

## Looking to SALT-II

The only surprise about the Russian-American SALT agreements, signed by Brezhnev and Nixon in Moscow on May 26, is that the summit meeting came off at all. But once the Russians decided to carry on as hosts to the man whom they had reviled as the architect of Vietnamization and the perpetrator of the renewed and intensified bombing of North Vietnam and the mining of its harbors, the rest was as predictable as a grade-B television western, including the irreconcilable differences that could be resolved only by the last-minute intervention of the two great statesmen-leaders.

Now we have been presented with the greatest step towards world peace since the Sermon on the Mount, and we are torn between the impulse to cry "bravo" and the desire to shout "fraud."

Despite all the careful orchestration, it is impossible to hide the fact that this agreement could have been had anytime during the past two years. By drawing out the negotiations, the audience has become more desperate and, correspondingly, less demanding; so we can expect less opposition, both from the skeptics and from the peaceniks. But it is also true that both we and the Russians have accumulated lots of new arms and some dangerous new systems during these years.

Still, the accomplishments are very real and important: We have succeeded in avoiding a costly and futile race in the deployment of antiballistic missile systems; we have halted the upward spiral in the numbers of long-range nuclear-tipped missiles, both land and submarine based. That is an accomplishment whose importance can only be measured against the numbers that would probably be emplaced if the missile race were permitted to continue unabated. These are clear and direct gains; the indirect ones are even more important. We have accepted the principle of *parity*, and agreed to define it loosely enough so as not to preclude small and irrelevant imbalances in one or another particular sub-system. We have agreed that verification through mutual inspection by national satellite systems is not only possible, but also important enough for the stability of the agreement that we must both eschew actions that would threaten to impair these verification capabilities. This represents the beginnings of sophistication. We have also acknowledged that mutual deterrence is vitally dependent on a continuing understanding and appreciation by both sides of the actions and intentions of the other, and we have set up a regular mechanism for trying to insure this mutual understanding through a continuing interchange of views. And we have promised one an-

other and the world that this SALT-I agreement is only the first step.

Bravo — all that warrants setting back the clock!

But our frustration — and it is a large one — comes from the more that might easily have been, and from all the obvious, and some not-so-obvious, pitfalls and obstacles that have been set along the route to SALT-II.

We could have had a total ban on ABMs, if either we or the Russians had insisted on it. Instead, they are now committed to a missile-site deployment in which they don't believe and we to a national command post (Washington) site that we don't want, both in addition to the useless systems we already have. Not only are these a waste of money and resources, but such arbitrarily limited systems are an invitation to a technological race to see how far it may be possible to stretch their effectiveness. Chalk one up for the Generals on both sides.

### No MIRV Ban

With no serious ABM, there is no rationale for MIRV (multiple independently targetable reentry vehicles). Yet there is no MIRV-ban in the agreements, because we are too far along with our deployment and the Russians too far behind — an asymmetry that we do not want to give up and they do not want to freeze. So we have accepted that we will both go to MIRV, after which it will be too late to avoid MIRV without unacceptably intrusive inspection. Chalk another one up for the Generals.

With MIRV in the offing, the vulnerability to a first strike of both their and our systems of fixed land-based missiles is greatly increased — especially if we both continue to improve missile guidance accuracy. Any chance of putting some kind of a lid on improved accuracy? Not a word in the agreements.

In any case, we've both still got our nuclear missile-firing submarines — Polaris-Poseidon for us and Yankee for them, with their possible successors (improvements and replacements are allowed by the SALT-I agreements). In fact, one of the encouraging features of SALT-I is its recognition of the growing importance of the submarine-based deterrent for maintaining an invulnerable second-strike retaliatory force on both sides; for there is no foreseeable means whereby either side could eliminate any substantial portion of the other's missile submarine fleet in a surprise attack. But both we and the Russians are spending vast sums on anti-submarine warfare (ASW) research and

development, much of it aimed at undermining the invulnerability of the nuclear submarine — a self-defeating effort as dangerous in the long run as ABM. To insure the continuing invulnerability of the nuclear submarine, and to avoid an ASW race, it is important to place limits on or to ban certain types of ASW activities. The agreements say nothing on this issue.

Nor is there any mention of the one qualitative limitation that could be immediately agreed upon and implemented — the Comprehensive Nuclear Test Ban, extending the 1963 Treaty to include underground testing. An opportunity missed.

All these missed opportunities point up the major flaw in SALT-I. Not only does it fail to address itself to the problem of controlling new and destabilizing *qualitative* developments, but, by its overemphasis on numbers and by its omissions, it may actually encourage a shifting of the arms race from the quantitative to the qualitative. As a result, if this shift actually occurs, the danger of a nuclear war could be increased as a result of SALT-I, despite the fact that both the ABM limitation and the missile freeze are good things in themselves. But our overkill capabilities are already so great — we are already so close to saturation in this respect — that more missiles do not represent the most serious danger. Rather, it is qualitative changes, changes that could undermine the stability of the present balance of terror and render it much more likely of breaking down in a time of crisis, that are much more to be feared. SALT-I does not touch at all on these problems.

#### *Forego ABM Options*

Maybe we should not move that clock back quite so far.

There are at least two directions in which we must move to rectify these deficiencies in SALT-I. First, their correction must be put at the top of the agenda for SALT-II; and we must not tolerate any unnecessary delays in getting on with the job. The freeze agreement gives us five years, but it would be a fatal miscalculation to think that we have anything like that length of time to halt the technological dangers now on the horizon. Meanwhile, we must establish an atmosphere that will encourage both the U.S. and the Soviet governments to exhibit the utmost restraints in the development, testing and most especially the deployment of new or improved systems that, although permitted by the letter of SALT-I, would violate its spirit by tending to destabilize the deterrent, make the achievement of SALT-II more difficult, and delay or impede the substantial reduction in current missile and weapons numbers that must remain the long-range aim of SALT.

A good beginning, in this regard, would be for the United States to forego its option of an ABM

around Washington and for the Soviet Union, reciprocally, to forego its right to a missile-site ABM deployment, at least as long as no better cases are made for these deployments than have been made until now.

As has so often been the case in recent years, further successes in limiting nuclear arms will be determined more by internal “hawk-dove” battles in each country than by the international negotiating process. In particular, we are already seeing the beginnings of a vociferous campaign, on the part of military-industrial hawks and their Senatorial spokesmen, to make Senate ratification of the SALT-I Treaty contingent on a commitment from the Administration to pursue vigorously all permitted research and development activities

*(Continued on page 50)*

---

## WE RESET OUR CLOCK

The doomsday clock of the *Bulletin of the Atomic Scientists* has been moved back to 12 minutes before midnight following the arms control agreement between the United States and the USSR. It had stood at 10 minutes before midnight since April 1969, when the U.S. Senate ratified the Nuclear Non-Proliferation Treaty.

The clock first appeared on the cover of the *Bulletin* in December 1947 to symbolize the approach of mankind to nuclear catastrophe. It was originally set at seven minutes to midnight recording the first use of atomic weapons by the United States during World War II.

The clock has had a history of fluctuation — moving forward or back as events heighten or lessen the possibility of mankind's annihilation by nuclear war. In 1949 it was pushed forward four minutes after Russia exploded its first nuclear bomb.

The closest the minute hand has been to striking the fatal hour was in 1953 when it was set at two minutes before midnight following the development of hydrogen bombs by both the United States and Russia.

It stood close to midnight until 1960 when the minute hand was moved back because of a rumored east-west detente. In what seemed to be a changing climate of diplomatic relations between the United States and Russia with the recognition of the need for mutual cooperation among nations, the clock was moved back three minutes.

In 1963 it was once again pushed back to 12 minutes before doomsday following the signing of the limited test ban treaty. But with the entry of France and China into the nuclear arms race in 1968 the clock jumped forward five minutes.

The U.S. Senate's ratification of the nuclear non-proliferation treaty in 1969 moved the clock back to 10 minutes before midnight where it stood until now.

# The Moscow Summit

EUGENE RABINOWITCH

*In the nuclear age, there is no alternative to . . . peaceful coexistence.*

This is the first point in the "Declaration of Principles" issued in Moscow on May 29, 1972. It is what scientists have been saying since the days of Alamogordo and Hiroshima. It took almost three decades and the expenditure of several trillion dollars in a futile arms race for the recognition of this fact to be sealed by signatures of the President of the United States and the General Secretary of the Communist Party of the Soviet Union.

Since knowledge of how to make nuclear weapons is a part of our technical culture, a future war between major technological powers, even if it does not start as a nuclear war, is more than likely to end as one. It will thus always carry an unacceptable risk of total destruction, making it unsuitable as a tool for achievement of any ideological or political aim.

If this is so, then preparation for such a war has no rational justification.

This fact is recognized in the Moscow declaration, which restates the commitment of both sides to complete disarmament as the ultimate aim.

However, as we have said before, movement towards disarmament and stable peace — one is impossible without the other — must start with stabilization of both the arms race and the political conflicts between the two nuclear powers ("Stop Before Turning," *Bulletin*, Sept. 1958). And the chief importance of the Moscow agreements is that they represent first steps toward such a freeze.

The arms control agreement signed by Nixon and Brezhnev aims at freezing the arms race on a rationally indefensible high level, implying the retention by both sides of an enormous overkill capacity. It even allows for further qualitative improvements, which will cost both

sides tens of billions of dollars annually. Still it is a first step towards breaking the spiral of a totally mad and ruinous arms race.

The other inescapable requirement of a successful freeze must be that of reducing the political and ideological divisions in the world. The Moscow-Bonn treaty and the agreement on West Berlin, permitting the scheduling of a European Security Conference, signify the acceptance of this principle in its application to Europe. But the situation remains far from a detente in Asia, where the United States pursues its formula for stabilization, while the communist powers (Hanoi, Pyongyang and Peking) press their revisionist aims. The situation is made worse by the American military effort to stabilize a geographically almost indefensible line in

Indochina. It is to be hoped that the United States and the Soviet Union — two great "have" powers in the world today, equally interested in the preservation of the status quo in avoidance of war — will find ways to cooperate in settling the conflicts in Asia and in minimizing the reverberations of change there until Asia follows Europe in settling into a stable configuration, which some cynically may describe as paralysis of fear.

Be this as it may, the signs of a turn towards a rational view of the world situation by the two main protagonists of the nuclear age, with mutual acceptance of a military "freeze" and abandonment of illusory hopes for victory in war or in the arms race, justify the *Bulletin* in setting its "Doomsday" Clock back, even by only two minutes.

## SALT-II

*(Continued from page 3)*

and deployments; nor if the past is any guide, can we expect the present Administration to provide much leadership for resisting such pressures. What needs to be avoided at almost any cost is a replay of what happened to President Kennedy on his way to ratification of the Test Ban Treaty in 1963; in that case, the "Jackson safeguards," extracted as the price of ratification, have made a travesty of the arms control aspects of that agreement. We must not permit SALT-I to go the way of the Test Ban.

We can prevent this only, I believe, by turning the tables on the hard-liners. This is an election year, and Mr. Nixon is running on a platform promising "a generation of peace." The success of SALT is essential for the fulfillment of that promise. There are enough clear-thinking liberals in the Senate to be able to block ratification of SALT-I, or to threaten to do so, unless it is

accompanied by a firm commitment to hold down the lid on the testing and deployment of new systems while we pursue serious negotiations aimed at further stabilization and arms reduction in SALT-II.

Until now, we arms control advocates have been so desperate for progress that we have been willing to accept crumbs. But this is, I believe, a case where half a loaf may be worse than none. Then let us for once be as tough as our opponents in insisting that ratification of the SALT-I treaty with reservations that nullify its intent is simply not acceptable.

Two other aspects of the Brezhnev-Nixon talks bear seriously on the future course of the nuclear arms race. The first relates to possible reduction in the deployment of so-called tactical nuclear weapons, especially in Europe, a subject that was, by mutual consent, assigned to the agenda of the negotiations on European Security and on Mutual Balanced Force Reductions. It is

*(Continued on page 54)*

the schools had an authoritative role in determining Laboratory policy." That is a common but probably an incorrect interpretation of the situation. If the AEC had, at the very outset, been prevailed upon to establish a laboratory primarily concerned with university-based research in the midwest, that laboratory would have been a natural site for a new accelerator. Whether it was managed by The University of Chicago, in an arrangement analogous to that at Berkeley's Radiation Laboratory or Stanford's Linear Accelerator Center, or managed by a consortium of universities, as in the case of Brookhaven, would have made little difference.

There was a complete absence of high energy physics activity at Argonne and there was nothing in Argonne's history to make the high energy physicists look to Argonne as a natural site for an accelerator. When the issue was first raised, it was looked upon as a gimmick to make Argonne a more interesting place and thereby help maintain a high quality staff for other purposes (an argument that has often been heard, and what a mistake it is). The high energy physicists had close connections with Brookhaven, they saw how well things had worked out there when AUI had established a new laboratory for the single purpose of meeting university needs, and they wanted to duplicate that pattern rather than be trapped by history. Therefore, they convinced their universities to try to make a new start by modeling MURA after AUI.

Although there were no active high energy physicists at Argonne, the formation of MURA was a serious blow to the hopes and expectations of Walter Zinn, the director of Argonne, because of his recognition that a national laboratory could continue to be an exciting and attractive institution only if it faced new and challenging problems. (As early as 1947 he had visualized the possibility of turning to the construction of a large accelerator after a period of activity centered around reactor development.) His position was strongly supported by the AEC and, in 1957, after much maneuvering that is described graphically by

Greenbaum, Argonne was authorized to build a 12.5 BeV accelerator, the zero gradient synchrotron (ZGS), with a clear mandate that this facility was to serve the university community. Midwestern high energy physicists continued to pursue the dream of an accelerator of "their own" through MURA but they also directed their attention to the possibility of exploiting the mandate in the meantime by making use of the ZGS. Greenbaum also covers this story thoroughly. He notes that Roger Hildebrand, as Associate Laboratory Director for High Energy Physics at Argonne had the responsibility for establishing policy for use of the accelerator, and to help him in making such policy he had asked E. L. Goldwasser of the University of Illinois to form a Users' Group. What is not mentioned in "A Special Interest" is that this was the first attempt to involve a very inclusive group of users of a machine both in decisionmaking and in the building of major items of equipment. All accelerator laboratories have been subjected to criticism to the effect that special groups are favored, and Hildebrand tried to meet this problem head-on before the ZGS was completed by establishing a means of communication, the Users' Group, that has since been adopted in more or less the same form by all other major AEC acce-

erator laboratories.

Hildebrand's initiative undoubtedly was influenced by his earlier experience as a member of the MURA group and his realization that Argonne not only had a mandate from the AEC to provide for the needs of the universities but also was compelled to depend on university users for a successful research program because the in-house high energy physics staff of Argonne was almost nonexistent at the beginning. In this regard, Greenbaum tends to give a somewhat distorted view of Argonne's record vis-a-vis the high-energy physics users, probably because of his lack of direct contact with the users and the other limitations on his sources of information mentioned earlier.

Another important point that is omitted from the book concerns the decision by MURA to propose in 1963, with modest support from the Ramsey Panel, the building of another accelerator of identical energy to the ZGS but of much higher intensity. Although most of the action is covered in some detail, an underlying lack of confidence in the success of the ZGS is not mentioned. The MURA-associated physicists, and they included most of the high energy physicists in the community, had reservations about the design of the ZGS, which they found to be complicated. Since they had held aloof

## SALT-II

*(Continued from page 5)*

to be hoped that the agreement to get on with these negotiations, West Germany's ratification of its treaties with Moscow and Warsaw and the successful conclusion of SALT-I now set the stage for negotiations, long overdue, aimed at European denuclearization.

Finally, it is important to keep in mind that, more than any amount of Russian-American good will and negotiation skill, responsibility for the success of SALT-I belongs to the Chinese. Fear of a Chinese-American "gang-up" is a major element in the ideological ascendancy in the Soviet Union of the advocates of peaceful co-existence and de-

tente; on our side, the classical diplomatic concept of the balance of power played a nonnegligible role in the design of an American foreign policy that needs to match the success of Nixon's Peking journey with an equally striking symbol of Russo-American cooperation in the nuclear superpower realm. But it is important to remember that the days of our bilateral hegemony are numbered; China cannot be kept indefinitely waiting in the wings. Probably not yet in SALT-II, but sooner or later — preferably sooner — the rest of the world, and China in particular, must be brought into the discussions and the agreements. This is important if we hope to achieve any substantial nuclear disarmament.