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to provide information and to stimulate discussion. Not to be attributed as official FAS policy unless specifically so indicated.

UTAH FALLOUT SPURS CLARIFICATION OF RESPONSIBILITY FOR COUNTER MEASURES

In Salt Lake City during the month of July, Iodine 131 in milk samples rose to an average concentration of 580 microcuries per liter and as a result, the first official preventive measures to counteract the hazard were taken. With the advice and guidance of the City Health Department, the State Agriculture Department, and the University of Utah, the dairy industry voluntarily took steps to reduce the radioactive iodine content of milk. Some dairy herds were shifted to dry feed and the milk from others was diverted to the making of butter, cheese and other dairy products to allow for decay of the radioactivity.

Dr. Donald R. Chadwick, Chief of the Division of Radiological Health of the Public Health Service, lauded the milk industry for its responsible approach to the problem of radioactivity in milk. The Utah action was based upon the radiation exposure guidelines recommended by the Federal Radiation Council and accepted by the President last September (see "A Clarification of the Fallout Problem," FAS Newsletter, Vol. 14, No. 9). It is also in accordance with some of the protective-measure recommendations developed at the request of the Surgeon of the Public Health Service by the National Advisory Committee on Radiation.

But this was not the end of it.

CNI Issues More Detailed Statement

On August 7, the Greater St. Louis Citizen's Committee for Nuclear Information (CNI) released a more detailed statement of what had happened in Salt Lake City and said that the "Utah experience . . . clearly shows the necessity for preparing counter-measures in advance if peaks are not to cause doses in excess of the RPG (Radiation Protection Guide)." The report continues, "The first warning of the coming danger in Salt Lake was apparently received by the Utah State Health Department on July 8, when their air sampling showed a rise of gross beta activity to 900 microcuries per cubic meter of air. This was followed on July 13 by a heavy rain, which could be—and probably was—tested for radioactivity. The same day there was a rise in milk iodine to levels in Range III (designated by the Federal Radiation Council as suggesting 'strong and prompt action'). Previous experience with the relationship of iodine 131 fallout to weather conditions would indicate that a further rise in iodine levels might follow the rain by a few days, and this proved to be the case. On July 20 the levels rose to 1,660 uuc. per liter, a level which is ten times the Range III boundary. After dropping slightly, they rose again to a new peak of 2,050 on July 25. It was not until July 31 that measures to reduce the intake were instituted by the Salt Lake City Health Dept. and in that time the exposed public received more than a third of the RPG for the year.

Holifield Asks Clarification of Criteria.

On June 18, 1962, and again on August 16, Chairman Holifield and Congressman Price wrote to HEW Sec'y Ribicoff of the Federal Radiation Council requesting information concerning (1) the role of the FRC's Radiation Protection Guides (RPG), particularly in relation to iodine-131; and (2) what Federal agencies were responsible for invoking protective countermeasures in the event radiation levels became unduly high. The need for resolving these matters was indicated as "increased by the recent resumption of atmospheric nuclear tests by the Soviet Union and the United States."

The Federal Radiation Council under the chairmanship of HEW Sec'y Celebrezze replied August 17, 1962.

As a summary with respect to the Guides, the Council stated:

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DISARMAMENT AND TESTS

As the seventeenth UN General Assembly opens, it faces an oversupply of cold war tensions, thorny problems such as the Congo and financing, and had news from almost every front of the arms race. The Assembly is due to take up a number of reports and proposals in the field of disarmament and weapons tests, and the Soviet Union and United States will go all out to argue their cases before world opinion.

Tests and test-ban

The main issue for this Assembly may well be the fact that the Big Three are continuing nuclear tests all the while they continue to disagree on the text of a test-ban treaty.

As a result of its recent underground tests, the U.S. concluded that the problem of distinguishing nuclear explosions from seismic event was much less than had previously been thought. In July and August, the Administration gradually changed its position on test-ban controls, apparently feeling its way with the Russians, Congress, and world public opinion. On August 28, the U.S. and U.K. formally submitted to the Geneva Conference two new drafts dealing with a test ban. One, their stated preference, would bar weapons tests in all environments: to check suspicious underground events, the two Powers still insisted on a system of detection station plus a quota of on-site inspections, though the number of both was greatly reduced and other concessions were made to Russian views, especially their suspicion of espionage. The second draft would simply bar tests in the atmosphere, in space, and under water, omitting international control machinery.

The Soviet Union continued to reject either controls or a "partial" ban, and on August 29 proposed a moratorium on all tests, to begin next January 1 and continue until there was a "permanent solution" for detection of underground

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DR. RAGNAR ROLLEFSON APPOINTED DIRECTOR OF INTERNATIONAL SCIENTIFIC AFFAIRS

The Department of State announced 9/14 the appointment of Professor Ragnar Rollefson as Director of International Scientific Affairs. Dr. Rollefson, an FAS member, will be designated a Principal Officer of the Department and will also act as the adviser to the Secretary of State and other Department officers on scientific and technological matters.

Dr. Rollefson will head a newly organized Office of International Scientific Affairs. The establishment of this new Office is in response to the Department's recognized need for strengthening the role of science in foreign policy. The primary functions of the Office of International Scientific Affairs will be to bring to bear the impact of science and technology in foreign policy development and decision making, and to provide advice and guidance to the Department, other Government organizations, and the science community on matters concerning science and technology in foreign affairs.

The new Office will absorb the functions previously carried out under Dr. Walter G. Whitman who joined the Department on Labor Day 1960 as Science Adviser. During Dr. Whitman's tenure, the Science Adviser's functions were expanded to include also the peaceful uses of outer space and atomic energy which had previously been handled by a separate office. The number of Science Attaches serving at overseas posts has increased to 17 and today the following posts have one or two attaches: London (2), Paris (2), Bonn (2), Stockholm (2), Rome (2), New Delhi (2), Tokyo (2), Buenos Aires (1), Bern (1), Rio de Janeiro (1). The post at Rio is a regional office for Latin America with science representation

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LETTER ON ARMAMENT

The following Open Letter to President Kennedy, written by the Nuclear Policy Letter Committee, P.O. Box 273, Lexington, Mass., appeared in the N.Y. Times of Aug. 21, 1962. It was signed by about 180 faculty members of educational and scientific institutions in the Boston area.

Mr. President: We see a disturbing contradiction in the policies by which our nation is seeking security. Recognizing that a major nuclear war would yield no victor and would threaten to destroy mankind, our government has affirmed the goal of general disarmament; yet it pursues an armament policy that guarantees, in our opinion, continuing failure of disarmament negotiations.

Important disclosures by your Administration support this interpretation. Recently Assistant Defense Secretary Gilpatrick has stated that "We have a second strike capability at least as extensive as what Russia could deliver by striking first." This means that we have several times the Soviet striking power. The alleged "missile gap" did not materialize—except in reverse. This news increases our immediate sense of security, but how does it affect our hopes for long-term security through general disarmament?

The persistent obstacle has concerned inspection. The United States insists on unlimited inspection at an early stage; The U.S.S.R. rejects it until a late stage. Why?

It is easy to consider the Russians entirely responsible for this impasse, and to question the possibility of negotiating with them. But the recently revealed profound imbalance of nuclear power in our favor suggests that the problem is more complex. Since the Russians cannot disable our retaliatory capacity they cannot accomplish an effective first strike against us. Neither, however, can the United States successfully attack first so long as the exact locations of the Soviet bases are unknown. To protect its limited force the U.S.S.R. maintains geographical secrecy, strenuously resisting our efforts at reconnaissance. The United States cannot maintain secrecy over its territory. Instead, relying on our greater industrial capacity, we have developed an enormous nuclear force.

In this weapons imbalance we see a reasonable explanation for the disarmament deadlock. The Soviet plan would deny the U.S. adequate safeguards against hidden weapons; our plan would deny the U.S.S.R. the secrecy essential to its deterrent force. We find encouragement in this explanation. Disarmament negotiations may become fruitful if a better balance in armaments can eliminate the Soviet need for secrecy.

But can the United States reduce its overwhelming nuclear superiority without weakening its security? Recent technological developments make this course feasible. We have begun to make weapons that are virtually invulnerable: Polaris missiles in submarines and Minuteman missiles buried underground.

With these new weapons, the United States no longer need rely on vast numerical superiority for its defense by deterrence. Our defense force is adequate if it contains enough of these weapons to threaten retaliatory destruction of major Soviet cities.

Yet we see under way a vastly larger program than is required for deterrence. According to the Department of Defense, by 1965 the U.S. intends to have 800 Minutemen, over 200 Atlas and Titan missiles, 950 intercontinental bombers, and about 650 missiles on 41 Polaris submarines. In addition, we have about 1300 planes able to deliver nuclear bombs from overseas bases and carriers. To try to comprehend the meaning of these figures, we may recall that one bomber or missile can deliver more explosive force than was released in all of World War II.

Why is the United States Developing This Fantastic Force?

From recent statements of Defense Secretary McNamara we fear that the reason may be a radical shift, from a primarily defensive policy to the nuclear strategy called "counterforce." This would have us strive for a force so large and discriminating that we could (1) destroy most Soviet military installations, and (2) retain enough reserve power to threaten destruction of their cities. This policy is claimed to allow us to resort to nuclear war, in defense of our most vital interests, without destruction of cities on either side.

On the surface this strategy may seem more humane than a deterrent strategy, which threatens bombing of civilian popu-

lations. But can anyone who remembers the bombings of World War II imagine that cities would be spared in any major nuclear war? Mr. President, this new strategy might seem to offer temporary solutions to some great problems you face:

It might keep our NATO allies from building nuclear forces by assuring them that we are conspicuously prepared to defend them.

It might even make the Russians more cooperative for a while.

But surely these short-term advantages would soon be swept away in an evil flood of later consequences.

Would not this strategy provoke the very thing it aims to prevent? Would not the U.S.S.R. be driven to maximize its capacity to destroy our cities with the weapons that survived attack?

Would not the policy become bankrupt when the Russians developed enough invulnerable weapons?

Does not this policy perpetuate an unlimited arms race, increasing the likelihood of accidental war in a tense and frightened world?

Worst of all, does not this policy block all progress toward disarmament? Believing that we aim at overwhelming nuclear superiority, has the U.S.S.R. any choice but to maintain secrecy and view our disarmament proposals with extreme suspicion?

We therefore urge that you:

1. Substantially reduce the scale of our nuclear arms program to fit a purely deterrent strategy.
2. Renounce—publicly and firmly—the strategic use of nuclear weapons except in response to a nuclear attack on us or our allies.
3. Revise our disarmament proposals to allow, by a disproportionate weapons reduction, a closer approach to equality before the U.S.S.R. would have to abandon its secrecy.

Let us not drift—or deliberately march—into an aggressive posture.

Let us instead pursue the policies that should follow from your own eloquent statement: "Today every inhabitant of this planet must contemplate the day when this planet may no longer be habitable. Every man, woman, and child lives under a nuclear sword of Damocles hanging by the slenderest of threads capable of being cut at any moment by accident or miscalculation or by madness. . . . The risk inherent in disarmament pales in comparison to the risks inherent in an unlimited arms race." United Nations, September, 1961.

U.S. MAY HELP FRENCH NUCLEAR WEAPON PROGRAM

The U.S. may change its policy toward French nuclear weapon development if the French program shows continued progress, according to a "high U.S. official" quoted in the Washington Post of Sept. 11.

Asked if the United States would share nuclear secrets with France on the same basis that enabled Britain to become the second Western atomic power, the official replied:

"Perhaps not quite that much, but when France gets a lot further than it has. I think the United States would welcome cooperation along the lines of the U.S.-British arrangement."

The official, who would not allow himself to be quoted by name, denied the implication that Washington changed its mind after de Gaulle's tour of West Germany in the past week, during which he spoke repeatedly of Franco-German unity. The General long has pressed for German financial help in the French weapons program with the aim of creating a European nuclear force.

"It is wholly unrealistic to think that France could build, with European help, a separate nuclear force that could defend the continent within the near future," the U.S. official said.

He asserted that a cooperative European nuclear force within the North Atlantic Treaty Organization, however, would be completely acceptable to the United States. And in such a case, he said, it would be in the interest of Europe to have the United States as a partner.

The United States would still rather see Europe accept President Kennedy's proposal for immediate creation of a multilateral Atlantic nuclear deterrent but "we're not pounding the desk" for it, the official said.

HIGH ALTITUDE TEST EFFECTS EXCEED EXPECTATIONS

The AEC and DOD, in a joint statement issued September 1, acknowledged that the effects of the high altitude nuclear explosion set off by the U.S. on July 9, 1962 had indeed exceeded previous estimates. The announcement indicated that the radiation in the upper region of the artificial belt created by the explosion was substantially greater in intensity than expected, that it might persist for many years, and that it had completely knocked out the transmissions from three satellites.

The original announcement, several months ago, of the U.S. test plans had touched off an international reaction (mainly from British scientists). Fears were expressed in regard to a possible long term distortion or disturbance of the natural radiation belts and resentment voiced over the unilateral decision of the U.S. to perform tests which could affect worldwide phenomena. Official reassurances followed indicating that the effects would be relatively short lived and that the information gained from the study of these perturbations would far outweigh the minor damage to the belt.

On July 9th "... a megaton yield range device was detonated in the ionosphere at an altitude of hundreds of kilometers in the vicinity of Johnston Island ..." (International AGIWARN message). The first public release on the test results was issued on August 19 and was based on a report by Dr. J. A. Van Allen and his co-workers of data taken by the Injun 1 satellite (1961 omicron 2) [Aug. 12, 1962 University of Iowa report "Preliminary Study of the Geomagnetically Trapped Radiation Produced by a High Altitude Nuclear Explosion on July 9, 1962," J. O'Brien, C. D. Laughlin and J. A. Van Allen]. They concluded that, as in the Argus test of 1958, the explosion had given rise to a very significant belt of particles trapped in the geomagnetic field. This new artificial belt dipped low, to be about 200 miles above the earth at its edges and about 500 miles high at the center. They also found that it was about 400 miles thick and thus at its outer regions it extended into the inner natural radiation belt. The data indicated that the intensity of these artificially injected particles was much greater than the normal intensity in the natural belt at its lower altitudes. However, the activity at the lower edges of the artificial belt began to disappear shortly after the blast and it was concluded that at the intermediate levels it would dissipate within a few weeks and at the upper levels within a few months.

The latest data, apparently obtained from the Telstar satellite, were reported in the press on September 1. The statement issued by the two agencies said that these data confirm "the previous description of the extension of the belt to low altitudes," but also "... indicate a substantial and greater than anticipated increase in the intensity of radiation at high altitude in the region of the natural Van Allen belt." "Increased radiation at these altitudes may persist for many years." Also, communications from three satellites, "Transit IV-B," "TRAAC" and "Ariel" were completely knocked out. The first two were companion satellites launched last November to help set up an all weather navigational system. The third, "Ariel," is a U.S. launched British satellite.

Apparently, then, some of the fears expressed prior to the test have been realized. The region of highest intensity of the new belt merges with the natural belt and may persist for years. Future measurements and experiments designed to further our understanding of the natural belt could possibly now be distorted and more difficult to interpret and perhaps in some instances impossible to do for many years.

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Chairman.....Freeman J. Dyson

The FAS Newsletter is prepared in Washington by FAS members. The staff for this issue were: Editor—Gary Felsenfeld; Writers: L. Gellert, F. K. Millar, N. Seeman, E. Shelton.

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

SHELTER PROGRAM BARELY SURVIVES

The Administrations Civil Defense program can operate at its present pace for another year, thanks to the Senate Appropriations Committee. The Senate group on August 25 voted \$185 million for fiscal 1963, an increase of \$110 million over the amount set by the House. In July, Representative Albert Thomas, Chairman of the House Independent Offices Appropriations Subcommittee, had exercised his power as an old foe of Civil Defense and virtually killed the program by completely refusing to contribute money to the construction of shelters and reduced the appropriation for existing programs not concerned with shelter construction from \$126 to \$75 million.

The funds restored by the Senate Committee still fall far short of the \$695 million requested by the Defense Departments Office of Civil Defense. But \$490 million of this request was to be used for shelter construction and as yet neither House nor Senate has passed enabling legislation for the program. Lack of the enabling legislation prevents the Congress from appropriating funds for the program.

Differences between the House and Senate bills will be resolved in Committee. Pentagon spokesmen say that if the restored funds are allowed to remain, they will be sufficient to permit the continuity of present programs.

Administration Attitude a Puzzle

In the August 31 issue of *Science*, D. S. Greenberg analyzes President Kennedy's attitude toward the Civil Defense program. It is apparent that the President is much more tepid toward Civil Defense than any other of his New Frontier programs and his actions during the past year have not indicated a feeling of urgency in the Executive Branch.

Paradoxically, the Civil Defense Office under Stuart Pittman is now functioning with great efficiency. They have completed their shelter survey months ahead of schedule and at about two-thirds the budgeted cost. Their research and development program is going ahead with planned projects among which is the intended installation (for \$10) of the National Emergency Alarm Repeater System (NEAR) in every home. It is clear that the real future of the Civil Defense program has yet to be determined.

HANFORD A-PLANT WINS IN CONGRESS

On Sept. 18, the Senate sent to President Kennedy the long debated authorization for constructing the world's largest atomic electric-power plant at Hanford, Wash. (See NL, XIV, Nos. 5 & 7.)

Having long favored the project, the Senate completed legislative action by adopting, on a voice vote, a compromise spending authorization bill affecting the Atomic Energy Commission.

The Hanford item was the only controversial one in the measure. The proposed plant would be capable of generating 800,000 kilowatts. Its construction has been a point of controversy between public and private power advocates.

Under the original proposal the Government would have built the plant. But that plan was defeated in the House.

No Federal funds would be involved. The plant would be built by the Washington Public Power Supply System, a group of sixteen utility districts in that state.

The system would be obligated to offer 50 per cent of the electricity for sales to private power companies under non-discriminatory terms. Half would be reserved for public organizations.

The plant would use steam from the large A.E.C. plutonium reactor at Hanford. This is a dual-purpose facility, constructed with the idea that it could be used for power generation as well as plutonium production.

Advocates of the Hanford plant long have contended that it would be wasteful not to use the steam for power.

Supporters of the project finally won House approval last week for their latest compromise. The vote was 186 to 150.

The power generated at the plant will go into the Bonneville Power System. Under the compromise, any losses resulting from the project will be borne by that system. No Federal agency may take over the plant without Congressional authorization.

Senator Henry M. Jackson, Washington Democrat, said it was estimated that the Government would realize \$125,000,000 from the sale of steam over the next 25 years. (AP story, N. Y. Times, Sept. 19.)

DISARMAMENT

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tests. The U.S. immediately rejected an "unpoliced" general moratorium. Many of the Geneva "neutrals" seemed ready to back the Soviet proposal.

As early as last June, India proposed that the General Assembly take up testing issues again. On U.S. initiative, the three-Power subcommittee will continue to negotiate during the Geneva recess. However, the Assembly promises to be the scene of a full-scale debate and intensive pressure for quick agreement on some form of moratorium, cutoff, or ban.

Added material for this debate will probably be provided by the second general report of the UN Scientific Committee on the Effects of Atomic Radiation. This lengthy report gave strong emphasis to the dangers of all forms of radiation. It dealt only with general aspects of radiation from weapons tests, but did contain a warning of the danger of further increases.

Disarmament

The Assembly will receive a "no progress" report from the seventeen-nation Disarmament Conference, which has recessed until November 12. Apparently, the UN will rehear the U.S. and Soviet arguments from Geneva (see Newsletter for June). Beyond this, there has been little advance news about proposals or tactics of East, West, or "neutrals," though the latter group will do all it can to press the major Powers towards action and agreements.

The U.S. defense of its position involves complicated questions of NATO and Germany, and the Soviet propaganda attack on the West's "aggressive" alliance. Moreover, France, the eighteenth official member of the Disarmament Conference, has continued to boycott the negotiations and is even more skeptical of the Assembly's role in disarmament. French insistence on building its own nuclear weapons capacity, a difficult issue for the U.S., makes it all the more probable that the West will not be a united front at the UN.

A specific item on the agenda is Acting Secretary General Thant's report that member States are sharply divided on a proposal to call a conference to sign a treaty which would bar the use of nuclear weapons: of 58 States answering his query, 29 favored and 26 opposed such a conference. This poll followed up an Assembly resolution, originated by Asian-African States, which, declared the use of such weapons would be a "crime against mankind." In their answers, the U.S. and other Western States opposed such a conference, maintaining that a simple prohibition, without disarmament measures and controls, would leave States vulnerable to attack. The Soviet bloc joined Asian-African neutrals in favoring a conference.

Another "divided" report is due on the question whether States would be willing to join a "non-nuclear club," by renouncing the manufacture, acquisition, or stationing on their territory of nuclear weapons. U.S. allies have been opposed because of the implications for defense arrangements such as NATO. Sweden may drop its sponsorship of this plan (originated by Swedish Foreign Minister Uden, who will soon retire).

UTAH FALLOUT

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"The Guides are not intended to be a dividing line between safety and danger. We have assumed that there is some slight risk to health from any level of radiation exposure, however low, even at or below the low levels set by the Guides. At the same time we do not believe there is any risk of a major health hazard until exposure levels are many times above the Guide levels. For example, this is borne out in relation to iodine-131 by the report to the Federal Radiation Council of the National Academy of Sciences, 'Pathological Effects of Thyroid Irradiation,' July 1962."

As to responsibilities for invoking protective measures, the Council stated:

"Within the Federal Government, authority now exists under the Federal Food, Drug, and Cosmetic Act to control the shipment of adulterated food in interstate commerce. By definition, foodstuffs containing excessive radioactivity would be adulterated. States have the authority to control intrastate distribution or sale of adulterated foods, which would include foodstuffs containing excessive amounts of radioactivity. State food and drug laws vary widely in their scope and adequacy with respect to the problem of radioactivity in foods. The Public Health Service has the general responsibility to recommend appropriate health protection measures to States and local authorities and to the general public."

Congressmen Holifield and Price stated that the Joint Committee would study the FRC letter to determine whether the answers were adequate, but indicated:

"We seem to be making some progress in clarifying this important subject." (From Press Releases of CNI, Public Health Service and Joint Committee.)

On August 31, further correspondence was released by Representatives Holifield and Price, in which the FRC criticized for premature action those states which had taken steps to reduce the quantity of fallout products in milk (W.Post, 9/1). Minnesota was the only state other than Utah to have taken such steps.

DR. RAGNAR ROLLEFSON

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from the National Institutes of Health, the National Science Foundation, and the Department of Defense.

Dr. Rollefson received his B.A., M.A. and Ph.D. from Wisconsin where he has been, with interruptions for wartime and Government service, since 1930. He was chairman of the Department of Physics from 1947 to 1961, with interruptions in 1951-52 to help start the MIT Lincoln Laboratory, 1954 to work for the President's Scientific Advisory Committee, and 1956-57 to serve as Chief Scientist of the United States Army.

According to the N.Y. Times of Sept. 15, the reorganization of the State Department's science advisory unit reflects dissatisfaction with its previous role, which was restricted largely to technical matters.

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