If authentic, Vinland Map could be worth $20 million.

Old Map, New Ink?

For more than 3 decades, scholars have debated the authenticity of the Vinland Map—purported to be the first chart of the New World. Now, U.S.-based researchers have confirmed that the parchment dates to the 15th century. But a British team says it was drawn in 20th century ink—putting the parchment and ink camps an ocean apart.

Since the map first surfaced in a private library in 1957, some researchers have argued that its similarities to other documents link it to the Council of Basel, a meeting in Belgium of Catholic clergy held from 1431 to 1449. That timeline is consistent with new radiocarbon dating suggesting that the parchment was made between 1423 and 1445, report physicist Douglas Donahue of the University of Arizona in Tucson, chemist Jacqueline Olin of the Smithsonian Center for Materials Research and Education in Suitland, Maryland, and chemist Garman Harbottle of Brookhaven National Laboratory in Upton, New York. Their results, which appear in the August issue of *Radiocarbon*, make it harder to explain how the map might have been faked, Olin says. "It would be very fortuitous for a forger to go out and pick a parchment of that exact age."

But only a modern forger could have obtained the ink used to draw the map, argue chemists Katherine Brown and Robin Clark of University College London in the 31 July issue of *Analytical Chemistry*. Black lines on the map fade to yellow around the edges, as if the ink had soaked into the parchment. However, by studying laser light reflected by the lines, the researchers confirmed that yellow areas contain anatase, a naturally rare compound that has been used as a synthetic ink pigment since the 1920s, which suggests that the yellowing was faked. Ironically, the carbon-based ink in the black lines wouldn't have leached into the parchment naturally, Clark says. "But the forger might not have known that."

Brainy Answers to Stuttering

Stuttering hinders speech in 1% of all adults and reportedly dates to the dawn of humanity. Now researchers say they've found weaknesses in brain fibers that could help explain this perplexing disorder. The study, in the 3 August issue of *The Lancet*, is one of a few to map the brains of stutterers and the first to focus on the white matter that links brain structures involved in speech and tongue movement.

Neurologist Christian Büchel and his colleagues at the University of Hamburg, Germany, recruited 15 stutterers and 15 nonstutterers, matched for age and other qualities. The team then performed a type of magnetic resonance imaging called diffusion tensor imaging (DTI). DTI detects fine details in the brain's white matter: the nerve fibers, surrounded by fatty myelin, that make up about 90% of the brain. They found that fibers in between two regions of the brain were 30% less tightly packed in stutterers than nonstutterers. These fibers sit in the left side of the brain, adjacent to the rolandic operculum, which is involved in speech, and a motor-control region for the tongue and larynx. Whether the presumed poor connections are a result or cause of stuttering remains unclear, says Anne Foundas, a neurologist at Tulane University Health Sciences Center in New Orleans, Louisiana. In a separate study, she found that Wernicke's area and Broca's area, which help control speech and language and are located near the rolandic operculum, also differ between stutterers and nonstutterers (*Science*, 3 August 2001, p. 795). It's possible, she says, that these oddities induce the nearby changes in white matter found by Büchel's team.

Fishing gear entangles and kills 60,000 whales, dolphins, and porpoises each year, according to a new global cetacean bycatch estimate. Marine conservation biologist Andrew Read of Duke University in Durham, North Carolina, tabulated estimates of fishing-related cetacean deaths reported by the U.S. National Marine Fisheries Service from 1990 to 1999. To derive a global total, Read and his team calculated the ratio of cetacean bycatch to total U.S. fish hauls and applied it to global catches. Conservationists say the result, reported at a 23 July meeting of the U.S. Commission on Ocean Policy in Boston, underscores the need for greater protection for marine mammals such as the European harbor porpoise, above.

Beetle Breath

Short-sheeted.

Evolution has shaped how desert dung beetles keep water from escaping through their breath—but not in the way previously thought. Using an elaborate contraption, researchers have discovered that whereas many insects draw air in one set of holes (or spiracles) and out another, one kind of dung beetle uses a single hole to breathe.

To study the respiratory habits of these desert sanitation engineers, which roll the dung of behemoth herbivores, scientists at the University of the Witwatersrand in South Africa developed a rubber skirting device to separate body compartments and measure the oxygen and carbon dioxide flowing through individual spiracles. Clad in a latex sheet, with sampling tubes superglued over each spiracle, the beetles "look ready for takeoff," says entomologist Marcus Byrne, who reports his results in the 15 August issue of the *Journal of Experimental Biology* with co-author Frances Duncan.

The authors say the findings poke holes in the prevailing theory of how these critters conserve water. Scientists had assumed that dung beetles inhaled through the mesothoracic spiracles in front and exhaled through abdominal spiracles in back, into a sealed cavity that buffers the holes from the arid air. But Byrne and Duncan found that resting beetles breathe through a single spiracle on the right side of the thorax. With only one hole, they theorize, air spends more time in the beetle's body, helping it conserve water.

CREDITS: (TOP TO BOTTOM) BEINECKE RARE BOOK AND MANUSCRIPT LIBRARY/YALE UNIVERSITY; F. DUNCAN AND M. BYRNE; WORLD WILDLIFE FUND