

which correlates with the size of the colonies and can be measured with time (that is, without sacrificing the colonies) is the hydranth. A count of hydranth number with time under the conditions described reveals that the number increases exponentially for as long as hydranths can be counted accurately (Fig. 2). This is also true of *Hydra*, where the new hydranths quickly separate from the parents, and the count permits the determination of growth rate by the standard equations for exponential growth (2). Whereas Loomis found the average doubling time of *Hydra* to be slightly less than 2 days, the average for *Cordylophora* is 3 days.

By using growth rate as a measure of conditions, the influence of environmental variables on the growth of *Cordylophora* has been studied (9). Except for the composition of the aqueous environment and the feeding rate, the growth rate of colonies is relatively insensitive to variation of many parameters, including light, temperature, pH, and oxygen tension.

The method described has permitted the continual asexual growth of a clone of *Cordylophora* for over 2 years, providing vigorous and uniform material for experimental studies (10).

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References and Notes

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4. Addition of 1.5×10^{-4} molar disodium diethylenediamine tetraacetate ("versenate") chelates heavy metals and makes it possible to prepare CCS5 in tap or distilled water.
5. H. M. Lenhoff and J. Bovaird, *Anat. Record* **134**, 598 (1959).
6. *Artemia* are handled according to the controlled procedures described by W. F. Loomis and H. M. Lenhoff, *J. Exptl. Zool.* **132**, 555 (1956). *Artemia* were found to hatch inefficiently in their NaCl-tap water solution (made with either New York City or Woods Hole tap water) unless versenate and a buffer were added. To prepare a 30 X stock hatching solution, the following are added to 3200 ml of hot tap water: 345.6 gm of NaCl, 4.8 gm of disodium versenate, and 9.6 gm of NaHCO_3 .
7. With daily feeding, a second daily CCS5 change is essential for vigorous growth. Colonies can be maintained without feeding for several months if the culture solution is kept clean and evaporation is avoided.
8. Silk thread is wound once around a slide, about an inch above the bottom, and sealed to one edge with a drop of molten wax. A single upright is slipped between the thread and slide.
9. A report of these studies is in preparation.
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Long-Range Detection of French Nuclear Tests of 1960

Abstract. With a relatively small number of strategically located ground-level air-filter stations, it has been possible to detect the presence of radioactive debris from the French nuclear test of February 1960 at a great distance from the test site, and to obtain data on the time of arrival of this debris and the extent of its north-south spread.

An atomic device of 60 to 80 kilotons' yield was fired by the French Government in the Sahara Desert near lat. 26°N , long. 0° at 0700 hours on 13 February 1960 when, according to news reports, weather conditions were such that all radioactive debris would be transported in an easterly direction. This debris would thus have to travel about three-quarters of the distance around the earth before it would intersect the 80th meridian network of air-filter stations operated by the U.S. Naval Research Laboratory (1, 2).

As is shown in Fig. 1, the station at Miraflores, Panama Canal Zone, received the first indication of fission products from this test in the 2-day collection of 24–26 February, 12 or 13 days after shot time. The time of arrival at San Juan, Puerto Rico; Miami, Fla.; and Guayaquil, Ecuador, was a day or

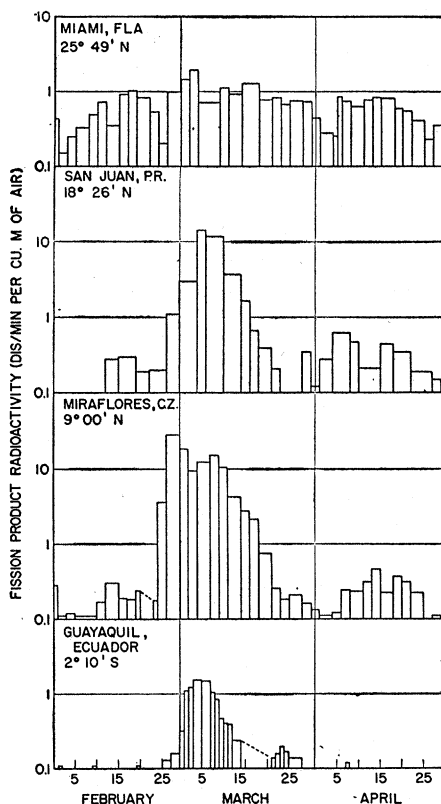


Fig. 1. Changes in the concentration of fission product radioactivity in the air along the 80th meridian (west) following the French nuclear tests of 1960.

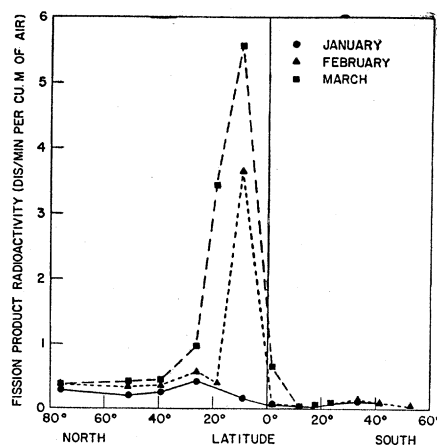


Fig. 2. Gross fission product β -activity in the air at ground level along the 80th meridian (west) during early 1960.

two later. Fission product activity reached its highest level at Miraflores in the collection of 26–29 February, when it was about 100 times the previous background of residual activity from past tests. Maxima occurred at the other sites at later times: Miami, 2–4 March; San Juan, 4–6 March; Guayaquil, 3–5 March. The second rise shown, during early April, is also probably related to the February test, since debris from the French test of 1 April would not be expected to arrive so soon. Debris from the much smaller second test could be hidden by residual activity from the first test; in any event its presence was not confirmed at any of these sites.

The extreme spread of this activity at the 80th meridian is shown in Fig. 2 to range from a few degrees south of the equator to just above lat. 25°N . No fresh activity was detected at Lima, Peru, or Washington, D.C., or at any stations north or south of these points. Conclusive proof of the absence of fresh debris at these other sites has been obtained through radiochemical analyses which showed the absence of the shorter-lived fission products. The progressive increase in the level of activity during the period January to March 1960 at the three northernmost stations is due to the predicted spring rise in activity in the Northern Hemisphere and is not associated with the French shot.

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2. Partial financial support of this work was supplied by the Division of Biology and Medicine, U.S. Atomic Energy Commission.

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