quickly made than stone-tipped spears, the wood-tipped speares would allow hunters more time to look for these quarries.

Of the sites studied by Shea that contained stone tips, only five have yielded fossils of Neandertals or modern humans. He found that the two groups showed similar variation in how many points were produced from a rock.

Anthropologists have assumed that only modern humans typically engaged in intercept hunting, but Shea suggests that his data indicate that Neandertals did too. This contradicts the idea that Neandertals were markedly inferior, he says.

Surprisingly, the Neandertals' efficiency at producing stone spear tips tended to be high—up to 28 times that of the early modern humans.

"I often tell my students these guys [Neandertals] were probably like wolves with knives," Shea says. "They were big people. . . .They probably required enormous amounts of calories to subsist."

Critics challenge the accuracy of Shea's method of calculating the efficiency of stone-point production and suggest that differences in the distribution of stone points do not necessarily suggest variable hunting styles.

After analyzing the same data, Steven E. Churchill of Duke University in Durham, N.C., says in a CURRENT ANTHROPOLOGY commentary that the variation in production does not correlate with the locations of migrating prey, as it should if Shea's thesis is correct.


d'Errico

Some scientists argue that Neandertals sawed the long bones of birds to produce the tubes decorated with notches found in a cave in Arcy-sur-Cure, France.

Shea responds that fossils of such species have not been preserved or studied sufficiently to reveal whether or not any correlation exists.

Shea's explanation may not be complete, says Erik Trinkaus, an anthropologist at Washington University in St. Louis. "But I think his approach needs to be very much commended for trying to get at things that are behaviorally and adaptively important," he adds. "It may be that the traditional ways that people have looked at animal bones and stone tools may not tell us much."

Taken together, the studies leave researchers with many further mysteries to consider. Archaeological evidence for similarities between Neandertal and modern human behavior does not jibe with their distinct anatomies, which suggest to some researchers that the groups would have evolved different lifestyles.

Many investigators now agree that anatomical differences alone cannot explain the Neandertals' fate. But if the two groups' behaviors were similar, why did Neandertals disappear?

By suggesting new avenues of research, the recent studies may help scientists better understand what factors decided this ancient family struggle for survival.

"I think what other people should do is pretend [they] don't know Neandertals became extinct," Shea says. "Because it's just as likely that the end of the Neandertals was being driven by some fundamental change in what modern humans were doing than by some intrinsic flaw in Neandertal behavior." □

Biology

Cloned mice make long-awaited debut

The rumors were true. The brave new world of cloning now includes mice.

After gossip about their work had circulated for months (SN: 7/11/98, p. 21), scientists from the University of Hawaii in Honolulu have finally confirmed that they have cloned a mouse—actually, about 50 of them—from cells of adult animals. In the July 23 NATURE, Teruhiko Wakayama and his colleagues describe their technique, which differs slightly from the method used to clone the sheep Dolly.

As in the making of Dolly, the researchers removed DNA from an egg cell. However, instead of fusing an entire adult cell to the DNA-free egg—as Dolly's creators had—the Honolulu team merely injected the nucleus from an adult mouse cell into the egg. They allowed the transplanted DNA to sit inside the egg for several hours before treating the egg with a chemical that prompts the cell to start dividing into an embryo. Through this technique, the investigators have created dozens of mice, including clones of clones.

Since Dolly's birth, scientists have speculated that mice, and perhaps humans, might be impossible to clone because of the speed with which their developing embryos turn on genes (SN: 4/5/97, p. 214). Cloning depends upon the egg returning the adult cell's DNA to an embryonic state, but that reprogramming was suspected to require more time than the embryonic development of some species allowed. "Given that so many of us failed [to clone mice from adult cells], it is not immediately clear why Wakayama *et al.* have succeeded," notes Davor Solter of the Max Planck Institute for Immunology in Freiburg, Germany, in an accompanying NATURE commentary.

While inevitably reigniting the debate over the cloning of humans, this success in mice, the most common laboratory animals, should also speed research into the many mysteries still surrounding the working of this artificial reproductive method. The researchers, for example, were able to clone mice using nuclei from cumulus cells, which surround a growing egg in the ovary; attempts to clone mice from several other cell types, such as brain cells, failed.

Two additional reports in the same issue of NATURE also contain news about Dolly that should dispel doubts about her heritage. Some scientists had questioned the evidence establishing that Dolly was cloned from an udder cell of an adult sheep. Two new analyses of Dolly's DNA, one conducted by the research group that cloned her and another by an independent team, now concur that it's almost impossible that the sheep is not a clone. These reports "have shown that Dolly is indeed the direct descendant of an udder cell from a nameless Finn Dorset ewe," says Solter. —*J.T.*

Frozen in time: Cells' clocks tick on

Takes a freezing and keeps on ticking. Rat skin cells frozen for 25 years, when thawed out, exhibit daily rhythms of gene activity that suggest the cells maintain their own biological clocks, a Swiss research group reports.

This finding by Ueli Schibler of the University of Geneva and his coworkers, reported in the June 12 CELL, supports the growing belief that many, if not most, of the cells in an animal harbor individual biological clocks. Last year, for example, researchers showed that fruit flies seem to have clocks distributed throughout their bodies—including their wings, legs, and abdomens (SN: 12/6/97, p. 365).

The discovery that laboratory-grown cells can keep time may make it much easier for scientists to tease apart the workings of the biological clock (SN: 7/11/98, p. 24). In the past, they've had to examine whole organisms, such as flies, or to study specific tissues that are hard to keep alive in the lab, such as slices of a region in the brain called the suprachiasmatic nucleus. —*J.T.*