

East Scandinavian Style I: An Answer to Birgit Arrhenius

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SCHOLARLY discussion plays an important and necessary part in all research and a significant element in such discussion is constructive criticism, of a kind that also presents alternative interpretations. Such criticism should be well founded on accurate and reliable evidence. It is therefore regrettable that the recent article by Birgit Arrhenius on East Scandinavian Style I¹ (based largely on a discussion of the Helgö workshop material) contains a number of misconceptions which materially affect the substance of her arguments and which, we feel, could most helpfully be amended by the presentation here of some complementary information and further examination.

THE HELGÖ WORKSHOPS: THEIR STANDING AND FOREIGN INFLUENCES

Arrhenius discusses in her article² the long equal-armed brooches with animal ornament, which are well represented at Helgö. In this connexion she relates the brooches from E. Scandinavia to the plain, equal-armed brooches from Langobardic Italy and central Europe: yet, a more detailed comparison would reveal that they have nothing to do with each other. She³ states furthermore that Wilhelm Holmqvist attributes the production of the Svennevad (i.e. Gillberga) and Sczentes-Nagyhegy brooches to Helgö: Holmqvist,⁴ however, asserts merely that brooches *of this type* were manufactured there; an assertion which is fully supported by the evidence. The argument applies equally in other cases where mould variants are matched by finished articles. Nowhere is it suggested that these objects were actually manufactured at Helgö, though it would seem likely that similar objects were manufactured there. Beyond that the evidence will not go.

In Arrhenius's discussion of the Svennevad brooch and the mould fragment R 644 from Helgö (which, in our opinion, corresponds to the Svennevad brooch) she comes to the conclusion that while the metal brooch is an excellent work the mould fragment has "a blunt and lifeless execution". Her opinion is that these

¹ B. Arrhenius, 'East Scandinavian Style I — a review', *Medieval Archaeol.*, xvii (1973), 26-42.

² *Ibid.*, 34 f.

³ *Ibid.*, 35.

⁴ W. Holmqvist et al., *Excavations at Helgö*, iv, *Workshop*, pt. 1 (Stockholm, 1972), 254.

differences result from the Helgö artist copying from metal prototypes. In support of her hypothesis she states that "the large variety of brooches from different parts of Europe found at this site demonstrates that at Helgö the artists would have had an opportunity to copy many types".⁵ The fact is that only three non-Scandinavian brooches, all of them from the E. Baltic area, were found at Helgö, and the extant moulds show no signs whatsoever of influence by these three brooches. Further doubt is cast on Arrhenius's argument when it is realized that the brooch from Alternierding in Bavaria is now thought to be of Scandinavian origin.⁶

Basing her argument partly on the supposed poor quality of the two mould fragments of Svennevad type, Arrhenius seems to dismiss the Helgö workshop as an establishment for copying imported models only, having no capacity for independent creative work. It is an argument of the same kind as A. Erä-Esko presented in 1973 at a symposium in Budapest: the weakness of it is obvious, and we will come back to the question in a later context (p. 23). As Helgö is the only large workshop excavated in northern Europe of a date earlier than those found at Birka or at Hedeby or in Scotland, Ireland and the Slav area, it seems prudent to wait until there is some comparative material before assessing the nature of its production. The suggestion that other workshops would have been discovered at other sites, if excavations had been on a scale similar to that at Helgö, is not supported by Arrhenius's argument that the workshops lie at some distance from the dwelling houses.⁷ As *Excavations at Helgö*, I and III show,⁸ Building Group 2, a typical residential area, is bounded immediately on the W. by a workshop area (Foundation II and VIII), which produced a large quantity of crucibles, moulds, hearths and melting pits.

TECHNICAL ASPECTS OF THE HELGÖ CASTINGS

Our comments so far have been concerned with possibly minor, but nevertheless significant, discrepancies in the non-technical part of Arrhenius's article; we now turn to the technical aspects of her paper. It should be made clear at the outset that in *Excavations at Helgö*, IV, no attempt was made to present a complete catalogue or discussion of the total mould material from the workshops; the purpose was rather to provide a *catalogue raisonné* of some of the more important groups of the mould material and a discussion of the general character of this important material for the benefit of the many scholars who would not have the opportunity to see it for themselves. This is quite clearly stated in *Helgö*, IV, and it was also made clear that a full study of the very wide technical implications of this material would have to wait for a later volume. Arrhenius's criticism that such a full technical discussion has not yet been presented is thus unnecessary,

⁵ Op. cit. in note 1, 35.

⁶ J. Werner, 'Zur Verbreitung frühgeschichtliche Metallarbeiten (Werkstatt-Wanderhandwerk-Handel-Familienverbindung)', *Early Medieval Studies*, I (Stockholm, 1970), 78 ff.

⁷ Op. cit. in note 1, 40.

⁸ W. Holmqvist et al., *Excavations at Helgö*, I, *Report for 1954-56*; III, *Report for 1960-64* (Stockholm, 1961-70).

the more so since her own interpretation of the technical evidence is open to argument.

We may take issue with Arrhenius's identification of the mould R 580 as being for part of the foot of a brooch of the Bjällsta type⁹ rather than an arm as suggested in the Helgö publication. This identification is based on a lengthy discussion of angles and measurements. A careful examination of the mould in question clearly shows, however, that beyond the triangular field the edge is unbroken. And yet this is precisely where the casting-gate should have been if her theory is correct unless, in this one instance, the casting-gate was situated elsewhere than at the foot — where it is to be found on all known moulds of square-headed brooches.¹⁰ Furthermore, in her reconstruction¹¹ the dowel is also placed uncharacteristically near the foot terminal. The position of the dowels on all moulds of square-headed brooches is on each side of the bow. Moulds for larger specimens of this type of brooch are often provided with some extra dowels placed just below the arm terminals (FIG. 9). As a further argument for the correctness of our classifications of R 580 as an arm termination we can point out that the outer edge of the bow is preserved on moulds R 578, R 579, R 580 and R 581 (i.e. on four out of the five fragments assigned to variant XVI). As far as we are aware, the square-headed brooches normally have the bow in closer proximity to the arms than to the foot termination.

Here it must also be mentioned that Arrhenius's assumption that the published drawings of the Helgö material were from plasticine casts is incorrect,¹² since all the casts were in fact taken in silicone rubber, a material which fills the moulds satisfactorily without doing any damage. In our experience it lacks the drawbacks of which Arrhenius writes and it appears to us to be equal if not superior to Wood's alloy for the purpose in question. It is true that silicone rubber does not shrink but, on the other hand, it is a soft and flexible material and the casts can easily be taken out of the moulds without breaking them. When making casts with Wood's alloy the risk of breaking the moulds is much greater. Arrhenius has, however, taken casts with this alloy of some of the moulds while they were out of the Helgö Institute.

Arrhenius is of the opinion that Wood's alloy "will shrink in the same way as the metal for which the mould was originally intended".¹³ However, as we are unable to tell in fact what metal alloy originally was cast in the moulds, we did not wish to speculate concerning the correct percentage of shrinking. When the drawings were prepared for publication we thus decided to give the drawings the same measurements as the moulds. Here it must be stressed that *the moulds themselves* were used for the drawings, while the silicone casts are to be regarded merely as aids when details in the decoration are difficult to distinguish. The fact

⁹ Op. cit. in note 1, 33.

¹⁰ On the construction of moulds for square-headed brooches see K. Lamm, 'The manufacture of jewellery during the migration period at Helgö in Sweden', *Bull. Historical Metallurgy Group*, vii, ii (1973), 3 f., figs. 4-5.

¹¹ Op. cit. in note 1, pl. viii, e.

¹² *Ibid.*, 30.

¹³ *Ibid.*

that the finished metal objects would turn out a little smaller in size than the moulds and the drawings of them, but with the proportions largely unaltered, seems too obvious to mention. On a metal cast, Arrhenius writes, the ridges are higher and narrower than on a rubber cast:¹⁴ to this we can only add that it is difficult for us to see how their height can exceed the depth of the corresponding cavities in the moulds. Judging by Arrhenius's illustrations of her cast from mould R 371¹⁵ the ridges are not narrower than those of the mould itself. This may, however, be due to a discrepancy in scale, as the whole cast seems to be slightly larger than the mould.¹⁶

Silicone rubber reproduces details with more clarity than Wood's alloy and we consider it most important to reproduce in the drawings the shape and decoration of the object, if necessary at the negligible expense of ignoring the slight and uncertain shrinkage that might have taken place in the finished object. The metal cast of mould R 371¹⁷ illustrates the blurring of the pattern on the foot plate as compared with the same area on the mould itself. Rubber casts are, in our view, more distinct, and our drawing of the same mould¹⁸ was prepared with the aid of such casts. Arrhenius's drawing of the downwards biting animal head¹⁹ was evidently prepared from a blurred metal cast and the execution of its mouth has no correspondence in the mould.

The metal cast of R 371 can, however, serve as an excellent demonstration of the importance of tooling on cast objects. Even where the mould is perfectly sharp, the cast may turn out indistinct and diffuse as is the case here. Did the customers on Helgö really wish to buy a brooch with a finish like that on the R 371 cast, or a Svennevad brooch which looked like the cast of mould R 644?²⁰ Arrhenius's comparisons between the two mould fragments from Helgö and the brooch from Svennevad leave something to be desired.²¹ It is surely not reasonable to compare the quality of the chip-carving in a clay mould with that of a finished object which has been worked over with a graver. Furthermore, Arrhenius's judgement of the mould carving as "blunt and lifeless" is purely subjective. If such value judgements are to be made it is surprising that she did not consider the tooling of the finished objects, as this has always been a feature of the high quality objects of Style I. In some cases it is even possible to distinguish impressions from different engraving tools in one and the same object.

Mould R 371 does not, according to Arrhenius,²² demonstrate that the foot consists of an animal mask with a *Scharnier*-like extension. However, another example of variant III, R 368, which, judging by the curvature of the frame also forms part of a foot, does have this type of terminal.^{22a} It seems that Arrhenius has

¹⁴ Ibid.

¹⁵ Ibid., pl. vii, a-b.

¹⁶ The scales of the illustrations on this plate are very confusing: items c-g are not 1:1 as stated in the caption. *Editor's note: we wish to apologize for this error.*

¹⁷ Loc. cit. in note 15.

¹⁸ Ibid., pl. vii, c.

¹⁹ Ibid., pl. vii, e.

²⁰ Ibid., pl. x, c.

²¹ Ibid., 35.

²² Ibid., 30; pl. vii, a.

^{22a} Op. cit. in note 4, 194-5.

perhaps not realized that the description of a variant is based on the features of all the fragments belonging to it. Lundström explains it thus: "As the basis for the description of each individual variant are used all the fragments within the group. Thus the description does not relate to the individual fragment depicted but to the variant."²³

Arrhenius here presents an alternative interpretation to the design of R 371; she suggests that a comparison with the brooch from Kakumäki could indicate the true shape of the terminal. It must be stressed, however, that it is very dangerous to reconstruct the moulds by comparing them with finished objects. In her assessment of the production of square-headed brooches at the Helgö workshop 'Form Element and Variation',²⁴ Lundström stresses the *paramount importance of the individual form elements*. The foot plates of variant VII are used as an example. Holmqvist has pointed out that moulds of this variant, as far as the decoration of the side fields, the transition between the bow and the foot plate and the frame work are concerned, are paralleled in a brooch from Hade in Hedesunda. The arm terminations of this brooch are embellished with medallion-shaped and triangular fields. Variant VII has an arm termination consisting only of a medallion-shaped field. The reconstruction of the variant VII mould using the Hade in Hedesunda brooch would thus be incorrect. By the same token, it is wrong to reconstruct the design on the R 371 mould using the brooch from Kakumäki as a model.

Arrhenius makes several mentions of the fragile nature of the moulds.²⁵ It should be remembered, however, that although they may now appear brittle after being buried for 1,500 years, it does not necessarily mean that this was their original condition; on the contrary, we believe that they usually stood up well to the stresses of casting. We base this assumption on practical casting experiments, carried out by us over a long period of time, using crucibles and moulds made of similar materials to those of the originals.²⁶ In these experiments the moulds did not crack during casting. In fact our main problem has been that the metal tended to set too soon, before the mould was completely filled. There is occasional evidence that the bronze founders of Helgö also encountered this problem. We consider, therefore, in contrast to Arrhenius, that the casting process was not a problem for the Helgö craftsmen. There seems no reasons why they should fail more often than we did in our experiments, especially as we were hampered by lack of experience in handling the material. The Helgö bronze founders would have been thoroughly familiar with both materials and techniques based on a thousand-year-old tradition.

Arrhenius derives her view of the breakable nature of the moulds from the large number of mould fragments found at Helgö and links this with a high failure rate of casts. However, the evidence may be better interpreted simply as an indication of a fairly heavy production. She also argues that since the moulds of

²³ A. Lundström in *op. cit.* in note 4, 137, note 8.

²⁴ *Ibid.*, 158.

²⁵ *Op. cit.* in note 1, 30-1.

²⁶ *Op. cit.* in note 10, 5 f.

clasp buttons are less numerous, the casting of these objects must have been more successful. To support her hypothesis she points out that the proportion of square-headed brooches to buttons is reversed if we consider the finished article rather than the moulds. But this argument is based on too many uncertainties. It is impossible to tell whether the numerical relationship of square-headed brooches to buttons, in the finds, correctly reflects the numbers originally made — especially in view of the fact that only some 2% of Swedish archaeological sites have been excavated. Although some 200 decorated buttons have been found in Sweden, these represent only seventy separate finds, as buttons are often found in groups. Another unknown factor is the extent to which brooches or buttons were buried in graves. Besides, a higher proportion of the extant clasp buttons than of the square-headed brooches have been found in graves. If it is assumed that not all the personal adornments of the dead were included with the grave-goods — whether for reasons of economy or affection — we must also not forget that the square-headed brooch was a detachable piece of jewellery, while the clasp buttons were costume accessories and riveted to the dress.

The moulds present us, however, with further uncertainties. First, we do not know how many were originally produced at Helgö, for the material recovered cannot represent the entire bulk of the waste products. It is probable that some of the waste was cleared out and tipped into Lake Mälaren, the water of which lapped the site. Secondly, it is impossible to tell the fate of the moulds after they were broken up at the end of the casting process. Obviously many broken fragments were left lying about on the workshop floor; consequently it is more than likely that they were further broken up by being trampled on as the workshop activities were carried on within the same area for several hundred years. Further, we know nothing of the methods used when the moulds were opened after casting; they may have been carefully opened along the seams to preserve the different parts or, on the other hand, they may have been roughly broken and no attempt made to reuse them. The fragmentation of the moulds from Helgö need not, therefore, as Arrhenius herself implies in her discussion, be the result of unsuccessful casting. Such fragmentation may have taken place when the cast was removed or at any subsequent period.

In the introduction to her review Arrhenius suggests that the ridges of the moulds served to canalize the heat.²⁷ She omits, however, to quote Holmqvist,²⁸ who was the first to discuss the small ornamental fields in relation to their framework and to take into account their technical significance. His treatment is also somewhat fuller. Later she postulates a technical origin for dividing the ornamental field into small panels;²⁹ but again omits any reference to Holmqvist, who made this point.³⁰ Furthermore she argues that “a characteristic feature of East Scandinavian Style I is the frequent use of small ornamental fields bordered by high

²⁷ Op. cit. in note 1, 26.

²⁸ W. Holmqvist, ‘Christliche Kunst und germanische Ornamentik’, *Accademia Nazionale dei Lincei*, CCCLXV (1968), Quaderno N. 105, Roma, 353, 357 ff.

²⁹ Op. cit. in note 1, 27.

³⁰ Op. cit. in note 28, 358-9.

ridges".³¹ Style I in Norway, Denmark and England shares similar features and Arrhenius's characterization cannot be said to contribute to the definition of East Scandinavian Style I.

While we accept that the ridges of the framework may have helped to distribute the heat, we do not believe that this was their primary function; it was not the heat which needed help to spread, but the metal. On square-headed brooches the framework often forms a median ridge and also follows the contours of the foot (FIG. 9). This would facilitate the rapid distribution of the molten

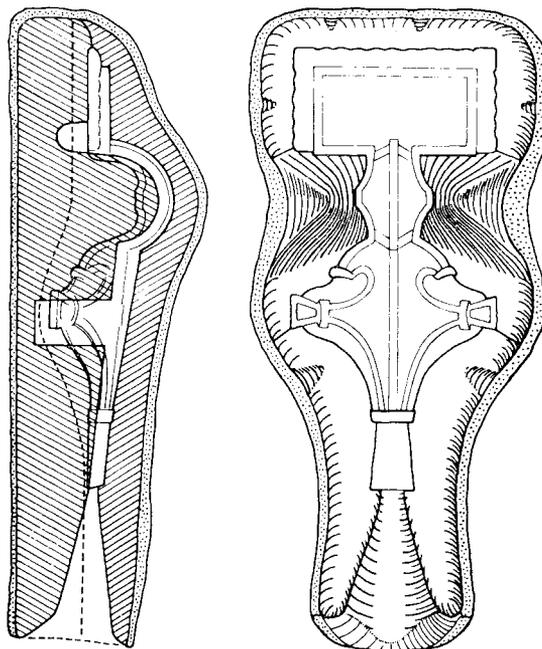


FIG. 9

RECONSTRUCTION OF MOULD FOR SQUARE-HEADED BROOCH

The broken line marks the junction between the two mould halves.
 Sc. 1:1. (Courtesy Anders Eide)

metal to all parts of the brooch. The median ridge of the foot plate would act as a continuation of the casting-gate (which, in all cases where its position can be established, is situated at the foot) and carry the metal rapidly towards the head plate.

According to Arrhenius, the median ridge also was introduced to facilitate casting "so that large fragile fields were avoided".³² But the fact is that almost all moulds of foot plates of square-headed brooches have broken along this ridge. If we return to Arrhenius's argument that most of the moulds broke during casting —

³¹ Op. cit. in note 1, 26.

³² Ibid., 31, note 13.

and apparently always down the centre —, it seems strange that this ridge was not abolished. As the median ridge was retained, it seems logical to assume that the moulds were broken after casting and not during it. As the mould was thinnest over the median ridge and the bow, it would easily crack in this place when the mould was opened to remove the cast, or when it was crushed under foot.

On moulds of buttons the ridges of the framework also served another purpose. The moulds were often made up of as many as six pieces, and the ridges were made to coincide with the seams. It was thus easier to remove the flash from a plain ridge than from a field of chip-carving.

STYLE ANALYSIS OF THE ORNAMENT ON THE HELGÖ MOULDS

Arrhenius deplores in her article that the method of analysis devised by Erä-Esko³³ has not been applied to the animal ornament of the moulds of square-headed brooches and that the animal ornament has not been discussed. She further states that "from this it follows that Lundström's criticism of Malmer's method in the construction of typological series is irrelevant. She has not distinguished typological elements capable of being objectively described, nor has she investigated whether the elements she presents are mutually independent . . .".³⁴ However, Erä-Esko's method does not register the typological elements altogether objectively, as Arrhenius herself points out in her discussion of Erä-Esko's analysis of the Gullydynt button: "Erä-Esko has not, however, interpreted the hand which grasps the leg correctly."³⁵ If Arrhenius adheres to Malmer's method of objectively recording all the elements of an ornament, she ought not at the same time to embrace the subjectively interpretative methods of Erä-Esko. It seems further that Arrhenius has overlooked Lundström's analysis of the so-called B-elements, carried out by means of no less than ten diagrams.³⁶ These analyses show that all the B-elements are mutually independent typological elements.

By analysing the animal ornament on some of the moulds from Helgö, Arrhenius has anticipated a task which for many years has been included in the research plan for an interdisciplinary project attached to the Helgö Institute.³⁷ We ourselves have not wished to anticipate this. We have stated, furthermore, the reasons why the so-called C-elements (the details of the animal ornament) of the square-headed brooches are not discussed in *Excavations at Helgö*, IV: "I have thought it advisable not to bring into the forefront of this discussion the C-elements, which previously have been too dominant in the study of Migration Period art handicrafts. On the other hand the B-elements seem to me to be at least equally important components in the study of the composition of the brooches, and it is therefore around these that I have centred the discussion which follows."³⁸

³³ A. Erä-Esko, *Germanic Animal Art of Salin's Style I in Finland* (Finska fornminnesföreningens tidskrift, LXIII, Helsingfors, 1965).

³⁴ Op. cit. in note 1, 32, note 15.

³⁵ Ibid., 36, note 29.

³⁶ Lundström in op. cit. in note 4, figs. 77-86.

³⁷ This project has been in progress since 1969. For its research programme see *ibid.*, 12.

³⁸ Ibid., 134.

Arrhenius discusses some anthropomorphic elements in Style I while examining variant L.³⁹ She is particularly concerned about the figures which appear to take up dancing postures and quotes an article by G. Haseloff.⁴⁰ These figures in Style I are, however, also discussed by Holmqvist, whose articles on the subject have not been quoted.⁴¹ Arrhenius further asserts that the anthropomorphic element on the Söderby bracteate has not been considered in earlier works.⁴² However in the articles by Holmqvist already mentioned, as well as elsewhere,⁴³ the Söderby bracteate figures prominently. Arrhenius's only contribution to this debate is two clasp buttons.

SUMMARY

Arrhenius's criticism tends to be directed against those areas which we have not yet had the time to consider, rather than against the work we have already done. As we are working according to a plan, we intend to deal with all the problems in turn — given time and the necessary grants. A style-analysis of two or three out of many hundreds of mould fragments with animal ornament,⁴⁴ as Arrhenius has done, is comparatively simple; but to make a total investigation of the decorative elements of all the moulds is indeed a complicated and time-consuming process.

It remains difficult to isolate Arrhenius's own ideas about the mould material from Helgö because of the many critical statements in her review, but she seems to put forward three main theses:

- (i) on p. 26 she says: "In this article it is suggested that the ridges served to canalize the heat of the melted bronze during casting, and so prevent the mould from cracking." This we believe is no new thesis, but has already been put forward by Holmqvist (see p. 21);
- (ii) on p. 30 f. she writes: "It is possible that the very large number of fragments of piece-moulds found at Helgö shows that many castings had not been completed when the mould cracked." This we contend is based on unsupported evidence (see p. 20);
- (iii) on p. 40 she characterizes the workshop at Helgö as a copy workshop with "the ability to receive, copy and develop influences from many different areas". Again, on p. 35, she writes in connexion with the Svennevad brooch: "It seems probable that these differences result from the Helgö artist copying from metal prototypes. The large variety of brooches from different parts of Europe found at this site demonstrates that at Helgö the

³⁹ Op. cit. in note 1, 36.

⁴⁰ G. Haseloff, 'Goldbrakteaten-Goldblattkreuze', *Neue Ausgrabungen und Forschungen in Niedersachsen*, v (1970).

⁴¹ W. Holmqvist, 'Dryckeshornen från Söderby-Karl', *Formvännen* (1951), 33-65; idem, 'Kaisergestus und Stil I', *Forschungen zur Kunstgeschichtlichen und Christlichen Archäologie*, I (1954), 13-25; idem, 'The dancing gods', *Acta Archaeologica*, xxxi (1960), 101-27.

⁴² Op. cit. in note 1, 38.

⁴³ W. Holmqvist, 'Den nordiska sfinxen', *Formvännen* (1958), 225-40.

⁴⁴ We use the term 'animal ornament' in Salin's sense, as a collective term for his Styles I-III, irrespective of whether or not anthropomorphic elements occur.

artists would have had an opportunity to copy many types." This we argue is also an unsupported statement, partly based on an error (see p. 16 f.).

Finally, we would add that, despite Arrhenius's criticism, we believe the material published in *Excavations at Helgö*, iv, will have a very important part to play in any discussion of migration period crafts, both from a stylistic and a technical point of view.