

New research shows Romans were early pioneers of recycling

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Sampling a Roman Republican denarius for chemical analysis. Credit: University of Liverpool

New research from the University of Liverpool's Department of Archaeology, Classics and Egyptology, together with the Department of

Classics and Ancient History, University of Warwick, has used gold impurities in silver coins and lead pollution in Greenland ice to show that the Romans were early pioneers of recycling.

Extracting silver from ores and refining it at mints resulted in a lot of lead [pollution](#). Ancient pollution entered the atmosphere, drifted across the Atlantic and left a pollution fingerprint in Greenland ice.

However, this research, published in the journal [Archaeological and Anthropological Sciences](#), outlines that there was a dramatic decline in lead pollution levels in the ice during the late Roman Republic, even though coins were still being produced.

The research says that during the first and second centuries BC, Rome's access to silver mines in Iberia and southern France was interrupted by conflict. Deliberate debasement of the denarii (the predominant silver [coin](#) of the Romans) with copper is often considered to show interruptions in silver production. Yet, despite slight dips in the fineness of [silver coins](#) (especially around the times of the Social and Civil Wars in the first century BC), this does not provide enough of an explanation for the drops in lead pollution.

To explain this phenomenon, Liverpool researchers Dr. Jonathan Wood and Dr. Matthew Ponting, point to the Romans recycling silver, often plundered following conflicts in Iberia and southern France, to make coins.

The researchers analyzed how much of a different element was present in the coinage: gold, given that all silver produced in antiquity contains small quantities of gold.

At around 120 BC clusters of coins began appearing with very low levels of gold in them. The silver used for these coins also appears to have

become part of the silver supply for coinage in the first half of the first century BC. Then, in 49 BC, a new infusion of silver with high levels of gold in it appears to enter circulation. Given that Julius Caesar returned to Rome from his battles with the Gauls in 49 BC, the researchers propose that this new silver in circulation was plundered by Caesar's army.

The research paper forms part of the Rome and the Coinages of the Mediterranean 200 BCE–64 CE project on understanding Roman monetary strategy as an instrument for imperialism.

Dr. Jonathan Wood said, "Debasement of silver was one way to deal with fluctuations in the silver supply. Melting down existing silver, either yours or someone else's, was another.

"For the Romans, recycling coins would have been considerably less expensive than extracting new [silver](#)—a benefit for their finances, as well as for the environment."

More information: Jonathan R. Wood et al, Crisis? What crisis? Recycling of silver for Roman Republican coinage, *Archaeological and Anthropological Sciences* (2023). [DOI: 10.1007/s12520-023-01854-w](https://doi.org/10.1007/s12520-023-01854-w)

Provided by University of Liverpool

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