

Arms Control Report Card— Nuclear Treaty: Fatal Flaw . . .

More than a year after President Nixon and Communist Party leader Brezhnev signed a threshold nuclear test ban treaty in Moscow, the agreement looks more and more like a dead letter. Widely vilified by nongovernment arms control analysts as a “sham,” the treaty, which would limit nuclear weapons tests to 150 kilotons and below starting next 31 March, has not yet been submitted to the Senate for ratification and it may never be.

The latest expressions of pessimism about the treaty's future come from a new report on arms control issues published by the congressional Joint Committee on Atomic Energy. According to the report, the treaty is being held up by the continuing inability of U.S. and Soviet negotiators to conclude a separate but related agreement covering so-called “peaceful nuclear explosives,” or PNE's, which are exempted from the Moscow treaty signed on 3 July 1974. A number of American arms control specialists have argued that this exemption constitutes a fatal flaw in the treaty because weapons tests could be carried out under the guise of PNE tests. Unless PNE's are to be limited to 150 kilotons as well, U.S. negotiators want some unambiguous way of verifying the peaceful nature of such tests, preferably by on-site inspection. Historically, the Soviets have resisted on-site inspections (although on occasion they have indicated willingness to allow limited inspections). At the same time, some Soviet plans for PNE's call for explosions larger than 150 kilotons.

According to the Joint Committee report, the White House has promised not to submit the threshold treaty for ratification until the Soviet Union agrees to extend its coverage to peaceful explosives as well as weapons—a logical move, as the Senate would otherwise almost surely reject the treaty. But the Soviets seem no more likely to back down than the Senate. “The negotiations with the U.S.S.R. to close the PNE loophole are very difficult,” the Joint Committee report says. “This raises some doubt about whether or when the treaty will be submitted to the Senate for ratification.”

Soviet scientists and engineers have

long been among the world's leading enthusiasts of nuclear explosions for civil purposes. One much discussed proposal, for example, calls for digging a 75-mile canal between the northward-flowing Pechora River and the southward-flowing Volga. The canal would divert water now bound for the Arctic Ocean to the Caspian Sea, where a declining water level (due in part to dams along the Volga) has damaged Caspian fisheries and other elements of the coastal economy. Almost half of the proposed canal route goes through hard rock formations that Soviet engineers believe can be blasted with nuclear explosives at approximately one-third the cost of conventional excavation methods.

Recently, a few cracks have appeared in the once-monolithic Soviet position that PNE's were an unmitigated boon to mankind, although official policy seems to remain unaltered. Perhaps noticing the waning of American enthusiasm for such things, several individual Soviet scientists and at least one institute have in recent months expressed reservations about the usefulness of PNE's. In July for instance, at a disarmament meeting in Moscow sponsored by the Soviet-oriented World Federation of Scientific Workers, Soviet delegates—in what some Americans present regarded as a significant move—proposed a resolution reading in part that “a further exploration of the usefulness of these explosives was thought desirable by some participants.”

The resolution reflected a debate currently under way in Moscow on the worth of peaceful nuclear explosives. This disagreement, however, seems not to have penetrated to policy circles, and the stalemate over the threshold treaty negotiations seems to have moved no closer to resolution now than it was a year ago.

In the meantime, both sides have blithely ignored an instruction in the Nixon-Brezhnev agreement of last year to hold nuclear testing to an unspecified “minimum.” Both sides have instead stepped up testing of biggest new weapons. In the past year, the Energy Research and Development Administration has reported three Soviet explosions of a megaton or more, and ERDA has announced its own detonation of three tests in the 200-kiloton to 1-megaton range.—R.G.

. . . Biological Warfare: Unexpectedly Good . . .

The army's biological warfare scientists at Fort Detrick, Maryland, labored for many years to enhance the unpleasantness of microorganisms noxious to man. They are said to have had little success by the time that offensive biological warfare was renounced by President Nixon in November 1969. The newly developed art of creating recombinant DNA molecules with restriction enzymes affords an obvious means of succeeding where Fort Detrick failed. The technique renders conceivable a Frankensteinian microbiology in which it would be possible, for example, to equip the human gut commensal *Escherichia coli* with the genes for botulinum toxin.

It is fortunate that the potential of recombinant DNA technology in warfare seems unlikely to be realized, at least in the United States. The Biological Warfare Convention, which came into force this March, prohibits the development of microbial agents “that have no justification for prophylactic, protective, or other peaceful purposes.” Asked if the recombinant DNA technique fell under this ban, the Arms Control and Disarmament Agency (ACDA) has ruled that it does. In a letter to David Baltimore of MIT, a member of the organizing committee of the Asilomar conference on recombinant DNA, ACDA general counsel James L. Malone says that the convention “prohibits not only existing means of biological and toxin warfare but also any that might come into existence in the future.” ACDA originally gave this answer to the Senate Foreign Relations Committee when asked if the convention covered yet-to-be developed techniques such as gene modification.

The United States renounced biological warfare, and signed the convention, because biological weapons were considered at the time to make such poor weapons. It is probably to the good that the recombinant DNA techniques have only now become available. The U.S.S.R. and Britain are also signatories of the convention.

The convention permits the development of microbial agents for purposes of prophylaxis. Signatories would seem to have the right to use re-

combinant DNA and other techniques to develop vaccines against the biological agents of an aggressor. But a Defense Department spokesman says that the department is definitely doing no work with the recombinant DNA technique. Military scientists are expected to adhere to the guidelines drawn up by the Asilomar conference. "If when we review their programs we believe they are violating the guidelines, then we would say 'That is it, fellows, you knock it off,'" the Pentagon spokesman adds.

The Asilomar conference eschewed discussion of biological warfare for lack of time. But an almost unanimous vote of assent was given to the proposition that "there is a class of experiments which should not be done at all, irrespective of the type of containment that we have available today." The experiments referred to were the so-called Class VI experiments which involve dangerous human pathogens and which would presumably include most manipulations of military interest.

—N.W.

... Environmental Warfare: Needs More Work

Following through on a July 1974 joint pledge to seek a global ban on environmental warfare, the United States and the Soviet Union last week proposed identical texts of such a treaty. The treaty would prohibit large-scale military activities such as the herbicide spray program which was conducted by the United States during the Vietnam war.

At the moment it is unknown to what extent the treaty will place tight controls on environmental modification activities now in existence, such as weather modification. One clear aim of the treaty, however, is to ban other techniques still in the distant future, such as man-made tsunamis, earthquakes, and deliberate manipulations of the ozone layer.

The treaty language is ambiguous on some key points. Nations pledge not to modify the environment for military or "other hostile" uses. But since many environmental modifications are inadvertent or result from "peaceful" activities, under the treaty a nation could say

it intended no harm, yet still carry out environmental manipulations which adversely affected other countries.

Moreover, the ban extends only to "environmental modification techniques having widespread, long-lasting, or severe effects," a criterion which may not cover attempts at small-scale destruction, such as the localized "fire storms" which the United States tried three times to start in South Vietnam (*Science*, 21 July 1972).

As for herbicides, most U.S. government experts interpret the treaty as clearly banning military "first use" of herbicides in war, since it bars "deliberate manipulation of environmental processes" including the earth's "biota." The United States has already renounced military first use of herbicides in a national policy enunciated by the Administration last year as part of a compromise with Congress which enabled final ratification of the 1925 Geneva Protocol (*Science*, 17 January 1975).

U.S. officials say that the treaty covers "effects imposed on thousands of square kilometers," and hence that it probably also covers the covert, U.S. 7-year program of rainmaking over Southeast Asia. More exact definitions of what is and is not banned will be discussed at the 31-nation Conference of the Committee on Disarmament in the coming year before the treaty will be open for signature.—D.S.

Kissinger Speaks on Law of Sea

Secretary of State Henry Kissinger uttered his first speech about the Law of the Sea Conference to the American Bar Association on 11 August. But the Secretary added little that was new to the United States position there—perhaps to the disappointment of some observers who had hoped that once Kissinger got around to studying the parley and its problems, he would propose some creative contributions. The sea law meeting finished its second session in Geneva last spring and will convene again in New York next year. Its aim is to draw up a single, global treaty governing maritime activities from environmental preservation to fishing rights.

There was some news, however. Kissinger offered a counter to Capitol Hill critics of the sea law negotiations who want the United States unilaterally to extend its fishing rights out to 200 miles from shore. But Kissinger announced that the United States, in the interim period before a sea law treaty is concluded, will seek new bilateral agreements with other fishing nations to sort out disputes over catch limits and methods and conservation of stocks. He urged other nations to do likewise.

Prompted by maritime interests, Congress is considering bills to extend U.S. fisheries jurisdiction unilaterally to a 200-mile limit. But the Administration has criticized similar actions by other nations, such as Peru, Brazil, and Iceland, and opposes the proposed new law. Presumably, Kissinger's announcement of interim bilateral agreements is a step toward some compromise with Capitol Hill.

On other oceans issues, Kissinger repeated the U.S. position on ocean mining, which differs sharply from that of developing nations at the meeting. Many of these are exporters of minerals who claim they would be adversely affected by ocean mining; there is a strong movement afoot at the conference to have an international organization control prices and production and conduct all mining operations (*Science*, 30 May). But the United States, as Kissinger explained, wants individual companies and countries to be licensed to mine as well; it seeks, in effect, guaranteed freedom of access by all to the resources of the deep seabed.

Kissinger mentioned scientific research only once, almost as an afterthought. "Ways must be found to encourage marine scientific research for the benefit of all mankind while safeguarding the legitimate interests of coastal states in their economic zones" he said—a noncommittal statement with which few at the sea law parley would disagree.

Kissinger also described the work of several United Nations commissions that are working out new codes to deal with satellites, terrorism, and multinational corporations, and for the laws of war. But regardless of whether he said anything new, the fact that so prominent a leader said anything about these deliberations could be something of a fillip to their efforts.—D.S.