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C143846

UNITED STATES
ATOMIC ENERGY COMMISSION
Washington 25, D. C.

FOR IMMEDIATE RELEASE
(Thursday, April 25, 1957)

NOTE TO CORRESPONDENTS: Attached is text of a letter on radiation hazards from weapons tests, sent today by Dr. W. F. Libby, writing as a scientist, to Dr. Albert Schweitzer of French Equatorial Africa.

Washington, D. C.
April 25, 1957

Dr. Albert Schweitzer
Lambarene Hospital
Lambarene, Gabon,
French Equatorial Africa

Dear Dr. Schweitzer:

I am writing you as a scientist, to present data bearing on a scientific fact: The degree of hazard to humanity from radioactive fallout from nuclear weapons tests.

In the press on April 24, I read your statement from Oslo on the hazards of nuclear weapons testing, and in this way learned of your fears that the present testing program may be dangerous. Since I have spent much time during the past several years in the study of this question, I am taking the liberty of writing you. Also, since your statement was issued to news media and received wide public attention, I am making this letter public in the belief that every possible action should be taken to increase public understanding on the important question of weapons testing.

Your belief in the sanctity of life, and the dedication with which you have devoted your own life and talents to unselfish causes, have made a deep impression on the minds of persons throughout the world. Your concern over the possible effects of nuclear tests is characteristic of the humane and sensitive qualities which you always have displayed, and for which you are justly honored. Along with these qualities, I know you have the intellectual strength and integrity to seek the truth wherever it lies. It is in this spirit that I write you, believing that you will welcome whatever facts I may be able to provide regarding radioactive fallout from weapons testing.

I do not know what data you have utilized in studying this question, but I seriously doubt, from the evidence of your statement, that you have had access to

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the most recent information. Immediately after reading your statement, I sent you a copy of a speech which I gave recently regarding what we know from scientific studies on fallout radiation and its effects. I am enclosing with this letter a copy of a paper which I am presenting on April 26 before the American Physical Society. I hope these documents will be of use to you. They demonstrate that an intensive effort has been made to calculate on theoretical grounds, and to determine from sample collections, the actual levels of radioactivity in the soil, in water, in food products, and in human bodies as a result of weapons tests.

If you have gained the impression that United States official statements do not take into account the possible hazard from internal radiation -- and I fear from your statement that you have -- I hasten to assure you that this is not the case. Government statements have dealt extensively with this matter. It has likewise been considered at length in a report prepared by scores of eminent scientists for the National Academy of Sciences, and in England by the British Medical Research Council, both reports appearing in June of last year.

Particularly since the summer of 1953, the Atomic Energy Commission has conducted an intensive study of worldwide fallout which has revealed most of the information now available on this subject. These studies have included analysis of soil, plants, foods and other materials from many parts of the world. The United States Government has furnished this information without reserve to the United Nations Scientific Committee on Atomic Radiation, which was established at the recommendation of the United States and which has studied data provided by other countries.

Although there are some differences in the findings of scientists in this country and abroad, there is general agreement upon the approximate magnitude of the fallout and the rate at which it is descending from the stratosphere. Perhaps there is less agreement about the magnitude of the physiological effects which can be expected to result from fallout radiation. Nevertheless, it is very generally agreed, among those who have studied the question, that the radiation exposures from fallout are very much smaller than those which

would be required to produce observable effects in the population. The U. S. Government agencies have been continuously concerned with maintaining this condition of very small test radiation hazard and have never neglected study and action to reduce it.

I do not mean to say that there is no risk at all. What I should like to demonstrate to you is that the risk is extremely small compared with other risks which persons everywhere take as a normal part of their lives. At the same time, I ask you to weigh this risk against what I believe would be the far greater risk--to freedom-loving people everywhere in the world--of not maintaining our defenses against the totalitarian forces at large in the world until such time as safeguarded disarmament may be achieved. Of course, a workable, safeguarded system of international disarmament is a paramount objective of the United States Government, and one which we must work for and hope and pray will be achieved.

To go into more detail on the question of risk from world-wide radioactive fallout, there are two possible hazards. The first is the genetic hazard due to radiation of the reproductive organs by penetrating gamma radiation, and the second is the hazard due to the irradiation of the bones by assimilated strontium-90, taken up largely through food. These two possible hazards should not be confused; there is no reason to fear genetic hazard from strontium-90, since it accumulates in the bones and does not appreciably irradiate the reproductive organs.

In order to understand the degree of these hazards, it is necessary to compare the amount of radiation dosage received from fallout with the amount of radiation dosage normally received by all living things because of the natural radioactivity in the environment. In this way, it is possible to put the hazards from weapons testing into the context of normal human experience.

When this kind of comparison is made, it becomes apparent that we all carry in our bodies, and have in our surroundings, amounts of radioactivity very much larger than those derived from radioactive fallout.

Cosmic rays, which come from outer space, have their radiation effect progressively diluted as they pass through the atmosphere. Thus, a person living at an altitude of about one mile above sea level receives a dosage of cosmic rays approaching double that of a person who lives at sea level. There are other variations in the natural "background" dosages. For example, people living in certain localities of uranium or thorium mineralization will receive much more radiation than the average, and their ancestors have received these much higher doses over centuries in many parts of the world. Living in a brick house, rather than in a wooden house, will, with certain kinds of bricks in certain parts of the world, increase radiation exposure many times over that from test fallout.

The additional radiation dosages which persons receive from fallout are small compared to these natural dosages and even the variations in the natural dosages. To be specific, the dosage to new bone as in children which results from strontium-90 at present is about the same as the additional dosage which a resident at sea level would receive from cosmic rays if he moved from a beach to the top of a hill a few hundred feet high.

There is no question that excessive dosages of radioactive strontium can cause bone cancer and leukemia in animals, so we should not casually dismiss the possibility of harmful results from test fallout. However, keeping in mind that populations are exposed to natural radiations considerably greater than the fallout dosages, we can attempt to determine whether these have caused any detectable effects. We can examine, for example, whether there is any obvious increase in the rate of occurrence of bone cancer and leukemia in populations living at higher altitudes or in regions of uranium mineralization, etc.

Examination of available records does not disclose any such effects. However, vital statistics have not always been carefully kept, and further studies are being carried on under the aegis of the United Nations Committee to determine whether any such effects can be detected. One fact is apparent, however--it certainly is not our normal experience that people can appreciably increase the occurrence of these

dread diseases by moving to a higher altitude or by moving from a sedimentary soil, where the uranium content is low, to an igneous or granitic surface, where the uranium content is very much higher, or by moving from a wooden to a brick or concrete house.

Another way of evaluating the possible risk from strontium-90 in fallout is through comparison with the permissible concentration of strontium-90 recommended by authoritative groups. The permissible amount of strontium-90 for atomic energy workers in the United States is about 2,000 times the present strontium-90 content of new bone in the United States resulting from fallout. (Strontium-90 concentrations in the rest of the world are generally lower than those in the United States.) Authoritative groups have recommended that, on grounds of general prudence, the permissible limit for whole populations be one-tenth of that for atomic energy workers. On this basis, the present level for new bone, that is, in children, in the United States is somewhat less than one percent of the maximum permissible concentration for the population.

Perhaps a word of explanation should be given regarding these maximum permissible concentrations. As you know, scientists do not speak of "risks" or "hazards" in the sense that the words ordinarily are used. They try to measure possibilities almost to the limits of the finite; therefore, "risk" includes the possibility of effects far beyond the range of the probable or detectable. The maximum permissible concentrations are not safety limits, rather, they indicate that at considerably larger concentrations, perhaps tenfold greater, there would be definitely detectable effects.

So far, I have been discussing principally the possible risks from radioactive strontium. Radioactive fallout includes other materials which do not accumulate inside the body, but do emit penetrating radiation which can irradiate the sex organs and other parts of the whole body from the outside. Such radiations can produce genetic mutations.

Again, in evaluating the possibility of genetic effects from fallout, we should try to compare it with normal experience. The external dosages from fallout, that is, those

which might cause genetic effects, have averaged between one and five thousandths of one roentgen per year in the United States during the last three or four years. This figure should be compared with a normal dosage of 150 thousandths of one roentgen per year from cosmic rays and natural radioactive materials in the environment. In other words, the external fallout radiation has been from 0.7 percent to about three percent of the natural radiation exposure.

As another example, in certain countries of the world a brick house might easily have enough natural radioactive material in the walls to give up to 40 thousandths of a roentgen more exposure per year than a wooden house and a concrete block house gives about 100 thousandths of a roentgen more annually. These dosages range between 8 and 100 times the dosage due to test fallout.

Obviously, the genetic effect of fallout radiation must be very small compared with the genetic effect of natural radiation.

As you pointed out in your statement, radioactivity from tests which already have been held is present in the stratosphere, from which it will descend for years to come. The radioactivity of this material constantly is decreasing through normal radioactive decay. The tiny radioactive particles fall so slowly from the stratosphere that the continuing fallout in the United States just about compensates for the radioactive decay of the radiostrontium already deposited. Therefore, the present level of radiostrontium in the soil is about as much as we shall ever have from tests already fired.

Continued testing would not increase radioactivity on a straight additive basis, since an equilibrium would be established between the added radioactivity and radioactive decay. If tests were to continue until 1983 at the rate of the past five years, levels in the United States would be expected to reach about four times their present values. Levels about six times the present ones would be reached by the year 2011 if testing were to continue for that long a time.

I hope that I have provided enough information to demonstrate that the risk from nuclear testing at the present rate is small. Of course, a great amount of more detailed information is available, and I shall be glad to supply it to you if you wish. No scientist contends that there is no risk. We accept risk as payment for our pleasures, our comforts, and our material progress. Here the choice seems much clearer--the terrible risk of abandoning the defense effort which is so essential under present conditions to the survival of the Free World against the small controlled risk from weapons testing.

Sincerely yours,

/s/ W. F. Libby

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