



Metals used in personal adornment

Conference and AGM

Abstract Book

31st May – 1st June 2014
Birmingham Museum and Art Gallery,
Birmingham

Metals used in Personal Adornment Conference

Programme

Saturday the 31st May

9.15-9.45	Registration (refreshments provided)	
9.45-9.50	Introduction	
	Chair Justine Bayley	
9.50-10.10	Susan La Niece	Platinum and coloured gold jewellery of the 19th century and its manufacture
10.10-10.30	Teresa Moreno	Silversmithing and its Impact on Jewellery Making Amongst the Native People of the American Southwest
10.30-10.50	Ann-Marie Carey	Rediscovering the Cheapside Hoard
10.50-11.10	Hazel Forsyth	Metallurgical aspects of the Cheapside Hoard
11.10-11.30	Guthrie Stewart	Some thoughts about manufacturing from comparing medieval stone moulds to modern finds
11.30-12.00	HMS AGM	
12.00-12:40	Lunch	
12.40-13.00	Visa Immonen	Piece by piece – The combination technique of constructing Nordic medieval jewellery
13.00-13.20	Pieta Greaves	Conservation and the Staffordshire Hoard
13.20-13.40	Eleanor Blakelock	Gold Analysis of the Staffordshire Hoard
13.40-14.00	Niamh Whitfield	Filigree on three Early Medieval Brooches from Scotland
14.30-15.20	Jewellery Quarter Museum Tour group A (Refreshments provided after the tour)	
15.20-16.10	Jewellery Quarter Museum Tour group B (Refreshments before tour so please arrive before 15.00)	
16.10-17.00	Jewellery Quarter Museum Tour group C (Refreshments before tour so please arrive before 15.40)	
19.00	Conference Dinner at Jimmy Spices	

Sunday 1st June

9.00-9.20	Registration (refreshments provided)	
	Chair Duncan Hook	
9.20-9.40	Maxime Callewaert	Metal Composition of Roman Enamelled Brooches in Gallia Belgica and Germania Inferior
9.40-10.00	Justine Bayley	How Roman brooches were decorated
10.00-10.20	Maria Filomena Guerra , Paloma Carcedo de Mufarech, Luisa Vetter Parodí	The problematic Frías culture (Alto Piura, Peru): analytical study of the goldwork
10.20-10.40	Francesca Oliveri	Some Phoenician golden jewels from Motya
10.40-11.00	Tea/Coffee Break	
11.00-11.20	Isabel Tissot , Matthias Tissot, Maria Filomena Guerra	Atmospheric corrosion of Iron Age gold jewellery from the Portuguese territory: the case of the torc from Codeçais
11.20-11.40	Maria Laura Mascelloni	The Disc Phenomenon. A technological study of 50 Sporadic Bronze discs with concentric decoration from the protohistory of the Funcino Area, in Abruzzo
11.40-12.00	Lore Troalen , Maria Filomena Guerra, Jim Tate and Margaret Maitland	The gold catfish pendants and necklaces from the el-Harageh cemetery in Egypt: An analytical study
12.00-12.50	Lunch	
	Chair Susan La Niece	
12.50-13.10	Maria Filomena Guerra , Lore Troalen, Susan La Niece, Stephen Quirke	Egyptian gold jewellery from the Second Intermediate Period: an analytical study
13.10-13.30	Deborah Schorsch	A Jewel of the Middle Kingdom—The Pectoral of Sithathoryunet in The Metropolitan Museum of Art (16.1.3)
13.30-13.50	Levent Keskin	A Survey Of Anatolian Metal Jewellery During The Early Bronze Age: Materials, Techniques And Patterns Of Gender-Based Preferences
13.50-14.10	Giovanna Fregni	Chasing Dreams: Tools and techniques used in the creation of Bronze Age jewellery
14.10-14.15	Closing	
14.20-14.50	Staffordshire Hoard Tour group A	
14.50-15.20	Staffordshire Hoard Tour group B	
15.20-15.50	Staffordshire Hoard Tour group C	
16.00-16.30	Staffordshire Hoard Tour group D	
16.30-17.00	Staffordshire Hoard Tour group E	

Platinum and coloured gold jewellery of the 19th century

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Platinum is a metal which came into use in Europe relatively late, in large part due to its high melting temperature, 1768° C, and also to difficulties in refining it. During the 18th century, scientists in several countries were independently (and with great secrecy) experimenting with methods of producing a malleable form of platinum. The two main routes used were either sintering a purified precipitate of platinum i.e. an early application of powder metallurgy, or the preparation of an arsenic platinum alloy which will melt at 597° C; the arsenic was then volatilised. The latter was the method developed by Janety, the French royal goldsmith in the 1780's. In Spain, England and Russia the powder metallurgy methods, which are less hazardous to health, were favoured, but not always with successful results. From 1805 onwards, William Hyde Wollaston was producing platinum commercially in England, its properties making it useful for gunsmiths, scientific instrument makers, and for manufacture of boilers for the sulphuric acid industry. From 1810 onwards his accounts show he was also supplying jewellers, including Rundell, Bridge and Rundell, jewellers to George III and Queen Charlotte. The next advance which made platinum a more usable metal was the invention of the oxy-hydrogen blow pipe, at last facilitating the melting and soldering of platinum. These new discoveries coincided with the fashion for jewellery made from different coloured gold alloys in combination, and platinum's resistance to tarnishing gave it an advantage over silver so it began to be used in high quality items of jewellery.



French 'gardening' earring of coloured gold and platinum c. 1860
(BM1978,1002.345)

This paper presents some of the findings from an analytical and technical study of selected items of coloured gold jewellery from the collection given to the British Museum by Mrs Hull Grundy. The study aimed to identify the different metals and alloys used and to investigate some of the manufacturing techniques. No sampling or surface preparation was possible, for obvious reasons. Because some of the metal components are very small, the work was carried out using a scanning electron microscope (SEM) with energy dispersive X-ray analysis (EDX). The white metals proved to be particularly interesting, especially for the early commercial application of platinum. Unusual alloys, such as the use of iron in gold, forming a whitish metal, suggest some experimentation being carried out. The multi-coloured effects were the result of making tiny components or veneers in different alloys, and surprisingly few pieces relied on surface colouring and plating for their polychrome effects.

Silversmithing and its Impact on Jewellery Making Amongst the Native People of the American Southwest

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Silversmithing developed relatively recently amongst the indigenous peoples of the American Southwest. Navajo, Zuni, Hopi and other Puebloan peoples first learned to work metal for use as personal adornment in the mid-nineteenth century from Spanish and Mexican smiths.

Silver jewelry was initially worn as personal adornment, as a symbol of personal wealth and prestige. With the arrival of the railroad in the 1880s, Indian silver jewelry grew in popularity among the non-Indians settling or travelling through the West. The craft quickly developed into a lucrative commercial venture for silversmiths, traders and collectors, soon leading to assembly-line production of lesser quality pieces.

The indigenous peoples did not mine and process ores for working themselves. Early smiths relied on U.S. and Mexican silver coins or scraps of silver for their raw material that they would use to create different forms of jewelry. As the craft evolved the source and quality of the silver shifted. Coins were easy for smiths to obtain; early on, provided by U.S. soldiers stationed at forts on and around the newly formed reservations or by trading post operators. However, in 1890 the U.S. government passed a law prohibiting disfigurement of U.S. coins, inducing a shift to the increased use of Mexican pesos. In the 1920s traders began importing sheet silver.

This paper examines the use of pXRF in the study of a collection of American Indian silver jewelry to determine if the shift in alloy composition of the silver from one period to another can be distinguished.

Rediscovering the Cheapside Hoard

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'The Cheapside Hoard' is the greatest cache of Elizabethan and Jacobean jewellery in the world and one of the most remarkable and spectacular finds ever recovered from British soil. It is an intriguing time capsule of over 500 precious artefacts. This unrivalled resource of early modern goldsmithing embodies the cultural and technological advances of the time, untouched and of its age it is a rare and inspiring window into our craft heritage.

If we can decipher the craftsmanship involved, we will begin to understand the manufacturing decisions and workshop practices of the goldsmiths' craft. How were these artefacts made? What skills and tools did these craftsmen have? How were raw materials from all over the world turned into the artefacts of the Hoard?

This research project has sensitively applied our current digital technology to act as a conduit in bridging 400 years of history, to better understand the goldsmithing skills and technology of Elizabethan times. Through this investigation a range of data collection methods were deployed: craftsmanship observation, laser-scanning, digital camera, microscope and CAD. Governed by the perspective of craftsmanship analysis, the raw data was deconstructed and interpreted to generate data montages; creating enhanced, step by step easily communicated visual narratives.

Selected artefacts were virtually augmented to repair and replace fragile aspects, then handle-able 3D metal prints were built and combined with traditional hand skills.

Thus presenting the jewels original appearance as it first left the workshop to become an object of personal adornment in an era of conspicuous consumption.

Metallurgical aspects of the Cheapside Hoard

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The Cheapside Hoard, recovered by chance in 1912, is the largest cache of Elizabethan and early Stuart jewellery in the world. As part of the research for the recent exhibition *The Cheapside Hoard: London's Lost Jewels* (2013-2014) the gold jewellery was analysed by the Worshipful Company of Goldsmiths' London assay office. The data poses many questions about the nature of the craft, manufacturing technique and contemporary legislation.



Some thoughts about manufacturing from comparing medieval stone moulds to modern finds

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A comparison between surviving British 13-16th century stone casting moulds and surviving artefacts, drawing conclusions as to the methods and materials of manufacture of the artefacts, and what the relative numbers of surviving moulds and artefacts suggests about the popularity of brooches, rings and buckles of the period.

Piece by piece – The combination technique of constructing Nordic medieval jewellery

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A characteristic feature of Nordic jewellery during the Middle Ages (c. 1050–1550), especially in the latter part of the period, is their construction technique in which several prefabricated pieces are combined together. The paper examines how such a technique was applied and what its broader implications were. For example, a typical late medieval finger ring of gold and silver is a combination of several elements, each of them cast separately and then soldered together. Within the limits set by the chosen main figure on the bezel, other decorative elements could be added to

the body of the item quite freely. The process of casting smaller elements and soldering them into a final product was also followed in making other artefacts such as buttons and dress hooks. On the one hand, some scholars suggest that the technique gave medieval goldsmiths in the Nordic countries an opportunity to present their skills and taste when making and decorating rings and other small items. On the other hand, this way of constructing medieval jewellery has been described as standardized, and indeed such items display uniformity in their basic forms. Goldsmiths probably made the bodies of the products beforehand, and only later soldered the central iconographic motif chosen by the customer. This made it possible to organise production in an efficacious way, while allowing the customer to choose the potent religious central motif, for instance, her or his patron saint.

Conservation and the Staffordshire Hoard

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Discovered in July 2009, the Staffordshire Hoard conservation and research program in a multi-disciplinary collaborative programme which seeks to investigate the origins and meaning of the assemblage in the context of early medieval Europe.

The Staffordshire Hoard conservation program was started in 2010 and has to date conserved over 1700 objects and fragments. Mostly military in nature the Hoard has begun to shed light on the technological capabilities and techniques of the Anglo-Saxon craftsmen. With the help on common garden thorns and high powered microscopes the conservators have been able to uncover spectacular details of both of the elaborate and minuscule designs as well as technological aspects of their construction, which has enriched the whole project.

The conservators have been able to observe many details through the slow process of removing soils from the surfaces and interiors of the objects. The fact that the objects are damaged from their removal prior to archaeological deposition helps us to see features that are hidden on whole or undamaged examples from other sites. Possible maker's marks, laying out marks and solder are just some of the details that we have been able to observe under the microscope due to the damage.

This paper will focus on the aim of the conservation program, what the conservators have uncovered so far and what part conservation has to play in a large research framework.



Gold Analysis of the Staffordshire Hoard

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The Staffordshire Hoard was discovered in 2009, in a field near the village of Hammerwich, in Staffordshire, England. It consists of more than 3,500 fragments, many of which are gold. It is essentially military in character with the bulk of the identified pieces coming from the handles of edged weapons, although a small, but significant, number of explicitly Christian items have also been identified. Most of the material belongs to the sixth to seventh centuries and much is richly decorated with intricate interlace patterns carried out using a variety of techniques including cloisonné garnet and filigree.

As part of the wider research project on the Staffordshire Hoard, an initial pilot study of the gold compositions of a selection of objects from the Staffordshire Hoard was undertaken, using a combination of XRF and SEM-EDX. The results from the analysis of these objects have clearly shown in many cases that there is significant but not consistent enrichment of the gold at the surface due to the depletion of both copper and silver. This finding has far-reaching implications for the viability of surface analysis of gold artefacts not just from the Anglo-Saxon period.

This presentation reveals the results from the most recent study of a larger number of over 150 pieces from the Staffordshire Hoard and British Museum's collection. This has shown that the surface enrichment treatment was widespread, occurring on a range of object types across the country. The analysis has provided more information about the construction of these objects, along with more details about workshop practice and some of the decisions made by the goldsmiths in the Anglo-Saxon period.



Seax hilt set from the Staffordshire Hoard
(copyright Birmingham Museums Trust
and Potteries Museum and Art Gallery,
Stoke on Trent)

Filigree on three Early Medieval Brooches from Scotland

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In the stratified societies of early medieval Ireland and Gaelic Scotland brooches were used to denote rank. Only the most powerful individuals owned brooches decorated with gold filigree, amber or glass studs.

The proposed paper is based on first-hand microscopic study and also on relevant published sources. It will describe the gold filigree on the three most ornate early medieval brooches in the National Museum of Scotland: the Hunterston brooch, the Westness brooch and the fragmentary Dunbeath brooch. They range in date from the late seventh to the eighth, or perhaps early ninth, centuries, but can be considered together because they belong the same class of brooch.

Filigree plays a very important role on all three, since the entire front face of each is decorated with gold wires and granules, soldered to gold back-plates formed of small sheets of gold set in sunken compartments. Gold filigree was also originally found on the tops of the largest amber studs on the Hunterston brooch.

The paper will describe the various techniques used to make this filigree: the types of simple and compound forms of wire found; the treatment of the back-plates and the techniques used to secure them. It will consider, in addition, indications of individual workshop practices on different brooches. The filigree on the three brooches will also be compared to that on the similar 'Tara' brooch from Ireland which has already been described in *ArchéoSciences, Revue d'Archéométrie* 33 (2009), 235-241.

Metal Composition of Roman Enamelled Brooches in Gallia Belgica and Germania Inferior

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This paper is part of a PhD research which intends to establish a techno-typology of Roman enamelled brooches dated to the 1st-3rd. c. A.D. and to identify socio-economic aspects induced by the production, the diffusion and the consumption of these objects for the *Civitates Menapiorum*, *Nerviorum*, *Tungrorum* and *Treverorum*.

An archaeometrical approach has been developed in order to understand the manufacturing of brooches; to characterise the composition of the alloys; to identify technological (shaping, mechanical properties, etc.) and socio-economic (availability of materials, recycling, etc.) choices for the use of specific alloys; and to study the use of different alloys according to the different types of brooches in order to identify chronological and/or geographical variations.

A representative set of 350 brooches (around 6 items from each main typological category) has been selected. The metal of these brooches is analysed using X-rays fluorescence (XRF) that gives the alloy composition and types.

The results show that the brooches were made of different copper alloys (bronze, brass and gunmetal) with various amount of lead. A chronological evolution of the alloys choice has been identified. The alloy variations can be explained by both socio-economic and technological factors.

How Roman brooches were decorated

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Most Roman brooches were made of a range of different copper alloys, though both silver and gold were used occasionally for particular types of brooch. Some brooches were wrought while others were cast before being decorated. This paper will focus on the various types of decoration, and especially on the materials that were added to the brooches. Commonest are a variety of styles of champlevé enamelling, and tinning. Other additions include gilding, brass and silver overlays, metal inlays, niello, and glass cabochons. There are good correlations between date of manufacture, the alloy used to make the brooch, and most types of applied decoration. These relationships will be described and illustrated.

The problematic *Frías culture* (Alto Piura, Peru): analytical study of the goldwork

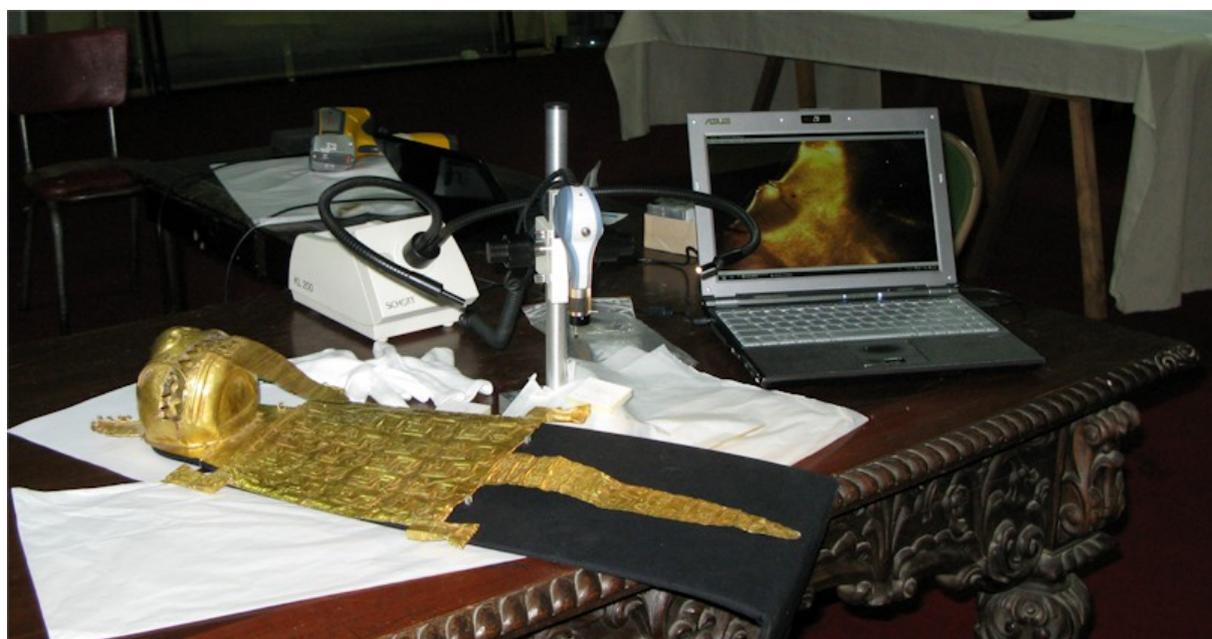
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The big looted pre-Hispanic cemetery found by Ramiro Matos Mendieta in 1963, near the village of Frías in the highlands (Alto Piura), with very different tomb types, was suggested as the discovery site of the 200 gold objects arriving in the Peruvian art market between 1953 and 1956. In spite of the diversity of the items, their typology and production technologies are in majority close to what is expected as regional variations of the Vicús culture in the Piura area.



Analysis with portable equipment at the Gold Museum in Lima of the gold bag for coca leaves attributed to the Frías culture.

Lack of documents and archaeological information their attribution is controversial, like in the case of the looted cemetery of Loma Negra (discussed by H. Lechtman and D. Schorsch), situated nearby Frías. However, the objects attributed to what is called the “Frías culture” are representative of the developments observed for precious metals metallurgy during the Early Intermediate Period in the north central Andes.

No study of the gold and silver objects attributed to the “Frías culture” was until nowadays carried out to determine whether they constitute a real metallurgical “set” or a group with different origins. Using handheld XRF and optical microscopy we studied about 30 objects kept in the Gold Museum/Mujica-Gallo Foundation, in Lima. In this work we summarize the main results obtained for the most important pieces, particularly the presence of several consistent groups of gold alloys and some systematic decoration characteristics.

Some Phoenician golden jewels from Motya

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The study of precious pendants and earrings found on the Phoenician island of Motya in Sicily has offered the opportunity for reflection on fashion habits of the Phoenician of the West Mediterranean.

Jewels are special artefacts: probably born with the will of embellishment, they possess a much deeper meaning than that, upgrading the simple material object with symbolic, magical and religious values or making it an instrument of prestige and ostentation.

This complexity leads toward two substantive aspects related to the duration of use and the geographic distribution of some ornaments.

It is important to remember that even on the occasion of discovery in a perfectly datable archaeological context, a jewel could always be much older, representing, for example, a family inheritance.

Similarly, some productions particularly welcome and fashionable, enjoy wide circulation capable of overcoming regional boundaries.



Atmospheric corrosion of Iron Age gold jewellery from the Portuguese territory: the case of the torc from Codeçais

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The National Archaeology Museum (Lisbon) exhibits the most important gold torcs found in the Portuguese territory. During the last years some of these torcs developed an accentuated surface corrosion. This alteration characterized by a rose coloration with a multihued iridescent effect, which can be related in part with the exhibitions conditions, is heterogeneous and particularly concentrated at the terminals, suggesting a relationship between corrosion and the fabrication techniques.

Among the most characteristic Iron Age gold torcs of the Northwest Iberian Peninsula one found in Codeçais (Bragança), which presents an impressive corrosion layer, is very representative of a period of technical transformation with the introduction of soldering and granulation. This work presents the first data obtained for the corrosion study of this torc related to the atmospheric conditions and the exhibition materials of the museum room, to the mounting and decoration techniques of the torc, and to the gold alloys (determined by portable XRF) used in its manufacture. The main analytical difficulties encountered in the identification of the corrosion products are discussed.

No systematic analytical studies have so far been carried out for the Iron Age gold torcs from the Portuguese territory. Aiming to contribute to their material and technical knowledge, two torcs typologically very similar to the torc of Codeçais were also studied for their gold alloys and manufacturing techniques, the torc of Paradelado Rio (Braga) and the torc of Rendufe (Vila Real).

The Disc Phenomenon. A technological study of 50 Sporadic Bronze discs with concentric decoration from the protohistory of the Funcino Area, in Abruzzo

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The discs, referred to in classical terms as 'armour-discs', are a class of objects which are bronze, bronze/iron or iron discs used for almost a millennium across all the Italic cultures in particular those belonging to the 'medio-Adriatic' horizon which also included the Fucino area.

The discs have been for long time qualified as a unique class and interpreted as components of armours. Currently stylistic, syntactic and technological differences are recognized and discs are more widely linked to the expression of social and cultural belongings and associated with both genders.



Ortucchio disc - diameter: 11,8 cm

The most of them are sporadic, but in the last decades many samples have been properly dug and the finding contexts of discs with concentric decoration documents a clear predominance of feminine contexts of provenience.

Also the drilling hole suspension systems show that discs with concentric decoration were unfitting for fight purposes. The disc suspension presupposed a slow gesticulation and didn't leave much freedom of movement. Perhaps, many discs of different size served for better balancing. In any case, disc dressing must have been very tiring.

Most of the discs appear to have been frequently repaired with the addition of different metals and alloys. Particular attention is given to chemical compositions and technologies of the various constituent elements of artefacts or parts of reparation.

Points of discussion are:

- Statistical quantification of finds
- Technological and traceological examination by stereo optical microscope (80x)
- Chemical characterization by a portable ED-XRF

The gold catfish pendants and necklaces from the el-Harageh cemetery in Egypt: An analytical study

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In 1914, the ancient cemeteries at el-Harāgeh, near the pyramid of Senusret II, were excavated including the tomb of a young old girl (no. 72 in Cemetery A). The surviving grave-goods from this tomb were sent as a complete group to the Royal Scottish Museum (now National Museums Scotland) and included stone vases, gold and silver necklaces, two turquoise scarabs, and three gold pendants shaped as fish, the finest of which (registration no. A.1914.1079) is a masterpiece of the goldsmith's art. These pendants (called *nekhau*) were typically worn by children or young women during the Middle Kingdom (c. 2016 - 1650 BC) and the fish can be identified as "upside-down catfish", a type of fish that floats with its belly upwards against a rock-crevice or a plant upside-down catfish, which held a protective symbolism in ancient Egypt.

This work aims to give an overview of the gold alloys and goldsmithing techniques used in the production of these jewellery items using a range of analytical techniques, including optical microscopy, X-radiography, XRF, SEM-EDX and μ PIXE.

This work falls under the scope of PICS 5995 CNRS (2012-2014) "Analytical study of Bronze Age Egyptian gold jewellery".

Egyptian gold jewellery from the Second Intermediate Period: an analytical study

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SEM-AEI micrograph showing details of the heterogeneous beads of the Qurneh child's necklace (scale bars is 500 μ m) kept at the National Museum Scotland.

The transition phase in Egypt corresponding to ~1800-1550 BC (Second Intermediate Period) has been thought as a period where a loss of expertise in fine metalwork should be perceived, however some known objects are of an unexpected quality, made with high carat gold alloys, and show different degrees of use wear.

In this work we aim to give an overview of the gold alloys and goldsmithing techniques used in the production of jewellery attributed to the 17th Dynasty, examined and analysed by optical microscopy, radiography, XRF, SEM-EDX and

PIXE, kept in four museums: the National Museums Scotland, the Petrie Museum of Egyptian archaeology, the British Museum and the Louvre Museum.

The gold alloys used in the fabrication of the objects from the burial in Qurneh of an adult and a child are in this work compared to, among others, finger rings, bracelets and amulets belonging to queen Ahhotep I, king Nubkheperre and queen Sobekemsaf and to the heart-scarab belonging to king Sobekemsaf. The use of techniques with different penetrations for the analysis of gold alloys is discussed; the joining and decoration techniques are summarized; the variety of the gold alloys used to produce polychrome effects in the jewellery is considered; and the origin of the gold is discussed.

This work falls under the scope of PICS 5995 CNRS (2012-2014) "Analytical study of Bronze Age Egyptian gold jewellery".

A Jewel of the Middle Kingdom—The Pectoral of Sithathoryunet in The Metropolitan Museum of Art (16.1.3a, b)

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A masterpiece of refinement in design and manufacture, the pectoral of Sithathoryunet in the Metropolitan Museum was found by Flinders Petrie at el Lahun in 1914 in a niche leading off from the antechamber of her tomb with further examples of exquisite Middle Kingdom jewellery. Suspended from a necklace of teardrop beads of gold and semi-precious stones, it is an outstanding example of the cloisonné inlay technique, employing minute slivers of these same



stones set into cells fashioned from hammered gold strips attached to supports of gold sheet. The reverse was chased in elaborate detail. The central cartouche names one of Sithathoryunet's royal male relatives, King Senwoset II (reign. ca. 1887–1878 B.C.), within whose precinct she was buried; the princess herself lived well into the reign of his grandson, Amenemhat III (ca. 1859–1813 B.C.), whose name is inscribed on a second pectoral found in her tomb (Egyptian Museum, Cairo), a close replica of the older one.

This paper presents the origins of the cloisonné inlay technique in Egypt and the fabrication of the Metropolitan Museum pectoral, which was inaccurately described by Cyril Aldred and correctly inferred by Alix Wilkinson in their ground-breaking studies of ancient Egyptian jewellery, both published in 1971. New knowledge of the jewel's manufacture and state of preservation may contribute to Egyptological theories concerning the identity of its original owner, the ritual context in which it could have served, and concepts of gifting, heirloom, and inheritance in Middle Kingdom Egypt.

A Survey Of Anatolian Metal Jewellery During The Early Bronze Age: Materials, Techniques And Patterns Of Gender-Based Preferences

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Anatolia has been one of the leading regions of the Old World regarding the mining and metallurgical activities. The richness of metal ores and mineral sources throughout the country resulted in the emergence of many metalworking schools in different regions. The Early Bronze Age in Anatolia, which covers roughly the third millennium B.C., is a turning point in its history in terms of economic, political and social transformations, as well as the development in metallurgical activities. This fact is very well reflected in the metal inventory of the period. Metal jewellery, in particular, produced of precious and other types of metals present the richness of the region and the well-developed skills achieved by Anatolian metalworkers. A wide variety of artefacts produced in different techniques reflect a local character, as well as external influences as a result of extensive interactions and trade with the neighbouring zones. This paper aims to present a general overview of the development of Anatolian metal jewellery during the Early Bronze Age with a particular focus on divergent approaches of different schools and trace the possible patterns of gender-based jewellery preferences derived from several sites as a case study.

Chasing Dreams: Tools and techniques used in the creation of Bronze Age jewellery

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Over four thousand years ago the first goldsmiths in the British Isles practised their craft and created prestigious ornamental objects. These early smiths designed specialised tools that would exploit the properties of the non-ferrous metals with which they worked. The tools they made enabled smiths to practise new metalworking techniques such as chasing, drawing wire, and embossing.

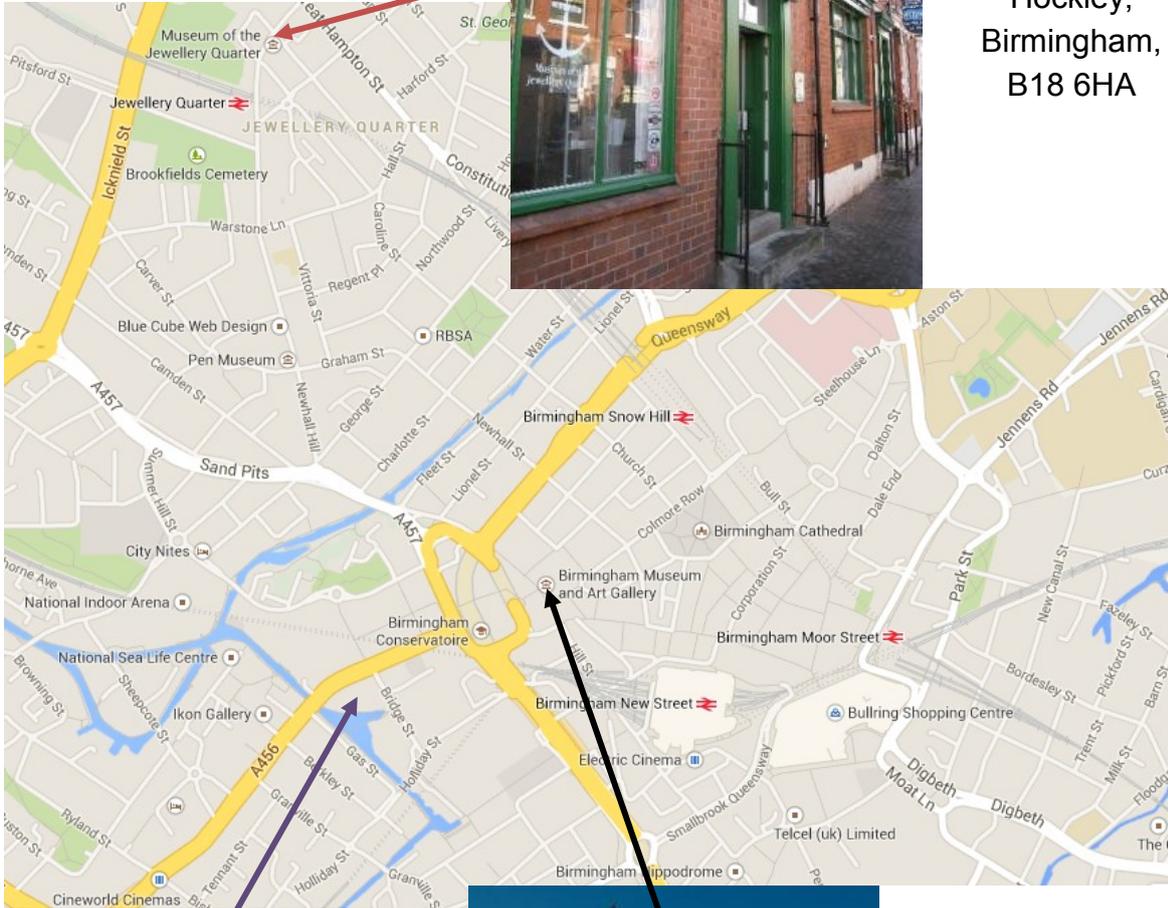
The techniques used to make Bronze Age jewellery can still be seen in modern workshops, and ancient tools can be compared to modern equivalents. These comparisons enable us to conduct experiments with replica tools that allow connections to be made between the tools, techniques, and the finished objects.

This paper explores the ways in which metal smithing tools were developed and adapted for use in new techniques that enabled the production of complex ornaments. An example is drawn from the Melfort type armlets in the Lockington Gold Hoard that required several processes that included cold welding gold sheet metal, wire drawing, forming, and embossing. It will further demonstrate how different types of hammers found in the British Bronze Age were designed to make different types of torcs and other ornaments.

By exploring specialised tools, jewellery making techniques, and finished objects we can make statements about the way in which smiths practiced their craft and how they adapted tools to accommodate new and different techniques for making jewellery.



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Hockley,
Birmingham,
B18 6HA



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Conference Dinner
Regency Wharf,
Broad Street
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Birmingham Museum
and Art Gallery
Chamberlain Square,
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