

Nuclear proliferation : opposing viewpoints

Charles P. Cozic, book editor ;

Karin L. Swisher, assistant editor.

Other Books of Related Interest in the Opposing
Viewpoints Series:

American Foreign Policy
America's Defense
Central America
China
Eastern Europe
Israel
Latin America and U.S. Foreign Policy
The Middle East
The New World Order
Space Exploration
Terrorism
War and Human Nature

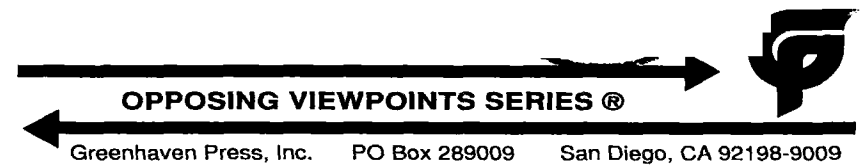
NUCLEAR PROLIFERATION

OPPOSING VIEWPOINTS®

David L. Bender & Bruno Leone, *Series Editors*

Charles P. Cozic, *Book Editor*

Karin L. Swisher, *Assistant Editor*



No part of this book may be reproduced or used in any form or by any means, electrical, mechanical, or otherwise, including, but not limited to, photocopy, recording, or any information storage and retrieval system, without prior written permission from the publisher.

Library of Congress Cataloging-in-Publication Data

Nuclear proliferation : opposing viewpoints / Charles P. Cozic, book editor; Karin L. Swisher, assistant editor.

p. cm. — (Opposing viewpoints series)

Includes bibliographical references and index.

Summary: Presents differing opinions on the threat of nuclear proliferation, the need for arms control, the role of NATO, the elimination of nuclear weapons, and other related topics.

ISBN 1-56510-005-0 (lib. : acid-free paper) — ISBN 1-56510-004-2 (pbk. : acid-free paper)

1. Nuclear nonproliferation—Juvenile literature. [1. Nuclear nonproliferation. 2. Disarmament.] I. Cozic, Charles P., 1957-. II. Swisher, Karin, 1966-. III. Series: Opposing viewpoints series (Unnumbered)

JX1974.73.N83 1992

327.1'74—dc20

92-23065

CIP

AC

"Congress shall make no law . . .
abridging the freedom of speech,
or of the press."

First Amendment to the U.S. Constitution

The basic foundation of our democracy is the first amendment guarantee of freedom of expression. The Opposing Viewpoints Series is dedicated to the concept of this basic freedom and the idea that it is more important to practice it than to enshrine it.

Contents

	Page
Why Consider Opposing Viewpoints?	9
Introduction	12
Chapter 1: How Serious a Problem Is Nuclear Proliferation?	
Chapter Preface	16
1. The Threat of Nuclear Proliferation Is a Serious Problem	17
<i>Stephen Budiansky</i>	
2. The Problem of Nuclear Proliferation Is Exaggerated	25
<i>Thomas W. Graham</i>	
3. Nuclear Proliferation Is Inevitable	33
<i>Tom Clancy & Russell Seitz</i>	
4. Nuclear Proliferation Is Not Inevitable	41
<i>Center for Defense Information</i>	
A Critical Thinking Activity: Distinguishing Between Fact and Opinion	49
Periodical Bibliography	51
Chapter 2: Are International Measures Effective Against Proliferation?	
Chapter Preface	54
1. The Nuclear Nonproliferation Treaty Is a Success	55
<i>Lewis A. Dunn</i>	
2. The Nuclear Nonproliferation Treaty Is a Failure	61
<i>Jennifer Scarlott</i>	
3. The International Atomic Energy Agency Deters Nuclear Proliferation	67
<i>International Atomic Energy Agency</i>	
4. The International Atomic Energy Agency Is Ineffective	73
<i>Leonard Weiss</i>	
5. NATO's Nuclear Arsenal Encourages Nuclear Proliferation	79
<i>Daniel Plesch</i>	
6. NATO Must Maintain a Nuclear Arsenal to Counteract Aggression	85
<i>Thomas-Durell Young</i>	

A Critical Thinking Activity: Evaluating Sources of Information	91
Periodical Bibliography	93
Chapter 3: Which Nations Contribute to Nuclear Proliferation?	
Chapter Preface	95
1. The United States Contributes to Nuclear Proliferation	96
<i>Jennifer Scarlott</i>	
2. China Contributes to Nuclear Proliferation	104
<i>Shen Tong</i>	
3. Germany Contributes to Nuclear Proliferation	111
<i>Gary Milhollin</i>	
4. Western Nations Contributed to Iraq's Weapons Program	118
<i>David Albright & Mark Hibbs</i>	
5. Israel Introduced Nuclear Weapons to the Middle East	126
<i>Leonard S. Spector</i>	
6. North Korea Could Acquire Nuclear Weapons	134
<i>Andrew Mack</i>	
7. Former Soviet Republics May Contribute to Nuclear Proliferation	141
<i>William C. Potter</i>	
A Critical Thinking Activity: Recognizing Deceptive Arguments	149
Periodical Bibliography	151
Chapter 4: How Can Nuclear Proliferation Be Prevented?	
Chapter Preface	153
1. Arms Control Will Prevent Nuclear Proliferation	154
<i>Jack Mendelsohn</i>	
2. Arms Control Will Not Prevent Nuclear Proliferation	161
<i>James Fergusson</i>	
3. Nuclear Export Controls Limit Proliferation	169
<i>Henry D. Sokolski</i>	
4. Nuclear Export Controls Do Not Limit Proliferation	175
<i>Paul L. Leventhal</i>	
5. Eliminating Nuclear Weapons Will Prevent Proliferation	181
<i>Gerd Schmückle</i>	

6. Drastically Reducing Nuclear Weapons Will Prevent Proliferation	186
<i>Harold Feiveson & Frank von Hippel</i>	
7. Hiring Former Soviet Nuclear Scientists Can Reduce Proliferation	192
<i>Richard A. Eisner & Stephen Rosen</i>	
8. Adopting a Comprehensive Test Ban Can Limit Proliferation	196
<i>Tina Rosenberg</i>	
9. Swift Military Action Can Prevent Proliferation	204
<i>William R. Van Cleave</i>	
A Critical Thinking Activity: Recognizing Statements That Are Provable	211
Periodical Bibliography	214
Glossary	215
Chronology	217
Organizations to Contact	221
Bibliography of Books	225
Index	228

Why Consider Opposing Viewpoints?

"It is better to debate a question without settling it than to settle a question without debating it."

Joseph Joubert (1754-1824)

The Importance of Examining Opposing Viewpoints

The purpose of the Opposing Viewpoints Series, and this book in particular, is to present balanced, and often difficult to find, opposing points of view on complex and sensitive issues.

Probably the best way to become informed is to analyze the positions of those who are regarded as experts and well studied on issues. It is important to consider every variety of opinion in an attempt to determine the truth. Opinions from the mainstream of society should be examined. But also important are opinions that are considered radical, reactionary, or minority as well as those stigmatized by some other uncomplimentary label. An important lesson of history is the eventual acceptance of many unpopular and even despised opinions. The ideas of Socrates, Jesus, and Galileo are good examples of this.

Readers will approach this book with their own opinions on the issues debated within it. However, to have a good grasp of one's own viewpoint, it is necessary to understand the arguments of those with whom one disagrees. It can be said that those who do not completely understand their adversary's point of view do not fully understand their own.

A persuasive case for considering opposing viewpoints has been presented by John Stuart Mill in his work *On Liberty*. When examining controversial issues it may be helpful to reflect on this suggestion:

The only way in which a human being can make some approach to knowing the whole of a subject, is by hearing what can be said about it by persons of every variety of opinion, and studying all modes in which it can be looked at by every character of mind. No wise man ever acquired his wisdom in any mode but this.

Analyzing Sources of Information

The Opposing Viewpoints Series includes diverse materials taken from magazines, journals, books, and newspapers, as well as statements and position papers from a wide range of individuals, organizations, and governments. This broad spectrum of sources helps to develop patterns of thinking which are open to the consideration of a variety of opinions.

Pitfalls to Avoid

A pitfall to avoid in considering opposing points of view is that of regarding one's own opinion as being common sense and the most rational stance, and the point of view of others as being only opinion and naturally wrong. It may be that another's opinion is correct and one's own is in error.

Another pitfall to avoid is that of closing one's mind to the opinions of those with whom one disagrees. The best way to approach a dialogue is to make one's primary purpose that of understanding the mind and arguments of the other person and not that of enlightening him or her with one's own solutions. More can be learned by listening than speaking.

It is my hope that after reading this book the reader will have a deeper understanding of the issues debated and will appreciate the complexity of even seemingly simple issues on which good and honest people disagree. This awareness is particularly important in a democratic society such as ours where people enter into public debate to determine the common good. Those with whom one disagrees should not necessarily be regarded as enemies, but perhaps simply as people who suggest different paths to a common goal.

Developing Basic Reading and Thinking Skills

In this book, carefully edited opposing viewpoints are purposely placed back to back to create a running debate; each viewpoint is preceded by a short quotation that best expresses the author's main argument. This format instantly plunges the reader into the midst of a controversial issue and greatly aids that reader in mastering the basic skill of recognizing an author's point of view.

A number of basic skills for critical thinking are practiced in the activities that appear throughout the books in the series. Some of the skills are:

Evaluating Sources of Information. The ability to choose from among alternative sources the most reliable and accurate source in relation to a given subject.

Separating Fact from Opinion. The ability to make the basic distinction between factual statements (those that can be demonstrated or verified empirically) and statements of opinion (those that are beliefs or attitudes that cannot be proved).

Identifying Stereotypes. The ability to identify oversimplified, exaggerated descriptions (favorable or unfavorable) about people and insulting statements about racial, religious, or national groups, based upon misinformation or lack of information.

Recognizing Ethnocentrism. The ability to recognize attitudes or opinions that express the view that one's own race, culture, or group is inherently superior, or those attitudes that judge another culture or group in terms of one's own.

It is important to consider opposing viewpoints and equally important to be able to critically analyze those viewpoints. The activities in this book are designed to help the reader master these thinking skills. Statements are taken from the book's viewpoints and the reader is asked to analyze them. This technique aids the reader in developing skills that not only can be applied to the viewpoints in this book, but also to situations where opinionated spokespersons comment on controversial issues. Although the activities are helpful to the solitary reader, they are most useful when the reader can benefit from the interaction of group discussion.

Using this book and others in the series should help readers develop basic reading and thinking skills. These skills should improve the reader's ability to understand what is read. Readers should be better able to separate fact from opinion, substance from rhetoric, and become better consumers of information in our media-centered culture.

This volume of the Opposing Viewpoints Series does not advocate a particular point of view. Quite the contrary! The very nature of the book leaves it to the reader to formulate the opinions he or she finds most suitable. My purpose as publisher is to see that this is made possible by offering a wide range of viewpoints that are fairly presented.

David L. Bender
Publisher

Introduction

"It is essential . . . to prevent nuclear proliferation, which poses one of the greatest risks to the survival of mankind."

President George Bush, March 1990.

"We should be like the Chinese—poor and riding donkeys, but respected and possessing an atom bomb."

Libyan president Mu'ammar Qaddafi, 1987.

On November 21, 1991, Secretary of Defense Dick Cheney announced, "We are convinced that North Korea is developing the capability to build a nuclear weapon." Cheney and leaders from around the world feared the worst: the possibility that the Communist dictatorship could build and one day launch a nuclear weapon. But North Korea is not alone. A growing number of primarily Third World nations are suspected of seeking nuclear weapons. Nearly all Western nations agree that if Third World nations obtain these weapons, they could use them to threaten global security.

Concern about the spread of such weapons dates back to World War II. After the detonation of two U.S. atomic bombs over Japan in August 1945, the United States understood how massively destructive these weapons could be. The United States also realized the powerful security value of nuclear weapons. Through the threat of nuclear retaliation, the United States could deter almost any nation from attacking it or its allies.

These security benefits were not ignored by other nations. In 1949, the Soviet Union, head of the Warsaw Pact alliance in Eastern Europe, became the second nation to develop and test a nuclear weapon. Thus began the nuclear arms race. In the ensuing years, the two superpower foes built the largest nuclear arsenals in the world. But they managed to refrain from using them, a restraint that was tested most severely during the 1962 Cuban missile crisis that brought the United States and the

Soviet Union to the brink of war. Ironically, many experts believe that nuclear weapons helped prevent such an outcome: neither side dared risk initiating hostilities that could lead to a devastating nuclear strike.

Today, with the demise of communism in the Soviet Union and the end of the Cold War, concern over the threat of a nuclear confrontation has shifted to other nations, primarily those of the Third World. In 1974, India became the sixth nation to test a nuclear device. And in 1979, U.S. satellite photos revealed that Israel, in collaboration with South Africa, also may have tested a nuclear device. Both Israel and India, located in volatile regions with long histories of war and aggression, apparently sought nuclear weapons for many of the same reasons as the United States and the Soviet Union, to increase their security and protect their borders.

In the Middle East, the tiny nation of Israel has long been embroiled in conflict with its surrounding Arab neighbors. Terrorism and uprisings stemming from Arab-Jewish differences mark the region as one of the most unstable in the world. Since 1948, Israel has been directly involved in six wars or invasions with neighboring enemies. In southern Asia, India, too, is flanked by traditional enemies—Pakistan and China. Here, regional disputes frequently erupted over the possession of Kashmir, a territory north of India now divided and occupied by all three nations.

The potential nuclear capability of Israel and India has prompted some of their adversaries to conclude that they, too, cannot afford to be without nuclear arms. Following the Persian Gulf War in 1991, inspections in Iraq confirmed that Saddam Hussein, who had once threatened Israel with chemical weapons, had nearly been successful in completing a nuclear device. Western nations suspect that other Islamic states, specifically, Iran, Syria, Libya, and Algeria, are now following in Iraq's footsteps. And in Asia, after years of having been suspected of possessing nuclear weaponry, Pakistan finally admitted to it in 1992.

The idea of these volatile nations possessing nuclear weapons has prompted much concern among the United States and other Western nations. They fear that a nuclear device in the hands of an irrational, militaristic dictator in Syria, Pakistan, or other Third World state could be used to threaten neighboring enemies, the United States, or one of its allies. They are concerned, too, with the possibility of a crude nuclear device falling into the hands of terrorists, who could then detonate it or use it as a form of blackmail. Western nations are convinced that if these regional enemies obtain such destructive weapons, they will inevitably use them. If this were to occur, many analysts believe it

would lay the groundwork for the next world war, most likely between Arab nations and the West.

But many Third World nations suspected of developing nuclear weapons assert that they should be allowed to obtain them for the same reason the United States and Russia have them: to defend their territories as best they can. As Iran's vice president, Sayed Ataollah Mohajerani, stated in 1991, "Since Israel continues to possess nuclear weapons, we, the Muslims, must cooperate to produce an atomic bomb, regardless of UN attempts to prevent proliferation." Leaders such as Mohajerani contend that nonproliferation efforts by primarily Western nations amount to hypocritical discrimination against the Third World and the Arab world in particular. Arab leaders argue that their nations are victims of a double standard: the West condones the ownership of nuclear weapons technology and materials by the United States, Russia, and others but denies it to Arab states. Arab states assert that they, too, would never use the weapons, but would merely have them to deter their enemies.

Whether Third World nations obtain these deadly weapons and use them in peace or in war is a vital issue. The contributors to *Nuclear Proliferation: Opposing Viewpoints* address this and other questions surrounding the spread of nuclear weapons in the following chapters: How Serious a Problem Is Nuclear Proliferation? Are International Measures Effective Against Proliferation? Which Nations Contribute to Nuclear Proliferation? How Can Nuclear Proliferation Be Prevented? As the reader examines the viewpoints in this book, one issue becomes clear: the management of nuclear weapons must ensure that they are never used again.

1

CHAPTER

How Serious a Problem Is Nuclear Proliferation?

NUCLEAR
PROLIFERATION

"A new and much more dangerous era of nuclear proliferation has begun."

Chapter Preface

In 1991, a United Nations investigative team began uncovering the extent of Iraq's success at building a nuclear bomb. Their discoveries refocused world attention on the problem of Third World nuclear proliferation. Accounts such as this one have led many to believe nuclear proliferation is a serious problem.

Those who consider nuclear proliferation a serious threat to international peace point to the number of countries that have attempted to and, in some cases, succeeded in constructing nuclear weapons. Israel, Pakistan, India, and South Africa are all widely believed to possess at least one functioning nuclear weapon. In addition, Brazil, Argentina, North and South Korea, and, of course, Iraq have all made progress toward attaining nuclear weapons. If any of these countries, critics maintain, exploded a nuclear bomb in their enemy's territory, a full-scale nuclear war could result.

Others, however, maintain that this threat is more appropriate to fiction. These critics point to the success of international proliferation prevention efforts. They argue that only five nations legally possess nuclear weapons, and the number has not increased in more than twenty years. They also maintain that, of those states that attempted to attain nuclear weapons illegally, many are now giving up their weapons programs and are willing to abide by international nonproliferation rules. They also suggest that international pressure would be sufficient to prevent even the most desperate terrorist nation from using a nuclear bomb. The viewpoints in the following chapter debate the seriousness of nuclear proliferation.

The Threat of Nuclear Proliferation Is a Serious Problem

Stephen Budiansky

In the following viewpoint, Stephen Budiansky maintains that the threat of nuclear proliferation is growing. According to Budiansky, repressive nations such as North Korea and Iraq have been working secretly to develop nuclear bombs. By developing atomic bombs, renegade nations threaten the entire world. Budiansky is a senior writer for *U.S. News & World Report*, a weekly newsmagazine.

As you read, consider the following questions:

1. According to the author, how have nations such as Iraq and North Korea developed nuclear weapons?
2. How should the United States respond to the increasing threat of nuclear proliferation, according to Budiansky?
3. How have control measures designed to prevent nuclear proliferation failed, according to the author?

Stephen Budiansky, "The Nuclear Epidemic," *U.S. News & World Report*, March 16, 1992. Copyright, March 16, 1992, U.S. News & World Report. Reprinted with permission.

Don't blame it on penurious Russian physicists selling their souls for 5,000 rubles and a Big Mac, or on accommodating German trading companies that are only too happy to ship sensitive electronic triggers under the label "automobile parts."

The North Koreans, who CIA Director Robert Gates warned may be only a few months away from building an atomic bomb, did it all by themselves. Saddam Hussein's Iraq got much closer to the bomb than anyone realized. And if the North Koreans and the Iraqis can do it, anyone can do it. "Things that were very difficult for the smartest people in 1943 are easy for ordinary people now," says Richard Garwin, a physicist at IBM's Thomas J. Watson Research Center and a former nuclear-weapons designer.

The Collapse of the Soviet Union

At the same time, the collapse of the Russian economy is unleashing a flood of uranium ore and other nuclear materials onto world markets; it may be only a matter of time before more dangerous products, including tons of plutonium from spent Soviet reactor fuel and perhaps even uranium-processing technology from the Central Asian republics, reach the black market. The West's attempt to prevent the spread of nuclear weapons, based on the premise that a combination of secrecy, export controls and inspections of civilian nuclear reactors could thwart the world's nuclear wannabes, has failed, and a new and much more dangerous era of nuclear proliferation has begun.

U.S. officials privately concede that the system has failed—and that America blew an important opportunity to strengthen it after the gulf war. "We should have pointed to Iraq as proof positive that the system doesn't work and that something much more aggressive must be put in place—an assertive nonproliferation policy instead of the passive one we have now," admits a senior U.S. official.

Now America and its allies may be facing a painful choice: Either use military force to prevent North Korea and others from going nuclear, or learn to live in a world in which nearly every nation that wants nuclear weapons has them. U.S. officials fear that a North Korean bomb could destabilize all of Northeast Asia, triggering a nuclear arms race that could bring South Korea, Japan and Taiwan into the nuclear club as well. A white paper issued by the South Korean Defense Ministry ominously warned that North Korea's bomb program "must be stopped at any cost."

But it would be much harder to muster allies for an attack on North Korea than it was to round up support for driving Saddam Hussein out of Kuwait. A commando raid, a cruise missile attack or a Stealth bomber raid on the North's nuclear installations could trigger another Korean war. In addition to its mil-

lion-man Army, North Korea has thousands of artillery pieces and hundreds of Scud missile launchers lined up just across the demilitarized zone—well within range of Seoul, just 35 miles away. Japan would be likely to oppose the use of bases on its soil for such a mission; using them anyway could jeopardize the U.S.-Japan Security Treaty and magnify the growing tensions between Washington and Tokyo. "We'd like to see a political solution to this," says U.S. Under Secretary of Defense Paul Wolfowitz. "It's not the time to start discussing military options. But we haven't ruled anything out."

The Wrong Door

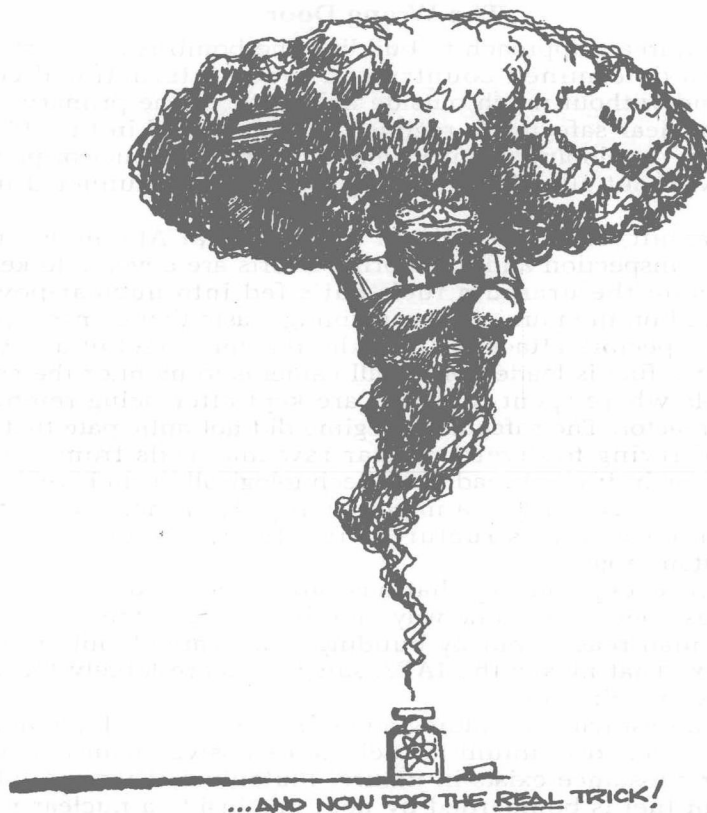
North Korea's approach to building the bomb is a case study of how a determined country can evade international controls—and without much outside help, either. The primary aim of the nuclear safeguards regime, first developed in the 1950s, was to let developing countries have commercial nuclear-power plants without allowing their byproducts to be funneled into bombs.

As a result, almost all of the International Atomic Energy Agency's inspection and monitoring efforts are devoted to keeping tabs on the uranium fuel that's fed into nuclear-power plants and on the plutonium-containing waste that comes out of them. Inspectors attach seals to the reactor vessel of a power plant after fuel is loaded or install cameras to monitor the cooling pools where spent fuel rods are kept after being removed from a reactor. The safeguards regime did not anticipate that instead of trying to divert nuclear raw materials from power plants bought from abroad, even technologically primitive countries such as North Korea might simply build their own, complete nuclear infrastructures—in effect, reproducing the Manhattan Project.

In fact, every country that has built a bomb or even come close has done it the same way—not by hijacking the operations of a civilian reactor but by building a dedicated bomb-making complex. That means the IAEA safeguards are largely focused in the wrong direction.

The hardest part of building a bomb is obtaining plutonium or highly enriched uranium to fuel the explosive chain reaction. Neither substance exists in nature. Plutonium is formed when uranium fuel is bombarded by neutrons inside a nuclear reactor; it must be extracted from the spent fuel, a step called reprocessing. Highly enriched uranium is made in an industrial process that selectively concentrates the isotope uranium-235 from 1 percent or less—its abundance in natural uranium ore—to the 20 percent, or ideally 90 percent, that is required for a nuclear explosive.

North Korea picked the plutonium route, which meant it needed a nuclear reactor. IAEA rules control the sale of reactors, as well as the hard-to-come-by materials needed to fuel and operate most power-producing reactors: low-enriched uranium fuel, which is needed for the water-cooled reactors typical in the United States and Europe, and heavy water (a combination of deuterium—a heavy isotope of hydrogen—and oxygen), which is needed for reactors fueled by more easily obtainable natural, unenriched uranium.



Paul Conrad, © 1992, Los Angeles Times. Reprinted with permission.

The North Koreans sidestepped these obstacles entirely. The design they chose went back to the dawn of the nuclear age. It

uses natural uranium fuel and, in place of heavy water, graphite—which North Korea has in abundance. "The first reactor, which we built at the University of Chicago football field, was a graphite reactor," notes Michael Golay, a professor of nuclear engineering at MIT [Massachusetts Institute of Technology]. "It was built by stacking blocks [of graphite]" on a wooden scaffold. North Korea, like just about every country in the world, also has its own source of uranium ore.

The North Korean reactor, completed in 1987, is tiny by commercial standards, with a power output of 30 megawatts compared with 1,000 megawatts for a typical electric power plant. Yet it can produce at least 20 pounds of plutonium a year—more than enough to build one nuclear weapon.

"If you're in a weapons program, you don't want to tie in to your electric power system; you want a reactor that's especially for that purpose," says A. David Rossin, a nuclear engineer and a former U.S. assistant secretary of energy. Trying to divert plutonium from a power reactor presents a host of technical hurdles. Fuel in a power reactor is left in the core for a long time to maximize energy production; that makes it highly radioactive and hard to handle. Then it has to be reprocessed by remote control behind heavy shielding.

Undesirable Reactions

Moreover, long irradiation leads to undesirable nuclear reactions that complicate the bomb maker's task. When the neutrons produced in a nuclear reactor strike uranium-238—the abundant and otherwise uninteresting isotope of natural uranium—it is converted to plutonium-239, the stuff that bombs are made of. But in subsequent reactions the Pu-239 can in turn capture more neutrons itself, forming Pu-240 and -241. These isotopes not only are highly radioactive, but because they tend to undergo nuclear fission spontaneously, they can cause the nuclear chain reaction of a bomb to begin a fraction of a second too soon—making a whimper instead of a bang. To overcome this problem, a bomb has to be designed so the conventional explosives that squeeze the plutonium together to create a critical mass do their job much more quickly, an extremely difficult technical challenge. "But if your whole thing is oriented to production of the bomb, you avoid some of the headaches," says Leonard Spector, an expert on nuclear proliferation at the Carnegie Endowment for International Peace.

The obstacles that secrecy and technical backwardness once presented to the world's would-be bomb makers have largely vanished, too. Perfectly legal assistance has provided countries such as North Korea with a cadre of skilled technicians. Technicians from the former Soviet Union are working in Libya

and Algeria. North Korea even received technical aid from the IAEA in uranium mining and assaying, and had reactor operators trained by the Soviet Union as part of an IAEA-sanctioned deal during the 1960s in which the Soviets provided a small, safeguarded research reactor at Yongbyon, the site of North Korea's burgeoning nuclear complex.

Uncontrolled Proliferation

Whatever happens to the nuclear weapons in the disintegrating Soviet Union, the old nightmare of uncontrolled atomic proliferation is moving measurably closer to reality—and it would not be dispelled even by an arrangement to destroy many of the Soviet nukes and keep the rest under responsible control. The Bomb may soon be brandished by a whole new class of countries—Third World regimes far more radical and unpredictable than any of the eight present members of the nuclear club.

George J. Church, *Time*, December 16, 1991.

Even designing a nuclear weapon, once the most closely guarded of secrets, is now not a terribly difficult task for a physicist anywhere. "What's classified today is how to build a good weapon," says Golay, "not how to build a weapon." Mathematical problems that challenged some of the best minds in the world during the Manhattan Project can now be solved on a personal computer. What's more, not all the best minds in the world are in the West anymore. Citizens of Taiwan, South Korea and India, for example, account for more than 2,600 of the science and engineering Ph.D.'s awarded annually by American universities.

The United States has been pressing its allies and the IAEA to tighten up export controls and inspection procedures to eliminate the kind of loopholes that North Korea exploited. All the major nuclear nations—with the notable exception of China—have now agreed that they will not sell *any* nuclear technology to a nation that refuses to open all its facilities to IAEA inspection—so-called full-scope safeguards. Under the nonproliferation treaty, the only obligation of a supplier nation is that the particular plant or material it sells be placed under safeguards. That loophole allowed Pakistan, India, Algeria and Israel, none of which have signed the treaty, to receive nuclear help from abroad while pursuing nuclear-weapons programs at uninspected sites.

Germany, embarrassed by the prominent role played by German companies in the legal, quasi-legal and blatantly illegal

sales of nuclear technology to Pakistan, Iraq and other proliferators, has tightened its export controls. And a new IAEA policy has affirmed the agency's right to conduct inspections at undeclared facilities in countries that have signed the treaty or otherwise accepted full safeguards. Such inspections might have detected Iraq's clandestine nuclear program, for example, and may be invoked soon in an IAEA demand to see North Korea's undeclared production reactor and reprocessing plant.

But with the equivalent of only 40 full-time inspectors to cover close to 1,000 *declared* nuclear installations, the IAEA has its hands full already. And what especially concerns many nuclear experts is the increasing ease with which a determined nation can gain direct access to the critical technologies needed to enrich uranium or reprocess plutonium, as well as to weapons-grade materials themselves. Once a nation has the ability to manufacture its own highly enriched uranium or plutonium, no inspection regime is worth very much. It takes only a few weeks to make plutonium from a sealed and monitored storage depot into a nuclear bomb. Argentina, Brazil, Pakistan, India, Israel and South Africa all have declared or undeclared reprocessing or enrichment plants in operation. "Good intentions in peaceful times last for years; plutonium lasts forever once it's separated into weapons-usable form," says Paul Leventhal of the private Nuclear Control Institute. . . .

In the case of North Korea, U.S. officials are especially worried that Pyongyang may continue its foot dragging on allowing IAEA inspections just long enough to reprocess a couple of bombs' worth of plutonium, which it could then hide—or sell to the highest bidder.

But if the North Koreans try to peddle plutonium, they could face stiff competition. Russia has recovered at least 20 tons of plutonium from power reactors, in addition to military stockpiles of 115 tons of plutonium and 500 tons of highly enriched uranium, all of which the government is eager to sell as reactor fuel.

Peaceful Uses

"It could conceivably be sold to companies and consumers, as can any other valuable commodity. Hopefully it will be used in a beneficial method," says Boris Nikipelov, first deputy minister of Russia's Ministry of Atomic Power and Industry. "We see no technical or political restrictions against utilizing the materials." The fact that they have a market value of close to \$1 billion is no doubt a factor, too. The Soviet Union sold 12 million pounds of uranium in the United States in 1991, worth \$110 million, nearly 30 percent of the entire U.S. consumption; Russian shipments reached as much as 5 million pounds in the first month of 1992 alone. American uranium producers have filed an anti-

dumping suit against the Russian sales.

The plutonium trade, meanwhile, is getting a boost from Japan, which is reprocessing reactor fuel in France and Britain, and plans to ship a *ton* of plutonium aboard a freighter escorted by a single Japanese patrol boat armed with a light cannon and machine guns. Japan plans to reprocess a total of 100 tons of plutonium over the next 20 years.

"You have an impossible task of accounting for it all," says Leventhal, "and ensuring that the 15 pounds you need to blow up a city doesn't fall into the wrong hands" through theft, terrorism, or black-market sales.

Leventhal argues that a global ban on the production of weapons-grade material would shut this door. "We haven't produced any plutonium for two or three years because our production reactors are all unsafe or broken," adds physicist Richard Garwin, "and we haven't produced any highly enriched uranium since 1964." The only remaining use the United States has for HEU is as fuel for reactors in ships and submarines, a demand Garwin says could easily be met from the U.S. stockpile of 500 tons. Russia says it no longer makes HEU and will stop plutonium production by 2000.

But it is unclear whether France and Britain, eyeing lucrative Japanese reprocessing contracts, would go along. And even some U.S. officials, while acknowledging that the nation no longer needs to produce weapons-grade material, are apathetic about a ban on the production of weapons-grade nuclear fuel. "I don't believe that I see any downside to it," says Everet Beckner, an official at the U.S. Department of Energy who works on defense programs, "but there are more important problems to consider."

In any event, nuclear experts are virtually unanimous in believing that no "technical fix" alone can do the job. "It's effectively impossible to keep the lid on," says MIT's Golay. "The only way you're going to control these things is to make them uninteresting." Unfortunately, some of the most unsavory regimes in the world are just now discovering that their motives and their opportunities for going nuclear are converging.

"The actual scope of the current proliferation threat is smaller than is generally perceived."

The Problem of Nuclear Proliferation Is Exaggerated

Thomas W. Graham

Thomas W. Graham is policy research coordinator at the University of California's Institute on Global Conflict and Cooperation in San Diego. In the following viewpoint, Graham argues that global nonproliferation efforts—from export controls to enforcing the Nuclear Nonproliferation Treaty (NPT)—have been successful. He maintains that these controls will continue to be successful and will continue to eliminate the threat of nuclear proliferation.

As you read, consider the following questions:

1. Why does Graham speculate that "winning" the nuclear nonproliferation battle is possible?
2. What evidence does Graham give to show that nonproliferation efforts have been successful?
3. Why does the author conclude that the threat of nuclear proliferation has been exaggerated?

From Thomas W. Graham, "Winning the Nonproliferation Battle," *Arms Control Today*, September 1991. Copyright 1991 by the Arms Control Association. Reprinted with permission.

As the Cold War dissipates, the spread of nuclear weapons has risen to the top of the international security agenda. After the *laissez-faire* nonproliferation policy of the Reagan era, the Bush team—initially reluctant to embrace a strong nonproliferation policy because of a mistaken perception that little could be done—has substantially upgraded its nonproliferation effort.

Nonproliferation Victories

Since then, six substantial nonproliferation victories have been won. France has announced its intention to sign the Nonproliferation Treaty (NPT), thereby codifying its transformation into a supporter of nonproliferation, which began in the mid-1970s. China, the last declared nuclear-weapon state hold-out and once one of the harshest critics of the NPT as a conspiracy against the developing world, has announced its willingness to sign. South Africa has actually signed the NPT, a step which could result in the first case of genuine nuclear disarmament—a state with a nuclear weapon capability dismantling that potential—and help assure that the African continent remains free of nuclear weapons. Argentina and Brazil have agreed to establish a mutual system of comprehensive safeguards and to take steps to implement the Treaty of Tlatelolco, Latin America's nuclear-weapon-free zone agreement. The International Atomic Energy Agency (IAEA) has successfully conducted several challenge inspections against a hostile country (Iraq), demonstrating that international safeguards can be extremely effective if backed by strong political support and intelligence information from the major powers. Finally, in the course of the gulf confrontation, the United Nations has established many potentially important precedents which could help reverse proliferation in other volatile regions of the world. If the North Korean nuclear program can be brought under control by a U.S.-led international coalition, the Bush administration will be able to lay claim to the most effective nonproliferation policy in U.S. history.

In the midst of these successes, there has been a growing debate over the future of U.S. nonproliferation policy. Some, including this author, believe that many current trends, especially the increasing delegitimization of nuclear weapons for all forms of extended deterrence, provide an opportunity to think about "winning" the nonproliferation battle—freezing or reversing the nuclear programs of the four current *de facto* nuclear-weapon states (India, Israel, Pakistan, and South Africa), and ensuring that no additional states are added to this list for at least the next 20 years. . . .

Fundamental to the winning strategy is the belief that many current conventional wisdoms about nuclear proliferation are wrong. The primary reason for this is that many discussions of

proliferation take place on a very abstract level, focusing on the nuclear fuel cycle or the NPT regime. Most of the actual business of nuclear proliferation, however, relates to the often highly classified specifics associated with the "sensitive" nuclear programs of a handful of "problem" countries. Accurately assessing the options for an effective U.S. nonproliferation strategy for the 21st century requires a detailed knowledge of the successes and failures of these countries' nuclear programs over the last 30 years. Unfortunately, few individuals have had the historical perspective, breadth of detailed knowledge, or time to reflect on the key lessons learned over these three decades of international nonproliferation efforts.

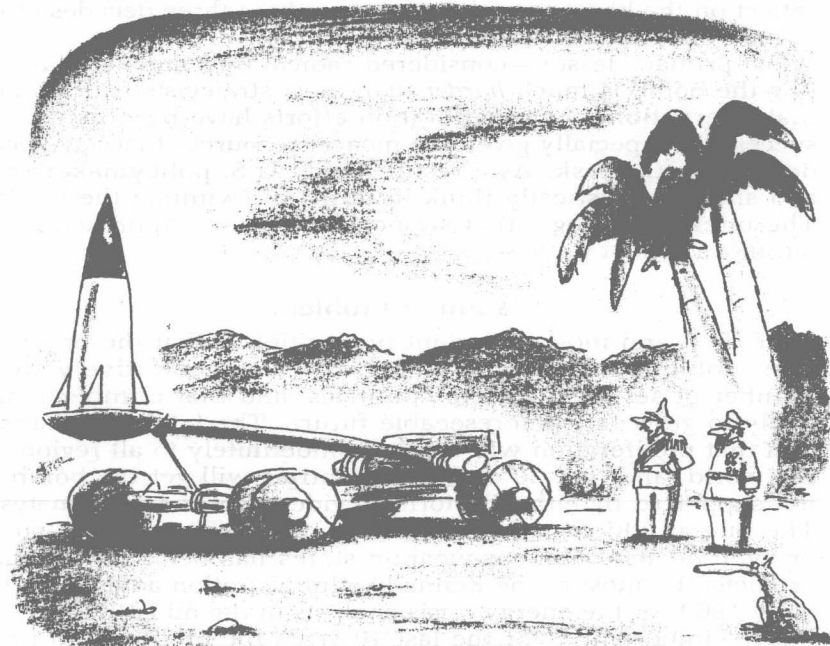
The primary lesson—considered radical by some—is that getting the bomb is much *harder* than most strategists believe, and that international nonproliferation efforts have been extremely successful, especially given the meager resources that have been devoted to the task. As a result, today U.S. policymakers can and should realistically think in terms of "winning the battle." The intellectual logic that supports a winning approach is set out in a series of propositions.

A Finite Problem

The first and most important proposition is that the proliferation problem is finite, involving only a comparatively small number of serious problem countries, and that number is unlikely to grow in the foreseeable future. The fatalistic assumption that proliferation will continue indefinitely to all regions of the world, and that 20 or more countries will get the bomb, is not supported by either historical evidence or detailed analysis. The rate at which nations have become nuclear-weapon states or even *de facto* nuclear-weapon states has been slower than predicted by most of the Kennedy administration advisers in the early 1960s or the energy crisis analysts in the mid-1970s.

More importantly, for the last 10 years the proliferation problem has been limited to approximately a dozen nations. Despite wars, revolutions, conventional arms races, and the increasing spread of nuclear and high-tech military technology, these problem states have *not* increased appreciably in number. While 40 to 45 countries are sometimes cited as having the technical capability to begin a nuclear weapon program, most countries have clearly and deliberately "opted out" of the nuclear proliferation game. Virtually all of the nations of the world have calculated that acquisition of nuclear weapons would not strengthen their national security. Not only are more than 140 countries parties to the NPT, but all but a few of those countries (i.e., Iran, Iraq, Libya, and North Korea) are genuine parties to the treaty and represent no nuclear proliferation problem. Many na-

tions that were considered potential problem countries 15 to 30 years ago are no longer of proliferation concern, a testament in part to the success of the international nonproliferation regime. Today, it is remarkable to remember that Egypt, Germany, Indonesia, Japan, Saudi Arabia, Spain, Sweden, Switzerland, Turkey, and Yugoslavia, were all once considered potential problem countries.



"We got a good deal on the warhead, but unfortunately there wasn't enough left over for a state-of-the-art delivery system."

© Frank Cotham. Reprinted with permission.

In addition, since many countries also have opted out of nuclear energy research and production, any decision by most states to produce nuclear weapons would now face extremely long lead times and an international export control environment that makes procurement of complete sensitive nuclear facilities extremely difficult. . . .

The second major proposition supporting a winning nonprolif-

eration strategy is that the actual scope of the current proliferation threat is *smaller* than is generally perceived. In addition, the capabilities of the dozen or so problem countries fall into distinct categories, and this has important implications for policy.

As mentioned earlier, despite the formal denials of several governments, four nations' nuclear weapon programs have progressed to the point that they must be considered *de facto* nuclear-weapon states—India, Israel, Pakistan, and South Africa. These countries either have nuclear weapons or could build them in days or weeks. Behind this group are four "advanced threshold countries"—Argentina, Brazil, South Korea, and Taiwan which have the technical capability to become *de facto* nuclear-weapon states in only a few years; because of international nonproliferation efforts, however, it appears that none of them is now likely to do so. Five "potential threshold states"—Algeria, Iran, post-war Iraq, Libya, and North Korea—are further away from having the technical capability to build a nuclear arsenal, but appear to have an interest in pursuing the nuclear weapon option. Only the four *de facto* nuclear-weapon states have produced nuclear weapons or could move quickly to do so. All other problem states will have to take clear and often difficult steps to become *de facto* nuclear-weapon states. And again, there is no evidence that this list of problem countries is lengthening; in fact, new opportunities are opening to shrink it.

Proliferation Can Be Rolled Back

A third proposition is that nuclear proliferation is not a one-way street. Reversing the tide is possible. Indeed, U.S. policy interventions both in the mid-1970s and recently have already succeeded in shortening the list of active problem states from approximately a dozen to about seven.

In the 1970s, the United States forced South Korea and Taiwan to take steps which reversed their nascent nuclear weapon programs. In the early 1980s, the United States took steps that have had the effect of significantly reducing Libya's nuclear proliferation potential. With the substantial recent progress made in diffusing the nuclear competition between Argentina and Brazil, these two long-time problem states have moved into the category of probable success stories. The complete implementation of U.N. Security Council Resolution 687, if achieved, could force Iraq into remission for a substantial period. With international attention focused on Iraq, rebuilding a covert nuclear weapon program there will be far more difficult than it was in the past.

South Africa's signing of the NPT could set an even more remarkable precedent. If South Africa ratifies the NPT, presents a credible accounting of its stockpile of highly enriched uranium to the IAEA, and places its entire stockpile under safeguards, it

would become the first case of real nuclear disarmament in history—the first former *de facto* nuclear-weapon state. . . .

In short, active policy initiatives taken by the United States, by other nonproliferation leaders, and by domestic political leaders opposed to nuclear weapon development within various problem countries have created a new category of states that are "in remission." This list of successes is impressive: Argentina, Brazil, Libya, South Africa, South Korea, Taiwan, and potentially Iraq. It attests to the fact that winning the nonproliferation battle is possible, even in difficult cases. While constant attention will have to be paid to ensure that these countries stay in remission, one should not be surprised to find all of them free of nuclear weapons 20 years from now.

A fourth thesis challenges the conventional wisdom that the diffusion of technology makes it relatively easy to produce a nuclear weapon capability. A corollary is the belief that the continued spread of technology makes it much easier to produce nuclear weapons today than it was several decades ago, and that eventually it will become impossible to control sensitive nuclear technology. These impressions, common though they may be, are largely false—and they tilt the policy debate in a dangerously fatalistic direction.

A review of problem countries' efforts to build nuclear weapons reveals that lead times between a decision to build a nuclear device and the actual acquisition of a nuclear weapon capability remain quite long for virtually all Third World states of proliferation concern. The fact is that it remains extremely difficult to build a bomb. It requires a wide array of advanced technology, and a huge and expensive industrial infrastructure. . . .

This means that the international community continues to have "timely warning" in which to take action to stop a potential proliferator. In the process of building a nuclear weapon capability, proliferating states are highly vulnerable to cut-offs of technology and equipment, diplomatic pressure, and covert action.

In sum, the imperfect success of nonproliferation efforts to date has been due not to the inherent difficulty of controlling nuclear technology and equipment, but to the extremely limited diplomatic, intelligence, and military resources that have been devoted to the problem.

Export Controls Work

The fifth pillar of the winning strategy is the conclusion that nuclear export controls have substantial utility even against states with advanced industrial capabilities.

At a minimum, export controls ensure that a nuclear weapon program will be correctly identified as such early on. In every known case, export controls have forced proliferating countries

to take steps in acquiring equipment and materials that clearly label their effort as being directed toward a military program. There is no need to set up a covert purchasing system or to acquire various specialized equipment if one wants only a peaceful nuclear power program. While proliferating states may hide behind the peaceful atomic rhetoric popular in the Atoms for Peace era, informed government officials in dozens of countries now have sufficient intelligence and analytical capability to differentiate between peaceful and military activities. . . .

Nonproliferation Success

Despite dire predictions in past years that 20 or 30 countries would have nuclear weapons by the 1990s, only one additional nation, India, is known to have detonated a nuclear device since the NPT came into effect. The two nuclear-weapons states that did not originally adhere to the treaty, France and China, have now decided to join as we work toward the indefinite extension of the pact when it is reviewed again in 1995.

Ronald Lehman, *The Washington Times*, February 2, 1992.

The sixth thesis is that from the point of view of potential proliferators, nuclear weapons are not cheaper than conventional weapons, as was once argued to be the case in the United States. A complete economic analysis shows that production of nuclear weapons for most potential proliferators is expensive.

As mentioned above, proliferators have generally been forced to spend billions of dollars to build a serious nuclear weapon program. Moreover, since nuclear weapons have not replaced conventional weapons for any state that has them, expenditures on nuclear weapons must be added to expenditures for modern conventional forces. As a result, while the phrase "more bang for the buck" did justify nuclear reliance in the specific context of the United States in the 1950s, the historical record of the nuclear age shows that most states correctly do not see nuclear weapons as a cost-effective way to deal with the security threats they face. Thus, economics provide a limited disincentive for developing nuclear weapons. . . .

Seventh, proponents of a winning strategy challenge the idea that the United States has to be "realistic" about its nonproliferation goals and has to acknowledge that stemming proliferation is only one aspect of foreign policy.

The historical record shows just the opposite: highly idealistic nonproliferation initiatives have always challenged the conventional *realpolitik* view of the day, and in essentially every case