THE VOICE OF SCIENCE ON CAPITOL HILL

F.A.S. NEWSLETTER

FEDERATION OF AMERICAN SCIENTISTS — Founded 1946 —
A national organization of natural and social scientists and engineers concerned with problems of science and society.

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SALT COMES TO CONGRESS

In November, 1969, ten months after it took office, the Nixon Administration was ready to open SALT talks in Helsinki. After discussing strategic principles, the talks moved on to an agenda for future work and then bogged down in discussions of comprehensive proposals. It took 18 months for the two sides to agree on what was to be done. Then, on May 20, 1971, the two governments agreed to work for an agreement limiting ABMs with some side agreements on strategic offensive weapons.

By this time, the Nixon Administration had been in office for more than two years. It had urged the ABM upon the public in two different budgets — first as "prudent" to protect U.S. missiles, then as a defense of cities against a purported Chinese threat, and later as a "bargaining chip." As a result, the Administration had, from a political point of view, precluded itself from negotiating an agreement for *no* ABM.

Furthermore, in order to win, in 1969, the Congressional authority for the ABM, the Administration raised an enormous and quite premature alarm about the threat which the ABM was supposed to resolve. This was a political reason why, in the May 20, 1971 agreement on goals, the Administration felt obliged to have some kind of reference to agreements on offensive weapons. For their part, the Soviets were pressing for a separate agreement on ABMs only. And this would have been the simplest thing to do — something which the FAS also had proposed in December, 1971.

Treaty, Plus Interim Agreement, Signed

The resulting ABM Treaty, and the interim agreement on offensive weapons, were signed one year later, on May 26, 1972, in the midst of yet a third Congressional debate over the budget. By this time, general acceptance of the bargaining chip agreement had committed the Congress to at least one or two ABM sites which were then under construction. But overtures toward China had undermined the case for an anti-Chinese missile defense of the entire country. The U.S. had emphasized defense of missiles as its use for the ABM, but the Soviets had an ABM site around Moscow. As a result, two ABM sites became the resolvent of political forces on each side: the agreement permitted one site for missile defense and one site for defense of the capital city.

The interim agreement was an effort to halt the growth in numbers of Soviet missiles. The Soviet Union had gone into mass production of ICBMs a few years later (1965) than the United States (1962) and was showing signs of continuing its deployment until it had far more missiles.

—Continued on Page 2

FAS ESTABLISHES TAX-DEDUCTIBLE SUBSIDIARY

In August, 1972, FAS announced the establishment of an IRS approved tax-deductible subsidiary: The Federation of American Scientists Fund. For 26 years, FAS performed many educational and scientific activities without the special tax advantages these activities normally receive from the IRS. This was a matter of choice for FAS. It preferred registration only as a public interest civic organization so that it could express its views on legislative matters on which comments from tax-exempt organizations are proscribed.

Now, through the creation of the Fund, FAS will be able to separate research, educational and non-legislative activities and, hopefully, fund them through philanthropic and foundation gifts.

Present plans for using the Fund call for hiring specialists to concentrate on each of these fields: environmental science activities; public health activities; and problems of science and scientists. However, these increases in staff will require new sources of financial support and take time to complete.

Meanwhile, efforts are being made to continue to expand the membership at the same high rate that was obtained during the last two years (60% a year) Our goal is to increase the present membership (of 4,000) to 10,000 members by November 1976—the next Presidential election. In order to fulfill this goal, FAS must expand its activities. For this also it will need additional financing. The next four years will, therefore, be a development period for FAS. Members are urged to reassess their priorities during these four years for giving to good causes. If you can give us a substantial fraction of whatever you give to charity during some or all of these years, we will institutionalize a voice of science in Washington. Now is the time to help FAS create an organization that will last.

While contributions to FAS are not deductible, contributions to the FAS Fund are! The Trustees of the Fund are: George W. Rathjens, Chairman; Marvin L. Goldberger, Matthew S. Meselson, Arthur W. Galston, Laurence I. Moss, Townsend Hoopes, Herbert F. York, and Jeremy J. Stone.

SALT—from Page 1

The solution to this (political) problem was to reach agreement on limits of numbers of missiles on each side. Unfortunately, such agreements were only of limited strategic significance since each missile permitted could be fitted with an indefinitely large number of ever smaller warheads — so long as accuracy continued to increase, as it had since the beginning of the missile age, so that the smaller warheads would be effective.

U.S. Leads With MIRV

The Soviet Union has not, thus far, tested MIRV warheads despite three years of Administration warnings that such tests were imminent. But it was assumed that such tests would come eventually. The U.S. had begun testing MIRV in 1968, and deploying it in June 1970. Rationales for U.S. MIRV had changed periodically and roughly like this: 1962-1965 — provide cheap capability to attack many Soviet targets; 1965-1968 — penetrate a potential thick Soviet ABM; 1969-1971—offset the numerical advantage the Soviets were achieving in land-based missiles; 1972-present — provide the capability to attack many Soviet military targets (as in 1962-65).

U.S. commitment to MIRV, and inspection problems, made agreements precluding MIRV impossible. But the SALT agreements limiting ABM prevented the U.S. from building hotly debated ABM defenses of its missiles. Thus it became a U.S. goal to limit the Soviet threat to U.S. missiles through an interim treaty on offensive weapons.

The interim treaty therefore tried to limit especially the construction of land-based launchers upon which MIRV would be mounted. In particular, it limited the total of large missiles (SS-9s); these would make particularly effective use of the MIRV technology because of their large yield. And it prohibited upgrading of missiles in size by more than 10 or 15%.

Nevertheless, since the U.S. was deploying MIRV, it had to be assumed that the Soviet Union would eventually deploy comparable MIRV devices upon the missiles permitted in the treaty. And, as MIRV opponents had long argued, these missiles would be quite enough — in time — to threaten Minuteman, if the Soviets made the effort. Some strategists considered the eventual vulnerability of Minuteman (and Soviet land-based missiles also) inevitable but unimportant because missile firing submarines were so invulnerable. But others were not prepared to accept this conclusion. For the latter group, the interim agreement thus had a critical loophole. Had a Democratic Administration proposed this treaty, it seems certain that this point would have received close scrutiny and, probably, harsh criticism.

Numerical Imbalances Criticized

The interim agreement was criticized also, by some, for permitting the Soviet Union more land-based missiles (1618 to 1054) and more submarine-based launchers (740 to 710). While the U.S. had programmed much larger numbers of warheads, it was argued that this advantage would be narrowed, or even greatly overwhelmed, once the Soviet Union achieved the technology to generate large numbers of warheads out of its larger throw-weight. It was further argued that these differences, while irrelevant strategically, might have some psychological significance.

With this in mind, Senator Henry Jackson offered an amendment which was first endorsed, and then endorsed without "interpretations", by the White House. The operative part of the resolution said:

> The Congress recognizes the principle of United States-Soviet equality reflected in the anti-ballistic missile treaty, and urges and requests the President to seek a future treaty that, inter alia, would *not limit the United States to levels of intercontinental strategic forces inferior to the limits provided for the Soviet Union.* (Italics added.)

The backers of the resolution refused to permit the insertion of the word "overall" so as to have the resolution read "overall levels"; thus they indicated that system by system equality in numbers was desired.

Opponents of the amendment argued that it would hamstring the negotiators and require a rigid equality that was both unnecessary and impractical in view of the many different and relevant force characteristics. Taking this view, Senator Edmund Muskie proposed that the italicized portion of the Jackson amendment be changed to read:

> "maintain an overall equality between the United States and the Soviet Union in nuclear strength, taking into account such components as numbers of delivery vehicles, numbers of deliverable warheads, accuracy, throw-weight, gross and equivalent mega tonnage, technical reliability, geography, deployment, survivability, overall quality of weapons systems, and other factors . . .

On September 14, the Senate approved the Treaty and interim agreements 88-2, and passed the Jackson amendment, 56-35. □

THE SALT TREATIES DESCRIBED

ABM TREATY: The ABM treaty prohibits a nationwide ABM deployment or the basis for such deployment. It permits at most the defense of two areas which must be at least 1300 kilometers apart. One of these ABM sites must be around the capital city. The other must contain ICBM sites (to be protected). Neither ABM site may have more than 100 launchers and 100 interceptors. Each must be deployed within a circular area of radius 150 kilometers.

Neither side may develop, test, or deploy new kinds of ABMs: sea-based, air-based, space-based or mobile land-based. Nor may they pursue such developments as launchers for multiple interceptors or launchers with rapid reload capability. ABM system components may not be given to other nations.

A standing consultative commission is set up to handle any problems. The treaty is of unlimited duration but is to be reviewed every five years. If "supreme interests" are jeopardized, a party can withdraw on six months' notice.

In the protocol to the interim agreement, the U.S. included a unilateral statement containing these sentences:

> **"If an agreement providing for more complete strategic offensive arms limitations were not achieved within five years, U.S. supreme interests could be jeopardized. Should that occur, it would constitute a basis for withdrawal from the ABM treaty."**

INTERIM AGREEMENT: Under the five-year interim agreement, both parties stop construction of additional land-based ICBMs after July 1, and they undertake not to upgrade light or older ICBMs into newer model heavy ICBMs (i.e. SS-9s). They also halt construction of submarine launched missiles except as replacements for an equal number of ICBM launchers of a type deployed before 1964.

National verification is to be used. Active negotiations for limitations on strategic offensive weapons are to be pursued. Withdrawal is possible, as in the case of the ABM treaty.

PROTOCOL TO INTERIM AGREEMENT: The upshot of the interim agreement is noted in the protocol to be as follows: the U.S. may have no more than 710 sub-launched ballistic missiles on no more than 44 submarines. The Soviet Union may have 740 such missiles but, if it retires older model missiles, it could have up to 950 sub-launched missiles on at most 62 ballistic missile submarines.

The Soviet Union made a unilateral statement, embodied in the protocol, asserting its view that the above imbalance in nuclear submarines was only a partial compensation to that strategic imbalance in ease of deployment that arises from the geography of the two sides. The Soviet Union argued that any increase in the NATO total of 50 such submarines, and 800 missiles, would justify a corresponding increase in Soviet forces. This was denied by the U.S. negotiators. □

CEQ RELEASES THIRD REPORT

This third annual report of the President's Council on Environmental Quality, released in August, discussed indices of environmental quality and costs of pollution control.

Environmental Indices

Of all pollution problems, air quality best lends itself to the construction of indices. By these indices, nationwide air quality improved between 1969 and 1970. For example, one can form separate indices of air pollution for these pollutants: carbon monoxide, sulfur dioxide, nitrogen dioxide, photochemical oxidants, and total suspended particulates. One can then combine these separate indices into an overall index (designated MAQI — Mitre Air Quality Index) by taking the square root of the sum of their squares. The result shows 10-15% improvement from 1968-69 notwithstanding the size of city. Another ten percent improvement occurred in 1969-70 except in cities of 100,000 to 400,000. (A different cumulative index which measures, essentially, how often air quality is really bad — i.e., one which accumulates extreme values — shows 30% improvement between 1968 and 1969 and 15% the next year.)

More difficulties arise with regard to water pollution because there are more pollutants, different uses for water, many relevant chemical reactions taking place in it, and no uniform national standards upon which to base the indices. Indeed, not enough is known to decide what are the major sources of water pollution. As a result, CEQ cannot tell whether things are getting better or worse, and to what extent or where.

Pesticides provide still worse problems because they contaminate different mediums (air, water and soil) and food — and because one presumably wants to have *some* of the "pollutant" in the environment. Indices determining how the environmentalist is doing with regard to pesticides will be comparably more difficult to construct.

Indices for land-use and toxic substances also provide severe conceptual problems, as well as insufficient data. And conservation of wildlife provides even greater problems since animals desired for one purpose may be bad for another. It seems that, in dealing with the environment, the simple question: "How can we know how well we are doing?" offers many interesting aspects for research.

Costs of Pollution Control

At present levels of spending, the U.S. is said by CEQ to be spending $100 billion on cleaning up the environment during the seventies. But to meet the new standards, another $180 billion will be required. The total will have to be spent about equally on air, water and solid waste problems. But half of the incremental costs induced by higher standards are associated with air pollution and one quarter with water pollution; this reflects the demands of the Clean Air Act and the Water Pollution Control Act. These high costs will, CEQ estimates, be about 2.2% of the GNP of the seventies. □

DEFENSE DEPARTMENT ATTACKS CRITICS

In July, the Defense Department snarled at its critics with 187 pages of heavily documented and somewhat sarcastic rebuttal of what it called the point of view of the "military fundamentalist." The report, entitled "The Economics of Defense Spending: A Look at the Realities," was produced by the Office of the Comptroller, Robert C. Moot.

According to the Comptroller, the military fundamentalist is one who blames all current economic problems on the military, and especially on the military-industrial complex and its strategic weapon program. The point to which the document returns, again and again, is that: other, larger economic forces are at work and strategic weapons are now less expensive than even recent increases in costs of manpower.

The report is interesting. Unfortunately, it often attacks straw men. And hitched as it is to redressing excesses of its critics, it fails to come to grips with the more sophisticated case against defense spending.

For example, the report emphasizes over and over again that, in constant dollars, the fiscal 1973 budget is at the lowest level since 1951. But what this means, of course, is that we are spending less now than at any period of the post-Korean War cold war. Why not?

The President has announced a period of negotiation; cold war tensions, fears and expectations are at an unprecedented low ebb. While the opponents of military spending do not suggest that military expenditures should be proportional to immediate tension, they are aroused by the over-slow response of the budget to long-term diminutions in the threat. Furthermore, the invested capital in armament on station is very large; we have tens of billions of dollars in strategic weapons on station. The Communist camp is split and in disarray. Its major members all have evident problems of their own. In short, for critics of defense spending, the threat is vanishing faster even than the budget.

Attacking the Wrong Thing?

The report emphasizes that military pay has increased $24 billion in the last dozen years despite declines in manpower and asks: "Whey don't the critics mention manpower costs instead of focusing all their attention on strategic weapon procurement?" (DOD is the only government agency with the chutzpah to suggest that people ought to lay off a budget item because it is only $20 billion.)

The Comptroller's report suggests that "Defense spending has remained high largely because of military pay increases." The political realities are subtler and quite the contrary. The defense critics never had the power to *cut* the budget. They *were* able — more or less — to keep a lid on it however and, as a consequence, manpower pay increases simply squeezed out strategic weapons which would otherwise have been promptly authorized.

In any case, it simply is not true that critics have ignored the cost of manpower; they have asked for manpower cuts. In this connection, someone should ask whether or not manpower cuts could be justified on the grounds that the capital investment in weapons with which each soldier is armed have increased. Surely, we must be delivering more bang per soldier than we did in Eisenhower's day. Depending upon the tactical situation and the Russian investment, in weapons per soldier, perhaps there are unused arguments here.

The Comptroller's report rejects the claim of Seymour Melman that defense and space use of R&D had importantly depleted the supply of R&D talent in civilian industries. It argues that such R&D has only been about half of the total R&D during the cold war and, moreover, that domestic R&D grew most rapidly during periods of greatest defense buildup. But even the current third of R&D resources now being devoted to defense (excluding space) is a lot. And the charges Melman makes about the opportunity costs of 20 years of such devotion to defense can hardly be easily dismissed by noting that the military took only half.

Why the Inflation?

Mr. Moot does not agree with the widespread view that the current inflation was touched off by Vietnamese war deficit spending. He says that between 1964-68 defense spending rose by $27 billion or 50%. He notes that during this time Federal social and economic spending rose by $29 billion (65%) and state and local spending rose by $33 billion (48%). But much of these latter increases were transfer payments paid out of steadily rising built-in taxes. The sudden expenses induced by the war were quite different. These produced deficits people, for political reasons, were unwilling even to predict much less to prepare for.

The Comptroller's basic position is simply stated: the defense budget is no longer the central element in the resource-allocation problem. He sees the defense budget as too small a share of the GNP (6.5%), of total Federal spending (1/3) and of the tax dollar (1/5) to be the major force in such economic problems as inflation, balance of payments, productivity, or the public spending crunch.

But at least as far as the latter is concerned — the public-spending crunch — his case depends upon one's perception of what is politically possible and militarily desirable. Certainly, so far as Senator McGovern's advisers are concerned, the controllable, available and disposable funds in the U.S. budget lie in the military budget. Where else could one find $32 billion that depend on one's estimate of what is really necessary! Whatever the GNP may say, only the Defense Department budget plays games with billions of dollars. Other controllable Federal programs are counted in tens of millions or, at most, hundreds.

Most of the Comptroller's case comes down to the fact that we are spending less now than at any time in the cold war. But the cold war is warmer now than at any previous time — much much warmer. And many many weapons are in place. Controllable funds are in short supply. Are we always to spend as much as we found ourselves spending after we got into the Korean war? This seems to be the current, if tacit, point of controversy between the Comptroller and his critics. □

STOCKHOLM CONFERENCE: ONE PLANET, TWO WORLDS

In the developing countries, most of the environmental problems are caused by under-development. . . .

In the industrialized countries, environmental problems are generally related to industrialization and technological development. (Stockholm Conference conclusions.)

One hundred and thirteen countries attended the U.N. Conference on the Human Environment and passed 26 principles and over 200 recommendations. For most of these countries, poverty is the real problem. (Principle 1: "Man has the fundamental right to freedom, equality and *adequate conditions of life* in an environment of a quality that permits a life of dignity and well-being . . ." italics added.)

They want help. For the developing world, the uproar over environment is just another reason why they need more aid. (Principle 9: Environmental deficiencies generated by the conditions of underdevelopment . . . can best be remedied by accelerated development through the transfer of substantial quantities of financial and technological assistance as a supplement to the domestic effort of the developing countries . . ."; Principle 12: "Resources should be made available to preserve and improve the environment, taking into account the circumstances and particular requirements of developing countries . . .")

The pressure became sufficiently evident that the United States felt obliged to submit an "interpretation" stating that it did not regard the text of the Conference declaration, or its 26 principles, "as requiring the United States of America to change its aid policies or increase the amounts thereof."

For their part, the developing countries fear that the environment will be used as a pretext for further exploitation. They felt obliged to recommend:

> "That all countries present at the Conference agree not to invoke environmental concerns as a pretext for discriminatory trade policies or for reduced access to markets and recognize further that the burdens of the environmental policies of the industrialized countries should not be transferred, either directly or indirectly, to the developing countries. . ." (Recommendation 103).

Environmental Aggression?

The Conference recommended that the governments be reminded of the need for regional consultation when conditions or plans in one country could have repercussions in another country. (Although this recommendation was prefaced by discussions of urban problems, it seems to apply equally to Amchitka nuclear tests, or the placing of large numbers of needles in the atmosphere.) In Principle 21, the Conference asserted the responsibility of states "to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction." (On July 20, 1972, FAS joined with the Sierra Club in noting, in a letter to the President, that this principle seemed in conflict with the use of weather modification in the Vietnamese war.) Recommendation 70 urged that "Governments be mindful of activities in which there is an appreciable risk of effects on climate" and consult accordingly.

Scientific Exchange

The Conference supported "free flow of up-to-date scientific information" and recommended that Governments arrange exchanges of visits for public and private researchers.

Nuclear Testing

The Conference did not adopt the no-first-use of nuclear weapons position espoused by the People's Republic of China (and rejected by all other nuclear powers). But it did note that "Man and his environment must be spared the effects of nuclear weapons . . ." and then urged general and complete disarmament. The U.S. promptly provided an interpretation that equated this statement with previous U.S. positions. Elsewhere the conference condemned nuclear weapons tests of all kinds. □

FAS SEEKS PROPOSALS

The Federation of American Scientists Fund is soliciting suggestions from FAS members for studies relevant to present or future problems of science and society. Members need not be interested in pursuing the studies themselves, but should indicate whether they would be prepared to develop their ideas further, if encouraged.

The suggestions will be screened initially by a series of consultants led by Dr. Leonard S. Rodberg, formerly Chief of the Science Policy Office of the Arms Control and Disarmament Agency. Among the consultants with areas of special interest are: Dennis Hayes (environment), Quentin Young (medicine) and William Capron (economics). The Committee will be assisted in screening the proposals for feasibility of funding by Lindsay Mattison.

Efforts will be made to fund the most promising proposals through philanthropic gifts to the FAS Fund and to carry them out under its auspices. All suggestions should be sent to the Federation national office: 203 C St., N.E., Washington, D. C. 20002. □

FAS QUESTIONNAIRE

Approximately 300 members responded to the May questionnaire. Asked to rank issues in terms of weight that FAS should give to them, FAS members had the option of choosing: "critically important", "important", "interesting but not pressing", "not important", "outside FAS area of concern." With weights of 3, 2, 1, 0, −1 assigned to these categories, FAS members ranked the issues like this:

> Defense problems (1227); Environment (1167); Science Policy (1057); Vietnam (1026); Science and Society Problems (998); Ethical Problems of Science and Technology (940); Unemployment and Underemployment of Scientists (757); Proper Functioning of Government (702); Consumerism (383). □

1972 ELECTIONS: GOLDBERGER AND MORRISON ELECTED

Marvin L. Goldberger was reelected Chairman of FAS in the June election. Philip Morrison, Professor of Physics at MIT, defeated Franklin A. Long for Vice Chairman in a close race.

Dr. Goldberger is Chairman of the Department of Physics of Princeton University and has long been active in both arms control and environmental public policy issues. He was formerly Chairman of the Strategic Weapons Committee of the President's Science Advisory Committee.

Dr. Morrison is a long-standing and active FAS member whose interests in, and knowledge of, science are extremely broad. Professor of Physics at MIT, he also reviews books for *Scientific American*. He will become FAS Chairman in June.

Dr. Franklin A. Long, who will serve on the National Council, became well known to the public at large when the Nixon Administration chose him as President of the National Science Foundation and then changed its mind when Long's anti-ABM views became known. As Assistant Director for Science and Technology of the Arms Control and Disarmament Agency, Dr. Long had previously played a central role in negotiating — and securing ratification of — the partial test ban treaty. He is currently Director of the Program on Science, Technology & Society (and Professor of Chemistry) at Cornell Univ.

Other FAS members elected to the National Council were Nina Byers, Professor of Physics at UCLA; Arthur W. Galston, Professor of Biology at Yale University; George W. Rathjens (re-elected), Professor of Political Science at MIT; Joseph L. Sax, Professor of Law at the University of Michigan, and Vigdor Teplitz, Assistant Professor of Physics at MIT.

Dr. Byers, who will serve on the FAS Executive Committee, has been active in FAS affairs in Los Angeles for many years.

Dr. Galston is chairman of the FAS committee on Sino-American exchanges and is a leading figure in efforts to improve relations between American and Chinese scientists.

Dr. Rathjens is a specialist on systems analysis, particularly of defense matters; he is one of the most vigorous figures in that small community of ex-Government science and defense officials who serve the public interest by providing candid and expert testimony on related public policy issues.

Professor Sax is probably the nation's leading expert on environmental law. He is the principal architect of the Hart-McGovern bill permitting citizen class actions on the substance of environmental issues.

Dr. Teplitz has been one of the Federation's most active members in the Boston area. He has played a key role in organizing discussion of MIRV in particular. His efforts to organize scientists for political electioneering included the campaign of Congressman Drinan and the current campaign of Senator George McGovern for the presidency. □

GORDON MacDONALD LEAVES CEQ—WILL CHAIR ENVIRONMENT COMMITTEE OF FAS

On October 6, Gordon J. F. MacDonald is retiring from the President's Council on Environmental Quality (CEQ) to become Henry Luce Professor of Environmental Policy at Dartmouth and Director of the Environmental Studies Program. Upon his retirement from the Government, Dr. MacDonald will chair a committee on the environment for FAS. (Other committee members will be: Council Member Joseph Sax, referred to above, and Council Member Laurence I. Moss, now executive secretary of the Academy of Engineering's Committee on Public Engineering Policy (COPEP) and Vice President of the Sierra Club.)

Dr. MacDonald played a central role in securing the legislation which set up CEQ. He served as one of its charter members and — many believe — was its most active and best informed scientific member.

He was a member of the President's Science Advisory Committee from 1965-69 and served on such National Academy of Sciences Commissions and Boards as Atmospheric Sciences 1961-70: Space Science Board, 1962-70; and the Environmental Studies Board, 1968-70. □

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