

THE YEAR IN SCIENCE

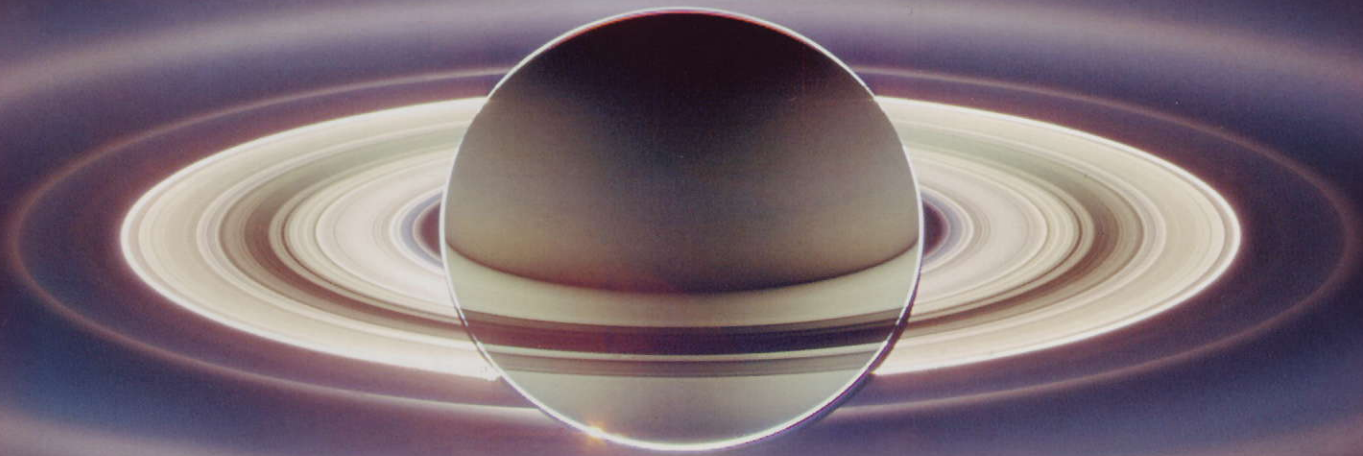
DISCOVER

Science, Technology, and The Future



TOP 100 SCIENCE STORIES OF 2006

Alternative Energy, **Synthetic Organs**, Infant Galaxies, T. rex's Big Brother, Face Transplants, **Teleportation**, Obesity Vaccine, **Hobbit Wars**, Invisibility Cloak, **Nano Risks**, Fluffy Planets, **Global Meltdown**, Walking Fish, **Inflatable Space Station**



PLUS The Cockroach Brain, Morphing In A Virtual World, Marvin Minsky, and Why It's Impossible to Map Afghanistan

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? PALEONTOLOGY Scientists Get Inside the Mind (and Genes) of the Neanderthal

For a span of 200,000 years or more, Neanderthals thrived from Gibraltar to Uzbekistan. Big-brained and robust, they weathered the depths of the last ice age, only to vanish around 30,000 years ago, about when modern humans entered Europe. Did the new arrivals annihilate the natives, or were Neanderthals absorbed by interbreeding? Two studies offer new perspectives on the nature and fate of the Neanderthals. One is a project devoted to analyzing Neanderthal DNA; the other is a reconstruction of hunting strategies that suggests the Neanderthals were not slow-witted brutes unable to compete with modern humans.

Archaeologist Daniel Adler from the University of Connecticut, working with David Lordkipanidze and Nikolaz Tushabramishvili of the Georgian State Museum and their colleagues at the University of Haifa, Hebrew University, and Harvard University, analyzed animal remains in a rock shelter in the Republic of Georgia that was used by Neanderthals and later by modern humans. Apparently, Neanderthals and modern humans hunted the same prey in the same way. Their favored quarry was a large, fleet mountain goat called the Caucasian tur. "We saw again and again that Neanderthals were hunting the prime-age adults—the fastest, the most nutritious, but also the hardest ones to capture," says Adler. Hunting such difficult prey requires a high degree of cooperation and communication and a detailed understanding of the goats' seasonal routines, he notes. "Our study indicates very clearly that Neanderthals were not only good hunters, they were the top predators in whatever environment they occupied; they were the most dangerous thing in town."

Still, Adler notes that "while modern humans didn't have an edge in hunting, they did seem to form larger social networks. We tested this by looking at the stone tools and what kind of stone the artifacts were made of. All the Neanderthal artifacts were made of stone they could find locally, within three miles. Modern humans, on the other hand, had artifacts made of

material that you could only find at least 60 miles away, so they would have had to negotiate relationships with other modern humans. In times of trouble a modern human group would have some other group to turn to for help, whereas a Neanderthal group didn't. So if modern humans suddenly appeared in your territory, and you didn't know the other Neanderthal groups around you, you would have nowhere to turn. You'd be in big trouble."

Then again, modern humans may have formed more widespread alliances merely because their population density was higher. If the Neanderthals didn't lose out because of their inferior social skills, maybe they interbred with modern humans and simply disappeared into the larger population. In that case, some Neanderthal DNA should still be afloat in the modern gene pool. Svante Pääbo, a geneticist at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, may soon be able to address both issues.

In 2006 Pääbo managed to extract DNA from a 38,000-year-old Neanderthal skeleton in Croatia. "Our goal for the next two years is to create a rough draft of the Neanderthal genome," he says. He is particularly keen to study a gene called *FOXP2*, believed to be involved in muscle control of the larynx. If the Neanderthal gene resembles the one in modern humans, that would suggest that Neanderthals had linguistic abilities equal to our own. The genome map will also refine our family tree. Our ancestors may have gotten up to 25 percent of their DNA from Neanderthals—including genes for red hair and pale skin and possibly a gene linked to brain size. "The only way to clarify this is to study a Neanderthal and get the hard data," says Pääbo. We won't really know what it means to be human until we understand what it meant to be a Neanderthal. **Tim Folger**



The Neanderthal fossil displays a smaller forehead, longer collarbones, and shorter forearms than a modern human.