Arms Control: U.S., Soviets Revive Threshold Test Ban Talks

With the Nixon-Brezhnev summit meeting in Moscow tentatively set for the end of June, and with prospects for a major new agreement from the Strategic Arms Limitation Talks still dim, U.S. and Soviet officials have fallen back instead to talking about broadening the 10-year-old Limited Test Ban treaty to include a partial ban on underground nuclear explosions. Arms control analysts tend to believe such a step will have minor but not inconsequential effects on strategic balances of power.

In mid-March, independent arms control observers in Washington were speculating hopefully that the Administration might agree to extend the Limited Test Ban to underground explosions (the treaty now prohibits tests in the atmosphere, undersea, and in outer space) as a kind of "hip-pocket" alternative to no arms agreement from the summit at all. The speculation proved well founded. In late April, Administration officials confirmed that preliminary talks had taken place between Secretary of State Henry Kissinger and Soviet Foreign Minister Andrei A. Gromyko toward a "threshold" test ban, one that would prohibit underground explosions above a particular magnitude. A second option said to have been considered, at least within the Administration, is a "quota ban" under which each side would be limited to a specific and possibly declining number of tests each year.

Both the threshold and quota concepts have been debated inconclusively in bilateral and multilateral disarmament talks off and on since the late 1950's. Arms control experts familiar with these discussions say that the most compelling argument for a broadened test ban agreement these days is that it might have a salutary psychological effect on other, more momentous arms talks, and that it might give the two superpowers added moral leverage in selling the Non-Proliferation Treaty to holdout nations, especially those like Japan that have signed but not ratified the treaty.

At the same time, though, there seems to be general agreement that a partial underground test ban—or even the comprehensive ban the United States and Soviet Union have professed to seek since the late 1950's—is unlikely to affect materially the pace of development or deployment of strategic arms. "It'll make a nice summer splash," one arms authority, a former high official in the first Nixon Administration, says of the threshold ban. "But I have a little trouble seeing where it would make a great deal of difference."

Almost 11 years have passed since the United States, the Soviet Union, and Great Britain signed the Limited Test Ban treaty at Moscow in August 1963. The expectation then was that it would soon be extended to a comprehensive ban on nuclear weapons explosions. But that was not to be. In the ensuing decade, while test ban talks remained deadlocked, the United States spent more than $3.5 billion to conduct, according to the Atomic Energy Commission's public count, 255 underground nuclear tests. The Soviet Union in the same period is known to have detonated at least 90 underground explosions.*

Nuclear tests serve several functions. Some are for basic studies of weapons physics. Others are used to test the effects of blast and radiation on military equipment ranging from communications satellites to nuclear warheads themselves. Still other tests are for purposes of sampling the stockpile, and some tests serve all three purposes.

But the majority—65 percent, according to the Pentagon—have been devoted to weapons development. Among the new weapons developed since 1963 are a family of compact and ultrasophisticated explosives ranging from a 5-megaton Spartan antiballistic missile (ABM) warhead that produces an intense burst of gamma rays to a group of controversial "neutron-enhanced" devices of subkiloton power destined for tactical deployment in Western Europe.

* Actual numbers of tests conducted by both sides are higher although U.S. officials say this country's program has been about two and a half times more active than the Soviet effort. Precise test counts are classified as military secrets in part, apparently, to deprive other nations of an accurate measure of U.S. (and their own) detection capabilities.

As the development of these devices proceeded, the concept of a threshold ban was periodically floated in arms talks as a means of getting around the perennial sticking point—verification of a comprehensive test ban. The Soviets have always maintained that "national" means of verification (such as seismic detection, satellite photography, and electronic eavesdropping) were entirely adequate to monitor adherence to a comprehensive ban. The United States, officially at least, steadfastly disagreed, insisting instead on privileges of on-site inspection of suspicious activity. By prohibiting only those tests large enough to be unambiguously identified by national means, a threshold ban might have broken this impasse.

Over the years, support for the idea came mainly from nonnuclear nations like Canada, Japan, and Sweden, whose governments worried about the potential dangers of earthquakes and accidental ventings of radioactive gas from multimegaton blasts being touched off near their borders. The threshold ban also gained adherents within the Johnson Administration during the mid-1960's. It seemed to some experts then that a partial underground ban might restrain development of new and destabilizing strategic weapons, especially the ABM and MIRV, the multiple independent reentry vehicle.

The Soviet Union, for its part, repeatedly expressed willingness from 1963 to 1971 to accept a threshold ban combined with a moratorium on subthreshold tests—a position the United States just as consistently found unacceptable. (The Soviet Union abandoned this position in 1971 as part of an apparently general hardening of attitude against further restrictions on testing.) Over all this time, the official U.S. attitude in disarmament talks was that a threshold or quota ban constituted "half measures" that were not worth taking.

Perhaps ironically, most of the threshold concept's original adherents now seem inclined to agree. One reason, of course, is that MIRV and ABM escaped from the drawing board to become realities, although the latter is controlled by the interim SALT agreement of May 1972. Furthermore, multimegaton missile warheads are becoming obsolete (at least in the United States) while the military significance of explosives with much smaller yields—small enough to slip under any probable threshold—has greatly increased. For these reasons the threshold

ban is widely thought of, in the phrase of the Arms Control Association's Thomas Halsted, as "an idea whose time has passed."

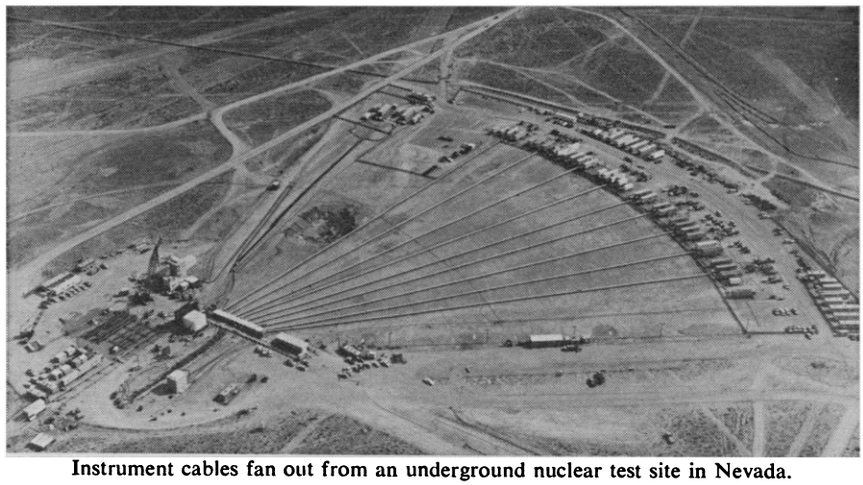
Shopworn as it may be, the threshold ban is also one of the few rabbits in the arms control hat at a time when President Nixon and Chairman Brezhnev are at pains to show that the magic of détente still works. In this respect, the diplomatic circumstances today are remarkably similar to those preceding the Moscow treaty 11 years ago.

In late October 1962, as the Cuban missile confrontation wound down, President Kennedy and Chairman Khrushchev exchanged a series of conciliatory messages in which they sought to restore a damaged détente. ("The world now is agitated and expects reasonable actions from us," Khrushchev wrote on 27 October.) A renewed effort to ban nuclear testing, they agreed, would be an appropriate first step toward reconciliation.

Initially the two sides sought a comprehensive ban, but by early 1963 negotiations had grounded on the familiar reef of on-site inspection: The Soviets consented to 2 or 3 inspections a year (an offer later withdrawn), and the United States dropped its minimum demand from 12 a year to 7. From those positions neither side would budge.

In July 1963, however, two frenzied weeks of talks in Moscow, led on the U.S. side by W. Averell Harriman and on the Soviet side by Andrei Gromyko, produced a compromise agreement. The verification problem was neatly excised by banning weapons tests everywhere but underground, where anything of any size was to be allowed. Now, 11 years later, high-level negotiations have resumed with Gromyko, this time in the aftermath of a confrontation that grew out of last October's Arab-Israeli war.

Other pressures to conclude an agreement, apart from concern for détente, are also at work. For one, the Non-Proliferation Treaty comes up for study by an international review conference next April. Last summer, Philip J. Farley, then acting director of the State Department's Arms Control and Disarmament Agency, told the Senate arms control subcommittee that the Administration regarded this review meeting as something of a deadline in moving toward a comprehensive test ban. As of early this year, 105 nations had signed the treaty, and 83 of those had ratified it. But among the 39 holdouts who haven't signed are leading candidates for the nuclear club,



Instrument cables fan out from an underground nuclear test site in Nevada.

including India, where government officials make occasionally boastful noises about detonating a "peace bomb," perhaps before the next election.

In addition, some analysts believe the Administration may have concluded that a threshold test ban is about as far as the Soviet Union is willing to go, so long as the People's Republic of China maintains an active testing program. (Senator Edward M. Kennedy has been expressing a contrary view lately. Following recent talks with Soviet leaders, Kennedy says he believes they are ready to negotiate a comprehensive test ban. A resolution urging President Nixon to propose such a ban, co-sponsored by 36 senators, is awaiting floor action.)

However compelling the incentives to conclude an agreement may be, some arms control authorities are skeptical that there is time enough to finish the job between now and the end of June. A likelier result of the summit, they say, might be a draft treaty for consideration in multilateral European arms talks next year at Geneva, or perhaps a declaration of intent to produce such an agreement.

In any case, several sticky questions will have to be resolved at a technical level: How to define a threshold; where to set it; and how to avoid, or deal with, disputes over explosions that seem to violate the threshold.

If past proposals are any guide, the threshold, provided that it is adopted, would be stated in terms of Richter magnitude, there being no technique for remote measurement of explosive yield. If the threshold is keyed to the best available seismic detection technology, it would come out at a magnitude of about 4.0. Herbert Scoville, Jr., a former assistant director for science and technology of the arms control agency, has written that seismic systems are capable of distinguishing between earthquakes and explosions at this level "or possibly even lower." This corresponds to a blast of 1.5 kilotons in hard rock or about 12 kilotons in dry alluvium, which tends to muffle the explosion.

From a lower limit set by seismic technology, the threshold may be moved upward by political considerations—as much within governments as between them. The Pentagon and the AEC would probably prefer a cutoff of 20 kilotons or higher if forced to accept any threshold at all, and 50 to 100 kilotons has been bruited about; support of the military and the weapons laboratories counts for a lot in Senate consideration of any arms control agreement.

At a 20-kiloton cutoff, and even at 10 kilotons, the degree of restriction on weapons testing would seem relatively modest for the United States, though slightly more severe for the Soviet Union. According to figures gathered by the Stockholm International Peace Research Institute, well over half of U.S. explosions from 1963 through 1971 were 20 kilotons or less; a similar portion of Soviet tests was larger than 20 kilotons.

A threshold would discourage full-scale proof testing and deployment (but not partial development) of large new strategic warheads. And it might impede development of a new generation of laser-triggered "pure fusion" weapons, whose practicality is by no means certain.

On the other hand, development and testing of tactical nuclear weapons would continue unhampered, and so would work on exotic new strategic warheads. The Sprint ABM for instance, already carries a warhead of

only a few kilotons for "killing" enemy warheads at close range within the atmosphere. The accuracy of the Spartan ABM, designed for nuclear duels above the atmosphere, is being refined, and as its "miss-distance" declines from a few tens of kilometers, a much smaller warhead may suffice.

Weapons effects work would also continue, although possibly at some disadvantage; the radiation profile of small-yield devices generally is not the same as from large devices. Similarly, stockpile-sampling could also continue, although large thermonuclear weapons could not be fired at their full yield. While the military may find this unsettling, arms control advocates contend that any uncertainties in the reliability of the deterrent force tend to discourage thinking about preemptive "first strikes." Uncertainties felt equally by both sides are viewed as stabilizing.

Plowshare-type explosions for peaceful purposes, however, may be a source of problems. Most of the devices developed in the United States run 30 kilotons or more, and the Soviets' presumably are no smaller. Scoville, among others, notes that a plowshare program could be used as a cover for weapons work. Whether such work would significantly affect the U.S.–Soviet balance of power is a matter of disagreement.

Whatever the final form of the agreement now under study, it seems certain that nuclear testing will continue—fettered but not hog-tied.

Ironically, the United States and the Soviet Union came this far once before, only to fail. In the spring of 1960 only minor differences on a threshold test ban remained for the upcoming summit in Moscow that May. But the summit and the treaty went down in flames that spring, along with one of those troublesome "national means of verification," the U-2 aircraft piloted by Francis Gary Powers. Fourteen years later, the two governments appear ready to try again.

—ROBERT GILLETTE

Antarctica: World Hunger for Oil Spurs Security Council Review

A little-known government decision-making body, the Antarctic Policy Group, which is part of the White House's National Security Council (NSC) apparatus, is considering possible revisions in the historic 12-nation Antarctic Treaty in anticipation of the day when oil, gas, and minerals begin to be extracted from that continent. The review could result in the first major change in U.S. Antarctic policy in more than a decade.

Both the U.S. government and other nations that are party to the treaty are looking at this issue in preparation for negotiating possible changes in it at a forthcoming meeting in Oslo, Norway, next April. At the last biennial meeting of the treaty nations, one of them, New Zealand, proposed that the resource question be taken up. A unanimous vote of the 12 is needed to change the treaty.*

The Antarctic Treaty is something of an international benchmark. It bans emplacement of weapons and military activities in Antarctica; it requires free exchange of all scientific information gleaned about the continent. It has, in effect, reserved the continent and its surrounding waters for the twin purposes of scientific research and environmental preservation since it came into force in 1961.

But the treaty neither permits nor bans exploration for oil and minerals there. Officials are fearful that, if some preparation is not made, exploration for oil or minerals could lead to international conflict in this heretofore peaceable continent. At the moment, the treaty makes no mention of nonliving resource exploration and exploitation—although it facilitates preservation of the living resources, such as the seals, found in Antarctica. Hence, no one knows whether individual countries, or some international body, has the authority to issue licenses or resolve disputes over nonliving resources. At present any company that launched operations there would be working in a complete legal vacuum.

Another unresolved problem is that 7 of the 12 treaty nations have at some time or other made territorial claims in the Antarctic;† three of these claims overlap in one possibly mineral-rich region, the Antarctic Peninsula. A valuable sudden oil or mineral discovery could lead these countries to reassert their territorial claims. And, since the treaty explicitly holds all such claims in abeyance, such an assertion would weaken it drastically and open the door to international conflict over claims.

Herman Pollack, assistant secretary of state for international scientific and technological affairs, who heads the Antarctic Policy Group and the current review, is worried that these things may actually happen. "This is one treaty people haven't violated," he said. "We are considering what kind of proposal we would make as to how these parties would manage exploration and exploitation."

So far, no major oil or mining company has expressed serious interest in shoving off to the South Pole in search of greater wealth, although rumor has it that a nontreaty nation, Brazil, is interested in the possibility. However, no major find of these exploitable resources has yet been made, although a great number of commercially valuable minerals and fuels, from gold and diamonds to oil, are believed to exist there.

The technical problems of resource exploration and exploitation in Antarctica's harsh and dangerous environment are many. Nonetheless, scientists predict that technology for offshore drilling in the stormy, iceberg-ridden Antarctic waters and possibly for commercial mining could be available before a decade is over. After all, increased demand for new oil, at least, has spurred drilling in other unlikely places. Mortimer Turner, a veteran Antarctic geologist

* Parties to the treaty are Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, the Soviet Union, the United Kingdom, and the United States. Five other states have acceded to the treaty since it came into force in 1961.

† Australia, Argentina, Chile, France, New Zealand, Norway, and the United Kingdom have cut up Antarctica into pie-shaped pieces. The Argentine, Chilean, and British claims all overlap in an area including the Antarctic Peninsula, which is south of Cape Horn.