Table 1. Food preference by snapping turtles after 12 days on each of two constant diets. M, horsemeat; F, fish (guppy); W, redworm.

Turtle (No.)	Original diet	Choice, first test		Second diet	Choice, second test	
		First	Second		First	Second
		Group 1				
1	M	M		W	M	W
4	M	M		W	M	W
7	M	M		W	M	W
10	M	M	W	W	M	W
13	M	M	W	W	M	F
16	M	M	W	W	M	W
19	M	M		W	M	W
		Group 2				
2	F	M	F	W	F	W
5	F	M	F	W	F	W
8	F	M	W	W	W	F
11	F	F	M	W	F	W
14	F	F		W	F	W
17	F	F	M	W	M	F
		Group 3				
3	W	W	M	M	W	M
6	W	W	F	M	W	M
9	W	W	M	M	M	F
12	W	M	W	M	M	
15	W	W	M	M	W	M
18	W	W	M	M	W	M
20	W	W	M	M	W	M

to either the type or quantity of chemical stimuli emanating from the meat when it is placed in water. Nevertheless the fact that the group originally fed worms developed a preference for worms, and maintained such preference through an equally long exposure to meat, suggests that food preference in turtles can be modified in a way similar to that shown to obtain in chicks.

One of the original criteria for imprinting was irreversibility (*4*). The status of this concept has not been adequately tested in the laboratory, although indications are that the situation in social imprinting is more complex than was originally assumed (*5*). The study of food imprinting in chicks, however, showed that the results of experience during the critical period strongly resist extinction for at least 10 days. The turtles in our experiment would eat food other than the imprinted one, but, all things being equal, they preferentially selected the imprinted food. Prolongation of the period of original exposure to a particular food may further lower the probability of response to unimprinted foods. This possibility is consistent with observations of hatchling diamondback terrapins (*Malaclemys terrapin*): those reared for an unspecified period on an all-beef diet "consistently refused to accept any other type of food" (*6*).

Our results do not tell us much about involvement of a "critical period" in the imprinting, similar to that demonstrated in chicks (*2*). Since newly hatched turtles can endure long periods without food, it is probable that the first experiences of feeding are important, regardless of their exact times after hatching. Twelve small feedings, or less, suffice to modify food preference, but the amount of food given, the number of consummatory snapping reflexes, or the time interval from the first feeding also are possible factors.

GORDON M. BURGHARDT
ECKHARD H. HESS
Department of Psychology, University of Chicago, Chicago 60637

References and Notes

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Quaternary Stratigraphy

Charles B. Hunt's review of Quaternary geology in the United States, 1 Oct., p. 47, refers to what he calls "an old ailment in Quaternary stratigraphy, the numbers game. Given one glaciation, it must be Wisconsin; given two they must be Wisconsin and Illinoian; given three they must be Wisconsin, Illinoian, and Kansan, and so on."

Certainly, Chamberlin, Leverett, Kay, and others who worked large areas in detail recognized no such premise. That was not the way the Illinoian came to be distinguished from the Kansan. They differentiated drift sheets on the basis of age differences as indicated by weathering and erosion. Field studies have advanced to the point where it can be definitely said that the Pleistocene had at least four continental glaciations separated by interglacials, though it is recognized that a glaciation older than the Nebraskan may yet be found beneath the Nebraskan, as more exposures occur, but it must bear definite record of prolonged weathering before burial.

Mountain glaciation is in another category. The deposits are isolated, subject to different back-wall, side-wall, and axial valley environments. The older deposits of mountain glaciation are usually fragmentary. One who is experienced in the study of the older drifts in the Middle West is aware of the much longer duration of the Yarmouth and Aftonian interglacials than the Sangamon or the Recent, and is better oriented to recognize older mountain glaciation. Although exacting study of field evidence is given first place, the number of deposits of distinctly different age may aid in reaching conclusions. By this discipline we have no "numbers game." Otherwise, our study of glaciation can lay no claim to science.

Correlation of glacial substages of mountain glaciation with those of continental glaciation is more subtle than that of glacial stages. Although the climatic changes that bring about successive substages are believed to be worldwide and may affect continental glaciations fairly consistently, the factors affecting mountain glaciation and deglaciation are so variable that substages may not be distinguishable from interstadials between a succession of retreatal moraines. Moreover, the admissibility of radiocarbon datings must be critically assessed. Reliable analytical practice in chemistry requires duplicate analysis; radiocarbon determinations, which commonly meet with more unknown factors than does chemical analysis, should receive no less than equal care.

MORRIS M. LEIGHTON
307 East Florida Avenue, Urbana, Illinois 61801