Do sea turtles stop and ask for directions?

Sea turtles navigating the Pacific Ocean follow the same narrow routes from year to year, as if they were migrating along thin ribbons of highway stretched out across the open ocean. This discovery, made by attaching satellite transmitters to leatherback turtles, may help scientists devise more effective strategies for preserving the dwindling populations of leatherbacks and other endangered turtles.

Ed Standora

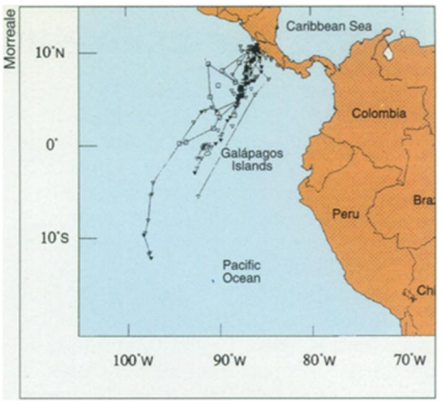
Leatherback turtle.

"Our perceptions are that the oceans are a vast, almost infinite resource. But the turtles are showing us that the resources are clustered along narrow, tight bands," says Stephen J. Morreale of Cornell University. Morreale and his colleagues identified the migratory routes by tracking eight female leatherbacks after they left their nesting site on the west coast of Costa Rica. The scientists describe their findings in the Nov. 28 NATURE.

Each year from 1992 through 1995, Morreale's group studied two turtles for up to 3 months. All eight followed similar, in some cases identical, courses toward the Galápagos Islands. Even turtles traveling 3 years apart maintained the same route.

The migration path appears to go beyond the Galápagos for a distance of at least 2,700 kilometers, according to the longest-lived transmitter, which lasted 87 days.

Morreale



Eight leatherbacks follow nearly identical annual migration paths.

Propelled by the dire situation of sea turtles around the world, researchers have redoubled their efforts to collect data on the behavior and biology of these holdovers from the days of the dinosaurs. Almost all of the information gleaned so far has concerned females engaged in laying eggs, because that is the only time that scientists can easily observe turtles, says Morreale.

With the advent of small satellite transmitters, researchers are starting to get their first insights into where turtles go when they are not nesting. Morreale has also tracked migratory patterns for loggerhead turtles and Kemp's ridley turtles that summer off the coast of New York. As these species migrate south for the winter, they follow narrow, unvarying pathways along the East Coast, much as the leatherbacks do in the Pacific.

Biologists cannot explain how turtles follow identical paths, especially in the open ocean. Evidence suggests that the animals rely on a number of navigational cues, including the length of daylight and the angle of Earth's magnetic field, but none of these can account for the paths in the Pacific, Morreale notes.

Populations of several turtle species have plummeted in the last 15 years, in large part because of hunting, collection of eggs, and accidental deaths from commercial fishing. If most turtles do follow narrow migratory routes, knowledge of these paths will help nations limit the harmful run-ins between turtles and fishing fleets, contends Morreale.

Preliminary evidence from other studies of long-range migration shows that turtles do not always stick to the same open-ocean course, says Scott A. Eckert of Hubbs Seaworld Research Institute in San Diego. When Eckert tracked Atlantic leatherbacks for a year with satellite transmitters, the turtles followed the same path for the first 2 months, then split up. If Morreale's transmitters on the Pacific turtles had continued working for more than 3 months, they probably would have shown a similar pattern, says Eckert. — *R. Monastersky*

African fossil pushes back human ancestry

A 2.3-million-year-old fossil unearthed in Ethiopia comes from the oldest known member of the human evolutionary lineage, a scientific team announced last week.

The new *Homo* specimen, which consists of an upper jaw holding nine relatively complete teeth and part of the lower nasal area, is about 400,000 years older than the next-oldest securely dated *Homo* fossils. Those discoveries were made more than 30 years ago at Tanzania's Olduvai Gorge. Many researchers now divide the Olduvai bones into two species, *H. habilis* and *H. rudolfensis*.

Preliminary comparisons indicate that the new fossil's remaining teeth bear close similarities to those of *H. habilis*, but the Ethiopian find cannot confidently be assigned to a species, assert anthropologist William H. Kimbel of the Institute of Human Origins in Berkeley, Calif., and his coworkers. Kimbel's group will present its findings in the December JOURNAL OF HUMAN EVOLUTION.

"The new specimen is complete enough to assign to *Homo* and has a pretty solid date," remarks anthropologist G. Philip Rightmire of the State University of New York at Binghamton. "It helps to clear away some of the mist surrounding early *Homo* evolution."

Investigators found the partial jaw at the Hadar site, where prior work yielded the remains of "Lucy" and other members of *Australopithecus afarensis*. At Hadar, these upright-walking, small-brained creatures date to between 3.4 million and 3 million years ago.

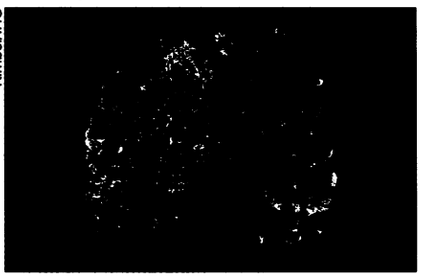
A number of stone tools lay in the sediment that held the Hadar jaw. The researchers have not established that these implements were made by early *Homo*, but this is the oldest association between a human ancestor's fossils and stone tools. The oldest known stone implements come from a nearby Ethiopian site and date to around 2.6 million years ago (SN: 4/15/95, p. 237).

Fossils of antelopes, hippopotamuses, and other animals recovered near the Hadar jaw suggest that early *Homo* lived in an open, grassy locale with stands of trees and water nearby, the scientists contend. In contrast, when *A. afarensis* lived at Hadar, the area was wetter and more densely wooded.

Analyses of two isotopes of the element argon contained in volcanic ash situated just above the *Homo* fossil allowed the researchers to calculate the jaw's approximate age.

"I wouldn't be surprised if further *Homo* fossils are discovered that date to around 2.5 million years ago, when the lineage probably originated," Rightmire says. — *B. Bower*

Kimbel/IHO



Early Homo *upper jaw found at Hadar, Ethiopia.*