zation stresses the importance of the application of meteorology to aviation, agriculture, shipping, water resources and other human activities and gives priority to such activities as are of a particularly urgent character in view of scientific and technical progress.

Fallout Hazards Assessed by AEC Group

A review of the dangers of radioactive fallout from nuclear test explosions has been issued by the General Advisory Committee of the Atomic Energy Commission. Chairman McCone requested the special report last March after many expressions of public concern had been voiced. Warren C. Johnson, dean of the division of physical sciences at the University of Chicago, is chairman of the reporting committee. The text of the statement follows.

1) The General Advisory Committee has reviewed carefully the available facts and many opinions regarding the magnitude of fallout to date, and how much can be anticipated in the future from weapon tests that have already been carried out by the United States, the United Kingdom, and Soviet Russia.

2) We find that the Atomic Energy Commission has released all significant fallout data to other agencies and to the public. Certain information as to the estimated yield of various weapon tests and certain other factors bearing on the radioactive content of the upper atmosphere have defense implications which require classification, but the significant information on actual fallout throughout the free world that the AEC has developed has been released. Furthermore, the commission has been largely responsible for the development of equipment and procedures to measure extremely minute quantities of radioactive materials.

3) It is now apparent that the circulation of the upper atmosphere, and particularly the stratosphere, is much more complicated and the concentration of bomb debris less uniform than had been anticipated when early estimates were made. This has resulted in nonuniform distribution of the fallout with higher concentrations in the middle latitudes of the Northern Hemisphere. Fortunately, it was just here that most of the early measurements of actual fallout were made. The principal result of later information has been to reduce somewhat the earlier estimates of future fallout of debris which has been injected into the stratosphere near the equator by the United States and United Kingdom tests. The debris injected last autumn by U.S.S.R. tests into the stratosphere in the more northern latitudes has been falling out quite rapidly and is largely confined to the Northern Hemisphere.

A reasonable estimate of the amount of fission products that has been injected into the stratosphere by all nuclear tests is 65 megatons (TNT equivalent) of fission energy.

This corresponds to about 100 pounds of strontium-90 in the entire stratosphere. It is estimated that fully 50 percent (50 pounds) of this strontium-90 has already fallen out. This means that not more than half of the total strontium-90 injected into the stratosphere still remains there.

4) The present state of knowledge does not permit a full evaluation of the biological effects of fallout. However, in order to place the hazard of the fallout in proper perspective, it should be pointed out that the amount of total body external radiation resulting from fallout to date, together with future fallout in any part of the world from previous weapon tests, is: (i) less than 5 percent as much as the average exposure to cosmic rays and other background radiation; (ii) less than 5 percent of the estimated average radiation exposure of the American public to x-rays for medical purposes.

5) It is interesting to note that human beings have lived for many generations in parts of the world which have five times or more the background radiation normal to the United States, or more than 100 times the average amount of radiation from fallout in the United States.

6) In regard to internal effects of strontium-90 due to ingestion, the amount of strontium-90 which has been found in food and water is less of a hazard than the amount of radium normally present in public drinking water supply in certain places in the United States, and in public use for many decades.

7) Next, the committee addressed itself to the question of the responsibilities of the Atomic Energy Commission with regard to radiation safety. Clearly, the commission must assure itself that it is conducting its own operations in a safe manner, as is required by the Atomic Energy Acts. To meet these needs the Atomic Energy Commission has established, in addition to worldwide sampling of air, soil, foods, and water, an effective and outstanding biological and medical research program in the general field of radiation hazards and protection. The AEC needs this program in order to have scientific facts available to insure and improve the safety of its own operations. Therefore, the committee recommends that the AEC continue its scientific studies in these areas.

As the civilian uses of x-rays, radioisotopes, and nuclear reactors increases, public health authorities should actively sponsor proper public standards of radiation safety. In so doing they should continue to make use of all information available. The relation between the public health authorities and the AEC in its civilian activities should be analogous to that between the same authorities and most industry.

The Public Health Service and the Food and Drug Administration should make the best use of information developed by the AEC and others and should be given whatever funds are necessary for programs to be carried out on their own initiative, whether these programs be in the realm of research, training, or dissemination of information to local authorities. It will take time for the public health authorities to develop such programs and to acquire the necessary background of knowledge and experience. In the opinion of the committee, the public health agencies, both national and local, should gradually assume responsibilities for matters pertaining to the regulation of all radiation hazards affecting the public. At present x-rays are the most important artificial source of such hazards.

8) It is the opinion of the committee that the level of effort the AEC has devoted to its research programs on radiation standards and protection, in their broadest sense, has been quite adequate. However, it is realized that in several areas of the programs considerable time will be required to obtain conclusive results which will provide a more comprehensible understanding of radiation and its effects.

9) The committee feels that although the AEC is releasing information on fallout to the public promptly and completely, the statements and scientific papers presenting this information have not always been in a form readily understood by the public. As a result, the public has been confused about the status of fallout and its implications. There is a real need for clear, simple exposition of the facts of fallout in media widely available to the public. We feel that the commission should assume this responsibility. It should be clearly explained to the public that weapons tests have been an essential part of our effort to prevent the occurrence of nuclear war.

General Advisory Committee Members

Jesse W. Beams, chairman of the physics department at the University of Virginia.

Manson Benedict, professor of nuclear engineering at Massachusetts Institute of Technology.

James W. McRae, vice president of the American Telephone and Telegraph Company.

Eger V. Murphree, president of Esso Research and Engineering Company.

Kenneth S. Pitzer, dean of the College of Chemistry at the University of California.

J. C. Warner, president of Carnegie Institute of Technology.

Robert E. Wilson, former board chairman of Standard Oil Company of Indiana.

Eugene P. Wigner, professor of mathematics at Princeton University, who served as consultant to the committee.

Lodge Offers Plan to UN Space Committee

Speaking at the first meeting of the United Nations Committee on the Peaceful Uses of Outer Space, Henry Cabot Lodge, U.S. representative, urged that the members of the committee recognize the scope of the job before them and work together on it. In a speech that avoided controversial issues, Lodge summarized the benefits to be gained from space exploration and made a number of recommendations for the committee's consideration.

Five members of the 18-man committee were absent because of a boycott by the Soviet Union, Poland, and Czechoslovakia. The remaining members elected Koto Matsudaira of Japan chairman of the committee.

Excerpts from Lodge's address follow.

Our task is to help to chart for the United Nations a course of cooperation among nations in the use of outer space for peace. . . .

Much of the necessary cooperation is being carried on by the Committee on Space Research of the International Council of Scientific Unions, which is also called COSPAR. This organization of scientists is continuing the cooperation begun during the International Geophysical Year. Its work is of the greatest value. But there must also be cooperation among governments. That is why we are here.

Now as to our plan of work, Mr. Chairman, the United States believes we can take as our point of departure paragraph 1 of the resolution by which the General Assembly last year created this committee and defined our task. That resolution asked us to report to the fourteenth session this fall on four main topics. I shall take up each of these in turn.

Topic A is: "The activities and resources of the United Nations, of its specialized agencies and of other international bodies relating to the peaceful uses of outer space." In our view this question can best be handled by the Secretariat with its extensive knowledge of international organizations. We therefore propose that the Secretary General be asked to report to this committee on Topic A at an early date.

Topic B is: "The area of international cooperation and programs in the peaceful uses of outer space which could appropriately be undertaken under United Nations auspices to the benefit of states irrespective of their economic or scientific development."

In the first instance this is a question for qualified scientists. We therefore propose that this committee establish a subcommittee to deal with Topic B and report on it to the full committee. This subcommittee should be open to each member of the committee wishing to take part. The United States intends to designate Dr. Hugh L. Dryden of our delegation to serve on this subcommittee.

I will pass over Topic C and return to it in a moment.

Topic D deals with legal questions. There are many possible international legal problems in the outer space field. Some of these may be remote or abstruse but others are of real practical importance and may arise soon.

To study them we propose that the committee appoint a second subcommittee of representatives versed in international law. It too should be open to each member of the committee wishing to take part. The United States intends to designate Mr. Loftus Becker of our delegation to represent us on this legal subcommittee. It should report to the full committee at an early date.

By following this plan of work the committee would have before it at an early date the report of the Secretary General on Topic A and the reports of the two working groups on Topics B and D. We believe that will be the best stage, Mr. Chairman, for the committee to consider the remaining Topic C—"future organizational arrangements."

It is axiomatic that no sound recommendations can be made on organization until the activities involved are clearly understood. This should be the case when the subcommittees and the Secretary General have made their reports. The full committee can then frame its report to the General Assembly covering all four topics. We hope that last phase can be finished by 31 July.

As a contribution to the work of this committee the United States has prepared a series of documents on the topics which were set forth in the General Assembly resolution and which I have just discussed. We are making these available to the Secretariat for the use of committee members if they so desire. We have also made available a brief, semitechnical publication on the nature of outer space and space science. . . .

Britain Increases Study of Nuclear Energy in Medicine

Britain is launching a $3-million program to explore the use of nuclear energy in medicine. The project will be undertaken at Sutton Downs in Surrey, where the Royal Marsden Hospital is to build a branch, the first in Britain devoted solely to this work. The unit will be part of a bigger organization studying the effects of radiation on man.

D. W. Smithers, professor of radiotherapy in the Institute of Cancer Research, has announced that more than $1½ million of the initial cost of the scheme has already been allocated by the Ministry of Health, and $560,000 has been offered by the governors of the Royal Marsden Hospital from endowment funds. Another $700,000 is still needed for the installation of a 35-million-volt linear accelerator.

The hospital will be built with two main aims; first, to provide a radiation center that will make high-voltage treatment facilities available to a group of hospitals; and second, to study and develop the use of radioisotopes in medicine. This will include the treatment of patients with radioisotopes and instruction in the use of isotopes.

The British Atomic Energy Authority's establishment at Harwell is running a course on the fundamentals of the use of radioactive materials; at Sutton Downs it is hoped to have a course comparable with Harwell's, and in addition, a course on the practical application of isotopes in medicine. There will also be laboratories where visitors from other parts of Britain, and possibly overseas, can work on problems of radioactive isotopes.

Ford Teacher Training Grants

The Ford Foundation has announced grants totaling $9,161,210 for the first phase of a new effort to support improved training for teachers. Another series of grants may be announced later this year, but the size of these grants has not been determined and the recipients have not yet been selected. The awards will emphasize four trends: (i) extension of general and liberal education for future teachers; (ii) establishment of a direct relation between public-school systems and teacher-training colleges, comparable in many respects to the relation between medical schools and hospitals; (iii) development and application of new teaching and teacher-training techniques, including internships, teaching aides, and teams, and of such technological aids as television, film, and tape recording; and (iv) improved long-