This comes as no shock to Christopher Boehm, an anthropologist at the University of Southern California in Los Angeles. Group selection shaped decision making throughout much of human prehistory, Boehm argues. Stone Age survival tactics preserved genes that facilitate people's ability to fit into relatively small bands, which pool available information and solve pressing problems collectively.

This evolved capacity may help to explain why navigation teams routinely keep aircraft carriers from plowing through docks and why the Hutterites avoid cultivating crops of conniving schemers worthy of television's *Melrose Place*.

Surveying the limited ethnographic literature on tribal decision making in crises, Boehm identified three detailed descriptions of emergency judgments made by communities of nonliterate foragers or livestock herders. Their decisions concerned potential responses to violent attacks by other tribes or to a sudden food shortage. In each case, consensus was reached largely through rational considerations. Superstitions and cultural conventions carried little weight in the verdicts, Boehm reports in an article slated to appear next year in CURRENT ANTHROPOLOGY.

For instance, a highland New Guinea tribe decided to raid a nearby tribe after convening a meeting of all former and current members of a society for adult males. Several leaders solicited the candid views of everyone present and withheld their own opinions early on. After hours of debate, an appointed "big man" summarized arguments for and against an attack and announced that it would indeed take place. Dissenters then experienced considerable social pressure to take part in the raid, since the tribe's survival was at stake.

This type of egalitarian decision making, practiced by nomadic groups that keep their leaders on a short leash, has predominated for at least the past 50,000 to 100,000 years, Boehm contends. In a related study, published in the June 1993 CURRENT ANTHROPOLOGY, Boehm used ethnographic records to document egalitarian political systems in 48 tribal societies throughout the world. These groups vigilantly monitor and control their leaders' access to big game meat and reproductive partners, he contends. Collective decision making further restrains leaders' personal ambitions.

An egalitarian system gives an evolutionary edge to traits that serve group interests, such as cooperation, and dampens (but does not stamp out) those that further individual aims, such as deception, Boehm maintains. Moreover, differences in the ways groups deal with climate change, competition for food sources, and other threats can dramatically alter their reproductive fortunes. Thus, repeated confrontations with crisis decisions may have magnified the effects of group selection on Stone Age humans.

"I know I'm attacking a cathedral of individual selection theory," Boehm says. "Advocating group selection as a force in human evolution has become like violating the incest taboo."

Indeed, evolutionary psychologists, who take a Darwinian approach to studying the mind, overwhelmingly concentrate on individual selection and consider group-level adaptations relatively rare (SN: 4/8/95, p.220). Many would agree with Williams, who asserts that Wilson "engages in a kind of pedantic extremism by labeling all sorts of ephemeral groups as vehicles of natural selection."

Determined researchers can find ways to attribute cooperation, morality, and other group-oriented traits to the myriad deceptions of ultimately selfish individuals, Wilson responds.

"Evolutionary biology and other fields are sharply split regarding group selection," he remarks. "It will take decades for a full consensus to emerge."

Next week: Ultrasocial Darwinism—cultural groups may call the evolutionary shots in modern society. □

Paleontology

Richard Monastersky reports from Pittsburgh at the annual meeting of the Society for Vertebrate Paleontology

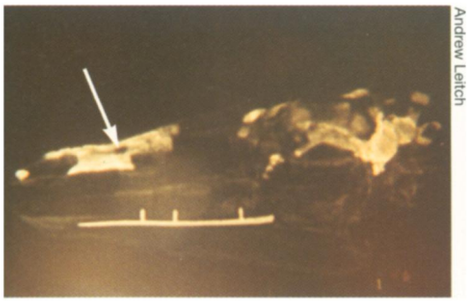
What lurks inside a dinosaur's nose?

In one of the more bizarre research crazes these days, scientists are racing each other to look up the nostrils of extinct beasts. Their quarry: a set of delicate bones that can tell whether an animal was warm-blooded (endothermic) or cold-blooded (ectothermic).

The current nasal fetish stems from an ongoing debate about dinosaurs. Although paleontologists once saw them as sluggish ectotherms, many now envision dinosaurs as endotherms. The debate rages on for lack of definitive evidence.

Enter respiratory turbinates. These thin, scroll-shaped bones or cartilage appear in the nasal passages of almost all modern endotherms, according to physiologists John A. Ruben of Oregon State University in Corvallis and Willem J. Hillenius of the University of California, Los Angeles. Covered with a moist membrane, turbinates humidify and warm air going into the lungs and dehumidify air on its way out, thus cutting down on water loss. Their presence in a fossil animal signals endothermy, say the researchers (SN: 5/14/94, p.312).

But computerized tomography (CT) scans of several theropod dinosaurs showed no evidence of respiratory turbinates in these active predators, reports Ruben. That puts a chill on the idea of endothermic dinosaurs.



Andrew Leitch

Arrow shows a theropod's narrow nasal passage.

Defenders of the warm-blooded theory thought they might get support from paleontologist John R. Horner of the Museum of the Rockies in Bozeman, Mont. Horner reported finding some unusual nasal structures on CT scans of a duck-billed dinosaur. But he eventually agreed with Ruben that the bones are not respiratory turbinates.

The pushy side of mammalian brains

The bones of the middle ear make a strange journey in growing mammals, one that has puzzled developmental biologists for almost 200 years. The tiny ear ossicles start out as part of the jaw. As the embryo matures, the ossicles tear away from the jaw and migrate backward, eventually attaching to the skull. Paleontologist Timothy Rowe of the University of Texas at Austin thinks he has an explanation for the movement: Our bulging brains are to blame.

Rowe started his study with a few facts. In the reptilian ancestors of mammals, the bones of the middle ear remained connected to the lower jaw. But when the earliest mammals appeared in the fossil record 160 million years ago, they showed the novel ear arrangement. They sported other new features as well, among them a greatly expanded brain. Rowe wondered whether the two had some connection.

Examination of opossum embryos provided a test. The paleontologist followed brain growth and ossicle position from early life through maturation. While the ossicles stopped growing after 3 weeks, the brains continued to enlarge for another 9 weeks, putting pressure on the ear bones.

"The growth of the brain tears the ear ossicles from the jaw and pushes them backward until they reach adult position," says Rowe. He reasons that the evolution of a more specialized brain in early mammals caused the middle ear to split from the jaw.