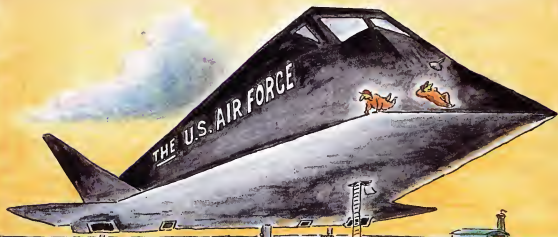


THE BULLETIN



OF THE ATOMIC SCIENTISTS

WEAPONS LUST



Surprise your friends with a truly intelligent gift!

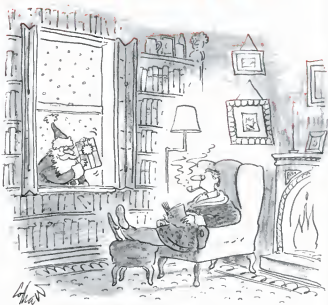
This holiday season, give a gift that will truly enrich the lives of your friends, colleagues, and even the patrons of your local library—a subscription to *The Bulletin of the Atomic Scientists*.

❖ The *Bulletin* will keep your friends and colleagues up to date on the ever-changing state of international security.

❖ And the *Bulletin* can be an important library research tool for students, teachers, and concerned citizens.

❖ Give as many gifts as you want—and renew your own subscription—for a special rate of just \$18 per subscription* (40% off our regular subscription rate). Simply complete and return the coupon below (or the postage-paid card inserted into this issue), and your gift will be on its way.

❖ And don't forget your friends and colleagues abroad! They too want the kind of accurate and up-to-date reporting about world security that they can't find elsewhere.



*If your order is received before December 4, 1992, we will send you a holiday gift card for each recipient, to present as you wish.
Cards will be sent directly to gift recipients on orders received after December 4, 1992.*

❖ Give the *Bulletin* . . . and save! ❖

Any subscription (may include renewal): \$18*
A savings of 40%!

- ☐ I enclose \$_____. ☐ Bill me later.
☐ Renew (or ☐ start) my own subscription.
☐ Begin _____ gift subscriptions as shown.

My name (please print) _____

Address _____

City/State/Zip _____

First gift to: _____

Address _____

City/State/Zip _____

Second gift to: _____

Address _____

City/State/Zip _____

*For subscriptions to Canada and Mexico add \$4.50; for other countries outside the U.S., add \$7.50 (surface mail). Prices are in U.S. dollars.

THE BULLETIN

OF THE ATOMIC SCIENTISTS



The *Bulletin* was founded in 1945 by Eugene Rabinowitch and Hyman Goldsmith.
The *Bulletin* clock, symbol of the threat of global catastrophe, stands at 17 minutes to midnight.

ARTICLES

Laid waste by weapons lust

JOSEPH J. ROMM

In the 1960s, the Pentagon started developing a new generation of weapons—with a trillion dollar price tag. As budgets decline, the Pentagon must face facts: glitzy new weapons will mean fewer troops, fewer spare parts, and inadequate maintenance.

14

Snatching defeat from the jaws of victory

DANIEL N. NELSON

The U.S. administration believed that keeping the NATO club intact was more important than genuine European security. But at Helsinki, the West's cries of Cold War victory could not drown out the sounds of battle.

24

If not NATO, who?

JANE SHARP

The only organization with the military muscle to stop the Balkan killing has "stayed in its bunk with its polished boots on."

29

Germans battle over blue helmets

OLIVER THRÄNERT

Most Germans do not want to see their army in action. But their government believes that taking part in U.N. peacekeeping missions—or in combat—is a major power's responsibility.

33

Chemical weapons: The end of the beginning

AMY E. SMITHSON

After a negotiating marathon of more than three decades, the chemical weapons treaty is finally ready for a vote.

36

Cover illustration by Frank Cotham; see pages 14-23.

THE FRONT PAGES

Editor's note

2
Neighbors

Bulletins

3
Military land grabs, cleaning out the silos, more

Reports

6
Senate surprises itself
JOHN ISAACS

International fusion
ARTHUR KATZ

"Understanding" START II
DUNBAR LOCKWOOD

Perspective

12
New tests mean new nukes
VLADIMIR IAKIMETS &
OLZHAS SULEIMENOV

THE BACK PAGES

Reviews

42
Bull's Eye
by James Adams
WILLIAM D. HARTUNG

A Different Sort of Time
by Jack S. Goldstein
BERNARD T. FELD

Prisoner's Dilemma
by William Poundstone
LINDA GAINES

Letters

46

Nuclear notebook

48
Mothballing megatons

This One



1DXK-BK4-UZ17

Neighbors

Chicago, where the *Bulletin* is published, has neighborhoods that are leafy, middle class, and relatively untroubled. I live in one. But frequently these neighborhoods are bordered by neighborhoods that are case-book studies in desperate social ills.

Beginning just three blocks north of my street, for instance, is one of those troubled broken-glass neighborhoods. One does not casually drive through it late at night, much less walk the dog in it after, say, 10 p.m. A sizable number of stores in the neighborhood have been boarded up. Shards of shattered bottles and crumpled beer cans sparkle in the streets and on the sidewalks. Graffiti shout from walls, garages, stop signs, postal boxes.

Though they exist side-by-side, the two neighborhoods are separate worlds. Those of us who live amid the 50-foot elms and oaks and fresh-cut lawns of "our" neighborhood seldom think of the other neighborhood, except when there's a late-night disturbance that spills over into "our" streets. To be sure, we may go to a meeting now and then, where we conspire to rid the area of a particularly noxious slumlord by applying pressure to the alderman or to this city department or that one. But we don't personally intervene in the troubled neighborhood. We leave interventions to social workers and cops.

We are not wholly insensitive. We understand that life is unfair, and that it has been vastly more unfair to those who live in the broken-glass neighborhood than it has been to us. Neither are we stand-patters. We gravitate, I suspect, toward the activist side of the scale. We have marched in protests, circulated petitions for good causes, and raised money for the poor. But we are realists. When personal intervention seems hopeless, we put the matter out of our minds and go on with our lives.

Provincial thoughts, surely, in a magazine devoted to international security. In this issue, for instance, Daniel Nelson and Jane Sharp separately deal with the reasons why Western Europe and the United States have not teamed up to bring peace, or at least a cessation of fighting, to what was once Yugoslavia. For more than a year, barbarities in the Balkans have been in the news almost daily, producing much hand wringing and many speeches in the West. But as I write in late August, nothing much has been done to halt the fighting.

Apparently the Western powers failed to act decisively because they did not believe that military intervention would be in their own strategic interests. The United States and Western Europe, it seems, are still in the grip of the hard-headed balance-of-power premises of *Realpolitik*, and in that amoral geopolitical game, the Balkans have not been perceived as holding any trump cards.

Western leaders may be right. Perhaps the proper course of action vis-a-vis the Balkans is to take no dramatic action. As in my Chicago neighborhood, it simplifies things not to worry too much about the broken-glass neighborhoods on our borders. But I wonder about the wisdom of that. In the past year, the streets in my neighborhood have become increasingly littered with bits and chunks of glass, and graffiti is now commonplace on "our" stop signs, "our" walls, "our" postal boxes. Our neighborhood is not an island. And each week, it seems a little more clear that if we are to preserve it, we must do something to make life better in the adjoining neighborhood.

That's an old idea, a variant of the Golden Rule. But it's daunting nevertheless. How do we proceed? In Chicago, one can become more involved in community action. But in the Balkans, "proceeding" may translate into large-scale military intervention. To some of us, that looks like a bottomless pit. But failure to act also brings to mind Chamberlain-esque strategies that did not—after all—bring "peace in our time."

—Mike Moore

THE BULLETIN OF THE ATOMIC SCIENTISTS

(ISSN 0096-3402) Published by the Educational Foundation for Nuclear Science, Inc.

Editor Mike Moore
Managing Editor Linda Rothstein
Senior Editor Iris Polski
Assistant Editor Alan Lonstein
Graphics Director Paula Lang

General Manager Nancy L. Watson
Circulation Manager Scott Ziegler
Administrative Assistant Cherie Dillon

Contributing Editors: Len Ackland, David Albright, William M. Arkin, John Isaacs, Michael Krepon.

Editorial Board: Frank von Hippel, chairman; George A. Lopez, Gerald Marsh, Marc Ross, Alexei Arbatov.

Board of Directors: Leonard Fieser, chairman; Russell Hardin, vice-chairman; Michael McCully, treasurer; Mike Moore, secretary; Anne H. Cahn, James W. Cronin, Gloria Duffy, Bernard Feld, Dennis Flanagan, Howard Hatt, Michael Janeway, Leon M. Lederman, Jane E. Nolan, Nicholas J. Pritzker, Victor Rabinovitch, Martin Rees, Ronald Sagdeyev, John A. Simpson, Pam Solo, John Stenbrun, Kosta Tades, Walter J. Blum, legal counsel.

Sponsors: Robert R. Wilson, president, Samuel K. Allison, Eduardo Amaldi, Robert F. Bacher, David Baltimore, Paul Berg, Hans A. Bethe, Owen Chamberlain, S. Chandrasekhar, A. H. Compton, E. U. Condon, James W. Cronin, Carl Djerassi, Paul Doty, Sam Edwards, Manfred Eigen, Albert Enten, Brian Flowers, James Franck, Richard L. Garwin, Donald A. Glaser, Sheldon Lee Glashow, Bentley Glass, Marvin L. Goldberger, Gerhard Herzberg, Dorothy C. Hodgkin, Ryogo Kubo, Leon M. Lederman, Reimer Lüst, Marcos Moshinsky, Navil Mott, J. Robert Oppenheimer, W.K.H. Panofsky, Linus Pauling, Rudolf Peierls, Gerard Piel, John C. Polanyi, I. J. Rabi, Andrei Sakharov, Oscar Sala, Abdus Salam, Julian Schwinger, Frederick Seitz, John A. Simpson, Cyril S. Smith, Leo Szilard, Toshiyuki Toyoda, Harold C. Urey, V.F. Weisskopf, C.F. von Weizsäcker, Jerome B. Wiesner.

The *Bulletin of the Atomic Scientists* is published monthly except February and August. Second Class postage is paid by the Educational Foundation for Nuclear Science, 6042 S. Kimbark Avenue, Chicago, IL 60637, and additional mailing offices. Subscription rates: U.S., 1 year, \$30; 2 years, \$55; 3 years, \$75. Canada and Mexico add \$4.50; other countries add \$7.50 per year. Single copies: cover price plus postage. Annual rates available on request. Claims for missing issues must be dated within 90 days (domestic) and 9 months (foreign) of issue requested. POSTMASTER: Send address changes to The Bulletin of the Atomic Scientists, 6042 S. Kimbark Avenue, Chicago, IL 60637. Copyright © 1992 by the Educational Foundation for Nuclear Science, 6042 S. Kimbark Avenue, Chicago, IL 60637. (312) 702-2555. Fax: (312) 702-0725.



During "Corn Cob II," a combined air force and national guard exercise in Texas last April, participants (according to an air force news release) "fended off all attacks including the heat, rain, fire ants, and mosquitoes, as well as aggressors and advisers."

Military exercises; musical chairs

Although East-West tensions have been greatly reduced, armies still want to play war games. But as civilians everywhere become less fearful of external threats, they become less tolerant of military exercises that involve tanks, endless target practice, or the roar of jets. As a result, military services at home and abroad appear to be devising creative strategies to hang on to, recycle, or "borrow" other people's training grounds.

For instance, the people of eastern Germany probably thought they would get some peace and quiet when Russian soldiers finally abandoned their local training grounds and went home. Instead, the German army,

the Bundeswehr, intends to move in (*The Guardian*, July 29, 1992).

Twelve eastern German towns are now protesting the German government's plan to have German troops conduct exercises at abandoned Soviet training sites in the East. The citizens of Wuensdorf, home of the former Soviet headquarters, are particularly unhappy.

At the same time, the German government has been more responsive to annoyed West Germans who are eager to see military activities curtailed in their part of the country. As a result, German officials have spent months negotiating with French, British, and U.S. military personnel over the reduction of foreign

training activities in western Germany—but the negotiations are not going particularly well.

U.S. military personnel say that the Germans don't seem to get it. "There is an underlying theme on the part of the German negotiators that Germany is an independent country and is not occupied," said Lt. Gen. David Maddox, who commands the U.S. Army's V Corps in Frankfurt (*Washington Post*, July 4, 1992).

In response, Werner Hoyer, a German parliamentary leader, points out that the "occupation" ended in 1990, with the "Two-plus-Four" agreement on reunification, and Germany is now "a fully sovereign nation, and that allied forces in this

country are here by our free will."

German officials complain that the British and French have been even more difficult to negotiate with than the Americans, who have yet to accept that Germans want foreign forces to obey the same training restrictions as the Bundeswehr, which is allowed little or no night flying, and is not allowed to fire live ammunition on Sundays.

According to Maddox, the Germans are fighting a lost cause; American military commanders will decide what kind of training U.S. forces do in Germany, and when they do it.

At home, however, the Pentagon quickly cut back on some of its 1990 plan to grab several million acres of public land for additional training grounds when U.S. citizens complained about the inconvenience, noise, and environmental degradation; any Pentagon proposal to take U.S. public land for training grounds must be discussed at public hearings and receive the permission of Congress.

To their horror, some of the complaining civilians have recently discovered that the Pentagon may have retreated quietly because they knew they could

"We have permanently set back the hands of the nuclear Doomsday Clock."

—Secretary James Baker, farewell speech to State Department personnel, August 13, 1992.

In brief

■ Forget earthquakes, let's talk volcanology

In mid-September, the Nuclear Waste Technical Review Board was to have held a kind of open house and field trip to the proposed high-level waste repository at Yucca Mountain, Nevada. The outing's object was to study any possible volcanic hazard at the site. The attendees may have been able to admire the view through the new windows at the Energy Department's Yucca Mountain field building, six miles from the site. In July the windows were shattered by an earthquake, the epicenter of which was in nearby Joshua Tree, California. In earlier site characterization studies, the Energy Department had expressed confidence that no earthquake would occur in the area for at least 10,000 years.

■ A new dorm, maybe?

Amherst College appears to be the winning bidder for an abandoned Strategic Command hideout built beneath a Massachusetts mountain pass (*Boston Globe*, July 23, 1992). The bunker, a three-story-high, 40,000-square-foot atom bomb-proof structure complete with glassed-in war room, went on the auction block for a minimum bid of \$250,000. "It's incredibly well built," said Sharon Siegel, Amherst College treasurer, who did not indicate what use the college intends for the bunker.

■ Be prepared

Last year the Mikoyan Design Bureau, starved for cash in the new Russian Republic, was kept afloat by \$400,000 earned by giving American capitalists expensive 15-minute joyrides in its MiG-29s. This year, the Ukrainian government arranged an 18-city North American tour for two MiG-29s, with the same money-raising idea in mind (*New Scientist*, July 4, 1992). But this year's jaunt may not be so lucrative. During the Canadian leg of the tour, the price must be based on actual costs, and in the United States, federal law now stipulates that profits must go to a worthy cause. Ukraine says the money will be donated to the Ukrainian Boy Scouts.

■ Ever vigilant

While the end of the Cold War has renewed calls to reduce secrecy in government in both the former Soviet Union and the United States, the director of the U.S. Information Security Oversight Office, Steve Garfinkel, doesn't hear them. Even the CIA has agreed in principle that it should begin to "err on the side of declassification," but Garfinkel has indicated that he thinks there should be more restrictions on materials that are not now classified. "Ultimately," he said at a July 1 meeting in Dallas, "we have no choice but to tear down the rather artificial barrier between the classified world and the unclassified world." According to the *Bulletin on Secrecy and Government* (August 1992), the administration wants to expand the restrictions in Executive Order 12356, a 1982 Reagan administration action that extended government classification into new areas—but it will not do so now, lest government secrecy becomes a campaign issue.

use a handy loophole in the law to get what they wanted by other means (*Las Vegas Review-Journal*, July 28, 1992).

National Guard and Pentagon officials describe themselves as "relaxed" about sharing training grounds (although it is technically illegal). And it is a lot easier for the National Guard to get its hands on large tracts of public land.

Unlike the regular army, the National Guard simply asks the Bureau of Land Management for what it wants, and it usually receives a "memorandum of understanding," as was the case last year when, despite thousands of protests, the Idaho National Guard "withdrew" the Snake River National Conservation Area for guard exercises. This year, however, public pro-

tests seem to have prevented the guard from taking 610,000 acres of Nevada that it wanted for tank practice.

Cong. Bruce Vento, a Minnesota Democrat who is chairman of the House subcommittee on public lands, has introduced a bill in Congress that would subject the National Guard to the same rules the Pentagon follows for land acquisition, and Defense Secretary Dick Cheney has ordered a moratorium on land withdrawals until after a Congressional debate over the military services' desire to expand control over public lands. No one knows how much land the military actually controls now, and estimates vary greatly—all the way from 15 to 125 million acres.

—Linda Rothstein

Farmers fear booming business

When the Strategic Arms Reduction (START) Treaty was concluded, U.S. and Soviet negotiators were very proud of the methods they had devised to verify that land-based ballistic missiles had actually been removed from silos. As each missile was removed, its underground silo was to be left uncovered for a time—to allow the other side to inspect by satellite. After that, the heavily reinforced concrete silo would be blasted to smithereens with high explosives. The result: happy U.S. and Russian arms controllers.

But there is another result: very unhappy American farmers and ranchers who have reluctantly "hosted" missile silos—some for as long as 30 years (*Chicago*

Tribune, July 30, 1992). A group of South Dakota farmers and ranchers are protesting the destruction plan, fearing that it will disfigure and destroy their property. Worse, they say, blasting the 90-foot-deep silos is likely to contaminate their water supplies by causing cracks in their well linings. A 330-page environmental impact statement issued last October by the air force, which dismissed the chance of such damage as "slight" or "unlikely," has only increased concern.

It seems ironic, as reporter Margaret Knox wrote, that those who once worried that their land would be blown up by the Soviets are now worried that it will be blown up by the U.S. government. —L.R.



25 years ago in the *Bulletin*

In the October 1967 *Bulletin*, Soviet Academician Anatoly Blagonravov argued that space research was justified and important. He was responding to an earlier article by Max Born, who had expressed doubts about the value and the need for space research for ordinary people. Besides the obvious interested parties—science professionals, rocket designers, and the military—Blagonravov noted other areas in which spin-off from such research would ultimately benefit the general population.

He was eloquent about the infant radio-communications industry, which had recently sprung from man-made satellites. The main point, he said, was that "not a single corner on our planet will be beyond the reach of this communication system, which will eventually cause great changes in world culture and economy." He quoted British scientist and writer Arthur C. Clarke, who anticipated an "orbital mail service in which a message is translated into electric pulses transmitted to the address via relay satellite and translated again by a machine into writing."

Blagonravov pointed out that weight and size restrictions on space research instruments were having a substantial influence on micro-miniaturization of technological devices in general (he thus anticipated laser surgery by many years), and added that systems to monitor the condition of an in-flight cosmonaut might help develop new ways to diagnose diseases.

He said that there were many lessons to be drawn from "this new period in history," and he singled out one: "Everything that is theoretically possible is bound to be realized in practice, however great the technical difficulties may be."

Russian roulette

Eric Voice, a researcher at the Harwell nuclear facility in England, believes that there is no convincing evidence that the human ingestion of plutonium has proven dangerous. He rejects the idea that anyone has ever been harmed by having absorbed plutonium, and he claims that the only case in which a death was attributed to ingested plutonium is highly questionable. (The death occurred 45 years after an individual inhaled plutonium dust.)

Arguing that the danger of plutonium is "theoretical" and "not widely demonstrated, as the public seems to believe," Voice says that greater "public acceptance" of plutonium is critical because the need for energy means that the world's supply of plutonium will inevitably increase as nuclear power generation increases.

Voice so strongly rejects the oft-repeated statement that plutonium is "the most lethal substance in the universe" that he decided to

put his own life on the line to prove it.

Writing in *New Scientist* (July 18, 1992), Voice described a visit he made last year to the Russian high-energy particle physics laboratory at Dubna, north of Moscow. Voice concluded that the Dubna laboratory's methods produced the purest form of plutonium 237 to be found anywhere in the world. Plutonium 237 is, explains Voice, "chemically and biologically plutonium." But it has a half-life of only 45 days, so any residual effects of the isotope should disappear within a year.

In May 1992, Dubna scientists sent a batch of plutonium 237 to Harwell. Under the supervision of the biomedical research department, Voice and another volunteer were each injected with 20,000 becquerels of plutonium citrate, and medical personnel will monitor the movement of plutonium in the systems of the two volunteers for a year.

—L.R.

Announcement

Each year the Kroc Institute for International Peace Studies at the University of Notre Dame invites a small number of scholars and practitioners to participate in its research and teaching program. Visiting fellows enjoy access to university research facilities and are provided with office space and staff support. Some scholars receive financial support from the Institute; others are supported by sabbatical salaries or foundation grants. For a Visiting Fellows application, write George A. Lopez, Acting Regan Director, Kroc Institute, Hesburgh Center for International Affairs, University of Notre Dame, Notre Dame, Indiana, 46556.

Missing pages

A few subscribers have reported that their copies of the September *Bulletin* arrived with missing pages. If your September issue was similarly deficient, please call the *Bulletin* office at (312) 702-2555, or write us at 6042 South Kimbark, Chicago, IL 60637, and we will make sure you receive a complete copy.

Senate surprises itself and the arms control community;
Fusion fans pull off international agreement;
Bush, Yeltsin reach "understanding" on START II

NUCLEAR TESTING

The Senate that can say no

By JOHN ISAACS



Happier days for weapons testers: observers at a 1951 nuclear test in Nevada.

For years the Senate has resisted ending nuclear testing in the Nevada desert. Its obstinacy is not surprising—the Senate has rarely voted to reduce the military budget or to cut major weapons programs.

With this background in mind, two Senate votes during the first week of August were little short of astonish-

ing. Not only did the Senate endorse an end to testing, but it did so by an overwhelming margin, 68–26. Four days later, the Senate stunned the White House, the Republican leadership, and itself by casting a preliminary vote to chop a billion dollars from Star Wars.

It is hard to say which vote was

more surprising. The last time the Senate considered any kind of nuclear test ban, in 1988, it handily rejected (57–39) a Hatfield-Kennedy motion to ban nuclear tests with yields over five kilotons.

But in late 1991, Oregon Republican Mark Hatfield and Senate Majority Leader George Mitchell agreed to lead the fight for a 12-month moratorium on nuclear testing. After patiently slogging for many months, the team had signed up 53 co-sponsors, a Senate majority.

Enter the "Cohen Rule"—a dictum promulgated by senior arms control lobbyist David Cohen, president of the Professionals' Coalition for Nuclear Arms Control. Narrow majorities are not safe in the Senate; any time a vote has looked close, Republican leader Robert Dole, Armed Services Chairman Sam Nunn, and White House lobbyists have been able to twist the arms of enough shaky senators to turn back the tide. In the last decade, there have been 15 very close Senate votes on military spending levels, on the MX missile, on Star Wars, and on chemical weapons that have been decided by two votes or less, including five ties broken by the vice president. The arms control record is a dismal 0–15 on those votes.

Hatfield and Mitchell were playing a strong hand with 53 likely supporters, but they were still uncertain of victory. The opposition—Nunn and Nebraska Democrat Jim Exon, chairman of the Armed Services Strategic Forces and Nuclear Deterrence Subcommittee—was similarly unsure about whether the Hatfield-Mitchell effort could be sidetracked. Nunn and Exon had tried but failed to build a majority in the Armed Services Committee for an alternate approach. They opposed the Hatfield-Mitchell moratorium, but they were willing to endorse some limits on nuclear testing. With neither side sure where it would find the 51 votes needed for victory, it was time to make a deal.

On Friday, July 31, Hatfield announced on the Senate floor that he would negotiate with Exon and Nunn

to broaden and modify the 12-month moratorium. Hatfield's objective was "a very, very large consensus of the Senate, not just 53."

The negotiations proceeded, and a deal was struck—by Hatfield, Mitchell, and Exon. The moratorium was shortened to nine months, but the Energy Department would have to end testing by September 1996. Until then, the administration could conduct up to 15 tests, primarily for safety reasons. Exon, a moderate, added significant weight to the coalition, and argued for it forcefully on the Senate floor. Unfortunately, Nunn was playing hard to get, and his opinion about the compromise was uncertain.

Louisiana Democrat Bennett Johnston, the manager of the Energy appropriations bill, argued that testing was necessary to insure a safe nuclear stockpile. "Our situation now," he said, "is that most of our nuclear weapons in the inventory are not safe." Johnston loaded the *Congressional Record* with stories of 32 "hair-raising" nuclear accidents; he talked about thousands of test-site employees twiddling their thumbs for nine months; and he recommended deferring to administration wishes.

Maine Republican William Cohen not only stood with Johnston, he couldn't resist reliving the battles of the 1980s. He compared the Senate's test ban move to the nuclear freeze crusade: "I go back to the mid-1980s, when we had something comparable to this in terms of its popularity. It was called the nuclear freeze movement in this country, which was very, very popular at that time. It was something deeply held by well-meaning people. . . . By rejecting the freeze's popularity and the apparent simplicity—not unlike what has been suggested here that a test ban is a simple issue—by rejecting that, we were able to deploy our Pershing II . . . and to eliminate the threat of the SS-20."

Nevadans Richard Bryan and Harry Reid felt compelled to defend a testing program that provides thousands of jobs in their state. The White House belatedly joined in, dispatching three last-minute letters from Defense Secretary Dick Cheney, Energy Secretary James Watkins, and National Security Adviser Brent Scowcroft. In a hand-written postscript, Cheney warned, "If a moratorium is

passed, I will recommend the President veto the bill."

Exon, the new man on the anti-testing team, jostled with test-ban opponents, arguing that a comprehensive test ban "is the key to nuclear nonproliferation." He underscored the need to respond positively to the Russian and French moratoria.

Majority Leader Mitchell added his voice to the fray. "It is in this context—the end of the superpower arms race and the urgent need to strengthen nuclear non-proliferation—that this amendment is so important and timely." And, said Mitchell, it was up to the Senate: "It is time to face the facts: This administration will not willingly pursue further limits on nuclear testing."

Returning from a weekend trip, Nunn broke his silence on the amendment. He was uncomfortable with the nine-month pause; he disagreed with an end to testing in 1996; and he was inclined to vote against the compromise.

Then moratorium opponents Johnston and Nunn began to count heads. With Exon in league with Mitchell and Hatfield, the tide was running out for continued testing. Johnston finally acceded to the inevitable. After spending the day condemning the compromise, Johnston urged the Senate to vote for it in order to move it to a conference with the House. In the meantime, he hoped to get off the hook by allowing the Armed Services Committee, which was about to bring the annual Pentagon authorization bill to the Senate floor, to take another run at a compromise. Nunn laid down several "markers" about changes needed in the language of the compromise. However, he too announced he would vote for it, and then work for modifications in the authorization bill. A potentially close vote turned overwhelming; the compromise passed 68-26.

Some in the arms control community and the peace movement were unhappy that the Senate vote allowed any tests. They preferred a 12-month halt followed by a complete cessation of testing no later than 1996, the year of the Nuclear Non-Proliferation Treaty review conference. But the *Washington Post* focused correctly on the Senate vote for an end to nuclear explosions as "a sweeping reversal of its Cold War-era opposition to any

constraints on underground nuclear explosions (August 4, 1992). The same day, the *Wall Street Journal* called the vote "a decision that could rid the country of a vestige of the Cold War." Majority Leader Mitchell labeled the vote "truly historic," and he lavished praise on long-time test-ban leader Mark Hatfield.

The Senate was on a roll. A few days after the test ban vote, the 1993 defense authorization bill came up for consideration. On Friday, August 7, Democrats Jim Sasser of Tennessee and Dale Bumpers of Arkansas offered an amendment slashing a billion dollars from the \$4.3 billion Star Wars budget the Armed Services Committee had approved.

After extensive debate, Virginia Republican John Warner moved to table or kill the amendment. But the White House and Senate Republican leadership, apparently distracted by an impending vote on the B-2 bomber, had failed to count votes. And Nunn, although opposed to the Sasser-Bumpers provision, was so annoyed at the Pentagon's management of the Star Wars program that he sat on his hands.

Everyone—including the peace community—was stunned when the motion to table failed, 43-49. Fearful of losing another SDI vote, Star Wars proponents refused to bring it up again, and Sasser and Bumpers blocked consideration of any other amendments until it was brought to a conclusion.

After a full day of negotiations on Monday, August 10, Sasser and Bumpers agreed with Majority Leader Mitchell and the Republican leadership to hold the final SDI vote on August 11. But Wyoming Republican Malcolm Wallop intervened. Seeing his beloved Star Wars headed for trouble, Wallop complained: "What the Senate has done, and is about to do, stands squarely on the throat of the administration's [SDI] negotiations in Moscow. . . . The Senate knows how long I have worked on this thing—long before it was a gleam in President Reagan's eye. I had been working on it with the Carter administration. I believe where the Senate is at this moment is contrary to the interest of the United States."

Under the Senate's archaic traditions, one determined senator can de-

rail action. Despite his appeal to Wallop to permit a final vote, Nunn was ultimately forced to hold the authorization bill over to September. Nunn feared that, in the rush of business in the last weeks of the session, the bill might never find its way back on the schedule. Decisions on Star Wars funding could be made through another bill, either the 1993 defense appropriations bill or a "continuing resolution" (a stop-gap measure for funding items on which action has not been completed), over which he has little control. SDI's fate was thus left

hanging over the summer recess.

Nonetheless, the tentative victory on SDI marked a major Senate turning point on the issue, and one of the few times the Armed Services Committee has lost on a major issue. And if the \$3.3 billion SDI total prevails, the Senate will have authorized \$1 billion less than the House—an unprecedented turn of events. ■

John Isaacs is executive director of the Council for a Livable World in Washington, D.C., and a Bulletin contributing editor.

FUSION POWER

Is ITER the way?

By ARTHUR KATZ



U.S. DEPARTMENT OF ENERGY

Inside the Energy Department's experimental tokamak in San Diego.

In September 1958, the Second International Scientific Conference on the Peaceful Uses of Atomic Energy (famously known as Atoms for Peace), was held in Geneva, Switzerland. Sixty-one nations and nine special agencies participated, and exhibits included fusion devices, operating fission reactors, models of nuclear power plants, and a model of an atom smasher. It was in this atmosphere of cooperation and competition that for the first time the United States and the Soviet Union discussed magnetic fusion. The technology was considered a potential source of "unlimited" energy for the future, and it was pursued with some optimism by both East and West.

Now, more than 30 years later, those discussions and subsequent cooperation have produced a unique experiment in international collaboration, the International Thermonuclear Experimental Reactor—ITER—project, a partnership between the United States, the Russian Federation, Japan, and the European Community (EC) that may serve as a model for future large-scale scientific projects requiring extensive international collaboration.

The goal of the ITER project is that the four partners jointly build a multi-billion dollar fusion energy physics and technology tokamak experiment—an experiment with approximately 30 times the internal volume of the largest U.S. tokamak experiment at Princeton. If successful, the ITER experiment would be a critical transition step in the development of fusion power, potentially an important source of energy in the next century.

The implications, however, for science and cooperation are much broader. The joint project would represent an unprecedented attempt to share equally from its initiation the responsibility and substantial cost of a multi-billion dollar experiment for developing a new and important technology. A substantial level of trust and mutual interdependence is implied. Not surprisingly, someone chose the acronym ITER (pronounced "eater"), which Latin scholars will recognize as meaning "the way or path." But like many innovative activities, the path was long, winding, and not without pitfalls.

Despite the invention of the toka-

mak (the most successful magnetic fusion concept) by Soviet scientists in the 1960s, and its aggressive expansion by U.S. and European programs during the 1970s, these decades were an unlikely time for close collaboration. One barrier was each nation's strong desire for its own fusion program to succeed, which led to the construction of larger, more elaborate experiments. Also present were concerns about potential high technology transfer between East and West, even in unclassified areas such as magnetic fusion.

It was not until the mid-1980s, specifically at the 1985 Geneva summit, that an evolving financial and political environment conspired to create circumstances ripe for change. At Geneva, to help defuse tension, U.S. President Ronald Reagan and Soviet General Secretary Mikhail Gorbachev searched for initiatives that promised at least the appearance of productive cooperation. As a pre-summit signal, Soviet Foreign Minister Eduard Shevardnadze had proposed to French President François Mitterrand the idea of joint construction of a major fusion project. But Reagan and Gorbachev directed their respective governments to pursue a vaguer, less ambitious concept, "the widest practicable cooperation in fusion energy."

The Geneva proposal could easily have become meaningless summit rhetoric, if the timing had been less propitious. Organizers of the U.S. fusion program, in response to steadily declining budgets, sought out the leaders of the major fusion programs in Japan, Europe, and the former Soviet Union and developed about two dozen international agreements during the early 1980s. The resulting intense formal and informal cooperation by scientists and engineers built a broad—if loose—organizational base, a structure ready to respond when the United States created a domestically acceptable proposal for a first step toward ITER in 1987.

The United States spent the rest of 1987 drawing the European Community (EC) and Japan into this cooperation, forming the four-way partnership. This was not easy, because neither Europe nor Japan was ready to concede that its own next project should be set aside. Nevertheless, at

that moment it was politically difficult to turn away from a four-party peaceful cooperative venture that included the Soviet Union. In April 1988, the old Cold War adversaries agreed to work for almost three years as equal partners.

They agreed to develop a preliminary ITER design and some supporting research and development. Each partner would spend about \$50 million over the three years. Politically, this was a perfect solution. Modest and limited in time and scope, it satisfied technology transfer concerns, and did not directly threaten Europe's and Japan's ability to continue work on their own projects.

It also bought time for budget pressures to be increasingly felt in Europe and Japan, and time for the national program leaders and working-level scientists to become more comfortable with the idea of working together on a single project.

A small central ITER headquarters was established at Garching, Germany, where the flags of the European Community, Japan, the Soviet Union, and the United States flew together. This represented a small foreign policy coup, because the Soviet Union had studiously avoided any signal recognizing the existence of the European Community, and Soviet occupation of the Kurile Islands off Japan's northern coast had been a source of friction between those two countries since World War II.

The first step ended successfully in December 1990, and after complex and demanding negotiations, the four partners began the second phase of the proposed ITER project in July 1992. The goal: to jointly design a tokamak large enough to confirm magnetic fusion's scientific feasibility and evaluate its sophisticated technologies. The joint design effort will take six years and cost more than a billion dollars.

Hundreds of scientists and engineers will work together at three central sites in Naka, Japan; San Diego, California; and Garching, Germany, as well as in their home countries. The partners will contribute national expertise and experiments to support research and development in physics, materials, superconducting magnets, high-energy microwave and radiofrequency technologies, and related

areas. The international technology team is expected to produce the final engineering design for the ITER facility. Despite the substantial joint effort, the organization carefully agreed that each partner would finance its own work, including supporting its experts at the central sites.

A truer test of collaboration lies in the future, after the design phase ends in 1998. The construction and operation of the multi-billion-dollar tokamak will require mutual dependencies for critical equipment, sustained integration of multinational staff, and lots of money. And since only one partner can host the construction site, delicate political balancing will be necessary.

The partners' demands for equity are exquisitely illustrated by the project's organization. There are three sites for the central design team—in the United States, Japan, and Europe—instead of one. Although the overall ITER director is European, there are four deputies: an American for the European site, a European for the Japanese site, a Russian for the American site, and a Japanese director located in the lead site at San Diego. Furthermore, the key policymaking ITER council meets in Moscow (and perhaps other sites) with a Russian chairman, and two advisory committees are headed by an American and a Japanese, respectively. (The negotiations leading to the ITER partnership were rendered even more complex by the former Soviet Union's disintegration; the Russian Federation assumed its ITER mantle.)

Whether the ITER tokamak is constructed in the future is ultimately a political question, subject to all the vicissitudes of international relations. It is a question likely to be posed as the United States faces budget constraints, Russia confronts more dramatic economic changes, Japan searches for its role in basic international research, and Europe reconstructs its identity.

The experience thus far, however, has provided some valuable lessons. By beginning as technical peers, by proceeding by incremental steps, by avoiding the transfer of money, and by carefully choosing a costly research problem at a pre-competitive stage, a workable formula may

have emerged. The formula did not challenge or offend national sovereignty and budget controls, and it muted the implicit economic competition, at least among the Western partners. ITER shows that with creativity and commitment, accept-

able arrangements can be found. ■

Arthur Katz, a member of the Office of Fusion Energy in the U.S. Department of Energy in Washington, D.C., is the author of Life After Nuclear War (1982). The views expressed are his own.

START II

The pen-chant for peace

By DUNBAR LOCKWOOD



Boris Yeltsin and George Bush wield their agreement-signing pens at the June summit.

At their Washington summit meeting in June, President George Bush and Russian President Boris Yeltsin signed a "joint understanding" for a START II nuclear arms agreement, which would insure much deeper cuts than last year's landmark Strategic Arms Reduction Treaty (START).

In the weeks immediately following the summit, at which Bush and Yeltsin pledged to "promptly conclude" a

START II agreement along the lines of the "understanding," several conservative commentators in Russia criticized Yeltsin for giving away the store.

A *Pravda* editorial called the agreement a "hasty, unjustified concession to Washington—and the final loss of Russia's status and its significance as a superpower." *Sovetskaya Rossiya* complained that while Russia is re-

quired to "destroy the best part of" its stockpile, the U.S. military will push ahead with modernization "and they will do so while knowing full well that our military-industrial complex is agonizing in [a] convulsion of conversion."

Russian parliamentary leaders of hardline factions also denounced the agreement as weakening Russia's defense. One, Nikolai Pavlov, said the agreement would result in a "massive imbalance . . . in favor of the United States" and the destruction of Russian MIRVed ICBMs "is nothing but the complete abandonment of an independent state policy and total surrender."

Just after the joint understanding was signed, Col. Gen. Boris Pankov, acting First Deputy Commander of the United Armed Forces of the Commonwealth of Independent States, told *Interfax* that while he supports the new agreement, it "still causes uneasiness among the military" because Russia would eliminate its most powerful weapons. An article in *Rossiyskaya Gazeta* on June 22 reported that the agreement "came like a bolt from the blue for the Russian military-industrial complex . . . (and it) prompted a reproach from them."

While criticism of the new treaty may represent only the views of a small conservative faction, it suggests that the pact's ratification and implementation are certainly not a foregone conclusion. Such opposition to the accord combined with the ethnic violence, severe economic problems, and general political instability currently plaguing the former Soviet Union, make the path to the year 2000—the earliest date envisioned by Bush and Yeltsin for completing the terms of START II—a long and rocky one.

The two-page "understanding" commits the United States and Russia to reduce their strategic forces in two phases. The first phase would be implemented seven years after START enters into force and the second phase by the year 2003 or as early as 2000, if the United States contributes to financing the destruction or elimination of Russian strategic offensive arms. (If the new treaty were to enter into force in 1993, and if the United States provided sufficient aid, both phases could be merged into one.)

In the first phase, both sides would

reduce the number of their strategic nuclear warheads to 3,800-4,250, and in the second, to 3,000-3,500. While both sides may deploy any number within that range, Russia has indicated that it will be at the lower end of the deployment figures and the United States has said that it will "use up" its full quota, keeping 3,500 warheads.

The START II treaty requires the United States and Russia to reduce the number of strategic warheads they were projected to deploy under START I by 59 and 51 percent, respectively. (The U.S. cut will be larger because the United States had planned to have a substantially larger force than Russia under START I by taking fuller advantage of START's loose "counting rules" for bombers.)

After the first phase is completed, each side would be permitted no more than 1,200 warheads on MIRVed ICBMs—multiple-warhead intercontinental land-based missiles. Arguing that they are the most destabilizing weapons, the United States has tried to negotiate tighter constraints on ICBMs than on other strategic systems since formal strategic arms control negotiations began in 1969. The agreement to ban all MIRVed ICBMs, including all of Russia's "heavy" SS-18s (as part of phase two), was considered to be a major concession on Russia's part.

The two sides also agreed that neither will deploy more than 2,160 warheads on their submarine-launched ballistic missiles (SLBMs) after phase one, and no more than 1,750 once the new agreement is fully implemented. The agreement to reduce SLBM warheads to 1,750, about half the number the United States planned to deploy under START I, constitutes a significant U.S. concession.

Under START I, many weapons on strategic bombers got a "free ride" (that is, were not counted); under START II, all bomber weapons will be counted. At first glance, this would appear to be a major concession by the United States. However, bombers that have not been equipped with long-range nuclear cruise missiles (ALCMs), such as the U.S. B-1B, may be "reoriented" to conventional roles and not counted against the nuclear-warhead limit. START I already allowed both sides to convert up to 75 strategic bombers, so the United

States will not have to retire any more bombers than it would have had to under START I.

The new treaty, like START I, will require the destruction of launchers—ICBM silos, mobile ICBM launchers, submarine missile tubes, and bombers—but not most missiles or any warheads. Few, if any additional verification provisions are expected.

Under START II, the United States will retain all of the delivery vehicles or launchers it planned to field under START I, except for 50 MX missiles. All of the other reductions will be achieved through "downloading" ballistic missiles on submarines—placing fewer warheads on a missile than its "bus" (re-entry platform) was intended to carry—and by converting bombers to conventional roles. Russia will have the option of making reductions in the same way. But, while the surplus capacity that will remain after the treaty is implemented could create a potential for rapid "breakout," Russia's smaller bomber and submarine forces would limit its forces' growth potential.

The Defense Department projects that the U.S. ICBM force will ultimately consist of 500 Minuteman III missiles, each with a single warhead. The U.S. submarine force will consist of 18 Trident submarines carrying 1,728 warheads. This level will likely be achieved by downloading all 432 Trident missiles from eight to four warheads. Alternatively, the United States could deploy all 18 submarines with half of their missiles, but there is little enthusiasm in the navy for this approach.

The composition of the U.S. bomber force is more difficult to determine because it is not yet clear how many weapons will be attributed to each type of bomber, nor is it clear how many bombers will be converted to conventional missions. The Pentagon has announced that U.S. strategic bombers will be counted as having 1,272 nuclear weapons under the new agreement. Since it is likely that all of the B-1Bs will be "reoriented" to conventional roles, the U.S. nuclear bomber force will apparently consist of some 20 B-2s and 50 to 80 B-52Hs with ALCMs.

As far as Russian forces are concerned, the major change from START I will be in the land-based leg

of the triad. Russian ICBMs will probably consist of some 500 single-warhead SS-25s or their replacements. The new agreement will have little impact on Russia's submarine fleet beyond what was already planned under START I. Russia will probably retire all of its Yankee, Delta I, and Delta II class submarines, while retaining most or all of its more modern Delta III, Delta IV, and Typhoon submarines. Russia will retain a fleet of about 25 submarines, carrying nearly 1,750 warheads.

With respect to its bomber force, Russia will have room for another 750 weapons to be carried on Bear-Hs and Blackjacks. Russia has stopped building strategic bombers, so the number of planes it will be able to muster will largely depend on how many it can retrieve from bases in Ukraine and Kazakhstan. Once the new treaty is implemented, the composition of each sides' forces will probably be more similar than they have been in decades.

After the previous two Washington summits involving two U.S. presidents—Reagan and Bush—who met with Mikhail Gorbachev, SDF proponents crowded loudly that Moscow had finally come around to the U.S. position on Star Wars, and had finally realized that there was no link between reductions in strategic offensive arms and continued adherence to the Anti-Ballistic Missile (ABM) Treaty.

Star Wars proponents made the same arguments after the June summit. Once again, they were engaged in wishful thinking. Bush and Yeltsin merely agreed to continue discussing their very different views of strategic defense—a dialogue the United States and the former Soviet Union have been carrying on since 1985.

While Russia is clearly interested in collaborating on joint early warning systems, in developing anti-tactical ballistic missiles (ATBMs) to shoot down short-range ballistic missiles, and in receiving Western technology and research funds, it has never embraced space-based weapons.

In a television interview in June, Secretary of State James Baker said that "if we had said [to Russia] we're walking away from the ABM Treaty just pure and simple . . . I don't think we would have gotten this [START II] arms reduction agreement." In

(continued on page 45)

New tests mean new nukes

By VLADIMIR IAKIMETS and OLZHAS SULEIMENOV

The Bush administration recently announced two new policies to alleviate the economic burden the U.S. nuclear arsenal has placed on the economy. The first policy, which discontinues the production of plutonium and enriched uranium for nuclear weapons, merely recognizes what has been fact for the past four years. Still, formalizing the policy is entirely reasonable, given the high cost of the safe and secure storage of fissile materials—and the fact that accumulated supply far exceeds demand.

This is not the case with the second policy, which merely limits the number of underground nuclear tests. According to Bush's new policy statement, over the next five years the United States will conduct six nuclear tests a year. The president asserted that these tests are necessary to insure the reliability and safety of existing and future U.S. weapons, not to develop new nuclear weapons. This claim, however, is inherently troublesome.

Does testing insure the reliability and safety of nuclear weapons? As Theodore Taylor, a former U.S. weapons designer, points out in "Nuclear Tests and Nuclear Weapons" (*Opaque Nuclear Proliferation*, 1991): "Although nuclear tests of weapons taken out of stockpile are occasionally performed, this is not an effective way to assure reliability. Failure of a weapon to produce its normal yield will not reveal the cause, and observation of a full yield is no guarantee that most of the other weapons have not deteriorated seriously." He adds: "The principal way to assure reliability of the weapons is by periodic inspection . . . including dismantlement . . . and replacement of faulty components in all the weapons."

In his last interview, Andrei Sakharov expressed a similar view: "The essence of these [arguments for testing] comes down to that, as long as nuclear weapons exist, they have to be kept at full combat readiness. This readiness can be verified only through the use of nuclear testing. This line of reasoning is incorrect in its last point. We can check all the conditions related to the storage of nuclear weapons without conducting real nuclear explo-

sions, by checking through all the systems but excluding the final step—the actual nuclear explosion. . . . What are nuclear tests really needed for? They are only needed in order to develop fundamentally new nuclear weapons systems."

President Bush's statement that no new weapons will be developed and tested is in itself contradictory. If, during the inspection of the nuclear stockpile, faulty parts are found and they are refabricated, changes in weapon construction could well result. Will these altered weapons be termed "new or modified"? If the answer is yes, then any test of a nuclear device's reliability has to be considered as having the potential for developing a new weapon.

Regrettable as the technical inconsistencies of the Bush administration's policy are, its political drawbacks cause even greater concern. After nearly 50 years of the arms race, the U.S. and Russian governments have finally recognized that reducing the numbers of nuclear weapons will not threaten national security. As the world enters an era of geopolitical, economic, ecological, and ideological change, the time has come to lay down the foundation for a new system of interaction between nations. One of the key issues of this era will be the disposition of nuclear weapons. While nuclear tests were an important component of the Cold War regime, the situation has changed. But the nuclear powers have responded in different ways:

- The former Soviet nuclear test sites near Semipalatinsk in Kazakhstan and on the Novaya Zemlya archipelago in Russia are silent. The Semipalatinsk site was closed forever by an act of Kazakh President Nursultan Nazarbaev. The Russian site had its last explosion in October 1990, and in October 1991 Russian President Boris Yeltsin declared a one-year moratorium on Russian tests.

- In April 1992, France suspended its nuclear testing program until the end of the year, and declared that it would extend the moratorium if other nuclear powers followed suit.

- In the United States, legislative initiatives were introduced in the House of Representatives and in the Senate. The House passed a testing bill that included a one-year moratorium, while the Senate favored a nine-month ban. Meanwhile, between March 26 and June 23, 1992,

Vladimir Iakimets is a senior researcher at the Institute for Systems Analysis of the Russian Academy of Sciences. Olzhas Suleimenov, a Kazakh poet, founded the Nevada-Semipalatinsk anti-nuclear movement in 1989 and is now chairman of a new political party, "The People's Congress of Kazakhstan."

four of five nuclear tests went off as scheduled at the Nevada Test Site.

■ In May, ignoring the 150-kiloton threshold on the yields of underground tests established between the United States and Soviet Union in 1974, China exploded a one-megaton device. (Although the 1974 treaty was bilateral, the other nuclear powers have generally observed its limits.)

■ In June, British Prime Minister John Major told the Washington, D.C. press corps that his country would continue testing. (All British tests are conducted at the Nevada Test Site.)

When the Cold War iceberg gave way to a warming period, it brought to the foreground a number of problems that have been allowed to fester. These include several problems relating to the Cold War's legacy of nuclear weapons and radioactive weapons' waste.

The urgent task. Dismantling and destroying nuclear weapons and disposing of weapons-grade plutonium and enriched uranium is a task that both the United States and Russia must face squarely. According to the agreement reached in June 1992 by Presidents Bush and Yeltsin, each side will cut its strategic nuclear arsenal by two-thirds.

In principle this is a positive measure, but it raises many questions. How will the United States and Russia proceed from a technological point of view? Who will cover the costs? And where and how safely will fissionable materials be stored? Kazakhstan and Ukraine will not give up strategic weapons deployed on their territories until 1994. And about 30,000 nuclear weapons remain in Russia. The political situation is not stable in these countries. Moreover, Russia lacks the facilities to safely store the several-dozen-ton supply of weapons-grade plutonium and hundreds of tons of enriched uranium that will have to be removed from its nuclear warheads. Nor will it be easy for the United States to safely dispose of approximately the same amount of fissile material. Each side needs a "nuclear respite" in order to develop a comprehensive program for the safe utilization and secure storage of fissile materials.

The mid-term task. Given recent events, how should the system of international and bilateral treaties be adjusted? During the Cold War countries were divided into blocs according to their political and ideological orientation. Last year, that world order changed drastically with the final breakup of the Soviet Union. But a stable, multi-polar international order has not emerged, and it is hard to predict the future.

The expiration date for the Nuclear Non-Proliferation Treaty (NPT) is 1995, and its continuation is in doubt. The 1990 NPT review conference made clear that non-nuclear countries were highly dissatisfied with the nuclear powers, which had not fulfilled their treaty obligations to end testing and to reduce stockpiles.

According to the Senate proposal, during the period of limited safety tests that would immediately follow the moratorium, the United States would seek negotiations with other nuclear powers for a comprehensive nuclear

test ban. We feel it would have been more reasonable to start such negotiations at the end of this year.

The long-range task. Decades of building the nuclear arsenals have resulted in heavy contamination of the test sites, of nuclear facilities, and of nearby environments, in both the former Soviet Union and the United States.

It has been estimated that environmental restoration efforts will cost U.S. taxpayers \$150 billion over a 30 to 40 year period. The cost in former Soviet countries will be even higher. A testing respite would encourage the design and implementation of a mutually acceptable approach to the cleanup of the nuclear complexes.

If a detailed joint report on these very long-range tasks and their tremendous costs were made available to the public, it would weaken the motivation of some countries to develop nuclear arsenals, perhaps wiping out the incentive completely.

On-going tasks. During the respite, a number of other tasks must be completed, including an internationally accepted and appropriate system of imposing economic and political sanctions on countries that violate the nonproliferation regime.

It would also be desirable for ex-Soviet parliamentarians to be able to learn from the experience of U.S. legislators how to develop and improve nuclear legislation. Having lost centralized management of nuclear weapons, some republics might decide on unwise nuclear deregulation, the negative consequences of which, in the worst case, could exceed those of the accident at Chernobyl.

The effects of the radioactive legacy on workers at nuclear facilities must be assessed calmly. The objectivity of such an investigation may be threatened if weapons development and testing is still under way. Specialists from the former Soviet Union, the United States, Britain, France, and China could be of great help to each other in this endeavor.

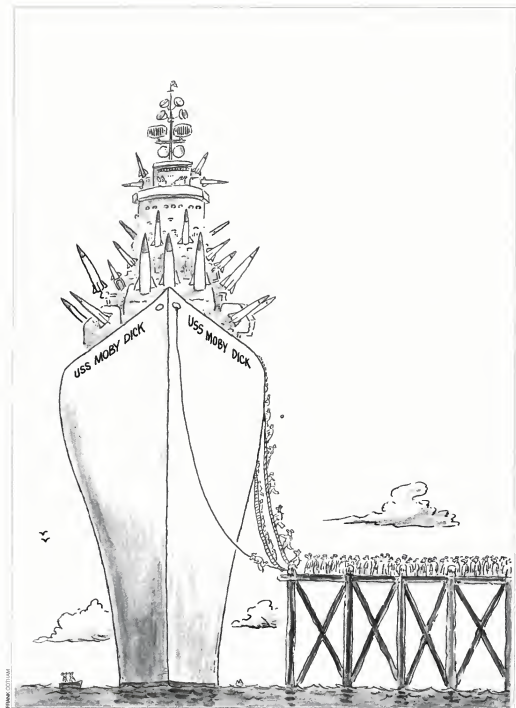
Finally, local citizens have the right to information about environmental contamination as well as the right to participate in the evaluation of a step-by-step reconfiguration of the nuclear weapons complexes.

In the former Soviet states, extremely complicated and interrelated processes including economic reform, the construction of new laws, the creation of independent armies and new military doctrines, and the emergence of a politically civilized structure of society are all being implemented. This activity follows a background of "shocks without therapy," political parties without ideas, doctrines without concepts, and laws that contradicted one another.

Introducing a nuclear respite observed by all nuclear powers would increase the national security of all nuclear powers and raise the sense of global security for all, an especially important issue for the ex-Soviet world. Having recognized this, 50 members of the Russian Supreme Soviet have appealed to the U.S. Senate for support "in preserving the incipient democracy" in Russia through "a one-year intermission of nuclear tests." Kazakh parliamentarians have sent similar appeals.

The U.S. administration must decide whether to help the emerging democracies in the former Soviet Union by

(continued on page 45)



LAI WASTE BY WEAPONS LUST

By JOSEPH J. ROMM

America's superpower status is in jeopardy. A lack of funds to invest at home and abroad threatens U.S. economic leadership. Military strength is being undermined by Pentagon misspending and misplanning—even though the Bush administration plans to spend more than \$1.4 trillion on defense over the next five years. A long-term plan for defense budget cuts, however, could free up tens of billions of dollars a year for urgent domestic problems, while maintaining the most potent military force in the world.

In October 1990, deepening economic problems (and the collapse of the Warsaw Pact) encouraged Congress and the administration to sign a budget agreement that would lead to a 22 percent inflation-adjusted cut in defense spending for the first half of the 1990s. In response, in early 1991 the Pentagon drafted a plan that would eventually cut manpower by 25 percent. Although this suggested force cut was dramatic, the saving still fell far short of the target set by the budget agreement. Moreover, the Pentagon did not cut, but merely slowed down or deferred, the production of expensive new weapons systems on the assumption that military spending would start to climb again in the second half of the 1990s.

Yet increases in defense spending are exceedingly unlikely. The collapse of the Soviet

Union has already led President Bush to propose slightly deeper cuts in defense spending, and Congress wants even deeper cuts. The bottom line is simple but stark: It will be increasingly difficult to maintain armed forces larger than half their present size. And unless the government cancels most of the next generation of weapons, the armed forces will not only shrink to half their present size, they will start to run short of equipment, ammunition, spare parts, and adequate training.

Put simply, the Pentagon must decide whether it wants an exotic array of expensive weapons or if it wants to maintain an effective military force. So far, there are few indications that the Pentagon will make the right decision.

"Unilateral disarmament"

The distortion in U.S. weapons acquisition policy was first described over 20 years ago by Norman Augustine, now chief executive officer of Martin Marietta Corporation. In a once-classified 1971 paper, Augustine argued that "the cost of new military hardware is determined simply by calendar time." Every 10 years the cost of tanks had doubled and aircraft costs had quadrupled. Unless the trend were reversed, said Augustine, by the middle of the twenty-first century, the air force would consist of a single, very expensive airplane.

In a 1990 book, Augustine suggested that the trend had accelerated. This time, he predicted, only somewhat facetiously, that the single airplane would be a bomber: "It will be the B-4... and the year will be 2020."¹

Franklin Spinney, a Pentagon staff analyst, warned the House Appropriations Committee

Will the Pentagon choose glitzy new weapons at the expense of spare parts and maintenance?

Copyright © 1992 by Joseph J. Romm. Joseph J. Romm is a research scholar at Rocky Mountain Institute in Snowmass, Colorado. The views expressed are his own. This article is adapted from a chapter of his book, The Once and Future Superpower (1992).

The navy wanted a "stealthier" plane to replace the A-6, (top) but the A-12, or "flying wing," proved so expensive and difficult to build, that it became the largest program ever canceled by the Pentagon.

PHOTOS
U.S. DEPARTMENT OF DEFENSE



in 1983 that new weapons' "costs are going up much faster than your budgets. The net result is lower rates of modernization and ultimately shrinking forces."⁷⁶

In December 1986, Gen. Bernard Rogers, then commander of NATO forces, said, "We are practicing unilateral disarmament when, with the increasing cost of new systems, we are replacing older systems with fewer numbers of new systems, even though the new systems may be more capable."⁷⁴

From 1982 to 1985 the United States spent 75 percent more for aircraft than it did between 1977 and 1980, but bought only 8 percent more planes. The Pentagon spent 91 percent more for missiles, but their number increased by only 6 percent. And it spent 147 percent more for tanks and armored vehicles, but increased inventory by only 30 percent.⁸

Numerical comparisons, of course, do not tell the whole story. Higher quality weapons do cost more. And the Gulf War shows that the United States has many capable weapons, most based on technology that was begun in the 1970s. Between 1980 and 1985, the Pentagon was able to buy weapons that cost twice as much as previous models because the budget for weapons procurement more than doubled.

But in 1986, three years before the Berlin Wall came down, the \$2 trillion national debt

combined with the Gramm-Rudman budget-balancing law forced the start of a budget decline. And as the cost of new weapons skyrocketed, a shrinking military became inevitable.

Still, the Pentagon, in its internal Future-Years Defense Program (FYDP), continued to project steady increases in defense spending. Each FYDP assumed that the defense budget would start to grow again the following year, and continue growing for five straight years. The 1986 FYDP actually projected a 1990 defense budget of more than \$450 billion.

In 1988, the Defense Department lowered its projected rate of growth, but it still anticipated a 1992 defense budget of more than \$400 billion. Even in April 1989, after five consecutive years of cuts averaging 2.8 percent a year, the FYDP projected an inflation-adjusted growth rate of 1.7 percent.

This optimistic outlook allowed the Defense Department to continue to research and develop more weapons than it could ever afford. Some items on the wish list included the navy's Seawolf submarine, Aegis destroyers, Trident II missiles, and A-12 attack aircraft; the air force's advanced tactical fighter, the C-17 airlift, the rail-garrison MX, the Midgetman missile, and a fleet of B-2 bombers; the army's light helicopter family and replacements for the M-2 tank and Bradley infantry fighting vehicle; and the marines' V-22 tilt-rotor aircraft; and whatever strategic defense system might finally result from Star Wars. The full list was even longer.

This business-as-usual defense planning, which keeps new programs going, is made possible in part because R&D funds represent only a fraction of production costs. The early stages of weapons development appear to be

inexpensive. Also, many weapons programs—like the Stealth bomber—begin as “black” programs, to which funds are allocated without congressional oversight. After a significant amount of money has been spent on a program, any effort to cancel it is opposed by the industrial and military constituency that has mobilized around it, and Congress has historically been reluctant to cancel weapons after so much money has been spent on them.

Shrinking forces

In fall 1990, Congress and the White House worked out a five-year budget deal that necessitated steady cuts in defense spending. The president had agreed to reductions in the defense budget and it was no longer possible to act as if the budget would suddenly start to grow again. Between 1990 and 1997, the Pentagon faced a \$500 to \$600 billion gap between what it wanted and what it would get.

The cuts the Pentagon suggested in 1991 did not account for even half of this shortfall, but they did include surprisingly deep cuts in military forces. Between 1990 and 1995, the Pentagon said, the army would shrink from 28 divisions to 18; the air force would be cut from 36 tactical fighter wings to 26, a reduction of some 700 fighters; and strategic bombers would be reduced from 268 to 181. The navy would be reduced from a 545-ship fleet to 451, and it would cut a single aircraft carrier, leaving it with 12.

The 1991 plan did cut one of the major next-generation programs—the A-12 naval attack plane. It also terminated many weapons that had been proven in the Gulf: the F-14D Tomcat, the F-16 Falcon, the Bradley infantry fighting vehicle, the M-1 tank, the AH-64 Apache helicopter, and the F-15 Eagle. But these weapons were cut to make room for expensive replacements.

Soon, forces will have to shrink much further, or many new systems will have to follow the A-12 into oblivion because of their extraordinary costs. For instance, the A-12 (designed as a “stealthy” replacement for the A-6), proved far more difficult to build than its contractors, McDonnell Douglas and General Dynamics, expected. Mismanagement and cost overruns led to estimates that the planes would actually cost more than \$150 million each. At that price, 25 A-12s would cost as much as an aircraft carrier. On the day he announced the plane’s cancellation, Defense Secretary Dick Cheney said, “No one can tell me exactly how much more it will cost to keep this program going.”

Cheney’s decision was surprising—the A-12 is the largest program ever canceled by the Pentagon and outright cancellations are rare.

The Pentagon usually “stretches out” troubled programs—simply buying fewer numbers of weapons at a slower rate, a practice that lowers efficiency and inevitably leads to higher unit costs and little or no savings. But given the price tag many of the new-generation programs carry, they are now starting to collapse of their own weight.

Consider the B-2 Stealth bomber. Originally, the Pentagon wanted 132 planes at \$500 million each. In April 1991, when Cheney lowered the order to 75 planes, he reduced the number of planes by 43 percent, but the projected

The trillion-dollar wish list

In the 1980s, the U.S. military began to develop and procure a vast number of new, high-technology weapons. In 1988, the Congressional Military Reform Caucus prepared the following list of “selected” weapons systems then under development and their estimated costs.

Weapon system	Estimated total cost in \$ billions
Strategic	
Trident II (missile and submarine)	\$53
Midgeman missile	36
Rail-garrison MX missile	30
B-2 Stealth bomber	69
B-1 bomber improvement	8
Advanced cruise missile	7
Short-range attack missile (SRAM II)	2
Subtotal	\$205
Conventional	
LHX helicopter	\$37
V-22 Osprey	24
Advanced technology aircraft	35
Advanced tactical fighter	64
Carrier battle groups (2)	38
Seawolf submarine	35
C-17 transport aircraft	36
Advanced medium range air-to-air missile	11
Joint Surveillance and Target Attack Radar System	5
Army tactical missile system	18
Subtotal	\$303
Other	
Strategic Defense Initiative	\$452
TOTAL	\$960

Source: Congressional Military Reform Caucus, *Budgets and Bullets: Improving Our Conventional Forces* (Washington, D.C.: Congressional Military Reform Caucus, Oct. 1988).

When Brent Scowcroft said "Five years out, there will be a peace dividend," he could not have been more mistaken.

overall cost saving was only 19 percent. By the time President Bush cut the program to 20 bombers in January, the per-plane cost had ballooned to over \$2 billion—a giant step toward Augustine's nightmare of a one-plane air force in the twenty-first century.

In April 1991, Cheney cut the C-17 order from 210 to 120, increasing the projected cost from \$200 million to \$250 million each, while deferring peak production until the mid-1990s. The Advanced Tactical Fighter (ATF) program has also been stretched out so that most planes will be built after 1996. The projected cost is \$95 billion for 650 planes, or nearly \$150 million apiece.

The navy originally hoped to buy four Sea-wolf submarines per year at a cost of about \$1.5 billion each. By 1991, the navy could afford to buy only one at a time, and the unit price had jumped to \$2.4 billion. By January 1992, the Seawolf program had collapsed. With ballooning costs, construction problems, and no mission, the president pulled the plug on this Cold War relic and proposed building only one submarine. Congress may insist on two, but the program is dead.

In the aftermath of the Gulf War, the Star Wars budget was increased to \$4.1 billion. Even this funding level is wholly inadequate to satisfy SDI's needs. In May 1991 SDI director Henry Cooper told Congress that the program would cost \$120 billion through 2005.⁷ To "fully fund" Star Wars, as President Bush called for in September 1991, its budget would have to more than double by the late 1990s, eventually reaching \$10 billion a year.

In late 1991 Congress approved a plan to go forward with Star Wars, even though SDI offers little hope of being an effective or useful weapon. Worse, it crowds out more important defense needs. In an age of constrained budgets, SDI is a serious threat to military security.

The coming squeeze

Assuming that the Defense Department could meet current budget targets by deferring or stretching out programs and making further force cuts, it would still face a tougher challenge in the second half of the decade—a result of its worst error in the late 1980s—based on R&D and procurement decisions on unrealistic projections. Unfortunately, the Pentagon seems to be projecting a growing defense budget beginning in 1997.

In September 1991, the Brookings Institution released a study showing that if all next-generation weapons were put into production and deployed, the Pentagon budget would have to be increased by 8 percent, or \$20 billion a year, starting in 1997, and it would have

to continue to increase at that rate until spending reached \$350 billion in 2001. This would surpass the highest level of defense spending reached in the 1980s. And—in inflation-adjusted dollars—it would equal the peak spending of the Korean and Vietnam Wars. Total Pentagon spending from 1992 to 2001 would be \$2.8 trillion.⁸

Although the Brookings Institution, the Congressional Budget Office, the Defense Budget Project, and leading analysts like Norman Augustine and Franklin Spinney have all described the coming budget squeeze in exquisite detail, government officials seem entirely unaware of it. President Bush's September 1991 speech called for eliminating most tactical nuclear weapons, mobile missiles, and other nuclear programs, but he endorsed the Stealth bomber and a "fully funded" Star Wars. After the speech, National Security Adviser Brent Scowcroft said, "Five years out, I think there will be a peace dividend." Defense Secretary Cheney said, "The most recent initiatives will produce long-term savings." These assessments could not be more mistaken.

Security v. new weapons

What will happen to military security when the defense budget does not rise in the second half of the 1990s? That depends on how the Defense Department, the White House, and Congress respond to the major defense choice they face in the early 1990s—force size versus modernization.

In the 1980s, the budget for military hardware doubled, but so did the cost of the weapons. As a result, at the end of the decade the military had roughly the same number of weapons it started with. But in the 1990s, budgets have been cut 25 percent. Even if the Defense Department buys the same weapons it did in the 1980s, it will be able to field only 75 percent of the force it had in the 1980s. If, on the other hand, the scaled-down budget is used to buy a new generation of weapons that cost twice as much as their predecessors, then the military will eventually be able to field forces only half as large. (In March 1991 the Congressional Budget Office concluded that replacing aging equipment with current-generation weapons would require roughly \$67 billion a year, but sustaining the proposed 1995 forces with the next generation of weapons would require an average annual procurement cost of \$109 billion.)

If the defense budget is cut more than 25 percent, the only way to avoid very deep cuts in force size (below 50 percent of 1990 levels) is to defer or cancel the ATF fighter, the C-17 transport, Star Wars, and the V-22 tilt-rotor



The F-14 Tomcat (top left), the F-15 (top right), the M-1 Abrams tank (middle), the AH-64 Apache helicopter (bottom left), and the F-16C Falcon (bottom right) were all hailed for their performance in the Gulf, and all have been canceled in anticipation of ordering expensive replacements.

The United States seems poised to return to "hollow forces"—short-changing readiness and sustainability.

aircraft—which Congress, not the Pentagon, is keeping alive. This stark reality is the product of staggering bureaucratic ineptness, poor planning, and blue-sky fantasies. For years hard decisions were avoided; now they must be made.

The writing on the wall

No one can say what defense spending will look like five to 10 years from now. But it seems certain to continue to decline—as it should, for both economic and military reasons.

The defense budget began to decline in fiscal year 1986 because of the \$2 trillion national debt. The changes in the Warsaw Pact were still a few years away. And the Pentagon was considering significant cuts in force size as early as 1988—a year before the Berlin Wall collapsed. In 1990, the end of the Cold War made it easier to accept the five-year cuts in defense spending required by the budget agreement. Again, the impetus for those cuts was the national debt, which had ballooned to \$3 trillion. Even those cuts could not stop the federal debt from growing; this fiscal year the deficit will exceed the defense budget. By 1996, the national debt will reach \$5 trillion, and interest on the national debt will exceed the defense budget. Prudent military planners should anticipate annual budget reductions of at least a 3 to 4 percent in the second half of this decade.

Deeper force cuts are not in themselves a problem. The argument for force cuts—to 50 percent of 1990 levels—was stated succinctly by the Office of Technology Assessment in July 1991: "If one believes that pre-World War II spending levels and the postwar peacetime minimum are more appropriate to the current security environment, then a 25 percent cut would merely return us to 'normal' Cold War levels, while a further 25 percent cut may be a justifiable response to the end of the Cold War."⁷ A 50 percent cut would reflect a genuine reorientation to changing circumstances.

In the last Cold War defense budget (fiscal year 1990), 60 percent of spending—roughly \$200 billion—was devoted to the Soviet and Warsaw Pact threat. Without those enemies—and even after deep spending cuts—the United States will enjoy significant military superiority over likely adversaries. On overall national security grounds, the United States desperately needs the money for economic, energy, and environmental security.

Defense spending clearly can and will be cut far below \$290 billion in 1997 (\$250 billion in constant 1993 dollars), which is the Bush administration's current proposal. But without a comprehensive and realistic long-term

defense plan, the Pentagon is likely to cut forces and short-change funds for readiness and sustainability, repeating the mistakes of the 1970s that led to "hollow forces." Air Force Gen. John M. Loh has said of 1970s Pentagon planners that "they protected force structure at the expense of a robust capability to support it."⁸

In 1988 congressional testimony, Brookings' Institution defense analyst William Kaufmann explained why cuts in military readiness and sustainability—personnel, spare parts, ammunition, training, and maintenance—are called the "attack of the termites." "In effect, what happens as a consequence is that the defense house looks from the outside to be in excellent order while all the parts on the inside that make it function are progressively eaten away."⁹

These hard-to-see cuts are as devastating to the military's vitality as the 1980s' cuts in education, R&D, and infrastructure have been to the vitality of the U.S. economy. Just as the nation requires a systematic, long-term plan to restore economic security as resources are shifted from defense to civilian needs, it also needs a comprehensive long-term plan to maintain military security. Otherwise there will be a haphazard battle between those who want to preserve weapons systems, those who want to preserve force size, and those who want to preserve readiness and sustainability. The result will be chaos—and a far smaller and less potent military.

A prudent plan

In September 1991, Kaufmann and his colleague John Steinbruner put forth a detailed, long-term plan in a Brookings' study, *Decisions for Defense, Prospects for a New Order*. Their comprehensive 10-year program would reduce the Pentagon budget to \$225 billion in fiscal year 1996 (\$20 billion less than the 1991 Pentagon plan), and to \$169 billion in 2001 (in inflation-adjusted dollars).

Their "low plan" would reduce the army to 11 divisions in 2001; reduce the navy to six aircraft carrier battle groups and a total of 259 ships; and keep the same number of air force fighter wings as the 1991 Pentagon plan. This option would provide the United States with the same resources it used during Operation Desert Storm, except for the reduction from six to four carrier battle groups. Naval forces, however, were not the decisive element of the Allied success in the Gulf. As the authors note, "It is hard to argue that six carrier battle groups were essential to the success of the campaign."

In fact, the navy is already beginning to have problems equipping its carriers. Vice Adm. Richard Dunleavy, chief of naval avia-



tion, told *Defense News* in March 1991, "We are in a death spiral and that is [a] pretty bad analysis. Unless we change the way we do business, [learn] how to make less expensive aircraft and how to employ them, we are going to have a crisis on our hands as to where naval aviation is going."¹⁰ Reducing the number of carriers would help alleviate the naval aviation problem and give the navy a decade to solve the problem of building affordable aircraft.

The "low plan" meets the test of Desert Storm while saving the country nearly \$75 billion a year. The United States could not fight a campaign as large as Desert Storm while fighting a second war elsewhere. But the likelihood of two such battlefronts at the same time is low (no simultaneous attacks occurred during the 45 years of the Cold War), and the United States has demonstrated how effectively it can destroy even a large, modern, well-dug-in army. Moreover, as the authors note, "It may well be the case that the United States committed larger forces to the [Desert Storm] campaign than were necessary to achieve the same outcome."

And immediate attack is not the only option in a crisis. Had the United States been engaged in another military operation during the Gulf crisis, it could have extended the embargo

against Iraq until the first operation was completed, thus avoiding two simultaneous battles.

Finally, the United States has few potential enemies whose military might approaches the magnitude of Iraq's armed forces. Joint Chiefs of Staff Chairman Colin Powell said in April 1991, "I would be very surprised if another Iraq occurred. . . . Think hard about it, I'm running out of demons. I'm running out of villains. . . . I'm down to Castro and Kim Il Sung." Tactical air forces were decisive in the Gulf War, and the "low plan" would give the United States a more than five-to-one advantage in air power over North Korea (about the same as against Iraq) and a more than 10-to-one advantage in air power over Cuba.

To achieve defense savings without cutting forces more deeply, Kaufmann and Steinbruner would build only 15 B-2s, scale back SDI, and continue upgrading current generation combat aircraft. But they would defer all next-generation successors, postpone the army's new systems, cancel the Seawolf submarine, terminate the C-17, and extend the life of the C-141 airlift aircraft. Since many of the next-generation weapons were designed with the Soviet and Warsaw Pact threat in mind, their cancellation would not jeopardize U.S. security.

Although not everyone would agree with Kaufmann and Steinbruner's recommenda-

The Advanced Tactical Fighter, a \$64 billion dollar program, is designed to replace the F-14, F-15, and F-16.

**"I'm running
out of
villains . . .
I'm down
to Castro and
Kim Il Sung."**

tions, upgraded versions of weapons that were effective in the Gulf War would be better than untested and expensive new weapons. And military security will decline if there are only rusty and cobwebbed production lines for the best battle-tested weapons and inadequate funds for their replacements.

A 10-year reduction plan allows many years to reverse policy decisions should events warrant, such as the rise of a new global military threat. But a major military foe is unlikely to arise in the next decade. Who can match the awesome power unleashed by the United States in the Gulf War? The United States demonstrated a unique capability to rapidly gather, process, and disseminate military information and then quickly create and implement effective battle plans.

The United States has the fastest, most effective military time-cycle in the world, and it is the only nation with the trained people and superior weapons to operate at such a tempo. The synthesis of special training, strategy, and weapons is a formidable achievement. Moreover, many key aspects of U.S. military superiority—satellites, aircraft carriers, a large high-tech air force—cannot be developed either quickly or in secret. There would be many years' warning if another nation attempted to match U.S. military might.

In February 1992, Defense Secretary Cheney described the remarkable state of America's military security:

"Today we have no global challenger, except with respect to strategic nuclear forces. No country is our match in conventional military technology or the ability to apply it. There are no significant alliances hostile to U.S. interest.

"To the contrary, the strongest and most capable countries in the world are our friends. No region in the world critical to our interest is under hostile, non-democratic domination.

"Threats to our security have become more distant, not only physically, but in time as well. A challenge to our security would have to overcome our formidable alliances, and their qualitative advantages that we displayed so impressively during Desert Storm. The events of the last four years have provided America with strategic depth in which to defend our national interest, that we lacked for decades."¹¹

Still deeper cuts

The "low option" provides remarkable security at \$169 billion a year. On the other hand, it is far from the absolute minimum that could be spent to maintain a potent defense. For instance the plan includes no significant reduc-

tions in national intelligence spending. The \$30 billion spent in that arena is a relic of the Cold War and it should be possible to reduce it in proportion to cuts in defense spending, saving another \$10 to \$15 billion per year.

It is also likely that new cooperative security arrangements with allies will be established in the 1990s. These agreements should reduce pressures for U.S. military spending. For the foreseeable future, the United States would have increased national security if—instead of squandering resources and effort on larger forces and ever more sophisticated weapons—it created a true "new world order" based on preventing aggression in the first place. The United States should work with other major powers—Russia, Britain, France, Germany, Japan, China, Brazil, and India—to establish a worldwide security standard based on limiting offensive military capabilities. Limits on force size and weapons mix could be informally negotiated based on each nation's size and population.

The key to true military security is prevention of weapons proliferation and war. One crucial measure would be stronger controls on exports. All weapons transfers should be licensed and fully disclosed. End-use should be strictly monitored to prevent weapons build-ups or diversions of weapons to third countries. Such an export control plan might have short-term costs—the United States would have to forgo billions of dollars in arms deals, but in the long run it would save far more. A well-enforced global export policy would slow the spread of technology and weapons that could eventually undermine the overwhelming U.S. military advantage. Such a policy would minimize the likelihood that the United States would ever face its own advanced weapons technology, as it did in the Gulf. Above all, such a global watchdog program would bring long-term military security benefits.

In addition to their "low plan," Kaufmann and Steinbruner have proposed a "cooperative security" defense plan. This plan projects a defense budget of \$155 billion in 1998, which is \$85 billion a year below the Pentagon's currently planned 1997 budget. Since the cooperative security six-year budget does not significantly differ from their "low option" until 1995, there is no near-term risk in working toward this new world order.

Cooperative security and the recommended defense cuts are mutually reinforcing—cooperative security would be attainable only if every member were demilitarizing. The United States would have the necessary credibility to help lead such a world only if it was perceived as part of the solution—by cutting its forces in half and curtailing arms exports. And there would be no reason for high levels of de-

fense spending in such a world.

The claims politicians and others make about multi-year programs for defense cuts are often misleading. Cumulative savings sound impressive—"50 billion over five years"—but the same savings can be achieved by a permanent \$10 billion spending cut in the first year (and spending \$290 billion a year for five years instead of \$300 billion a year). In comparison, the cooperative security plan would provide \$210 billion in cumulative savings through 1997, and another \$430 billion by 2002, and \$85 billion per year thereafter. This

is a genuine peace dividend for a nation that desperately needs to increase funding for non-military security.

America's task in the 1990s is to restore its economic leadership while maintaining its military strength. This can be achieved by a long term plan to cut the defense budget in half by 2001 and to transfer the money to pressing domestic needs, including deficit reduction. Moreover, a world where defense spending can be reduced more rapidly is possible, and the United States should take steps to bring such a world about. ■

1. Norman Augustine, *Land Warfare*, reprinted after declassification in *IEEE Transactions on Aerospace and Electronics Systems*, Sept. 1986.
2. Norman Augustine and Kenneth Adelman, *The Defense Revolution* (San Francisco: Institute for Contemporary Studies, 1990), pp. 98-99.
3. Congressional Military Reform Caucus, *Budgets and Bullets: Improving Our Conventional Forces* (Washington, D.C.: Congressional Military Reform Caucus, Oct. 1988), p. 9.
4. *Ibid.*
5. *Ibid.*, p. 10.
6. Eric Schmitt, "Pentagon Scraps \$57 Billion Order for Attack Plane," *New York Times*, Jan. 8, 1991, p. A1.
7. Henry F. Cooper, testimony before the Legislation and National Security Subcommittee of the House Government Operations Committee, May 16, 1991.

8. William W. Kaufmann and John D. Steinbruner, *Decisions for Defense* (Washington, D.C.: Brookings Institution, 1991), p. 55.
9. "New Weapons Cuts May Prompt More, Democrats Assert," *New York Times National Edition*, Sept. 30, 1991, pp. A1, A4.
10. U.S. Congress, Office of Technology Assessment, *Redesigning Defense*, OTA ISC-500 (Washington, D.C.: U.S. Government Printing Office, 1991), p. 30.
11. "Strategy for '90s: Reduce Size and Preserve Strength," *Washington Post*, Dec. 9, 1991, pp. A1, A10.
12. William Kaufman, "Defense Agenda for 1990-91," Testimony to the Common Budget, U.S. House of Representatives, June 21, 1988.
13. *Defense News*, March 11, 1991, p. 46.
14. Richard Cheney, testimony before the Senate Budget Committee, Feb. 3, 1992.

A Preponderance of Power

NATIONAL SECURITY,
THE TRUMAN ADMINISTRATION,
AND THE COLD WAR
Melvin P. Leffler

"A masterly work of synthesis, weaving together in a single coherent study the various and often contradictory trends in previous historical writing on the Cold War's origins. It is indefatigably researched: there does not appear to be a relevant archival collection, official or unofficial, that Leffler has not seen. And, most important, it is an intellectually honest work. . . . The best book anyone has yet written on the United States and the origins of the Cold War."—John Lewis Gaddis, *The Atlantic*. Illustrated with 15 halftones and 10 maps. \$29.95

Arms Control by Committee

MANAGING NEGOTIATIONS
WITH THE RUSSIANS
George Bunn

Written by a participant in many of the negotiations, this book is essentially a series of case studies of U.S.-Soviet nuclear arms control negotiations. It also looks to the future: What changes will occur in the arms control process given the end of the Cold War? \$39.50

STANFORD NUCLEAR AGE SERIES

The Wizards of Armageddon

Fred Kaplan

New forward by Martin J. Sherwin. "A fascinating account of a hidden elite and a hidden era in American politics, packed with inside stories that will be new to even the most seasoned specialists. The tale of the strategic 'Whiz Kids' has never been told in such detail or with such flair."—Les Aspin, Chairman, House Armed Services Committee. \$16.95

The Voice of the Dolphins

AND OTHER STORIES

EXPANDED EDITION

Leo Szilard

New forward by Barton J. Bernstein. First published in 1961, this is a collection of short stories ("Extraordinarily well written . . . extremely satisfying as a work of art."—*Saturday Review*) by the eminent physicist Leo Szilard (1899-1964). This edition includes a previously uncollected story that was the origin of the idea for the Moscow-Washington hot line and previously unpublished preface by Leo Szilard. Cloth, \$24.50; paper, \$10.95

Stanford University Press . STANFORD, CA 94305-2235

SNATCHING DEFEAT FROM THE JAWS OF VICTORY

By DANIEL N. NELSON

**The West's
cries of victory
can no longer
drown out
the sounds
of battle.**

The Helsinki summit in July was accompanied by the unmistakable sound of fiddling and the smell of smoke. As the leaders of the Conference on Security and Cooperation in Europe (CSCE) assembled for photo opportunities and ponderous statements, Bosnian Foreign Minister Haris Silajdzic said poignantly, "This is what is killing us."

With over 22,000 fatalities in the Yugoslav wars, and thousands more killed in battles waged in Moldova and from the Caucasus to Central Asia, the dangers of post-euphoric post-communism are all too clear.

Meanwhile, in Western Europe there is a rising chorus of intolerance and neo-fascist violence against immigrants; there are second thoughts about the Maastricht marriage; the

*Daniel N. Nelson, a former foreign policy adviser to Cong. Richard Gephardt, is director of the Institute for International Studies at Old Dominion University in Norfolk, Virginia. His book, *Security After Hegemony*, is forthcoming.*

U.S. role in Europe has been diminished; and NATO debates the role of the "Euro-army." Having so recently declared itself the Cold War victor, the West—and especially the United States—seems disinclined to make the necessary preparations for the twenty-first century.

Helsinki

Fifty-one leaders came to Helsinki this summer for the third heads-of-state meeting of the CSCE (otherwise known as the "Helsinki Process"). This gathering, unlike the Paris summit in 1990, had no happy ending. The not-so-distant sounds of war—from the Adriatic to the Caucasus—hung ominously over the agenda.

The Helsinki meeting moved some things forward. The summit leaders declared the CSCE to be a "regional arrangement" under Chapter 8 of the U.N. Charter; inaugurated a steering-group plan to avoid the need for the entire membership to convene in a crisis; and for the first time used CSCE's "consensus-minus-one" decision mechanism to suspend what remains of "Yugoslavia" (Serbia and Montenegro). It created a CSCE commissioner for minorities and agreed that Western military force could be deployed to insure the delivery of humanitarian relief to Bosnia.

But these measures were not the stuff of statesmen-like vision. Instead, the leaders were reacting to television reports vividly depicting intense suffering in Sarajevo. The United States has tried to limit CSCE's function to "the conscience of Europe"—as Secretary of State James Baker described it in a December 1989 speech in Berlin. But the unconscionable acts of Serbian leader Slobodan Milosevic and his allies forced the Bush administration to take a second look.

It was the tragic effect of their earlier inaction that finally moved CSCE leaders to enlarge the organization's portfolio. But these small steps were desultory and belated, falling far short of producing either an unequivocal political endorsement for meaningful collective security, or the resources necessary to get the job done.

While people die and principles are trampled in Eastern Europe, political fears have blinded both leaders and analysts in the West to the palpable need for a strategic shift toward truly collective security. At Helsinki, leaders tinkered with details, but tragic events demanded large-scale reconstruction. None of the temporizing steps of July will do more than heighten awareness of CSCE's impotence.

Collective security

The West has failed to move forward from common defense to collective security. In de-

fense pacts, dominant or hegemonic powers gather allies around them. They may or may not share values, but they share opposition to an identifiable adversary. Alliances for common defense implement strategies of containment and deterrence and attempt to prevent war by balancing military capacities, not by reducing threats.

In contrast, collective security includes the premise that threats may arise from within, and that avoiding internal discord is at least as important as countering external threats with military force. Collective security arrangements must include, not exclude, a concern for peace, stability, and the well-being of all participants.

Collective efforts to avoid resorting to mili-

tary force include techniques for nonoffensive defense, studies of conflict reduction by joint academic-policy centers, mediation via crisis-resolution organizations, collective and binding economic sanctions, and the use of peacekeeping forces to separate parties to a dispute. Collective security does not mean abandoning the right to self-defense, but it is intended to minimize the need to exercise that right by abating potential threats.

The charters of both the League of Nations and the United Nations invoked images of global commitments to mediation, conflict resolution, and peacekeeping. During the Cold War, the U.N.'s collective security role was thwarted as the five permanent members of the Security Council used the veto to preclude

The NATO "club" closed ranks against the kind of CSCE that Eastern Europe badly needed.



Children play in a burned-out section of Sarajevo.

PHOTOS: AP/WIDE WORLD



Flowers and a kiss: U. N. peacekeeper from a relief convoy is greeted by a resident of Gorazde, a besieged Bosnian town.

action—and that same veto power may still prove debilitating in today's Eurasian conflicts. Further, the deployment of U.N. truce observers/peacekeepers in Cambodia and other areas have exhausted the U.N.'s financial resources.

Secretary-General Boutros Boutros-Ghali has reported to the Security Council on ways to substantially enhance the U.N.'s capacity to organize military operations along the lines described in Articles 42 and 43 of the U.N. Charter. But the U.N.'s role is unlikely to expand—at least in those cases in which states with vetoes are parties to disputes (as Russia seems sure to be), or if no new ways to finance peacekeeping operations are agreed on.

Higher standards

CSCE originated in 1973 as a diplomatic endeavor to reduce East-West confrontation. Delegates from 35 states—all of Europe (except Albania), Canada, and the United States—met for two years to draft the Helsinki Accords, formally known as the "Helsinki Final Act."

Signed on August 1, 1975, the Final Act declared that all states must behave in ways consistent with higher standards—toward their own citizens and toward each other. Three principal areas, or "baskets" of agreement enunciated principles on the relations between states, which included mutual security assurances; economic, scientific, and environmental cooperation; and human contacts and exchanges.

Until the late 1980s, CSCE served chiefly as an instrument of Cold War competition. Follow-

up sessions held to gauge compliance with the 1975 accord were confrontational, reflecting worsening U.S.-Soviet relations. Periodic special-topic meetings held between summits were also beset by East-West intransigence, with the West using CSCE to attack Soviet and East European regimes for human rights abuses.

On the other hand, the courageous activities of Helsinki-related groups within the communist states formed a wedge of conscience into Leninist authoritarianism. But not until Mikhail Gorbachev's "new thinking" on foreign policy, which coincided with the third CSCE follow-up session in Vienna (November 1986 through January 1989), did CSCE's potential as a security instrument approach reality. The Vienna meetings could have—but did not—transform the Helsinki Process into the basis for a Euro-Atlantic security organization suited to the twenty-first century.

Although Vienna expanded CSCE activities in the areas of confidence and security-building measures and conventional arms reductions, it proved to be the beginning of a disastrous foreign policy blunder. The democratic West let slip the chance to transform CSCE into a vigorous institution by laying the foundation for Euro-Atlantic security—mandating an adequately equipped secretariat, well endowed finances, and the means to draw on the members' military strengths. Had the major Western powers been sufficiently far-sighted, this more advanced CSCE could have emerged in early 1989. CSCE could have been the security organization to abate the threats that have led inexorably to full-scale war, in the Balkans and the Caucasus.

Instead, an absence of strategic vision led to a wasteful and indecisive two-year debate in which the United States, Britain, and other "Atlanticists" opposed empowering CSCE. As walls fell, playwrights became presidents, and tyrants were overthrown, the West not only congratulated itself on its triumph over communism, it clung to the closed club of NATO as the premiere alliance. In so doing, the West lost its chance to prepare for the onslaught of problems spilling out of Eastern Europe. Speaking at the Helsinki meeting in July, President Bush admitted "We did not appreciate what awaited us."

In Paris, leaders signed the Conventional Forces in Europe (CFE) treaty, blessed German unification, and marked the end of the Cold War with the "Charter of Paris." The United States endorsed a few small CSCE institutions—a secretariat in Prague, a Conflict Prevention Center in Vienna, and an Office of Free Elections in Warsaw. But the United States opposed any European notions that favored collective security.

During 1989 and 1990, the newly non-com-

minist governments in East Central and Southeastern Europe, supported by German Foreign Minister Hans-Dietrich Genscher, suggested new security arrangements. Proposals for pan-European collective security emanated from the Polish, Hungarian, Czechoslovakian, and Romanian foreign ministries. In contrast to these larger and progressive visions, the U.S. "NATO first" position limited CSCE's structure, staff (171), and budget (a few million dollars a year).

In 1991, recognizing that the only path compatible with U.S. views led to NATO, East Europeans began to back away from their pan-European proposals. Given their dependence on the United States and other NATO members' financial largesse, East European leaders began to make pilgrimages to Brussels, and "Atlantic Clubs" and similar groups sprouted from Sofia to Warsaw, all in collusion with U.S. embassies. This was not because visionary statesmen in the fledgling democracies of post-communist Europe had abandoned their convictions about collective security; rather, they knew which side their bread was buttered on.

Policy failure

The U.S. lack of commitment to a meaningful Euro-Atlantic security organization is now glaringly obvious. The United States continues to regard CSCE as, at best, a tertiary player in post-Cold War Europe.

In March, at the beginning of the Helsinki meeting, as ominous signs mounted that fighting in Bosnia, Bessarabia, and the Caucasus would intensify, Deputy Secretary of State Lawrence Eagleburger endorsed only some incremental CSCE changes in areas of democratic institution building, human rights, and arms control.

The U.S. government still regards NATO as the unique vehicle for protecting American interests. NATO is so deeply enshrined in the administration's perceptions of its security and interests that its metamorphosis has been the leitmotif of U.S.-West European relations during the entire Bush administration. All other issues—from German reunification, force reductions, regional conflict—have been jammed into the NATO framework. And at the NATO summit in Rome in November 1991, which issued the results of a prolonged intra-alliance "strategic review," it was clear that the United States had dug in its heels—NATO would remain the single pillar of European security, with every other institution in a distinctly supporting role.

It is tragic that giving NATO life support—inventing a new role, new structures, and a new vocabulary—is more important to the

State Department and the Pentagon than thinking about what might be in the best interests of the country in the twenty-first century. Yet Americans at NATO and the State Department have spent the last two years remodeling the exterior of the alliance. A new wing, the North Atlantic Cooperation Council (NACC—pronounced "Nak-see"), which offers the former Warsaw Pact nations "consultation" instead of membership, is somehow meant to address the hemorrhaging security in Europe's eastern half.

But no one is fooled. Although East Europeans may now be able to see the NATO security umbrella, they know NACC does not open it for them. This second-class, buyer-beware association with NATO is a pallid and risky substitute for genuine collective security. People in the eastern half of Europe understand this so clearly that they have tried to establish new bilateral and regional alliances and ties with every "Western" institution they can think of.

At NATO's spring meeting in Oslo another step was taken to try to insure that only NATO would decide if military force would be deployed in Europe. NATO announced that the alliance would be willing to consider CSCE requests for NATO military forces to serve in peacekeeping roles.

Although the press covered this announcement as if it would actually enable the CSCE to call on NATO, the Oslo agreement was in fact much less clear-cut. Given that CSCE's decision-making process is "consensus minus one" (unanimity, excluding the offending country), there is only a remote possibility that NATO will ever receive a request. Even if CSCE were unanimous, the chance that all 16 NATO members would agree to deploy troops is improbable. The agreement is an example of NATO defining its business as military force, and confining other collective security organizations to roles that NATO does not want to claim.

The wars in Yugoslavia have spotlighted the grand failure of Western, and especially U.S., post-Cold War policy. The Charter of Paris rings hollow if no one will enforce it—and Washington will not, since only immediate U.S. self-interest defines U.S. security.

But only a clouded vision—or none at all—sees security as served by the hand-holding function of NACC or by post-hoc battlefield policing by U.N. blue helmets. Soothing talk in Brussels or cleanup after the carnage in Bosnia are inhumane substitutes for conflict prevention.

The roots of blindness

How can this misguided policy be explained? Individual self-interest is one answer, since careers may be endangered if NATO's prestige

Rebuffed, East Europeans reluctantly began making pilgrimages to Brussels.

In foreign policy, Bush has stayed the course—toward rocky shoals.

slips. And some Washington policy-makers, members of Congress, and think-tank pundits want to let the Europeans—particularly the French—demonstrate in the Yugoslav catastrophe that, without NATO and the United States, they are incapable of resolving the crisis. This has led to the inference among some observers that U.S. policy regarding CSCE has been a calculated effort to insure its failure.

In my conversations with many key policy-makers in the United States and Europe, I have found little corroboration for such a conspiracy theory. Nevertheless, the wish that without American resolve Europe will be shown as indecisive and divided is a hope that many in Washington have been unable to conceal.

The most often mentioned rationale for minimizing CSCE was the danger of linking U.S. national security to a large, amorphous forum that would be concerned about issues in which American national interests were not immediately threatened.

To "take a pass" on Yugoslavia, as one senior Bush adviser told me this spring, was a direct consequence of judging that U.S. national interests were unaffected by ethnonationalist warfare, and that U.S. involvement in multilateral efforts would intermingle U.S. concerns with those of other states. As a result, the United States made no effort to heighten CSCE's profile, and it has let the European Community, and ultimately, the United Nations, try to deal with the political and security dimensions of the growing Yugoslav crisis.

As stated, the U.S. position on the issue of collective security—and its specific applicability in Yugoslavia—has the ring of rationality. But underlying this mindset lurks a dangerous interpretation of *Realpolitik*.

"Realists" argue that with the demise of a bipolar concentration of power, nations will return to a free-for-all struggle for power, defined primarily in military terms, in pursuit of individual national interests. And national interests dictate that they have military capabilities sufficient to deter attack by potential enemies and to assure peace and stability through the operation of a balance of power propelled by self interest. *Realpolitik* has always emphasized power as the fundamental commodity in international relations, self-interest as the guiding principle, and the balance of power as the means by which to avoid war.

This reasoning is at the core of the U.S. decision to distance itself from collective security and to "take a pass" on Yugoslavia. Only after body counts and "ethnic cleansing" made it impossible to turn away did American policy move perceptibly. U.S. power and interests are thought to be embedded in a tried and trusted NATO. In a larger body, U.S. national

interests would be thrown into a cauldron of collective decision-making that the administration could not control. U.S. passivity in the face of the Yugoslav tragedy, and the administration's aversion to CSCE are direct consequences of the belief that U.S. policy should be guided by unambiguous national interests, and that those interests alone matter.

That the Bush administration's policies contain this disjointed logic is demonstrated by the starkly contrasting reaction to Iraq's invasion of Kuwait vis-a-vis the developing arc of warfare from the Adriatic to Central Asia. Against Saddam Hussein, the United States organized, led, and dominated "coalition" forces. The adversary was malevolent, and the war's result was sold to the American public as an unqualified victory. Power was used to protect immediate self-interest—access to oil, and the protection of allies like Saudi Arabia.

But that victory has proved to be far from glorious, and the policies that led to the war have been traced to the administration. The linkage between power, national interests, and a twenty-first century understanding of security has grown tenuous.

The Bush administration's spurious syllogism—that short-term national interests must guide security policy, and that power is the instrument of that policy—simply leaves out post-communist Europe. Threats in that region, from turmoil and collapse in nascent democracies to economic dislocation, migration, and the spread of warfare, are transnational and systemic. They may not affect the lives of Americans today, but they will have a substantial effect on whether Americans live in peace and prosperity in the future.

Mistaking woodenheadedness for realism, the Bush foreign policy has stayed the course—toward rocky shoals. As the United States rejects European collective security, it becomes less relevant to Europe's future, more isolated, and unable to offer meaningful alternatives to recurrent strife. And by refusing to take part in abating threats, the United States will be left with one of two choices—either undertaking costly military interventions after the killing has begun, or taking a seat from which to watch the slaughter.

CSCE could have been much more than it is, and it could have opened a pathway to avoiding conflicts like the Yugoslav wars. The administration's "realism" has stunted CSCE's development and helped cause unmitigated tragedy in southeastern Europe. Another tragedy is that, without a dramatic change in post-Cold War strategy and support for fully institutionalized Euro-Atlantic collective security, we may see more worst-case scenarios in Bessarabia, Kosovo, Macedonia, the Caucasus, the Crimea, and elsewhere. Time is exceedingly short. ■

The horrific policy of "ethnic cleansing" in what was Yugoslavia, and the half-hearted Western response to it (as of this mid-August deadline), should clarify thinking about a new security system in Europe. The Balkan war will reshape Europe far more than will any of the bureaucratic structures and mechanisms that have sprouted since the end of the Cold War.

The systematic persecution of Bosnian Muslims in the summer of 1992 made it blindingly obvious that the Conference on Security and Cooperation in Europe (CSCE) Charter, U.N. resolutions, European Community-brokered cease-fires, and economic sanctions are not worth the paper they are written on unless backed by credible military force. And the only military force that could have stopped the killing and restored order in Bosnia-Herzegovina was the North Atlantic Treaty Organization (NATO) under U.S. command. Too immense a task for U.N. peacekeeping, the situation required serious military intervention to enforce peace and establish rights for all minorities.

During the early 1990s, the former Warsaw Pact countries increasingly looked to NATO for some form of security guarantees and reassurance.

Jane Sharp is a senior research fellow at King's College and the Institute of Public Policy Research in London, England.

IF NOT NATO, WHO?

By JANE SHARP

The only organization with the military muscle to stop the Balkan killing "stayed in its bunk with its polished boots on."

August 1992: Muslim POWs at Trnopolje, a detention camp near Sarajevo.



For decades, NATO's mission was to repel the Red hordes. But by April 1992, while the Balkan body count rose, Evgeny Shaposhnikov, commander of the former Soviet forces, was swapping stories with NATO commander John Galvin.



surances. NATO responded with a North Atlantic Cooperation Council (NACC) that includes all former Warsaw Pact states and all former Soviet republics. But if NATO will not protect European civilians against murderous bullies with no regard for international law, what purpose can the alliance serve in the much-touted New World Order? In its Oslo communiqué in June 1992, NACC declared that "unilateral changes in borders, territories or populations achieved through force, violence, or faits accomplis are unacceptable." And what was NATO prepared to do when nations behaved unacceptably? After more than a year of fruitless European Community peace conferences and broken cease-fires, NATO did not intervene but instead, as Neal Ascherson wrote in the *Independent* on Sunday, August 16, "stayed in its bunk with its polished boots on."

The international community procrastinated and many innocent lives were lost. Because Slobodan Milosevic, Radovan Karadzic (head of the Bosnian Serbs) and Mate Boban (head of the Hercegovian Croats) were not stopped in Bosnia-Hercegovina, they and other chauvinistic expansionists are likely to continue their crimes against humanity in Vojvodina, Kosovo, and possibly Macedonia.

Moreover, if Western governments condone such action in the Balkans, they risk encouraging potential dictators in the Baltics, in the Transcaucasus, and perhaps in other former Soviet republics.

Since the end of the Cold War, scholars and European security specialists have sought to devise systems to maintain a stable peace in Europe. But governments have not invested in these institutions and events have made mincemeat of the pan-European peace process. In 1990 and 1991 the Gulf War demonstrated how logistically weak and politically disorganized the West Europeans are without U.S. support. And the war in Yugoslavia shows how reluctant the United States is to take the lead in a European conflict that does not directly threaten its economic interests. U.N. Secretary-General Boutros Boutros-Ghali tried to beef up the blue helmet peacekeeping forces, but many U.N. members refuse to pay their dues to support the effort.

At the end of March 1992, the United States owed the United Nations \$863 million, 43 percent of the U.N.'s outstanding assessments.

The other four permanent members—China, France, Russia, and Britain—owe \$444 million between them; Germany and Japan owe \$267 million (June 1992 *Bulletin*). Boutros-Ghali has been understandably angry that the resource-rich European powers have expected the United Nations to expend its resources in the Balkans, while only belatedly making an effort to intervene to end the anarchy and rampant starvation in Somalia.

The CSCE spawned a new charter and several structures in November 1990, and another batch in July 1992, all with new tasks, but with inadequate staff and funding. West European governments resuscitated the moribund Western European Union (WEU) to serve as the European pillar of NATO, or as the defense arm of the European Community, or both. But there was little or no consensus in Western Europe about what to do or whom to support in Yugoslavia, and the naval force dispatched to the Adriatic this past summer to monitor—not even to reinforce—the trade embargo on the rump of Yugoslavia was purely symbolic.

These new or revived security structures may yet prove valuable—particularly the CSCE efforts to establish minority rights and to strengthen the European pillar of NATO through the WEU—but they will not be in time for Bosnia. When action was needed there, NATO was the only organization available with the necessary military muscle, and the alliance should have put itself at the service of the United Nations as a peace-making rather than as a peace-keeping force. And if, for example, China had vetoed U.N. action, fearing future intervention on its own territory, NATO should have acted alone. Ideally, any Western military action should be in consultation with Russia and Ukraine. But Moscow and Kiev are still too close to Serbian interests to make full cooperation practicable. Nevertheless, NATO should have taken on Serbia directly, since it was Serbian ambition, albeit with Croat complicity, that drove the war against Bosnia and that threatens stability in Kosovo, Vojvodina, and Macedonia.

To push back Serbian and Croatian forces to the status quo ante would be a major undertaking, on the same order as Desert Storm in terms of manpower, though not as demanding logistically. Several hundred thousand ground troops would be needed not only to disarm the warring factions and establish safe havens, but also to maintain order until a settlement had been negotiated that secured rights for all ethnic minorities and brought war criminals to trial. The leaders responsible for murdering and incarcerating innocent civilians in detention camps—some eyewitnesses call them concen-

tration camps—must be brought swiftly to trial in an appropriate international court. But Western governments seemed to prefer a policy of appeasement.

A major military action has been obviously difficult for Western governments to contemplate since they usually intervene with massive military force only to support vital economic and strategic interests, not for humanitarian causes. But by condoning (by inaction) aggression against the Bosnian Muslims, NATO and EC governments can no longer boast of a civilized Western security community.

In the summer of 1992, realists in the strategic studies community argued that the United States should stay out of the Balkans on the grounds that there were no U.S. interests to defend—nothing that was worth losing American lives for. Military experts in London and Washington invoked the quagmires of Northern Ireland, Vietnam, and Lebanon to show that once deployed, ground troops are hard to withdraw, costly to support, and rarely able to solve underlying political problems that motivate warring factions.

Many peace activists and scholars agreed that military intervention would be a mistake. Those with experience in conflict resolution are especially skeptical of military solutions. But they also admit that there are only two phases of a conflict where mediation and conflict resolution stand a chance—early, before attitudes become too fixed and behavior too hostile, or later, when a conflict is stalemated and the parties are exhausted. The Western powers missed the first opportunity and they cannot afford to wait for the second. A military solution may be the only solution.

Although the war in Yugoslavia stems from long-standing ethnic rivalries in the region, the ambitions of Slobodan Milosevic for a Greater (and more ethnically pure) Serbia were the primary driving force of the conflict in Bosnia. The Serbs have been bullying other nationalities in the former Yugoslavia, especially the Albanian community in Kosovo, since the late 1980s. They began grabbing land by force first from Slovenia and Croatia in 1991, then from Bosnia-Herzegovina in early 1992. Before these three provinces became independent, much diplomatic time was lost in debates about whether international institutions like the CSCE, the EC, and the United Nations could interfere in another nation's domestic affairs.

In mid-1991, the EC tried to stop the fighting between Serbia and Croatia, but there was little consensus then about who the aggressor

Military experts invoked the quagmires of Northern Ireland, Vietnam, and Lebanon.

**Military
intervention is
dangerous, but
the dangers of
staying out are
worse.**

was. France and Greece tended to support Serbian interests while Germany and Austria clearly favored Croatia. Nevertheless, the EC was able to broker a cease-fire in Croatia in early 1992—with U.N. forces in place to stabilize the border with Serbia.

Since then the international community has recognized the independence of Croatia, Slovenia, and Bosnia-Herzegovina, but, according to Judy Dempsey's reports in the *Financial Times* (July 10 and August 13, 1992) the Herzegovinian Croats have agreed with the Serbians to carve up Bosnia-Herzegovina. The EC diplomatic effort continues there as does the U.N. Protection Force (UNPROFOR), but no cease-fires have held and the diplomatic results have been meager.

Indeed, EC efforts have tended to reward Serbian aggression. For example, the EC proposed dividing Bosnia-Herzegovina into cantons. And before the August 1992 U.N.-EC conference in London, U.S. and British policies were geared to persuading Bosnians to accept their fate rather than to rescue them from it.

Given the long-standing ethnic hatreds in the Balkans and Slobodan Milosevic's well-known plans for a Greater Serbia, it is not clear that diplomacy could have prevented the war. No doubt the international community was right to try non-military interventions first. But earlier failures to protect the rights of ethnic minorities mean that the violence could now spread throughout the Balkans and beyond. NATO should have moved earlier; it may still not be too late to limit the damage.

But in mid-August, the omens were not good. The arguments against military intervention were formidable. Most governments were prepared only to consider air strikes, judging a commitment to deploy ground forces too risky and open-ended.

Air power could punish Serbia and might be effective in interdicting arms supplies and removing the heaviest artillery, but it will not stop the killing on the ground. And even if ground forces are committed, there will be no quick victories. Large numbers of troops will be required, and Bosnia may need international supervision for years. It will be expensive and Western lives could be lost.

Legislators in the United States say that the Europeans should take the lead in what is essentially a European problem. But if the United States fails to lead a NATO effort in the Balkans, it likely will be faced with a more serious problem down the road.

The dangers of NATO military intervention in the Balkans loom large, but the dangers of

staying out are even worse. If the Western security community will not bestir itself to protect the Muslims in Bosnia, two kinds of risks arise. The first is that the other Muslim nations like Iran and Turkey could take matters into their own hands and move in with military force to crush Milosevic, thereby spreading the conflict eastwards. At the United Nations this summer, representatives of five Islamic countries (Turkey, Iran, Pakistan, Egypt, and Senegal) were working as a caucus with the secretary-general to promote action against Serbian aggression. Turkey has long urged a stronger stand against Serbia and, if the Turkish government cannot work through NATO, it may turn to an Islamic coalition.

A second, and related danger is that letting the Bosnian Muslims twist in the wind risks radicalizing the Muslim Diaspora and creating a new generation of rootless terrorists. Another important reason to protect Muslims in Bosnia is to offset a perception from the 1991 Gulf War—that the West, most especially the United States, is anti-Islamic.

Western governments defeated Nazi Germany in 1945 and concluded a genocide treaty in 1948. But responses to the war in Yugoslavia suggest that each generation must learn anew not to tolerate genocide, to respect international law, and to crush international bullies early in their rampages.

There are many unanswered questions about requirements for a NATO campaign to establish minority rights in the Balkans. For the Gulf War in 1991, the United States had contingency plans and weapons inventories ready. In early August 1992, NATO officials said there was no contingency plan for a Balkan action. But the Western allies fought in the Balkans in World War II, and after 45 years of NATO planning and exercises, it should not be beyond their capabilities to draw up feasible plans. If Western governments are not prepared to undertake this kind of effort, if they decide instead to appease the Balkan bullies, they can kiss goodbye to all prospects for a stable democratic Europe for many generations to come.

The Balkans may seem a long way off to Americans embroiled in an election campaign, but like it or not, the United States is a European power not only by virtue of its ethnic make-up but also through its economic ties. Americans cannot afford to ignore instability in Europe. Regrettably, other Western governments are unlikely to move decisively without the United States in the lead. ■

GERMANS BATTLE OVER BLUE HELMETS

By OLIVER THRÄNERT

**German soldiers with
guns give many
Europeans—including
Germans—cold chills.
But what about German
troops as
peacekeepers?**

When Germany was divided into the western Federal Republic and the eastern Democratic Republic, the mission of the two sets of German armed forces—the Bundeswehr and the Nationale Volksarmee—was clear. In the case of a major war in Europe, the two German armies would have faced each other in battle, fighting alongside their respective NATO or Warsaw Pact allies.

But since German unification in 1990, the military's role is no longer so straightforward. The Volksarmee has been disbanded and its equipment and some of its personnel have been absorbed into the western Bundeswehr. Yet former Soviet forces remain on what was the territory of the German Democratic Republic. The troops, now numbering about 200,000, are scheduled to withdraw by 1994.

Meanwhile, the Bundeswehr's mission has become cloudy—should a unified and politically more powerful Germany participate in military actions aimed at stopping localized, armed conflicts outside the NATO

area? What should the nature of German participation be? These questions assumed great urgency during the Gulf War, as U.S.-led coalition forces drove Iraqi armies from Kuwait—a unified action that would have been unthinkable during the Cold War.

In the aftermath of the Gulf conflict, Germany saw its military in a new light. Constitutional restrictions prevented Germany—like Japan—from participating in direct military action. Although German combat aircraft served in Turkey as part of NATO's Allied Mobile Force, they were not involved in any fighting. Germany also sent naval forces to the eastern Mediterranean, and after the war's end, German army aircraft, engineers, and medical personnel contributed humanitarian relief to the Kurds in the border area between Iraq, Iran, and Turkey. In addition, Germany made financial contributions amounting to almost 10 percent of the total cost of expelling Hussein's

forces from Kuwait. But no German combat troops went to the Gulf.

But the end of the Cold War has also changed the nature of conflict in Europe. In the past, a major confrontation between NATO and the Warsaw Pact countries was a pervasive worry. Today, smaller, but urgent conflicts predominate. The Yugoslavian struggle is an example of the worst, and because of its location in the middle of Europe, Germany would like it resolved quickly. And the Yugoslavian example shows that German peacekeeping or combat troops may be called upon for U.N. actions or actions involving a strengthened Conference on Security and Cooperation in Europe (CSCE).

Although the German discussion about the nature of the Bundeswehr's military role has been couched as a constitutional issue, the question is really a political one, with the history of the German military casting a shadow over the entire debate. Many Germans would have preferred to use the end of the East-West confrontation as a reason to reduce the military's importance, if not to abolish it completely. Around the world, there are many reservations about renewed German military engagement, particularly in those areas occupied by Nazi Germany during World War II. In fact, many Germans believe

Oliver Thränert, a senior researcher at the Division of Foreign Policy Research at the Friedrich Ebert Foundation in Bonn, Germany, also teaches international relations at the University of Darmstadt.

that German soldiers have caused enough harm in this century and that every foreign engagement should be rejected.

But 65 percent of the German public support some sort of participation in U.N. peacekeeping operations, although 53 percent of the western German public and 59 percent of the eastern Germans oppose German participation in a combat role. Sixty-two percent of the citizens from the former West Germany and 77 percent of those in the former East Germany reject the idea of German soldiers defending non-NATO European countries. These polls indicate a certain ambivalence on defense questions, but clearly show that Germans are a long way from giving enthusiastic support to Bundeswehr participation in security operations.

The Basic Law

The German constitution—officially called the Basic Law—directs but does not define Germany's military policy. The constitution states that the Federal Republic "may enter into a system of mutual collective security"; it bans the preparation for wars of aggression; it limits the use of the Bundeswehr to "defense purposes" and to those purposes "explicitly permitted by this Basic Law"; and it includes an article concerning the determination of a "state of defense"—the promulgation of martial law.

The constitution has raised sticky questions. Does the "system of collective security" mean NATO, or might it mean the United Nations? And what exactly is meant by "defense purposes?" In its historical context, many assume that Article 24 refers to NATO, and they believe that, as a rule, Bundeswehr units may not be deployed "out-of-area"—outside the area defined in the NATO treaty. This latter view leads to problems because NATO has defined itself not as an organ of collective security, but as one of collective defense.

And how does one define "defense?" As long as the East-West conflict continued, no one in Bonn needed to ponder the question. If war came, it would have been instigated by the Warsaw Pact countries, and homeland defense and the NATO defense obligation would have been

identical. But the Gulf War showed how other cases can arise; supporting a NATO partner might be necessary even though this would not entail defense of German territory—as was the situation when German troops were deployed to Turkey as part of NATO's effort to deter Hussein from aggression. And, as pressure to "do something" about Yugoslavia increased, German leaders pondered whether "defense purposes" included the "defense" of world peace through U.N. military actions.

As the discussion continued among Germany's political parties, all the political parties agreed that the Basic Law should be less ambiguous regarding future German participation in U.N. military action and that constitutional changes should be completed by the end of 1994. Since this change will require a two-thirds majority in the Bundestag, the German parliament, the opposition—the Social Democratic Party (SPD)—becomes a major player, since it is the largest opposition party, holding about 24 percent of the seats; the required two-thirds majority is only possible with SPD support.

So the SPD and the government would determine the nature and extent of German participation in future U.N. peacekeeping actions—and they disagreed. Two smaller opposition groups, the Party of Democratic Socialism (PDS), the successor of the ruling communist party of the former German Democratic Republic, and Bündnis 90, a group of civil rights activists also from the GDR, are too small to enjoy all the rights accorded to other parties, and they are represented only because of a one-time special arrangement following the 1990 federal elections after German reunification.

In May 1991, there were fundamental differences within the SPD regarding German troops and the United Nations. Most of the party leadership supported the idea of the Bundeswehr participating in U.N. peacekeeping activities as well as U.N.-commanded combat missions. Others, including some left-leaning members of the party's executive board, rejected not only German involvement in combat, but also in peacekeeping. Their stance reflected a fundamental pacifism as well as concerns—strong-

ly shaped by the Gulf War—that even the smallest German military involvement with the United Nations would lead to future German involvement in fighting such a war as the one in the Gulf.

The 1991 party conference hammered out a compromise on the issue. The official SPD position supported a plan to reform the United Nations so that the organization would be empowered both to intervene in acute crises, and also to preempt them, and that step by step, the United Nations should evolve into a world government. But the SPD's position also rejected German participation in military action carried out under U.N. command, or with U.N. approval. Only U.N. peacekeeping was acceptable to the SPD, and any German units could use force only in self-defense.

This spring, the SPD proposed a change in the Basic Law that would permit Bundeswehr soldiers to serve in a peacekeeping capacity under the command of the U.N. secretary-general. A corresponding resolution by the U.N. Security Council as well as the consent of the warring parties would be required before German soldiers could serve as peacekeepers. German soldiers in U.N. actions must be armed only with light weapons for self-defense, and participation would be limited to those who are professional soldiers or who volunteer for such duty. The Bundestag would have to approve every commitment of troops with a simple majority. Additionally, German soldiers could be used for unarmed U.N. activities without requiring the approval of the Bundestag. But German participation in U.N. combat operations would be prohibited.

Besides these majority views from the SPD, other party members felt that German soldiers operating under U.N. command, even on peacekeeping missions, should be unarmed. In contrast, still others wanted to keep the option open for both German peacekeeping and combat forces to serve under U.N. command. (This option would exclude operations like the Gulf War, which was authorized but not fought by the United Nations.) In early summer, the SPD parliamentary delegation voted with a large majority in favor of the first version: yes to peacekeeping; no to combat.

In the middle of August, however, Chancellor Helmut Kohl, feeling the pressure to respond to the Yugoslavian crisis, sent a destroyer and three naval aircraft to join the NATO forces patrolling the Adriatic Sea.

The SPD's immediate response was a court challenge, arguing that Kohl had overstepped his authority in sending German military units out of area. But at a meeting of party leaders on August 22, SPD leaders appeared to change their position substantially. Party leader Björn Engholm said that his party was prepared to support Bundeswehr participation—even in combat operations—out of the NATO area. But, said Engholm, such operations must be commanded by the United Nations and involve as many states as possible, not just the major powers.

Although the SPD's leadership has shifted its position, apparently many party members do not follow Engholm's line. In particular, more left-leaning party members continue to oppose any combat role for the Bundeswehr.

Toward combat

The political parties in power reject Engholm's restrictions. In Germany, the government is run by a coalition of the Christian Democratic Union and the Christian Social Union (CDU/CSU) and the Free Democrats (FDP). During the peacekeeping debate, the government and coalition parties made it clear that they would not support the SPD's proposed restrictions on German military activity under U.N. auspices.

At a press conference in February 1991, Chancellor Helmut Kohl had already argued that a country of Germany's political status and population (80 million) must be able to assume responsibility in the United Nations. Volker Rühe, then CDU general secretary and now German defense minister, added that Germany's influence would not be properly represented simply by putting the U.N.'s blue helmets on a few hundred German soldiers and claiming that this gesture fulfilled Germany's global political responsibilities. On many other occasions, Kohl had emphasized the German government's commitment to obtain the constitutional underpinning necessary for German participation in

military action outside NATO.

The chancellor's party, the CDU, declared in December 1991 that Bundeswehr units should be able to participate in military measures aimed at securing or reestablishing the peace if undertaken in a U.N. framework. Apparently, this participation would include military activities authorized by the Security Council, but not necessarily carried out under U.N. command. (This was the case in the Gulf War, where a U.N. resolution allowed U.N. members to take the measures necessary to expel Iraq from Kuwait, but where the United Nations did not command the operation.) The liberal FDP took a similar position—supporting a combat role for Bundeswehr units only within the U.N. framework.

The government wants to take a greater leadership role—but most Germans do not want to see German troops in combat.

In view of the SPD's resistance to a combat role for the Bundeswehr, and in the absence of popular support for such military engagements, the government appeared to be pursuing simultaneous strategies. On the one hand, the government would embed Bundeswehr U.N. combat operations in a European context (through the Western European Union). On the other hand, it would slowly accustom the public and the armed forces to the idea of giving the Bundeswehr a greater role.

The Franco-German "Euro-army," announced by French President François Mitterrand and Kohl this past May, was also intended to give future German combat operations outside the NATO area a European character. This corps will have three missions: defense within the NATO or Western European Union (WEU) alliances; out-of-area crisis management in either peacekeeping or combat roles; and humanitarian operations, such as emergency relief. The

June 1992 WEU decision to take on combat missions in the future reflects a similar intent, and the Franco-German corps could be part of such an undertaking. Every WEU member, however, is free to decide whether or not to participate.

The CDU seems to be in favor of the Bundeswehr serving in WEU combat operations even without the legitimization of a U.N. framework. In late August, the CDU parliamentary group leader made such a proposal, but it was rejected both by the FDP and the SPD.

Defense Minister Rühe was apparently assigned the task of making the German public and the Bundeswehr comfortable with the idea of German combat operations with the United Nations. Rühe said that accepting combat operations cannot simply be ordered into being, but must develop slowly. Deploying 150 Bundeswehr medics and doctors to Cambodia in May 1992 to provide medical care for the U.N. troops stationed there was part of Rühe's plan. It was the first participation by German soldiers in U.N. peacekeeping operations. But the medics flew to Cambodia on commercial, not military, aircraft, to avoid circumventing the Basic Law.

The CDU/CSU believes that German peacekeeping operations should be permitted, with combat operations approved at a later date; in the future, the Bundestag should approve every German participation in U.N. operations—by a simple majority for peace missions, and by a two-thirds majority for combat missions.

Defense Minister Rühe's go-slow approach seemed to reflect the temper of the country. But, in responding to conflicts like that occurring in Yugoslavia, all the parties have had to abandon hope that attitudes toward German involvement in U.N. military actions could be allowed to evolve over time.

Soon after the SPD leaders' meeting, the junior partner in Kohl's ruling coalition, the FDP, also changed its position, proposing a constitutional amendment that would speed military decisions, approve military actions to provide humanitarian aid, and allow German involvement in efforts to "enforce embargos." By the end of August, the issue had become the subject of heated public debate. ■

CHEMICAL WEAPONS: THE END OF THE BEGINNING

By AMY E. SMITHSON

The chemical weapons treaty is ready for a U.N. vote.

After more than three centuries of failed attempts and a final negotiating marathon of more than three decades, a chemical weapons convention (CWC)

Amy E. Smithson, a senior associate at the Henry L. Stimson Center in Washington, D.C., is co-editor of Open Skies, Arms Control, and Cooperative Security (forthcoming).

has been concluded and will be signed early next year in Paris. Over the summer, the Conference on Disarmament (CD) Ad Hoc Committee on Chemical Weapons, spurred by committee chairman Adolph von Wagner's tireless urging, developed a head of steam and did the improbable. Yes, cows have flown.

The CWC will prohibit development, production, stockpiling, transfer, acquisition, and



March 1988: A six-year-old girl, the victim of an Iraqi gas attack on a Kurdish village, receives treatment at a hospital in Vienna.

use of chemical weapons. (Small quantities of chemical agents can be produced to research defenses against them, but production will be monitored closely.) The CD, which is affiliated with the United Nations, will present the text to the United Nations this fall. Undoubtedly, the United Nations will review and approve the draft treaty—an achievement comparable to another major arms control agreement, the Nuclear Non-proliferation Treaty (NPT) signed in 1968.

Arms control negotiations are often circular affairs, and progress frequently collapses when negotiators play one issue off against another. The CWC negotiating circle has been especially vicious. It begins and ends with the premise that monitoring the chemical industry is essential for chemical treaty verification.

Chemical weapons are made from many of the same chemicals industry uses to produce pesticides, fertilizers, pharmaceuticals, and other commercial products. Chemical weapons formulas are well known, and commercial plants, with little or no modification, could be used to produce chemicals for military purposes. So there was endless debate about monitoring chemical production, inspecting facilities, and conducting challenge inspections at sites suspected of foul play. Reversing their earlier objections to arms control efforts, chemical manufacturers began taking an active role in the negotiations in the 1980s.

Industry's motives may have been a simple matter of survival. Manufacturers need to guard proprietary compounds and shield their secret manufacturing procedures to keep a competitive edge. With few exceptions, manufacturers supported the negotiations, volunteering plants for trial inspections, helping to design monitoring equipment and procedures, and coming out strongly in support of challenge inspections on an anytime, anywhere basis.

However, for most states participating in treaty talks, the prospect of opening military and commercial facilities for intrusive inspections remained a major point of contention. For the United States, the former Soviet Union, and the European states, the novelty of limited encroachments on sovereignty for arms control monitoring or confidence-building purposes has been wearing off since the late 1980s. The northern industrialized states argued that even countries with relatively unsophisticated chemical industries should shoulder a share of the inspection burden.

In structuring a verification regime, the developed states tried to establish a familiar framework of clearly defined inspection proce-

No more poison bullets

Chemical weapons are nothing new on the battlefield—the Greeks first used sulphur mixtures against enemies as early as 431 B.C.

Attempts to control chemical weapons date back to a 1675 Franco-German accord signed in Strassbourg, which restrained both armies from using poisoned bullets. Two hundred years later—about the time when large-scale development and use of chemical weapons was beginning to look practical—the 1874 Brussels Convention took another stab at prohibiting the use of poison or poisoned weapons. The 1899 Hague Convention, which was reinforced in 1907, elaborated the Brussels accord by prohibiting the use of projectiles that would diffuse “asphyxiating or deleterious” gases. Other technologies deemed threatening at the time, notably projectiles launched from balloons, were also banned.

These prohibitions were largely ignored during World War I; at the battle of Ypres, Belgium, chlorine gas used by Germany caused 15,000 casualties in April 1915. When the use of mustard gas was introduced by both sides in July 1917, injuries from chemical attacks rose to the hundreds of thousands. The terms of the Versailles Treaty, which ended the war, repeated earlier bans on the use of gases, and it specifically prohibited Germany from producing or acquiring chemical weapons.

Despite the public outcry against these weapons and military apprehension about their value, a complete ban continued to elude statesmen. The 1922 Washington Treaty, signed by the United States, Japan, France, Italy, and Britain, more or less repeated the 1919 Versailles Treaty's terms. But the prohibitions against the use of chemical weapons seemed to become more amorphous with each successive agreement as previous treaty terms were modified or ignored. Like its predecessors, the 1925 Geneva Protocol fell short of comprehensive restraints, but it included a ban on bacteriological weapons, and it has been the cornerstone of chemical arms control since its signing. In the early 1930s, the League of Nations accomplished little more than placing a chemical weapons ban on its agenda.

During World War II, the Italians used chemical weapons in Ethiopia and the Japanese followed suit in China. More widespread use may have been deterred by repeated warnings threatening Allied retaliation in kind. But by that time, there was a more lethal generation of chemical weapons. Tabun, the first nerve agent, was discovered in 1936, followed by others such as Sarin, Soman, and VX. Properly equipped soldiers could protect themselves from the effects of chemical weapons, but civilians were often victims of a chemical attack.

After the war, the two predecessor organizations of today's Conference on Disarmament (CD), the Ten—later Eighteen—Nation Disarmament Conference (ENDC) and the Conference of the Committee on Disarmament (CCD), wrestled unsuccessfully with a chemical weapons treaty. The ENDC began in 1960 and passed the baton to the CCD in 1968. A year later (November 1969), the United States renounced the first use of chemical weapons and began an 18-year-long moratorium on chemical weapons production. During the Vietnam War, the United States was accused of using heavy doses of herbicides in much the same manner as chemical weapons. Partly to offset

(continued on next page)

this criticism, the United States reinitiated ratification procedures for the Geneva Protocol. (This ratification was strongly opposed by the U.S. Army's Chemical Warfare Service and the chemical industry when the treaty was first submitted to the senate in January 1926.)

Although the United States finally ratified the protocol in 1975, it reserved the right to use riot control agents in limited, lifesaving, defensive modes on the battlefield. The Senate also ratified the Bacteriological (Biological), and Toxin Weapons Convention (BWC) which prohibited development, production, and stockpiling of biological weapons. Article IX of the BWC, which went into effect in 1975, commits signatories "to continue negotiations in good faith with a view to reaching early agreement" on a CWC. The 40 nations of the CD's Ad hoc Committee on Chemical Weapons inherited the CWC in March 1980.

Little headway was made until April 1984, when Vice President George Bush addressed the Conference on Disarmament, and introduced a comprehensive draft treaty that included the concept of challenge inspections, to be conducted on an anytime, anywhere, no-right-of-refusal basis to deter and catch cheaters. Negotiations stalled until August 1987, when the Soviets agreed in principle to short-notice mandatory challenge inspections. With renewed expectations of success in 1988, many CD participants began running experiments to test the procedures and equipment being proposed for CWC verification.

Several Western nations, alarmed by the acquisition and use of chemical weapons in the Middle East and disillusioned with 24 years of Geneva negotiations, met in Paris in January 1984 and periodically thereafter to coordinate efforts designed to stem the export of chemicals that could most readily be abused by a would-be proliferator. Known as the Australia Group, these nations attempted to control exports both as an adjunct to an eventual chemical weapons convention, and as a hedge against possible failure in the negotiations. The Australia Group, which includes the United States, Canada, Japan, and several European nations, has slowly expanded the list of controlled chemicals.

In 1985, the United States and the former Soviet Union resumed bilateral negotiations that culminated in a June 1990 agreement that bound the two countries to destroy at least 50 percent of their stockpiles by 1999 and to retain no more than 5,000 tons of agent by 2002. (The rate of reduction is being reconciled with the CWC timetable and revised because of the political, economic, and technical problems facing the new Russian government.) Another U.S.-Soviet objective was to stimulate more progress in the multilateral negotiations.

Saddam Hussein's flagrant use of chemical weapons against Iraqi civilians as well as Iraqi soldiers spurred 149 states to sign a declaration in January 1989 in Paris that reaffirmed the need for a chemical treaty. Despite near-universal acknowledgment that something had to be done, it would be another three years before these negotiations would conclude. —A.E.S.

Sources: Victor A. Utgoff, *The Challenge of Chemical Weapons* (New York: St. Martin's Press, 1991); Josef Goldblat, *CB Disarmament Negotiations, 1926-1970*, Stockholm International Peace Research Institute (Stockholm: Almqvist & Wiksell, 1971), Vol. IV.

dures. Many of the neutral, nonaligned mostly southern states (known as the Group of 21 or G-21), wanted less rigorous procedures, in-

cluding a process that could administratively screen challenge inspections. This latter approach would require the treaty's executive council to approve an inspection before it could proceed. The composition and functions of the executive council became significant issues for the participants.

Export controls was another issue that split along South-North hemispheric lines. Many G-21 states wanted to draw a clear line between treaty parties and non-signatories that would prohibit treaty parties from using export control among themselves. The G-21 identified the Australia Group, in particular, as a discriminatory mechanism that could be used to retard the growth of chemical industries in less developed countries. This group of industrialized states began coordinating policies in 1984 to stem exports of chemicals most easily abused by a would-be proliferator. The northern states, however, believed that it was essential they retain the right to initiate and maintain export controls (against suspected proliferators or for other reasons.) This issue would be the final bone of contention in the negotiations.

To have a reasonable chance of accommodating such varied interests, the CWC would have to be a "spandex" treaty. Arms control advocates were aiming for universal adherence, but just satisfying the 38 states at the table without sacrificing the treaty's main principles turned out to be a significant challenge. Year after year, the text remained pockmarked with brackets.

The Gulf War was a wake-up call. Diplomats working on the treaty in Geneva were jolted when Saddam Hussein threatened the Middle East with chemical warfare, and Iraq's capacity to produce weapons of mass destruction surprised and dismayed his neighbors and the global community. Hussein's earlier use of chemical weapons in the Iran-Iraq War emphasized the point and gave the negotiators a new sense of urgency.

In May 1991, President Bush challenged the negotiators to complete their work within a year. He relinquished the U.S. right to retaliate in kind for a chemical attack and dropped a requirement that the United States maintain a small "safety" stockpile until all states capable of making chemical weapons signed the CWC. Two months later, a U.S.-led proposal elaborating challenge inspection procedures backfired on the U.S. delegation. (See "Chemical Inspectors: On the Outside Looking In?" October 1991 *Bulletin*.) The feeble U.S. menu of challenge inspection options was rejected by some delegations, most vehemently by the French.

The Soviet empire collapsed after the aborted coup in August 1991, and the East-West an-

imposities that had handicapped the negotiations for so long collapsed as well. Without this over-arching conflict as pretext, the hidden agendas of various delegations became more visible. The disintegration extended to the Group of 21; key states such as Argentina and Brazil began to negotiate more independently and they also concluded regional accords to address chemical and nuclear proliferation.

At the beginning of this year, the chairmanship of the Ad Hoc Committee passed to a German, Adolph von Wagner, just as the Australians were preparing their final assault on the convention. After in-depth consultations in various global capitals, the Australians took a jackhammer to the negotiations impasse. They produced a leaner, meaner text by proposing compromises on all unresolved issues and by suggesting that decisions on some procedures be deferred to the Preparatory Commission (held after signature to prepare for implementation). Gareth Evans, Australian minister of foreign affairs and trade, introduced the draft on March 19 and 23 nations publicly lauded the effort.

Evans also gave the committee a badly needed lesson in cutting red tape. He recommended that von Wagner work during the intercessions, using the Australian draft to create a chairman's text. This strategy would take the negotiators away from the minutiae upon which they had seized, and redirect their efforts toward progress on the larger issues. Von Wagner took the Australians up on their proposal, and overnight he became "Robo-Negotiator."

Von Wagner focused discussions on key unresolved issues—the composition of the executive council, abandoned stocks, verification, riot control agents, and export controls. (See "Chemical Weapons: Tottering Toward a Treaty," July/August 1992 *Bulletin*.) He corralled the states that were farthest apart on each issue and involved them in drafting compromise language. No longer could states use surrogate issues or hide behind other states to block progress. The strategy effectively disarmed many reluctant participants, who could hardly object to language that they had drafted. Such tactics may appear as simple common sense and they are certainly long overdue, but in the jaw-jaw Conference on Disarmament atmosphere, von Wagner's stewardship was nearly revolutionary. He also set a fast-paced timetable and made sure that a forum that had excelled at missing deadlines met them.

Intrigue also played a part. The Japanese and Chinese, for example, had long clashed



September 1925:
U.S. cavalryman and
his horse model crude
anti-gas gear.

over the issue of abandoned stocks. The Chinese insisted that the Japanese take full responsibility for the chemical weapons they had abandoned in China during World War II. The Japanese wanted to make amends, but they also wanted to save face. So the Japanese and Chinese took, in effect, a "walk in the woods." Off the record they agreed in principle on terms that would meet the needs of both sides. To the credit of the Japanese, basically they issued an IOU to the Chinese—essentially a blank check to cover the destruction of the stocks. Continuing the walk-in-the-woods precedent, the Chinese later backed away from this entente. Behind the scenes, the United States and others pressed China to make sure the compromise stood.

Preoccupied by an increasingly troublesome election year, the Bush White House let the



September 1991:
Local worker opens
Iraqi chemical-
weapons missile
warhead for sample-
taking by U.N.
inspection team.

(U.N. / GHANAR AL-NAHDI)

U.S. bureaucracy run on autopilot through the CWC endgame. President Bush's earlier involvement made his desire for a chemical treaty clear, and it was obvious that concluding a chemical weapons convention before the November election would add to his claims as a post-Cold War peacemaker.

The U.S. Arms Control and Disarmament Agency (ACDA) persistently urged the interagency process along. ACDA's success in getting interagency participants—the Defense Department, the State Department, the intelligence community, and the Energy Department—to stop niggling and approve the chairman's draft was impressive, given that it took this same group from April 1984 to July 1991 just to agree on the challenge inspection position. The French labored long and mightily to convince the United States to bring its inspection position closer to a formula initially proposed by the British. (The resulting U.S.-French proposal was introduced on March 17, and it had an amazing resemblance to the procedures suggested in the Australian draft, introduced two days later.)

The United States worked on the export control terms for the chairman's draft with a friend of the chair. But the administration continued to harangue the CD members to insert less restrictive language on riot control agents. For the most part, though, the United States acquiesced to the Australian, German, and French proposals. The negotiations never would have reached the final stages without the foundation laid by the United States, nor would they have concluded without U.S. support and approval.

On some issues, von Wagner took matters into his own hands. Dissatisfied with the

treaty language on riot control agents, he rewrote the text using accordion-like terms that could satisfy both U.S. concerns and those of the other participants. His crowning achievement, though, was a consensus edict that went into effect once he put his draft on the table this past June. Any state that wanted to change the draft would have to recruit a consensus by August 7. Many delegations groaned about the authoritarian rules and griped about the tight timetable.

The most serious threat was launched by a Pakistan-led 14-nation G-21 splinter group. They objected to the export control language all during the summer. Von Wagner made sure that these and all other concerns were aired, but he held to his consensus rule. The already wobbly group of 14 was targeted by the Australians, Germans, French, and Americans for a divide-and-conquer maneuver. Unable to rally more nations to their cause, the group got only marginal concessions at von Wagner's discretion. True to his word, von Wagner brought the negotiations to a close on August 7.

The chemical weapons treaty has been a long time coming. The critics will want to send negotiators back to the drawing board in search of the perfect agreement. But those living under the threat of chemical weapons cannot be expected to wait while negotiators chase something as illusory as perfection. The time has come to celebrate the end of a long trek and prepare for the next challenges.

At the Paris ceremonies, initial signatories may surpass the number—65—needed to bring the convention into force. Nonetheless, CWC proponents will have to lobby reluctant states like China and Pakistan to attain even wider adherence and generate an NPT-like international norm that will make pariahs of states with chemical weapons. Next, major signatories must act. Quick ratification by initial signatories like the United States will provide leverage to push other states inclined to dally.

Finally, establishing the international organization that will supervise CWC implementation will be a huge task. Inspectors must be recruited and procedures and equipment for destruction and inspections must be tested. The CWC signing will kick off a 10-year countdown to zero chemical weapons for all treaty participants. That may seem like a long time, but ten years is a blink in comparison to the negotiating time this convention has consumed. The CWC has a few wars, but it is no toad. A thoughtful examination reveals it as one of humankind's truly remarkable achievements. ■

International Security

Ashton B. Carter, Chairman, Editorial Board
Steven E. Miller, Editor

A major journal in today's international arena, INTERNATIONAL SECURITY provides lucid, well-documented essays on all aspects of the control and use of force, from all political viewpoints. Its articles cover contemporary policy issues, and probe historical and theoretical questions behind them. Whether a topic is emerging, maturing or taking an interesting twist, each issue of IS provides important information, penetrating analysis, or new interpretation. Recent important articles include:

"Lessons of the Gulf War Experience with Patriot"

—Theodore A. Postol

"A Defensible Defense: America's Grand Strategy After the Cold War"

—Robert J. Art

"On the Threshold: Environmental Changes as Causes of Acute Conflict"

—Thomas F. Homer-Dixon

"Back to the Future: Instability in Europe After the Cold War"

—John J. Mearsheimer

"Pearl Harbor: Military Inconvenience, Political Disaster"

—John Mueller

Subscribe to INTERNATIONAL SECURITY and be at the hub of national and international political and security debates.

Published quarterly by The
MIT Press for the Center for
Science and International
Affairs, Harvard University.
ISSN 0162-2889

"... easily the most important and
consistently interesting journal
in the field. ..."

—John Lewis Gaddis,
Ohio University



"By providing rigorous, theoretically-informed scholarship on crucial security issues, IS consistently advances the scholarly analysis of international relations and sets the terms of debate on contemporary policy problems."

—Stephen Walt, University of Chicago

Yearly rates

Individual \$30

Student and Retired \$20

Institution \$75

Subscriptions outside U.S.A.

add \$14 postage and handling.

Canadians add additional 7% GST

Prepayment is required. Send check,
MasterCard or VISA number to:

MIT Press Journals

55 Hayward Street

Cambridge, MA 02142-1399

TEL 617/253-2889

FAX 617/258-6779

Gun man meets gunman

**Bull's Eye:
The Assassination and Life of Super-
gun Inventor Gerald Bull**

by James Adams
Times Books, 1992
317 pages; \$23.00

WILLIAM D. HARTUNG

Despite its sensationalist trappings—most notably the grainy cover photo of Gerald Bull caught in the crosshairs of a gun scope—the latest book by London *Sunday Times* Washington bureau chief James Adams provides a balanced and informative account of Bull's career as one of the most notorious post-World War II arms merchants. At a time when Western governments are preoccupied with the question of how to keep ex-Soviet weapons scientists and engineers from hiring out their talents to Third World dictators, Bull's story offers a chilling reminder of how much damage one determined weapons expert can do to the cause of nonproliferation.

The first third of *Bull's Eye* describes Bull's rapid rise in the scientific establishment of his native Canada, from his days as one of the youngest graduates ever to receive a bachelor's degree in aeronautical engineering from the University of Toronto, to his role as founder and director of the joint U.S.-Canadian High Altitude Research Project (HARP) during the early 1960s. The HARP project was originally designed to fulfill his "dream" of constructing massive guns with the capacity to launch projectiles into space, but its main spin-offs were more mundane—long-range howitzers with specially built shells able to outdistance anything else available on the world market.

Adams uses the material on Bull's early career to launch one of his principal themes; that Bull's progression from "boy rocket scientist" to gun designer and eventually to arms merchant was a case of idealism gone sour, a byproduct of Bull's single-minded determination to find some

way, any way, to finance and develop HARP. Adams argues that Bull's resentment of the Canadian and American governments, for not giving him the kind of support he felt HARP deserved, was an important motivating factor in his turn toward less reputable clients—the apartheid government in South Africa, the Pinochet dictatorship in Chile, and Saddam Hussein's regime in Iraq.

The book's most interesting sections deal with two infamous incidents in Bull's career, his 1980 conviction on charges of illegally exporting arms to South Africa and his role in Saddam Hussein's abortive effort to build a "supergun," the project which may have prompted his March 1990 assassination.

Bull's South African connection began innocently enough, with a contract to provide training simulators for air traffic controllers in the mid-1970s. But it was not long before the South Africans wanted to buy Bull's long-range artillery and shells, along with the know-how to build their own.

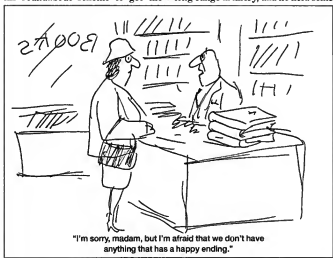
Bull gladly complied with their request, but as Adams makes clear, he did not act alone. Bull's dealings with South Africa depended on assistance from the U.S. Army, which provided shell casings from one of its own arsenals; the State Department's Office of Munitions Control, which unwittingly gave Bull a written "green light" for his roundabout scheme to get the

weapons to South Africa; the governments of Israel and Antigua, which agreed to serve as transshipment points for the illegal sales; and the CIA, which turned a blind eye to Bull's activities because the agency wanted to put long-range artillery into the hands of U.S.-and South African-backed forces in the Angolan civil war.

Before the whole sordid train of transactions was over, the South African government had stepped in as part owner of Bull's company, and an energetic U.S. Customs agent named Larry Curtis had gathered enough information to indict Bull on charges of illegal arms sales to South Africa. Bull was allowed to plead guilty to one count of exporting arms without a license, and he served a four-month term at the Allenwood Penitentiary.

According to Adams, Bull emerged from jail an embittered man, convinced that "he had certainly been let down by a number of officials from several U.S. government agencies, most notably the CIA, which had been perfectly aware of the arms traffic to South Africa and had endorsed it enthusiastically."

Shortly after his release, Bull was back in the arms business again. Operating out of his Space Research International office in Brussels, Bull went to work teaching the Chinese government the niceties of building long-range artillery, and he held some



preliminary meetings with Iraqi military officials (arranged by Lebanese arms dealer Sarkis Soghanalian). But it wasn't until 1987 that Bull struck a deal with the Iraqis to modify some of their howitzers, to help them develop several longer range versions, and to work on the much discussed Iraqi "supergun."

Adams speculates about what Saddam Hussein intended to do with such an unwieldy weapon, which could probably not have been fired more frequently than three times a day. He leaves open the possibility that Iraq did in fact plan to use the gun for Bull's original purpose, launching satellites. Leaving aside the question of the supergun's ultimate purpose, Adams provides the fullest account yet of Bull's contribution to Iraq's military capabilities, both through direct contracts with Iraq and through South African and Austrian arms manufacturers' sales of his howitzer design.

As for the lessons to be drawn from Bull's checkered career, Adams suggests in his concluding chapter that "Bull and his inventions are merely symbols of a greater problem: the failure of the international community to halt the spread of weapons throughout the world, and the seemingly endless cycle of proliferation that is a hallmark of the arms business."

Adams describes the strengths and weaknesses of current efforts to curb the spread of nuclear, chemical, biological, and conventional arms, and offers a few pointed observations about ways to improve them. The one thing missing from Adams's analysis—and it would make the strongest link with the rest of the book—is an analysis of how to deal with individuals like Bull who decide to sell their design and manufacturing knowledge to the highest bidder. A fuller presentation of Adams's views on this issue would have been a welcome addition to the book's concluding section.

Finally, the biggest mystery of the book—who killed Bull—is not definitively solved. It is clear that Bull was gunned down by a professional assassin outside his Brussels apartment in March 1990, for reasons connected with his ongoing activities as an arms merchant and scientific mercenary. Adams provides a reasoned analysis

of the strengths and weaknesses of a half dozen theories about who was behind Bull's assassination. He ends up leaning toward the now popular view that he was hit by Israeli intelligence, in part to stop the Iraqi supergun project, and in part to serve "as a warning to all the other dealers operating in the underground arms bazaar that trading with Israel's enemies is a dangerous business." ■

William D. Hartung is the director of the Arms Transfer Control Project of the World Policy Institute in New York City. He is working on a book about the future of U.S. arms transfer policy.

A life in science

**A Different Sort of Time:
The Life of Jerrold Zacharias, Scientist, Engineer, Educator**

by Jack S. Goldstein
M.I.T. Press, 1992
373 pages; \$35.00

BERNARD T. FELD

Jerrold Zacharias was the ideal scientist-administrator. He understood, as well as anyone he supervised, the scientific and technical content of the work. And he did not hesitate to intervene directly when he perceived a way of accelerating progress. At the same time, he gave individual scientists maximum leeway for developing their skills and ideas.

Zacharias grew up in Jacksonville, Florida. From his earliest teens, he was interested in things technical: cameras, automobile engines, and amateur radio transmission and receiving. He studied engineering in high school (physics was not yet taught in public schools) and he attended Columbia University in New York, where he majored in mathematics and minored in physics (no major was available). After graduation, he did his doctoral research at the solid state laboratory of Professor Shirley Quimby, Columbia's foremost solid state physics researcher.

After graduation he taught at Hunter College and spent his spare time doing research in Professor I. I.

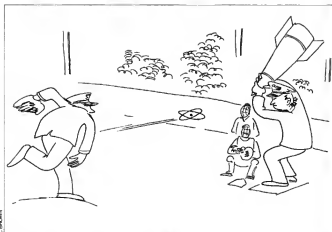
Rabi's atomic beam laboratory at Columbia. It was an exciting time; among other things, the group managed to measure the magnetic moments of the proton and of the deuteron (nucleus of heavy hydrogen). For this research and the exploration of its ramifications, Rabi eventually won the Nobel Prize.

But the real world intervened—Hitler overran Europe and threatened to take over the British Isles. The United States, through a project at M.I.T.'s "Radiation Laboratory," developed a radar technology to combat German submarines that were threatening to cut off the U.S. lifeline to Britain. Zacharias contributed to the development of important submarine detecting systems. Afterward, the lab's "scientific stars" concentrated on technical issues related to winning the war with Japan. Most of them were enlisted into various aspects of the Manhattan Project. Zacharias moved to Los Alamos where the atomic bomb was being designed.

The project soon revolved around the possibility of developing an atomic bomb in time to avoid the necessity of an island-by-island march across the Pacific, eventually culminating in an invasion of Japan. Such a march, if carried out, would have involved many casualties (although, in retrospect, it is generally believed that a naval blockade of the Japanese islands would have produced a Japanese surrender, probably requiring more time but producing fewer casualties on both sides).

Dropping the atomic bomb on Hiroshima led rapidly to the Japanese surrender and the end of the war. The Nagasaki bomb was superfluous, only providing a public demonstration that the vast expenditure for the Plutonium Project had not been for nothing.

For Zacharias, myself, and the others at Los Alamos, the time had come to consider how (in the immortal words of General Groves) to "go back to your future lives." I was faced with a choice between two offers—an assistant professorship at Purdue University and an instructorship with Zacharias at M.I.T.'s newly-established Laboratory for Nuclear Science and Engineering. I chose M.I.T. and found Zacharias to be a superb leader. After getting the lab under control, his interest slowly turned to



science teaching. His initial interest in teaching college physics changed when he realized that the greatest problems arose because of the very poor quality of science teaching in high school and grade school. Typically, he set about remedying these defects by organizing programs for teaching modern science to graduate and high school teachers. He was also attracted to the challenge of teaching science in the underdeveloped world, and arranged for courses training science teachers in Africa.

Summer studies were among Zacharias's favorite methods of gathering the right people to deal with specific problems and issues. It was an obvious way to attract academics, and Zacharias developed the technique to a fine art. If he wanted a colleague to participate in a summer study, that colleague would find it almost impossible to turn him down.

In all of his efforts, Zacharias had the unflinching cooperation and support of his wife Leona, who was also interested in biology and teaching. Together they raised their small family and pursued their mutual interests with enthusiasm. Toward the end of his life, Zacharias suffered from cardiac problems, and died on December 10, 1977, while undergoing triple bypass coronary artery surgery.

Goldstein's book gives an excellent summary of the life and accomplishments of a man about whom it would be appropriate to use the old cliché:

"They broke the mold after they made him." I highly recommend it. ■

Bernard T. Feld, a member of the Manhattan Project, is professor emeritus at M.I.T. and a member of the Bulletin's Board of Directors.

War games

Prisoner's Dilemma

by William Poundstone
Doubleday, 1992
290 pages; \$22.50

LINDA GAINES

This book is a pastiche. It combines three elements: the life of John von Neumann, his development of game theory, and the application of game theory to the Cold War. Von Neumann (1903-1957) was a pioneer of the electronic digital computer, a Manhattan Project participant, and a brilliant mathematician. One of his major contributions—game theory—explores conflict situations in which opponents must make simultaneous choices in a way that optimize their payoffs.

Von Neumann was from a well-off Jewish family in Budapest, and his extraordinary abilities were recognized early. Fleeing the persecution of intellectuals and Jews in Hungary and then in Germany, von Neumann came to the United States, where, at age 30, he became a professor at Princeton University's new Institute

for Advanced Study. His early contributions to mathematics were impressive, as were his later complex and crucial calculations for the Manhattan Project and then for the H-bomb.

Von Neumann genuinely feared that war with the Soviet Union would follow World War II, and he was reported to have advocated a "preventive war" against the Soviet Union before the Soviets could develop atomic weapons. He was a consultant for the RAND Corporation, the think tank that encouraged thinking about the unthinkable, and he provided important government and corporate counsel. It was at RAND that von Neumann studied and expanded the "prisoner's dilemma."

The dilemma is this: Two prisoners in solitary confinement are each offered a deal. If one testifies against the other, or "defects," he/she goes free or wins and the other gets a stiff prison sentence ("sucker payoff"). If both testify, they get intermediate sentences. If neither testifies (they "cooperate"), they receive light sentences. The dilemma occurs because each prisoner does better if he/she alone chooses to defect rather than to cooperate. But the punishment for two defections is more severe than for cooperation.

In connecting game theory to East-West relations and the bomb, the author invokes interesting people and events and provides some tantalizing hints about how this reasoning might have been used at high levels. In one possible "game," the players were the Allied and the Axis powers; the actions both sides could choose were building or not building the bomb (defecting or cooperating).

How good an analogy is the prisoner's dilemma game for the development and deployment of the bomb? How might it have been used by national security advisers? These questions are not answered. An Allied failure to develop the bomb could have resulted in losing World War II (sucker payoff). But the Allies could have lost even if nobody built the bomb, so the payoff matrix was not typical for the game. In the second and perhaps more standard application of the game, the players were the United States and the Soviet Union, and defection meant dropping the bomb.

The arms race offers another appli-

education: Should a country build a bigger weapon? This is the "dollar auction" game in which a dollar is auctioned off to the highest bidder. The catch is that the next-highest bidder must also pay his last bid, so there is an incentive to keep bidding and no obvious place to stop. The (unrealistic) implication is that the side with the better weapon automatically wins a war (the dollar) at the cost of the weapons only, or somehow achieves security. The loser, by analogy, has wasted the cost of the weapons. But he might lose more—his security. If a country chooses not to play, there is no cost for weapons, and the opponent wins cheap. If neither plays, nobody wins—but no one loses, either.

These games are troubling. Players settle for non-optimal outcomes because they assume that their opponents are ruthless and will not make deals. But the assumptions differ from real situations. First, unlike the players, nations can talk to each other. Verification and enforcement can improve confidence in agreements, so that cooperation is more attractive.

And nations can recognize more realistic payoffs. The real world might be better represented by payoffs structured so that cooperation is much preferred to war; the assumption that players only maximize their own good is simplistic. We can think about changing the objective, like cooperative games where children try to save the whales. This is equivalent to altering the payoffs. What may have actually happened in the Cold War is that both sides eventual-

ly realized that the payoffs were wrong. Although you couldn't win, you could lose big, and the costs were getting to be higher than any potential gains. So the game ended in mutual cooperation. ■

Linda Gaines is a physicist who works on technical and policy analysis for the Arms Control Program at Argonne National Laboratory, Argonne, Illinois.

PEN-CHANT (cont. from p. 11)

testimony before the Senate Foreign Relations Committee, both Arms Control and Disarmament Agency Director Ronald Lehman and Chief U.S. START negotiator Linton Brooks said they agreed with Baker's assessment.

In a June 23 *Izvestia* interview, Russian Defense Minister Pavel Grachev said, "the process of strategic offensive arms cuts is tied in to observance of the ABM Treaty. If the United States tries to step outside the bounds of this treaty, the [START and START II] accords will immediately lapse."

As to future reductions, Secretary of State James Baker told the Senate Foreign Relations Committee in June that he did not anticipate any "major arms control negotiations within the next five to six years" beyond those required to complete the START II treaty. Defense Secretary Dick Cheney indicated that the administration was not interested in negotiating deeper cuts, telling the

committee that the Defense Department had made a "military judgment" that 3,500 strategic nuclear warheads—the maximum number permitted each side after implementation of the START II treaty—was "the floor below which we would not go."

However, Russian Defense Minister Grachev said in a speech in late July that Russia was open to still deeper cuts, provided the ABM Treaty was maintained and the "interrelationship" with French, British, and Chinese weapons was "considered." ■

Dunbar Lockwood is a senior research analyst at the Arms Control Association in Washington, D.C.

NEW NUKES (cont. from p. 13)

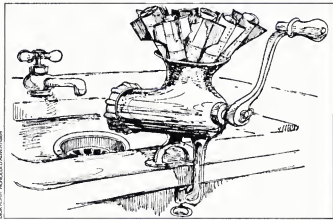
joining the Kazakh, Russian, and French moratoria, or to leave the door open for a riskier and more vulnerable life for future generations.

The administration's recently announced policy on limited tests means that the president will probably veto any moratorium called for by the House and Senate. If so, it is likely that Russia and France will resume testing. And a renewed round of testing will also renew the determination of the 20 so-called "threshold" countries to become nuclear powers, while strengthening their feeling that they have the moral right to do so.

If this happens, no treaty or strategy of deterrence, nor international body will save the world from the increased menace of nuclear terror. The world will enter a new and extremely dangerous phase of development.

On the other hand, if the administration can be persuaded to agree to a testing moratorium, the advantages are clear. Several hundred million dollars will be freed for civilian purposes, and fewer high-level radioactive waste dumps will be added to the hundreds already pockmarking the Nevada Test Site.

Most important, the United States could gain the time and moral energy to devote to a newly established post-communist order. And with renewed moral authority it could help launch and lead international negotiations to extend and strengthen the NPT beyond 1995. ■



DICK CHENEY: NATIONAL ASSOCIATION

Technology centers for Russian scientists

The West's concern that former Soviet nuclear weapon specialists might sell their knowledge in service to a nation eager to acquire nuclear weapons was questioned by Sergei Kapitza ("Low Pay, No Pay, Now Insults," *May Bulletin*.) Kapitza appears to interpret this concern as evidence that the West views ex-Soviet weapons specialists as having no scruples about selling their skills in an irresponsible manner for personal gain.

A lack of integrity on the part of ex-Soviet weapons specialists is not at issue. The issue is our collective responsibility to reduce the likelihood of nuclear proliferation. It is only prudent to forestall situations in which weapons scientists can see no way to provide the necessities of life for themselves and their families except to use their skills in support of a would-be proliferator. I am sure that ex-Soviet weapons specialists are people of integrity. Nevertheless, I would not want to see either ex-Soviet

or American—weapons scientists in such a dilemma.

These scientists possess talents and skills that could benefit the democratic, economically vibrant society that Russia seeks to build. The ideal course of action would involve the scientists in meaningful work to revitalize the Russian economy and provide for their livelihood.

The initiative that most directly addresses the current plight of these scientists is the International Science and Technology Center in Moscow, jointly established by the United States, Russia, Japan, and the European Community. Funding is expected to total more than \$70 million. The United States, Canada, and Sweden are establishing another science and technology center in Kiev; its funding is expected to total more than \$12 million. These centers will function as clearinghouses and liaison offices for non-weapons-related projects that will provide professionally rewarding

alternative employment to ex-Soviet weapons scientists and engineers. For the most part, the scientists will work in the former Soviet Union.

The centers will encourage collaboration among scientists from the funding countries and ex-Soviet specialists. Additional collaborators would be welcome. We hope that the projects will address problems inherited by the Republics of the former Soviet Union—nuclear power reactor safety, radioactive waste handling, and environmental pollution problems, among others.

Scientists and engineers in the former Soviet Union and in the funding countries are already submitting proposals, which are being prepared for funding review. The centers are expected to be fully operational by the end of the year.

As Kapitza points out, there are other dangers to world security attendant to the breakup of the Soviet Union, and most are being addressed. But perhaps none has as great a potential for catastrophe as nuclear proliferation, a component of which is proliferation of the detailed technical knowledge and experience of nuclear weapons scientists and engineers. We hope that Kapitza, as president of the Russian Physical Society, will assist by identifying and proposing appropriate projects.

Edward J. Dowdy,
U.S. State Department
Washington, D.C.



"The gentleman at the next table wishes to know if you have received satisfaction."

Reforming U.N. finances

In "U.N. Dues: The Price of Peace" (June), Enid Schoettie describes how U.N. peacekeeping operations have been stymied by inadequate financing, and she makes an excellent case for increasing support for the Secretariat's operations. She endorses then Secretary-General Javier Perez de Cuellar's 1991 proposals for reforming "the hand-to-mouth financing" habits of the organization and adds some ideas of her own. All are sensible, within feasible costs, and well "worth the price."

It may be difficult for readers to understand why such sensible ideas were not adopted long ago—or at

least after the January 1992 summit meeting, at which the heads of state of the Security Council's member nations piously stressed the importance of "strengthening the United Nations." Those same leaders committed themselves to nothing, merely instructing the new Secretary-General, Boutros Boutros-Ghali, to come up with recommendations for financing and strengthening preventive diplomacy, peace-making, and peacekeeping.

The impediment to reform lies in the U.N.'s nature as an intergovernmental institution. The Secretariat is the servant of member governments, not an independent source of power. In 1945, no government at San Francisco, despite dissatisfaction with the League of Nations' weaknesses, wanted its successor to be a supra-national agency.

Today, despite all the changes in the world, governments still exhibit basically the same attitude toward international governance. Stronger military powers (the United States above all) do not want the Secretariat to be able to act speedily, or with adequate and informed foresight, as the de Cuelar/Schoettel proposals would make possible. They do not want it any less under their thumb than it has always been in crisis situations. And the majority of weaker Third World governments are equally fearful of peacekeeping interventions as possible threats to their sovereignty.

Although traditional concepts of national sovereignty have been eroded by the scientific and technological revolutions since 1945, and the nation state has become nearly obsolete as an organizing basis for international relations, it can still disrupt the body politic even as the appendix can poison the human body. In 1945 negotiations revealed how much smaller nations distrusted the leading powers, and the U.N. Charter almost foundered on this issue. We cannot afford to underestimate the roadblocks to an adequately equipped and financially sound Secretariat.

I hope I am overly pessimistic. Perhaps Dwight Eisenhower was prophetic when he predicted that someday the people would so strongly demand peace that their governments would have to give it to them.

Ruth B. Russell
Berkeley, California

Bulletin abandoning human rights?

Reading Michael Radu's "Can Fujimori save Peru?" (July/August *Bulletin*), I almost forgot the vigorous manner in which the Peruvian people attempted to lawfully dispute Fujimori's assumption of dictatorial powers. The article itself was a powerful argument against the "willing suspension of disbelief."

The author attempts to portray the Sendero Luminoso ("Shining Path") as a tiny group of fanatics, but—in the next paragraph—admits they have a wide base of support. He portrays the Sendero as the cause of Peru's economic failure, but Peru's economic problems are the same as those of every country in the region. Radu tells us that the courts, the churches, the legislature, the press, the labor unions, and the universities—all of Peruvian society, except Fujimori, the police, and the army—are corrupt and deviously evil.

The only believable part of this narrative is the supposition that the United States would support the overthrow of democratic governments to keep the "drug war" going. In its brief history, the "drug war" has become a catalogue of human rights and civil rights violations. Built on lies, the breeding ground of obscene profits for police and criminals alike, the mere invocation of "the cocaine threat facing American cities" is supposed to make us bow and cover our heads.

But the "drug war" could be over tomorrow if Bush and his police could give up the fantastic profits and power they've gathered under the cloak of "fighting drugs." Outside the United States, the "drug war" is seen for what it is—a publicity trick to puff up the police state. The administration can't expect the whole world to give up democratic government and human rights just to support its persecution of minorities and liberals.

And what is this article doing in the pages of the *Bulletin*? Even my local newspaper provides a more balanced account. I hope never to see another *Bulletin* article that supports the violation of human rights.

Terry Scott
Seattle, Washington

Arms diplomacy

At the close of the Gulf War in March 1991, George Bush expressed the hope that "out of all this there will be less proliferation of all different types of weapons." Yet by the end of 1991, the United States led all countries in new arms deliveries to the Middle East.

Many Americans are not aware that most of these sales are made by private companies (but promoted at taxpayer expense). Last year, when private companies exported \$23 billion worth of weapons to foreign governments, Howard Fish, a defense industry official, said this practice not only benefits companies, but is helpful to the United States because "arms sales are a . . . currency of diplomacy."

Fish's view reaffirms the fact that, regardless of administration claims, U.S. foreign policy continues to be shaped and conditioned by the military-industrial complex. Is this all there is to Mr. Bush's "New World Order"?

Herbert Kriedman
Lido Beach, New York

CONTAINING THE ATOM

Nuclear Regulation in a Changing Environment, 1963-1971

J. SAMUEL WALKER

The late 1960s

saw an extraordinary growth in the American nuclear industry. Yet at the same time, public concern about the natural environment and suspicion of both government and industry increased dramatically. *Containing the Atom* is the first scholarly history of nuclear power regulation during those tumultuous years.



\$50.00 cloth, illustrated, at bookstores or order toll-free 1-800-822-4657.

University of California Press
Berkeley Los Angeles New York

PANTEX LAYS NUKES TO REST

Nearly all of the efforts of the Energy Department's weapons complex are now directed toward disassembling and storing nuclear warheads. For more than four decades, old warheads were disassembled and recycled into new ones. But this is no longer the case.

In addition to dismantling, the Energy Department is also modifying a few naval non-strategic B61 bombs, testing and evaluating warheads randomly removed from the stockpile, repairing those that are beyond the capability of Defense Department personnel to work on, and converting some into "joint test assemblies," which are used on test delivery systems. (The nuclear material or "physics package" in these test assemblies is replaced by an instrument package that records and transmits data.)

Pantex today

Weapons disassembly is conducted at

the Pantex plant near Amarillo, Texas, a facility with more than 323 buildings and 1,900,000 square feet of work space. (Pantex's replacement value was recently estimated at more than \$3 billion.) Some new workers have been transferred from other Energy Department facilities, such as the now-closed Rocky Flats plant in Colorado, and the Pantex workforce has grown to 2,600 employees who work a single shift, five days a week. About 500 employees were once directly involved in warhead production. With production now halted, we assume that 500-600 now work directly on disassembly. On average, about seven warheads are dismantled each day.

Warheads built in the 1960s, particularly army artillery shells and Lance missile warheads, are being disassembled first. Disassembly is essentially a reversal of the assembly process and each warhead requires, we estimate, between one and two weeks. First, the chemical high explo-

sive is separated from the nuclear components in an "assembly cell." These cells (also called "gravel gerties" for their gravel ceilings designed to collapse and contain the contents in the event of an accident) are specially reinforced rooms capable of withstanding an explosion equivalent to 250 kilograms of TNT. Eleven of Pantex's 13 assembly cells are used for disassembly, and approximately 60 assembly bays are used to further break down sub-assemblies and components for salvage or disposal. At any given time, there are some 500-700 warheads at Pantex; some in cells and bays being taken apart and others stored in "igloos" awaiting dismantlement.

After disassembly, warhead components containing uranium are returned to the Y-12 Plant at Oak Ridge, Tennessee, for storage or processing. Lithium-6 deuteride components—the hydrogen bomb fusion material—is also sent back to Oak Ridge. Tritium is shipped to Savan-



Once a temporary holding area, Pantex's "igloos" now store plutonium pits from disassembled weapons.

nah River, South Carolina. The high explosives are burned at the Pantex plant. Between 1981 and 1986, an average of 227,000 pounds of explosives were burned each year.

A wide variety of non-nuclear components are also returned to the facilities that manufactured them. Among the items returned to the Kansas City Plant (operated for the Energy Department by Allied-Signal, Inc.) are radars, contact fuses, arming and firing sets, Permissive Action Links, and safing components. Thermal batteries, neutron generators, capacitors, and crystal resonators are returned to the Pinellas plant (operated by General Electric) in Clearwater, Florida. Explosive actuators and other pyrotechnic components go to the Mound plant near Dayton, Ohio, which is operated by EG&G. The Energy Department plans to move most of the activities conducted at Mound and Pinellas to the Kansas City Plant over the next three years.

A little more than a mile from Pantex's disassembly area are 60 storage igloos that once housed new warheads awaiting shipment to "Military First Destination" points for transfer to the army, navy, and air force. Today, some of the igloos hold warheads awaiting dismantlement, but many are used to store weapons "pits" that would once have been sent back to Rocky Flats (now closed). A pit is a grapefruit-sized hollow ball of plutonium that, when compressed by chemical explosives, generates the fission reaction that initiates the fusion reaction necessary for a thermonuclear explosion. The pits, encased in stainless steel or other metals, are placed in their original shipping containers for storage.

The igloos are 39 feet deep, 25 feet wide, and, at most, 15 feet high. Each igloo can hold 240 pits if they are "single stacked" (in two rows of containers stacked four to six high, separated by a center aisle wide enough for a forklift to operate). But a single igloo could hold 400 pits if they were "double stacked" (in four rows). At the recent rate of disassembly, 35 pits are added each week, and a "single stacked" igloo is filled every seven weeks. Hoping to increase igloo capacity, the Energy Department is preparing a safety analysis



Nuclear weapons are disassembled in "gravel gerties" designed to collapse and contain explosions equivalent to 250 kilograms of TNT.

and environmental assessment to address the issues of "double stacking."

Pantex history

Built by the Army Ordnance Corps in 1942, Pantex was used during World War II to load conventional munitions (bombs and artillery shells) with TNT.

Although an assembly facility was already in operation in Burlington, Iowa, in 1950 the Atomic Energy Commission (AEC) decided that a second assembly plant was needed. During late 1950 and 1951 the Pantex plant was rehabilitated, and it began full operation in May 1952 with Proctor and Gamble as the operating contractor. With some exceptions, Pantex evolved into the assembly facility for warheads designed by the Livermore Laboratory, while Burlington assembled warheads designed at Los Alamos. In 1956, Mason & Hanger replaced Proctor & Gamble as the plant contractors.

In 1951, the AEC wanted to build as many as five nuclear assembly plants, and a third facility was planned for Spoon River, Illinois. But by 1953, Burlington and Pantex were capable of meeting future production goals and the other assembly plants were canceled. In 1975 the Burlington plant was closed and its operations were transferred to Pantex.

During the post-war period the United States produced almost 70,000 nuclear weapons—some 75 types for

more than 120 weapon systems. Annual production rates in the late 1950s and early 1960s reached 5,000–6,000 per year, resulting in a 1967 stockpile of over 32,000 warheads.

The future

Over the years, more than 50,000 warheads have been dismantled, and the Energy Department plans to disassemble 2,000 a year between now and the end of the decade. This goal includes a slightly increased disassembly pace. Pantex has more than enough capacity to achieve the new rate. The one-shift work day could be increased to one and one-half or two shifts, requiring overtime for the current staff, or the training of additional personnel. Additionally, disassembly could begin at the Nevada Test Site's new Device Assembly Facility (DAF). [See April 1990 "Nuclear Notebook."] The DAF, originally intended as an assembly site for nuclear test devices, has five assembly cells, seven assembly bays, and five bunkers. Using only two or three of DAF's cells could increase Energy's disassembly rate by 350–500 warheads per year. ■

Nuclear Notebook is prepared by Robert S. Norris of the Natural Resources Defense Council and William M. Arkin of Greenpeace. Inquiries should be directed to NRDC, 1350 New York Avenue, N.W., Suite 300, Washington, D.C. 20005 (202-783-7800).

Subscribe to the leading intellectual journal published in the US

In every issue of *The New York Review of Books* you'll find tremendous variety and intellectual excitement. Every other week the world's best writers and scholars address themselves to more than 130,000 readers who represent something important in America... people who know that the widest range of subjects—literature, politics, science, history, music, art, education—will be discussed with wit, clarity, and brilliance. And each issue contains the witty and wicked caricatures of David Levine.

Here's what readers of *The New York Review of Books* have enjoyed in recent issues:

- RONALD DWORKIN** on justice for Clarence Thomas.
- FELIX RONAHATY** on the case for a new domestic order.
- NADINE GORDIMER** on the novelist Joseph Roth, a genius of the empire.
- TATYANA TOLSTAYA** on the deeply ingrained terror in Soviet life.
- VÁCLAV HAVEL** on Kafka.
- TIMOTHY GARTON ASH** on how Poland's Solidarity has broken apart.
- JOAN DIDION** on the Central Park jogger and the decline of New York.
- THEODORE DRAPER** on the true history of the Gulf War.
- ISAIAH BERLIN** on Joseph de Maistre and the origins of fascism.
- V.S. NAIPAUL** on living with cruelty in Argentina.
- OLIVER SACKS** on blindness.
- GARRY WILLS** on why Cuomo said no.
- JAMES FALLOW** on Japan's economic challenge to the West.
- ELIZABETH HARDWICK** on Henry James in New York.
- ALFRED BRENDEL** on the conductor Wilhelm Furtwangler.
- JOHN UPDIKE** on the German artist Caspar David Friedrich.
- SAMIR AL-KHALIL** on Iraq and its future.
- C. VANN WOODWARD** on *Illiberal Education*.
- PHYLLIS GROSSKURTH** on Feminists and Freudians.

...and so much more in issue after issue.

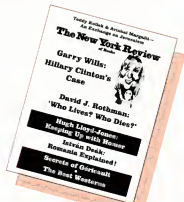
Now... a Full Year's Subscription (21 issues) at a significant saving off the Regular Rate PLUS an Exciting Bonus AND a No-Risk Guarantee. You'll receive:

21 ISSUES at the special money-saving rate of \$22.95 (a saving of almost 50% off the regular subscription rate).

A FREE BOOK—A MIDDLE EAST READER, a handsome paperback collection of *New York Review of Books* articles that provide a better understanding of the explosive politics in the Middle East and the role taken by the United States. Contributors include Bernard Lewis, Arthur Hertzberg, Samir al-Khalil, and Avi Shai Margalit. It is yours as our gift to you.

RISK-FREE GUARANTEE: a refund of any remaining portion of your subscription is guaranteed at any time during the year—but you keep all issues received and *A Middle East Reader*.

So subscribe to *The New York Review of Books*, the journal where the liveliest intelligence, insight, and wit are brought to bear on today's most significant issues in books, politics, and the arts.



The New York Review of Books

Subscriber Service Dept., PO Box 420380, Palm Coast, FL 32142-0380

YES, you may enter my subscription to *The New York Review of Books* for a full year (21 issues) at the special rate of \$22.95, a saving of almost 50% off the regular \$45 subscription rate. I will also receive *A Middle East Reader* at no extra charge. (Note: I understand this low rate will only apply for my first full year's subscription.)

Name

Address

City/State Zip

☐ \$22.95 enclosed * Charge my ☐ Am Ex ☐ MasterCard ☐ Visa ☐ Send Bill

Account No. Exp. Date

Signature C20045

*Offer good for new subscribers within the US and Canada only. May not be used for gift subscriptions. *Checks or money orders accepted in US Dollars drawn on US banks only. For Canadian orders, add \$16.05 for postage and GST. We cannot accept international money orders. Please allow 6-8 weeks for receipt of your first issue.