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Welcome to Swords and Ploughshares, the new bulletin of the Program in Arms Control, Disarmament, and International Security (ACDIS) of the University of Illinois at Urbana-Champaign. Swords and Ploughshares will be published three times this academic year and twice each semester thereafter.

The ACDIS Program, academic in nature and in existence since 1978, has as its goals enhancing education, research, and public discussion in the following areas:

- political and technological issues related to international security
- efforts to control and reduce nuclear and conventional weapons
- historical and contemporary factors which lead to war
- means of achieving and enhancing peace
- economic, cultural, and ethical dimensions of war and peace

In its work, ACDIS involves scholars from disciplines as diverse as political science, physics, history, Asian studies, law, philosophy, and anthropology. In addition to participating in activities sponsored by the program as a whole, students and faculty members interact through special interest sections:

- The Ethical Studies Group
- The South Asian Regional Security Project
- The Science and Technology Group
- The War in History Unit
- The Project on European Arms Control and Security
- The Unit for Curriculum Development

The purpose and activities of each of these ACDIS sections are described further at the end of this bulletin. Participation in ACDIS is open to interested faculty and students from all sectors and disciplines of the campus.

About This Issue . . .
The first article in this issue is a memorial to a remarkable individual, the late Arthur B. Chilton, a graduate of Annapolis, a career officer in the U.S. Navy, a professor of nuclear and civil engineering at Illinois, and a co-founder of ACDIS.

The two articles which follow are devoted to the complex and contentious issue of ending all nuclear test explosions. This subject is once again moving to the forefront of the arms control agenda, and so it is a fitting theme for the première of Swords and Ploughshares.

“Nuclear Test Bans: the Verification Issues” discusses scientific methods of monitoring underground nuclear explosions and discriminating them from natural seismic activity. “Nuclear Test Bans: the Policy Issues” discusses national policy issues which are raised by efforts to limit or ban nuclear weapons tests.

The final article of this issue, “Did the Bishops Ban the Bomb?”, reviews and evaluates the conclusions of the recent reports of the American Catholic and Methodist Bishops on the moral and ethical dimensions of nuclear weapons.
**Short Takes**

*Seeking to achieve the discontinuance of all test explosions of nuclear weapons for all time, determined to continue negotiations to this end, and desiring to put an end to the contamination of man's environment by radioactive substances...*”

Preamble to the 1963 Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space, and Under Water

*Arms control should be pursued because the peoples of the world expect it of their leaders. That is a reason of special importance in a democracy.*”

Report of the President’s Commission on Strategic Forces, March 21, 1984

*There have been over 1,630 nuclear tests since 1945—an average of about one every nine days.*

Nuclear Weapons Databook, working paper, 86-2

*The United States has carried out over 20 nuclear tests since the Soviet Union declared a moratorium and suspended underground testing on August 6, 1985.*

Nuclear Weapons Databook, working paper, 86-2

*I've looked carefully at the evidence and have concluded, as President Reagan did, that there is significant evidence the Soviets have violated the 150 kiloton threshold.*”

Richard Perle, Assistant Secretary of Defense

*There is no evidence that the Soviets have tested over 150 kilotons, none whatsoever.*”

Dr. Charles Archambault, Seismologist, University of Colorado

*We believe that the moral case for nuclear deterrence, even as an interim ethic, has been undermined by unrelenting arms escalation.*”

United Methodist Council of Bishops, May, 1986
Articles

Arthur B. Chilton —
1918-1986: an ACDIS Pioneer

A few among us, seemingly driven by a special energy and intellect, reach across cultural divides, and, in doing so, enrich their fellow beings in special measure. Arthur B. Chilton was that kind of person.

Arthur joined the faculty of the University of Illinois in 1962, and, after 21 years of distinguished service as a scientist, engineer, and educator, retired in 1984 as a professor of civil and nuclear engineering. He left his mark in many places—one very special mark is ACDIS.

Arthur believed that this university had to be engaged in the great issues of the day to meet its obligations to students, state, and country. As a scientist and engineer, he understood the workings of the atom and the positive benefits which nuclear knowledge and energy offered mankind. He also understood the darker side of this technology — nuclear weapons. Convinced that all thoughtful citizens needed an understanding of the threat that mankind faced from an uncontrolled arms race, Arthur set about to use his knowledge as a scientist and engineer and his skills as a teacher.

In 1978, he joined with two Illinois colleagues from the social sciences and founded what was then called the Office of Arms Control, Disarmament, and International Security. The early years were lean ones, but, in 1980, ACDIS became a program with space and a staff of its own, and Arthur's dream became a reality.

Arthur contributed much in the early days of ACDIS besides initiative and technical knowledge. His standards of academic rigor and of open and non-partisan inquiry became standards of ACDIS. His recognition that problems of war and peace went beyond policy and technology to philosophical, moral, and historical issues saw expression in the interdisciplinary structure of ACDIS.

Arthur Chilton was born in Montgomery, Alabama in 1918. Upon completing high school, he won an appointment to the United States Naval Academy and was commissioned upon graduation in 1939. The navy sent him to Rensselaer Polytechnic Institute where he earned bachelor's and master's degrees in civil engineering in 1942 and 1943. He spent the remainder of World War II in the Pacific with the Naval Construction Battalions.

After the war, Arthur served as public works officer at the Philadelphia Naval Yard before being accepted into a new navy program in radiation protection. He earned master's and Ph.D. degrees in physics from the Ohio State University in 1951 and 1952 and afterward continued his naval career in the Civil Engineering Corps as a research scientist and engineer. In 1962, he retired with the rank of captain and began a second career as an academic at the University of Illinois.

Over the years, Arthur became an internationally recognized authority on radiation shielding. He served on many professional committees, including the Board of Directors of the American Nuclear Society. He also won many awards, including the society's Arthur Holly Compton Award in 1984. In 1969, the Department of Defense awarded him a Distinguished Service Citation.


Arthur gave much to his nation, to his professions, and to his fellow human beings. To this university he gave ACDIS. Thank you, Arthur.
Nuclear Test Bans: the Verification Issues

by FREDERICK K. LAMB

For three decades, it was official U.S. policy to seek a complete ban on testing of nuclear weapons. However, in July, 1982, President Reagan ended U.S. participation in international efforts to ban nuclear tests. In particular, he declined to resume negotiations on a comprehensive test ban with the Soviet Union, negotiations that had made substantial progress during the period 1977-80.

President Reagan partly justified his reversal of long-standing U.S. policy by expressing his desire to attempt development of new nuclear weapons, such as the proposed X-ray laser, and by the claim that continued testing is needed to check the reliability of old ones. But he also claimed that a total test ban would, in any case, be impossible to verify.

In halting further negotiations on a comprehensive test ban, the Reagan Administration has charged that the Soviet Union has repeatedly violated the Threshold Test Ban Treaty which limits underground tests to 150 kilotons (kt) or less. However, numerous distinguished scientists who have long been involved in monitoring test bans for the U.S. government say the Administration is basing its charges on a misinterpretation of the data.

During the last year, these test ban issues have once again come to the forefront of the arms control debate. This is due largely to increased public and congressional interest in a complete ban on nuclear testing, spurred in part by the unilateral Soviet halt in nuclear testing and new Soviet flexibility on test ban verification. There are also indications that substantial improvements in our ability to detect underground nuclear explosions in the Soviet Union are possible. Thus it seems appropriate to review the current situation.

What are our present test ban verification capabilities? What is the current status of the controversy over Soviet compliance? Could a comprehensive test ban be verified?

Current Capabilities

U.S. verification of Soviet compliance with any arms control agreement is a two-step process: collection and interpretation of data on Soviet activities (monitoring), followed by a decision by the President as to whether Soviet activities are in compliance with the agreement. Although the President's decision is inherently political rather than technical, in order to make a wise decision the President must receive accurate information.

Currently, the United States and the Soviet Union have agreed not to carry out nuclear tests in the atmosphere, in outer space, or underwater, and not to test weapons with yields larger than 150 kt. In order to monitor Soviet compliance with these agreements, the United States relies on a variety of measures, some unilateral and some cooperative.

Unilateral measures include networks of sensors to detect the sound waves produced by explosions underwater, satellites carrying detectors sensitive to the electromagnetic radiation produced by nuclear explosions in the atmosphere or in space, and a radioactivity program to detect the radioactive debris produced by nuclear explosions in the atmosphere. The United States presumably also makes use of other information such as that gathered by interception of Soviet communications and by spies.

The Soviet Union has agreed to a variety of cooperative arrangements to assist U.S. verification of the Threshold Test Ban Treaty (TTBT) and the Peaceful Nuclear Explosions Treaty (PNET). The PNET, for example, grants U.S. verification personnel the right to set up monitoring and inspection equipment on-site, provides them with various privileges and immunities, and protects U.S. ownership of the data gathered by the inspection team when a series of explosions with an aggregate yield of greater than 150 kt is planned. Before the United States broke off negotiations, substantial progress had been made in agreeing on monitoring and inspection procedures to verify a comprehensive test ban.

Underground nuclear tests may be detected by observing test preparations with photographic and communications satellites, by looking for the crater that sometimes forms above the explosion site, or by picking up radioactivity in the atmosphere from gases escaping from the explosion. However, the main technique for monitoring underground nuclear tests is to use seismometers to detect and measure the ground motion produced by such explosions.
The United States maintains a worldwide network of seismic stations to monitor Soviet underground testing. The usual method is to measure the amplitudes of 0.05 Hz waves that propagate around the surface of the earth and 1 Hz sound waves that propagate through the mantle. Underground explosions can be distinguished from earthquakes by a variety of methods, including the depth of the event, the relative amplitudes of the two waves, and their spectra.

The current capabilities of the U.S. network are impressive. The array in Norway, for example, can detect 25-ton explosions at the Soviet test site near Semipalatinsk, 4,000 km away, and routinely detects 10-ton chemical explosions in quarries in the western Soviet Union. Underground explosions anywhere in the Soviet Union with yields near the 150 kt maximum permitted by the TTBT are easily detected by the existing seismic stations outside the USSR.

Verification of the Threshold Test Ban
In order to monitor Soviet compliance with the TTBT, the United States must not only be able to detect any explosion near the 150 kt limit but also be able to estimate its yield with some precision. This requires knowledge of how much of the explosive energy ends up in seismic waves. Over the years U.S. scientists have carefully determined the conversion factor at the Nevada Test Site (NTS). However, the geologies of the Soviet test sites are different from the geology at NTS and therefore require different conversion factors. The appropriate factors can be estimated by various procedures but have not so far been measured directly by Western scientists.

Until recently, the U.S. government used a procedure that gave most likely yields above 150 kt for numerous Soviet tests. This was the basis for the Reagan Administration's charge that the Soviets have violated the TTBT. However, many distinguished seismologists involved in test ban monitoring had long criticized the government's procedure on scientific grounds, claiming that it systematically overestimated the yields of Soviet tests.

Criticism of the government's procedure reached a peak late last year. First a panel of scientists selected by the Defense Advanced Research Projects Agency (DARPA) reported that the government's procedure was based on faulty assumptions and recommended a change that would lower estimated yields. Then a separate study initiated by the Air Force Technical Applications Center, which operates seismic stations to monitor Soviet tests, issued a report agreeing with the DARPA panel. Finally, the Joint Atomic Energy Intelligence Committee recommended that the CIA adopt the scientists' advice.

As a result of these recommendations, last January the CIA finally revised the procedure it uses to estimate the yields of Soviet tests. Applying the new procedure retroactively leaves only three or four of about 200 Soviet tests over the last twelve years with most likely yields large enough to be of concern. Thus, there is now general agreement in the scientific and intelligence communities that Soviet test yields probably have not exceeded the 150 kt limit. Interestingly, ten months later the Administration still has not changed its official position that the Soviets have systematically violated this limit.

Verification of a Comprehensive Ban
What about verification of a low-threshold or comprehensive test ban? Strictly speaking, any monitoring program can only detect tests larger than some threshold at a specified level of confidence. However, if this threshold can be made small enough, there are strong political incentives for establishing a complete ban (see "Nuclear Test Bans: The Policy Issues"). Furthermore, the question of compliance or noncompliance then becomes simpler, since the monitoring program only has to detect militarily significant nuclear explosions without having to provide an accurate estimate of yields.

If it could be assumed that no efforts would be made to muffle the seismic signals, a network of detectors outside the Soviet Union would be able to detect any nuclear test with a yield of 1 kt or more. However, the seismic signals produced by underground explosions can be muffled by setting off the explosion in a large underground cavity (a procedure called cavity decoupling) or in a thick deposit of soft, dry soil.

If a nuclear charge is exploded in a large enough cavity, in theory the amplitude of the 1 Hz sound wave can be reduced by as much as a factor of 100. However, existing cavities are small in number, and their locations are generally known. Creation of new cavities large enough to fully decouple a 10 kt explosion would be all but impossible without being observed, but covert
excavation of smaller cavities that would cause partial decoupling might be possible.

If a nuclear charge is exploded deep in soft, dry soil the amplitude of 1 Hz sound waves can be reduced by a factor of 10. There is disagreement over the availability of layers of soft, dry soil in the Soviet Union deep enough to fully contain explosions larger than a few kilotons (if the explosion is not fully contained, a crater will form above the test site revealing the test to surveillance satellites). Another evasion ploy would be to conduct small nuclear tests during earthquakes. Although the usefulness of a test program constrained in this way is doubtful, some seismologists believe that traditional methods would have difficulty in detecting such explosions.

For these reasons, there is disagreement among seismologists about the kind of seismic network that would be required to detect fully-decoupled 1 kt explosions anywhere in the Soviet Union with high confidence. Some scientists believe this would be possible with 25 single seismic detectors in the USSR. Others believe that as many as 30 seismic arrays of 25 detectors each would be required (the Soviet Union has for many years accepted the need for in-country seismic stations to monitor a comprehensive test ban).

Recent progress in understanding the differences between earthquakes and explosions and new recognition of the possible usefulness of sound waves with frequencies in the range of 5-20 Hz may make it possible to detect small explosions during earthquakes and to completely eliminate decoupling as an issue. First, there is strong evidence that explosions during earthquakes can be picked out much more easily above 5 Hz. Second, U.S. nuclear tests have shown that the amplitudes of 10-50 Hz sound waves are only reduced a factor of 10 by decoupling.

The scientific question not yet fully resolved is whether these high-frequency waves can be picked up at the required distances. This question can be settled soon by more research. It is worth noting that the United States currently invests only a very small fraction of its defense budget on such research. Last year, for example, the Defense Department spent 1,000 times as much on military intelligence programs alone ($16 billion) as for research on test ban verification. (The Arms Control and Disarmament Agency has a total research budget of less than $1 million per year!) Given the importance of this question, adequate support of research to determine the answer should be a high priority.

A dramatic new development occurred last May when the Soviet Union agreed to allow U.S. scientists to set up three seismic stations surrounding the principal Soviet nuclear test site at Semipalatinsk. With this agreement, the Soviet Union demonstrated its willingness to accept in-country monitoring while the United States stands to gain valuable information about this Soviet test site. Even if the Soviets conduct no nuclear tests during the experiment, the seismo-meters will detect earthquakes and quarry explosions in the Soviet Union and nuclear weapon explosions in the United States, providing Western scientists with the first direct measurements of the geologic structure near this test site. At the Reykjavik Summit, the Soviet Union reportedly accepted a phasing-in of further restrictions on nuclear testing and additional verification measures as part of the proposed arms control package.

Conclusion
We have seen that the United States already has impressive capabilities for monitoring test bans and that important improvements in this capability appear possible. Even in the absence of improvements, there is broad agreement within the scientific community that 25-30 seismic stations in the Soviet Union, plus stations outside, would be sufficient to detect all unmuffled explosions larger than 100 tons and fully-decoupled explosions larger than 1 kt. The current strong Soviet interest in a comprehensive test ban presents a special opportunity for concluding an agreement that would meet U.S. verification concerns. Will this chance be missed? Or will nuclear weapon testing at last be ended?

The author, professor of physics and astronomy at the University of Illinois at Urbana-Champaign and a member of the University’s Program on Arms Control, Disarmament, and International Security, is a consultant to the U.S. government on national security and arms control issues. He has just returned from a year as a Fellow at Stanford University’s Center for International Security and Arms Control.
Nuclear Test Bans: The Policy Issues
by JEREMIAH SULLIVAN

The United States, Soviet Union, and other signatories of the 1963 Limited Test Ban Treaty (LTBT) agreed for an unlimited period of time not to conduct nuclear explosions of any type in the atmosphere, in outer space, or underwater. In the preamble to this treaty, signatories proclaimed as a goal the permanent end of nuclear weapon test explosions and pledged their determination to continue negotiations to this end. These commitments were reaffirmed in the preamble of the 1968 Non-Proliferation Treaty (NPT), another multilateral accord binding upon the superpowers.

In spite of these pledges, efforts to reach agreements to restrict underground nuclear explosions have produced limited results. The bilateral Threshold Test Ban Treaty (TTBT) of 1974 and the companion Peaceful Nuclear Explosions Treaty (PNET) of 1976, are the only visible products to date. Together, these treaties restrict underground nuclear explosions for any purpose to individual device yields not to exceed 150 kilotons.

Arguments Pro and Con
Several major factors are behind the limited progress made towards a comprehensive test ban (CTBT) since 1963. Foremost of these is the adversarial relationship between the United States and Soviet Union which often causes unrelated issues to become coupled to nuclear weapon agreements even when this is contrary to the best interests of both countries.

The second major factor is verification. The 1963 talks started with a comprehensive ban as a declared goal, bogged down over verification, and were rescued only when the subject of underground testing was put aside. As discussed earlier, enormous progress has been made in understanding and advancing seismic monitoring capabilities since the signing of the LTBT (see “Nuclear Test Bans: the Verification Issues”). Unfortunately, this progress is often unappreciated or ignored in the public debate. In order to focus on the other issues of the CTBT, the discussion below assumes that adequate verification is feasible.

A third major factor standing in the way of progress on underground nuclear test limitations is the lack of consensus in the United States that partial or complete bans on underground testing are desirable. One can only speculate about the analogous situation in the Soviet Union. Powerful constituencies within and without the U.S. government feel strongly that nuclear weapon testing must continue. The main arguments are: the need to assure stockpile reliability, requirements of nuclear force modernization, the necessity of keeping a body of expert nuclear weapon scientists and engineers intact, the need to conduct nuclear weapon effects tests, and the need to develop new generations of nuclear weapons. Taken together, these seem to be a powerful set of arguments against restrictions on nuclear testing. However, when these arguments are carefully evaluated in the broad context of U.S. security interests and actual experiences of over 40 years of the nuclear arms race, they are far less compelling.

What are the arguments against continued underground nuclear testing? There are two major ones: a discontinuance of nuclear weapon testing would restrain and temper the nuclear arms race between the United States and Soviet Union which has gone on since the 1950s and led to a dangerous world; and an end to testing by nuclear weapon states, especially the U.S. and USSR, would dissuade non-nuclear weapon states from acquiring nuclear weapons. Although these two arguments deal with issues of fundamental and long-term importance, because they are necessarily stated in broad policy terms, they are often taken less seriously than arguments for continued testing, especially when the latter are viewed in a narrow context as is so often the case.

A Critique of Continued Testing
Consider now the arguments presented above against test bans, beginning with the issue of stockpile reliability. Although actual numbers are classified, it is generally agreed that very few of the 20-30 nuclear test explosions the U.S. conducts each year are for stockpile verification. If reliability were a major concern in an era of limited or no testing, weapon designs could be chosen with this in mind. Currently there is no incentive to do this. In addition, a great deal of reliability testing can be done without generating an actual nuclear yield. And if
non-nuclear tests or careful inspection shows that weapon components are deteriorating with time, these components could be remanufactured to original design standards.

Another factor to keep in mind is that deterrence is the stated purpose of U.S. nuclear weapons. It is difficult to believe that a slight decrease in stockpile reliability, should it occur, would have a discernable effect on deterrence, given the latter is intrinsically non-quantifiable, and the nuclear arsenals on both side are so large. The consequences of test ban restrictions are felt by both sides. A mutual decrease in stockpile reliability would lessen fear, without significantly affecting retaliatory capabilities. This would be a stabilizing factor.

Next consider the argument that testing must continue because nuclear forces must be modernized. To assume that new nuclear weapons contribute automatically to a safer world or give some practical military advantage is a fallacy. Two separate, parallel developments need to be distinguished: one in delivery systems and the other in warhead design. The ability to manufacture smaller, more compact nuclear weapons has made it possible to reduce dramatically the size and cost of delivery systems in comparison to the 1950s and early 1960s. At the same time, improvements in accuracy have enabled destructive capabilities to be retained at lower yield values. As components of delivery systems have gotten smaller, warhead numbers have increased dramatically, and arms control measures have become more difficult. In recent years, research and testing has led to increases in the yields of weapons on delivery systems already in the field. A continuation of this trend is undesirable. Especially troubling for arms control are dual-purpose delivery systems such as cruise missiles, which have the same external appearances, whether nuclear or conventionally armed. Of course, an end to testing would not mean an end to the offensive arms race. Even in a CTBT regime modernization programs for delivery systems could still be carried out if existing warhead designs were used.

Keeping a body of nuclear experts intact is a complex issue of motivation and incentives. New accords on underground testing—even a CTBT—would not suddenly throw employees of the weapons laboratories and their supporting contractors out of work. Nuclear weapons would still be with us, and many technical questions would arise. Present trends of using increasingly sophisticated computer simulations for design would probably be accelerated in many areas which now rely upon testing as a matter of tradition, convenience, or economy. The tremendous advantage that the U.S. has over the USSR in computer technology is particularly notable. Finally, it must be remembered that the U.S. has over forty years of nuclear testing experience, and, even if there were a Soviet breakout from a test ban, a new group of technical experts could be rapidly assembled. We are a country where unmatched technological and organizational capabilities can be summoned when real needs exist.

Nuclear weapon effects are difficult to simulate by non-nuclear means and to calculate from first principles because of the special physical regimes involved. However, much more could be done than at present via non-nuclear test simulation if appropriate support were available. And, as already mentioned, computer calculations are destined to play an increased role in nuclear weapon studies anyway, and this is especially true in the effects area. Even today, computer simulations are the only way to study the performance of large components or entire systems which are too big or too expensive to subject to radiation from an underground nuclear test explosion.

Finally, consider the development of new generations of nuclear weapons. Although a number of possibilities have been discussed in the open literature, the X-ray laser is the most frequently mentioned. Under development at the Lawrence Livermore National Laboratory, the X-ray laser has been widely heralded as an effective anti-ballistic missile weapon and is an element of the SDI program funded by the Department of Energy. Even if this type of laser can someday be developed to the brightness levels required to destroy enemy ballistic missiles, countermeasures have already been identified which make the usefulness of the X-ray laser as an anti-ballistic missile weapon highly unlikely. Assuming that these and the many other obstacles facing the defense designer are somehow overcome, could the U.S. ever depend on a device which had never been tested in its operational environment? And, if not, would the U.S. want to abrogate the LITB in order to conduct nuclear test
explosions in space? The X-ray laser does not seem to offer a compelling reason to continue nuclear testing.

Advantages of a CTBT
What about arguments in favor of test bans? They have been persuasive to all U.S. administrations up to the present. The first argument, cited above, that an end to nuclear testing by the superpowers would put restraints on the arms race, is supportable on both practical and symbolic grounds. Without the certain opportunity to develop and test new warheads to extract an extra few percent of yield out of the available volume or lift capability of a missile or airplane, strategic force planners are much more likely to accept present systems and limitations on the introduction of new types of delivery systems. When the offensive nuclear forces of the enemy are better known, worst-case analyses are restrained. Subsequent measures to reduce or limit offensive nuclear arms would be correspondingly enhanced.

The second main argument cited above in support of test bans, discouragement of nuclear proliferation, has been the cornerstone of U.S. policy since the NPT was signed in 1968. The Soviets have been especially cooperative in helping to prevent the spread of nuclear weapons to other countries. The non-nuclear signatories to the NPT have been uniformly critical of the nuclear weapon states for failing to live up to a pledge made in signing the treaty, namely that all nuclear weapon testing would be ended. Many nations have stated repeatedly that they feel continued testing threatens the future of the treaty. While it may be doubted that these claims can be supported by real security needs, continued testing by the U.S., USSR, and other weapon states provides a convenient excuse for holdout states to refuse to sign the NPT and for non-nuclear signatories to withdraw. The claim made by the Reagan administration in the past year that, if the U.S. discontinued testing, its non-nuclear allies would lose confidence in our nuclear deterrent and be forced to adopt nuclear weapons programs of their own, is totally unsupported by any statements from these allies.

Conclusion
A policy decision to seek limitations on underground testing, especially a comprehensive ban, cannot be said to have no risk or uncertainty. However, in assessing the merits of test bans, the risks and uncertainties of the present course of the nuclear arms race must not be forgotten. Nuclear weapons have made this a more dangerous world, even if they have made certain forms of deterrence cheap. The present course is manifestly one of high risk. Measures to reduce and eventually eliminate underground testing can lessen these risks.

Recently the administration accepted the principle that nuclear weapons testing could someday be stopped but stated that this would be the case only after nuclear weapons themselves had been eliminated. It seems more likely that the opposite is true. Namely, a cessation of nuclear weapon testing is a necessary first step.

Many technical developments, especially in the field of seismology, indicate that substantial improvements in verification are possible, that much can be learned quickly from a well-supported research program, and that cooperative efforts with the Soviets can work (see “Nuclear Test Bans: the Verification Issues”). Although the jump to a comprehensive test ban treaty cannot be taken in one step, the time seems ripe to resume efforts in that direction. In October, the Reagan administration agreed to submit the TTBT and PNET, with certain qualifications about verification, to the Senate for ratification. A major national debate on underground testing appears to be in the offing and could be the springboard for a reversal in the nuclear arms race. Progress toward eliminating nuclear testing would be a magnificent statement heard around the world.

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Did the Bishops Ban the Bomb?

by JEFF McMAHAN

In the mainstream debate about nuclear weapons in the U.S., two documents stand virtually alone in calling into serious question the moral legitimacy of nuclear deterrence. These are the Pastoral Letter of the American Catholic bishops and the Foundation Document of the Methodist Council of Bishops. Both are quite radical documents which challenge the prevailing wisdom about nuclear weapons in a number of important ways. Indeed, in probing beyond and eventually expanding the frontiers of "respectable" opinion about nuclear weapons policy, the authors of these reports have exposed themselves to considerable criticism from various high priests of the cult of deterrence, who naturally bridle when the fundamental postulates and dogmas of their cosmology are skeptically inspected from an alternative perspective. In thus defying received opinion the bishops of both churches are to be commended for their integrity and moral courage. But there is a point at which the courage of each group of bishops apparently fails. For both express their approval of the continued possession of nuclear weapons by the U.S. on an interim basis. But I will argue that this approval is incompatible with the logic of their own arguments.

Consider first the position of the Catholic bishops. They argue that most uses of nuclear weapons are ruled out as impermissible by the just war criteria of discrimination (which requires that noncombatants not be an intended target of attack) and proportionality (which insists that an act of war must not do more harm than good). They then note that U.S. war plans almost certainly include intended uses of nuclear weapons that would be indiscriminate or disproportionate or both. Finally, they declare, presumably on the basis of the principle that it is wrong to intend to do that which it would be wrong to do, that "no use of nuclear weapons which would violate the principles of discrimination or proportionality may be intended in a strategy of deterrence." What these claims together seem to imply is that deterrence as practiced by the U.S. is ruled out as impermissible.

Yet the bishops dutifully follow the Pope in granting conditional acceptance to the U.S.'s policy of deterrence. Is there any way that this acceptance can be reconciled with their earlier arguments? Since they leave open the possibility that there are some uses of nuclear weapons that would be both discriminate and proportionate, they might argue that a policy of deterrence based on a conditional intention to use nuclear weapons in only those ways is morally acceptable. But the problem with this suggestion is that the policy it supports is merely hypothetical, since the bishops themselves provide sufficient evidence to show that U.S. strategy depends crucially on a targeting policy that would violate just war requirements.

Another possibility is that the prohibition on using nuclear weapons in indiscriminate or disproportionate ways is not to be regarded as absolute. Then the prohibition on intention would not be absolute either and might therefore be overridden by considerations of consequences. In other words, having a deterrent policy based on a conditional intention to use nuclear weapons in prima facie wrongful ways would itself be prima facie wrong but might nevertheless be permissible if the consequences of not having it would be dire. This suggestion is, however, ruled out by the fact that the bishops, following a venerable Catholic tradition, explicitly assert that the requirements of discrimination and proportionality are absolutely binding.

A third and final possibility is that, while the prohibition on using nuclear weapons in wrongful ways is absolute, the prohibition on intending to use them in these ways is not, so that it might be permissible to have a policy of deterrence based on a threat and a conditional intention to do what it is absolutely forbidden actually to do. There are, however, three objections to this proposal. First, given the connection between intention and action, it's not clear that it's coherent to suppose it could be permissible to intend to do what it could never be permissible to do. Second, if the prohibition on intention is to be overridden there must be decisive reasons for thinking that the consequences of abandoning deterrence would be very much worse than the consequences of continuing to practice it. Yet, while the bishops discuss at length the risks of deterrence, they never compare these risks to those of unilateral nuclear disarmament.
Thus they provide no reason for overriding the presumption they have established against deterrence. Finally, and most importantly, the bishops themselves reject the idea that it may be permissible to adopt a policy which involves wrongdoing in order to promote good consequences: “In moral means can never be justified by the end sought; no objective, however worthy... in itself, can justify sinful acts or policies.”

The Catholic bishops’ conclusion that deterrence as practiced by the U.S. is conditionally acceptable is, then, incompatible with their own moral arguments. What about the Methodist bishops? They, unlike their Catholic counterparts, condemn not only all uses of nuclear weapons but also the practice of nuclear deterrence itself. They have a great many plausible objections to deterrence: that what it threatens is impermissible, that it imposes risks on innocent third parties (indeed, risks the extermination of all human life), squanders resources in a world of poverty, perpetuates mistrust and hostility, undermines democracy, and so on. And they point out that the conditions which the Catholic bishops contend could justify a temporary deterrent policy are not being met. Yet, as the passage quoted in the margin indicates, they do not infer from this that there is a moral imperative to abandon nuclear weapons unilaterally.

Their reasoning here is obscure. If nuclear weapons aren’t intended to serve a deterrent function in the interim, what’s the reason for keeping them? Are they to be retained as “bargaining chips” to coerce the Soviet Union and others to disarm with us? That hardly seems a likely dictate of an “ethic of reciprocity.” More generally, how would retaining our nuclear weapons help to realize a vision of common security, promote mutual trust, or serve the function of positive peacemaking? Why wouldn’t unilateral nuclear disarmament serve those goals?

The bishops write that “neither the U.S. nor any other nuclear power can extricate itself unilaterally from all nuclear perils. Indeed, immediate and total nuclear disarmament by the U.S. might well tempt other countries to develop or expand their own nuclear arsenals, thereby increasing the risk of nuclear war.” These points, while true, would count against unilateral nuclear disarmament only if the probability of nuclear war would be greater if the U.S. disarmed unilaterally than if the U.S. retained nuclear weapons. And even if that were true (which seems highly unlikely), that wouldn’t necessarily justify the retention of nuclear weapons, since the purpose of retaining them would then be to maintain deterrence in order to reassure other countries, an option which the bishops have already rejected.

In short, it would seem that, while the bishops have given good reasons for abandoning nuclear deterrence, they have given no persuasive reasons for retaining nuclear weapons even on an interim basis. Thus the logic of their own argument seems to commit them to a policy of unilateral nuclear disarmament.

The Catholic and Methodist bishops have evidently been reluctant to embrace the conclusions that I have claimed are entailed by their arguments. If I am right, then there are only two ways in which they can achieve consistency. They can either revise their arguments or else summon up the courage to denounce deterrence and the continued possession of nuclear weapons by the United States.

The author has just joined the Department of Philosophy of the University of Illinois at Urbana-Champaign as an assistant professor and is a member of the Program in Arms Control, Disarmament, and International Security. His preceding three years were spent as a Research Fellow at St. John’s College, Cambridge University. He is the author of Reagan and the World: Imperial Policy in the New Cold War (Monthly Review Press, 1985) and of various works in moral philosophy, including several articles and a monograph on the ethics of nuclear deterrence.
ACTIVITIES OF THE SECTIONS

New this year in ACDIS is the Ethical Studies Group which brings together faculty and students interested in humanitarian, ethical, and legal issues of nuclear weapons, arms control, and international security. Co-chairs of the group are Francis Boyle, College of Law, and David Goodman, Center for East Asian and Pacific Studies.

The group meets approximately once a month in a seminar format and features presentations by faculty members at UIUC as well as outside speakers. Plans of the group include the development of seminars and courses at the undergraduate and graduate levels. Interested individuals should contact Professor Boyle, 333-7954; Professor Goodman, 333-3249; or the ACDIS office, 333-7086.

The War in History Unit, chaired by John Lynn from the Department of History, provides a home for three separate projects. The first is the “University Seminar on War in History,” which assembles scholars from several departments on campus to discuss subjects of common interest, to present their own research, and to host visiting scholars.

The second project is a major conference, “Tools of War: the Technology and Concepts of Warfare in the West, 1500-1865” will be held on the campus 1-4 April 1987. Keynote speaker at the conference will be Sir Michael Howard, Regius Professor of Modern History at Oxford. Invited papers from the conference will be published by the University of Illinois Press in a volume edited by conference organizer Lynn.

The third project is the establishment of a regional organization, “The Midwest Consortium on Military History.” The April conference will also serve as organizational forum for the consortium. Once in operation, the consortium will have as its primary role the sponsoring of conferences in the midwest.

The above activities all tie into the recent creation of a formal graduate program in military history within the Department of History at Illinois. Two new faculty members, Geoffrey Parker and Mark Leff, have been added to the department in support of the program. ACDIS is using its MacArthur Foundation award to fund, on a one-time basis, two $9,000 fellowships for beginning graduate students in the new program. For further information about the War in History Unit, contact Professor Lynn, 333-6885, or the ACDIS office.

The South Asian Arms Control and Security Project was the first section of ACDIS to be formally established. Its activities, supported by a grant from the Ford Foundation, have included international conferences at Illinois and an extensive visitors’ program. Marvin Weinbaum from the Department of Political Science is acting director of the project until the return of regular director, Stephen Cohen, Department of Political Science, in the fall of 1987. Cohen is serving a two-year appointment on the Policy Planning Staff of the United States Department of State. Interested individuals should contact Professor Weinbaum, 333-0796, or the ACDIS office.

The Science and Technology Group of ACDIS provides a forum for faculty and students in the sciences and engineering. The group, still in a formative stage, arranges occasional seminars addressing technical issues important to national security and arms control. Another purpose of the group is supporting and encouraging the development of courses for students in engineering and science. Individuals should contact the chair of the group, Jeremiah Sullivan, 333-1689 (a.m.) or 244-0219 (p.m.).

The Project on European Arms Control and Security was recently established to enhance teaching and research dealing with the special problems of European security and to give ongoing efforts at Illinois greater focus and visibility. Project director, Edward Kolodziej, former director of ACDIS, will be spending the next two semesters on leave at several major European security centers. In Professor Kolodziej’s absence, information about the project can be obtained from Roger Kanet, Department of Political Science, 333-5880, or the ACDIS office.
COURSE DEVELOPMENT

The Unit for Curriculum Development, chaired by Robert Crawford, Department of History, provides coordination and support for the development of new courses within regular departments. Support, made possible by a MacArthur Foundation Grant, has primarily been in the form of summer course development awards to campus faculty. The following awards were granted in summer, 1986:

- Robert McKim, Religious Studies 125: War, Religion, and Society
- Mahir Saul, an anthropology course: Military Expenditure, Social Structure, and Development in Africa
- Steven Seitz and Roger Kanet, a computer-based political science course: Superpower Conflict Decision Making
- Elke Weber, a psychology course: Human Perception, Judgment, and Decision Making in the Arms Control Process

Other courses under development with support from ACDIS include the following:

- Quantitative Approaches for the Empirical Study of Arms Control and International Security, Arun Elhance, Department of Geography
- The Third World and International Security Affairs, Edward Kolodziej, Department of Political Science
- Business Policy, Law, and National Security, John Kindt, Department of Business Administration
- Applications of Modern Technology to National Security and Arms Control, Jeremiah Sullivan, College of Engineering
- The Ethics of Nuclear Deterrence, Jeff McMahen, Department of Philosophy
- War and Twentieth-Century American Society, Mark Leff, Department of History

The deadline for applications for the 1987 ACDIS summer course development grant program is 1 April. Interested faculty should contact the ACDIS office, 333-7086, for further information.

SCHOLAR IN RESIDENCE

Major Charles Meyer of the United States Air Force is in residence at ACDIS for the 1986-87 academic year. His stay at Illinois is supported by the Air Force Research Associates Program. Prior to coming to Illinois, Meyer served for three years as the assistant air attaché at the U.S. Embassy in Stockholm.

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