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GENEVA DISARMAMENT TALKS

William C. Foster, Director of ACDA, spent more than a month at the Geneva disarmament conference before returning to Washington early in March. In several major speeches to the conference, he took up ways of carrying out President Johnson's "next step" proposals, or variants that might be more palatable to the Soviet Union. While none of his ideas got a warm reception from the Russians, the conference seemed to be proceeding in an atmosphere of cautious optimism. At least there were none of the polemics and mutual accusations that have marked previous sessions.

One of Mr. Foster's speeches (Jan. 31) dealt with Johnson's most significant proposal, a "verified freeze" on the number and type of strategic nuclear vehicles. Mr. Foster listed some specific points which the U.S. felt should be explored on both sides before undertaking detailed negotiations. He made it clear that the U.S. favored a freeze applying not only to delivery systems (strategic missiles and aircraft) but to anti-ballistic missile systems. In addition, the "objective of the freeze on characteristics should be . . . to prevent the development and deployment of strategic vehicles of a significantly new type. Like the freeze on numbers, this should apply to defensive as well as offensive vehicles." Mr. Foster suggested that compliance with the freeze might be assured by monitoring of declared production and test facilities plus limited checking to guard against undeclared facilities. He stressed that checking would be much simpler than verification required for a freeze or cutback on all major arms categories such as the U.S. has proposed.

The Soviet Union's main initial comment on the freeze scheme was that it was inadequate, since it failed to end the nuclear threat at an early stage. To accomplish this, Soviet delegate Tsarapkin again urged acceptance of Moscow's plan for destroying all but a "strictly limited" number of missiles during the first stage of disarmament. (The Russians have stressed that the offer to allow each side to keep some missiles was a major concession to Western views, and the Soviet Union last September hinted that some "nuclear umbrella" could be maintained until the third and final stage of a general disarmament plan.)

While the U.S. and its allies have wanted a spelling out of what missiles would be kept and how destruction of others would be ensured, the Soviet Union is urging adoption of the general proposal, with details to be negotiated.

There seems to be widespread agreement at present on the desirability of preventing the spread of nuclear weapons to States which do not now have them. The Johnson message urged steps to prevent this and to safeguard international transfers of nuclear materials for peaceful programs. At Geneva, Mr. Foster said that the U.S., in private talks would seek agreement with the Soviet Union on the terms of a "declaration" whereby nuclear powers would undertake not to disseminate weapons and nonnuclear States would pledge not to manufacture or acquire them. Meanwhile, the "declared policy" of the U.S. would conform with this. However, he stressed that the U.S. does not regard creation of a NATO multilateral defense force as dissemination of nuclear weapons.

The difficulty of getting a formal international agreement on the subject apparently might lead the U.S. to seek a looser pledge, perhaps similar to the U.S.-Soviet pledge to refrain from orbiting nuclear weapons.

In several speeches, Mr. Foster stressed the "flexible" nature of the U.S. long-standing proposals of a worldwide "cutoff" in production of nuclear weapons material, and also of the new Johnson suggestion that the U.S. and Soviet Governments should meanwhile each take steps to reduce military production and accept inspection of closed military facilities (and peaceful ones in operation).

At several points, Mr. Foster suggested that the IAEA might undertake verification tasks, permanently or pending creation of a disarmament organization.—(N.Y. Times, 2/14, 2/28, 3/7.)

McGOVERN TO ADDRESS FAS

The annual FAS public meeting features an address by Senator George McGovern of South Dakota, entitled "Science in the Service of Peace." Senator McGovern will speak on Sunday, April 26, at 8:30 p.m., in the auditorium of the Natural History Building of the Smithsonian Institution at Constitution Avenue and 10th Street, N.W., Washington, D.C. A discussion period will follow the speech.

Senator McGovern has long been interested in limitations on armaments and the role of scientists in promoting such steps. He has also been instrumental in starting public discussion of economic problems that will result from a drop in defense spending, and has introduced legislation dealing with this problem. In a major speech to the Senate last August, he argued the need for "New Perspectives on American Security"; excerpts appeared in the Oct. 1963 Newsletter.

For those attending the American Physical Society meeting, the Natural History Building is easily reached by taxi from the Sheraton-Park and Shoreham hotels. The fare is 35 cents per person in groups (75 cents for a single passenger).

COUNCIL MEETING

The April FAS Council meeting will take place Monday, April 27, at 7:30 p.m. in the Sheraton-Park Hotel. The room will be announced later.

REPORT ON COUNCIL ACTIONS

Discussions at the last FAS Council meeting, held in New York on January 24-25, centered around several proposals for FAS statements: on ballistic missile defense, on international space cooperation, on the Geneva disarmament negotiations, and on biological and chemical warfare.

An active discussion was held on a draft statement opposing early deployment of U.S. anti-missile defense systems. Freeman Dyson, who had drafted the brief statement and a longer background paper (which has since appeared in the January Newsletter) explained several arguments for such a stand. He pointed out that even a partly effective missile defense system would be very expensive, and that any major U.S. effort in this direction could touch off a truly "open-ended" arms race, with both the U.S. and Soviet Union building such defenses and then being forced to build more missiles to overcome the other side's defenses; that the missile requirements on both sides would increase sharply, since neither could be sure how effective the other side's defenses were. Dyson also pointed out that an extensive fallout shelter system would be needed to make any missile defense effective; otherwise an attacker could wipe out cities by dropping bombs upwind, out of range of the defense system. He expressed fears that a large fallout and/or blast shelter program would require an unprecedented "hardening" of American society, so that people would be trained and disciplined to move quickly to shelters and obey orders in a crisis situation.

As there was some disagreement about these points and, in particular, about their phrasing in the draft statement, a committee was appointed to expand the statement. Council members felt the discussion had been highly educational and that the issues should receive more public attention; Dyson and Gerald Holton were invited to collaborate on a longer explanatory article, aimed at a larger audience than the FAS membership.

A group from Boston presented a draft statement on chemical and biological weapons, calling on the President to declare a policy of "no first use," and proposing that U.S. research to develop new weapons, as well as field testing, be dropped. Their supporting paper pointed out that these weapons, especially the biological ones, are suited principally for use against mass civilian populations, a morally repugnant prospect. The spread of these weapons would also complicate the problems of arms control and inspection.

(Continued on page 4)

AEC SEES DELAY IN CANAL PROJECT

The Atomic Energy Commission has estimated that it would be at least 10 years before it would be economically feasible to dig an isthmian canal with nuclear explosives.

The development of these explosives for peaceful purposes is being retarded by the atomic treaty and budgetary cut-backs ordered by the Johnson Administration, the commission also told the Joint Congressional Committee on Atomic Energy on Feb. 25. The commission's estimate was in contrast to the impression left by earlier official statements—that the use of nuclear explosives for major earth-moving projects was just around the corner. Since the Panamanian crisis, there has been a burst of interest within Congress and the executive branch in using nuclear explosives to dig a canal across the Central American isthmus. Estimates from commission scientists have indicated that such a canal could be dug with nuclear explosives at a fraction of the cost of conventional engineering methods.

DEVELOPMENT LAGGING

From the testimony it was apparent that the AEC did not have a nuclear device sufficiently "clean" in radioactive debris that could be used for such an engineering project. AEC Chairman Glenn T. Seaborg estimated that "at the optimum" it would take five years to develop the devices and excavation technology for a canal project. This estimate was based on the premise that the development would not be restricted by existing budgetary and diplomatic limitations. A somewhat more optimistic estimate was offered by Dr. Gerald Johnson, who predicted a device could be developed in two years. Dr. Johnson is associate director of the Livermore Laboratory in California in charge of Project Plowshare, the program for development of the peaceful uses of atomic explosives. Even after the device and technology are developed, Dr. Johnson testified, it will take five years to produce the few hundred explosives needed for a canal project. These estimates, however, were based on the assumption that Project Plowshare would be permitted to proceed faster than is now being allowed by the Administration for budgetary and diplomatic considerations. The net effect of the testimony, therefore, was that it might be 15 to 20 years before the United States was able to take on a project of digging a canal with nuclear explosives.

PROGRESS IS REPORTED

The commission reported that it was making significant progress in developing "clean" devices producing only a limited amount of radioactive debris. An underground test in Nevada Feb. 20, for example, was described as being highly successful. The devices can be developed in completely contained underground tests. The problem that is arising is in developing the excavation technology for using the devices. This development requires explosions that break through the surface, as would occur in an excavation project. Here the commission and the Administration are running into the restrictions imposed by last year's test treaty.

The treaty makes no provision for atomic explosions for peaceful purposes. It does permit underground explosions, but only so long as they do not produce radioactive debris beyond the territorial boundaries of the testing nation. From diagrams displayed by Dr. Johnson, it was evident that in a canal project the debris although small would be carried over international waters. Thus a canal project would undoubtedly require an exemption or amendment to the treaty.

The commission officials said that the treaty was already inhibiting the cratering experiments necessary to develop the excavation technology. To comply with the treaty, the commission disclosed, it has had to reduce the size of the planned cratering experiments and to defer one large test. Furthermore, it was said the Administration has not yet given approval for cratering experiments and President Johnson has ordered a deferral of one "small shot" that had been planned. Representative Craig Hosmer, (R., Calif.) said that this contrasted to the impression left by Administration officials at the treaty hearings that the nuclear test ban treaty would not inhibit the development of nuclear explosives for peaceful purposes (N. Y. Times, 2/26).

DR. BUNTING NAMED TO AEC

The White House has announced the nomination of Dr. Mary I. Bunting, president of Radcliffe College, to fill out a one-year vacancy on the Atomic Energy Commission, caused by the resignation of Dr. Robert E. Wilson. The appointment neatly extricated the Administration from an impasse between labor and business groups, both of whom were pushing their own candidates. In appointing a woman to the post, the White House resolved the deadlock without directly offending anyone, and helped President Johnson to fulfill his pledge to name 50 women to top-level posts in the government. (N.Y. Times, W. Post, 3/29.)

The American Federation of Labor and Congress of Industrial Organizations had urged that a labor representative be appointed to the commission which until now has been dominated by businessmen, lawyers, and more recently, scientists. The other members of the commission are two scientists, a lawyer with Government and Congressional background, and a lawyer with university experience. Reportedly the present members had recommended that a businessman be appointed. The deadlock was said to be responsible in large measure for the White House's delay in filling the post, vacant since February 1 when Dr. Wilson, a former oil company executive, resigned. Earlier, the news of his impending resignation set off considerable maneuvering between labor and business groups to fill the vacancy. In recent weeks, AFL-CIO leaders, previously divided on a candidate, had been reported to have joined forces in supporting Charles F. McGowan for the post. Mr. McGowan, a graduate engineer, has served as technical adviser and international representative of the International Brotherhood of Boiler Makers and as a union representative on several atomic advisory committees.

Meanwhile, the United States Chamber of Commerce and the National Association of Manufacturers, at the request of AEC Chairman Glenn T. Seaborg, offered businessmen as candidates. The commission had privately made clear that it favored the appointment of a man with business or industry background. The argument was that because of the commission's responsibility for the industrial development of atomic energy, it would be advantageous to have at least one businessman on the commission. One of the principal contributions made by Dr. Wilson, according to associates, was to apply his business and management background to straighten out a nuclear power program that had tended to become too esoteric and diversified (N. Y. Times, 1/9 and 3/18).

AMA BACKS TOBACCO INDUSTRY

The latest chapter of the smoking issue has dealt with the Federal Trade Commission's move to require a hazard label on each pack of cigarettes. The cigarette industry, supported by some tobacco-state Congressmen, is vigorously opposing the FTC proposals and is calling for "more research" before any restrictions are imposed. Cigarette advertising, meanwhile, has come up with its own form of the hazard label: "No medical evidence or scientific endorsement has proved any other cigarette to be superior to Kent."

The industry acquired surprising support from the American Medical Association. In accepting an unrestricted \$10 million dollar grant from the tobacco industry, the AMA echoed the call for more research. A few days later, the AMA testified in opposition to the FTC's proposed hazard label.

The AMA explained that it had always been for labeling requirements with respect to drugs and other hazardous products, but that in regard to cigarettes it was unnecessary, as everyone knows about the hazard. Representative Frank Thompson, Jr. (D.-N. J.) suggested that the AMA was siding with the tobacco industry in return for support against medicare, but the AMA denied this.

Meanwhile, President Johnson has been silent on the issue. He made no mention of smoking in his otherwise far-ranging health message. In a news conference, he pointed out that the report was not, as yet, a government report, but rather a committee report to the Surgeon General, and there are even reports that he has told the Surgeon General to "take it easy." (Science, 3/27 and W. Post, 3/21).

U.S. OFFERS INSPECTION OF BIG A-POWER PLANT

The U. S. has announced to the 17-nation disarmament conference at Geneva that one of its largest nuclear power reactors will be placed under permanent international inspection in a move designed to halt the spread of nuclear weapons. U. S. Delegate Adrian S. Fisher told the conference that the U. S. has invited the International Atomic Energy Agency to place an inspection group in the Yankee Atomic Electric Company's \$57-million power plant at Rowe, Mass. Fisher said the action was meant as a pilot project to encourage other countries—particularly the Soviet Union—to submit to agency inspection of their nonmilitary reactors.

Fisher said three smaller American reactors, two at the Brookhaven, N. Y., Research Laboratory and one at Piqua, Ohio, are already under agency inspection to help it develop its procedure for safeguarding the peaceful uses of atomic energy. This was under a program involving reactors of under 100,000-kilowatt capability. Yankee exceeds that limit and comes under a new IAEA program agreed to Feb. 26.

Other plants in the U. S. will be open to inspection, according to Fisher, if the Soviet Union joins in the program on a reciprocal basis. Although Soviet Delegate Tsarapkin implied that the Russians viewed such a proposal with the same suspicion they have expressed toward all other Western arms control proposals containing inspection procedures, American officials did not seem discouraged by this initial cool reaction (W. Post, 3/6).

JCAE WANTS CURB ON FERMI AWARD

The \$50,000 Fermi Award for atomic scientists is facing Congressional curtailment. The Joint Committee on Atomic Energy has approved legislation prohibiting the AEC from automatically giving \$50,000 with the annual award. Instead, the AEC would be required to obtain Congressional approval for the amount of the award. The Congress would presumably act on the advice of the JCAE.

It is expected that the award would often be reduced well below \$50,000. The JCAE is reported to feel that the \$50,000 award has outweighed the contributions some of the recipients have made to atomic energy. This criticism was made in particular of last year's award to Dr. J. Robert Oppenheimer.

Members of the JCAE have also reportedly charged that a small group of scientists is just passing the honor around among themselves. It was pointed out that the AEC has largely delegated the selection of the recipient to its Advisory Committee, and that all but two of the seven winners have served on that body. Previous winners have been Drs. John Von Neumann, Ernest Lawrence, Eugene Wigner, Glenn Seaborg, Hans Bethe, and Edward Teller.

The JCAE was said to have favorite candidates of its own, and to be incensed at having them repeatedly passed over. (N. Y. Times, 3/8)

NSF SCIENCE DEVELOPMENT PROGRAM

The National Science Foundation recently announced its long-awaited Science Development Program, designed to promote the development of new centers of excellence. The Foundation, asked Congress for \$33 million to start the program during FY 1964, only to have the request cut to \$3 million. During hearings on March 16 and 17 before the House Appropriation Subcommittee on Independent Offices, \$25 million was asked for the Science Development Program for FY 1965. Out of the combined total of \$28 million, the Foundation plans to make 10 to 15 grants. These grants will enable qualified institutions to develop stronger science programs by building up their science departments, by initiating new interdisciplinary research and education programs, by adding faculty, by building new laboratories, or by purchasing new equipment. Proposals will describe five-year plans and ask Foundation support in the order of \$5 or \$6 million for the first three years of the program, with the possibility of further funding for two more years.

NAS REPORT ON RESEARCH

A 98-page report issued by the National Academy of Science on March 20 calls for adjustments in the methods used by the Federal Government to support universities and

scientists and in the way universities and scientists use public funds. The report, *Federal Support of Basic Research in Institutions of Higher Learning*, was prepared by the NAS Committee on Science and Public Policy (COSPUP) under the chairmanship of George B. Kistiakowsky, Professor of Chemistry at Harvard University and former Special Assistant to the President (Eisenhower) for Science and Technology. The report may be obtained for \$2 from the NAS Printing and Publishing Office, 2101 Constitution Avenue, N.W., Washington, D. C. 20418. COSPUP was formed in April, 1963 when the American Society of Biological Chemists asked the Academy "to enunciate the principles and philosophy which could serve as a basic policy in the future conduct and administration of Federal programs in support of fundamental research." The request was caused by the adoption by NIH of some restrictive additions to its grant policies, these additions having been caused, in turn, by the activities of the Fountain Committee concerning NIH.

Whereas the report takes the view that Federal support of basic research can be administered in a manner which would preserve both the traditional freedom of scientific inquiry and accountability of public funds, it does also say that much of the current problem has been caused by the failure of universities and scientists to recognize that a federal grant commits them "to a conscientious effort" to achieve the stated purpose of the grant.

"Research project grants and contracts should remain the backbone of Federal policy in support of basic research in science in the universities," the report states, and it recommends three different types of new grants.

- A. Institutional or general research grants,
- B. Small research grants for junior scientists on the basis of a very general outline of their research interests and the endorsement of their seniors; and
- C. A distinct and selective program of research grants to "serve weaker institutions on the basis of demonstrated will to utilize new funds to raise the level of research and graduate education. We believe that development grants should not be extensively used until principles and criteria for such awards have been carefully studied by a competent special task force."

"We believe that the health of the project system requires that three principles remain inviolate, *never* becoming subjects of negotiation or giving rise to restrictive clauses in grants. They are: (1) the responsibility of the government for the expenditure of public funds; (2) the independence of the universities; and (3) the freedom of the scientist to conduct his research, reach his conclusions in his own way, and make them public. Unfortunately, there is a current trend toward introducing into grant and contract negotiations and regulations administrative restrictions that are inimical to effective basic research. We believe that this trend should be reversed, with the universities taking increasing responsibility for proper administration of grants and contracts."

Other recommendations include: increased support of indirect costs in institutions which have large-scale projects; a movement away from a "time-clock" attitude now being adopted by some agencies; a lessening of report requirements and of bookkeeping by the researcher; short-term, rotating, wide-circle advisory panels; closer understanding between university research and administrative staffs; simpler requirements for proposal writing; and better proposal writing.

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Chairman.....Robert R. Wilson

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The FAS, founded in 1946, is a national organization of scientists and engineers concerned with the impact of science on national and world affairs.

REPORT ON COUNCIL . . .

(Continued from Page 1)

This draft was criticized mainly on the grounds that it linked chemical weapons, which might have tactical military uses, with the mass biological weapons. It was agreed that a revised statement should be submitted to the April Council meetings. Another suggestion raised was that the FAS should condemn the use of defoliating anti-crop chemicals in Vietnam: the political cost of these programs was said to be tremendous.

John Toll presented a statement advocating greater international cooperation in investigations of space, and in particular endorsing joint U.S.-Soviet efforts to explore the moon. After some revisions, the statement was adopted, to be released at a suitable time. The Executive Committee was also authorized to offer Congressional testimony in support of this policy.

A discussion of the Geneva disarmament negotiations led to Louis Sohn's being invited to draft a statement supporting President Johnson's new initiatives, particularly the proposed freeze on strategic nuclear weapons. This statement was approved by the Council and released on February 6 (see February Newsletter).

VITA PROGRAM DESCRIBED

Robert Walker of MASE spoke briefly about VITA (Volunteers for International Technical Assistance). VITA aims to provide technical advice and develop simple devices to meet specific needs in underdeveloped countries. As examples, he mentioned a solar cooker, a simple well pump, and a handbook of technical devices for community development. VITA now has 700 members, and its program is getting too large to handle on a part-time basis. Walker asked for advice in getting support, financial and otherwise. After some discussion, the Council passed a resolution expressing admiration and support of VITA's activities, and authorizing use of the FAS mailing list for a fund appeal.

The question of the long-range goals of the FAS was again raised. W. A. Higinbotham, head of the committee, said that the FAS tends to meet crises as they come up and goes on momentum in between. There was some feeling, expressed particularly by Peter Bergman and Ilse Bry, that FAS should give more attention to other problems, besides disarmament, of great importance to science and society. Educational policy, the side effects of automation, and the organization of science were raised as examples. Owen Chamberlain suggested that it is the problems of "life and death" that bring the FAS together, and that these would probably remain its central concern.

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**FAVORABLE REPORT ON
NUCLEAR POWER PLANT**

The atomic power industry has just received an unexpected and dramatic shot-in-the-arm, according to an article in the March issue of *Forum Memo*, the publication of Atomic Industrial Forum, Inc. The cause of the stir is the publication by Jersey Central Power & Light Co. of a "Report on Economic Analysis for Oyster Creek Nuclear Electric Generating Station", a detailed economic analysis of that nuclear power project. According to *Forum Memo*, "This remarkable report confirms in the strongest possible way, short of actually operating the plant, that the premises for most earlier evaluations of nuclear power have suddenly become obsolete". The report "establishes that both capital costs and guaranteed fuel fabrication costs for large U. S. water reactors are now at levels which would have seemed incredibly low a year ago".

The purpose of the report of the power utility was to present a comparison between the nuclear plant and two coal power alternatives which the Jersey Central might have chosen for a source of power. The analysis concludes that, operating at levels which the utility expects to reach within the first five years after the start of operation (5-600 electrical megawatts), the Oyster Creek nuclear plant will have a distinct advantage over the two coal alternatives. For example, to make a coal fired station at Oyster Creek competitive with the nuclear plant, costs of coal delivered there would have to be less than 20 cents per million BTU, the report figures. On this estimate, the Jersey Central nuclear plant would be fully competitive with coal fired stations of the same size in the U. S., in all but the lowest coal cost areas. It would be even more attractive in the few foreign areas able to use so large a unit. The nuclear power plant also compared favorably with the alternative power facilities on the basis of installation costs.

The Jersey Central report takes on added significance, according to *Forum Memo*, because Niagara Mohawk's Nine Mile Point station will evidently do just as well. Moreover, General Electric, which will supply most of the major components for the Nine Mile Point station, will soon publish a price list giving basic costs for complete plants over a range of sizes. Both GE and Westinghouse are actively engaged in trying to win new customers for large plants abroad as well as in the U. S.

COMMITTEE TO PROBE NIH

Donald Hornig, Special Assistant to the President for Science and Technology, has appointed a 14-member study committee under the chairmanship of Dean E. Wooldridge to spend six months studying the National Institutes of Health to assess the quality of its operations. Eleven technical panels will assist the study in the areas of administration, anatomy, behavioral sciences, biochemistry, biophysics, microbiology, pathology, pharmacology, physical sciences, physiology, and review procedures. The members are Mary Bunting, James A. Doolittle, William V. Houston, George James, William McElroy, Carl Moore, Quigg Newton, Joseph Platt, Gwilym Price, Wayne Reitz, Julius A. Stratton, Thomas J. Watson, Jr., and Jerome B. Wiesner.

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