Old soles: 800-year-old shoe soles yield clues about preservation of leather

4 March 2009

Ancient garbage can be like gold to archaeologists. During excavation of an 800-year-old trash dump in Lyon, France, scientists discovered the archaeological equivalent of golden shoe soles: A trove of leather soles of shoes, which is helping scientists understand how leather stays preserved in wet, oxygen-free environments.

That knowledge could aid restoration of other leather artifacts, according to a report on analysis of the old soles scheduled for the current issue of ACS' semi-monthly journal *Analytical Chemistry*.

In the article, Michel Bardet and colleagues point out that leather consists of collagen, a tough protein that can remain intact hundreds of thousands of years under ideal conditions. The French soles were buried in mud in the absence of oxygen — good conditions for preservation.

They used laboratory technology called nuclear magnetic resonance to compare composition of the ancient leather to modern leather. It turned out that tannin, which helps to preserve leather, had been washed out of the old soles and replaced by iron oxides. The iron oxides, which leached into the leather from surrounding soil, helped preserve the soles in the absence of tannins.

More information: *Analytical Chemistry*, "Nuclear Magnetic Resonance and Electron Paramagnetic Resonance as Analytical Tools to Investigate Structural Features of Archeological Leathers"

Provided by ACS