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CONCENTRATION OF ACTIVE MATERIALS BY HYDROIDS
IN THE BIKINI LAGOON DURING THE SUMMER OF 1947

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CONCENTRATION OF ACTIVE MATERIALS BY HYDROIDS
IN THE BIKINI LAGOON DURING THE SUMMER OF 1947

Following the underwater bomb burst at Bikini on Baker Day 1946 and during the Scientific Resurvey of the area in 1947, many evidences of selective absorption of fission products by plants and animals growing in the waters of the lagoon were observed.

Since it is impossible to determine the rate of concentration of fission products without direct experimentation and because the press of other duties precluded such attempts, no direct experiments were conducted.

A chance observation during the Resurvey of 1947 provided some direct evidence of the continued selective concentration of fission products by forms growing in the waters of the lagoon.

Following the arrival of the U.S.S. Chilton, A.P.A. 38, in the Bikini lagoon on July 15, 1947, the cradles used to hold the picket boats on deck were unloaded and buoyed out near the beach of Bikini Island, in area 2604. The boat frames remained at the moorage from July 15 to August 28, 1947.

While floating in the waters of the lagoon, marine fouling organisms grew upon the wood. One growth, a marine hydroid, was particularly abundant.

Since the frame was of new construction and had not previously been in water, it is known that this hydroid growth occurred during the 44 days the frame was in Bikini lagoon. After the frame was brought back aboard the ship a sample was taken of the fouling growth. This sample was ashed and counted along with others and when it was found to be radioactive a larger sample was collected on September 8 and brought back to the laboratory at the University of Washington. Figure 1 is a photograph taken of the dry hydroid attached to the boat frame after the samples had been removed.

On January 14, 1948, the count of this sample at the University was 245 per minute per gram of dried sample, uncorrected for self-absorption. The geometry of the counter was about 15 per cent. On this basis the sample contained approximately 0.75 microcuries per kilogram.

The stored sample was in a semi-dried state and was further dried to the point of charring before being weighed. In order that the sample count would be well beyond the range of the background a relatively large sample, 1.115 grams, was used. The bulk of the sample necessitated the use of an evaporating dish for the initial ashing. It was later transferred to a stainless

steel plate and the ashing completed. This technique tends to minimize the count due to loss of ash in transferring.

A radioautograph exposed from October 10 to December 27, 1947 is shown in Figure 2. A photograph of the sample used to make the radioautograph was taken later and is shown in Figure 3. However, there was some rearrangement of the sample between the time of the radioautograph and of the photograph. The number of impulses of this sample was counted by the same procedure as mentioned above. The sample weight was 0.385 gram and the count above background per minute per gram of dried sample uncorrected for geometry of counter and for absorption was 71. Since this sample contained several splinters of wood and the wood per unit mass was less active, the count per minute per gram for this sample was less than for the pure hydroid sample.

The samples were ashed on .005 inch stainless steel plates, 1 inch in diameter, 1/16 inch deep and counted in a Victoreen mica window Geiger-Mueller tube connected to a Victoreen scaling unit of 64.

This hydroid was identified as belonging to the family Plumularidae and probably to the genus Plumularia although the hydrothecae are not strictly adnate to the hydrocaulus. Figure 4 is a photograph of a dried sample that was soaked in sea water.

Summary

The fouling growth on a boat frame that had been moored in Bikini Lagoon from July 15 to August 28, 1947 was counted for activity. This material, composed mostly of a hydroid belonging to the family Plumularidae had concentrated active materials. The gross activity concentrated by this new growth exceeded the activity found in the water many times, indicating a selective absorption and concentration of the active substances.

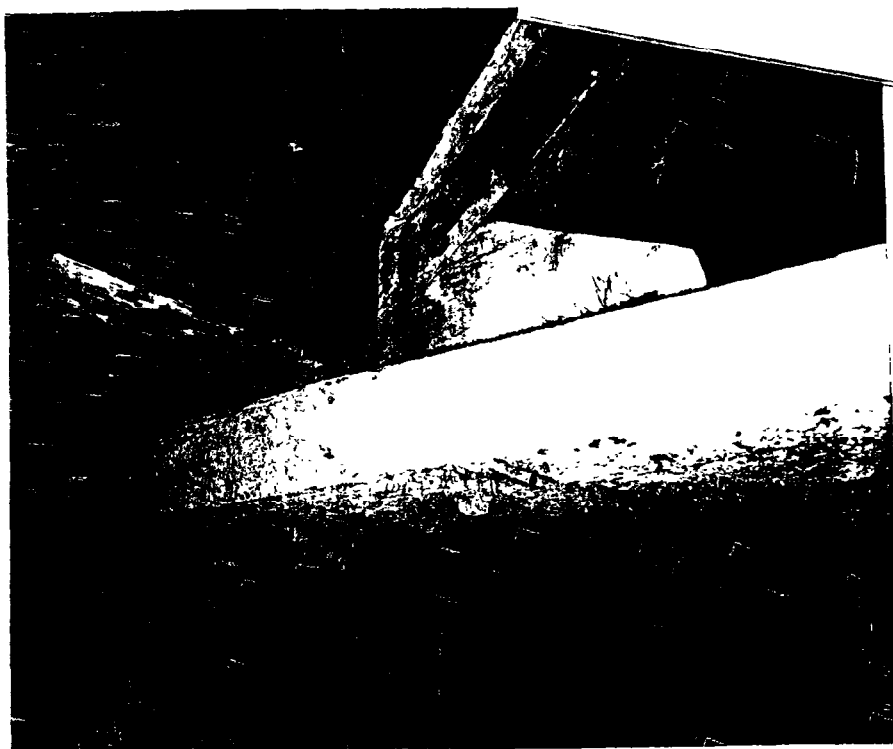


Fig. 1. Photograph of the hydroid and other fouling organisms attached to a portion of a boat frame after 44 days afloat in Bikini Lagoon during the summer of 1947. The growth was much heavier than shown, as samples had been removed before photograph was taken. The painted surfaces are those of the boat keel and hull nested in the frame.



Fig. 2. Radioautograph produced by hydroids that grew between July 15 and August 28, 1947, on a boat frame moored in Bikini Lagoon. Exposure time was 80 days.



Fig. 3. Photograph of the hydroid material used to produce the radioautograph in Figure 2. There was some rearrangement of the sample between the time of the radioautograph (Fig. 2) and this photograph. The scale is in centimeters.



Fig. 4. Photograph of the hydroid removed from boat frame. Sample was dried and then later soaked in sea water prior to photographing.