



ARCHAEOMETALLURGY  
ASM TECHNICAL COMMITTEE



# ASM INTERNATIONAL ARCHAEOMETALLURGY TECHNICAL COMMITTEE NEWSLETTER

JANUARY 2025 | VOL 2 | ISSUE 1



Minting Process -The House of Vetti, Pompeii (ADAP. Roger Ling, Cambridge University Press, 1991)

## Cymbals Webinar

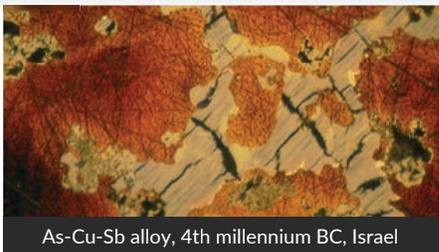
Join us for the webinar "The Manufacturing Process of High-Tin Bronze Cymbals," presented by Joseph Paul Mitchell, Director of Operations at Avedis Zildjian Company (Norwell, MA, USA).

Host: Notre Dame Chapter of ASM (Indiana, USA)  
Date: 17 FEB 2025 @ 7:00 PM (EST)

## Case Histories Presentation

We are excited to invite you to the presentation, "Case Histories of Fractures in Ancient Metals," by esteemed speakers Russell Wanhill and Omid Oudbashi.

★ Event: Festival of Metals  
Organized by: Historical Metallurgy Society  
Date: 24 and 25 MAY 2025  
Location: Butser Ancient Farm, Hampshire, UK



As-Cu-Sb alloy, 4th millennium BC, Israel

Peter Northover

<https://www.asminternational.org/communities/archaeometallurgy-committee/>

[matinfo@asminternational.org](mailto:matinfo@asminternational.org)

## IMAT 2024: Cleveland, Ohio

The presenters, Veronique Vitry (University of Mons, Belgium), Rebekah Smith (Michigan Technological University, MI, USA), and Amit Arora (Institute of Technology Gandhinagar, India) discussed interesting topics and traveled great distance for IMAT; their time and knowledge shared is greatly appreciated!



## IMAT 2023: Detroit, Michigan

The 2023 meeting featured two insightful sessions on Archaeometallurgy and Ancient Metalworking.

From left to right in the photo:

Ahmad N. Abu-Baker, Yarmouk University, Jordan  
Joseph Paul Mitchell, Avedis Zildjian Company, USA  
Patricia Silvana Carrizo, National Technological University Mendoza, Argentina



## IMAT 2025: Call for abstracts

Deadline: Friday, February 28, 2025

[Submit Here](#)



INTERNATIONAL MATERIALS,  
APPLICATIONS & TECHNOLOGIES

2025

OCTOBER 20-23, 2025 | DETROIT, MICHIGAN

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## 50 YEARS OF ARCHAEOMETALLURGY

by Peter Northover



50 years ago, in January 1974, I moved to a post-doctoral research post at the University College of North Wales in Bangor, on the north Welsh coast. The project was to make a metallurgical study of all the Copper and Bronze Age metalwork from Wales, and archaeometallurgy has been my life ever since. Here follow some thoughts on how things have changed in the years since.

A fundamental design flaw in the Welsh project was that nobody had worked out how much there was: in fact, there are well over 2,000 pieces of copper, bronze, and gold, so mea culpa, 50 years on I am still trying to complete it. The metallurgy has been done (about 750 analyses), and a text has been written, but I am still trying to complete the catalog. This was a dream job for me. I was first involved in archaeology when I was 15, volunteering for the excavations in Winchester. I encountered metallurgy between school and university, working at the Westland Aircraft/British Hovercraft Corporation at Cowes on the Isle of Wight. On my first day there, I was taught how to mount, polish, etch, and photograph a metal sample (a magnesium alloy, as I recall), and I was hooked – it is still the metallography that gets me out of bed in the morning.

Back then, two aspects of archaeometallurgy dominated: mining, smelting, and refining, on the one hand, and compositional analysis, which tended to be aimed at the question of provenance, identifying the sources of the metals used. Exploring how people viewed and used the metals they had produced was a poor third. One factor may have been that museums were spooked by the sizes of samples the pioneers took, often 10-12mm across. This first project established how I worked wherever possible, using small (<3 mm) metallographic samples and electron probe microanalysis (a metallurgist's technique to link composition and microstructure. In those days, the probe was manually operated, and I could perform three analyses on each of the four samples on a working day. Today, probes are highly automated, and five analyses can be made on each of up to 30 samples in a 24-hour day.

I have aimed to quantify and tabulate the metallography so that it can be treated statistically alongside the compositions. Large datasets can be built up rapidly, for example, 472 analyses for the Bronze Age site of Zug-Sumpf in Switzerland or over 1,000 for a project on 3rd-century AD Roman coinage. For a post-excavation project, there is no technical reason not to analyze everything; the only constraint is the budget.

### Technological Advances

Over 50 years, many developments have been made in instrumentation, and new techniques have been introduced. Even in optical metallography, the changes have been transformative, such as the x100 dry objective, digital cameras, stage automation, and software for image analysis. The scanning electron microscope (SEM) came of age – my first encounter was in my master's year in 1969-70 – at a time when I was using 10 ASA glass plate negatives from the best quality micrographs! The advent of personal computing greatly simplified data processing, but I took a long time to abandon paper tables and pocket calculators to get a really intimate knowledge of one's data.

More recently, I have had the privilege of being married to a metallurgist who has a special interest in texture analysis using electron back-scattered diffraction and neutron diffraction. This interest has greatly enhanced my understanding of the history of objects as diverse as silver vessels, from Schliemann's excavations at Troy to the copper bolts holding Nelson's warships together. These methods are still not widely appreciated enough in archaeometallurgy because, as I perceive it, there is a gap separating it from the mainstream of metallurgical science. This is something I hope can be rectified by initiatives like the Archaeometallurgy Committee.

I believe the greatest satisfaction archaeometallurgy has brought me has come from being involved with materials (basically face-centered cubic metals) rather than a period or place. I have been able to study materials from Norway, in the north, to the Balearics in the south, and from Ireland in the west to China in the east by way of Estonia and Lebanon. The friendships and working partnerships that have been formed continue to sustain me, not to mention the pleasures of traveling by rail, wherever possible. I have heard it said that genius is expressed as an infinite capacity for taking trains, and archaeometallurgy has allowed me to do just that. Even better, it has allowed me to work on historic railway material!



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Despite these pleasures, there are things that trouble me and can hinder me. One of the biggest is the difficulty of accessing quality radiography, especially with the incredible results that CT and micro-CT can offer: they are simply jaw-dropping. Then there is the myth of non-invasive analysis, where there is a head-on collision between the request for information and forbidding the only approach that would answer it, sample-based analyses of all kinds. This may all hark back to the 'giant' samples taken 60 or 70 years ago. A final aspect is statistics, where I avoid anything but the most basic approach.

On the whole, change here has been for the better. When I first attended conferences in the mid-1970s, cluster analysis was perhaps the most popular technique. I came to believe that every paper had to have a dendrogram to ward off the evil eye. Keep it simple because the nature of the data is such that they won't stand anything more elaborate.

### Where am I headed now?

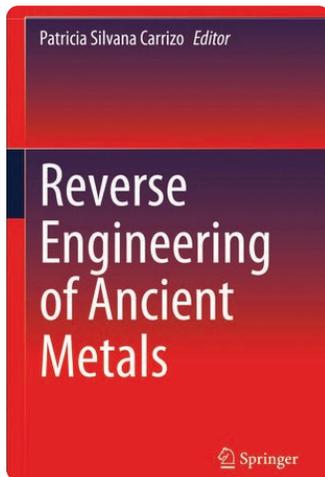
Apart from completing a PhD in landscape archaeology, my main interest now is in historical metallurgy, the metallurgy of the industrial revolution; questions such as 18th century experiments on new alloys; and the performance of structural materials. Also, it has become very clear that the same correlations between compositions, typology, and distribution apply as much in the 18th century AD as in the 18th century BC.

And there will always be a microscope by my desk.

*Peter Northover*

This article has been adapted from a version that will appear in the January/February 2025 issue of ASM International's Advanced Materials & Processes Magazine. [Click here to explore the full publication!](#)

### Exciting News from Our Team



We are thrilled to share that one of our esteemed members, **Patricia Silvana Carrizo**, Past Chair, has published a book titled **Reverse Engineering of Ancient Metals**.

This book, published by Springer, explores archaeometallurgy and the preservation of ancient materials, focusing on their structural and chemical properties to improve conservation efforts. By applying reverse engineering, the book demonstrates how technology can restore artifacts for display and educational use, ensuring the preservation of cultural heritage.

*Coming Soon*

### MMA Special Issue on Archaeometallurgy

The ASM International Archaeometallurgy Committee is proud to announce the sponsorship of a second special issue of the journal *Metallography, Microstructure, and Analysis (MMA)*, dedicated to the field of Archaeometallurgy. This special issue is scheduled for publication in 2025 and will feature original research and review articles related to archaeometallurgy and the historical applications of metals and metallurgical materials.

#### Guest Editors:

Patricia Carrizo, Omid Oudbashi  
Joseph Mitchell, Josh Mueller

Editor-in-Chief:  
Ryan M. Deacon

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## RECENT PUBLICATIONS

Mitchell, J. P. (2025). **Cymbal making: The Art of Bronze Metalworking, Part II.** *Advanced Materials & Processes*, 183(1), 18-19.

Oudbashi, O., & Wanhill, R. J. H. (2024). **Scientific Methodology for the Study of Corrosion Mechanisms, Morphologies and Cracking in Archaeological Copper-Base Objects.** In G. Emre, A. Yılmaz, P. Pogliani, G. Öğrücü İldız, & R. Fausto (Eds.), *Current approaches, solutions and practices in conservation of cultural heritage* (pp. 297-319). Istanbul University Press.

Oudbashi, O., L. Ziaii-Bigdeli and F. Carò (2024), "Sasanian Niello Inlay: Microanalytical Investigation of a Silver Oval Bowl with Tigers and Grapevines," *Studies in Conservation*. 70(2), 139-147.

Oudbashi, O., M. Seymour, J-F. de Laperouse (2024), **Analytical Investigation of Two Syrian-Style Bronze Sphinx Plaques from the Iron Age of West Asia (First Millennium BCE)**, *Journal of the American Institute for Conservation*, 63(4), 295-308.

Oudbashi, O., Naseri, R., & Asadi Hasanvand, P. (2024). **Long-Term Corrosion of Copper Alloys in the Soil: New Aspects of Corrosion Morphology in Archaeological Vessels from South-Western Iran.** *Heritage Science*, 12(73).

Oudbashi, O., & Wanhill, R. (2025). **Archaeometallurgical Materials Characterization.** *Advanced Materials & Processes*, 183(1), 22-23.

## ASM ARCHAEOMETALLURGY TECHNICAL COMMITTEE

### Officers:

Omid Oudbashi (Chair)  
Joseph Mitchell (Vice Chair)  
Nassos Lazaridis (Secretary)  
Patricia Silvana Carrizo (Past Chair)

### Committee Members and Project Contributors:

Ahmad Abu-Baker	Peter Northover	Javad Tayyari
Vikram Bedekar	Liciane Plouvier	Russell Wanhill
Nihad Ben Salah	Sam Saha	Alan Williams
Josh Mueller	Eva Stachouli	

**ASM Staff Liaison: Scott Henry**

## In Memoriam: David Sapiro



Past Committee Chair **Dr. David Sapiro** passed away in August 2023 at the age of 33. In addition to serving as one of the founders of the ASM Archaeometallurgy Committee, David was actively involved in the TMS Bladesmithing program. He received his Ph.D. from Carnegie Mellon University and was employed as a Senior Materials Engineer at Ultra Safe Nuclear (USNC-Tech) in Seattle. He is dearly missed by his family, friends, and colleagues.



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