41. A. Goor, *Econ. Bot.* **19**, 124 (1965).
42. V. Laurent-Täckholm, *Faraos Blomster* (Natur och Kultur, Stockholm, 1964).
43. I. J. Condit, *The Fig* (Chronica Botanica, Waltham, Mass., 1947), pp. 51–57; W. B. Storey and I. J. Condit, in *Outlines of Perennial Crop Breeding in the Tropics*, F. B. Ferwerda and F. Wit, Eds. (Veeman and Zonen, Wageningen, 1969), pp. 261–262; G. Valdeyron, *Ann. Inst. Natl. Agron.* **5**, 1 (1967).
44. In Smyrna-type figs pollination is brought about by the old practice of caprification, that is, by collecting branches of the wild caprifig just before the emergence of the fig wasps and suspending them on the flowering female trees of the cultivar.
45. For further details on wild figs consult O. Warburg, in *Festschrift Dr. Paul Ascherson*, U. Ign and P. Graebner, Eds. (Borntraeger, Leipzig, 1905), pp. 364–370; E. Warth, *Ber. Dtsch. Bot. Ges.* **50**, 38 (1932); P. M. Zhukovsky, *Kulturnie rastenia i ich sorodiczy* (Kodor, Leningrad, 1964), pp. 617–623. Also, note that substantial experimental results are available which indicate that the various types and species grouped in series *carica* are interfertile. More important, they are apparently pollinated by the same *Blastophaga* species (*43*).
46. Viable wild-looking feral seedlings of this derivation have been repeatedly encountered in northern Israel, western Turkey, and Greece. In the Aegean belt, where Smyrna-type figs are commonly grown, seed are disseminated in masses not only by man but also by birds and bats that thrive on the fresh supply they find in the fig orchards. Parthenocarpic figs too are occasionally pollinated by the *Blastophaga* wasps and produce viable seed. These give rise to a whole array of spontaneous, wild-looking seedlings. In Israel such feral descendants have been repeatedly detected by J. Galil (personal communication) in areas adjacent to common fig plantations near Safad, Upper Galilee.
47. H. Helback, in *Nimrud and its Remains*, M. E. Mallowan, Ed. (Collins, London, 1966), vol. 2, pp. 613–620.
48. J. Galil, *Econ. Bot.* **22**, 178 (1968); ——— and D. Eisikowitch, *New Phytol.* **67**, 745 (1968).
49. This also explains the almost total lack of remains of rosaceous fruit trees (apple, pear, cherry) in early Bronze Age sites in the Near East. Wild relatives of these fruit trees are richly represented in the Near East, but their domestication is based on grafting, and the mastering of this art of vegetative propagation seems to have been a later development.
50. The impact of introgressive hybridization on the rapid buildup of variation in weeds and cultivated plants has been convincingly argued by several workers, particularly E. Anderson. *Euphytica* **10**, 79 (1961); ——— and G. L. Stebbins, *Evolution* **8**, 378 (1954); C. B. Heiser, *Bot. Rev.* **39**, 347 (1973).
51. D.Z. is indebted to the Harry S. Truman Center, Hebrew University of Jerusalem, for a research grant that supported this study. We thank S. Stoler, veteran agronomist and member of Kibbutz Kinneret, for his information concerning the mode of origin of the date palm. Discussions with M. Hopf, Römisch-Germanisches Zentralmuseum, Mainz, added considerably to this evaluation of the archeological remains.

NEWS AND COMMENT

Strategic Arms Limitation (I): The Decades of Frustration

". . . [T]he advancement of science and technology can be like a whip, cracking over our heads, encouraging us to spend more and more money on national security. . . . But the goal of accumulating the very latest weapons in sufficient quantity to be completely safe, once and for all—that goal is an illusion, a dream."—from Khrushchev Remembers, The Last Testament.

For nearly 30 years, beginning not long after the detonation of the bomb at Hiroshima, the United States and the Soviet Union have been running a strategic arms race and engaging in strategic arms talks. The "asymmetry," to use a favorite word of arms control specialists, between the results of the race and the outcome of the talks is all too plain. The stocks of nuclear warheads and bombs possessed by the two nations are huge and still growing. The most recent result of the fitful process of arms negotiations has been to agree to put a ceiling or "cap" on the arms race at very high levels. The ceiling, decided at the Vladivostok summit last November (subject to further negotiations as to verification methods), would allow 2400 missiles and bombers to a side, with up to 1320 of the missiles permitted to be equipped with multiple, independently targeted warheads (MIRV's).

If such an agreement represents progress in strategic arms limitation, as many believe, it is a measure of the modesty to which U.S. and Soviet leaders have been reduced by the baffling complexities and dynamics of the arms race. The history of arms control is one in which the notion of success has continually been redefined in the face of onrushing technology. Usually, at each new turning point along the way "success" has come a step closer to being merely something less than total failure. For the problem of restraining strategic arms development has tended to become more difficult with every major new technological advance in weaponry—from A-bomb to H-bomb, from bomber to missile, from missile to antimissile, and from missile to MIRV.

This article, the first of two, is concerned with the period from 1945 through the 1960's to the beginnings of SALT. It reviews the turning points, the disappointments, the successes (such as they have been), and the changing concept of success. The second article will discuss SALT, the Vladivostok agreement, and the uncertain prospects for further gains in arms control.

The Soviets' rejection in 1946 of the Baruch Plan for international control of the atom prevented stopping the nuclear arms race before it could begin. Conceived largely by leading figures of the Manhattan project and presented by Bernard M. Baruch before a United Nations commission, this U.S. proposal today seems remarkable for its innocence and directness.

It called for the establishment of an International Atomic Development Authority that would assume exclusive control of "all atomic energy activities potentially dangerous to world security." Further, the proposed authority would make inspections worldwide and apply sanctions against any nation violating its rules. Once these arrangements came into existence, the United States would turn over to the new agency its stocks of atomic weapons and the technical information that went into producing them.

However altruistic and farseeing, the Baruch Plan could not overcome the deep suspicion and paranoia with which the Kremlin looked out upon the world. A number of years later, Nikita Khrushchev characterized the plan as an attempt by the United States to prevent development of atomic industry in other nations and to maintain its nuclear monopoly.

The monopoly ended in 1949, when the Soviet Union detonated an atomic device. With the Soviets now catching up with surprising speed, the United States soon became committed to the development of thermonuclear weapons of enormous yields, with the

Soviet Union running close behind.

Robert Oppenheimer and others took their futile stand against the H-bomb. And, before the end of the Truman years, Vannevar Bush suggested that the United States and the Soviet Union should agree never to detonate such a weapon, even if one had been developed. This proposal failed to get even the support of the arms control panel —a body created by Secretary of State Dean Acheson—on which Bush served.

Yet an early "test ban" of this kind, if it could have been agreed to, would have stopped the development of thermonuclear weapons. It would also have delayed and discouraged development of intercontinental ballistic missiles because there was then little prospect that ICBM's would ever be accurate enough to be effective at the relatively low explosive yields then attainable with fission weapons. With the testing of the first U.S. thermonuclear device in 1952, and of the first Soviet device 9 months later, the thermonuclear genie was out of the bottle, perhaps irretrievably.

By the mid-1950's the whole concept of nuclear arms "control" had, by force of circumstances, undergone redefinition. Behind the Baruch Plan was the idea that an international agency would physically control fissionable material and make sure that it was used only for peaceful purposes. But with the passage of time this concept became clearly unworkable. Fissionable material had been produced by the two superpowers in such great quantity that no agency, whatever its legal powers, could be confident that crucial amounts were not being secreted and withheld to the decisive advantage of whichever nation got away with it.

So, if control would no longer mean physical possession and management, what could it mean? It could mean formal or tacit understandings to achieve, either singly or in some combination, mutual arms reduction and restraint, the foregoing of certain kinds of weapon tests, and various kinds of inspections to ease suspicions or, if agreements were reached, to verify compliance. As thus defined, arms control would be steadily on the world agenda from 1955 to the present.

In July 1955, 2 years after Stalin's death, the first summit conference since the onset of the Cold War was held in Geneva. President Eisenhower presented his "Open Skies" proposal. It called for an exchange of military

Testing Minuteman in 1972 exercise at Vandenberg Air Force Base, California.

deployment plans and proposed that each nation have the right to make photographic reconnaissance flights over the territory of the other. The importance of the proposal lay in its recognition that an essential first step in easing the deep mutual fears and distrust would be to part the veil of military secrecy.

Nevertheless, circumstances militated strongly against the proposal's acceptance. With its "open society," the United States had every reason to favor such a plan because the Soviets already enjoyed a major advantage in intelligence gathering. But from the Russians' point of view, secrecy was one important advantage they enjoyed in an otherwise precarious situation.

Although the American nuclear monopoly had been broken, the Soviet Union had not—contrary to U.S. fears of a "bomber gap"—been able to match the powerful U.S. force of strategic bombers. And, although they led in development of an intercontinental missile, the Soviets would not have even the beginnings of an operational force of ICBM's until the late 1950's. Naturally, Soviet leaders wanted desperately to keep to themselves the extent of their weakness.

Accordingly, the Soviets rejected the Open Skies plan, and offered a counterproposal of their own. The Soviet position was that aerial photography for intelligence purposes would only be acceptable in the final stages of carrying out measures to reduce arms and ban nuclear weapons. The United States responded by initiating, in the summer of 1956, secret reconnaissance flights with the U-2, specially designed to fly well out of range of Soviet air defenses.

It was, of course, the downing of a U-2 by a Soviet missile, followed by President Eisenhower's admission that he had authorized the flights, that led Nikita Khrushchev to break up the 1960 summit meeting in Paris. But Khrushchev was only giving vent to a sense of wounded national pride, for both the United States and the Soviet Union would both soon have an instrument infinitely more effective than the U-2—the reconnaissance satellite.

The reconnaissance satellite, and the tacit acceptance of it by the superpowers as a legitimate means of gathering intelligence, would be of as much potential importance to arms control as any measure arrived at through negotiation during the decade.

Viewed in retrospect, arms control negotiations from the 1950's through the mid-1960's were flawed as much by a lack of realism in the U.S. attitude as they were by Soviet intransigence. The essential fact generally glossed over in U.S. negotiating positions was that arms control arrangements between the United States and the Soviet Union would have to be worked out in terms of strict equality or parity. In effect, if the United States was not willing to reduce its forces, it would have to wait for the Soviet Union to catch up in strength before any agreement could be reached.

A case in point was the predictable failure of a proposal by President Eisenhower in 1956 to freeze all production of weapon-grade material under a regime of strict international inspection. Its critical defect was that it took no account of the disparity between Soviet and U.S. weapons stockpiles. In truth, the United States was still pursuing the will-o'-the-wisp of "nuclear superiority," and would continue to do so for another decade.

The ambiguity in the U.S. position was particularly evident in the bitter conflict between Secretary of State John Foster Dulles and the President's chief arms control negotiator, Harold Stassen. Dulles, who had put forward the policy of "massive retaliation" as an answer to any threat of Soviet aggression, kept Stassen on a short tether. Moreover, he generally sided with such officials as Lewis L. Strauss, chairman of the AEC, and Admiral Arthur W. Radford, chairman of the Joint Chiefs of Staff, who strongly

believed that an all-out effort at continued weapons development was vital to U.S. security.

In 1964, the U.S. insistence on nuclear superiority would be reflected again in the American proposal made in Geneva for a "freeze" in the numbers and characteristics of strategic weapons. In light of all the dollars and rubles spent since then on missiles, missile defense systems, and warheads to penetrate defense systems, this proposal clearly had much merit. Yet it was unrealistic from the Soviet viewpoint, if not from that of the Pentagon. This freeze, like the one proposed by Eisenhower in 1956, would have left the Soviets in a position of nuclear inferiority.

According to an intelligence estimate made at the time of the Cuba missile crisis of October 1962, the Soviet Union had only 75 ICBM's. The American ICBM force was twice that large; in addition, the United States had nine Polaris submarines carrying a total of 144 submarine-launched ballistic missiles, whereas at that time the Soviets were only beginning to build a SLBM force. Two years after that crisis, the Soviets certainly had not closed the gap, especially inasmuch as the rate of growth of U.S. missile forces had increased.

Indeed, in 1961, even though the alleged "missile gap" of election year rhetoric had been found nonexistent, Secretary of Defense Robert S. McNamara had decided that a very large missile force should be built (though not so large as the Air Force and Navy wanted). By the year 1967, there would be 1054 ICBM's and 656 SLBM's, not to mention the some 460 B-52 bombers still in the Strategic Air Command. McNamara would later confess that he had overdone it, for the best of reasons, of course. Here is how McNamara, in a 1967 speech, explained what happened.

> In 1961, when I became Secretary of Defense, the Soviet Union possessed a very small operational arsenal of intercontinental missiles. However, they did possess the technological and industrial capacity to enlarge that arsenal very substantially. . . . Now, we had no evidence that the Soviets did in fact plan to fully use that capacity. But . . . a strategic planner must be "conservative" in his calculations; that is, he must prepare for the worst plausible case. . . .
>
> Since we could not be sure that [the Soviets] would not undertake a massive buildup, we had to insure against such an eventuality by undertaking ourselves a major buildup of the Minuteman and Polaris forces. . . . But the blunt fact remains that if we had had more accurate information about planned Soviet strategic forces, we simply would not have needed to build as large a nuclear arsenal as we have today. . . . It is precisely this action-reaction phenomenon that fuels an arms race. Clearly, the [recent] Soviet buildup is in part a reaction to our own. . . .

"Reaction without Action"

The truth of the matter is even more complicated than McNamara has indicated, for there is reason to believe that the commitment by him and President Kennedy to the high ICBM and SLBM levels was partly motivated by a desire to placate the military and their highly vocal congressional allies. Furthermore, whereas McNamara used "action and reaction" to describe an insidious but rational process, the fact is, as Jeremy Stone of the Federation of American Scientists has pointed out, this process has sometimes involved "action and *over*reaction" and even, as in this instance, "reaction *without* action."

In any case, it is true enough that the U.S. missile buildup produced a strong Soviet response. By the fall of 1969, the Soviet Union would have even more ICBM's than the United States (1100 to 1054), although it would still be far behind in SLBM's, bombers, and numbers of warheads.

The tendency for one superpower's numerical increases in weapons to be matched or exceeded by the other's is of course only one of the major aspects of the arms race. Another lies in technological innovation, which each side vigorously pursues not so much in response to what the other is known to be doing as to strengthen its own strategic systems and to hedge against breakthroughs. From the standpoint of arms control, this intense pursuit of innovation is particularly troublesome because it may be impossible to freeze the status quo with respect to the quality as well as quantity of weapons.

One concept favored by many arms control specialists as a means of impeding technological innovation has been that of imposing bans on weapons tests, or at least on those tests that cannot be carried on clandestinely without high risk of detection. An extraordinary opportunity to impede the further development of strategic weapons by such means came during the long period of the late 1950's and early 1960's when proposals for a comprehensive ban on nuclear testing were under discussion.

At one point during the relaxation of tensions that followed the Cuba missile crisis, U.S. and Soviet negotiators had come remarkably close to untying the knot posed by the issue of on-site inspections, which the United States wanted as a safeguard against clandestine underground tests which seismic monitors might not distinquish from earthquakes. The United States had demanded seven inspections, the Soviets offered three, with each side stipulating its own conditions. This gap was never closed, however, and the upshot was the Limited Test Ban Treaty of 1963 that bans tests everywhere but underground.

As a result, the test ban treaty would serve only as a pollution control measure, and possibly to some extent as a means of discouraging the proliferation of nuclear weapons among some of the smaller nations (although India, a signatory of the treaty, would join the nuclear club in 1974, testing its first device underground; France and China, two nonsigners, have tested in the atmosphere). The treaty has not restrained the superpowers in their nuclear test programs and arms race.

Efforts to stop or impede potentially destabilizing technological change in the arms race have led thus far to only one unqualified success: the ABM Treaty, entered into in May 1972 at the conclusion of the first phase of the Strategic Arms Limitation Talks, or SALT I. Ironically, however, this success in limiting ABM deployment to a maximum of two installations to a side had little or no effect on deployment of MIRV's, a system that gained impetus and support in the United States because of its high promise for penetrating any Soviet ABM systems. In fact, by the end of SALT I, the MIRV had assumed a life of its own. The history of the ABM and the MIRV developments offers an insight into the dynamic and unpredictable nature of the technological arms race, and the difficulty of controlling it.

In both the United States and the Soviet Union the development of the missile led naturally to R & D on the antimissile, and such work was already under way in each country in the 1950's. The Soviet Union began deploying a primitive ABM system around Moscow as early as 1964. There was also much unsubstantiated—and ultimately discounted—speculation that a Soviet aircraft defense system might have an antimissile capability.

Inevitably, this generated fears in

the Pentagon that the Soviet Union might ultimately develop an effective defense against American ICBM's and SLBM's. In such an eventuality, two of the major forces making up the U.S. deterrent "triad" of land- and sea-based missiles and bombers would be neutralized, with only the bombers having a chance to penetrate to Soviet targets. This dismal scenario always began with a Soviet first strike to eliminate the U.S. bombers and weaken the missile forces to prevent them from overwhelming Soviet defenses.

The U.S. response was to continue development of its own ABM and also to push development of the MIRV. For the MIRV, this was a new role, inasmuch as this system was first begun in the early 1960's to provide a relatively cheap way to attack increasing numbers of Soviet military targets. Now MIRV was being sold as a means of overwhelming even the most sophisticated ABM systems. Moreover, this could be accomplished cheaply compared to the huge outlays necessary for any ambitious missile defense.

Secretary McNamara, not wanting to intensify the arms race and aware that an American missile defense would be no less vulnerable to MIRV's than a Soviet system, kept delaying from one budget year to the next any decision to deploy the ABM, even though it would be a vast improvement over its Soviet counterpart.

The U.S. deployment decision came after Premier Kosygin's refusal at Glassboro in June 1967 to begin talks to limit strategic arms, including antimissile systems. McNamara had done all he could to arrest the momentum toward deployment. He had even arranged for President Johnson to meet with current and past White House and Pentagon science advisers to show that none of them believed an effective defense against a Soviet missile attack was possible. Now, going along with a presidential decision to deploy the ABM, McNamara announced it as a "Chinese-oriented" defense even though its characteristics would be indistinguishable from the beginnings of an anti-Soviet defense.

Eventually, Soviet leaders, perhaps influenced by intense public debate in the United States over the ABM, saw the need to limit ABM deployment. The 1972 treaty was the result. But, several years before, deployment of MIRV's began on a big scale, in the Minuteman III and the new SLBM, the Poseidon. Today, with some 800 missiles already thus equipped, the de-

Briefing

White House Presses New Energy Strategy

As the 102 neophytes of the 94th Congress went about memorizing the meaning of the bells and locating the rest rooms, the Ford Administration began an intensive campaign to sell its complex package of economic and energy policies that were announced piecemeal before, during, and after the State of the Union message on 14 January. The Democrats have yet to detail their counterproposals, but indications are that their approach to reducing oil imports will be fundamentally different, relying not on higher prices and market forces but on imposed shortages managed by fuel allocations. Just when a national energy policy might actually be cast into law, and what form it might finally take, is anyone's guess.

The Administration's energy proposals fall into three categories: short-term (now to 1977), intermediate (now to 1985), and long-range (1985 and beyond). The immediate objective, stated last October, is to lower oil imports a million barrels a day by the end of this year and another 1 million barrels by the end of 1977. This is expected to hold imports to below the 1973 level of 6 million barrels a day. Of the slightly more than 2 million barrels a day to be saved, 1.6 million barrels would be saved by reducing demand, through new tariffs and fees. In the next 3 months a sliding tariff on imports would reach $3 per barrel, boosting the cost of imported oil to more than $14 a barrel, well above the world price set by the exporters' cartel. Remaining price controls on "old" domestic oil would be removed, and a $2-per-barrel excise tax would be placed on all domestic oil. Also part of the proposed tax package is a levy on natural gas of 37 cents per thousand cubic feet (the energy equivalent of $2 per barrel of oil). This, along with "deregulating" the wellhead price of gas, is seen as a way of encouraging exploration and discouraging inefficient uses, as in power plants.

Another 600,000 barrels a day in imports could be saved, the Administration believes, by opening up naval petroleum reserves in California and later in Alaska and by encouraging power plants to switch from oil to coal.

The Administration says that all of this will raise the consumer price index by 2 percent in a single jump, but "with exceptions in some areas" should not add materially to inflation. Democratic critics, among them Senator Henry Jackson of Washington, believe that the impact of such broad levies on oil and gas will be much larger, and hence they are prepared to block them.

A proposal to increase automobile efficiency by 40 percent—that is, to average 19 miles per gallon in 1980—in exchange for a 5-year freeze on emission standards also is going to be hard to sell. Environmentalists are predictably opposed, and some analysts, like former energy chief John Sawhill, agree that so long a freeze is unjustifiable; a compromise of 1 to 2 years is possible.

By 1985, according to the Administration plan, a combination of reduced demand, increased offshore oil production (of 1.5 million barrels a day), opening the naval petroleum reserves for military needs, and production of small amounts of synthetic oil would result in a consumption level just under 20 million barrels a day. Of this, 4.7 million barrels would be imported, but would be replaceable temporarily by emergency conservation measures and a 1.3-billion-barrel national stockpile.

Imports thus would fall from one-third of present needs to one-fifth, while consumption would rise by about 1 million barrels a day from the current level. Overall, the White House envisions a 3 percent annual growth in U.S. energy consumption between now and 1985 with increasing reliance on coal and nuclear power. This contrasts with a widespread belief that the United States could hold itself to a 2 percent growth rate and remain economically healthy (*Science*, 10 January).

ployment continues, even though there is no longer the prospect of a significant Soviet missile defense. And for their part, the Soviets too are believed to be deploying MIRV's, although their MIRV program remains far behind the U.S. effort.

It now appears that MIRV has assumed the rationale that some strategic planners envisioned for it a decade ago —that of a "counterforce" weapon that can be directed in large numbers at enemy missile silos. But there is much confusion inherent in the counterforce doctrine. It implies a first strike, for otherwise the silos targeted would be empty when hit. Yet no sane national leader on either side will strike at enemy silos when the certain consequence would be a devastating retaliatory blow by the enemy's sea-based missiles. Thus, MIRV, as a counterforce weapon, appears to be both a costly redundancy and a pointless source of insecurity for the superpowers' land-based deterrents.

As many arms controllers were saying at the time, the chances of stopping MIRV began to fade in August 1968 when the United States began MIRV tests. Once the United States had bitten this particular apple of knowledge, the Soviet Union would insist on tasting of it too. Nevertheless, the decision to test MIRV was not even treated as a matter of presidential importance—it went no higher than the office of the Secretary of Defense, then occupied by Clark Clifford.

So, this is where the arms race stood in the early stages of SALT—more and more missiles, a declining interest in the antimissile, and a rising interest in the MIRV's once intended to cope with the antimissile. The fruits of nearly three decades of sporadic arms control negotiations had done nothing —though the ABM Treaty was near and would make an important exception—to stop the buildup of strategic weapons.

There had been the agreements never to deploy strategic weapons in Antarctica, in outer space, or on the seabed, plus a Nonproliferation Treaty of uncertain efficacy. But what all these agreements had in common was that they interfered not at all with the active programs or ambitions of either superpower, nor did they alter political perceptions as to which superpower was favored in the strategic balance. It would remain for the SALT negotiators to try to reverse the ominous tide of events.

—LUTHER J. CARTER

Briefing

Largely obscured by the complex tax and tariff proposals is a plan—still vague in detail—to launch what the White House calls a Synthetic Fuels Commercialization Program. As the name implies, the object would be to bring existing technology for oil shale and coal conversion across the threshold to commercial status. The goal is to have some 20 shale and coal gasification and liquefaction plants turning out the equivalent of at least 1 million barrels of oil a day by 1985. The key to the program would be a package of economic incentives to industry, possibly including price guarantees, purchase agreements, or other subsidies, all designed to protect a fledgling synthetic fuel industry from a decrease in world oil prices that the Administration continues to foresee in the next several years. Broad legal authority to grant such incentives is already on the books, but the White House is asking for additional authority to use tariffs, import quotas, import price floors, and other means of coping with sudden fluctuations in world oil prices.

As for energy R & D, Ford is promising to maintain the $11 billion program begun under President Nixon. In a ceremony on 15 January activating the new Energy Research and Development Administration, Ford said the new agency "won't be lacking adequate funds," but he added, "we expect some exciting things."—R.G.

Nuclear Advocates 34, Opponents 8

If the strength of an argument can be measured by the number of bishops who line up behind it, then the case for nuclear power won hands down last week in Washington in a flurry of manifestos and press releases.

First came an energy policy statement signed by 34 prominent American scientists, 11 of them Nobel laureates, declaring that the gravity of the energy problem and the difficulties posed by exotic alternative technologies leave the United States with no choice but to press ahead with developing nuclear and coal resources. Written mainly by physicists Hans Bethe and Ralph Lapp, the 750-word statement said, "the U.S. choice is not coal or uranium; we need both. . . . Nuclear power has its critics, but we believe they lack perspective as to the feasibility of nonnuclear power sources and the gravity of the fuel crisis."

All energy sources involve risks, and nuclear power is no exception, the statement continues. But it expresses confidence that technical ingenuity and careful operation of nuclear plants can preserve a largely unblemished safety record.

Bethe and Lapp presented their statement in a news conference on 15 January in which Frederick Seitz, the president of Rockefeller University, and Richard Wilson, a Harvard physicist, also took part.

Toward the back of the audience of 100 or so, consumer advocate Ralph Nader listened quietly. When it was all over, Nader took the occasion to release a broadside of his own, a letter to President Ford criticizing his decision to speed up nuclear plant licensing. Nader's letter said that more effort seemed to have been spent building plants quickly than in building them safely; the letter was signed by eight scientists, five of them Nobelist laureates.

In the meantime, the Federation of American Scientists, whose sponsors and council members include an even mixture of signers of both tracts, has begun a two-part analysis of the nuclear controversy in the monthly FAS newsletter. An introductory statement observes that between the advocates and the critics there exists a moderate school of thought which "sees dangers everywhere, certainty nowhere; for it, prudence includes maintenance of a vigorous sector of fission power until such time as at least one major nuclear accident certifies that the opponents were right." The statement goes on to say, "This view sometimes [holds] that the opponents of nuclear power are now as sensational as the proponents were dogmatic."—R.G.