Leather is a complex organic matrix. Accurately radiocarbon dating it presents significant challenges in sample processing. This study evaluated pretreatment techniques on two modern vegetable-tanned leather samples, an untanned modern rabbit skin, and four archaeological samples (images below) from Cougar Mountain Cave in Oregon.

Leather can absorb diverse organic molecules during its manufacturing and from its environment. Radiocarbon ratios ($^{14}C$) of variously pretreated leather samples and extracts produced dates that varied by hundreds, and occasionally thousands of years. Leather pretreatment should remove exogenous carbon and purify endogenous skin proteins to allow accurate radiocarbon dating. XAD (CC purification of amino acids with XAD resin stationary phase) yielded radiocarbon dates that were consistent with known ages or dates on paired organic material in five of six samples. Hydrolysis and XAD is necessary to purify leather.

Leather can absorb diverse organic molecules during its manufacturing and from its environment. Radiocarbon ratios ($^{14}C$) of variously pretreated leather samples and extracts produced dates that varied by hundreds, and occasionally thousands of years. Leather pretreatment should remove exogenous carbon and purify endogenous skin proteins to allow accurate radiocarbon dating. XAD (CC purification of amino acids with XAD resin stationary phase) yielded radiocarbon dates that were consistent with known ages or dates on paired organic material in five of six samples. Hydrolysis and XAD is necessary to purify leather.

-presented by: Margaret (Maggie) Davis

This research was conducted in State College, Pennsylvania which is part of the unceded land of the Susquehannock. We would like to acknowledge the Susquehannock and pay our respects to their past, present, and future elders.

Many people and organizations assisted with this research. We would like to thank: Tom Connolly, Department of Anthropology at the University of Oregon, for previous work sampling and radiocarbon dating the archeological leather samples. Pergamena and their CEO Jesse Meyer for providing modern vegetable-tanned leather samples, tannins and information about the tanning process. The Favell Museum for allowing access to their collections.