U.S. Seeking Classification Of Basic Soviet R and D

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U.S. strategic arms negotiators have told their Soviet counterparts that further public revelations and discussion of Soviet qualitative basic research breakthroughs of immediate significance for strategic weapons applications will severely jeopardize the early signing of a SALT II agreement. These same U.S. officials also insist that the principal contents of SALT III must be to outlaw the introduction of qualitatively new weapons systems into the U.S. and Soviet strategic arsenals. In fact, there is talk that placing the issue of qualitative advances at the heart of the SALT III agenda will already be part of the concluding phase of the SALT II negotiations.

The kind of Soviet R and D breakthroughs involved are exemplified by the semi-public disclosures by Soviet academician Rudakov on recent Soviet advances in electron-beam fusion during his early July 1976 visit to three major U.S. weapons laboratories. Rudakov's discoveries while representing a major step forward in the inertial confinement mode of fusion energy production, also have direct application to the design of enormously more efficient hydrogen bombs, etc. than are now in the U.S. arsenal.

More broadly, the substantial lead enjoyed by the Soviet Union in the field of coherent particle beam production is pointed up by the just-announced astonishing success of Prof. Budker and his collaborators at Novosibirsk in producing "cooled" proton beams vastly more focussed than had previously been thought possible.

SALT III

Why would U.S. officials have an interest in the concealment of Soviet R and D advances, and what would prompt the Carter administration to seek a ban on qualitative weapons improvements in SALT III? The answers to these questions can only in part be found in the realm of military strategy. The military problem is immediately connected to broader political and economic issues by the fact that major nuclear weapons R and D breakthroughs are always simultaneously breakthroughs in the development of controlled thermonuclear energy development and vice versa. And, of course, the Carter-Schlesinger policies of forced energy conservation and deindustrialization can hardly be expected to fare too well if consistently destabilized by the announcement of new R and D advances in this area. For this reason alone it would be disastrous if the Soviet leadership complied with U.S. secrecy demands; such a policy of compliance would lend crucial support to the very economic policies that define the major potential cause for thermonuclear confrontation and a third world war.

Militarily, concealment and the desire for a qualitative improvements ban, first spelled out in detail in the New York Times' "Nuclear Issues" editorial of November 2, 1976, are closely linked. In a political and ideological environment which is conservation and zero-growth oriented and strongly biased against scientific and technological advances, the Carter administration will not be able to maintain qualitative strategic parity (i.e. weapons systems based on qualitatively identical levels of basic scientific and technological achievement for any length of time with the Soviet Union, whose population and policies are oriented in exactly the opposite direction.

However, it is qualitative parity — rather than parity as defined on the basis of Paul Nitze's more advanced weapons arithmetic (as again in his latest "Deterring our Deterrent," *Foreign Policy*, no. 25, Winter 1976-77) — which is needed to at least render plausible some notion of "mutual deterrence." "Mutual deterrence," on the other hand, is the sine qua non of any Schlesinger-style strategy of "bluffs" and confrontation with the USSR.

Significantly, lack of qualitative parity would not only in the short run give the U.S. armed forces the odd appearance of a dinosaur stomping a modern battlefield; the first perception of the specter of the lack of such parity will already confront Messrs. Carter, Schlesinger, and Harold Brown with a most difficult "organizing" problem vis-a-vis their NATO allies and their own field commanders. The urge for a ban on qualitative improvements is understandable indeed.

Are Particle Beams Significant?

The *New York Times, La Stampa* and other newspapers have in the past two weeks published front page stories on "atomic rays" and their presumable use in the defense against incoming Intercontinental Ballistic Missiles and so on. To the extent that the issue of qualitative strategic parity between the U.S. and the USSR has been discussed in the press at all, it has been in those "superweapons" kind of terms. It must therefore be stated here that in that sort of application, heavy particle beams as those produced by Budker certainly have no immediate short-term military significance. (The different case of Rudakov's electron beam results has been discussed previously in New Solidarity.) However, it cannot therefore be argued that the Budker results at Novosibirsk have no place in an informed debate on the national security of the United States.

Briefly, Budker's results are as follows: Intense

compression of high-energy proton beams in proton storage rings has been achieved which now makes the study of proton-antiproton interactions on the basis of opposing proton-antiproton beams possible for the first time. At the same time, the compression or focussing method used by Budker will find application in ion beam fusion.

Budker had first proposed his compression method in a 1967 Atomnaya Energiya article, entitled "An Effective Method of Damping Particle Oscillations in Proton and Antiproton Storage Rings." The method employs an electron beam to effect very large reductions of the intrinsic energy divergences within the proton beam. The electron beam is inserted alongside the proton beam, and, as both move along at approximately 100,000 km-per-second, they mix, and electrons are hurled off to the side and continuously replaced by new ones. The Couloumb interaction forces between protons and electrons slow down protons moving too rapidly and speed up protons moving too slowly. In less than one-tenth of a second, divergences in the velocities and directions of the protons have been reduced to a very large extent: the electrons have "cooled" the proton beam. Remarkably, Budker's findings were almost exactly in line with his 1967 predictions.

As previously stated, such high energy heavy particle beams are not at present usable in anti-missile defense systems. However, in association with the Rudakov and related results, the Budker findings give the Soviet Union the kind of overall advantage in the crucial area of interaction of high energy particle and plasma physics which undoubtedly has already produced significant military applications in such widely diverse fields as communications, electronic countermeasures, even weather modification, and which embodies the potential of rapidly transforming entire sectors of military technology.

In basic research, moreover, these results are already thoroughly transforming the fields of both high energy particle and plasma physics. The dominance of "non-linear" interaction effects in both the Rudakov and Budker findings, clearly recognized by Soviet researchers as decisive, is forcing the kind of rapid reconceptualization in entire areas of theoretical and applied physics which is the basis of theoretical breakthroughs on the broadest scale. Beyond that, and in the starkest distinction to the policies of the Carter administration, the Soviet Union is committed to the broadest and most rapid and large-scale practical application of the results obtained by its theoretical researchers — specifically to early achievement of production of CTR fusion energy.

Precisely the opposite policies, maximum retardation and obstruction of the introduction of new technologies, govern the Carter government. It is here that the greatest danger to the national security of the United States must be located. The Carter-Schlesinger policies are nothing short of treason.