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DISARMAMENT

The seventeen-nation Geneva Conference on Disarmament is recessing for a month, until July 16, after three months of arduous and inconclusive discussion of disarmanent problems. The Conference made little headway on any major issues between the Soviet bloc and the West, though the eight neutral States have had some successes in their new role of probing positions and seeking compromises or new approaches. In addition, the Conference co-Chairmen, U.S. Arthur Dean and Soviet Valerian Zorin, have held a continuing private dialogue on specific issues. Details of the negotiations have been endless, but some main features of the Conference can be singled out.

General and Complete Disaramament

The full Conference has been discussing principles and specific stages of disarmament, in something akin to a "first reading" of Soviet and American proposals for a treaty establishing general disarmament and an International Disarmament Organization. The Soviet Union took the initiative here, pressing for action on its formal draft treaty, which incorporates earlier Soviet proposals for complete disarmament in three stages of one year each, with an IDO performing specific verification tasks. In response, the U.S. on April 18 submitted a lengthy "outline" of a treaty, with three stages of three years each, though with qualifications about completion of one stage and preparation for the next. (The U.S. plan is the most detailed yet presented; many provisions deal with future studies and agreements which would be needed to establish controls and verify disarmament steps such as elimination of atomic, bateriological, and chemical weapons. An official summary appears in N.Y. Times 4/19; the full text is in the Dept. of State Bulletin 5/7/62; an outline comparison of the U.S. and Soviet plans, prepared by Canada, is printed in Congr. Rec., 5/21/62, pp. 8091-96.)

During April and May the Conference discussed "first stage" measures, without any sign of overcoming major differences between East and West. In brief, the Soviet Union insisted on its "big" first stage, including total elimination of nuclear weapons delivery systems and foreign

(Continued on page 4)

FALLOUT

The Nation's Capital was buzzing during the first week in June with a wasp's nest stirred up by the June 1 report of the Federal Radiation Council, by the June 4 opening of hearings on "Radiation Standards, Including Fallout" of the Joint Committee on Atomic Energy, and by the June 5 release of the report of the National Advisory Council on Radiation. The essence of the flap was the old question "are people going to be hurt by fallout?" The answer to the question was given editorially by the Washington Post and Times Herald. The editorial of June 7 said in part that it is "plain beyond dispute by any reasonable person that this country does not now know enough about the effects of radiation and that it has not really developed any effective countermeasures."

Federal Radiation Council Report

The FRC report in general tended to play down the dangers of radiation but it did not deny the possibility of harmful effects.

> "We cannot say with certainty what health hazards are caused by fallout from nuclear testing. We expect there will be some genetic effects; other effects such as leukemia and cancer are more speculative and may not occur at all. We conclude that nuclear testing through 1961 has increased by small amounts the normal risks of adverse health effects".

The Federal Radiation Council was created in 1959 by public law 86-373 to advise the President on radiation matters. It includes the Secretaries of the Departments of H.E.W., Defense, Commerce, Labor and the Chairman of the Atomic Energy Commission and their designates. Conspicuously absent from the Council is the Secretary of Agriculture. It uses a group of scientists as consultants to aid in the formulation of its policies and in the preparation of its reports.

Hearings on Radiation Standards, Including Fallout

In announcing the hearings, Chairman Holifield said, "the Joint Committee has always looked very carefully at the vitally important subject of radiation standards. We are holding these hearings to up-date our previous hearings held in 1960 and also to receive testimony from experts regarding the latest developments concerning radiation standards and planned procedures to insure that the public is protected. . . . the resulting published hearings and summary-analysis will be a valuable tool for the . . . public."

Reports from the hearings indicate that the witnesses found that previous estimates of the radiation dose accumulated from natural sources and from medical and dental sources would have to be revised downward. The witnesses found also that fallout exposed the average American to radiation that was far less than that from other sources. (W. Post, 6/5)

Report of National Advisory Committee on Radiation

The fourteen-member Committee, headed by Russell Morgan, Radiologist-in-Chief, Johns Hopkins Hospital, acts in an advisory capacity to the Surgeon General of the United States Public Health Service. Their report examined the role of the P.H.S. in the prevention of undue radiation exposure of the population from environmental radio-contamination." In summary, the Committee concluded that "important gaps exist in current surveillance operations. Countermeasures to combat excessive contamination levels are inadequately developed. Coordination of the public health resources of the United States in a comprehensive program of radiation control is incomplete. And research and development in the several phases of the radiation control effort have been insufficiently supported." The Committee then made several recommendations as to how these deficiencies could be overcome. Not the least of the recommendations was that of increasing the budget of the radiation control program from 16 million to 25 million dollars in

(Continued on page 3)

CRITICISM OF HIGH ALTITUDE BOMB TESTS ANSWERED

In obvious response to international criticism (see F.A.S. Newsletter, May 1962), principally from British scientists, e.g. Lovel, Hoyle and Ryle, the President recently requested a group of outstanding U.S. scientists to meet and review the possible effects of the forthcoming U.S. high altitude bomb tests in the Pacific over Johnston Island. These tests should be underway at the time of this publication.

The news of this meeting appeared in an AEC release dated May 28, 1962 and appears to have been generally overlooked or not considered newsworthy by the U.S. press. The criticism of the U.S. plans was based on concern over the effects of the tests on the Van Allen radiation belts and the apparent lack of international scientific consultation. The AEC release (No. E-179), in addition to giving further details of the tests, also contained an attachment reporting the findings of the committee of experts as to the possible effects related to the radiation belts.

Two of the shots in the series were of cencern to the group. One to be exploded at the highest altitude of any of the series, will be in the sub-megaton range and at an altitude and geomagnetic position where the magnetic field lines connect to the lower part of the inner belt. The explosion is expected to create a "magnetic battle" of several hundred kilometers radius which will distort the Earth's field lines in this region for a short time. Recover is expected after 30 to 40 minutes. The particles of the belt in this region are expected to migrate around the distorted region and continue their normal motion or to be dumped into the atmosphere at the "kinks" in the field lines. Only a few percent of the normally trapped particles are expected to be removed. It is expected also that the belt will be restored to its original condition within a few days or weeks. Another effect considered was the trapping of decay electrons from the bomb fission products and neutrons. Theoretical calculations and also results from the ARGUS experiments (previous high altitude tests) indicate that the intensity of such electrons should not be large and will be confined to a thin shell. Most will subsequently be lost tothe atmosphere in hours or days with a small fraction persisting possibly for several weeks or months.

The second test of concern will be the largest shot of the series with a yield in the megaton range. However, the shot will occur sufficiently below the belt so that only a small fraction of the bomb debris is expected to enter the belt, nor will the magnetic distortion result in a measurable dumping of particles of the belt.

The committee thus concluded that the planned tests will not greatly disturb the Van Allen belts and that at most a few percent of the particles will be temporarily dumped. Perturbations of the inner belt should be minor—if detectable at all. However, observations and measurements of the relaxation time of the perturbations, if detected, could add to our knowledge and understanding of the belts and associated phenomena.

CONGRESS OF SCIENTISTS ON SURVIVAL

The First National Conference of the Congress of Scientists on Survival was held in New York City June 15, 16, and 17 at the Hotel Biltmore.

The Congress gives the following "Statement of Aims":

"The Congress of Scientists on Survival is organized to utilize the special knowledge of the relevant scientific disciplines in a positive program for world disarmament and peace.

"We pledge ourselves to:

—Unite the energies of scientists and the efforts of their organizations in a positive program for peace and a world free for individual fulfillment and social progress.

—Disseminate scientific evidence of the physical, social, and psychological consequences of the nuclear arms race.

—Facilitate communication and cooperation among scientists in the search for ways to eliminate war.

—Coordinate and communicate information and research findings on ways to eliminate war.

—Enable scientists to participate more effectively in public and professional education on constructive alternatives to war.

—Encourage scientists to initiate and support positive peace programs in their professional organizations."

ATOMIC POWER UPS AND DOWNS

Although the AEC has estimated it will spend $200 million in fiscal 1963 on research and development of civilian atomic power, the proposed program was sharply criticized by members of the Joint Committee on Atomic Energy during the Committee's March hearings on "Development, Growth, and State of the Atomic Energy Industry." Criticism stemmed from the fact that funding for prototype power reactors, which had decreased from $150 million in 1958 to $12 million in 1962, reached zero in the estimate for the coming fiscal year. Testimony by AEC Chairman Seaborg disclosed that the Commission had actually included a $60-million item for prototype power development in its estimates but that the amount had been deleted by the Bureau of the Budget. Thus, the Joint Committee had reason to be as critical of the present Administration as it had been of the previous one, for atomic penny-pinching. On the other hand, the AEC argued that the budget for atomic power is large and that the civilian power program should not be judged on the basis of one item alone. The AEC feels that it is not basically necessary to build large reactors each year, but rather that the building of new reactors should follow logically as information is gained from those already in operation and from other technological advances. In addition, the AEC argued that space exploration and defense have high priorities at present compared with certain civil projects which were deferred. It is just this shift in emphasis which was causing concern to some members of the JCAE. (Hearings before the JCAE on "Development, Growth, and State of the Atomic Energy Industry," March 20-23, 1962; Science, 4/20).

In a recent development, the Administration acted to placate the JCAE by adding projects and studies to the nuclear power program. The principal addition was $20

(Continued on page 3)

EARLY FALLOUT SHELTER REPORT

The Defense Department made public last month some results of its survey of potential shelter space, indicating that preliminary analysis of the data has shown that the Department will more than meet its announced goal of finding 50 million spaces. The survey represented the first stage of the Kennedy Administration's program to provide 235 million spaces for the American population by 1967. The survey, begun throughout the country last winter, is aimed at finding spaces in existing buildings capable of sheltering 50 or more persons from radiation. According to Stewart L. Pittman, Assistant Secretary of Defense for Civil Defense, most of the required data about the physical characteristics of buildings with potential shelter space has been collected and analyzed. Department plans now call for marking approved shelter areas and stocking them with provisions and medical supplies. He estimated that the survey would find up to 60 million spaces able to accommodate 50 or more persons and having walls, ceilings and floors that will reduce outside radiation 100 times. With this figure expected ultimately to reach 70 million, the remainder of the 235 million spaces are anticipated to come from private sources (industry, institutions and individuals), Federal Buildings and the proposed Shelter Incentives Program (W. Post, 5/12).

The Defense Department further made public some of the studies that led to President Kennedy's decision last December to press for fall-out protection for all Americans for 1967. His proposed $695-million program for fiscal 1963 faces an uncertain future in Congress. According to Mr. Pittman, under the most severe type of nuclear attack foreseeable in the late 60's or early 70's, 110 million Americans would probably die from heat, blast or immediate radiation. In addition, 40-55 million probably would die if they lacked protection but would survive if they were in fall-out shelters. An additional 35 million might survive through being out of range of both blast and fall-out. "Thus," Mr. Pittman said, "enough persons could live to insure the survival of the United States as a nation." Other reliable sources estimated that the most severe kind of attack would entail simultaneous, accurate dispersed delivery of 60,000 megatons, an attack believed to be beyond the ability of either the U.S. or the Soviet Union until 1970, and perhaps not even feasible then. (NY Times, 5/12).

On the negative side, House investigators from the Government Operations Committee, have reported that, on the basis of tests of the shelter program conducted in Washington and thirteen other cities, there was reason to believe that the President's plan to find shelter space would not work so

(Continued on page 4)

FALLOUT
(Continued from page 1)

1962-63, with an ultimate goal of 100 million to be reached in 1970.

Some quotations from the report concerning countermeasures follow:

"One of the first countermeasures to consider against I-131 is the placing of all children of early age, lactating mothers and pregnant women on evaporated milk or powdered dry skim milk. This provides protection for the most susceptible individuals within the population. Since the average transit time for evaporated milk and powdered milk to reach the consumer is at least two months, close to 100% reduction in I-131 intake is provided. The countermeasure produces no deleterious side-effects to health. The dairy industry has sufficient capacity to supply the additional quantities of processed milk which the women and children may need. Costs are reasonable and no legal problems are foreseen. The Surgeon General has authority to recommend the countermeasure when required. . . .

"The decontamination of I-131 from milk by the ion-exchange method is another countermeasure which has been studied intensively. However, at this time, the research needed to bring it to the point where it is fully satisfactory has not been completed. Furthermore, the ion-exchange process poses a number of legal questions due to changes in the composition of the decontaminated milk which are of concern to the Food and Drug Administration. These questions must be resolved before the method can be applied. . . .

"The removal of Sr-90 from milk by the ion-exchange technique has also received considerable attention in recent years. Encouraging progress on this method has been made in research conducted jointly by the Public Health Service, Department of Agriculture and Atomic Energy Commission. In an experimental plant developed at facilities of the Department of Agriculture, removal of more than 90% of radioactive strontium has proven practical on a pilot scale. However, much more research must be done, both in the laboratory and in the field to test the method's applicability on a commercial scale. Furthermore, studies are needed by the Food and Drug Administration to resolve a number of legal problems associated with the method since the composition and ion balance of the milk are altered by the process. Parenthetically, it is noteworthy that no serious attempts have been made to devise decontamination methods for other foods. . . .

"The complexity of the problems associated with Sr-90 control are difficult to over-emphasize. When this radionuclide contaminates the food supply, it has been observed that from one-third to one-half of the dietary intake of the contaminant may be from liquid milk, about one-quarter from cereals and about four to eight per cent from the combination of eggs, fish, meat and poultry. This might indicate that the intake of milk and cereals should be sharply reduced when contamination levels are high. However, both of these foods have substantial nutritional importance; indeed, more than three-fifths of the calcium needs of the child are provided by liquid milk. Hence any widespread interruption of the production and distribution of these foods may create individual and public health problems having a magnitude more serious than those created by the contaminant. Diminished Sr-90 intake can of course be accomplished by the dietary substitution of foods characteristically low in this contaminant for foods more heavily affected if stable essential elements lost in the substitution are regained in some other form. However, such manipulation of the diets of large population groups is extremely difficult from a logistic standpoint and again open to not inconsiderable risk.

"It will be evident from foregoing sections, that much remains to be done in the development of countermeasures to control radioactive contamination of the environment. Those which have been proposed for short-lived radionuclides tend to be more advanced than those for long-lived contaminants; indeed, countermeasures are currently available for I-131 which will prove quite effective for many and perhaps most circumstances.

"The countermeasures for Sr-90 are, on the other hand, quite incomplete. This has caused many to be concerned that serious exposure to the population will occur from this radionuclide as a result of nuclear weapons testing. The Committee wishes to reassure the public on this point. Human exposures from previous tests and estimates of those from tests now being conducted by the United States indicate that total doses to man from Sr-90 even in bone are likely to be only a small fraction of those received from natural background sources. Exposures are therefore far below the Radiation Protection Guides established by the Federal Radiation Council.

"Although countermeasures against strontium-90 are not required now or in the months immediately ahead, the present situation does call for important action. Attention has previously been directed to the need for a markedly intensified research effort to develop safe and effective countermeasures against all types of radioactive contamination of public health importance. Unless this effort is undertaken now, the nation may well be faced in a few years with contamination problems which cannot be easily solved. The Committee therefore strongly recommends that full support be given to an intensive countermeasure research and development program under the leadership of the Public Health Service.

"The Committee also notes that primary responsibility for the direction of the nation's countermeasure effort against environmental radiocontamination has not focused in any one place of the Federal Government. The complexity of radiation control problems makes such a focus mandatory. Hence, the Committee also urges that the Service assume this responsibility as rapidly as feasible. In making this recommendation, the Committee does not wish to imply that the Service be solely responsible for all countermeasure activity in the United States. On the contrary, many Federal, state and local agencies as well as universities and other institutions will be needed to meet the task ahead. However, since the most serious impact of radio-contamination is on the public health, the primary focus of responsibility should be the agency principally concerned with public health, namely the Public Health Service."

ATOMIC POWER UPS AND DOWNS
(Continued from page 2)

million for AEC construction of a small, 27,000-kilowatt reactor. The Administration also included nearly $10 million for design studies for future reactor construction. Most of the latter amount would go for work by Vice Adm. Hyman Rickover on a 300,000-kilowatt plant utilizing a highly enriched "seed" core and a fuel "blanket" of natural uranium. Reportedly the Rickover project was included over the objections of the AEC staff, who were reluctant to see a further intrusion of the Admiral into the civilian power field. A further addition to the program consisted of "engineering design" assistance to be offered to industry to offset the costs involved in the design of a prototype nuclear power station. Such an addition to previously available research and development assistance was felt by the AEC to be needed to make the cooperative arrangement between the Government and industry for construction of prototype plants more attractive to private concerns (N.Y. Times, 5/17).

Currently, the AEC, under instructions from President Kennedy, is taking a close look at nuclear power and its role in the nation's economy. The study, to be completed by Sept. 1, 1962, will consider the atomic power development program in relation to the country's energy needs. In addition, the study will encompass an evaluation of our atomic power program as it may contribute to our international objectives in the peaceful uses of atomic energy. Two other related studies, by the National Academy of Sciences and by the Federal Power Commission, will cover consideration of national resources and long-range power requirements, respectively (JCAE Hearings, March 20-23, 1962).

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DISARMAMENT
(Continued from page 1)

bases, while the U.S. stressed a "balanced" set of measures centering on a 30% reduction of major powers' armaments. The Soviet debating theme was that the main need was an immediate "political decision" to eliminate nuclear weapons; it charged the U.S. with "stalling" on this and proposing measures of control and espionage rather than disarmament. The Soviet delegate rejected repeated Western proposals for early establishment of technical groups to study specific steps and verification methods. (NY Times 4/5, 5/22, 6/8)

In their private talks, Dean and Zorin made some progress in drafting a treaty preamble setting forth principles. Unsettled issues include the U.S. emphasis on linking disarmament principles and measures to strengthen the UN and peace-keeping machinery. (NY Times 5/31)

Partial and Limited Measures

The Conference also decided to hold sessions as a Committee of the Whole to consider "partial and limited measures" which might be agreed on as preliminary and path-smoothing steps towards disarmament. The U.S. and U.S.S.R. each submitted several proposals, and the co-Chairmen agreed to give first attention to the Soviet proposal of a declaration barring war propaganda; after an inconclusive debate, the question was handed back to the co-Chairmen for private talks. (NY Times 4/28) The co-Chairmen were then unable to agree what item should be debated next. The U.S. claimed its "turn" with proposals to reduce risks of accidental or surprise attacks; the U.S.S.R. branded these useless and unacceptable efforts at espionage and sought action on its proposals to prevent the spread of nuclear weapons to States which do not yet possess them. (While both States have favored action on this problem, Soviet proposals involve a bar on stationing weapons abroad, which the U.S. flatly opposes.) After several weeks, it was agreed to consider simultaneously the Soviet item and the problem of "accidental war" (part of U.S. item). (NY Times 5/23, 26)

Meanwhile, Dean and Zorin made unexpected progress on drafting a six-point "declaration" against war propaganda and submitted it to their Governments. The draft called for appropriate practical measures, including national legislation, against war propaganda; U.S. officials decided this raised major constitutional problems and insisted on wording making legislation optional. The declaration then received preliminary approval by the full Conference. (text in NY Times 5/26) Five days later, the Soviet delegate announced that the declaration was unacceptable without amendments, including a flat requirement of national laws and a clause exempting "wars of national liberation." Further action was uncertain: one summary commented that the Soviet Union had been slow-footed and taken the blame, but both Governments seemed glad to bury the declaration. (W. Post 6/4)

Test Ban

The test-ban subcommittee continued to record total deadlock among the "Big Three." (See Newsletter for May)

DETECTING NUCLEAR EXPLOSIONS

The following are paragraphs taken from the Introduction to the Summary-Analysis of Hearings, July 25-27, 1961, before the Joint Congressional Committee on Atomic Energy, concerning "Developments in the Field of Detection and Identification of Nuclear Explosions (Project Vela) and Relationship to Test Ban Negotiations." (The Summary is available from the U.S. Govt. Printing Office for 25 cents; copies of the complete Hearings are $1.25):

"While the U.S.S.R. delegates were still going through the motions of negotiation with the United States and United Kingdom representatives at Geneva, the Soviet Government chose to break the suspension by resuming nuclear tests in the atmosphere on September 1, 1961. The Soviet series consisting of approximately 50 atmospheric detonations ranging into many megatons left little doubt in the minds of the free world that intensive preparation for these tests had been going on for some time in spite of the suspension. The peak of the Russian test series was reached on October 31, 1961, with the detonation of a device which by their own admission exceeded 50 megatons, defying a resolution on the part of the United Nations adopted October 27, 1961, appealing to the U.S.S.R. to refrain from carrying out their stated intention to explode a device of this yield.

"Mindful of the time lapse between the actual hearings and the publication of the record and recent newspaper articles attributed to British sources which indicated technical breakthroughs in the field of seismic detection and identification, the committee in March 1962 queried the Advanced Research Projects Agency and the U.S. Arms Control and Disarmament Agency to determine, in fact, if such significant breakthroughs had occurred.

"In essence, both agencies assured the committee that there have been no substantial technical changes nor major breakthroughs either in the United States or in the British seismic detection research programs since July 1961 when these hearings were held. Our scientists for several years have engaged in attempting to find new methods of detection and identification of nuclear explosions. While there are some promising avenues of investigation which they think may prove out in the next few years, little has been discovered as of now to justify any modification of the conclusions reached at the committee's hearings in July 1961."

EARLY REPORT ON FALLOUT SHELTERS
(Continued from page 2)

well. The investigators found evidence for lack of cooperation by certain Government agencies asked to participate in the program. Local civil defense officials, in the early phase of the operation, were getting better cooperation and faster action from private owners than from the Government agencies. Even with private owners, other problems had eventually developed, however. The House Committee further criticized the Administration's plan as being too "cheap" and called for a $20-billion program to build public shelters for all, not only against fall-out but also against blast and heat effects of nucler weapons (NY Times, 5/30).

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