

WOODS HOLE OCEANOGRAPHIC INSTITUTION
WOODS HOLE, MASSACHUSETTS

December 27, 1951

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Dr. Shields Warren
Harvard Medical School
Boston, Massachusetts

Dear Dr. Warren:

Since the war, this Institution has been very fully occupied with contract work for the Navy and for sheer lack of space it has been impossible for us to expand our activities in other directions. The Navy is now preparing to build us an additional laboratory to house the work done under their contracts and I am consequently giving much thought to the directions in which the Institution should develop once this pressure is off. Quite obviously, the current development in techniques for the use of radioactive isotopes should provide an opportunity for doing new things in oceanography. I am writing to obtain your views on whether it would be of interest to the Atomic Energy Commission to have established in this Oceanographic Institution a small laboratory devoted to the exploitation of these new possibilities for the advancement of oceanography, and whether support could be secured from the Commission for such a development.

The Oceanographic Institution has already had a number of contacts with problems arising from developments in radioactivity. At the time of the Bikini tests, we organized a field party which made studies of the circulation of the lagoon with a view to determining how long the lagoon might be expected to remain contaminated. We also had some discussions at that time on the requirements of instruments for scanning radioactive water from a moving vessel. Subsequently, we have been working actively on methods for determining the rate at which bays and harbors are flushed by tidal action and in this connection there has been much discussion of applications to the contamination of harbors in case of atomic bombing. Last summer the sub-Committee on Waste Disposal and Decontamination of the National Committee on Radiation Control of the Bureau of Standards met in Woods Hole and we took part in their discussions of means of disposing of contaminated materials at sea. More recently we have been consulted by the du Pont Company on how best to dispose of larger quantities of waste such as will be produced by the new plant in Georgia. We have also collaborated with the Lamont Geological Observatory, Columbia University, in securing samples of the deep sea water for use in carbon 14 studies aimed at estimating the age of the water in the deep ocean basins.

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If a laboratory were started here, the most obvious application would be in studying the cyclic exchanges of material between the sea and the organisms in the normal biological cycle. This is a matter which we have been working on actively for many years and quite obviously the use of short-lived products, such as phosphorous, would enable us to determine the time course of many of these exchanges. This study would not be a great departure in principle from much which is being done in biochemistry and physiology, except that we would extend the procedures to the exchanges between the organism and its environment. A second field of inquiry about which almost nothing is known might be on the dynamic processes which take place in marine sediments. I have in mind such questions as the rates of decomposition of organic materials entrapped in sediments and the exchanges of such materials between the sediment and the overlying sea water. This problem might have some practical application in relation to contamination problems in harbors and rivers. A third group of applications might be in the study of hydrodynamical problems of theoretical interest, particularly problems pertaining to the mixing processes which go on in the sea. Understanding of such processes is fundamental to all hydrographic research and is badly in need of theoretical elucidation. It seems to us quite possible that radioactive tracers might provide a key to such understanding.

The development which I have in mind is to establish here, as soon as space becomes available, a small laboratory adequately equipped for handling radioactive materials and making the standard measurements. We should like to put in charge of this a young Ph.D. trained in the techniques for handling and measuring radioactive materials and with interest in developing his own problem in geochemistry, geophysics, or biochemistry as related to oceanography. Such a man should be able to carry out his own work without supervision but would benefit from the collaboration of the rest of the Institution in dealing with marine problems. In return he would be in a position to help apply radioactive techniques to the problems of other members of the staff as opportunities arise.

You may recall that I was concerned with the physiological action of ionizing radiations back in the pre-atomic days at the Medical School so that I have a long background of interest in this business. Last summer we arranged to have Dr. Henry A. Kierstead of Brown University spend some time with us looking into the possible applications of radioactive techniques to our problems. He thinks my present proposal is a sound one and would be available as a consultant should it become a reality.

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I would appreciate very much your reactions to this suggestion. If it seems desirable to you, I would be very glad to discuss the matter with you further, but in any case I would like to have your advice as to whether and how to proceed, if you think it is a matter which would interest the Atomic Energy Commission.

Very sincerely yours, .

Alfred C. Redfield
Alfred C. Redfield
Associate Director

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