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Science Hall 101

April 28, 1948

Dr. Shields Warren
Division of Biology and Medicine
Atomic Energy Commission
Washington, D. C.

Dear Dr. Warren:

Following the telegram which I sent you concerning the projected experiment on the genetic effects of radiation in mice, to be carried out at Oak Ridge, I should explain that the division of Biology at Oak Ridge telephoned me yesterday afternoon to say that the location of this project within the area housing their main biological work has recently been called into question again on the ground that there might be too much background radiation. Unfortunately, your letter to them on this subject, although dated April 8th, reached them only the day before yesterday namely April 26th, and therefore not in time for them to reply before the committee meeting on April 24th which would presumably take up the matter. It was for this reason that I thought it best to send you a telegram, in the hope that there might still be time to reconsider the matter at the May 8th meeting of the committee.

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The question of background radiation, in its relation to the choice of location for the project, was considered several times in discussions which Dr. Hollaender and Dr. Russell entered into with me. In particular, we discussed the matter very fully during my visit to Oak Ridge on March 25th to 29th of this year. At no time was there any difference of opinion between us on this subject and I am sure that no new facts can arise to change our judgement concerning it. Even in flies, where the most refined genetic techniques are used, 25 r has proved to be the lowest dose which gives effects marked enough to be detectible, in view of the frequency of mutations that arise in consequence of spontaneous processes that have no relation to radiation; and with any technique that can at present be used in mice the minimum dose capable of producing detectible genetic effects could not be lower than this as pilot experiments have shown. This is not at all to say that effects are not produced by a lower dose but only that they would be negligible for purposes of any experiment that could be carried out at the present time or within the next decade. And certainly the amount of background radiation received by the mice in the projected location could not be higher than this otherwise it would come above the at present accepted tolerance dose for human beings and the personnel could not continue working in this location either.

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A further consideration lies in the fact that the much higher doses of radiation which the treated mice will receive will give a measure of the genetic effectiveness of radiation which can be used for calculating what the maximum effect of the given background radiation could be. The effectiveness of small doses is never more than proportional to the dose itself. Consequently it could be determined from the effects with the high doses just how much maximal allowance had to be made for the background

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radiation. Of course there would be monitoring to show approximately how much background radiation there actually was. In this way, any possible effect of the background radiation on the control animals could be allowed for and subtracted from the total effect found in them. It would certainly prove so small, however, if the total radiation received by them between conception and reproduction was only of the order of 10 or 20 r as to be practically negligible, and the work would certainly prove that. I cannot conceive of any responsible geneticist later attacking the results of the projected work on the ground that the background radiation was too high if it were kept within these limits. And these are limits which certainly would not be overstepped.

In view of the negligibility of the background radiation, in the light of the above considerations, the other reasons for locating the projected work on mice in the neighborhood of the other biological work would seem to be quite decisive. It would be of the greatest advantage to have the scientists concerned with the mouse work in close and constant touch with the other biologists, since a considerable amount of cooperative activity will be important for the successful prosecution of the mouse work. All sorts of problems are bound to arise in the search for mutations of varied kinds and in their analytical study which will call for help on the part of biologists having all sorts of specialties. Moreover, the scientists directly in charge of the work would themselves profit greatly by such constant association as physical proximity to the other biologists would make possible, while on the contrary their efficiency would be affected very deleteriously if they were to be in the relative isolation which a physical removal of their work so far from that of the others would entail.

For the above reasons I very much hope that if a decision to separate the work should already have been made it will be reconsidered. The work is in my opinion of the highest importance Both from a theoretical and from a practical standpoint and it would be very unfortunate if all the effort and expense which is to be incurred in the prosecution of it were not to be spent in the most efficient manner possible. As previously noted, any competent specialists in the subject would, I am sure, agree with me in this and they themselves if working on the project would rightly insist upon such conditions.

I hope that you will pardon my having taken the liberty of writing you unsolicited about this matter but, as I have myself at times been called in as a consultant on this very project, I am keenly interested in its being as successful as possible.

Yours sincerely,

H. J. Muller

HJM:wls
cc: Biology Division, Clinton Laboratories

Text of telegram: Would thoroughly approve location of mouse radiation project in building proposed by Hollaender and Russell since consider background radiation there insufficient to interfere with obtaining of significant results.

H. J. Muller