

Painting a Perilous Picture of Mercury

Up to one-third of all water-based house paint in the United States may release potentially dangerous mercury vapors, a government study suggests. Another new report adds an occult twist to mercury's menace by identifying a folk ritual as a mercury source in some homes. Such findings fuel a growing unease about the toxic metal, which can cause serious nervous and kidney disorders.

Public health officials drew the connection between mercury hazards and house paint in August 1989, when a 4-year-old Michigan boy developed acrodynia, a rare form of childhood mercury poisoning. Investigators discovered the boy had inhaled mercury vapor from interior walls covered with water-based (latex) paint containing phenylmercuric acetate, a mercury-laden preservative.

The specific paint brand used by the boy's family contained phenylmercuric acetate at levels about 2.5 times higher than the EPA limit in effect at the time. Researchers at the federal Centers for Disease Control (CDC) in Atlanta say they believe many other companies have formulated interior paints with similar mercury levels. Last August, EPA banned manufacturers from adding mercury-containing preservatives to interior latex paint, but EPA spokesman Albert Heier notes that some mercury-containing indoor paint produced before the ban may remain on store shelves today. The ban does not extend to exterior paint, typically formulated with even higher levels of mercury.

Prompted by the 1989 incident, a team led by CDC epidemiologists Mary M. Agocs and Ruth A. Etzel sought to quantify the mercury exposures of Detroit-area families whose homes were painted with the same brand of interior paint. These people, they conclude in the Oct. 18 *NEW ENGLAND JOURNAL OF MEDICINE*, may have inhaled "potentially hazardous" amounts of mercury vapor.

The researchers studied 19 homes painted with the high-mercury brand. Air samples taken from these homes revealed a mean mercury level of 10 nanomoles per cubic meter of air — a concentration 600 times greater than the level in Detroit's outdoor air at that time, the team reports. Air samples from 10 Detroit-area homes painted with mercury-free brands showed no detectable levels of the metal.

The investigators collected the air samples from test homes about a month after walls had been painted. Mercury levels in these homes may have been even higher during and immediately after painting, they say.

When the researchers analyzed resi-

dents' urine samples, they detected significantly higher mercury concentrations in the people living in test homes than in those living in control homes. The team didn't specifically look for health problems caused by the toxic vapors, says study coauthor John L. Hesse at the Michigan Department of Public Health in Lansing. But they did find that two exposed adults had urinary mercury concentrations comparable to those linked with mercury poisoning in previous studies. In addition, one child had elevated urinary mercury at a level known to cause acrodynia in some children.

A report in the Oct. 18 *NATURE* focuses on the mercury hazards of a ritual practiced by adherents of certain Afro-Caribbean-Hispanic religious groups. Arnold P. Wendroff of Columbia University in New York City surveyed 115 "botanica shops" selling medicinal plants and other ritual objects in several major U.S. cities, and found that 99 shops stocked mercury-filled capsules purported to banish evil spirits from the home. Wendroff says shopkeepers typically advise customers

to periodically sprinkle the contents on the floor — a practice that could expose residents, especially children, to dangerous mercury vapors.

House paint and the spirit-banishing ritual join a lengthening list of mercury threats. In an editorial accompanying the paint report, Thomas W. Clarkson of the University of Rochester (N.Y.) points out that a large segment of the U.S. population may eat mercury-tainted fish or inhale vapors emitted from mercury-laden amalgam tooth fillings. Scientists don't know whether chronic exposure to small amounts of mercury causes health problems, but Clarkson and others worry that it might lead to subtle neurological symptoms such as tremors, memory loss or insomnia.

For the millions of people whose walls are covered with mercury-containing paint and who now have concerns about exposure levels, Etzel offers some basic advice: "Open those windows. The evidence is very good that when the windows are open, mercury escapes outside." — K.A. Fackelmann

MRI provides glimpse into ancient bones

For the first time, scientists have used magnetic resonance imaging (MRI) to probe fossil remains, paving the way for in-depth studies of bone diseases that afflicted ancient animals.

"It's a technique that I think can be useful in the future because you can see internal structures without cutting the bone to pieces," says radiologist Jenö I. Sebes of the University of Tennessee in Memphis. He described the work last week at the annual meeting of the Society of Vertebrate Paleontology in Lawrence, Kan.

In the MRI procedure, a strong magnet aligns the spin axes of all free protons in a subject. As the protons return to their normal, random orientations, detectors monitor the radio waves they emit, providing three-dimensional data about the structure of bone and other tissue. In contrast, X-ray techniques such as CAT scanning do not penetrate well through the thick, rock-hard fossil bones of large animals.

Sebes and his colleagues turned to MRI to examine the 12-million-year-old vertebrae of a dolphin. Because fossilized bone contains few free protons, the researchers had to soak the vertebrae in water for 45 minutes.

The resulting images revealed interior bands of thickened bone along the length of the vertebrae. Physicians who have observed similar bands in human bones



Sebes

Magnetic resonance image shows bands of dense bone in a prehistoric dolphin vertebra. This view depicts a "slice" along the long axis of the vertebra.

have interpreted them as signs of arrested bone growth and have proposed a number of possible causes, including scurvy, heavy metal poisoning, hyperthyroidism and rickets. Sebes suspects that such bands instead reflect normal periods of accelerated bone growth.

MRI can help paleontologists identify a variety of bone tumors and arthritic changes that affected extinct animals, he says. The new approach poses several practical problems, however. Many fossils may be too fragile to withstand the necessary immersion in liquid, and the technique's current expense would prohibit widespread paleontological use, Sebes notes. His group is now testing MRI fossil probes using less expensive magnets. — R. Monastersky