

Coppersmithing:  
Researching Traditional Techniques,  
Ancient Origins and Modern  
Contexts



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## **Introduction**

In 1991, following two year's study at John Cass Art School in London, I arranged an industrial placement to complete my degree in Silversmithing, Jewellery and Allied Crafts. As life is, so often, shaped by the chance encounter, so it was when I met one of the last ornamental coppersmiths in Britain, Sam Fanaroff. Sam initially agreed to a six-week student placement – which in turn extended to three months – and after a year I stopped asking if I could stay. Eventually I was to serve a four-year apprenticeship with Sam, and after a decade away from the craft to raise my family, I returned to coppersmithing in 2004, thanks to a scholarship from QEST. With this support, I gained an MA by Project (Metal) at London Metropolitan University and in early 2007 I set up my own small business as one of the few coppersmiths in the country.

## **Applying for a Winston Churchill Travelling Fellowship**

I applied to the Winston Churchill Memorial Trust because I had reached a stage where it was difficult to further develop my skills in a craft that had become largely obsolete here since the Second World War. (It had thrived prior to this time during the Art and Crafts movement, but throughout wartime both men and metals went to munitions factories and resurgence was never to follow.) I was also interested in the ancient origins of smelting copper and the ways in which practitioners across the world conducted their business in a modern context. Had the internet created a global market to save these crafts or was an increasingly industrialised world accelerating their extinction? Is it possible for coppersmithing to exist outside of museums? In researching these questions I was looking for a diverse range of examples and cultural settings. I chose France, where I knew sheet copper was still being worked by hand, Athens as the cradle of European culture and three locations in India where I believed ancient styles of smithing were still taking place.

My seven-week project took place over two phases – one to Europe and one to Asia as follows:

3<sup>rd</sup> July to 14<sup>th</sup> July 2011 France

14<sup>th</sup> July to 28<sup>th</sup> July 2011 Greece

then

20<sup>th</sup> January to 10<sup>th</sup> February 2012 India

## July 2011 - Villedieu-les-Poêles

Villedieu-les-Poêles (simply called Villedieu locally) is a small town in Normandy known as "The Coppersmithing City of France". Its name, which means "God's town of frying pans," reveals a little of its historical background. The craft of coppersmithing is believed to have been introduced to the town



by the St Johns Knights (of Malta) after William the Conqueror's son Henri Beauclerc gave them the land – and indeed there is much evidence to support this. Local historian Phillipe Clairay very kindly shared his research with me, and verified that this

specific style of coppersmithing strongly resembles that found in Fez, thus suggesting a link through the crusaders. Furthermore, Villedieu is one of very few places to have a strong coppersmithing tradition and no indigenous source of the metal, giving weight to the idea that both metal and skills were brought in from elsewhere.

The first day in Normandy was spent visiting the "Musee de la Poeslerie et Maison de Dentellere" (House of Copper Pans and Lace) which, as well as giving a helpful insight into to the area, also furnished me with a useful list of French words for coppersmithing tools and techniques. I was also to learn that the inhabitants of Villedieu were known as the *Sourdins* or "deaf ones" because so many lost their hearing in the metal workshops.

As well as being a hub for sheet copperwork, the town is famous for its bell foundry – and is also the final resting place of St Hubert, patron saint of coppersmiths.

### L'Atelier du Cuivre

There are many small coppersmithing workshops in Villedieu, but the largest is probably l'Atelier du Cuivre, where I was to spend three days. This workshop was originally founded in 1830 and primarily supplies copper cooking pans to kitchens in restaurants, catering schools and private homes. They also make huge frying pans for the famous omelette restaurants on Mont St Michel.

The pans are mostly created on lathes by a mechanised yet highly skilled process using specially made chucks as formers. (The sheet metal is heated then cooled before forming to lend it pliability. This is called annealing.) Using this technique almost any shaped pan can be created.

Having created the pans and added the handles, the craftsmen then line the pan with molten tin – dispersed with a wad of cotton wool soaked in ammonia salts - or in special cases with silver - to prevent the copper coming into contact with the food being cooked. Copper is the preferred metal for culinary items because of its highly conductive properties – i.e. the pan heats and cooks evenly.



Larger pans are then hammered on stakes (*martelage*), partly to create a pleasing patterned surface, but more importantly to compress the surface molecules of the copper and add strength and durability to the piece. On the second day, thanks to the help of Sarah, the English Atelier employee, I was introduced to master craftsman Jean-Pierre Couget who is *Un des Meilleurs Ouvriers de France* – a highly prestigious national award given only to the best craftsmen in the country. On this day a school party were visiting and I was kindly invited to join in. The following day I was fortunate enough to be given an unforgettable masterclass by M. Couget.



Aside from the mass-produced work of making the pans, l'Atelier du Cuivre create large, bespoke hand-made items, from baths to sculptures. The technique they use is called *dinanderie*, which means creating shapes by alternately annealing and beating sheet copper into shape. This is done over a ground-anchored metal stake – a *retreinte*. By hammering over this tall stake they can produce very much larger bowls than those made using traditional British techniques. I had never seen this done before, but pictures of smiths working in Morocco for example show this is much more a Middle Eastern method. As well as putting me through my paces in raising a small dish of my own,

Jean-Pierre showed me how to put textures onto the surfaces of the metal with distressed hammers and charcoal (called *granité*). I was also introduced to an asymmetric blocking hammer used to prevent damage to the knuckles when creating bowls.

Other commissions l'Atelier accepts include specialist trophy making, created by using decorative repoussé work – i.e. producing a raised design on a sheet of copper using different shaped chisels on the underside. I was not able to

see this in progress, but understand that Jean-Pierre teaches specialist courses and I intend to return there to learn.

Finally, Sarah told me about a new partnership between l'Atelier and the



hospital at Rambouillet. Copper is a sterile metal and like silver is effectively toxic to bacteria. The hospital has commissioned l'Atelier to furnish the entire building with copper door handles, work surfaces and toilet seats as contact with the metal destroys MRSA. Initial results are extremely promising and I certainly will be following the story with interest.

### **Fonderie Cornille-Harvard**

Villedieu-les-Poêles is also home to the Fonderie Cornille-Harvard, where huge bells are cast using a lost wax casting technique (*cire perdue*) - a method unchanged for many hundreds of years. The current foundry began in 1865, but bell casting has taken place in Villedieu since the Middle Ages, and Cornille-Harvard continue to supply churches and cathedrals all over the world.

Lost wax casting is a method whereby the finished shape of the piece is first created by making an original in wax, in this case using templates to guide it. (Because the bell is a musical instrument, the thickness of the bronze must be exact otherwise it may not only be out of tune in the final casting, but may have no sound at all.)



When the wax bell has been made, the surface is decorated with appliqué wax sections, often depicting saints or the church itself. Frequently there is a dedication or other message included.

On the surface of this wax bell, a mould is created using a traditional mix of clay, horse manure and goats hair. When this has been dried, the wax is melted out and the mould inverted in to a pit, which is then filled with soil to support it. Finally a bronze alloy of 78% copper and 22% tin is poured into

the mould and the bell is cast. It is then finished by finely chiselling the inside to tune it, before sand blasting and polishing the exterior. Whilst the work in this foundry was only indirectly related to my own, it was extremely educational and was to inform my later expeditions both to Athens and India. By seeing this technique carried out on such a huge scale I was able to fully appreciate and understand it. In Normandy I also made a very worthwhile visit to Mont St Michel to see the beautiful architecture and metalwork.

## **Paris**

Before flying on to Athens I had a three-night stop in Paris. Here I made a point of visiting Musee d'Orsay in order to view the beautiful Art Nouveau metalwork by artists such as Paul Follot, Hector Guimard, Louis Majorelle and Daum Frères. Sam Fanaroff, the master craftsman who taught me, was particularly interested by this movement and the house style of Glynleigh Studio where I served my apprenticeship clearly had signs of the Art Nouveau influence, so it was pertinent to see for myself some of the original work. As an added bonus I was also given the opportunity to be overwhelmed by the Renoirs and see cabinets of Degas' bronzes. Charles Cordier's African busts were also particularly moving.

## **Athens**

Between the planning stage of my Travelling Fellowship and the departure time, the difficulties in Athens had escalated and I seriously considered changing my itinerary and not going. However I am very pleased that I did go ahead because although the culture shock of poverty was to be greater than that in India the following year, the insight it gave me into the current political situation, as well as the plight of the ordinary citizen, was indeed an education.

I had arranged to stay at the British School at Athens (BSA), with contact details for two coppersmiths working for the Greek Orthodox Church in the city. Unfortunately at some point within the previous three months, both shops had gone out of business joining the many empty and forlorn-looking premises in Athens. When the August heat wave then arrived over two weeks early I realised it was time to adjust my project and decide how best to use the time. The best strategy was to rise very early and visit the monuments, retire and read in the school library or siesta in the extreme heat and then visit the museums into the late evening when it was cooler. By doing this I amassed an extraordinary visual library of over 700 images of some of the finest metal artefacts in the world, which I can reference for the rest of my life.

My first visit was to the iconic Acropolis, which was undergoing a great deal of renovation. The excellent Acropolis Museum yielded less metal artefacts than I had hoped, and I was reminded that whereas throughout history broken ceramics and marbles are discarded to eventually appear in the archaeological record, metal is constantly reused and often the most ancient work is lost. Also, then as now, memorials disappear when scrap prices rise. There were however "finds of a coppersmith" displayed, dating back to 1200 BC, which

consisted of hammers and chisels I could still use today. History says that within the Parthenon there stood a 40ft high gold statue of the city's patron Athena (the goddess of craftsmanship), with two bronze replicas on the outside. They could be seen shining far out to sea and I imagined them as I stood on the place where once they had been.

My understanding had been that much of Athens' wealth in ancient times had been created around trading copper, mostly from mines in Cyprus – and indeed the metal got its name from the Greek word for the island *Kypros*. The Greek god of metalsmiths was Hephaestus and so it was with this in mind that I next visited the Agora to see his temple.

The Temple of Hephaestus is better preserved than its later counterpart the Parthenon and was built in the coppersmiths' quarter and funded by the



smiths themselves - however there no evidence of metalwork there now.

In fact, the only coppersmithing tools I was to see over the ten days (including the recognisable

asymmetric blocking hammer I had been introduced to in Normandy) were in a glass case in the Museum of Greek Folk Art. The curator was convinced the craft was gone for good.

Conversations with one of the residents at the BSA however gave me a new lead. Dr Sonia Klinger from the University of Haifa was in Athens to research a bronze repoussé mirror. She told me what I should be looking at in the National Museum of Archaeology, as well as recommending the Museum of Cycladic Art as a starting point. In turn, as a maker, I was able to offer her an insight into the processes used to create the artefact she was studying.



By making a number of visits to these museums and to the Byzantine and Benaki Museums I was able to discover that copper had been widely used in Greece from 3000 to 1050 BC (the Bronze Age) although there is evidence that copper was being smelted much further back in Neolithic times. By 6000 to 5000 BC people were able to create small pieces of jewellery and tools through hammering the metal.

However, from 5000 to 4000 BC proper metallurgy – i.e. the understanding and extraction of ores and the creation of moulds and casting techniques – had become fully developed.



In the beginning the ancient Greeks used pure native copper on a very small scale, but as the practice developed, first arsenic was added to create a more workable and durable alloy, and then finally tin, giving bronze.

Bronze has far better mechanical properties than pure copper and can be used on a much larger scale to create bigger and stronger pieces of work.

Artefacts of other alloys found included copper with lead and copper with zinc (brass) – the latter of which was more prevalent in Roman times.

Greece did have its own sources of copper, coming from the nearby islands of Chalkidike, Rodope, Phthiotis and Hermione, as well as from the Cycladic Islands Seriphos, Kythnos, Siphnos, Thasos, Euboea and probably Laurio. The island of Cyprus was also rich in copper deposits, supplying the entire Eastern Mediterranean. Cypriot copper was famed for its excellent quality and purity and copper trading flourished in the Mediterranean region from the late Bronze Age onwards.

Phoenicians also imported copper to Greece from the East, bringing it mainly from Sidon (which Homer called "rich in copper") and also from Iberia in the West.

Crete also played an important role in bronze working - their craftsmen created fine metal objects, whilst passing on techniques of metalworking to the Greek Mainland.

By the end of the Bronze Age, copper was widely used in the making of weapons and tools, buildings (for riveting or decorative work), doors, thresholds, fountains etc. – as well as in statues, votive offerings, embellishments and significantly, the very first coinage.

It is easy to see how this eminently desirable commodity fuelled the developments in trade and seafaring and filled the coffers of the ancient Greek Empire. I was struck by the similarity to present day demands, thanks to its use in computer manufacture and value in our burgeoning technological age. Copper, communication and global trade have always seemed inextricably linked.

### **The Museum of Cycladic Art**

The Cyclades are a circle of some twenty or so Aegean islands, noteworthy because they are the site of some of the earliest metalwork in Europe as well as some of the most distinct and best preserved Bronze Age artefacts dating from 3200 BC.

Here rapid developments in metal technology came about out of necessity because of the impoverished nature of the islands soils. By being at the cutting edge of emerging metallurgy these island peoples had scope to trade – their metal advances coincided with their seafaring advances.

Many of the examples at the Cycladic Art museum were of gold jewellery, and because a large number of hand manufacturing skills are interchangeable between non-ferrous metals, it was appropriate to examine these too.

Most gold contemporary jewellery these days is produced by being cast in factories, unlike Bronze Age pieces, which were worked from hammered sheets using simple tools of wood, bone or harder metals.

To produce gold sheet, a small quantity of gold was cast in the form of foil, and hammered it until it was less than 1mm thick. Gold ornaments were often

composed of several pieces joined together either by bonding agents and intense heating or with simpler methods like riveting or folding. I was surprised to see that the decorative techniques were not only familiar, but were those I had used at various times. I was also amazed to discover that many pieces were effectively mass-produced, even though this work was created many thousands of years ago. I realised I have been a bit of a purist about producing everything by hand and I am coming to realise that in the long term this may not be viable. By seeing the mass-produced components made by these ancient craftsmen, I realise that they may indeed have faced similar dilemmas to me.

The techniques I recognised included embossing, granulation and wirework.

#### Embossing:

- The motif is carved onto a wooden, stone or metal die.
- The sheet of gold is pressed into the die.
- A layer of yielding material (i.e. wool, leather, wax or lead) is pressed or hammered on top of it to dilate the metal and make it take the shape of the motif.
- Details are finished with fine wooden or bone tools - or by pressing with the fingers.
- Smaller items could be shaped simply by pressing the gold sheet onto a wooden, metal or clay core or by stamping.



*Embossed octopi motifs 16<sup>th</sup> Century BC.  
Photograph courtesy of the National Archaeological Museum Athens*

#### Granulation:

- The gold sheet is cut into small rectangular pieces.
- When heated the flat pieces soften and curl up, turning into solid "grains" of less than 1mm in diameter.
- After coating the "grains" with a mixture of glue and copper compound, they are placed beside one another in the desired pattern.
- Through intense heating, the metals fuse together and the "grains" become firmly attached to each other.

#### Wirework:

- Narrow strips of gold are cut from a thin sheet.

- The strips are twisted tighter and tighter until they acquire the form of a tube.
- The tubes are rolled between two flat surfaces until they turn into solid wires.
- Sometimes two or more wires are welded together and hammered.
- Wires are used in a variety of techniques (chains, filigree etc.).



*Wirework earrings 16<sup>th</sup> Century BC.  
Photograph courtesy of the National Archaeological Museum Athens*

In addition to these, there were many fine examples of repoussé work – produced in the very same manner I had seen in Villedieu-les-Poêles.

Leaving the gold work behind, I was interested to learn how copper was extracted from the ground.

In order to extract the copper, ores were smelted at high temperatures (approximately 1100°C) in large clay furnaces filled with successive layers of ore and charcoal. Blowpipes or bellows were used to introduce air into the furnace in order to raise the temperature to the desired level. The molten copper flowed into stone or metal bowls through a hole at the bottom of the furnace. It was then re-melted and cast into ingots of standard weight.

Alloys of copper - such as bronze - were more commonly used for durable items like tools, weapons or vessels, as pure copper was too soft.

The two main methods of bronze working used in antiquity were forging – i.e. hammering metal sheets - or casting, either by using the lost wax method or by carving moulds of stone and filling them with molten metal.

(Incidentally this latter method is how British Bronze Age swords were made, giving us the likely origin of the Arthurian “sword in the stone” legend.)



*Late Cycladic bronze artefacts from 14<sup>th</sup> to 12<sup>th</sup> Century BC  
Photograph courtesy of National Archaeological Museum Athens*

Combining these methods produced other items – for example, a cast axe could be made more durable by forging the blade – and a vessel could be created by casting a cylinder but hammering it into a special shape.



*Late 4<sup>th</sup> century/early 3<sup>rd</sup> century large bronze vessel made through casting and forging in combination  
Photograph courtesy of Museum of Cycladic Art Athens*

This advanced metal technology was to prove the ultimate undoing of the Cycladic culture. Having developed a sophisticated means of producing top quality weaponry, trade agreements turned ugly and wars broke out. In the end the Cycladic people destroyed one another completely, their advances having indeed become a double-edged sword.

## The National Museum of Archaeology

The National Museum of Archaeology houses possibly the finest collection of metals artefacts and bronzes in the world, but I was particularly interested seeing the famous gold death masks of the 16<sup>th</sup> Century BC – especially the one known as the mask of Agamemnon.



of

In addition to looking at more the extraordinary examples of Bronze Age gold jewellery and grave goods, I also wanted to view the bronze sculptures, focussing on those

huge creations of the Classical Age.

A strong contender for the finest example must be the statue of Zeus (or possibly Poseidon) created in 460 BC.



*Bronze statue of Zeus 460 BC  
Photograph courtesy of National Museum of Archaeology Athens*

Given that this enormous yet delicate piece was created two and a half thousand years ago, I wondered if the craftsmen had used a similar *cire*

*perdue* (lost wax) technique to that which I had seen in the bell foundry of Villedieu-les-Poêles. It transpired that the huge sculptures used the direct wax method that was particularly well explained in the museum:

A clay core would be built over an iron framework or armature. The general features of the figure would be indicated, but not in detail. It was then coated with wax and finely carved to give it its final form and details. The wax-covered model was then turned upside down and small wax tubes attached to create channels - some for the inflow of the metal and others for the air to escape. The model was covered with coats of clay before fine metal pins were inserted to keep the clay core in place and consolidate the outer layer.

The construction would then be placed in a kiln and fired at high temperatures in excess of 1084°C. The clay would be hardened and the wax between the clay core and the outer clay coating would be melted. This gap then accommodated the molten metal, which was poured in through the small channels. Hot air escaped via the other channels, so avoiding cracks and bubbles. When the work had cooled, the outer clay coating and inner clay

core would be removed. Holes, cavities and so on, which had been created by the casting process, would be masked by tiny pieces of metal sheet. The surface would then be smoothed and polished.

Small bronze objects (such as handles for vases, jewellery, etc.) were made using the lost wax method. Small cast pieces were usually solid, whereas larger ones were hollow.



In these days of immersing myself in the rich metalwork of the Athens' museums – particularly in the Byzantine Museum - two thoughts occurred to me.

The first was the devotional nature of so much of the work. Whilst it is true to say that churches and temples have often been the wealthy patrons of the arts, I still felt there was more to what I was seeing, and it didn't

explain, for example, the delicate shrine to the Virgin Mary placed high in the workshop at Villedieu, or the need for the coppersmiths to place flowers at the grave of St Hubert each year. All the bells I had seen in Fonderie Cornille-Harvard were destined for churches and cathedrals. There appeared to be an



alchemic connection between smithing and the divine and it reminded me of my own work. Often my best pieces come about when my mind is lost in a state of meditative reflection and the metal appears to refine itself.

Secondly, I realised that I had been subconsciously harbouring the notion that there was somehow a "golden age" of smithing – and whilst it must be true that certain areas and times had a proliferation of craftsmen and actively, the vast quantity of work in museums speak more of the enormity of time during which these skills have been practised. Only the best pieces make it to the museums because they have been kept and cherished and preserved, rather than hammered flat and the metal reused. Maybe there were no halcyon days and my coppersmithing forbears worried too about preserving their crafts and continuing their traditions.

I was to revisit these ideas in India the following January during the second phase of my Travelling Fellowship.

## January 2012 - New Delhi

Early on 21<sup>st</sup> January we arrived in New Delhi, spent two days acclimatising and made visits to Jantar Mantar Observatory, the Gurudwara Bangla Sahib Sikh temple, Lodi Park and the National Crafts Museum. The latter was disappointing as it was not the showcase of national crafts I had hoped for, but there were some promising signs of refurbishment.

### Dharamshala

On 23<sup>rd</sup> my travelling companion Barry Winchester began his week of yoga training, whilst I flew up to Dharamshala the following morning. I had arranged to stay for two nights at Norling Guesthouse in the Norbulingka Institute - a centre dedicated to preserving traditional Tibetan culture and craftsmanship, founded in 1988 under the leadership of Dalai Lama. This diversion had not been in my original itinerary, but presented itself as an opportunity when I came in well under budget after the European trip the previous summer. The chance to view a craft language different to all



I had seen so far was evident from the moment of my arrival, as even in the guesthouse each and every surface had been skilfully decorated by hand. The craft workshops were at their quietest during my stay, partly because of the extensive snowfall of the previous fortnight and partly because of the school holidays. Eight or so metalsmiths were still at Norbulingka working on tiny devotional

repoussé statues and they were most forthcoming when I showed them my small portfolio and asked them about their work.

Sonam Palden was born in Tibet and had come to India 6 years ago. He had brought with him his statue pattern book, which he was happy to share with me. He explained (with the help of Nawangi Dhondup who spoke English)

how he formed up the bases of the statues on a stake (in a similar manner to the Villedieu workshop) from flat sheet. These had been created from soldered cylinders, which were in turn formed up into ovals or whatever the required shape was. The copper sheet looked like 0.9mm gauge for the base, but rather thinner for the repoussé work.



(Interestingly they call it repoussé too – and used one or two other French terms for their techniques as well.) The younger apprentices were working on the small detailed



repoussé work i.e. crowns and earrings, which would later be applied to the statues as components were soldered together. They were sitting on cushions, with their repoussé work on their laps beside assortments of tools and worked whilst listening to music or chatting on their phones.



The sheets of repoussé work were formed on pitch blocks. I asked how long each apprenticeship took and was told that it would be twelve years in Tibet but due to financial constraints had been condensed to just six in the Norbulingka Institute. Nawangi Dhondup had been born in India in the southern state of Karnataka at Bylakuppe, but that there was no craftsmanship there, just a community. He said that outside Tibet there was nowhere else these specific metal crafts were being practiced. I asked where the repoussé they were doing had originated and they said it was from Nepal, which had a much older tradition. When I asked if Sonam's son would follow his

father's trade they all laughed and said that he was going get a proper education and become a doctor!

Within the Norbulingka Institute grounds there is a temple with a 14 ft.

Buddha sculpture, which was made by these craftsman. The previous summer their master craftsman Pemba Dorje had died and the sense of loss was still palpable. However plans are afoot to create an extended workspace so that larger commissions can be undertaken, and I sincerely hope to find a way of contributing in the future. I felt a strong connection to these people – and this connection was to be further reinforced by what happened the next day.



The following story is worth including not perhaps because it has a direct relevance to my metalworking research, but because it does embody the spirit of the Churchill Fellowships.

Near to my home in East Sussex there is an educational institute called the Pestalozzi International Village, which offers two-year IB scholarships to disadvantaged youngsters in Asia and Africa. Four years ago my family were

invited to become a host family to two of their students. Whilst the young people who receive Pestalozzi scholarships learn a lot about the cultures of their peers, they often come away with little idea about British life. By becoming a host family, we were able to include our two students in family events and celebrations and tell them about our lives. In turn, we all gained valuable insights into the countries from which our students came. Emman is from Zambia and Kunsel is a Tibetan refugee from India. I am pleased to say that we grew very fond of them both and stayed in touch.

I had remembered that Kunsel was originally from Dharamshala and so when I arrived in McLeod Ganj the following day for three night's stay at Chonor House (also owned by Norbulingka Institute), I contacted Kunsel to ask if his parents would like to meet me.

The next day they called for me and kindly showed me where Dalai Lama's temple was and where the exiled Tibetan government resided. I was able to tell them about how fond we were of their son and about his life in England. (He is now studying in Germany.) They told me the circumstances which led to them leaving Tibet in 1961, whilst showing me the prayer wheels and letting me rotate them. They explained the etiquette and rules when visiting the temples and told me how important Dalai Lama was in their lives.

They made me feel very welcome indeed and I returned to their home to enjoy momos for lunch the following day. When it was time to go, I thanked them profusely, whereupon Sonam, Kunsel's father stood up and made an announcement in Tibetan, which his wife translated as a formal thank you for being family to his son for two years in England. He then put a white silk around my neck, took out his prayer beads and chanted quietly before touching his forehead on mine. He presented me with a box of incense, thanked me again and saw me to the door. I was so profoundly moved by this gesture I was almost shocked. In true Buddhist style I realised a circle had been completed.

It was then the perfect time to walk quietly to the temple and really see the copper sculptures for what they were, and I reflected that the preservation of the Tibetan metal crafts was about so much more than style and technique. Here craftsmanship was all about identity and essence.

### **Chhattarpur**

From Dharamshala I returned to New Delhi and met Barry in Chhattarpur where we viewed the large number of Hindu temples. We also visited Chawri Bizar in the hope of finding metalwork in the markets, but were not successful. It appears that very little hand manufacture takes place in the city and that most merchandise is brought in from factories.

Later we visited Raj Ghat to pay our respects on the anniversary of Ghandi's death and the next day we made a special journey to see Taj Mahal, which was even more exquisite than I had ever imagined; a shrine to beautiful craftsmanship as well as to love.

### **Varanasi**

The next part of the journey took us to Varanasi. Here we took a dawn boat out onto the Ganges to see the sun rise and gained an insight into the

funerary rituals that take place there. Later we visited New Vishwanatha Temple, as well as the Durga (monkey) temple – both of which were Hindu. Given the education I had received at Dharamshala, I also made a point of going to nearby Sarnath, where the Buddha gave his first sermon after obtaining self-realisation.



After a protracted dialogue with the staff at the hotel they finally relented and stopped insisting that I visit their friend's silk factories, agreeing instead to find me some metalsmiths.

Prior to visiting Varanasi I had read several accounts of the tradition of coppersmithing to be found there – largely due to the numerous temples in this holy city. However, upon arrival it became clear that whilst there were plenty of mass-produced trinkets for the tourists, there was very little evidence of craftsmen. Eventually the hotel introduced me to a man called Jivan, who said he could show me where metalworkers were. As we made our way further

into the markets it became clear that he didn't really have a place in mind and

was simply asking as we went. Beyond the spice market we eventually came to a group of aluminium casters working on the earthen floors in their shops. Various scrap merchants around them were dealing in the metal and these casters were forming machine components by filling a circular frame with mud from the floor and pressing the master component into it. This would then be carefully removed and the molten aluminium poured into it. The dry mud looked like fine grade river silt – and probably was. This process was far from ideal, and even as I watched, despite their skill, one of the casts came out flawed and had to be hammered into pieces and melted again. The aluminium was melted in a hole in the ground with burning coal and an electric fan to raise the heat. The metalworkers explained that couldn't raise the heat sufficiently to melt brass or copper and aluminium was all they could manage. They could produce up to fifty pieces a day. I asked them if they were still able to work in the heat of



the summer and they said that they work consistently throughout the year, building up the numbers of pieces required for large orders. It was impossible to imagine how hard these peoples' lives were as I watched them with fumes and smoke filling my lungs.



Later with Barry while walking along the Ghats of the Ganges, we met a young chap called Rahul who persuaded us to visit his shop, located in a very overcrowded labyrinth of shops and stalls. I showed him my book and asked him if he could show me any smiths he knew and that I would pay him as a guide. He agreed and led us through the crowded and now increasingly

dark alleyways to where he said these people were. At the very moment when I wondered if we had been foolish to follow him, I began to hear the thrilling sound of distant hammering. We soon found ourselves in an almost deserted alleyway where men were smithing in the doorways. They chose to work at night time we were told – partly so they could see the flames of their torches better, and partly so that they would draw less attention to themselves. Like every smith I have ever met, their fear was that their store of metal would be discovered and stolen. When I said that I had been told there were no smiths left in Varanasi, they smiled and said, "Good".



At the third building along, we were introduced to the charming Ashok Kumar and his family. An extraordinary silversmith, he had worked with different non-ferrous metals all his life and was pleased to show me his workspace and the pieces he had made. He showed me his tools and I showed him pictures of mine and told him that my mallets belonged to my grandfather, who had been a lead worker. He said his had belonged to his grandfather too. I was really interested to see that he had an asymmetric hammer just like the ones in Normandy and Athens.

After some time of clumsily speaking through the help of Rahul's translation, something else took over, and sitting beside him as he showed me the plans he had drawn up for a new piece, and the photographs he had of his completed work, I realised we were communicating perfectly well by speaking in our own languages and miming with the tools. As I replay the



memory, I can't remember not understanding what he was saying, because I know we "discussed" the similar way we block out bowls in an iron former, the kinds of hammer blows we use to do so, and the identical way we set stones using a flat chisel and hammer. The last technique was especially interesting, as I was taught a way rarely used in Britain by my old master, yet it was exactly the same way Ashok sets his stones.

I was so touched by his work and by his kindness. We exchanged addresses in the hope that we would meet again, or even work together in the future.



*The Ashok family of silversmiths*

## Tamil Nadu

The final part of the journey was by air to Chennai, then on to Kumbakonam in Tamil Nadu, to see the famous bronze Chola statues in the Hindu temples and museums. Soon after our arrival we were able to visit the Brishadishwara and Swaminatha Temples and The Art Gallery at Thanjavur, which houses the largest collection of these bronzes in the world. However, what I had really hoped to see was these pieces actually being made.



*Photograph courtesy of Thanjavur Art Gallery*

Many years before, I had read a compelling account of the very earliest evidence of copper smelting found in Israel, by Professor Thomas Levy at San Diego University. Having contacted him at an early stage of this project, he advised me that whilst there was still much archaeological evidence of this metal work in Israel, it would be much more informative for me to visit Swamimalai in Tamil Nadu, as the Sthapathy family still used the identical form of *cire perdue* lost wax casting found in the early Chalcolithic Period some 6500 years ago.

From my research I knew that the Sthapathy family's work was of a very devotional nature and that lunar observances for example were strongly adhered to, so when my e-mails vanished without a trace, and Prof Levy advised me simply to "turn up", I chose 7<sup>th</sup> February as I knew it was a full moon and we might see something particularly interesting.

I was not to be disappointed.



Having eventually found the Sthapathy workshop, I introduced myself by showing photographs of my work, as well as photocopies of Prof Levy's book. The latter caused much amusement, as evidently they hadn't seen these pictures of themselves before and found them funny. Despite the lack of a common language we were made very welcome and invited into the workshops and

carefully shown all the processes involved in statue casting, as well as the beautiful repoussé work which was also taking place. Again I was struck by the similarities between the techniques I had witnessed in Normandy and those employed here.

We were shown the initial stages of statue casting – of how the sculpture is first made as a wax piece, entirely by eye, and then encased in a mould made of the fine indigenous river silt and charred coconut husks. These are then allowed to dry in the sunshine



before being heated, allowing the wax to melt and run out. The moulds are then buried upside down in the ground outside and the molten bronze poured in.



My hunch about the lunar phase paid off. They do only cast on full or new moons and they had just cast that morning. I felt extraordinarily privileged then to witness these casts being exhumed from the earth and to be the first person to see them emerge. To the Hindu faithful, these Chola statues are the embodiment of the gods they represent and

indeed as tiny heads and feet emerged I realised I was witnessing a kind of birth.

I was also seeing a process unchanged since the very birth of my craft, coppersmithing.



## **Conclusions**

My Travelling Fellowship has been thrilling, exhausting, stimulating, enlightening and a genuine once-in-a-lifetime experience, for which I am truly grateful.

By meeting the Normandy craftsmen I have seen how a thriving coppersmithing studio operates and made connections that I hope will remain for many years to come. I fully anticipate returning to Villedieu-les-Poêles in the next two years to undergo repoussé training in order to enhance my repertoire, and knowing where I can go for mass-produced components and help with larger projects will give me the confidence to tackle more adventurous commissions. Through my continued dialogue I have in return, been able to help with translations and offer advice about developing l'Atelier du Cuivre's own website and online sales.



By visiting Athens and affording the time for really close study of the ancient metalwork there I have come to understand something of the enormity of my craft. The revelations have been various – from amazement at the skills of our distant forebears, to surprise at the common problems and solutions we arrived at despite the gulf of time between us. And by connecting with the British School at Athens, I have found that I may also have something to offer archaeology as a maker myself. The possibilities are endless.

My visit to India shows that coppersmithing techniques have remained unchanged for thousands of years – almost as if the properties of this metal were understood from the start. It occurs to me that given a lifetime's dialogue with this material, the skills will emerge with practice.

I have so much in common with all these people – from Jean-Pierre in France to Nawangi in the Himalayas, from Ashok in the backstreets of Varanasi to the Sthapathy family in Swamimalai – and probably also the Hephaestus-worshipping ancient Greeks. We each fear we may be the last coppersmith in our line. We all feel a debt of honour to the master who taught us. And we all want to pass our skills on.

When I embarked upon this Travelling Fellowship I had a strong agenda for future fair-trade partnerships, and my travels have strengthened this resolve. I have discovered and acquired new skills around planning itineraries, found out that I really can talk to anyone and have generally become more confident. Unfortunately my anticipated meeting with the fair-trade company in India fell through, but I have continued to research this from home. The global economic situation has changed the game, as luxury markets in Europe decline and relative wages increase in Asia, but there are some very exciting ideas to do with co-operatives developing and through my fellowship of the RSA I now have access to so much more information and even potential funding.

I have already begun to share my findings, having given my first talk to a group at the University of Brighton a fortnight after my return.

My next job is to go back into my own workshop, try out all those amazing techniques I discovered on my travels, and keep them alive.

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*The front cover shows a photograph of my favourite mallet, which I inherited from Grandad.*