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A Scandinavian Relief Brooch: Artistic Vision and Practical Method Combined

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THIS PAPER considers the craftspeople that created ornamental metalwork, the contexts in which they operated, and the communication they had with their contemporaries. The study focuses on the Dalem brooch, a 6th-century Scandinavian relief brooch from Norway. By examining an object which expresses a complex symbolic language through intricate and demanding crafting processes, we emphasise the importance of considering both ornamentation and technology when studying these exquisite dress items. The brooch was manufactured from a variety of materials and decorated in Salin Style 1. This ornamentation, with its religious, political and social connotations, was completely integrated into the object from its conception. A combination of new and old designs indicates that the craftspeople purposefully created and transformed motifs for use on the brooch, operating within a creative, cross-disciplinary and intellectual centre of expertise.

The brooch considered here was found in Dalem in Norway (Fig 1). It is a masterpiece in terms of workmanship, decorated with the complex symbolic visual language of animal art in Salin Style 1. To explore the embodiment of this decoration on the piece and the meaning it may have conveyed to Iron-Age audiences, we attempt here to reconstruct the production sequence from the conception of the artefact until its completion as a finished item of jewellery. In doing so we embrace the concept of *chaîne opératoire*,[3] and the idea that technology was an integral way in which social ideas were conveyed in early medieval society. By exploring the production of the brooch in this way, we can gain insights into the practical, social and ideological frameworks within which craftspeople operated.[4] Animal art is well established as a meaningful, active and inseparable element of the pre-Christian cosmology,[5] and both the brooch and its ornamentation carried a related agency,[6] relevant to the makers, wearers and viewers of these intricate dress items.[7]

Relief brooches of the 5th and 6th centuries AD are found in Scandinavia, in England, and on the continental mainland.[8] The Norwegian examples are uniquely exquisite, demonstrating high levels of technical and artistic proficiency.[9] The Dalem brooch, an early 6th-century piece, is the largest of them all, with a length of 24 cm and a weight of more than 330 g. Its richly ornamented front side has been depicted

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[3] Leroi-Gourhan 1964.
[4] Dobres 2000.
[5] Building on the works of Hedeager 1999; 2011 and Kristoffersen 1995; 2010.
[6] Eg Joy 2009.
[7] See discussion in Martin 2015, 129–32.
[8] Hines 1997, 1; Nissen Meyer 1935; Sjøvold 1993.
[9] Kristoffersen 2000, for further description and context compare Kristoffersen 2015a.

FIG 1
Front of the Dalem brooch. Max length: 24 cm.
Photograph by Ellen C Holte. © Museum of Cultural History, University of Oslo.

countless times. The back has received less attention, but is equally important to our arguments here regarding manufacture and decoration. In the contribution that follows we demonstrate how essential it is to examine ornamentation and technology together and to consider the entire artefact, front and back, in order to gain insight into the production and use of crafted items.

CRAFTING TECHNIQUES AND AESTHETICS

The craftworkers succeeded in giving the illusion that the Dalem brooch is made of gold (Fig 1). In fact it is cast in silver, but the metal is hidden by the shiny gilding. This only becomes obvious when the brooch is turned over and the back is exposed (Fig 2). They also succeeded in creating the impression that the brooch was made in one piece. If observed from the back, it can be seen to be composed of five different pieces: the rectangular headplate, the bow, the footplate and the two masked side lobes of the footplate (Fig 2). The craftworkers made considerable efforts to conceal this construction; the parts are well matched, the small nails that hold them together are gilded and integrated into the ornamentation, and a border with stamped ornamentation on the bow helps to hide the seams between the parts. The back reveals a solid, but visually less elegant construction; the bow is extended in both directions with a long overlap onto the head- and footplate respectively (Fig 2), while the transition between each of the loose

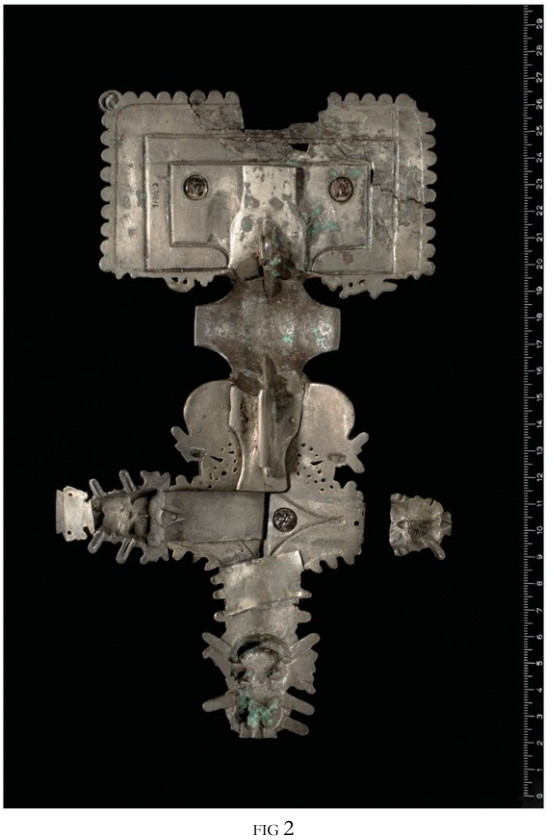

FIG 2
Back of the Dalem brooch.
Photograph by Ellen C Holte. © Museum of Cultural History, University of Oslo.

masks and the footplate is re-inforced with a robust silver plate.[10] The back can be described as solid and rugged, but nonetheless indicative of a high level of competency on the part of the craftworkers.

The gilding is one element in the extensive ornamentation that covers the entire front surface. Main features, like the masks, are easily noticeable, while other subtler features are only visible upon close study. The ornamentation is framed by dark niello bars, which create sharply defined panels (Fig 1), and highlight certain features. Contributing to the elaborate impression are insets of glass or gemstones, the smaller fixed to the surface and the larger set in perforations. The latter would let the light play in the material, especially if the brooch was worn on light coloured fabrics. Morten Axboe has argued that a finished product is a synthesis of the craftsperson's artistic vision and the practical methods used to materialise the idea.[11] We will now explore the artistry and aesthetic vision of the makers of the Dalem brooch, followed by the technologies employed in its manufacture.

[10] Today one plate is a loose fragment and the associated mask has been cut off at both ends. The repair patch rejoining the footplate terminal lobe to the rest of the footplate is modern.
[11] Axboe 1984, 33; compare also Leigh 1990.

VARIATIONS IN THE ANIMAL MOTIFS

Close scrutiny reveals more than 50 animal bodies covering the front of the brooch, not all of them rendered in one piece. Among them are two characteristic designs, labelled here as types A and B, the latter occurring on the headplate only. Describing the brooch from the headplate towards the foot: the frame of the rectangular headplate has two different motifs, en-face masks in groups of three (Fig 3) and the only occurrence of animal figures with ribbon-shaped bodies, our type-B design (Fig 4). Some

FIG 3
En-face masks in the frame of the headplate. Depth: 13 mm.
Photograph by Ellen C Holte. © Museum of Cultural History, University of Oslo.

FIG 4
(a) Animal type B, in the corners of the headplate. Depth: 13 mm. Yellow indicates the head, red indicates the limbs and blue is the body.
Photograph by Ellen C Holte. © Museum of Cultural History, University of Oslo. (b) Illustration by Hege Vatnaland.

FIG 5
(a) Animal of type A, from the second panel of the headplate. Depth: 6 mm. (b) Yellow indicates the head, red indicates the limbs and blue is the body.
Photograph by Ellen C Holte. © Museum of Cultural History, University of Oslo. (b) Illustration by Hege Vatnaland.

features suggest that these type-B designs are still at the experimental stage: thighs and paws are placed over the back without a clear connection to the body. The masks have two small ears and a head profile and nose inlaid with niello, in a design reminiscent of a helmet with a nose guard (Fig 3). In the second panel of the headplate there is another type of animal figure, our type-A design (Fig 5), with a transversely ribbed body within contour lines. The six figures are carefully executed and the artist has taken the liberty of manipulating them: the bodies are twisted 180 degrees with the front and back legs facing opposite directions. Two (birdlike?) heads in profile on long necks with strongly marked eyes and beak-shaped jaws dominate the inner panel (Fig 1). The plethora of beast-like creatures and three round insets means there are few contiguous surfaces, and the ambition to fill these surfaces has affected the remaining designs in the inner panel — for example the five type-A animals are more fragmented and distorted than animals rendered elsewhere on the brooch. Their heads, bodies and feet are adjusted to the available surface: for example, their long, drawn-out jaws fill the entire area along the bar.

The inner panel on the bow contains another two type-A animals, and just below the bow, on the upper part of the footplate, two large animal heads can be seen in profile, jutting out with long, curved necks and open jaws. Within their necks are animal figures with elongated bodies. Further in towards the centre, on each side of the footplate bar, is a horse-like (?) figure that stands out from all other designs (Fig 6). Thighs and hooves are positioned underneath the short and slightly curved body, giving the impression of a crouching animal. There is a forward-curving, loop-shaped ear on the top of the head and the long, mule-like muzzles end in a small crease — perhaps a nostril.

In the rhombic inner panel of the footplate, there are two large round inlays flanked by animal heads with jaws facing into the corners. Outside, there are four long, narrow panels containing more type-A animals. Finally, there are whole animals and animal parts outside the outer bar of the footplate; in the lower end they are combined with the tongue-shaped protrusions that are very characteristic of the Dalem brooch.

The ornamentation as a whole, combined with the distinctive niello bars, creates a unified design and visual expression, despite the fact that the artefact is composed of many different parts, designs and panels. The tongue-shaped protrusions unite the

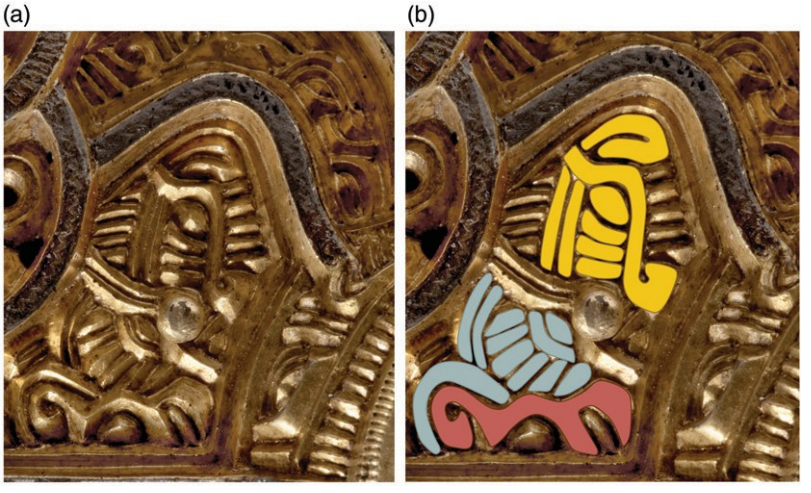

FIG 6
(a) One of the two horse-like figures situated below the bow of the brooch. Height of creature: 18 mm. *Photograph by Ellen C Holte. © Museum of Cultural History, University of Oslo.* (*b*) *Illustration by Hege Vatnaland. Yellow indicates the head, red indicates limbs and blue represents the body.*

different parts of the footplate, while type-A designs are a shared feature of the headplate, the bow and the footplate. The craftworkers were clearly ambitious to fill the entire front surface with motifs and yet there are also subtle variations in the designs. The combination of type-A and B designs is a notable feature. The former are, according to Günter Haseloff and Eva Nissen Meyer, more often evident on older, late-5th-century objects, whereas the latter appear to comprise an apparently new, early 6th-century motif.[12] Among the Norwegian brooches, type-A animal designs are never found on other 6th-century brooches, with the possible exception of certain relict elements on two brooches.[13] Animals of type A are, however, found on the 6th-century relief brooch from Håste, Jämtland in Sweden, which has other similarities with the Dalem brooch.[14] The execution of the type-B designs suggests that the new forms were still at an experimental stage — the artist was experimenting with up-to-date stylistic trends but did not quite succeed in getting all the limbs in place. The type-A animal bodies were executed with a sure hand, and their bodies expertly manipulated and twisted to fill the space.

MASKS AND FACES

The small and hard-to-identify animals discussed above stand in stark contrast to the three expressive masks with human features (Figs 7 and 8). All have staring eyes and

[12] Haseloff 1981, 180–216; Nissen Meyer 1935, 50.
[13] The brooch from Indre Arna (Sjøvold 1993, N 51) and the astragal-like bodies on the headplate of the large Ågedal brooch (Sjøvold 1993, N 29). Animal figures of our type A are a distinguishing characteristic of Günter Haseloff's early Style I (phase B) (Haseloff 1981, 180–96). The animal bodies develop through phase C to the late Style I of phase D, characterised by ribbon-shaped bodies of our type B (Haseloff 1981, 204). Most of the brooches with the late style of phase D are found within the borders of modern Norway (Haseloff 1981, 216).
[14] Nissen Meyer 1935, 49–51.

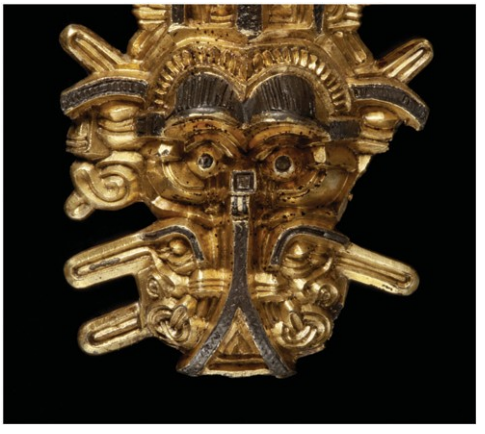

FIG 7
The integrated terminal lobe mask. Depth: 40 mm.
Photograph by Ellen C Holte. © Museum of Cultural History, University of Oslo.

FIG 8
The completely preserved side lobe mask. Depth: 40 mm (including triangular extension).
Photograph by Ellen C Holte. © Museum of Cultural History, University of Oslo.

an angry expression created by the V-shaped join at the top of the nose. The intense look is enhanced by the high relief of what are likely intended to be eyebrows: a striped outer surface with inlaid niello. The glossy and smooth inner surface, however, reflects the eyes, producing a strong visual impact. Niello was clearly chosen to create contrasts, and the effect is particularly evident in the integrated terminal lobe mask, which also has eyes of niello (Fig 7). The occurrence of animals and human figures in and on the

masks is another central feature.[15] All three masks probably ended in a triangular panel, but only the one in the side lobe is completely preserved.

The masks are different: the side lobe masks (Fig 8) are far more facially expressive than the integrated mask that features on the terminal lobe (Fig 7) and the latter has a slightly more surprised look. On the former, it is also clear that the triangular panel originates from the mask's mouth, which is round, and could be interpreted as breath exhaled or blown from the mouth, a motif argued elsewhere to have religious connotations.[16] The terminal lobe mask, however, has no mouth, and the triangular panel seems to be connected to a square element, perhaps intended to be a nose, but the motif is less explicit, and thus not as fully understood or deliberately depicted by the craftworker. It differs from the loose masks by rendering a mythical motif with far less precision, while the side lobe masks were designed by an expert with both the intention and ability to express mythical knowledge.

FROM IDEA TO BROOCH

By the time the Dalem brooch was made, people had been producing relief brooches for almost a century.[17] To fully understand its conception and creation, it is useful to consider some of the previous research on the production of relief brooches[18] and the resulting production waste.[19] The relief brooch is produced using a variety of techniques, with the casting process as the most significant, and in this case indicative of highly advanced skills. The makers worked in both positive models and negative moulds: the positive takes the shape of the finished brooch and the negative the shape of an imprint.[20] Indented designs or cut-outs in the negative version are rendered through casting as raised designs on the final product, while they remain cut-outs or indented motifs when carved in a positive version. Like many other relief brooches, the Dalem brooch carries motifs that are nearly impossible to achieve by making cut-outs in a positive model, but which can be easily created by cut-outs in a negative mould.[21]

The first stage of the production process consisted of cutting out the negative design in a block of wood (or wax), including the majority of the ornamentation, resulting in a mould for casting wax models; preliminary castings could be used to assess the success of the initial design.[22] The wax model could be changed or ornamented further before it was baked in a clay mould; the latter was then allowed to dry and the wax was melted out at low heat, in a technique known as *à cire perdue*, or lost-wax casting, before the mould was filled with molten metal. Once cool, the mould was broken to release the cast metal product.

So far, the process demonstrates that wood, beeswax and clay were essential raw materials. Gouges and knives were needed for cutting the first mould and crucibles and

[15] For a description see Kristoffersen 2017.
[16] Kristoffersen 2015b; 2017.
[17] Axboe 1984, 33; Kristoffersen 2000, tab 1, 82–3; Kristoffersen and Magnus 2010, 90; Nissen Meyer 1935, 99–101.
[18] Axboe 1984; Hines 1997; Kristoffersen 2015a; Kristoffersen and Pedersen forthcoming; Leigh 1990; Nissen Meyer 1935; Magnus 2015; Pedersen 2015b; Sjøvold 1993.
[19] Axboe 2012; Clarke and Lamm 2008; Hjärthner-Holdar 2012; Hjärthner-Holdar et al 2002; Holmqvist 1972; Lundström 1972.
[20] Axboe 1984; Salin 1904, 162.
[21] Axboe 1984, 39, fig 8.
[22] Axboe 1984, 37; Hedegaard 2005.

moulds of clay were necessary for casting with molten metal. Finally, bellows were needed if the fire was to reach the necessary melting temperature. The production sequence leaves no doubt that the working of clay, wood and wax were equally important to metalworking expertise,[23] and it is demonstrated elsewhere that high-quality ceramic production and metalworking had much in common at this period.[24]

The use of positive models and negative moulds has already been acknowledged in the creation of the frontal designs,[25] but this is further supported by our observation of the back of the brooch, where recesses and grooves are apparent that must have been carved out in the wax model. The grooves are positioned directly behind the niello bars (Fig 2), and the depressions correspond to the raised portions of the masks — these elements suggest that the aim was to create and cast a uniformly thick brooch. When viewed from the back, elements of the finishing work conducted to complete the final wax model are also apparent: notably the many tongue-shaped protuberances on the footplate (Fig 9) that must have been affixed to the wax models. Indeed, it is clear that the five pieces of the brooch were cast using individual wax models and that for each of these pieces, the wax model may have been assembled from various wax parts designed separately and attached together using a heated iron.[26] The bow for example, was most

FIG 9
Detail from the back of the mask in the terminal lobe with a modern repair, and evidence of tongue-shaped protuberances being added to the cast-wax model.
Photograph by Ellen C Holte. © Museum of Cultural History, University of Oslo.

[23] Pedersen 2010; 2016, 202.
[24] Fredriksen et al 2014.
[25] Axboe 1984, 39.
[26] Ibid, 38.

likely cast from a wax model composed from three different parts: the ornamented centre, probably designed flat and bent into shape after careful heating; and each lateral extension equipped with a pin-anchor and pin-catch respectively. It is conceivable that the integrated mask was another separate wax model element, but this is untraceable today due to a modern repair on the back of the brooch. Ultimately, five separate wax models were carefully matched to each other, judging from the virtually seamless joins between them, and from these the various metal parts of the brooch were cast.

THE PROCESS OF ORNAMENTATION

The cast parts of the brooch were subject to extensive finishing work, as has been observed for relief brooches more generally.[27] This most likely started with engraving, filing and sanding to remove any casting burrs, going over details of the ornamentation and making the two notched borders on the bow using a punch.[28] The bars were engraved with various patterns using burins and punches to facilitate the application of niello, made using silver and possibly copper, mixed with sulphur and borax.[29] The dot-in-circle decoration on the edge of the headplate seems likely to have been executed using a bow-drill, of a type known from contemporary graves,[30] used either to sharpen or create the motifs, before they were filled with niello and heated to a temperature above 680 ºC.[31] Then the parts were cleaned and gilded. The smooth gilding covers the side surfaces and where the various parts are joined together, demonstrating that the process was carried out before the brooch was assembled. A grey amalgam of gold and mercury was evenly applied to the surface with a brush. Then the piece was heated to a temperature of c 250–350 ºC — the point at which mercury evaporates and gold binds to the silver surface — completely changing the colour of the front side.[32] After cooling, the entire brooch was polished. It is only at this late stage that the ornamentation emerged in all its glory, enhanced by the bichrome effects. The darker niello parts would have stood out in contrast to the shiny gold, with the gilding emphasising the effect of light and shadow created by the high reliefs. Before the various parts of the brooch were assembled, it is likely that the inlays were put in place. Finally, the pin, of a type without a spring coil and with a charnier joint, was mounted in the pin-anchor and the pin-catch was bent around for the brooch to be worn. The end product, composed of more than 330 g of silver, is characterised by a lavish use of expensive materials and a high-quality craftsmanship in terms of design and technology.

It is clear from this detailed assessment that the ornamentation on this brooch was conceived and initiated at the very start of the design process, and continuously developed during its manufacture. The animal art is assumed in earlier studies to have been developed at the end of the manufacturing process.[33] Our discoveries show that it was integrated at least at the object's inception and that the craftworkers had a unified design in mind from the start. Claude Lévi-Strauss has argued that objects are not

[27] Axboe 1984, 31; Hougen 1967, 12.
[28] Holmqvist 1972, 24; Leigh 1990.
[29] La Niece 1983; Petersen 1995.
[30] Straume 1987, 48.
[31] La Niece 1983, 287.
[32] Northover and Anheuser 2000; Plahter and Simensen 2002.
[33] Nissen Meyer 1935, 85–6; Petersen 1932.

'independent' or 'pre-existing' and subsequently decorated, but that they 'acquire their definitive existence by the integration of decoration with their utilitarian function'.[34] In the production of the Dalem brooch there is no distinction between object and decoration: the ornamentation was completely integrated from the beginning and this demands a reconsideration of the agency and skills of craftworkers, their role as artists and the environments in which they operated.

MASTERS AND TEAMS

The production of the Dalem brooch had to involve a team: just in terms of basic process, the bellows would need to be operated by an individual separate to the one who performed the casting process. Silver has a melting temperature of 962 °C, and experiments have shown that a team of three is optimal, with someone handling the bellows, someone leading on casting and a casting assistant.[35] The unified nature of the Dalem brooch suggests that someone carried an overarching concept in terms of its design, and may have coordinated its complex production. The idea of knowledgeable and experienced master craftworkers has been acknowledged before,[36] and fits with evidence from experimental casting, which shows the advantages of having a leader in charge of the process.[37]

The technical and ornamental proficiency of the Dalem brooch implies the involvement of someone who carried the in-depth knowledge and confidence to push boundaries in making an exceptionally large brooch. The two round inlays on the footplate with S-shaped figures made from gold threads point towards a high level of creativity, and an interest and ability in combining techniques in unusual and perhaps new ways. The processes consisted of tasks with different levels of difficulty, which may have facilitated the division of work between a knowledgeable master and less-experienced apprentices.[38] However, it is likely that at least two experts may have collaborated for its manufacture as the production required in-depth knowledge of a variety of techniques and skills in diverse materials (eg clay, metal and wood), and very good eyesight considering the small size of some of the ornaments. The great variation detected in the ornamentation may attest to the use of a suite of wax parts assembled in to wax models. Above we identified that the craftworkers used animal motifs in both old and new styles (Figs 4 and 5). It is possible that two different artists were responsible respectively for the more archaic type-A ornamentation and the new type-B animals (Figs 4 and 5), and that the elements were united when different wax parts were joined together to form wax models for the final casting process. Both experts had a good understanding of ornamentation, and could use it independently, but the design of the new elements may indicate experimentation with style and expression. The signature of two different experts may also be suggested by the different mask forms; it is difficult to imagine that one person created such a distinct mythical motif while blurring significant details on the integrated mask.

[34] Lévi-Strauss 1963.
[35] Hedegaard 1992.
[36] Nissen Meyer 1935, 50.
[37] Hedegaard 1992.
[38] Hedegaard 1992, 84; Pedersen 2015a, 55–7.

CRAFWORKING IN CONTEXT

Recognising that ornamentation is elemental to the Iron-Age metalworking process has consequences for our understanding of the working context of the specialists who produced this artefact. The employment of different materials and the evidence for the work in various positive models and negative mould versions suggests that the brooch elements and their motifs may have been produced and refined by one or more individuals, who from the outset had a design in mind for this jewellery item. The brooch carries evidence that these producers had knowledge of the religious, symbolic and visual languages of the time,[39] a mode of expression under constant development that both rendered and developed the animal and other motifs from which it was composed.[40] *Kunsthåndverk*, which can be translated as 'artistic handicraft', is a term often used in Scandinavian discussions of elaborately crafted items of Iron-Age date. It is useful in academic discussion as the term highlights that handicraft products can vary widely in quality, and that not all craftspeople had the ability to compose, combine and design motifs. The detailed study of the Dalem brooch, however, suggests that such a distinction between art and craft might have been incomprehensible to 6th-century Scandinavians. If mythological creatures were formed through animal art, it is not certain that the craftspeople distinguished, as we do, between the creation of animal motives and the application of mercury amalgam. Today we look at the latter as a technical process, whereas the craftworkers of the time may have perceived the gilding process as another life-giving force that brought life to the brooch when grey amalgam was transformed to a shiny golden surface.

Several details from the Dalem brooch offer some potentially intriguing insights into these specialist workers. The potential 'breath' motif on this brooch appears to breathe life into a small animal figure (Fig 8). Does this capture a sense of how craftworkers envisaged the rendering of animal art on such elaborate metal items? Breath is essential to the metalworking process, when casting and for other techniques, for example using bellows to create necessary high temperatures. The tool with a conical hole that protects the bellows from fire and allows a steady and strong stream of air from bellows to forge, is called *avlstein,* from Old Norse *afl,* which connotes reproduction. An example of such a tool from Denmark is decorated with a human-like face with a mouth shown sewn closed, implying the close connection of blowing and metalworking technologies.[41] The motif on the Dalem brooch may capture the idea of the metalworker breathing life into the object and its tiny animal designs.

Furthermore, the apparent combination of old style and new design elements underlines the idea that the producers of this brooch were among those who could innovate and transform mythological motifs and symbolic visual language, perhaps they even had the ability to develop mythological narratives. Nissen Meyer has argued that master-craftworkers were well regarded in society and has compared them with the skald or poet, who mastered an art few could imitate and everyone cherished and appreciated.[42] Like the skalds, craftworkers communicated with an audience through subtle images.[43] The skalds

[39] Kristoffersen 1995; Hedeager 2011; Nissen Meyer 1935, 87–8.
[40] Kristoffersen 1995; 2000, 17, 266.
[41] Glob 1959, fig 3.
[42] Nissen Meyer 1935, 87.
[43] Kristoffersen 2010; Lie 1952.

communicated using metaphors and magical-poetic stylistic devices of the periphrastic style, such as *kennings* and *heiti*, while the craftspeople created tangible images at different scales, probably with different layers of meaning, and with references to myths and legends.

Many viewers may have observed, admired, and perhaps even feared, the masks on the Dalem brooch, yet few may have had the opportunity to examine closely the animal designs that filled the surfaces, or would have possessed a full understanding of all the references behind them.[44] The tiny animal figures may have been employed to develop the power of the object, infusing the brooch with 'magical qualities' that could make it operational in the social and ritual contexts in which it would appear.[45] The skaldic poem *Húsdrápa* is interpreted as an oral celebration of the carved mythological decoration of a Viking-Age hall.[46] Perhaps such synergies between words and metalwork of the exceptional quality of the Dalem brooch also existed. This implies that jewellery makers may have been part of a broader team than already outlined. They operated in an environment where legends and myths were created, communicated and developed through stories, objects of different materials and ceremonies, including funerals.[47] A cross-disciplinary environment of this kind may have been at the heart of the community's knowledge production: it is this kind of intellectual environment that we perhaps glimpse in the runic inscriptions on the 6th-century Tjurkö bracteate and the somewhat later Eggja stone and in Old Norse words written down several centuries later.[48] *Smiðr*, a smith, could work within what today would be regarded as different crafts, such as metalworking, wood carving, shipbuilding and shoemaking, *smíð* covers both craft, work of skill and art, and the metaphorical use includes *hróðrsmíð* (praise-making).[49] *Kunna* (to know, understand) is closely related to art and skill, while *skapa* (to create) involves giving shape — or life — to something.[50] These kind of cross-disciplinary connections have recently been suggested for the production of metal jewellery and high-quality pottery in 6th-century Scandinavia, based on similarities evident in the manufacturing, repairing and ornamentation relevant to both types of material culture.[51] Such craftspeople may also have set the agenda for the development of the ornamental grammar of religious and political symbols that defines the artistic production of the period, thus shaping both tangible and intangible expressions and ideas.

CREATIVE CENTRES OF EXPERTISE

The skalds, as we know them from later written sources, were closely associated with royal or aristocratic households, and arts and crafts in the 5th and 6th centuries are generally associated with elite ambits as well.[52] People from the upper echelons of society are, for example, buried with tools for producing jewellery.[53] Whether this

[44] Kristoffersen 2015c.
[45] Kristoffersen 2010.
[46] Clunies Ross 2007.
[47] Price 2010.
[48] Grønvik 1985; Kristoffersen 2010, 267; Magnus 1988.
[49] Cleasby and Vigfusson 1874, 287, 572.
[50] Cleasby and Vigfusson 1874, 358; Kristoffersen 2010.
[51] Fredriksen et al 2014.
[52] Kristoffersen and Magnus 2010, 82.
[53] Müller-Wille 1977.

points to practising craftspeople is disputed,[54] but it nevertheless underlines a close connection between metalworking and a high-status identity.[55]

The Dalem brooch ended up in a wealthy woman's grave in Trøndelag, presenting direct knowledge of the elite environment in which it was used.[56] To identify the circumstances under which the brooch was produced, we must make more indirect inferences. Hardly any brooch-production waste has been found in Norway, and local production has mainly been postulated on the basis of brooches with stylistic similarities.[57] Sites in Sweden and Denmark provide some information about workshops and their social affiliations.[58] Helgö in Mälaren, Sweden, with its large-scale production is undoubtedly a site that can be linked to the upper echelons of society; it was a seat of power, as was Uppåkra in Scania, Denmark.[59] Other sites, such as Bäckby in Mälaren also seem to be linked to the elite.[60] Although far more limited in scope, the production waste at Bäckby has striking similarities with that at Helgö and it has been suggested that craftworkers were sent from Helgö to work for the local ruler.[61] This may explain the many similarities in decorated jewellery items across Scandinavia, despite their recovery and likely production in many different workshops. Places like Helgö, where waste material suggests that there were a number of different jewellery makers at work at the same time, must have been sites where knowledge and designs were exchanged.[62]

Written sources tell us that 11th-century goldsmiths were members of royal entourages.[63] The so-called 'Alfred Jewel' with the following inscription, 'Alfred had me made',[64] underlines that rulers surrounded themselves with skilled people who created objects according to their fancy — in this case most likely King Alfred the Great (AD 871–99). However, significant differences existed between such Christian societies and the populace of the Scandinavian Iron Age. As an example, a distinction between secular and religious power does not seem to have existed in Iron-Age Scandinavia: at Helgö, archaeological evidence suggests that political and religious functions were closely intertwined.[65] In addition, we should not assume that all metalworkers were men, as our research suggests that metalwork teams may have been multifaceted and there is no reason to preclude involvement based on gender or age.[66] However, like later Christian craftworkers, our metalworkers may have practiced their art in dialogue with the god(s), just as the 12th-century craftsman/monk Theophilus set out in his handicraft manual.[67] In the 6th century, however, Scandinavian craftspeople lived in a society where the worldview was maintained and developed through a combination of

[54] Pedersen 2009.
[55] Kristoffersen 2012, 172.
[56] Hedeager and Forseth 2015.
[57] Hjärthner-Holdar et al 2002, 177–81; Kristoffersen 2012; Nissen Meyer 1935.
[58] Axboe 2012.
[59] Ibid 2012; Clarke and Lamm 2008; Holmqvist 1972.
[60] Hjärthner-Holdar et al 2002.
[61] Ibid, 169.
[62] Arrhenius 1973; Holmqvist 1972, 257; Lundström 1972, 132; Magnus 2015.
[63] Stafford 1997, vii.
[64] Webster and Backhouse 1991, no 260.
[65] Zachrisson 2004.
[66] Pedersen 2015a, 63.
[67] Theophilus, prologue, in Hawthorne and Stanley Smith (ed and trans) 1979.

material and oral expressions, perhaps giving even greater emphasis to the importance of technique, artistic skill, technology and the grammar of ornamentation.

The Dalem brooch is an inscribed object and thus one 'marked out as socially powerful at the time of production'.[68] The decisions of the craftspeople may well have defined its biographical possibilities.[69] The complexity of its creation, combined with its direct and powerful aesthetic qualities would have ensured its prominence within social and ritual contexts throughout its life, enhancing its relational agency.[70]

CONCLUDING REMARKS

We have demonstrated that ornamentation was seamlessly incorporated into the Dalem brooch from the outset of the crafting process. By scrutinising all facets of the object, we have been able to show that artistic vision and practical methods were equally integral from the start in the creation of this masterpiece of Style I art. Ornamentation was gradually developed through a technological process with several stages, in which specialists worked using positive and negative versions and many different materials and tools. We have argued that more than one craftworker collaborated in its creation and that a master craftsperson may have overseen its seamless assemblage and the entire process. This team included specialists that, through their skills, were able to inscribe and refine motifs with religious, social and political connotations. These specialists operated in the upper echelons of society, in creative centres of expertise, within an interdisciplinary and intellectual environment that allowed them not just to make objects, but to develop ideas and convey these via material expression. Our study emphasises the need to consider technology and ornamentation as elements of an integrated creative process. This re-inforces the idea that craftworkers at this time should be regarded as an intellectual, skilled sector of society, able to command and manage not just technology, but ideas and a symbolic grammar relevant to the elites of the Scandinavian Iron Age.

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[68] Joy 2009, 545, citing Marshall 2008.
[69] Ibid, citing Fontijn 2002, 28.
[70] Ibid, 544, citing Gell 1998.

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