

March 6, 1961

Dr. John N. Wolfe, Chief
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Division of Biology and Medicine
U. S. Atomic Energy Commission
Washington 25, D. C.

Dear Dr. Wolfe:

You have asked for our "reaction" to the "Addendum on Vegetation" to the 1960 medical report on the Rongelapese.

The first reaction was one of surprise at the inclusion of such a section in the medical report. The second reaction, shared by Ralph Palumbo who has been studying the vegetation at Eniwetok and Dick Walker the plant physiologist from the botany department who has been participating in the Rongelap studies, was that while the observations reported are correct, as far as they go, the implication that radiation has been the primary causative factor is without foundation and is scarcely negated by the general statements in the penultimate paragraph (Ralph is also sending you his comments). Unfortunately, the emphasis on radiation effects is given added credence merely by the inclusion of the addendum in a report by specialists in the area of medical aspects of radiation effects. This is quite a different proposition than the publication of similar material by Fosberg who does not purport to be a radiation expert. Fosberg at least has a backlog of observations recorded from other atolls, either as author or editor, from which he has implicated such other factors as drought and the activities of birds as being of primary importance (there was no fallout in those areas) in causing deleterious effects to the vegetation. When more data are available he has the background to enable him to reinterpret his observations and either change his suspicions or affirm them as conclusive. Such a reinterpretation would presumably be communicated through the same media Fosberg has used previously and the record would be clean.

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March 3, 1961

By way of background in explaining why I was especially surprised the following should perhaps be relevant: Blumberg had indicated in 1955 that he intended publishing a report on the vegetation of Rongelap in the Atoll Research Bulletin, which he did. I visited Bob Conard at BNL in May, 1955 and suggested at that time, that it seemed rather presumptuous of a man who had been introduced as an immunologist and was at Rongelap as a member of a medical team to prepare such a report. I gained the impression (obviously erroneous), at that time, that Bob looked upon this with some disfavor. There was never any question, of course, of a person's right to make and record his observations - only the questions of qualification to interpret the observations and the duty to indicate the degree of competence in making them.

Now, it is obvious that the levels of radiation at Rongelap have been great enough to produce some effects and that some of the effects observed could be caused by radiation, but certainly not uniquely by radiation. Going back to the earliest proposals concerning the Rongelap ecology program, it has been repeatedly discussed and agreed that without continuing observations, before and after fallout, the only reasonable way of assessing the role of radiation alone in affecting the biota of an atoll is by controlled experiments. Comparison with "control" areas has little meaning when considering the vegetation. One is dealing here with an area of some 500 square miles and an emergent land area of four to five square miles broken up into many small, low islets. Edaphic conditions alone preclude strict comparisons except within the limits of a few hundred feet at most.

While Stone's work with *Drosophila* is not directly related to the vegetation studies, it may not be out of place to mention it here as illustrative of the possibility of using the comparatively delicate tools of genetics in studying radiation effects in the field. And at the same time it points out that even here the action of factors other than radiation have made interpretation of the results difficult. For example, in *Genetic Studies of Irradiated Natural Populations of Drosophila*, Wilson S. Stone, et al., University of Texas publication No. 5721 November 1, 1957 in the summary of Section IV on page 291 is the statement: Factors which might explain the fact that the apparent mutation load of visibles from the Bikini test area was no greater than that from control areas were considered: . . . and in Section V on page 312, "The larger populations,



Rongelap and the more heavily irradiated Bikini, had not recovered to the level of the control population in 1956. By 1958 Rongelap had recovered even above the two controls, Majuro and Ponape. Bikini, which received some additional radiation in 1956 before the collection was made, was still low as compared to Ponape or Rongerik but only insignificantly lower than the Majuro control."

We are not prepared to go into a full discussion of the causative agents in the debilitation of the vegetation in the northern part of Rongelap Atoll. Nor will we be for some considerable time. However, we can list some of the possibilities that are being considered.

Radiation due to fallout - seeds of various plants have been collected and greenhouse culture techniques are being worked out in Seattle with a view to controlled radiation experiments (not by this lab - Sparrow (DNL) has verbally expressed interest in doing this).

Soils - soils from throughout the atoll are being classified. It is clear that the best soils of the northern islands are much less well developed than in other parts of the atoll (e.g. 0.26 μN in the best northern soil vs 0.57-1.71 μN in the prevalent soils of other islands).

Spray - we have not worked out a satisfactory method of assessing the role of spray.

Salinity Tolerance - tests are in progress in the greenhouse. Thus far Messerschmidia has been found to be more tolerant than Scaevola. There is putative evidence that Guettarda is less tolerant than Scaevola.

Over washing of islands - there is clear evidence of recent over washing at Lomuilal - e.g. glass floats, pumice area found near the center of the island.

Wind - the effect of wind on the isolated palms in the north as compared to those in groves in the south and east was repeatedly pointed out by the resident agriculturalist.

Drought - the "deformed bulges" Blumberg and Conrad refer to may be "telescoping" (at any rate telescoping has been observed at the northern islands) and is a well known result of drought.

Disease - This one had the district agriculturalist and his wife concerned. Such conditions as crown rot, which were observed, have been known to be caused by a transmissible agent. If we can find an available pathologist experienced with coconuts we will certainly try to get him out there.

Insect damage - This has been observed on several species of plants but has not been critically evaluated. With the exception of damage to coconut palms on Eriaetok Island by Brontispa, insect damage does not appear to be of major consequence.

And there are other factors which have not come to mind at the moment. Each field trip raises more questions of this nature than it provides answers. But perhaps these have been enough to indicate that it is wiser to speak much of radiation as an ecological factor and lump all of the others simply as "other factors".

I have tried to make this a reply of reaction and not a report -- hope it will serve your purposes.

Sincerely,

Edward E. Held
Research Associate Professor

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