

A black and white photograph of a nuclear mushroom cloud. The cloud is large and billowing, with a dark, dense stem rising from the ground. The background shows a flat, open landscape under a dark sky. The image has a grainy, halftone texture.

The Future That Never Came

BY MITCHELL REISS

In August the world will solemnly mark the 50th anniversaries of Hiroshima and Nagasaki. Their devastation in 1945 inaugurated an age fraught with doomsday anxieties: the fear of Armageddon, of uncontrolled proliferation, and, more recently, of nuclear terrorism. Yet even before the Cold War began to fade, many countries were quietly retreating from the nuclear temptation. Mitchell Reiss explains why—and what can be done to encourage the trend.

Half a century ago, World War II ended in two blazing flashes of heat, light, and devastation. The radioactive clouds that rose over Hiroshima and Nagasaki on those two fateful days in August 1945 cast a dark shadow over what historian John Lewis Gaddis has called “the long peace” that followed. Within seven years, the United States tested a fusion device 1,000 times more powerful than the atomic explosive that flattened Hiroshima and killed more than 100,000 Japanese. By then, the Soviet Union also possessed its own atomic bomb and would soon explode a thermonuclear bomb. It seemed a foregone conclusion that many other countries, in the quest for national security and international military and technological prestige, would seek and, inevitably, obtain nuclear weapons.

During the darkest periods of these 50 years, there seemed to be only one question on many people’s minds: when and where would the next Nagasaki occur? Few could have believed that every advanced country in the world would not want the bomb, and few would have imagined that such a “winning weapon” would not again be used in military conflict. Yet despite the wars and innumerable crises that have embroiled the nine countries known or believed to have acquired nuclear weapons (India, Israel, and Pakistan remain officially mute on the point), and despite the creation of nuclear warheads numbering in the tens of thousands, not one of these weapons has been

used in war since Nagasaki. Never before in military history have countries exercised such restraint with the destructive power at their disposal.

Nor have nuclear arms proved to be the irresistible temptation that many feared they would be. Not only have nations such as Germany and Japan eschewed them, but some countries that possessed either the weapons or the means to build them have quietly (and without much fanfare in the press) retreated. Even North Korea, the greatest saber rattler of recent years, has avoided all-out confrontation on its suspected nuclear weapons program.

Instead of the dreaded global nuclear conflagration, the 50 years since Nagasaki have provided the world with an unexpected nuclear education. These weapons have proved much less useful and far more costly than anybody expected. The imperative now is to recognize these lessons and to apply them in the post-Cold War world.

To the nuclear physicists of the early 1940s, the future had an ominous cast. Scientists working on the wartime Manhattan Project quickly recognized the dangers of unbridled postwar competition in atomic arms. They knew far better than their political masters that science knows no borders and that the American nuclear monopoly could not last.

The Manhattan Project itself was a cooperative venture among the United States,

the United Kingdom, Canada, and scientists from France. Its distinguished international cast, including Denmark's Niels Bohr, Germany's Hans Bethe, Hungary's Leo Szilard, and Italy's Enrico Fermi, was a living example of the cosmopolitan nature of scientific inquiry. The United States might keep its own atomic secrets (and even that proved impossible), but it was inevitable that other countries—perhaps many others—would eventually penetrate the mysteries of the atom on their own. The British physicist James Chadwick, whose experiments in the early 1930s revealed the inner structure of the atom, described his thoughts during the war: "I realized that a nuclear bomb was not only possible—it was inevitable. . . . Everybody would think about them before long, and some country would put them into action."

Even before the end of the war, these fears prompted Leo Szilard and other scientists working at the Metallurgical Laboratory of the University of Chicago, where history's first controlled-fission chain reaction took place in a squash court under Stagg Field in December 1942, to propose that the United States share its special knowledge with the world through a supranational organization. In return for receiving the peaceful benefits of the atom—chiefly, "energy too cheap to meter," in the phrase of the day—these nations would forgo autonomous nuclear research and development projects. The alternative was almost too horrifying to contemplate. Philip Morrison, a physicist who worked on the Manhattan Project, wrote immediately after the war: "If we do not learn to live together so that science will be our help and not our hurt, there is only one sure future. The cities of men on earth will perish."

The first two decades of the nuclear age

seemed to bear out some of the worst fears of the scientists. The poet W. H. Auden declared the postwar era an "age of anxiety." The bone-chilling prospect of a hundred Hiroshimas prompted policymakers to give serious thought to dispersing America's population to the countryside and even to building cities underground. The world-renowned British philosopher and pacifist, Bertrand Russell, was so alarmed by the nuclear peril that he recommended in 1946 that the United States launch an atomic attack against the Soviet Union if Moscow refused to help form a world government.

At first, hopes ran strong that atomic energy could be placed under international control. In a speech at the United Nations in June 1946, financier Bernard Baruch, the U.S. representative to the United Nations Atomic Energy Commission (UNAEC), proposed to transfer control of all the world's "dangerous" atomic activities, including fuel-production facilities, to just such a supranational authority. "Nondangerous" activities, such as the use of radioactive isotopes in medical research, would remain in national hands, monitored by the new agency. But only after these controls were in place would the United States relinquish the bomb. This plan, which now seems either hopelessly utopian or thoroughly cynical, was a serious attempt to prevent global disaster. "Let us not deceive ourselves: we must elect world peace or world destruction," Baruch declared.

The Baruch plan foundered on growing Soviet-American tensions. The Soviets offered a fundamentally different plan: the United States would eliminate its nuclear stockpile within three months, and an international control scheme would be devel-

*Mitchell Reiss, a Wilson Center Guest Scholar, was special assistant to the U.S. national security advisor from 1988 to 1989. He is the author of *Bridled Ambition: Why Countries Constrain Their Nuclear Capabilities*, which has just been published by the Woodrow Wilson Center Press and is distributed by Johns Hopkins University Press. He is currently writing and consulting on the relationship between technology and foreign policy. Copyright © 1995 by Mitchell Reiss.*

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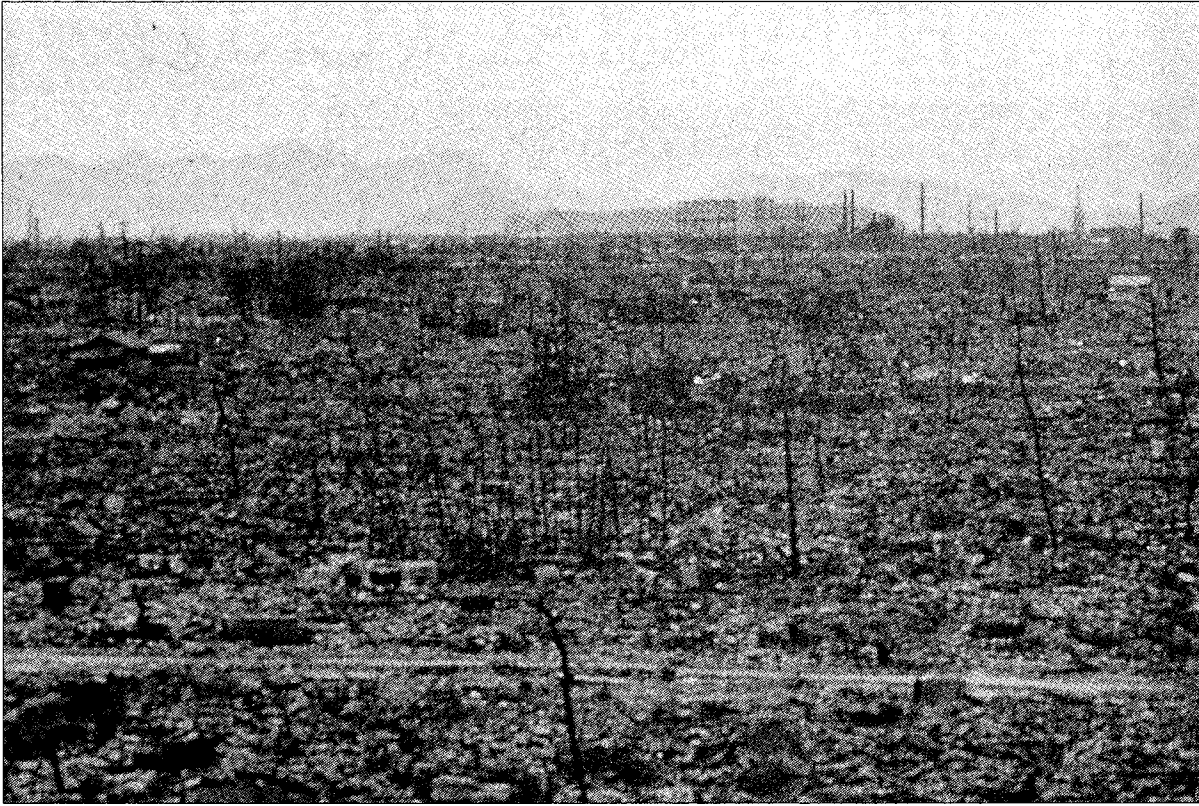
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oped in later negotiations. Two years of desultory political jousting followed before the UNAEC suspended its work in frustration. After Moscow exploded its first atomic device in August 1949, several years earlier than expected, most remaining enthusiasm for international control died, as did most talk in the U.S. scientific community of "one world or none."

Other countries, it was recognized, soon would be able to uncover the technological mysteries for themselves. As German physicist Werner Heisenberg warned in February 1947, the development of atomic bombs was "no longer a problem of science in any country, but a problem of engineering." In 1950, tens of millions of people around the world signed the Stockholm Appeal, a petition demanding that atomic bombs be outlawed as "weapons of terror and the mass destruction of whole populations." Audiences in the United States flocked to see *The Day The*

Earth Stood Still (1951), a Hollywood Cold War fantasy in which a benevolent visitor from outer space lands a flying saucer in Washington to warn humanity of its peril: the human race will destroy itself and perhaps the universe if it does not bring an end to the arms race.

Great Britain became the third member of the atomic club in October 1952, detonating a bomb on board a ship near the Monte Bello Islands off the coast of Australia. (No Americans were invited to observe the test, in retaliation for Washington's curtailment of the flow of nuclear information to London after World War II. The test, declared the British defense minister, showed that Britain was "not merely a satellite of the United States.") Later that month, at Enewetak Atoll in the Pacific, the United States exploded the world's first hydrogen bomb. It was built despite the opposition of some top nuclear scientists, including



Hiroshima after the blast, August 6, 1945. The bomb killed 140,000 people, about half of the city's inhabitants. Aftereffects killed another 60,000 by 1950.

Enrico Fermi and J. Robert Oppenheimer, who objected that such a "superbomb" could serve only as a weapon of genocide, not as a useful military device. "Mike," as it was called, gouged out a crater three miles wide and half a mile deep. Less than a year later, the Soviet Union exploded its own crude H-bomb. The arms race was on in earnest.

Inaugurating their famous "doomsday clock" in 1947, the scientist-editors of the *Bulletin of the Atomic Scientists* had set the minute hand at seven minutes to midnight; after the Mike test it edged five minutes closer. President Dwight D. Eisenhower, concerned about the growing cost of the U.S. defense effort and by the inability of the Western European countries to muster sufficient military forces to counter the Soviet threat, authorized in 1953 a "New Look" defense strategy. By empha-

sizing the use of battlefield (tactical) nuclear weapons to repel an attack, the New Look accelerated "vertical" proliferation: the enlargement of superpower arsenals. Now there would be nuclear artillery shells, demolition mines, and short-range missiles.

At the outset of Ike's presidency, 20 countries possessed independent nuclear-research projects that might allow them eventually to build the bomb. Eisenhower won worldwide applause in December 1953 when he announced his Atoms for Peace initiative before the United Nations. Coupling partial disarmament with the expansion of peaceful uses of the atom around the world, he proposed that the United States, Soviet Union, and United Kingdom "make joint contributions from their stockpiles of normal uranium and fissionable material to an International Atomic Energy Agency (IAEA)." This would have the effect of reducing the amount of material available for the manufacture of weapons—though it would handicap the Soviet Union more than the United States. The IAEA would act as a kind of nuclear-materials bank for countries with peaceful nuclear-energy programs.

By the time the IAEA came into existence in 1957, however, Eisenhower's original disarmament idea was all but forgotten. The IAEA, based in Vienna, was now designed to promote the peaceful uses of atomic energy and to act as a watchdog to ensure that nuclear technology was not diverted to military ends, an important function that it still performs today.

Another potential route to disarmament was a ban on nuclear testing. The idea gained impetus when American H-bomb tests at Bikini atoll in 1954 showered radioactive fallout over a broad swath of the Pacific, forcing the highly publicized evacuation of several islands. To the horror of the

Two years later, in February 1960, an explosion in the Sahara made France the fourth member of the nuclear club. The British scientist and writer C. P. Snow predicted that "within, at the most, 10 years, some of these bombs are going off. . . . That is the certainty."

Speaking before the United Nations in 1963, President John F. Kennedy voiced the apprehension felt by many of his contemporaries: "I am haunted by the feeling that by 1970 . . . there may be 10 nuclear powers instead of four, and by 1975, 15 or 20. . . . I see the possibility in the 1970s of the president of the United States having to face a world in which 15 or 20 or 25 nations may have these weapons. I regard that as the greatest possible danger and hazard."

In 1964, China became the world's fifth nuclear power. By this time, every country that was technically competent to build nuclear arms, save Canada, had done so. China's test, the first by a member of the developing world, accelerated international efforts to halt the bomb's spread. New treaties restricting weapons in space and in Latin America were drawn up. In the United Nations, the Eighteen-Nation Disarmament Committee abandoned its work on comprehensive disarmament and turned instead to nonproliferation. Its efforts led to the Treaty on the Nonproliferation of Nuclear Weapons (NPT), signed by 61 countries in 1968.

Under the NPT, the non-nuclear states pledged to forswear nuclear weapons and to accept IAEA safeguards on their peaceful nuclear programs. The members of the nuclear club formally agreed not to help other countries to arm themselves. (China and France, however, did not sign the treaty until the 1990s.) In Article VI, they agreed to pursue negotiations on "cessation of the nuclear arms race at an early date, and to nuclear disarmament." The day the treaty was signed, July 1, 1968, the United States

and Soviet Union announced the beginning of the Strategic Arms Limitations Talks (SALT).

But several countries that had no intention of swearing off the atom did not sign the NPT. With French help, Israel had developed a nuclear capability years earlier. In India, Prime Minister Lal Bahadoor Shastri had concluded in 1964 that China's nuclear blast left him no option but to permit research on "peaceful" nuclear explosives. On May 18, 1974, the Indians got their bomb. (Prime Minister Indira Gandhi received news of the successful test in code words: "the Buddha smiles.") From China and India, the chain reaction led to Pakistan. Prime Minister Zulfikar Ali Bhutto had already vowed that his country would acquire nuclear weapons if India did, even if his people had "to eat grass or leaves, even go hungry" to free up the necessary resources. New Delhi's nuclear test energized Pakistan's quest for an "Islamic bomb." South Africa decided that it too needed nuclear arms. The world appeared well on its way to fulfilling Kennedy's nightmare vision.

II.

The Cold War, however, ended not with the expected bang but a whimper—or at least a long, exhausted exhalation. Its passing has eased the world's most extreme anxieties about the nuclear age. Less than a decade ago, Armageddon seemed even more imminent to some than it had in Kennedy's day. "The world is moving inexorably toward the use of nuclear weapons," wrote a commentator in the *Journal of the American Medical Association* during the early 1980s, expressing a fairly common view. By 1984, the editors of the *Bulletin of the Atomic Scientists*, alarmed by the Reagan administration's military build-up and by the superpowers' increasingly bellicose

rhetoric, had inched their famous minute hand to three minutes to midnight, as close to apocalypse as it had been since the early 1950s. Visions of "nuclear winter," a new nightmare scenario of how the world would slowly die in the aftermath of a nuclear war, terrified the public, much as *On the Beach* had 30 years before. Critics warned that the arms race was propelling the world toward disaster.

Then, suddenly, it was over.

The disintegration of communism and of the Soviet Union itself after the Berlin Wall fell in November 1989 brought the quickest imaginable end—short of war itself—to the old fears. True, there had been significant change before 1989. Modest arms-control agreements during the 1970s that placed ceilings on certain categories of nuclear systems were replaced in the latter half of the 1980s with ambitious agreements that cut deeply, such as the 1987 Intermediate-Range Nuclear Forces Treaty. But today the superpowers can't disarm fast enough to suit themselves.

In the fall of 1991, George Bush and Mikhail Gorbachev announced sweeping reciprocal unilateral reductions in deployed tactical nuclear weapons. The 1991 START I Treaty virtually halved the number of U.S. and Soviet strategic nuclear warheads. If START II is fully implemented, the superpowers will cut their strategic nuclear arsenals by more than 80 percent from their Cold War peak. The United States and Russia will dismantle more than 15,000 warheads. The chief drag on disarmament now is not military or political but technical: the limited number of U.S. and Russian facilities equipped to dismantle these warheads and safely and securely store the leftover nuclear material.

Yet there has scarcely been time to celebrate. From the allied victory in the Persian Gulf War, barely more than a year after the fall of the Berlin Wall, came the sobering discovery that Saddam Hussein's Iraq was well advanced on a secret project to build

an atomic bomb. In late 1992, the IAEA uncovered (with the help of U.S. spy satellite imagery) another case of nuclear cheating, this time in communist North Korea. Earlier this year, news reports suggested that Iran was perhaps only five years away from developing a bomb, much closer than previously estimated. According to a 1988 study chaired by veteran military analysts Fred C. Iklé and Albert Wohlstetter, 40 countries will be able to produce nuclear weapons by 2000.

To borrow the metaphor used by R. James Woolsey, former director of the U.S. Central Intelligence Agency, the Soviet bear may be dead, but the forest is still full of poisonous snakes. The sprawling nuclear archipelago of the former Soviet Union, a complex of laboratories and factories employing almost one million physicists, chemists, metallurgists, engineers, and technicians, could well turn out to be a breeding ground for new nuclear snakes. Highly skilled scientists now earn less in a month than what an American teenager brings home after a day working the cash register at McDonald's. The temptations of going to work for a foreign power or even a terrorist group must be considerable.

Amid squalid military and deteriorating political conditions in Russia, there is also reason to worry about the safety and security of stockpiles of nuclear warheads and the fissile materials that can be used to make bombs. This is not an idle fear. To take one especially rich cache of bomb material out of circulation, operatives in a covert U.S. effort code-named "Project Sapphire" spirited 600 kilograms of highly enriched uranium (HEU), enough for perhaps 30 to 40 nuclear bombs, from a storage site in a remote and desolate corner of Kazakhstan. (However, 300 kilograms of HEU stored nearby was inexplicably left behind.) Nuclear smuggling from the former Soviet Union to the European black market is well documented. In one of the most alarming



Six short-range Soviet missiles are readied for destruction in Kazakhstan. If the Start II Treaty is fully implemented, the U.S. and Russian nuclear arsenals will be cut by more than 80 percent after the turn of the century, leaving each side with 3,000–3,500 deployed strategic warheads.

cases, police in the Czech Republic acting on an anonymous tip last year seized six pounds of highly enriched uranium, about one-sixth the amount needed for a bomb. Three men were arrested at the time, but who was behind the plot and where the uranium was bound remain a mystery.

But the great and still largely unrecognized surprise is that contrary to what scientists, statesmen, and ordinary people have assumed since Hiroshima and Nagasaki, the countries of the world have not rushed to arm themselves with nuclear weapons. Some have recognized the drawbacks and limitations of these weapons; others have gone so far as to conclude that they are a liability.

While the news media have focused with grim fascination on the new nuclear-nightmare scenarios of the post-Cold War world, several countries possessing nuclear weapons programs or harboring nuclear ambitions have, almost unnoticed, stepped back from the brink. They have slowed, halted, or even reversed their activities. Even North Korea, the most xenophobic and isolated country in the world, recently agreed to measures that promise over the course of 10 to 12 years to eliminate its ability to build nuclear weapons. These developments are without precedent in the nuclear age.

The Nuclear World

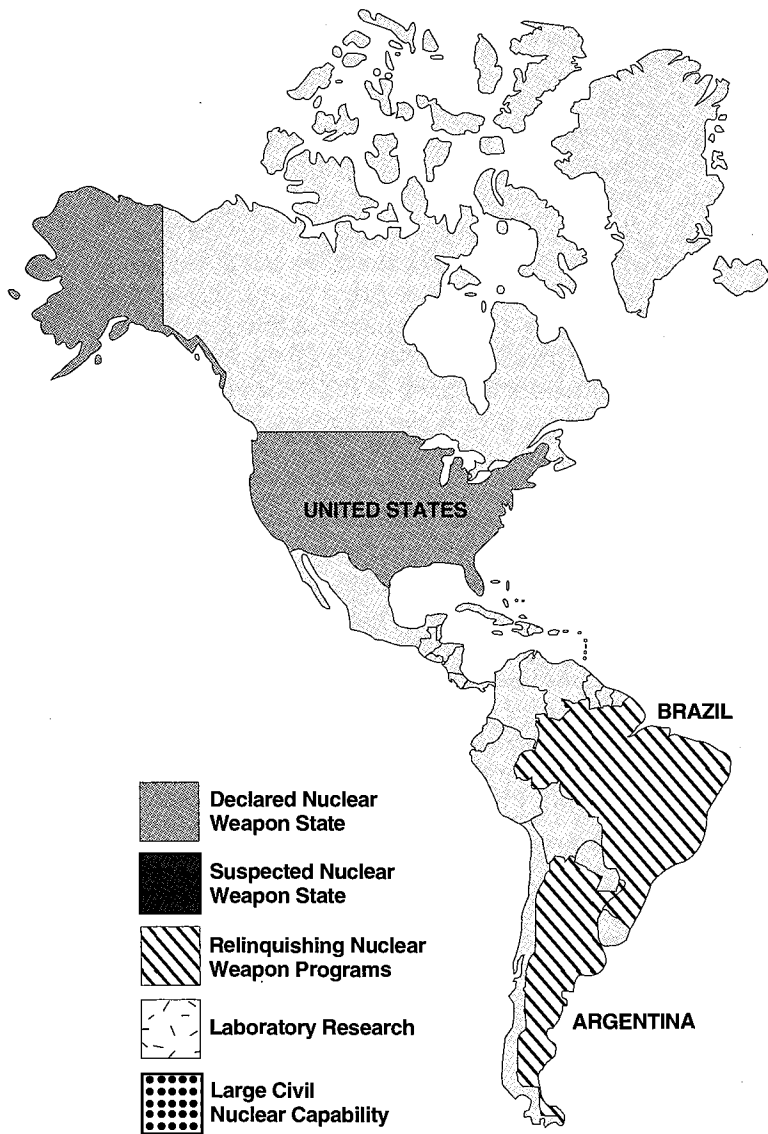


The "laboratory research" countries are three to 10 years from acquiring nuclear weapons. All are NPT signatories but show political and scientific signs of interest in acquiring nuclear weapons. Many other countries have nuclear energy programs and research, notably Armenia, Indonesia, Italy, Poland, Romania, and Spain. Most countries with large civil nuclear capabilities could produce nuclear weapons in a few months or years.

Source: Institute for National Strategic Studies, *Strategic Assessment 1995: U.S. Security Challenges in Transition*.

Very often people talk about the perils of proliferation as if nothing has changed during the course of the world's long experience with nuclear weapons. But this half-century of "mutual assured destruction" between the superpowers as well as nuclear crises in Cuba in 1962, the Middle East in 1973, and during the India-

Pakistan clash of 1990 have provided the world with a profound nuclear education. The fact that an arsenal of some 30,000 strategic and tactical nuclear weapons could not preserve the Soviet Union, and may even have hastened its collapse, has raised new questions about the value of nuclear arms. The deep cuts scheduled by



Moscow and Washington, moreover, have lowered the weapons' prestige value.

The stunningly large (and unexpected) bills that have started to fall due from the arms race also give other nations pause. The cost of dismantling nuclear weapons, storing excess plutonium and other dangerous materials, and repairing

the environmental damage caused by more than 50 years of weapons research and production is huge. The United States will have to spend between \$30 billion and \$100 billion to clean up various installations, including production facilities at Rocky Flats, Colorado, Hanford, Washington, and Savannah River, South Carolina. In the former Soviet Union, the bill could reach \$300 billion, although it is unlikely that anywhere near that amount will be found. And who knows what other costs of this radioactive legacy remain to be discovered? It is equally difficult to gauge the "opportunity costs" incurred by having generations of skilled scientists, engineers, and technicians devote their talents to building bombs instead of the gross national product.

All of these lessons have bred new attitudes toward nuclear weapons. In December 1991, when the Soviet Union was in its death throes, the world was confronted with the uncomfortable reality that three countries it had scarcely heard of—Ukraine, Belarus, and Kazakhstan—with leaders whom it hardly knew, now each possessed the means to

devastate the United States, Europe, or any other target they chose. Thousands of Soviet tactical and strategic nuclear weapons were located on these three countries' soil. Yet each of them agreed to surrender these arms over the next few years.

Quickest to act was Belarus, site of more than 1,000 nuclear weapons. Stanislaw

Shushkevich, a physicist-turned-antinuclear activist after the 1986 Chernobyl disaster, used his largely ceremonial position as chairman of the Belarus Supreme Soviet to push a more rapid withdrawal than even Moscow wanted. In the West there was dread that the Muslim leaders of Kazakhstan might transfer some of its fearful nuclear inheritance—including 104 huge SS-18 intercontinental ballistic missiles, each code named “Satan”—to their radical coreligionists in the Middle East. Eager for U.S. aid and investment and wary of angering Moscow, Kazakhstan pledged in 1992 to return the SS-18s and other weapons to Russia.

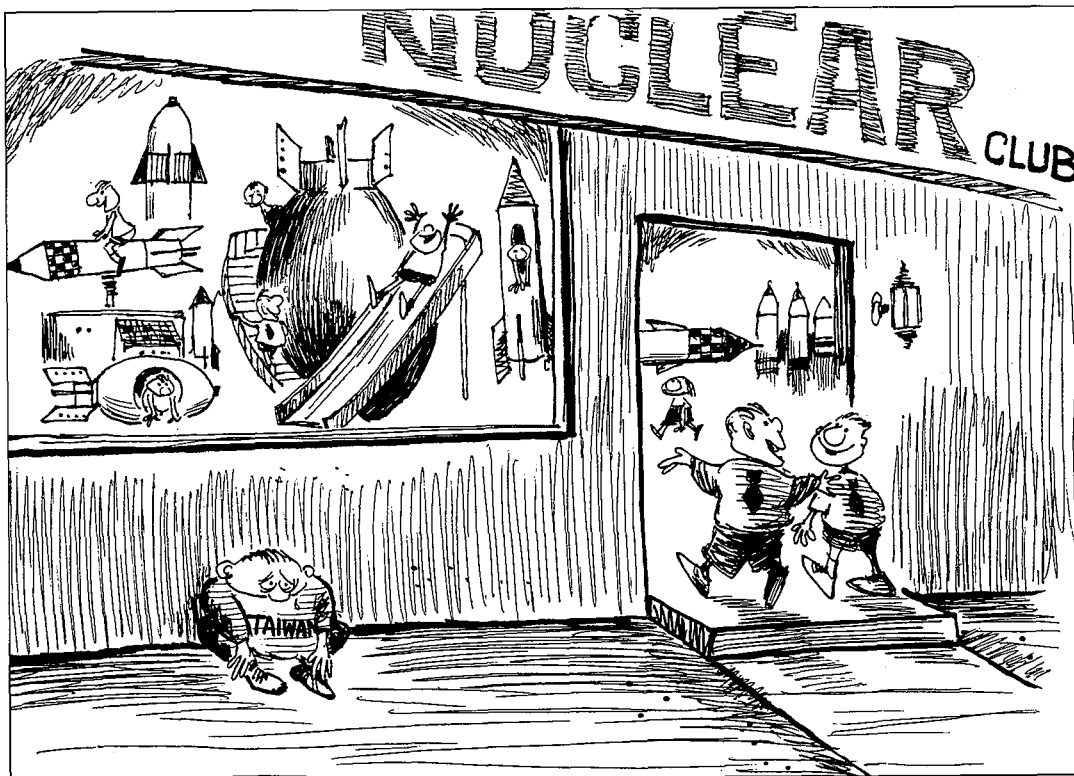
Ukraine was a little more recalcitrant. The country’s stolid president, former Communist Party ideology chief Leonid Kravchuk, understood that the weapons would not be terribly helpful in defending Ukraine or improving its appalling economic conditions. But they could be bartered for Ukrainian membership in useful international organizations such as the North Atlantic Treaty Organization’s Partnership for Peace. Ukraine’s assent was finally purchased in 1994 at the cost of hundreds of millions of dollars in U.S. denuclearization assistance and, among other things, Russian promises to forgive Ukraine’s multibillion-dollar oil and gas debt and to provide fuel for the country’s nuclear power plants.

For each of these three countries the nuances were slightly different, but the fundamental calculations were essentially the same. Their leaders recognized that nuclear weapons are largely irrelevant to the most pressing problems of the late 20th century: civil war, ethnic and tribal conflict, mass migration, AIDS, economic backwardness, and international terrorism. More and more, these weapons appear to be elaborate and expensive anachronisms. There is not even much scientific prestige to be gained by building a bomb—now, after all, a 50-year-old technique.

A nuclear arsenal rarely promotes domestic prosperity, fosters better relations with neighbors, enhances national security, or wins international prestige. Nuclear weapons programs are more likely to siphon off scarce scientific and engineering talent, trigger a costly nuclear arms race with a regional adversary, sow mistrust among allies, inhibit the transfer of sensitive technologies needed for economic development, and invite international ostracism. This “winning weapon,” moreover, turns out to be almost too terrible to use.

That is one reason why the popular fear of nuclear terrorism, while not wholly unrealistic, is greatly exaggerated. Nuclear blackmail is a staple of international spy thrillers such as Dominique Lapierre and Larry Collins’s *Fifth Horseman* (1980), in which Libya’s Muammar Qaddafi tries to force the United States to support the establishment of a Palestinian state by threatening to blow up New York City. But terrorists and leaders of “rogue” nations face many of the same constraints limiting others who seek to promote a political agenda. Would a nuclear blast advance their cause, or would it unify a horrified international community against them? If one is bent on violence, isn’t it far easier to strike at a symbolic target with conventional means? The terrorists who attacked the World Trade Center, after all, made their explosive from a mixture of fertilizer and diesel fuel. This is not to mention the still-daunting technical tasks of manufacturing and safely handling a nuclear bomb.

Only one country in history has unilaterally and voluntarily eliminated its own fully developed nuclear arsenal: South Africa. That it was done virtually without fanfare or international acclaim and headlines is regrettable, since South Africa’s experience illustrates some of the new realities of nuclear weapons. Immediately after becoming president in September 1989, F. W. de



A cartoon from the Taipei-based China Times shows nuclear weapons' continuing appeal on grounds of national pride. Under pressure from Washington, Taiwan abandoned nuclear weapons research in the 1970s.

Klerk ordered that the country's nuclear weapons program, including an arsenal of six nuclear devices that had taken a decade to build, be dismantled. By July 1991, the highly enriched uranium from the warheads had been removed and melted down and most of the non-nuclear components had been destroyed.

These extraordinary steps were part of a much larger design. The coming transfer of power to the black majority certainly helped sway de Klerk, but so did South Africa's growing sense of security from external threats following the negotiated removal of Cuban troops from Angola in December 1988 and the dwindling of Soviet influence in southern Africa. A nuclear arsenal, moreover, would hinder South Africa's efforts to become a respected member of the international community.

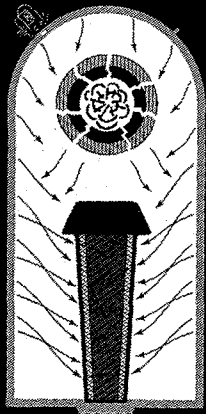
The power of international opinion is

not merely a matter of rhetoric. Countries that insist on maintaining nuclear programs pay a price in the international arena. They are excluded from international organizations such as the IAEA. They may be denied loans and other assistance by the World Bank and other multilateral institutions, as well as the Japanese and some other aid givers. They are also subject to formal and informal embargoes on the transfer of a variety of sensitive technologies, ranging from supercomputers to civilian nuclear power plants to induction furnaces used in the fabrication of high-tech metals. Some countries (such as Belarus) now clearly hope that there may be as much prestige to be gained from forgoing nuclear weapons as from possessing them.

International standing was a powerful consideration in the slightly less dramatic December 1991 decision by two long-time

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rivals, Argentina and Brazil, to accept international safeguards on all their nuclear activities. During the 1980s, both countries seemed intent on producing nuclear bombs—more for prestige purposes, apparently, than because one posed any threat to the other. Although relations between the two countries improved in mid-decade, the breakthrough came in the late 1980s with the accession to power of two dynamic civilian leaders, Carlos Menem in Argentina and Fernando Collor in Brazil. The two presidents were eager to carve out larger roles on the international stage (and in the international economy) for their countries,

of full admission to the international community was placing their nuclear programs under IAEA safeguards.

The United States had a hand in all of these success stories, directly cajoling, convincing, or coercing some countries and more indirectly influencing others through its support for international export controls, the NPT, and IAEA safeguards. But Washington probably played its most important role in May 1990, when the world may have come as close to nuclear war as it had since the 1962 Cuban missile crisis.

That spring, the explosive issue of

and, not incidentally, for themselves. And that meant currying favor with the international community, especially the United States. Brazil, in addition, faced a threat from its long-time financial supporter, Germany, to cut off economic assistance by 1995 if Brasília did not abandon its nuclear pretensions.

Whereas Argentina's Raul Alfonsín could declaim to popular approval in the mid-1980s that he would break before he would bend to the wishes of the United States and the industrialized West, his successor, Carlos Menem, stated that he would much prefer Argentina to be the last country in the First World rather than the first country in the Third World. (The Argentine foreign minister put the idea more colorfully when he declared that he wanted ties between Argentina and the United States as intimate as "*relaciones carnales*.") For Argentina and Brazil, the price

Kashmir was again agitating India and Pakistan. Amid strikes, bombings, and assassinations by Muslim separatists and fundamentalists in the Indian state of Kashmir, Indian prime minister V. P. Singh ordered a crackdown. Singh's government accused the Pakistanis of aiding their Muslim brethren; there was an exchange of hot rhetoric and before long there were military maneuvers along the India-Pakistan border. In May, U.S. intelligence concluded that Pakistan had assembled nuclear bombs. President Bush instantly dispatched Deputy National Security Advisor Robert Gates to mediate.

In Islamabad, Gates was blunt: "Our military has war-gamed every conceivable scenario between you and the Indians, and there isn't a single way you win," he informed Pakistan's leaders. Gates then visited New Delhi, where he warned that Indian air strikes against insurgent training camps in Pakistan-held Azad Kashmir might prompt Islamabad to use nuclear weapons immediately rather than as a last resort to save the regime. Gates was successful; both sides pulled their troops back.

In the annals of nonproliferation, however, the story of India and Pakistan must be counted a draw rather than a success. The two countries have not halted their nuclear programs, even though over the years they have exercised some self-restraint. India has not detonated a nuclear device since its first explosion more than 20 years ago. Pakistan has never conducted a nuclear test and reportedly stopped producing weapons-grade uranium in 1990 when President Bush cut off U.S. military and economic aid to Islamabad. Neither country has deployed nuclear weapons or ballistic missiles or even officially declared that it has nuclear weapons.

Nevertheless, the subcontinent remains a potential nuclear flash point.

India can assemble 15 to 25 nuclear weapons on short notice and Pakistan can assemble six to eight, probably within a few days, according to U.S. government estimates. If nuclear war ever breaks out in the world, many defense analysts believe, the Indian subcontinent is the most likely location.

A more familiar "draw" is Israel, whose opaque nuclear posture was perfectly expressed by strategist Yigal Allon's remark in the mid-1960s: "Israel will not be the first to introduce nuclear weapons in the Middle East, but it will not be second either." Although widely suspected of having as many as 200 nuclear weapons, Israel has neither deployed nor detonated one, although some observers believe it was behind a mysterious flash in the South Atlantic detected by a U.S. satellite in September 1979.

Even nonproliferation success stories remain unfinished. Backsliding may yet occur; political commitments can be renounced and legal obligations can be flouted. Nuclear recidivism is a possibility, with North Korea the most likely candidate. A small number of countries will undoubtedly persevere in seeking to acquire nuclear arms or holding onto those they already have. Nuclear weapons are still thought by some to confer international status and enhance national security. For others, they remain useful tools for intimidating neighbors and regional rivals. These countries will pay the price of being hated in return for being feared.

There are military defenses against such transgressors—the United States, for example, is developing ballistic missile defenses. But nuclear weapons can be delivered by boat, truck, or several other means. Over the long term the most effective defenses are political.

III.

For four weeks this spring, delegates from 172 countries will meet in New York City to decide the fate of the Nuclear Non-proliferation Treaty. The conference can be seen, in effect, as a global referendum on the nature of the international system for the next century.

The absence of any solid security architecture to replace the Cold War's bipolar system has already contributed to a general unease in the world. Regional tensions have increased in many areas; ancient antagonisms, ethnic strife, and religious hatreds have resurfaced, literally with a vengeance in some cases. Without vigorous international regimes to control the spread of nuclear arms and other weapons of mass destruction, the world will certainly become an even more dangerous place.

Since it took effect in 1970, the NPT has been the most important means of easing nuclear anxieties around the world. It provides countries with reasonable assurances that their neighbors, potential rivals, and enemies are not arming themselves with the world's ultimate weapon.

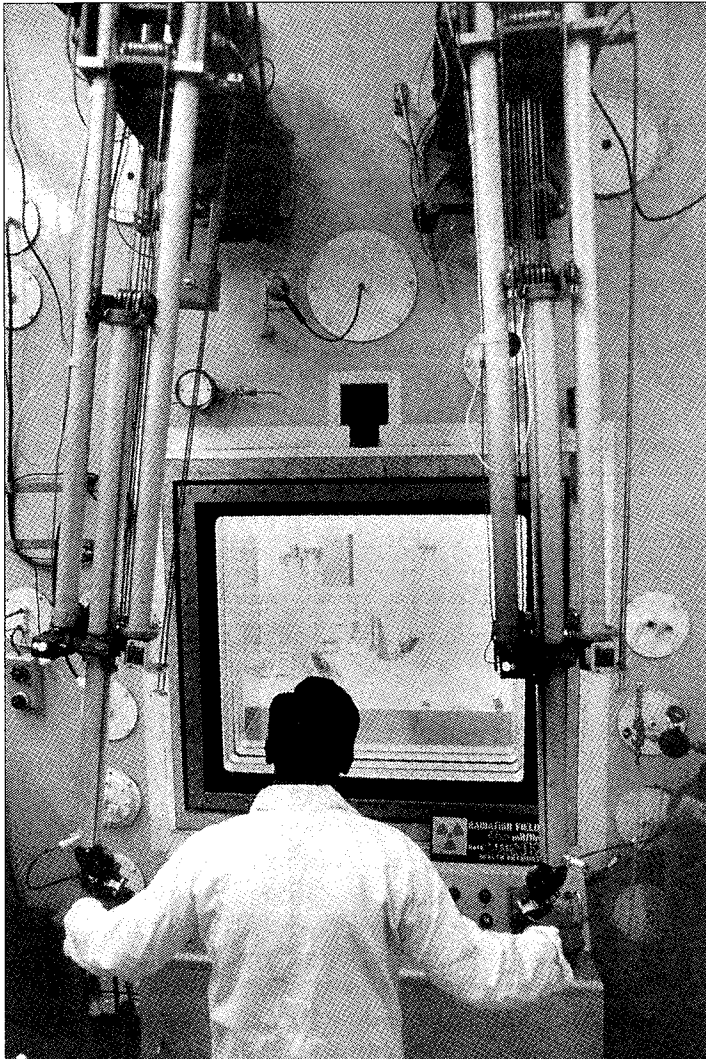
Along with the inspection and verification system provided by IAEA safeguards (which would end with the NPT's demise), the treaty is a vital strand in a web of interlocking, overlapping, and mutually reinforcing political pledges and legal commitments. This web also includes strict export controls that deny sales of sensitive technologies, such as supercomputers, that can be helpful in building nuclear weapons; nuclear weapons-free zones, such as those established in Latin America and the South Pacific (and soon to be created in Africa); strong multilateral alliances; ballistic missile defenses to protect U.S. and allied forces; and "negative" and "positive" security as-

surances, which are vows by the nuclear powers that they will not use or threaten to use nuclear weapons against other countries and will come to their defense should they face nuclear aggression.

The NPT and the IAEA safeguards system are not panaceas and they are certainly not fail-safe. They do not *determine* decisions by countries on whether to acquire nuclear weapons. But this harsh truth overlooks the positive influence they do exert. Submitting to comprehensive IAEA safeguards and taking NPT membership are earnest of the intent not to develop nuclear weapons. Although the sincerity and durability of these pledges may be questioned in some cases, such as Iraq, Iran, and North Korea, they are an accurate barometer of the nuclear intentions of the vast majority of countries.

Many of the states not possessing nuclear weapons that will participate in this spring's conference complain that the nuclear powers have not kept their side of the original bargain, notably their promise to share the benefits of peaceful nuclear technology—chiefly nuclear power. They are threatening to block the treaty's renewal or extend it only for a limited period. They believe, as Ambassador Makarim Wibisono of Indonesia, the leader of the 77-member Non-Aligned Movement at the NPT conference, observes, that "efforts to combat the danger of proliferation have been used to preserve and promote a technological monopoly in the hands of nuclear supplier states and relegate the developing countries to a position of continued dependency." Some of the nonnuclear states also want speedier superpower disarmament, or even a firm target date for the total elimination of nuclear arsenals.

At the heart of all of these concerns is the worry that if the treaty is extended indefinitely and unconditionally this spring, the non-nuclear states will lose a valuable (and, for many countries, their only)



An Indian engineer at a nuclear facility in Trombay. India has made the difficult step from civilian nuclear power to military capability.

means of leverage in their quest for wider technology transfer and nuclear disarmament. But the consequences of following through on their "nuclear extortion" would be very serious for these countries: without an NPT, their security would be at far greater risk than that of the states with nuclear weapons.

Anything less than the extension of the treaty indefinitely (or for a very long time) would be a failure. Even if the NPT is not canceled outright but only extended

for a short period, countries such as South Korea, Japan, and Germany would be tempted to hedge their bets against the treaty's eventual collapse by increasing their ability to build bombs. Analysts at the RAND Corporation have dubbed this ratcheting up of nuclear potential "virtual proliferation."

Total collapse of the NPT would have more clear-cut results. Gradually but inexorably, the bomb would spread. Perhaps the treaty's demise would galvanize the leading states to devise new institutions and arrangements to halt proliferation. But a failure to agree on extension would itself suggest a breakdown in the global consensus against proliferation.

The stakes ultimately go beyond nuclear weapons. The treaty's demise would cripple efforts to restrain the spread of other weapons of mass destruction. Specialists warn that it could doom the Chemical Weapons Convention, which

has been signed but not yet ratified by many countries, and vastly complicate efforts to strengthen the verification provisions of the Biological and Toxin Weapons Convention. (The Central Intelligence Agency estimates that 25 countries currently have programs to build nuclear, chemical, or biological weapons.) Even under the best of circumstances, controlling these weapons in the future will probably prove even more difficult than the regulation of nuclear arms. A world that cannot agree

on the latter will be very unlikely to achieve the former.

IV.

In the early 1960s, a young physicist named Herman Kahn published a provocative book on thermonuclear war challenging the world to "think about the unthinkable." But it turned out that war, even with thermonuclear weapons, was easy to contemplate. The truly unthinkable challenge, as Kahn's critics noted, was to map out a realistic path toward a nuclear-free world. Until recently, this kind of thinking was casually dismissed, left to the liberal fringes of the peace and disarmament community. Hard-headed professional nuclear strategists, armed with their RAND Corporation "bomb wheels"—which allow them to estimate the size of the crater and the extent of the fallout from a blast of a given nuclear yield—preferred instead to discuss throw weights, MIRVs, and the seemingly ever-gaping "window of vulnerability."

Yet some especially visionary (or cynically calculating) politicians envisioned a different future. In January 1986, Mikhail Gorbachev called for a nuclear-free world by 2000. Nine months later at Reykjavik, Iceland, Ronald Reagan, the quintessential Cold Warrior, called for the elimination of all nuclear weapons (although his horrified advisers quickly qualified his statements). In 1988, Prime Minister Rajiv Gandhi of India proposed before the UN's Special Session on Disarmament a phased disarmament that would lead to a world without nuclear weapons by 2010. Recently a number of retired senior U.S. officials, including former secretary of defense Robert McNamara and General Andrew Goodpaster, former supreme allied commander in Europe, have urged that

the United States dedicate itself to the elimination of all nuclear weapons.

In fact, under both domestic law and international treaty, the United States is already obligated to eliminate all of its nuclear weapons. The legislation that established the U.S. Arms Control and Disarmament Agency in 1961 and Article VI of the NPT both stipulate this goal. Is it really a desirable one?

Even among the dry policy analysts, there is serious discussion of moving toward a nuclear-free world. The end of the U.S.-Soviet rivalry, it is said, has vastly reduced the need for nuclear weapons. Their role in the Pentagon's war planning, for example, has greatly diminished. The United States, moreover, is highly unlikely ever to be the first to use these weapons in a conflict. Indeed, one former U.S. official argues that Washington would not likely use them even if the United States were attacked first. Nuclear weapons, in other words, are moving toward obsolescence.

At the other extreme, strategic analyst Kenneth N. Waltz of the University of California at Berkeley contends that "more might be better." The further spread of nuclear weapons to many countries might have a stabilizing influence on international life, he believes. Waltz's thinking is based on the Cold War experience of deterrence, the "balance of terror" that helped keep the peace between the United States and the Soviet Union. "The likelihood of war decreases as deterrent and defensive capabilities increase," Waltz argues. "New nuclear states will feel the constraints that present nuclear states have experienced."

Waltz's theory has been much discussed among academics during the past decade, and its flaws have been thoroughly vetted. It is not at all clear, for example, that other countries could reconstruct the same delicate balance of deterrence—and even the Soviet-American stand-off was full of

Thinking About the Unthinkable, Again

Some U.S. analysts argue a new military strategy is needed to deal with nuclear threats in the post-Cold War world. In the *National Interest* (Winter 1993-94), Eliot Cohen of the School for Advanced International Studies at Johns Hopkins University offers one such view.

Three forces have come together to increase the danger of proliferation in the 1990s. First, over the decades technological know-how has diffused, putting nuclear potential within the range of a number of states. Second, the collapse of the Soviet Union has created a vast pool of scientists available for hire to work on such programs. It has also, in all likelihood, made nuclear material, including weapons, available for sale to potential proliferators. At the same time, the implosion of the Soviet state has removed from the world stage a major military power that had come to see the benefits of preventing nuclear proliferation. Third, and ironically, the Persian Gulf War has made it clear that no country can match the United States in a conventional conflict. To a hostile general staff, nuclear weapons look increasingly attractive as means of deterring either the Yankees or (more likely) their local clients, who provide the necessary bases from which American military power operates.

It is hard to see how any American strategy, no matter how clever the conception or assiduous the implementation, could do more than meliorate the fundamental problem. . . .

Of course it makes sense to pursue marginal remedies [such as anti-missile defenses and more aggressive efforts to help dismantle the Russian nuclear arsenal] as energetically as possible. . . . But both technically and politically they can achieve only limited success. The problem of detecting mobile missiles during the Gulf War offers a good example. Even if American pilots had received instantaneous warning of Scud launches (and some did, when they witnessed the actual firing of the missiles), they simply could not locate the launchers with sufficient accuracy to bring weapons to bear on them. . . . If ever the United States manages to defeat the ballistic missile, the low-flying (and soon, stealthy) cruise mis-

sile will prove a more difficult challenge yet. As for the talk of pre-emptive war, would that the United States were willing to engage in it, should the need arise. But really, who can imagine a president authorizing a large-scale, unilateral air and possibly ground attack against a country that has done no direct harm to the United States or its allies? The days of Osirak-type raids on a single, easily located and above-surface nuclear facility are over. Secrecy, camouflage, deception, and dispersion will make preemption a far more extensive and uncertain operation than ever before.

It is altogether proper to be gloomy about the proliferation problem. In addition to undertaking [other measures], the American government needs to prepare itself, materially, organizationally, and psychologically, for the day after the first nuclear weapon is used in anger. . . . The material preparation requires, among other things, a renewal of investment in the development of sophisticated nuclear weapons which the United States might use to destroy a nascent nuclear arsenal. It is technically feasible to develop nuclear weapons that could do useful work against such limited targets, without incinerating cities or blasting into the air large quantities of radioactive dust. The organizational preparation entails a kind of war planning unfamiliar to the armed forces in the recent past—crippling, punitive strikes against opponents whom the United States cannot disarm, or sudden, preemptive blows thrown at very short notice. The psychological preparation will prove the most difficult of all, however, for it will require a confession that none of the cleverly conceived arms-control efforts (export controls, buy-back plans, and international agreements) will do more than defer the dark day on which, for the first time since Nagasaki, a country uses an atomic bomb as a weapon of war.

perils. There are many other difficulties: a nuclear power might, for example, have an incentive to strike pre-emptively at a neighbor just developing a bomb. And as the number of nuclear powers rises, so does the chance of a classic "madman scenario" or, more likely, a fatal error in the more mundane command-and-control systems of the weapons.

Yet there is some wisdom in Waltz's argument, at least insofar as it applies to the *current* line-up of nuclear powers. Nuclear weapons do generally promote prudence and caution, in their possessors as well as in others. They deter others from using not only nuclear arms but perhaps chemical and biological weapons as well. Under some circumstances, they may even prevent conventional warfare among the states possessing nuclear weapons.

There are, in other words, benefits to be reaped from these ultimate weapons. But these benefits would survive even if the United States and other nuclear powers vastly reduced their arsenals. Borrowing a page from India and Pakistan, it may be possible to move to what specialists call "non-weaponized" deterrence. It is too late to "disinvent" the bomb, and impossible to lock its "secrets" away. But

nuclear weapons can be taken off alert, deactivated, and disassembled. Such a step would greatly lengthen the "nuclear fuse." It would fall short of total nuclear disarmament. It could, however, be a significant way station on the long road toward a goal that seemed hopelessly utopian only a short while ago. Before it can be reached, we will need to reduce the role and number of nuclear weapons in international affairs and, ultimately, render them irrelevant to political life.

On this path to zero, perhaps the greatest danger is not from the spread of the weapons themselves but from our forgetting how very different they really are. For this reason, Harold Agnew, the former director of the Los Alamos National Laboratory, once suggested that a nuclear bomb be detonated in an isolated part of the ocean once each decade with world leaders in attendance. Then they would hear, see, and *feel* its awesome power. The danger is that as the echoes of Hiroshima and Nagasaki grow more distant with the passing of time, the devastation and unspeakable horror of those events may fade from our collective memories. We forget at our peril.

THE FUTURE THAT NEVER CAME

Hiroshima (1946), John Hersey's account of the bombing based on interviews with six survivors, remains a good starting point for any discussion of nuclear weapons. **The Making of the Atomic Bomb** (Touchstone, 1988), by journalist Richard Rhodes, tells the scientific and political story of the bomb's creation. Biographies of the leading scientists involved include **Genius in the Shadows: A Biography of Leo Szilard, the Man behind the Bomb** (Univ. of Chicago, 1994), by William Lanouette and Bela Silard; **James Conant and the Birth of the Nuclear Age: From Harvard to Hiroshima** (Knopf, 1993), by James Hershberg; and **The Advisors: Oppenheimer, Teller, and the Superbomb** (Stanford, 1989), by Herbert F. York.

Was the United States justified in dropping the bomb? Paul Fussell's answer is obvious from his book's title: **Thank God for the Atom Bomb** (Ballantine, 1990). His is the prevailing view. Its leading critic is Gar Alperovitz, author of **Atomic Diplomacy: Hiroshima and Potsdam** (Penguin, 1985).

The bomb's impact on American life is the subject of Paul Boyer's **By the Bomb's Early Light: American Thought and Culture at the Dawn of the Atomic Age** (Univ. of N. Carolina, 1994) and Spencer C. Wear's **Nuclear Fear: A History of Images** (Harvard, 1988). William L. O'Neill's **American High: The Years of Confidence, 1945-60** (Free Press, 1986) is another sturdy survey. Sensational charges of Soviet atomic spying contributed to the Cold War atmosphere at home. Revisionist historians have argued that these charges were exaggerated. Much scholarship suggests otherwise. **The Rosenberg File: A Search for the Truth** (Vintage, 1984), by Ronald Radosh and Joyce Milton, deals with the era's most celebrated case. Also noteworthy is David Holloway's **Stalin and the Bomb** (Yale, 1994).

Serious thinking about nuclear war began with Bernard Brodie's **The Absolute Weapon: Atomic Power and World Order** (1946). Brodie argued that it is a contradiction in terms to think of waging nuclear war since it is impossible to

"win" such a conflict. Brodie elicited a host of responses, including Thomas Schelling's **The Strategy of Conflict** (1960); Herman Kahn's **On Thermonuclear War** (1960, repr. Greenwood, 1978); and Henry Kissinger's **The Necessity for Choice: Prospects of American Foreign Policy** (1961). These books' authors argued that presidents needed a host of intermediate military options. Among the results were a new emphasis on tactical nuclear weapons and the concept of graduated response in war—an idea that was applied to conventional warfare in Vietnam. Much of this history is surveyed in **The Wizards of Armageddon** (Stanford, 1991), by Fred Kaplan.

The New Yorker's Jonathan Schell gained celebrity with his alarming evocation of the consequences of nuclear war, **The Fate of the Earth** (1982), but his much more thoughtful consideration of the ways nuclear weapons can be tamed, **The Abolition** (Avon, 1986), was ignored.

A flurry of new books suggest that the debate over what to do about nuclear proliferation is coming to a boil. **Critical Mass** (Simon and Schuster, 1994), by journalists William E. Burrows and Robert Windrem, offers an alarming tour of today's nuclear world, emphasizing the need for controls on technology exports. Mitchell Reiss's **Bridled Ambition: Why Countries Constrain Their Nuclear Capabilities** (Wilson Center, 1995) stresses political and diplomatic measures. The 10 contributors to **New Nuclear Nations: Consequences for U.S. Policy** (Council on Foreign Relations, 1993), edited by Robert D. Blackwill and Albert Carnesale, emphasize the need to devise military responses. Michael Klare, in **Rogue States and Nuclear Outlaws** (Hill and Wang, 1995) critiques the Pentagon's nascent "counterproliferation" strategy.

Kenneth N. Waltz's argument that a world with more nuclear-armed countries would be more peaceful appears in **The Spread of Nuclear Weapons: A Debate** (Norton, 1995). Waltz's co-author and sparring partner, Scott D. Sagan, argues that the root problem with proliferation is all too human: the high likelihood that someone, somewhere, will someday make a disastrous mistake in handling these most destructive weapons known to humankind.