

**CONTEXTUALISING METAL-DETECTED DISCOVERIES:
THE STAFFORDSHIRE ANGLO-SAXON HOARD**



A pommel in gold of cocked-hat form with all over garnet cloisonné decoration.

Originally found in two pieces (K1160 and K1272).

Photograph by Lucy Martin

Notes from the Project Manager

This Newsletter comes to you at the point where we are a third of the way through Stage 2, and slowly the final publication is starting to take shape. Some people have already completed their part of the work. Since June we have said goodbye to three of the BMT team: Giovanna Fregni is now in Italy, Peter McElhinney is now doing a PhD at the University of Bradford, and Rachel Altpeter has returned to complete her degree at UCL. Many thanks to all of them for their input; and especially to Peter who, in the midst of a busy student life, has found time to write a note on the work he did on the organics.

New members of the team have also started work. These include John Hines, Alan Thacker, Barbara Yorke, Matthias Hardt and Svante Fischer who will be contributing essays to the book to help place the hoard within its seventh century context. Aleks Osinka from Cotswold Archaeology has joined Lucy in the mammoth task of taking and preparing all the final photographs.

Looking forward to the end of the project, I'm very pleased to announce that the Society of Antiquaries of London has agreed to publish the book part of the final publication. I had a very useful meeting with Kate Owens (SAL's publications manager) and John Creighton (Chair of the SAL publications committee) in October where we decided on the format. The book will be the size and shape of the *Catalogue of*

Paintings in the Collection of the Society of Antiquaries of London which they have recently published. This is a very flexible format (215 x 275mm) that will allow the book to be designed to display the hoard and what we have learnt about it, to full advantage.

Finding the funding to do all of the things we would like to do in Stage 2 continues to be an area of concern. I am due to have a meeting with representatives of the Owners and Historic England next month to decide which tasks of those outlined in Section 16 of the Project Design, we will carry out. On the positive side, the splendid success of the BMT conservation team in winning the Pilgrim Trust Award for Conservation at the 2015 Icon Conservation Awards has not only resulted in them being described as the poster project of the sector, but also in a prize of £10,000 which is going towards the shortfall. Well done chaps. I'm also extremely grateful to the The Idlewild Trust for their grant of £2,000. This is going towards the cost of reconstruction drawings which will show how all of the bits fitted together.

I hope you enjoy the articles and news in this Newsletter, and would like to take the opportunity to wish you all a very Merry Christmas and a Happy New Year.

Hilary Cool

Conservation Update

The conservation team have been busy with reconstruction of the fragments of silver and silver gilt objects recently. Alongside the conservation work the team have been busy presenting the hoard project at conferences, including the European Archaeological Association conference in Glasgow and Monumental Treasures conference in Helsinki.

Some of the best news for the conservation team since the last newsletter is winning the Pilgrim Trust Award for Conservation at the Icon awards. The project, which was described by judges in the annual awards as "the poster project of the sector" received praised for its public engagement, which has raised

the profile of conservation, "making the public say 'wow' about conservation" Also it came with a £10 000 cash prize, which has been added to the fundraising for the research project.

Now conservators Kayleigh and Lizzie will share what they have been doing in the lab.

Pieta Greaves

The Helmet Crest

This week I've been busy trying to reconstruct the second and very fragmented Helmet Crest. In total there are about 25 fragments in the assemblage which need re-attaching to their corresponding parts.

The crest itself has the remains of organics based inside the long tray, which forms the shape of the circumference of the helmet. The fragments were first laid out on the table in a way that had been associated previously at the time of the grouping exercise. Sections of the side panels to the tray were carefully adhered together in stages and larger portions carefully built up. Next, sections of the panel decoration were attached to the side of the tray using 30% W/V Paraloid B72 in Acetone and additional support with polyester netting was used to support areas where there was a lot of weight on one side of the join.

The final crest will need a custom made mount to support it; however, during the conservation work and due to the distorted sections and curved shape, a temporary mount out of plastazote was created to support the crest during join adhering and drying. There is still work to do, but the process of reconstruction benefits hugely from patience and overnight drying so that it is structurally sound to add on more.

Although the horse head will not likely be adhered in place, we have perfect alignment of the button holes and joins on the end of the tray.

The work with reconstruction will give important evidence on dimensions of the helmet overall, which will then aid the research happening right now on how the helmet once looked.

Kayleigh Fuller



Top: the fragments of crest and tray before joining.

Middle: The fragments after joining.

Bottom: Drying in the temporary mount,

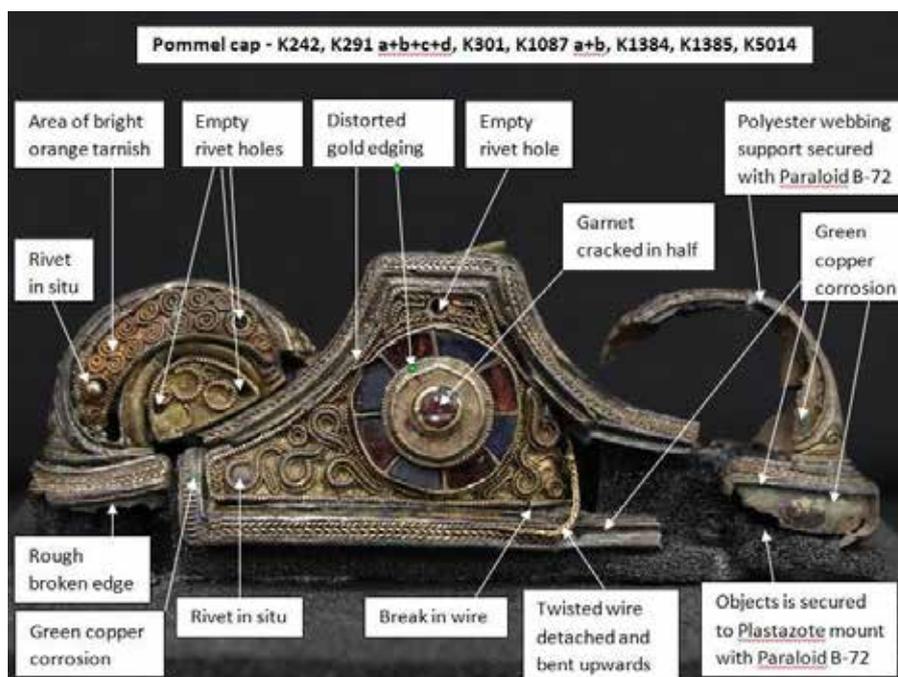
Joining a hilt collar and the condition assessments

Over the past few months I have been working on joining associated fragments, which aids interpretation of the objects and ensures that related fragments are kept together. An example of one of these objects is the hilt collar shown on the left below which consists of 12 individual fragments which came together as part of the grouping exercises. I cleaned the break edges and then adhered the fragments together using a conservation grade adhesive called Paraloid B-72, working under the microscope to ensure the correct alignment. I strengthened the weaker joins using a polyester webbing material adhered to the reverse of the join to provide additional support.



As well as cleaning and rejoining fragments, I have been working on undertaking a condition assessment on each of the objects in the hoard. Documentation is an important part of the conservation process and provides a record which is useful for determining if, and in what way, an objects condition is changing over time. I photograph the object from all angles and then carefully inspect it under the microscope, annotating the image with information about its condition. I note down any areas of damage, including things such as areas of loss, breaks, cracks, corrosion and surface accretions. The annotated image of this pommel cap below shows the type of condition information I record. This is a complex object, consisting of 11 fragments which have recently been rejoined. The condition assessment shown here provides important information which can be compared to the object at a future date. This will help to determine whether the objects condition remains stable and that no new damage has been noted.

Lizzie Miller



New Volunteer at BMAG

Conservation has a new volunteer- Susan Hull who is currently a museum assistant/ BMAG Conservation Club volunteer but interested in pursuing further training in conservation. She is working hard to renumber the plain gilded silver sheet metal and seeing if she can make any associations and joins for the many fragments.



Above: Susan at work

Left: a selection of the silver gilt sheet fragments (K1520)

A Note on the Organics

The survey and technical analysis of organic material from the Staffordshire Hoard was completed in September 2015 and has provided some fascinating insights into the materials and supporting activities employed in the production of the hoard objects. Small fragments of wood, bone and horn have been identified as structural and decorative components of some hoard items, while pastes formed from varying combinations of beeswax, animal glue, and calcium carbonate based material have been identified as bedding materials in the production of garnet cloisonné, and as filler inside several pommel caps.

The material choices of the Anglo Saxon goldsmiths demonstrate a refined understanding of material properties and performance criteria. The blend of beeswax and animal glue for example, used as bedding pastes in many hoard cloisonné decorated objects, suggests that the goldsmiths were attempting to adjust the viscosity and surface tension of the molten paste to aid application, and possibly to avoid the formation of undesirable menisci within to the cloisonné cells.

The presence of some materials also asks questions of the supporting activities required to produce the hoard objects. How did the goldsmith acquire the beeswax

used in the hoard pastes? Was beekeeping widely practiced in this period? The calcium carbonate paste employed as fill material inside some pommel caps exhibit evidence of processing consistent with lime processing. Was lime burning widely practiced in the Anglo Saxon period, and how else might lime have been used at this time? The research into the organic components of the Staffordshire Hoard has generated as many questions as it has answered, and represents a valuable resource for Anglo Saxon researchers in the years ahead.

Peter McElhinney

Metal Analysis of the Hoard in 2015

A pilot study using surface XRF analysis of silver hilt-plates revealed a range of compositions due to the presence of corrosion products. The presence of mercury and gold on the surface confirmed that many pieces were gilded (Figure 1), however this also interfered with the core alloy results. The sub-surface analysis of these hilt-plates provided more consistent and reliable results for the bulk alloy. Therefore a larger sub-surface study of silver objects from the Hoard was carried out, with objects of interest chosen by Chris Fern.



Figure 1. K453 showing the mercury gilding present on the cheek piece.

The results have shown that the silver objects in the hoard demonstrated a range of compositions between 75-98% silver and 0-20% copper. Within many of the objects there was up to 4% tin, 4% lead and 4% gold; some had traces of zinc up to 1.5%.

The analysis has shown that there is a consistent presence of gold within the silver (Figure 2 top). There are two possible explanations for this. The first is that a silver ore was being used that naturally contains gold and the silver from this ore had not been parted to remove the gold after the cupellation process. Alternatively the silver stock has been contaminated with gold, perhaps from the recycling of gilded silver.

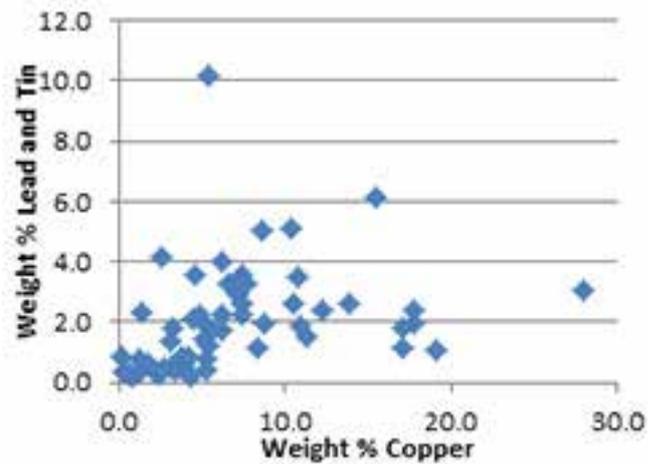
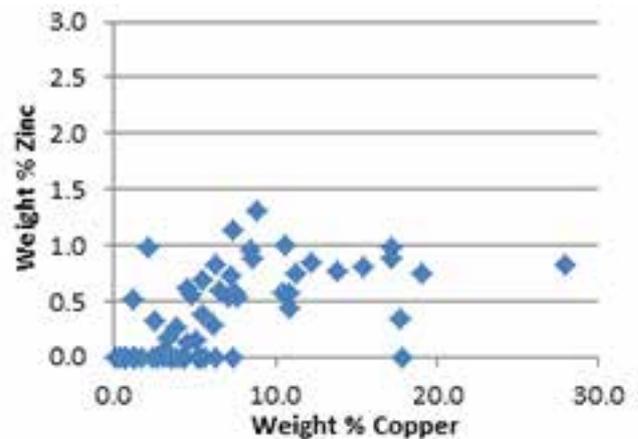
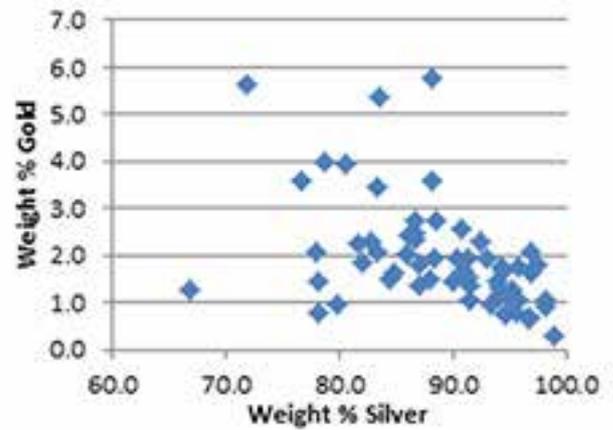


Figure 2. Gold/silver, zinc/copper and lead and tin/copper bi-variate graphs showing all the data collected during this study.

There is an apparent relationship between lead, tin and copper contents in the silver alloys (Figure 2 bottom), which suggests that the lead and tin may

have entered along with the copper, in the form of a leaded bronze alloy. This correlates nicely with a qualitative surface XRF survey of the copper alloys in the hoard which suggested an assemblage dominated by leaded tin bronze.

The presence of zinc in the silver suggests that it also entered with the copper (Figure 2 middle). Any zinc present in the silver ore would have evaporated during smelting and cupellation processes, since zinc has a boiling point lower than the silvers melting point. It is therefore likely that pieces of brass or gunmetal (mixture of copper, tin and zinc) were also occasionally added to the silver.

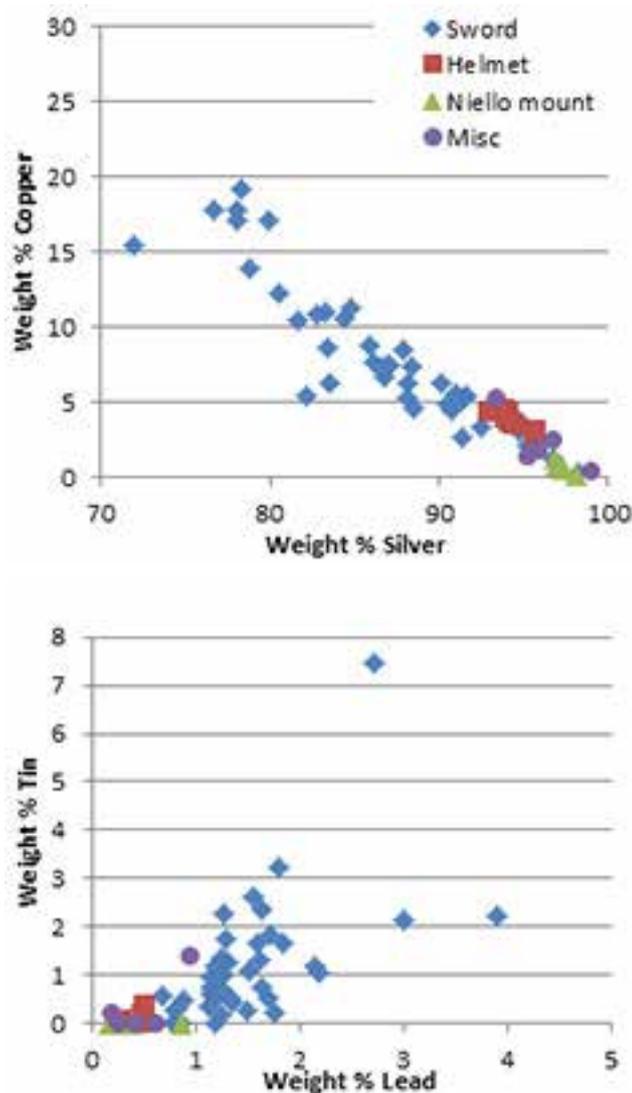


Figure 3. Copper/silver and tin/lead bi-variate graphs showing the difference between the sword fittings, niello mounts and helmet pieces.

The analysis revealed no specific alloy choice based on decoration, i.e. gilded or niello. When the different types of sword fittings were plotted no patterns emerged, but when the objects are grouped based on function it appears that the helmet and niello mounts, are generally purer silver than the sword fittings (Figure 3). This is remarkable considering the evidence for recycling seen in the silver alloy compositions and suggests that the Anglo-Saxon goldsmiths recognised and separated purer silver for when it was required. A recent new survey of the niello objects in the Hoard has shown that the group of niello mounts including the fish (K82) and eyes (K310 and K620) have similar cut channels, and niello inlays, so along with the distinctive composition it is likely these were made in the same workshop.

Alongside the new analysis of the silver, copper alloys and niello pieces carried out in the Birmingham conservation studio, more work is being carried out on the gold in the Hoard. In conjunction with Birmingham University cross sections of six objects are being examined to investigate the surface enrichment treatment identified during stage 1 (Figure 4). In addition, this study also aims to determine the type of the solder used to attach the beaded wires to the sheets. The results are still being gathered and interpreted, but so far what we have is intriguing.

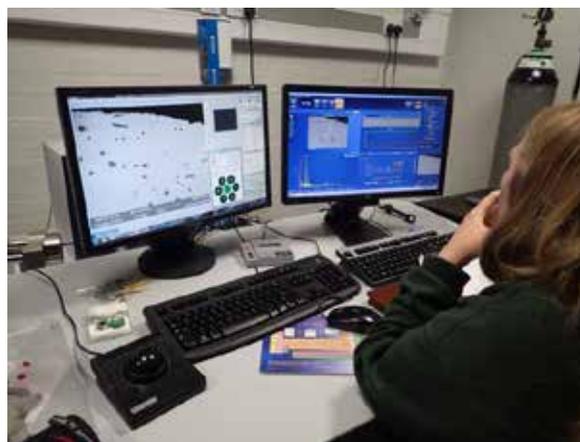


Figure 4. Using the SEM-EDX to look at changes in composition at the surface of the sheets.

Eleanor Blakelock

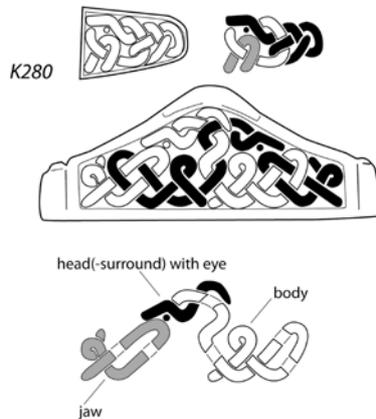
Pommel Art



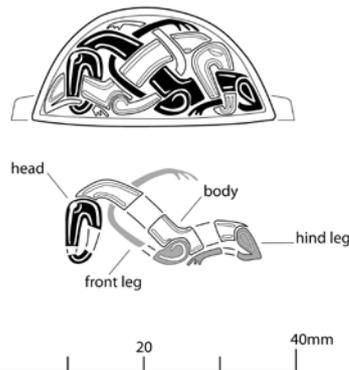
Stallion combat, picture-stone,
Sweden, 5th or 6th century
(not to scale)



'Horses' on a brooch from Apple Down,
W. Sussex, early 6th century



K347



The hoard's over seventy pommels demonstrate between them almost the full range of the fine metalworker's craft of the late 6th and 7th centuries. Each was an individual creation, and no two pommels are exactly alike. Together the collection represents production over many decades. Yet despite this, many have animal art (of Style II) showing a strong adherence to one motif in particular, that of paired creatures with biting jaws (K280 and K347 are examples). The exact posture of the beasts, their form and other details were subject to change, in accordance with fashion and the creativity of the smith, but the motif persisted. The design can be traced back to the 5th and 6th centuries in northwest Europe (though the symmetry of paired beasts ultimately has a more ancient and wider application across cultures). In 7th-century England, therefore, use of the motif could indicate a 'pagan' legacy remembered into the period of religious conversion.

Species is generally unassignable, with limbless zoomorphic forms common to most (e.g. K280), possibly akin to the serpentine *wyrm* ('dragon') of *Beowulf*. By contrast, the quadruped creatures depicted in profile on later pommels (e.g. K347) are perhaps more horse-like (Fern and Speake 2014, 30–31). Horses were prized beyond their economic value in the period (Fern 2010). Rituals to do with the animal probably included the practice of stallion combat, with pairs of males baited to fight, as shown

on picture-stones in Scandinavia, although there is as yet no proof they took place in early England (Hagberg 1967, 81). Nevertheless, a 'creature pairing' of possible significance is the famous legend of Hengist ('Stallion') and Horsa ('Horse'), the two founding brothers of the Anglo-Saxon folk, recorded in Bede's history (HE I.15, II.5; McClure and Collins 1994). They suggest heroes of hybrid stock, and a further memory of a pre-Christian cult of the horse (Turville-Petre 1957).

Fern, C. 2010. 'Horses on Mind', in Carver, M., Sanmark, A. and Semple, S. (eds) *Signals of belief in early England: Anglo-Saxon Paganism revisited*. Oxford, Oxbow; 128–157.

Fern, C. and Speake, G. 2014. *Beasts, Birds and Gods: Interpreting the Staffordshire Hoard*. Alcester, History West Midlands

Hagberg, U. E. 1967. *The Archaeology of Skedemosse II: The Votive Deposits in the Skedemosse Fen and their Relation to the Iron Age Settlement on Öland, Sweden*. Stockholm, Almqvist and Wiksell

McClure, J. and Collins, R. (trans. and eds) 1994. *Bede: The Ecclesiastical History of the English People*. Oxford, Oxford University Press

Turville-Petre, J. E. 1957. 'Hengest and Horsa', *Saga Book* 14, 273–290

Chris Fern

Exploring an Equestrian Warrior



Newsletter 8 (June 2015) outlined the challenging and tantalizing task in Stage 2 of sorting and classifying the figural and zoomorphic designs on the many fragmentary die-impressed sheets derived from at least one magnificent helmet. These were grouped into a sequence of panels and bands made up of warriors and zoomorphic creatures.

This brief note highlights the problems of interpretation that have arisen in attempting to piece together further fragments of a single helmet panel showing an equestrian warrior, where many pieces of the jig-saw are missing or not identified.

Initial work at Stage 1, carried out at the British Museum, had already assembled many components of this panel, which partially show a mounted warrior riding down a naked foe, who is plunging a sword or knife into the chest of the horse, whilst his right hand grips its left foreleg.

The suggested reconstruction as drawn in *Beasts, Birds and Gods* (Fern and Speake 2014, 37), which was based on the mounted rider from the Sutton Hoo helmet panel, now needs to be modified.

A close scrutiny of the many disparate fragments show that the design of the panel was more complex, as more sheet fragments of the panel have been identified. Although large gaps in the overall design still exist, small visual clues are helpful in identifying and placing individual fragments. In addition, analysis by Dr Eleanor Blakelock has confirmed that traces of zinc were detected in the silver-gilt alloy of this panel making the fragments distinctive, in relation to other designs. The average gauge of the

sheet used is 0.2mm with a range with a range of 0.3 to 0.15mm.

Whilst many body parts are still missing we can now confirm that the mounted warrior wore a helmet with distinctive in-curved cheek-guards, comparable to certain Roman cavalry helmets. As yet we are unable to confirm if the helmet had an eagle-headed crest as worn by the marching warriors illustrated in the previous newsletter.



Abutting the head is a bossed disc, which was initially identified to be a shield boss. Given that the rider already holds a shield in his left hand, the identification of another shield was questioned, as was the joining of the disc to the helmeted head. The join between head and disc had come apart following its initial joining at the BM and alternative

proposals were considered. Could the disc have been part of the horse-harness? Such bossed discs can be seen on the harness fittings on one inner panel of the



shield boss remains a possibility, although there are no known archaeological for such a shield boss with nine securing studs. The maximum number of boss studs I am aware of is depicted on a helmet plate from Vendel 14 where a warrior holds a shield with a central boss, which has five securing studs. If the representation of a shield is intended, we are left with the problem of who is holding the shield. In terms of the iconography, the mounted warrior should be holding a spear in his right hand, as on the Sutton Hoo helmet panel. Parts of a spear and its haft have been identified on fragments from the top part of the panel.

An intriguing parallel for the bossed disc, juxtaposed next to male head on top of a horse can be found on three sixth century C-bracteates from East Sweden, one example being from Bostorp on the island of Öland, where its significance has been seen as a solar

Gundestrup cauldron (see below).

A second proposal was that the disc was attached to the chest of the rider signifying his rank and comparable to that worn by of a Germanic warrior, whose nine-bossed silver disc found in the Thorsbjerg



bog in Schleswig.

Both these interpretations are now rejected following further deliberation. A recent examination of the fragments and their joins by Kayleigh Fuller in the Hoard Conservation Lab at BMAG, has now confirmed that the initial joining was correct and the disc does connect with the warrior's head.

The notion that the nine-bossed disc represents a



symbol.

Could East Sweden be the source for the motif on the Hoard helmet panel? If so it would reinforce the east Scandinavian links, which are evident both at Sutton Hoo and in other aspects of the helmet panel. These analogies can be seen in the fragmentary sheets of small figures located in front and behind the mounted rider. Their possible arrangement can be seen in the Swedish helmet panels from Valsgärde 7 and Valsgärde 8 boat graves. (pictured next page).



Helmet panels from Valsgärde 7 and Valsgärde 8 boat graves.

Work continues on the sheet fragments in close collaboration of the Conservation Team in an attempt to answer the many questions that still remain. Progress can be slow and erratic but new discoveries and insights have been made.

George Speake

Publications

Within the research project we have always thought it is appropriate to share the research as it develops. You read about it first in this Newsletter, but our aim is to publish more widely. Team members are writing articles for journals and other outlets. Several articles are either in the refereeing process, or are being developed. The first are now starting to appear.

Blakelock, E.S. 2015. 'Never judge a gold object by its surface analysis: a study of surface phenomena in a selection of gold objects from the Staffordshire Hoard', *Archaeometry* doi: 10.1111/arcm.12209 .

Altpeter, R., Fern, C., Fuller, K., Greaves, P. and Miller, L. 2015. 'The assembly of the Staffordshire Hoard objects', *News in Conservation* October 2015, 7-10. Available at <https://www.iiconservation.org/node/5977>

Cool, H. 2015 'The Staffordshire Hoard', *Historic England Research News* 2. Available at <https://historicengland.org.uk/images-books/periodicals/historic-england-research/the-staffordshire-hoard/>

Programme News

The research project is just one part of the wider Hoard programme. Interesting things are happening elsewhere too.

At Birmingham the gallery devoted to the hoard which opened in October 2014 has had 187,875 visitors in its first year of life showing the fascination the hoard still exerts.

The Mercian Trail has relaunched itself as the Staffordshire Hoard Trail, and in October Tamworth Castle won a £55,000 HLF award to enable them to begin working on plans for a new Saxon gallery.

Also of interest is the creation of a gold pectoral cross set with a hand-cut garnet which shows how the one in the Hoard would have looked before damage. This was a joint creation by the Jewellery Industry Innovation Centre (JIIC), School of Jewellery, Birmingham City University (for the laser scanning and CAD/CAM technologies); the Hockley Mint (for casting and finishing); and CW Sellors (for the stone carving and setting). It was formally presented at a service in Manchester Cathedral on Saturday 24th October to consecrate a newly appointed Bishop into the Apostolic Pastoral Congress (APC).



The replica pectoral cross and bishop at the Manchester service

And finally

Amongst all their other activities, our ever busy conservation team found time to organise a Hoard-themed cake baking competition, here are the winners. You may have seen them in Current Archaeology's Edible Archaeology feature earlier this autumn.



The winner of the adult category - Tamara Walter, Associate Professor of Archaeology at Texas Tech University



The winner of the children's category - six-year-old Oscar Paul from Birmingham.