# HISTORIES OF METALLURGY AND METAL MATERIAL CULTURE

A Hybrid Symposium

# Australian National University

Friday 18 November, 2022

For details and to register: <u>https://www.eventbrite.com.au/e/histories-of-metallurgy-and-</u> <u>metal-material-culture-tickets-451119058247</u>

# **Symposium Schedule**

Please note that all times are AEDT (UTC+11).

- 9.00–9.25 Arrival and registration (in-person only)
- 9.25—9.30 Acknowledgement of Country Welcome
- 9:30—10:10 Keynote: Matthew Winterbottom
- 10:10-10:30 MORNING TEA

## **SESSION 1**

- 10:30—10:50 Post-colonial Copper: A Material Critique of Modern Bronze Statuary Nikolas Orr
- 10:50—11:10 Understanding the Chemistry of Coins and its Implication for Conservation Emma Brand and Nigel Brand
- 11:10—11:30 Surfaces of Time: Patination and Colouring in Vessel Making Zoe Veness
- 11:30—11:50 A Portable Altar by Eilbertus of Cologne (c 1130-50) and Female Presence in the Liturgy Julie Hotchin
- 11:50—12:10 Questions and discussion
- 12:10—1:10 LUNCH

## **SESSION 2**

1:10—1:30	Christian Crosses with Buddhist Swastikas? An Overview of the Bronze "Nestorian Crosses" Alexander Sutherland ( <u>presenting online</u> )
1:30—1:50	Artisanship and Archaeology in the Art Historical Archive: Silversmithing Practices of Louis XIV's Royal Goldsmiths

Christina Clarke

- 1:50—2:10 Slags in the house: Metalworking and the Geometric Settlement of Zagora, Andros, Greece Ivanna Vetta
- 2:10—2:30 Early Metallurgy in Eastern Arabia; Case Studies in Technological Development, Exchange, and Ritual Economies Lloyd Weeks
- 2:30—2:50 Questions and discussion
- 2:50—3:10 AFTERNOON TEA

## **SESSION 3**

- 3:10—3:30 Metalwork presentation by Rowan Thin-Smith (in-person only)
- 3:30—3:50 Metal in Material Culture: Archaeo-technological Copper Smelting Experiments Diya Mukherjee (presenting online)
- 3:50—4:10 The Early Bronze Age ingots from Mesi Glyfada hoard, Northern Aegean, Greece: Preliminary Data Athina Nikolopoulou and Eleni Filippaki (<u>presenting online</u>)
- 4:10—4:30 Metals in the Collection of the ANU Classics Museum Georgia Pike-Rowney
- 4:30—5:00 Questions and discussion Closing remarks

#### 5:00—6:00 RECEPTION IN THE ANU CLASSICS MUSEUM

# Abstracts

# Keynote: The 'Bacon Cup' (1574): A Recent English Acquisition in Silver for the Ashmolean Museum, Oxford

Matthew Winterbottom, Curator of Sculpture and Decorative Arts, Ashmolean Museum of Art and Archaeology, University of Oxford

The silver-gilt 'Bacon Cup' of 1574 is one of three made for English politician Sir Nicholas Bacon (1510–79) from the Great Seal of Queen Mary I (reigned 1553–1558). The cup is attributed to Affabel Partridge (fl. 1554–79), goldsmith to Queen Elizabeth I and one of the foremost London goldsmiths of Elizabethan England. When Elizabeth ascended the throne in 1558 Mary's seal was rendered unusable and given to Sir Nicholas Bacon as the new Lord Keeper of the Great Seal. Sir Nicholas had the seal made into three cups in the 1570s, as heirlooms for his country houses.

The bowl of the cup is engraved with the arms and motto of Sir Nicholas; the family crest, and a boar – a pun on the name Bacon – forms the finial, hence the 'Bacon Cup'. The cup is amongst the few surviving examples of 16th-century London hallmarked silver and, with its connection to the courts of Queens Elizabeth I and Mary I, it is a historically important work which perfectly demonstrates the goldsmiths' art of the Tudor period.

The cup joins the Ashmolean's British silver collection which is one of the finest of its kind anywhere in the world. They will be displayed in the Museum's England 400 AD-1600 AD Gallery which tells the story of how England came to be a unified nation and a cultural, political and military power under the Tudors.

## Understanding the Chemistry of Coins and its Implication for Conservation

Emma Brand, Portable Spectral Services

Dr Nigel Brand, Portable Spectral Services and School of Earth Sciences, The University of Western Australia

This paper focuses on the chemical analysis of 25 Roman coins of British origins from a private collection. The coins range from Celtic Durotriges 58-45 BC, when Julius Caesar led the first Roman military expedition to Britain, to Constantine the Great AD307-337, who legalised Christianity during his reign of the Roman Empire. Silver values observed in these coins map the rise, peak occupation, and subsequent downfall of the Roman Empire in Britain over this 395-year period. The coins' silver content is inversely proportional to the copper content until the Postumus period of AD 259-268. The coins from this period contain copper with significant amounts of lead and tin substituted for silver. Historically, this compositional change coincides with Britain, Gaul and Spain splitting from the Roman Empire. The elemental analysis of these coins was undertaken using a micro-XRF to produce non-destructive quantitative elemental analysis of all 25 coins. Qualitative elemental maps

reveal element distribution of impurities and element relationships within and between coins including phosphorus, calcium, iron, and silica. Utilising micro-XRF capabilities gives insight into how these coins were potentially forged, minted and produced. Coins with high silver appear better preserved than high copper coins, which are visually more deteriorated. Preservation planning is aided in the understanding of varying elemental compositions in the coins.

These qualitative and quantitative results indicate micro-XRF may overcome the need for multiple techniques on metallurgical artefacts. This paper briefly outlines findings of this study, which forms part of some ongoing research into ancient metals and alloys.

# Artisanship and Archaeology in the Art Historical Archive: Silversmithing Practices of Louis XIV's Royal Goldsmiths

Christina Clarke, Lecturer in Early Modern Art, Design and Material Culture, ANU Centre for Art History and Art Theory

Taking the silver furnishings produced for French king Louis XIV (r. 1643-1715) as a case study, this paper demonstrates an "undisciplined" approach to interpreting material culture which has left virtually no material record. Between c. 1666 and 1689, royal artisans working for Louis the Sun King produced a collection of silver furnishings unprecedented in scale, abundance, technical skill and material value to decorate royal residences and fêtes. Silver furniture, lighting and plate unlike any seen before or since astonished courtiers and visitors to the royal court, setting in motion a fashion for silver furnishings in European princely courts abroad. Nonetheless, over a few short months in 1689 to 1690, the king had the entire collection downcycled to bullion to pay war debts, leaving limited documentary and visual records for scholars to interpret these extraordinary pieces. Using a methodology which is founded in practical metalsmithing experience and draws on archaeological approaches to examine this art-historical subject matter, the author examines documentary evidence in royal accounts and inventories, artisans' probate inventories and visual sources to establish something of a chaîne opératoire of their fabrication. The resulting evidence illuminates these objects' biographies, reconstructs the professional practices of the royal artisans and provides insights into the experiences of visitors to the French court who encountered these astounding silver objects.

# A Portable Altar by Eilbertus of Cologne (c 1130-50) and Female Presence in the Liturgy

## Julie Hotchin, Honorary Lecturer, School of History, ANU

A portable altar now preserved in the collection of the Kunstgewerbemuseum in Berlin (W 11) is one of the finest extant copper enamel portable altars from the twelfth century. An inscription on its base records that it was made by one Eilbertus of Cologne (*Eilbertus Colonienis me fecit*), making it one of the few objects from this period to be identified with its maker. The altar consists of copper gilt engraving and enamel affixed to oak boards with

an image painted on parchment protected beneath a slab of rock crystal. Dated to c. 1130 – 1150, the altar is recognised as a fine example of the technical virtuosity of *ars sacra* in Cologne, a centre of enamel production, in the middle of the twelfth century. Documentation of the altar's original context has not survived, although it is widely assumed to have been made for a collegiate community of canons or monks in or around Cologne.

Closer attention to the iconography on the top of the altar invites a fresh examination of the altar's context. The top and sides of the altar are richly ornamented with scenes of the life of Christ and figures of the apostles and prophets. Of particular interest is an unusual image of the prophetess Anna, dressed as a consecrated nun, depicted in a scene of the Presentation of Christ in the Temple (Luke 2:22-39). Largely overlooked in scholarship on the altar, this figure of Anna raises questions about the significance of women in the object's imagery and its potential association with a female monastic community. Focusing on the object's iconography, materiality and possible contexts of use, I propose a possible patron of the altar and argue that the figure of Anna represents women's spiritual presence during the performance of the ritual at the centre of Christian worship.

# Christian Crosses with Buddhist Swastikas? An Overview of the Bronze "Nestorian Crosses"

Alexander Sutherland, PhD candidate, Department of Art History and Theory, University of Canterbury

From 1929 to 1933, famine relief workers in China's Inner Mongolia Autonomous Region collected over 1000 small bronze amulets that they called Nestorian crosses. Resembling Chinese seals, or 'chops', these bronzes come in a variety of shapes, including crosses, birds, and even musical instruments. Sinologists and Christian missionaries in China believed these bronze crosses once belonged to a sect of Nestorian Christians who lived on the banks of the Yellow River in the thirteenth century. Lacking in any certain provenance, the 'Nestorian crosses' have been subject to much speculation regarding their manufacture, function, and interpretation. Recent research has called a Christian interpretation of these objects into question and has attempted to move from an iconography-based methodology to a greater focus on materiality. This paper considers the taxonomy of the 'Nestorian crosses' and how a limited provenance contributed to the creation of a new category of metal material culture in China. By creating the category 'Nestorian crosses', amateur collectors constructed a paradigm for their collecting practices and interpretation of metal material culture.

#### Metal in Material Culture: Archaeo-technological Copper Smelting Experiments

Dr. Diya Mukherjee, Heritage Science and Society Programme, School of Humanities, National Institute of Advanced Studies, Bangalore

The paper unfurls the archaeological evidences of ancient copper smelting technology provided by archaeological excavations. Pyro-technology have always been an integral part of Harappan culture and the metallurgical activities of that particular culture have been identified to be a consequential factor in branding it as the first urbanization. Based on metallurgical evidences from archaeological excavations, ethnographic studies conducted by the author and reviewing experiments on copper and other metals conducted by Indian and foreign nationals; all these resources have formed an background of research which has helped in formulating objectives and methodologies for conducting experimental approaches by the author.

# The Early Bronze Age Ingots from Mesi Glyfada hoard, Northern Aegean, Greece: Preliminary Data

Athina Nikolopoulou, PhD candidate, Department of History and Archaeology, National and Kapodistrian University of Athens; Laboratory of Palaeoenvironment and Ancient Metals Studies, Institute of Nanoscience and Nanotechnology, National Center for Scientific Research (NCSR) "Demokritos", Athens

Eleni Filippaki, Laboratory of Palaeoenvironment and Ancient Metals Studies, Institute of Nanoscience and Nanotechnology, National Center for Scientific Research (NCSR) "Demokritos", Athens

In 2008 a hoard of metal objects was found by the Ephorate of Underwater Antiquities in the sea area between the contemporary settlements of Mesi-Glyfada in the Rhodope Prefecture in northern Greece. The assemblage is consisted of 134 findings: 115 tools, 2 bases of Early Helladic handmade vessels and 17 ingots, which are considered as the raw material for manufacturing the tools. Analyses were carried out in 64 of the total 134 items with the non-destructive XRF method for the determination of the alloy type that was used for their production. The data that have been obtained showed that all the metal findings are made of Cu with varying percentages of As, while some minor elements (Sb, Zn, Pb) are present. In order to draw further conclusions about the proportion of their components as well as the manufacturing technology of the tools, we took samples from 13 ingots to conduct further analyses. In this paper, we briefly present the preliminary results of the SEM-EDS analyses of the ingots as well as the results from their (metallographic) examination under the optical microscope. The aim of this research is the reconstruction of the metallurgical techniques that were practiced in northern Greece during the 3rd millennium B.C.

# Post-colonial Copper: A Material Critique of Modern Bronze Statuary

Nikolas Orr, PhD candidate (History), Centre for the Study of Violence, School of Humanities, Creative Industries and Social Sciences, University of Newcastle

Statues across the world are under scrutiny for their relationship with racism, manifest in the historical figures they represent. Yet might a monument be contested not only on the grounds of its iconographic content but on the very material that it is made of? As the principal element in bronze alloys, what bearing does copper – its origins, and the conditions in which it is produced – have on the symbolic and ethical qualities of the object it forms?

This paper first explores the economic and social processes in which copper production is entangled. As a driver of Spanish colonialism in the early modern period, New World copper helped shape the global economy along racial lines; its ever-increasing utility ensured that metropolitan interests in colonial copper continued well beyond the independence of the main supply nations and into the post-colonial present.

Having established the colonialist origins of the modern copper industry, the paper then addresses the limitations of chemical analysis and archival research for establishing the provenance of the metals in bronze statuary. It finds that the multiple phases that copper undergoes in its passage from subterranean resource to public statue stand in the way of any easy identification. Instead, an alternative approach is proposed whereby copper is interpreted as an inherently fraught artistic medium due to the racial injustices perpetrated in its production. While copper from certain sites and periods are undoubtedly more vexed than others, as a symbolic medium in the service of bronze it has a distinctively pro-colonial lustre.

## Surfaces of Time: Patination and Colouring in Vessel Making

Zoe Veness, Senior Lecturer, School of Art & Design, University of New South Wales

This paper explores the metallurgical phenomena of patination and colouring to reflect on notions of time and materiality in vessel making. In metallurgy, patina describes a thin coating that forms on the surface of objects through natural or artificial oxidation processes, often referred to as tarnish or verdigris in the case of green or green-blue colours on copper, brass or bronze, and is an observable indicator of change. A significant feature in the decorative arts, especially in vessel objects from antiquity, patina, as a symptom of change, signifies a sense of becoming in the life of objects.

I contextualise this study of patina as a signifier of becoming by first discussing the aesthetic value of patina through natural oxidation processes in historical examples of vessel objects. I then refer to practice-based methodologies in my studio work involving empirical research of metallurgy and metal colouring to emphasise tensions between predetermined and unpredictable colouring outcomes with natural and artificial oxidising processes. Central to this discussion of my studio work is a recent series of vessels titled Wayfaring (2019-2022)

made from copper, brass and sterling silver in which heating and chemical-based methods result in richly textured surfaces of nuanced colour. I conclude the paper by discussing contemporary examples of vessel making by pre-eminent artists in Europe and Japan who employ patination and colouring in their metalwork through casting and finishing methods. In these contemporary examples of metal colouring, the accelerated process of casting creates surfaces that make enduring connections to geological time.

# Slags in the house: Metalworking and the Geometric Settlement of Zagora, Andros, Greece

Dr Ivana Vetta, recently graduated, Archaeology Department, University of Sydney

On an isolated and windy promontory of the Cycladic Island of Andros in Greece lies the Geometric period settlement of Zagora. Metallurgical slags are found scattered across this eight century BC site providing tantalising evidence of a robust metalworking industry at the very dawn of the Greek Iron Age. Eight seasons of excavation conducted by the University of Sydney, in the 1960s and 1970s and more recently from 2012-2019, have uncovered evidence of metalworking spread widely across the site with slags found in occupation levels, floor deposits, packing fills and rubbish dumps. Through both scientific and archaeological analysis of the slags and ores, we can begin to appreciate the metallurgical technologies available to the ancient smiths of Zagora, the potential ore sources that they utilised, and what other materials were employed in the process of metal production. The wealth of metallurgical material indicates a rich and diverse metalworking industry within the settlement, and it must be considered whether it is possible to reconstruct such an industry from only its waste. The lack of a clear centralised location for metalworking necessitates the re-evaluation of the economic conditions of ancient smithing and provides an opportunity to consider other industrial models for the chaîne opératoire such as household production and itinerant specialists. The evidence from Zagora sheds light on how industrial processes like metalworking may have operated in premonitory societies such as those of Early Iron Age Greece.

# Early Metallurgy in Eastern Arabia; Case Studies in Technological Development, Exchange, and Ritual Economies

Prof. Lloyd Weeks, Department of Archaeology, Classics and History, University of New England

During the Bronze and Iron Ages (c. 3300-300 BCE), Eastern Arabia was a major copper producing and exporting region that was deeply, if discontinuously, engaged in the complex interaction systems of the greater Persian Gulf region. This presentation draws on several case studies from the author's recent archaeological and archaeometallurgical research to explore: 1) the development of copper extraction technologies in the region; 2) changing patterns in the long-distance exchange of base and precious metals and metal artefacts through time; and 3) the complex belief systems and practices that provided the cultural

context in which Iron Age metal extraction technologies developed and flourished. In each instance, the presentation explores the significance of metallurgy (and archaeometallurgical studies) for our understanding of the broader development of eastern Arabian societies in this period. Case studies include analyses of metallurgical residues from the settlements on Failaka Island, Kuwait, the collective Middle Bronze Age burials of Qarn al-Harf, UAE, and the Early Iron Age ritual metal production site of Saruq al-Hadid, UAE.

# **Invited Speakers**

Friends' Lecturer and Curator of the ANU Classics Museum **Dr Georgia Pike-Rowney** will discuss a selection of metal objects in the museum's collection and guide participants in the first-hand examination of several objects.

Canberra jeweller and metalsmith **Rowan Thin-Smith** will present and discuss a selection of his works which are based on or draw on historical metalwork.