a consensus might be reached on how to handle nations that attempt nuclear programs or terrorist activities.

While total elimination of nuclear weapons is a condition devoutly to be wished, consensus building around any objective is rare enough among Western powers, as illustrated by the almost universal condemnation by Europe of the Clinton administration's plan to impose sanctions on companies that invest in Iran or Libya. "The five nuclear powers have to develop strong, cooperative relations if we're to win this battle," Fisher declares. "If China or Russia are helping outliers, we lose." Fisher concedes, however, that the declared nuclear states are "unlikely to consider a policy of nuclear elimination without first developing reliable tools for verifying compliance as well as safeguards against nations that attempt to acquire weapons of mass destruction in a nuclear weapon-free world."

The Use of Confidence-Building Measures in India and Pakistan

As nuclear disarmament stands to be a long-term process, strategies for conflict avoidance are now needed in many regions of the world. Employing confidence-building measures (CBMs) is one such strategy.

The Stimson Center has been a long-time proponent of confidence-building measures to promote reconciliation, arms control, and disarmament. Examples of CBMs are hot lines between heads of state, permission for overflights of commercial aircraft and possibly even unarmed surveillance planes ("open skies"), and advance notice of military exercises (including possible exchange of observers during such exercises).

In recent years, the focus of the center's efforts is on diffusing the continuing conflict on the Indian subcontinent. India and Pakistan have fought three wars since 1947, and they continue to exchange fire over Kashmir. Both countries could deploy new nuclear-capable missiles, greatly increasing tensions and leading to even more dangerous proliferation steps. What is needed in such regions are confidence-building measures that address the causes behind regional tension and reduce hostilities.

Since its founding, the center has promoted direct contact and collaboration among principals across borders that lead to creative problem-solving approaches. "We hope to provide the tools for averting conflict in the present while also influencing the leaders of the future," says Krepon. Even while allowing that the seeming intractability of present-day tensions makes confidence-building measures in South Asia a discouraging undertaking, the Stimson Center "sees its work as a wise investment in the long-term stability of the region," according to Krepon.

The animosity between India and Pakistan dates back at least to Britain's 1947 partitioning of the subcontinent, and any discussion of nuclear disarmament is apt to be met with stony resistance on both sides. "External pressure does not work in South Asia," says Krepon. In fact, because India and Pakistan have not talked officially at a high level since early 1994,

most of their dialogue has been conducted through nongovernmental organizations. The center tries to show the two countries the security benefits of cooperation and nonproliferation without imposing specific ideas for solutions. "We look at the reasons for tensions and encourage South Asian countries to come up with creative problem-solving approaches of their own. We only ask that they propose the confidence-building and reconciliation measures. The idea is to get them to think in problem-solving terms rather than grievance-expression terms."

The center's confidence-building program extends to a visiting fellows program similar to that at the Monterey Institute's Center for Non-proliferation Studies. The Stimson program is geared toward those South Asians at an early or mid-career stage who are interested in the issue and who can contribute to the public debate on national security in India, Pakistan, and China. Journalists, academics, researchers, and military officers are brought to Washington, D.C., for up to two months of work-study programs on negotiation and implementation of various types of confidence building. On the agenda are visits to the On-Site Inspection Agency, the U.S. State Department, the Pentagon, the Arms Control & Disarmament Agency, the Nuclear Risk Reduction Center, and the Washington-Moscow hot line.

Some of the visiting fellows are Cheng Ruisheng, former Chinese ambassador to India and Burma; Lieutenant General Nishat Ahmad (ret.), former commandant of the Pakistani National Defense College; Raj Chengappa, senior editor of *India Today* magazine; Lieutenant General Gurinder Singh (ret.), former commandant of India's Defense Services Staff College; and Yogesh Tyagi, professor of international law at Jawaharlal Nehru University in New Delhi.

The Stimson Center is also promoting confidence-building measures in other regions of the world where nuclear weapons are of concern. The staff recently conducted meetings and workshops on CBMs in Beijing and Shanghai at the invitation of the China Institute for Contemporary International Relations. Previous workshops have been held in Israel, Egypt, and Malta for participants from Middle Eastern States and in the Southern Cone (Argentina, Brazil, and Chile). The center plans to publish a historical study of confidence-building measures, analyzing both successful and failed CBMs between Israel and Egypt, Israel and Syria, Argentina and Brazil, India and Pakistan, India and China, China and Russia, and the U.S. and the Soviet Union. "The successful implementation of CBMs in regions of tension could have salutary spillover effects, including improved civil-military relations and strengthened democratic institutions," Krepon believes. "The relaxation of tensions and the development of improved communication channels tend to erode military autonomy while making it easier for civilian leaders to foster democratic institutions."

For Information

Michael Krepon, President, Henry L. Stimson Center, 21 Dupont Circle, NW, Fifth Floor, Washington, DC 20036. (202) 223-5956.

Note

* START I addresses strategic arsenals and calls for a maximum of 1,600 deployed ballistic missiles and heavy bombers each for the United States and Russia. Each country can have a maximum of 6,000 strategic nuclear warheads on those systems, of which no more than 4,900 may be on ballistic missiles and 1,100 on mobile ICBMS. START II cuts the number of warheads to no more than 3,500 for each side and also bans multiple warheads on land-

based missiles. The U.S. ratified START II in January 1996. If approved by the Russian Duma, START II reductions would be in place by the year 2003.

Achieving the Comprehensive Test Ban Treaty

Many observers agree that the road toward denuclearization must begin with the banning of nuclear tests. The Comprehensive Test Ban Treaty (CTBT) would make a significant contribution to nuclear nonproliferation because it would be the first time the five declared and three de facto nuclear states ever linked in a common nonproliferation goal. The practical effect of the CTBT would be to hinder development of more powerful hydrogen bombs, which is largely dependent on continued testing. Moreover, banning the kind of testing that has accelerated development of nuclear warheads delivered by missile would bring such work to a halt.

The Bush and Reagan administrations in the U.S. opposed the CTBT on the grounds that testing was necessary to ensure the reliability of America's nuclear arsenal. In the post-cold war environment, however, the Clinton administration has determined that incremental improvements in reliability are not as valuable as the nonproliferation gains that would accrue through a test ban.

The future of the test ban treaty was still uncertain as of late summer 1996 because of India's reluctance to sign it unless the nuclear powers first agreed to a formula that significantly reduced the number of weapons. India also wanted the U.S. and Russia to offer security assurances that they would not attack India with nuclear weapons and would defend nonnuclear states from nuclear attack. Pakistan then said it would not sign the treaty without India's signature.

"Many countries agree with India's call for progressive reduction and elimination of nuclear weapons, but almost no one supports its direct linkage to the CTBT," says Michael Krepon, president of the Henry L. Stimson Center. "Why? Because the test ban is an essential precondition for that progressive reduction and eventual elimination. It has to come first."

Nonetheless, with India objecting to the text, the result was a deadlock that threatened to wreck the treaty. It was then diverted from the Conference on Disarmament, which requires unanimous consent, to the UN General Assembly, where a two-thirds majority is enough to open the treaty for signature. In early September 1996, the General Assembly voted 158 to 3 in favor of the Comprehensive Test Ban Treaty. Only Libya, India, and Bhutan (the latter relies on India for its defense) voted against it.

Cooperative Security and Nonproliferation

Grants awarded by the Corporation in the area of cooperative security and arms nonproliferation between 1994 and 1996 include:

American Association for the Advancement of Science: toward support of the Program on Science and International Security, $150,000 (1994, 1 year); renewal, $150,000 (1995, 1 year).

Arms Control Association: as a final grant toward a program on arms control and national security for the Washington press corps, $100,000 (1996, 1 year).

Aspen Institute: toward support of the Aspen Strategy Group, $300,000 (1996, 2 years); for discussions between U.S. and Russian policymakers conducted by the Aspen Strategy Group, $518,000 (1996, 2 years).

Atlantic Council of the United States: toward programs on Ukrainian-American relations and on nuclear arms reduction and nonproliferation, $125,000 (1994, 1 year); renewal, $150,000 (1995, 1 year); renewal, $150,000 (1996, 1 year).

Brookings Institution: toward research on the operational aspects of a cooperative security system, $1,500,000 (1994, 3 years).

Carnegie Corporation of New York: for research and writing by McGeorge Bundy, $48,871 (1994, 1 year); renewal, $68,500 (1995, 1 year); renewal, $72,000 (1996,1 year).

Carnegie Endowment for International Peace: toward a project on nonproliferation and regional security, $800,000 (1994, 2 years); renewal, $400,000 (1996, 2 years).

Council on Foreign Relations: toward the concluding conference of a project on U.S. national interests after the cold war, $25,000 (1996, 3 months); toward a task force on U.S.-Russian arms control, a joint project with the Nixon Center for Peace and Freedom, $25,000 (1996, 3 months).

Federation of American Scientists Fund: toward research and education by John Pike on antiballistic missile systems, $75,000 (1995, 1 year).

Fund for Peace: toward the Media and Security Project, $200,000 (1995, 2 years).

University of Georgia Research Foundation: toward a project on export control enforcement in the former Soviet Union, $125,000 (1994, 16 months); renewal, $100,000 (1996, 1 year).

Harvard University: for research on cooperative security and conflict prevention and on weapons proliferation, at the Center for Science and International Affairs, $700,000 (1995, 2 years); for dissemination of a publication addressing issues of compliance with the Biological Weapons Convention of 1972, $1,900 (1995, 4 months).

Human Rights Watch: toward a project on weapons transfers and human rights violations, $20,000 (1995, 1 year).

Institute for Defense and Disarmament Studies: toward an international study of cooperative policy on conventional arms control, $300,000 (1995, 2 years); final grant, $150,000 (1996, 2 years).

Institute for EastWest Studies: toward a project on subregional security and cooperation, $250,000 (1996, 14 months).

Institute for Science and International Security: toward a project on nuclear nonproliferation, $25,000 (1994, 1 year).

Institute of USA and Canada Studies: for support of a project on international security and democratization in Russia, $75,000 (1996, 1 year).

Lawyers Alliance for Nuclear Arms Control: toward dissemination of a study of the Non-Proliferation Treaty, $20,000 (1994, 1 year).

University of Maryland Foundation: for research and writing by Stansfield Turner on U.S. national security in the post-cold war era, $172,500 (1994, 13 months); renewal, $172,500 (1995, 1 year); final grant, $172,500 (1996, 15 months); toward a professional development program for women in international security, $300,000 (1995, 30 months).

Massachusetts Institute of Technology: toward a project on innovative ways to destroy land mines, $55,000 (1996, 15 months); toward support of the Defense and Arms Control Studies Program, $900,000 (1995, 2 years); for the study of the implications of university training of foreign nationals for the proliferation of weapons of mass destruction, $6,000 (1995, 16 months).

Monterey Institute of International Studies: toward research and education on the proliferation of weapons of mass destruction, $400,000 (1995, 2 years); renewal, $70,000 (1996, 1 year).

National Academy of Sciences: toward support of the Committee on International Security and Arms Control, $300,000 (1995, 1 year); renewal, $300,000 (1996, 13 months); renewal, $250,000 (1996, 1 year).

Natural Resources Defense Council: toward a program on nuclear nonproliferation, $225,000 (1995, 1 year).

New York University: for media coverage of the Moscow nuclear summit, $10,000 (1996, 3 months).

Nuclear Control Institute: toward research and public education on nuclear nonproliferation, $150,000 (1995, 1 year).

Parliamentarians for Global Action: toward projects to strengthen multilateral security and peacekeeping institutions, $200,000 (1994, 2 years); toward projects on the Chemical Weapons Convention and nuclear threat reduction, $100,000 (1996, 1 year).

Rockefeller University: toward policy research and writing by Joshua Lederberg on public protection from biological weapons, $25,000 (1994, 1 year).

Stanford University: toward a study of Soviet and American approaches to conversion of defense industries, $440,000 (1994, 16 months); toward research and training in international security and arms control, $1,666,000 (1995, 22 months); renewal, $2,000,000 (1996, 2 years); toward a project on industry restructuring and the political economy in Russia, $440,000 (1996, 1 year).

Henry L. Stimson Center: toward support, $600,000 (1994, 2 years); renewal, $600,000 (1996, 29 months).

Wisconsin Project on Nuclear Arms Control: toward research, writing, and advocacy on the enforcement of export controls, $150,000 (1994, 2 years); renewal, $75,000 (1996, 1 year).

Carnegie Corporation News

Publications Received

The following publications are among those that recently resulted from Corporation grants. They may be ordered directly from their publishers.

Autopsy on an Empire: The American Ambassador's Account of the Collapse of the Soviet Union, Jack F. Matlock, Jr. (New York, NY: Random House). As ambassador to the Soviet Union during Mikhail Gorbachev's presidency, Jack F. Matlock witnessed the forces undermining the republic. In this history, he outlines the fall of the Soviet Union, analyzing U.S.-Soviet relations, the rise of perestroika, and the dissolution of the Communist party. He also addresses current relations among the former Soviet states.

Raised by Wolves, photographs and documents of runaways, Jim Goldberg (New York, NY: Scalo). For ten years, Jim Goldberg walked the streets with Hollywood runaways, writing down their words and photographing their tragic lives. His documentary work, in brutal black and white, shows the pain that drives children to the streets and the terrors that hold them there: the prostitution, drugs, physical and psychological abuse, and, ultimately, the hopelessness.

Rallying the Whole Village: The Comer Process for Reforming Education, edited by James P. Comer et al. (New York, NY: Teachers College, Columbia University). James P. Comer and his Yale colleagues describe the foundation of the School Development Program three decades ago and revisit its challenges and successes. The authors offer practical advice on how schools can be reformed to improve student performance by including parents and community members and by focusing attention on the developmental needs of each child.

The South African Women's Health Book, edited by Margaretha Goosen and Barbara Klugman (Cape Town, South Africa: Oxford University Press).This accessible and visually appealing health book, written by and for the women of South Africa, presents a wide range of essential information on women and their bodies. Included are chapters dealing with women's position in society, reproductive health, sexuality, family planning, nutrition, and parenting.

Other Recent Publications

Avoiding Nuclear Anarchy: Containing the Threat of Loose Russian Nuclear Weapons and Fissile Material, Graham Allison et al. (Cambridge, NY: MIT Press).

Bridge Builders: African Experiences with Information and Communication Technology, National Research Council (Washington, DC: National Academy Press).

Common Ground on Terrorism: Soviet-American Cooperation Against the Politics of Terror, edited by John Marks and Igor Believ (New York, NY: W. W. Norton).

Crisis Prevention, Confidence Building, and Reconciliation in South Asia, edited by Michael Krepon and Amit Sevak (Washington, DC: Henry L. Stimson Center).

Democratization in Russia: The Development of Legislative Institutions, edited by Jeffrey W. Hahn (Armonk, NY: M. E. Sharpe).

Force and Statecraft: Diplomatic Problems of Our Time, Gordon Craig and Alexander George (New York, NY: Oxford University Press).

In Confidence: Moscow's Ambassador to America's Six Cold War Presidents, Anatoly Dobrynin (New York, NY: Random House).

Media Ratings: Design, Use and Consequence, Joel Federman et al. (Studio City, CA: Mediascope).

The Price of Admission: Campaign Spending in the 1994 Elections, Larry Makinson (Washington, DC: Center for Responsive Politics).

Strategies for the National Support of Basic Research: An International Comparison, edited by Irvin Asher et al. (Jerusalem, Israel: Israel Academy of Sciences and Humanities).

Audiovisual Materials

Chicano! History of the Mexican American Civil Rights Movement (Los Angeles, CA: National Latino Communications Center).

Early Learning (New York, NY: Learning Matters).

Eye on the Presidency (Los Angeles, CA: Center for Governmental Studies).

First Vote: A Video on Citizenship and Voting (Washington, DC: People for the American Way).

In the Mix: Compilation Reel, WNYC (New York, NY: Castle Works).

The Magic School Bus Ups and Downs (New York: Scholastic Productions).

These Girls Are Missing (New York, NY: Camerini*Robertson Documentary Films).

Recent Grants

The following are among the grants approved by or reported to the trustees at the April 11, 1996, and June 13, 1996, board meetings:

Children and Youth

Children's Defense Fund: toward support of Transforming America: A Crusade to Leave No Child Behind, a public education and capacity-building initiative on behalf of children, $700,000 (33 months).

National Coalition of Hispanic Health and Human Services Organizations: toward a policy initiative on the health and well-being of Hispanic youth, $273,000 (1 year).

University of Colorado Foundation: toward a center for the study and prevention of violence, $600,000 (2 years).

The Urban Institute: toward the National Campaign to Prevent Teen Pregnancy, $500,000 (1 year).

Preventing Deadly Conflict

Council on Foreign Relations: for a study of relations between India and Pakistan, $25,000 (4 months).

Harvard University: toward a working group on Israeli-Palestinian relations, $25,000 (1 year).

Project on Ethnic Relations: toward a project on ethnic conflict in Eastern Europe, $1,200,000 (2 years).

Developing Countries

Akina Mama Wa Africa: toward an African women's leadership institute, $50,000 (1 year).

Fundaci n Mexicana para la Salud: toward strengthening health resources and philanthropy in Mexico, $700,000 (2 years).

Africa Policy Information Center: toward a meeting on constituency development for Africa, $75,000 (1 year).

Special Projects

Joint Center for Political and Economic Studies: toward a national leadership conference for African American elected and appointed officials, $25,000 (9 months).

League of Women Voters Education Fund: for a citizens' guide to the issues in the 1996 elections, $75,000 (1 year).

National Coalition on Black Voter Participation: toward its voter education program, $50,000 (1 year).

Race and Ethnic Relations Grants Initiative

At its June board meeting, the Corporation's board of trustees approved a total of $2.1 million for sixteen research groups to study intergroup relations among elementary, middle, and high school students. The groups will attempt to learn more about how racial and ethnic differences affect young people, and how they cope with related pressures in school and among their peers. The grants were selected from a pool of 260 proposals submitted following an October 1995 request for proposals.

Carnegie Council on Adolescent Development

The Carnegie Council on Adolescent Development, a ten-year operating program of the Corporation, officially concluded its activities in June. Its major reports, *Turning Points, A Matter of Time, Great Transitions, and Fateful Choices* are now available from the Corporation. Ruby Takanishi, who served as executive director of the council, has been named president of the Foundation for Child Development in New York City, which acts to improve the quality of life for children at risk through research, policy and direct-action initiatives.

Internet Access

Carnegie Corporation's online resources contain information about the foundation, its program areas, trustees, proposal guidelines, and publications as well as summaries or full text of publications. The "What's New" section highlights the most recent Corporation activities and lists the latest funded grants and appropriations. These materials can be accessed through **gopher.carnegie.org** or **www.carnegie.org** on the World Wide Web.

Task Force on Learning in the Primary Grades

The Task Force on Learning in the Primary Grades, created in January 1994 to focus on the crucial developmental and learning needs of children from three to ten, released its report, *Years of Promise*, in September. Single copies are $10.00 and can be ordered prepaid from Carnegie Corporation of New York, P.O. Box 753, Waldorf, MD 20604. A free executive summary is also available by phone: (301) 645-2742.

Presidential Medal of Freedom

In a White House ceremony on September 9, the Corporation's president, David A. Hamburg, was awarded the Presidential Medal of Freedom, the nation's highest civilian award. President Clinton recognized Dr. Hamburg's lifelong commitment to improving the "health and well-being of our children."

New Publication

A new Carnegie meeting paper, *The Role of Sports in Youth Development*, by Alex Poinsett, is now available free of charge from the Corporation's publications office.

Staff News

McGeorge Bundy, historian, former national security advisor to presidents Kennedy and Johnson, and president of the Ford Foundation from 1966 to 1979, died on September 16. Bundy's many accomplishments include his service as cochair of the Carnegie Commission on Reducing the Nuclear Danger and his authorship of *Danger and Survival*, a history of the nuclear arms race. Most recently, he was scholar-in-residence at the Corporation. His wise counsel will be greatly missed.

Carnegie Quarterly

Spring/Summer 1996

Carnegie Corporation of New York
437 Madison Avenue
New York, New York 10022

Phone (212) 371-3200, Fax (212) 754-4073

Web Site: www.carnegie.org
Gopher Site: gopher.carnegie.org
Editor: Avery Russell
Writers: Barry Rosenberg and Avery Russell
Assistants: Beth Hickner, Laura A. Clark and Anne S. McCook
Illustrator: Geoffrey Moss