Snake swords and barbed spearheads: the visibility of pattern-eelding

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ABSTRACT: Overall there has been little attention paid to how iron objects from the pre-modern era would have looked in so far as surface colour and texture is concerned. Some of this can be deduced by identifying the combinations of alloys, both ferrous and non-ferrous used to form the surface and some studies have examined this. Less attention has been paid to what evidence for the original appearance survives on the objects themselves, largely because archaeological (or any) survival is generally so poor. On its own, this does not amount to much, but used in combination with some fragments of evidence that can be gleaned from contemporary illustrations, plus early descriptions, it can enable us to say much more especially with reference to specialised decorative techniques such as pattern-welding. Surviving Iron Age to early medieval evidence for the appearance of pattern-welding in Europe is examined in this study.

Introduction

It is now generally accepted that pattern-welded designs – as used in the manufacture of composite ferrous edged weapons – were intended for display. This is almost certain to be correct but little direct evidence has been put forward to show that this was the case. However this can be done using a combination of three classes of evidence. Firstly there are a few examples where visible patterns survive on the almost perfectly preserved original surface of the blades themselves. In addition to this there are both contemporary illustrations and contemporary descriptions that show the patterns were meant to be seen (Gilmour and Giumlia-Mair 2009, 999–1006). Some evidence from all three classes exists, and when taken together demonstrates the visibility of pattern-welding more or less throughout the thousand years or so that it was popular in Europe for edged weapons such as swords and spearheads.

Its use for swords was well established by the late Iron Age in this region and for swords this continued until about the end of the first millennium AD when it ceased (Gilmour 2007a, 102). Sometime after about the middle of the first millennium pattern-welding began also to be used for spearheads and *seaxes*, the large form of knife or single edged dagger which became more widespread in NW Europe during this period (Gilmour 2007a, 102). Its use in Europe greatly declined after this although it is still occasionally found used for some knives until as late as the 14th century (as in the case of a large pattern-welded knife found during excavations of 14th-century levels at Stafford Castle; Gilmour 2007b, 129–134). In the Middle-East or further afield its use is known from documentary sources, and surviving 16th century or later examples from this region have also found their way into many museum collections. Examples such as these may have inspired European smiths to begin using the technique again later on, although this time mainly in the manufacture of gun barrels such as the 'damascus' shotgun barrels which were made throughout the 19th century (Gilmour 1996a, 118). Many of these barrels survive with their patinated and polished surfaces which show their pattern-welded construction.

There is little evidence of this kind from much earlier

because iron sword blades or spearheads with well preserved surfaces are exceedingly rare, although they do exist. This is not surprising given the corroded condition of archaeological ironwork when recovered from damp ground conditions. Excavated material is almost invariably heavily corroded and often there is little or no iron left at all, let alone a preserved surface. Similarly, little or no evidence of contemporary illustrations has been put forward or commented on, although the survival of these is less clear, and sometimes the evidence is not recognised for what it is. Indisputably the best evidence comes from contemporary written descriptions, many of which were brought together, quoted and discussed nearly 50 years ago by Hilda Ellis-Davidson (Davidson 1962), but even here the interpretation of some of the written evidence, or what the original writers were describing, has been called into question.

Archaeological survivals of original pattern-welded surfaces

All but a few of the pattern-welded weapons so far found in Britain (as elsewhere in Europe) belong to the post-Roman or Anglo-Saxon period. There appear to be no good archaeological examples from this period of pattern-welding still visible on the blades of weapons, or at least none where the surface preservation is good enough for this to be anything like certain. In Britain pattern-welding was first noted on blades: of swords, *seaxes* and spearheads, recovered mainly from rivers where they had been placed as part of a ritual of votive watery deposition in the late Anglo-Saxon or Viking period (9th–11th centuries AD). The pattern-welded designs of many of these weapons was obvious from the way that the partly anaerobic burial environments

Fig. 1: Orton Meadows sword: detailed views of both sides of the blade showing the resist protected margins along the edges, and the heavily etched, 'free-form' pattern-welded detail along the centre, strongly resembling flowing water. In addition note the distinctive 'dumb-bell' shaped maker's punch-mark visible near one edge.

of river beds had resulted in relatively slow corrosion, which produced heavily etched, highly visible patterns on the surfaces.

Unfortunately this means that in almost every case the visibility of the patterns is likely, at the very least, to have been enhanced by prolonged etching during water-logged burial – even if the surface patterns had already been exposed by intentional etching as part of the final surface preparation during manufacture. At least partial examples of the preserved original surfaces of these weapons are likely to exist; however these have either not yet been recovered from their waterlogged burial environment or not yet recognised. Much the same can be said of the many pattern-welded swords from great votive deposits in Danish peat bogs which have long been known but are generally much earlier, typically belonging to the 2nd–4th centuries AD (Biborski and Ilkaer 2007; Engelhardt 1866; Todd 1975).

It becomes much easier to identify an original surface where the structure of a composite blade is the same right across, as has been observed from X-radiography and/or metallographic analysis in some late Iron Age swords (Gilmour 1996b, 112–113; Tylecote and Gilmour 1986, 162–164). The patterns are only visible in the better preserved examples, running as a wide band down the centre, the edges being featureless (eg Stead 2006, 47, plate 6). Perhaps the best preserved example is one of several such swords recovered from its votive burial site, an old bed of the River Nene at Orton Meadows, Orton Longueville, near Peterborough, Cambridgeshire (Stead 2006, 174, 180): where the surface preservation was so good that there could be no doubt that what is now visible is more or less exactly how it would have appeared when it was made (Fig 1). A clear fibrous or wood-grain effect (Stead 2006 describes this as stripy) can still be seen running down the centre of the blade while the edges form a plain border on either side. The watery-looking structure has been made visible by a treatment using an acid to preferentially etch part of the metal structure, probably along the welds, thus leaving a visible pattern. However the underlying structure is the same right across the blade, as has been shown by an X-radiography study, but the margins along either side of the blade were protected from being etched by a resistant medium such as a wax or grease, so as to leave these plain in contrast to the decorative central band.

It is only when the edges of swords, like the example from Orton Meadows, are made the same way as the centres that we can be sure that we are looking at a preserved original surface, and hence seeing the pattern on the surface as was intended (or nearly so). Later, when the edges of pattern-welded weapons were made separately with a different construction and welded on, it becomes more difficult to distinguish what is the result of acid etching during long term anaerobic burial and what is original acid etching preserved where little further etching takes place in more extreme anaerobic burial conditions.

The pattern visible running down the central part of the Orton Meadows sword, and others like it, actually resembles that of running water and this may provide an additional important link with the deposition of this sword in the river, which recalls the return of the sword Excalibur to the Lady of the Lake in Arthurian legend, a probable echo of this form of votive deposition. Later on the patterns visible on swords become more stylised and (from the 7th century) are also found on *seaxes* and spearheads.

Pattern-welding from contemporary illustrations

Little if any evidence has been identified of (near) contemporary illustrations which can reliably be said to represent pattern-welding as seen on an edged weapon before the 11th century when the technique ceases to be used for weapons in Europe, although it is seen in simplified form on European knives until as late as the 14th century (Tylecote and Gilmour 1986; Gilmour 2007b, 129–130).

One curious detail in a late Anglo-Saxon manuscript illustration (British Museum MS Claudius Biv), which was repeated on the Bayeux Tapestry, may be best interpreted as a representation of pattern-welding. Where spearheads are shown in these illustrations they appear as a distinctive large-barbed form of the weapon (Fig 2 upper), although barbed spearheads did not exist at this time in this region. Instead, what we do commonly see is a barbed form of pattern-welding which closely matches, in form at least, the barbed representation of the illustrated spearheads, although these are pictured effectively as the negative counterparts (in photographic terms) of what would actually have been seen. The example shown here (Fig 2 lower) is an approximately contemporary example of one such spearhead deposited as a votive offering in the River Thames at Kempsford, Gloucestershire (see also Tylecote and Gilmour 1986, 117–121).

This simple illustrative device would have been necessary in order to achieve a basic pictorial representation

Fig. 2: Upper image shows part of an 11th-century manuscript illustration showing barbed spearheads, the same depiction as in the Bayeux tapestry. The lower image showd the barbed spearheads enlarged and placed alongside a reconstruction of the original surface of a roughly contemporary spearhead recovered from the Thames at Kempsford, Gloucestershire.

of one of these weapons. It is hard to see any other viable explanation for what is otherwise a non-existent type of spearhead, not to be confused with the *angon*, a derivative of the Roman *pilum*: a form of javelin with a barbed head and very long narrow iron shaft, still found in northern Continental Europe in the 6th and 7th centuries, after which it seems to disappear. It is notable however that the barbed *angon* disappears at about the same time that the barbed form of pattern-welding is first found in spearheads, of which there are various examples in museum collections, for instance from 7th-century burials at Tattenhoe and Bottledump Corner,

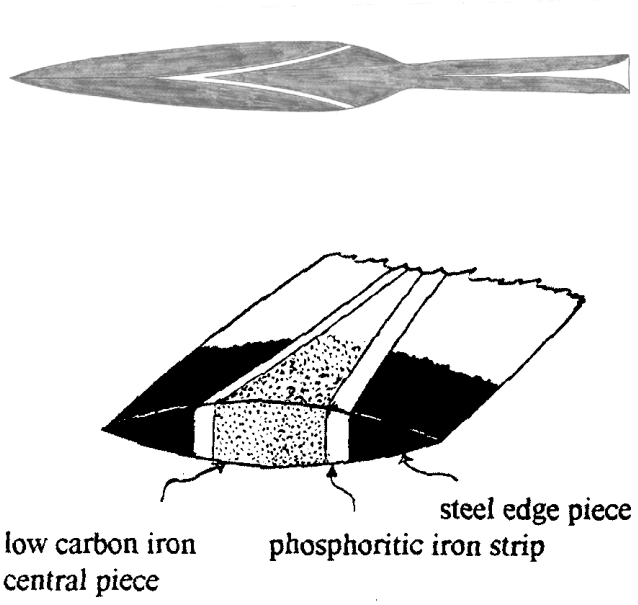

Fig. 3: Reconstructed view of the appearance of a simple barbed pattern on a 7th-century spearhead from an Anglo-Saxon burial at Broome Hill Quarry, Bedfordshire, plus a three-dimensional view of the structure in section.

Fig. 4: Snake image shown running down the blade of a sword on the lower left panel of a mid-13th-century stained glass window originally from the church of St. Germain-des-Prés, Paris, but now in the Metropolitan Museum of Art.

Buckinghamshire (Parkhouse and Smith 1994, 103–119), and Broome-Hill Quarry, Bedfordshire (Fig 3; Gilmour 1996a). An interesting possibility is that these events are connected and that the barbed form of pattern-welding is actually an echo or preserved depiction of the barbed form of weapon last seen as a separate weapon in the *angon* of the mid-7th century (Swanton 1973, 35).

Images of pattern-welding on swords are just as elusive in contemporary illustrations. Although 'snake swords', (such as that described in *Thiðriks Saga* below) are unlikely to have been made later than the mid-11th century, when pattern-welding ceases to be used for swords, some clear memory of this use, if not some of the swords themselves, must have survived. This much is clear from the depiction of a snake image shown running down the blades of two swords, one in each of two lower left panels of a mid-13th-century stained glass window originally from the church of St Germain-des-Prés, Paris, but now preserved in the Metropolitan Museum of Art as 'Scenes from the Passion of Saint Vincent of Saragossa and the History of His Relics, 1244–1247' (MMA 24.167a-k). The scenes in these stained glass panels depict much earlier (5th- to 6th-century) events, but the unmistakeable depiction of a snake sword (Fig 4) shows this was a still-familiar tradition in the mid-13th century.

Pattern-welding in contemporary written sources

As mentioned above, much of the early descriptive evidence for the visibility of pattern-welding on the surface of swords was gathered together in the early 1960s by Hilda Ellis-Davidson (1962, 104–177). This comes from a variety of sources, starting with an early 6th-century letter written by Cassiodorus, secretary to the Ostrogothic king Theodoric the Great. In it, he thanks the King of the Warnii for gifts which included several pattern-welded swords:

> 'The central parts of their blades, cunningly hollowed out, appear to be grained with tiny snakes and here such varied shadows play that you would believe the shining metal to be interwoven with many colours' (Davidson 1962, 106).

The 'tiny snakes' in this description must refer to a herringbone (or similar) form of pattern visible on the surface of these sword blades. Variations of this form of pattern, referred to as *mæl* (literally mark), are almost certainly what is meant in the poem Beowulf by references to *brogdenmæl* (woven patterns), *hringmæl* (curved or winding patterns), *sceadenmæl* (branched patterns), *wundenmæl* (twisted patterns), and in similar references to visible patterns in other Anglo-Saxon poems (Davidson 1962, 121–135). This kind of patterning is also referred to as 'watering' by early Arab sources, most particularly in the sword treatise of Ya'qub al-Kindī, that was written for the third Abbasid Caliph al-Mu'tasim between 832 and 841 (Hoyland and Gilmour, 2006).

There is at least one description of a larger snake pattern in the Old Norse *Thiðriks Saga* – written down in the 13th century but containing material that may be as early as the 6th century in origin. In this it is said of the blade of the sword *Ekkisax*:

> '...if you set the point down on the earth, it seems as if a snake runs from the point and up to the hilt, gleaming like gold. But if instead you hold it upwards, then it seems as if the same snake runs from the hilt and up the point, and it moves as if alive...' (Davidson 1962, 166).

Davidson suggested that this description was a poetic device referring to the kind of 'serpentine' herringbone patterns already mentioned, but more recently the X-radiographic and technological examination of a sword from a 6th-century grave from the Anglian cemetery at West Heslerton, Yorkshire, revealed one sword blade that yields exactly this form of pattern (Fig 5). At least two probable 9th-century examples of this kind of larger snake pattern have also been noted (Gilmour 1999b, 121–123).

Similarly, only recently has archaeological evidence for another larger snake pattern been found. A passage in another Old Norse poem, the *Edda Helgakviða*, describes a sword with a ring on the hilt and also includes the description:

> '...along the edge lies a blood-hued serpent..' (Davidson 1962, 167).

Davidson again suggests that this is a poetic device referring to 'serpentine patterns', but the recent technological examination of an example of a ring-hilted sword

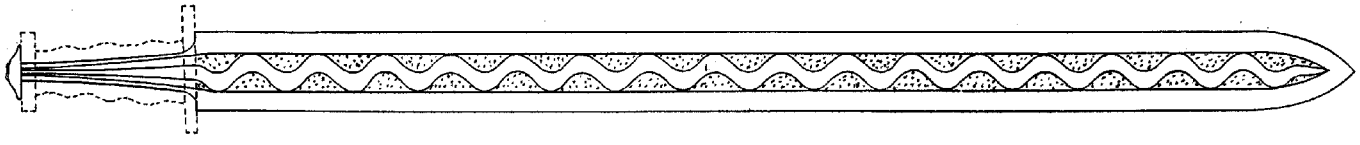

Fig. 5: West Heslerton snake sword: reconstruction view of the original surface appearance.

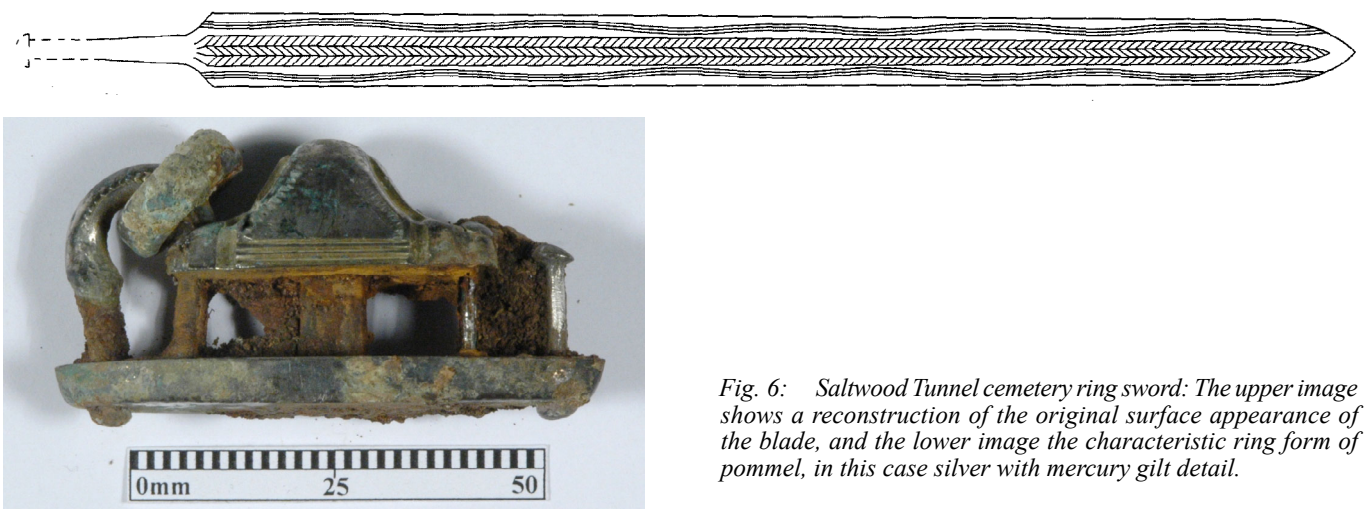

Fig. 6: Saltwood Tunnel cemetery ring sword: The upper image shows a reconstruction of the original surface appearance of the blade, and the lower image the characteristic ring form of pommel, in this case silver with mercury gilt detail.

excavated at the late 6th- to early 7th-century cemetery at Saltwood Tunnel, Folkstone, Kent revealed that the blade had a snake-like pattern running along its welded-on edges, in addition to a herringbone pattern running down the central part of the sword (Fig 6; Gilmour 2010, 62). These examples give further confirmation that the visible patterns were not always just confined to the central part of a sword, this having been interpreted for three out of four swords examined recently from a late 6th- to early 7th-century Anglo-Saxon cemetery at Croydon, Surrey (Gilmour 2003, 97–100).

A form of visual art in Europe for a thousand years

It has been clear for some time that the way pattern-welded swords were made, and later on *seaxes* and spearheads, was a strong indicator that the patterns were meant to be seen, moreover their construction does not make a lot of sense unless this was the case. This is not the same as finding or identifying first-hand evidence that actually shows this to have been the case; however when the meagre archaeological evidence and the almost equally sparse pictorial evidence is taken together with this series of surviving descriptions from written sources, we have enough first-hand evidence to show that pattern-welding was meant to be seen, right from its early stages in the mid to late Iron Age up to the 11th century when this technique ceased to be exploited in Europe.

This perhaps seems most obvious in the case of the inscribed Ulfberht, Ingelrii or similar swords which are not strictly speaking pattern-welded swords at all but are a form of blade inlaid with short lengths of – usually, but not always twisted – iron rod. Together these form either an inscription (as in Ulfberht or similar blades) or a decorative design which can vary from a simple cross to a form of interlace design. Investigative work on sword blades of this type indicates that most of them made a much greater use of steel in their construction, especially at the surface (Gilmour 1990). To this can be added the likelihood that the inlaid (twisted) bars of the designs, 'makers' names and so on, were made of phosphoric iron so that when the whole blade was etched, then polished, the letters etc would stand out in contrast to the much darker etched iron/steel of the rest of the surface.

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