Anthropology

Nosing into Neandertal anatomy

Inside a Neandertal nose, the walls flaunt big clumps of—bone (we're dealing with fossils, after all). In fact, these bony masses are so large and jut out in such an unusual way that they bolster the classification of Neandertals and *Homo sapiens* as separate species, two anthropologists argue.

Neandertal nasal features may be unique not only among members of the human evolutionary family, or hominids, but among all land-dwelling mammals, contend Jeffrey H. Schwartz of the University of Pittsburgh and Ian Tattersall of the American Museum of Natural History in New York.

"It's mind-boggling how different Neandertal nasal structures are from those of humans," Schwartz holds.

Neandertals lived in Europe and western Asia from about 200,000 to 30,000 years ago. Characteristic features of these hominids include thick bones, sloping foreheads, bulging brow ridges, chinless jaws, and peg-shaped front teeth.

Schwartz and Tattersall observed the newly described structures in nine skulls, three of them from children, that retain the nasal bones. They also examined nasal features in four *Homo* skulls ranging from 400,000 to 26,000 years old.

Neandertals display a horizontal, bony wedge at the front of the nasal cavity and an even more pronounced extension of bone farther back—the latter associated with an expanded sinus, the researchers assert in the Oct. 1 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES. Neandertals lack *Homo's* bony roof for tear ducts, which run into the nasal cavity, the researchers add.

These findings fit with controversial evidence that the Neandertal upper respiratory tract differs from that of modern humans (SN: 4/11/92, p. 230), write anatomist Jeffrey T. Laitman of Mount Sinai School of Medicine in New York and his coworkers in an accompanying comment.

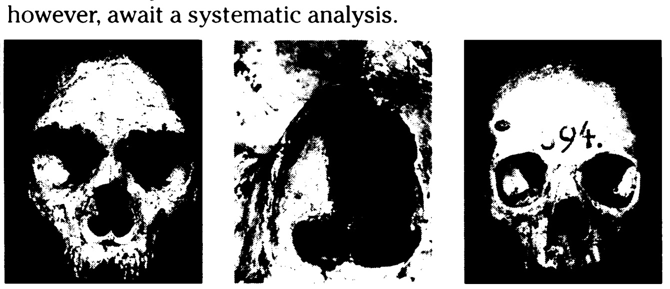
Neandertals may have breathed less through their mouths and more through their noses than *H. sapiens*, Laitman holds. The expanded Neandertal nasal bones may have been sheathed with mucous membranes for warming and cleansing air in cold locales, he suggests.

Other researchers view the new report cautiously. Bony growths in the Neandertal nose apparently arose from sinus expansion, which scientists have long known about, argues anthropologist David W. Frayer of the University of Kansas in Lawrence. In his view, Neandertals and *H. sapiens* shared enough skeletal features to belong to a single species.

Moreover, Neandertals cannot lay sole claim to the nasal traits described by Schwartz and Tattersall, maintains anthropologist Phillip V. Tobias of the University of the Witwatersrand in Johannesburg, South Africa. Comparable bony protrusions appear in the nasal cavities of the modern southern African people known as the San, Tobias argues.

"I'd bet my next month's salary that Tobias is mistaken," responds Schwartz, who has failed to find Neandertal nasal features in any of about 600 modern human skulls. San noses, however, await a systematic analysis.

Schwartz



Large, jutting nasal bones appear in a Neandertal skull (left) and in a close-up of its nasal opening (center). An H. sapiens *skull (right) exhibits markedly smaller scrolls of bone on the side of its nasal cavity.*

Earth Science

A date for the ice ages

For nearly 2 million years, Earth has been moving to the rhythm of the ice ages, bopping back and forth between long glacial epochs and short, balmy spans known as interglacials. To understand what choreographs this global dance, researchers need to determine the timing of the ice ages—a subject of much debate in recent years. A team of oceanographers has now developed a technique, using radioactive elements in seafloor sediments, to pin down the dates of the most recent interglacials.

The shells of ancient marine algae played a pivotal role in the research, explains Niall C. Slowey of Texas A&M University in College Station. As the algae were growing thousands of years ago, their calcium carbonate shells incorporated atoms of uranium from the seawater. After the algae died, their shells blanketed the seafloor, and the enclosed uranium began to decay into thorium.

By measuring the ratios of these radioactive elements in algal shells collected near the Bahamas, Slowey and his colleagues determined the age of the sediments. This enabled them to date dramatic shifts in the sediments' oxygen isotope ratios, which record the ice ages.

Oceanographers had previously relied on the carbon-14 dating technique to judge the age of deep-sea sediments, but this method reaches back only 45,000 years. Because uranium decays more slowly, it provides a means of dating sediments going back several hundred thousand years.

According to the new study, the last interglacial began sometime before 127,000 years ago and ended 120,000 years ago, the scientists report in the Sept. 19 NATURE. These findings match dates taken from shallow-water coral, but they contradict substantially older dates obtained from minerals growing on the wall of a Nevada cave called Devils Hole (SN: 10/10/92, p. 228).

Since the late 1800s, scientists have theorized that subtle shifts in Earth's orbit orchestrate the glacial cycle. The Devils Hole record, however, suggested that the last interglacial warming occurred during an orbital phase that should have been associated with cooling. The new dates from Bahamian sediments support the orbital theory, says Slowey.

Other researchers disagree. Jurate M. Landwehr of the U.S. Geological Survey in Reston, Va., notes that Slowey and his coworkers failed to date the beginning of the last interglacial, which makes it impossible to compare their findings with the Devils Hole record. "They are asking the right questions. Everybody wants to be able to date sediments directly. But they really have not done the critical experiments yet," she says.

Ancient Arctic splashdown

Delving beneath the seafloor north of Scandinavia, geologists have discovered a large crater left by a meteorite impact roughly 130 million years ago. The crater and surrounding debris are among the best-preserved on Earth, reports a team of Norwegian and U.S. researchers in the September GEOLOGY.

The 40-kilometer-wide Mjølnir crater lies 400 meters below the surface of the Barents Sea. In 1993, researchers at the University of Oslo proposed that the crater had formed during an impact, but they lacked conclusive proof and could not determine its age. To resolve these issues, the scientists studied sediments drilled at a site 30 kilometers north of the crater.

There they discovered slivers of shocked quartz—grains with intersecting fractures caused by high-pressure shock waves. They also measured high concentrations of the element iridium in the sediments. Geologists regard both features as calling cards left by an extraterrestrial impact. The age of the sediments dates the crash to the latest part of the Jurassic or the earliest part of the Cretaceous period.