The 10-min period is now filled with groups of responses at high rates and periods of no response. This record is typical of others obtained after injection of sodium pentobarbital with a tandem-schedule base line.

The result obtained by Dews seems to be confirmed here by the use of a different experimental technique. Dews showed that the behavior maintained by fixed-ratio schedules was much more resistant to sodium pentobarbital than that maintained by fixed-interval schedules. In the present experiment, a tandem schedule was used, combining features of both fixed-interval and fixed-ratio schedules. The behavior generated by the tandem schedule shows both the progressive increase in rate typical of fixed-interval performance and the rapid responding characteristic of fixed-ratio performance. Sodium pentobarbital, by its selective interference with these two forms of responding, served to fractionate the tandem-schedule performance. Both effects of sodium pentobarbital on fixed-interval behavior were observed when the tandem schedule was the base line. There was both the depression in rate and the loss of positive curvature in the record. The rapid, fixed-ratio responding, which is insensitive to sodium pentobarbital when a fixed-ratio schedule alone is used as a base line, was not, however, disrupted by the drug. These findings serve the dual function of further substantiating the selective action of sodium pentobarbital and of being a demonstration of the presence of fixed-interval and fixed-ratio components within the tandem-schedule performance.

R. J. Herrnstein*
W. H. Morse
Department of Psychology, Harvard University, Cambridge, Massachusetts

References and Notes

1. P. B. Dews, *J. Pharmacol. Exptl. Therap.* 113, 393 (1955).
2. This research took place in the Psychological Laboratories, Harvard University, with the support of the William F. Milton Fund and ONR contract N5 ori-76.
3. C. B. Ferster, *Psychol. Bull.* 50, 263 (1953).
4. ——— and B. F. Skinner, *Schedules of Reinforcement* (Appleton-Century-Crofts, in press).

* Present address: Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D.C.

22 June 1956

Fish Scales in a Sediment Core from Linsley Pond, Connecticut

During a study of the LV sediment profile (*1*) from Linsley Pond, Connecticut, two fish scales were found at depths of 25.0 and 24.2 m below the present water surface (10.2 and 11.0 m below the mud-water interface). The scales

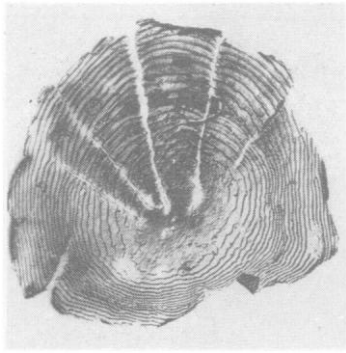

Fig. 1. Fish scale from 24.2-m depth in sediment of Linsley Pond, Connecticut. (approximately × 22).

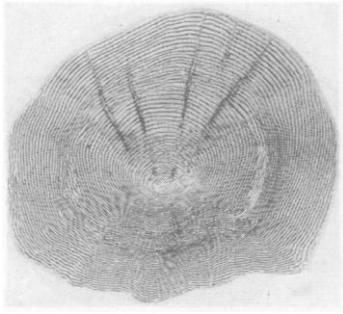

Fig. 2. Scale of golden shiner, *Notemigonus crysoleucas*. (approximately × 26).

were found in sediments of the lower Cl pollen zone. The radiocarbon dates for the upper and lower Cl pollen zones are 5200 and 8300 years, respectively, (*2*). The scales are therefore located in sediment that is approximately 7500 years old.

Following Lagler's key to scales of Great Lakes fishes (*3*), the older of the two scales (25.0-m depth) was identified plausibly by Vallentyne as a scale from a member of the family Cyprinodontidae, of which there is only the banded killifish, *Fundulus d. diaphanus,* in Connecticut's lakes now (where reportedly they are restricted to sandy-gravelly shoals (*4*). This scale was lost inadvertently.

A photograph (Fig. 1) of the younger scale (24.2-m depth) shows one apparent annulus; the fish was nearing its second birthday at least. The characteristics of this scale further indicate that it came from a member of the minnow family, Cyprinidae. The present-day native minnows of Connecticut are fallfish (*Semotilus corporalis*), creek chub (*Semotilus atromaculatus*), blacknose dace (*Rhinichthys atratulus*), common shiner (*Notropis cornutus*), cutlips minnow (*Exoglossum maxillingua*), bridled shiner (*Notropis bifrenatus*), golden shiner (*Notemigonus crysoleucas*), and spottail shiner (*Notropis hudsonius*) (*4*).

The find resembles "typical" scales of the last two of the foregoing and quite clearly of none of the rest. Comparison is made difficult by the facts that the Cl specimen is somewhat fragmented, that its central area (focus) is eroded (almost certainly it is a replacement scale and not one of the fish's original complement), and that there is variation in scale configuration and visible components from place to place on a fish. Identification as golden shiner (see Fig. 2), *Notemigonus crysoleucas,* is preferred to that as spottail, *Notropis hudsonius,* because of the small number and angles of the radii and on grounds of contemporary ecology. *Notemigonus* is the most common Connecticut lake minnow (*4*) —also predominantly lacustrine elsewhere in its range—although it is locally abundant in the Great Lakes. There is no evidence for concluding that the Cl cyprinid scale is from a species once but no longer extant in the pond drainage.

This appears to be the first instance in which single fish scales have been found in lake-sediment cores. The scales were encountered only by accident. A thorough and premeditated search for scales in lake sediments might provide data bearing on fish succession during lake history. Providing that the scales could be specifically identified, the information obtained would be of considerable interest to paleobiogeographers and limnologists alike. The presence of scales from cold stenothermal fishes would be of particular interest in relation to the obliteration of the hypolimnion as the lake basin filled in (*5*).

Karl F. Lagler
Department of Fisheries, University of Michigan, Ann Arbor
J. R. Vallentyne
Department of Biology, Queen's University, Kingston, Ontario, Canada

References and Notes

1. J. R. Vallentyne and Y. S. Swabey, *Am. J. Sci.* 253, 313 (1955).
2. R. F. Flint and E. S. Deevey, Jr., *ibid.* 249, 257 (1951).
3. K. F. Lagler, *Trans. Am. Microscop. Soc.* 66, 149 (1947).
4. D. Webster, *Connecticut State Geol. and Nat. Hist. Survey Bull. No. 63,* 122 (1942).
5. This work was supported by the National Research Council of Canada.

23 July 1956

Correction

In our paper "Mitochondrial self-duplication observed *in vitro*" [*Science* 124, 123 (20 July 1956)], the authors of two of the references were incorrectly given. The authors for reference 5 are E. P. Kennedy and A. L. Lehninger; the authors for reference 6 are J. W. Harman and M. Feigelson.

H. A. Leon
S. F. Cook
Department of Physiology, University of California Medical School, Berkeley

29 July 1956