Perler fra vikingtiden (Beads of the Viking-Age).

A study of the social and economic patterns in the appearance of beads from Viking-Age sites in Britain.

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Abstract

To date there has been no comprehensive, broad study of Viking-Age beads from sites in Britain. In order to fill this gap in Viking-Age literature, this study intends to present a characterisation of Viking-Age bead finds in Britain and an analysis of the social and economic processes which have influenced patterns in the appearance of this artefact type. In order to incorporate the widest dataset, this study has used finds from secondary literature on 'Viking' sites dating to the 9th to 12th century. This study aims to characterise the bead forms presented in the secondary literature and connect the resulting types to key ideas in academic discussions of the social and economic patterns during Viking-Age Scandinavia and Britain. To achieve this goal, this study aims to take a multi-scale approach to the study of Viking-Age bead types. Local, regional and global networks are considered in the presentation of the bead finds and the analysis of social and economic processes. Specifically, production, trade and use are highlighted as the most useful processes to analyse in this study. It is argued here that these processes have had the greatest influence on the patterns in the appearance of this artefact in the archaeological record. This study will demonstrate that patterns of bead finds shaped by production, trade and use can be used to highlight and discuss the close relationships between local and Viking World networks of communication and trade.

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Thank you to my family and friends for their support in this endeavour which took me to the other side of the world. I would like to especially thank Mikhail Turner and Laura Davies for their help with proof reading this thesis.

Finally, I would like to dedicate this thesis to my grandfather, David McClintock (1932-2011).

Author’s Declaration

I hereby declare that I am the sole author of this thesis. This work has not been previously submitted for examination. No material in this thesis has been presented prior to the submission of this work.

Chapter 1: Introduction

The material culture associated with Vikings and settlers from Scandinavia has been used to define and characterise their presence in early medieval Britain. Many studies have focused on prominent artefacts such as brooches, and distinct deposits such as hoards (see Kershaw 2013; Graham-Campbell 2011). These highly visible and valuable artefacts are important in discussions regarding social and economic relationships in the Viking-Age. In this study, it is argued that Viking-Age bead finds also contribute important data to these discussions. Beads are a widespread form of adornment used throughout history (Brugmann 2004: 1). They are defined as centrally perforated objects, often strung in multiples to form a jewellery item such as a necklace (Brugmann 2004: 1).

Figure 1: A necklace of beads found in a female grave from a cemetery complex at Saffron Walden, Essex. Photograph by author (2014), courtesy of the Saffron Walden Museum, Essex.

In Viking-Age sites, beads commonly appear as grave goods in (mainly female) burials (Jesch 1991: 18-9). Beads formed a part of the Scandinavian female dress, often either strung between a pair of brooches or as a necklace (Jesch 1991:17, 19). However, the study of beads cannot be confined to this context alone; to do so ignores the ways in which beads were involved in shaping economic interactions. The appearance of large

concentrations of beads and bead working waste at urban sites has highlighted how beads can contribute to the understanding of craft development (Sode 2004: 99). The appearance of these artefacts in sites distributed around the Viking world demonstrates the economic connections between places and peoples (Callmer 1977: 9). Archaeological evidence for Viking-Age beads in Britain has not yet been comprehensively discussed in regards to these social and economic patterns, beyond site specific examples. This study seeks to present an analysis of relevant economic themes of production and trade, and the use of beads to express aspects of personal identity, to create a comprehensive picture of the processes behind the appearance of beads in Viking-Age Britain.

In order to conduct this study, a large body of comparable data was required. Analyses of the patterns in the appearance of beads in the archaeological record are better developed (particularly at a regional level) by the use of earlier research and information from a range of site types (Welch 1999: 3). This research sought to approach the appearance of beads using a range of secondary sources, from antiquarian accounts to well-published assemblages. Existing comparative studies often focus on sites in a specific area, or on sites which share certain bead types (Welch 1999: 3). This approach is limiting when discussing processes that work at broader scales (Welch 1999: 3). The scale of this study will move between focussing on site specific examples to focussing on a group of sites across regions, and ultimately across Britain. This study does not aim to cover every Viking-Age bead find to create a reference collection of types. Rather, it is hoped that the data produced from the analysis of the selected beads will demonstrate a better framework for understanding the context of the processes that led to the appearance of this material culture in Viking-Age sites in Britain.

Theoretical framework

The areas of focus for this study are the production, trade, and (social) use of beads. One way to structure these different themes is to place them in a framework as stages in the 'life' of a bead or beads. The idea of this framework is based on biographical studies of material culture. The idea behind examining material culture from a biographical point of view is rooted in the theory that an artefact is 'involved in a particular set of social relationships during its lifetime' (Joy 2010: 8). Studies which adopt this approach aim to answer questions regarding material culture and society (Joy 2010: 8). These studies focus particularly on the ways in which the biography of material culture can chart changing

ideas of artefact meaning within society and the subsequent history of social relationships in which artefacts are actively involved (Joy 2010: 8). This life cycle method of analysing beads as material culture has been adopted as a framework rather than as a formal theoretical approach because the biography of the beads is reduced to key stages. The life-cycle framework places the themes into major stages in the life cycle of a bead: the production stage, the trade (and distribution) phase, and the use phase. These are the stages in which beads are involved in shaping the social interactions and economic processes which occur at different scales.

The Viking-Age in Britain

This study aims to analyse beads appearing in Britain during the Viking-Age. The Viking-Age is traditionally identified as the period from the first Viking Raid on Lindisfarne in AD 793 until Norman Conquest in AD 1066 (Graham-Campbell & Batey 1998: 1). These events are used to mark the beginning and end of the period; however, the history of Scandinavian contact and settlement in the British Isles is more complex (Wilson 2008: 20). There is evidence for slightly earlier contact between Scandinavia and Britain (Redmond 2007: 1; Graham-Campbell & Batey 1998: 1). Furthermore, Scandinavian involvement in different areas of Britain occurred at different times and lasted beyond the Norman Conquest in many areas such as the Northern Scottish Isles (Ritchie 1993: 9). Many Viking-Age sites are difficult to date due to unsecure excavations and/or a lack of material for use in absolute dating methods (Graham-Campbell & Batey 1998: 48). This study has sought to focus on beads from sites with evidence of Scandinavian presence or influence dating to the Viking-Age. The broad chronologies of particular sites often fall outside of the traditional AD 793 to AD 1066 period. In general, the sites date from the 9th century through to 12th century.

Vikings, Scandinavians and Anglo-Scandinavians

The popular term Viking is often applied to the foreign peoples from northern Europe (specifically from the modern day countries of Norway, Denmark and Sweden) who appeared in early medieval Britain (Wilson 2008: 11-2). The term has several possible origins; most notably, the words *víkingr* and *víking* appear in Icelandic Sagas in reference to pirates and raiding expeditions (Richards 2007: 10). While this term is conveniently broad and appealing, it does not adequately cover the full context for migrants from this

area (Richards 2007: 11). Archaeological literature often uses 'Danish/Danes' or 'Norse' as descriptive labels, particularly as these terms are used in early medieval documents (Richards 2007: 14). These terms signify specific geographic origins in Norway and Denmark. Often the use of these terms is supported by socio-political evidence and/or the proximity of different regions of Britain to these north European areas (Richards 2007: 18-20). Terms denoting migrants from Sweden are not often used, as Swedish settlement is largely unknown in Britain (Ritchie 1993: 15). In using these connotative labels, it is essential to be wary of restricting these migrant groups to a homogenous ethnic identity (Richards 2007: 14). The modern nations of Norway, Denmark and Sweden developed late in the Viking-Age; ethnicity in the early period was arranged on a regional basis (Richards 2007: 14). Recent discussions of Scandinavian settlement use terms which recognise hybrid communities; Anglo-Scandinavian, Hiberno-Scandinavian, Hiberno-Norse and Cambro-Norse (Griffiths 2010: 22). In light of the wide geographic focus of this study, the broad term 'Scandinavian' will be used. Terminology related to specific ethnicities will be used where appropriate to reflect the interpretations from the source literature.

The Sources

This study has relied on published sources for the descriptive data regarding beads and information on the context of the finds. As time constraints meant it was not possible to undertake a first-hand analysis of all the collections, it was necessary to turn to the published sources in order to be able to discuss the beads at the multi-scale manner. Selected unpublished sources, made accessible for this study, were used for a small number of sites which have not been fully published. First-hand examination of the beads from the Saffron Walden (courtesy of Saffron Walden Museum) and 16-22 Coppergate sites (courtesy of York Archaeological Trust (YAT)) was conducted. Selected bead assemblages on display were observed in a visit to the National Museum of Scotland (Edinburgh). Reliance on the secondary sources (which vary in terms of descriptive content and reliability), has meant that there are incomplete records in the database. The quality of the data from each site can be characterised into four groups:

1. Find spot – Isolated finds, often from field walking. Usually no other finds and no context.

2. Antiquarian – Finds from an early (often pre-1950) excavation context. Questionable dating, interpretation and security of context. Some publications contain detailed bead descriptions, whilst others have little information on the beads present.

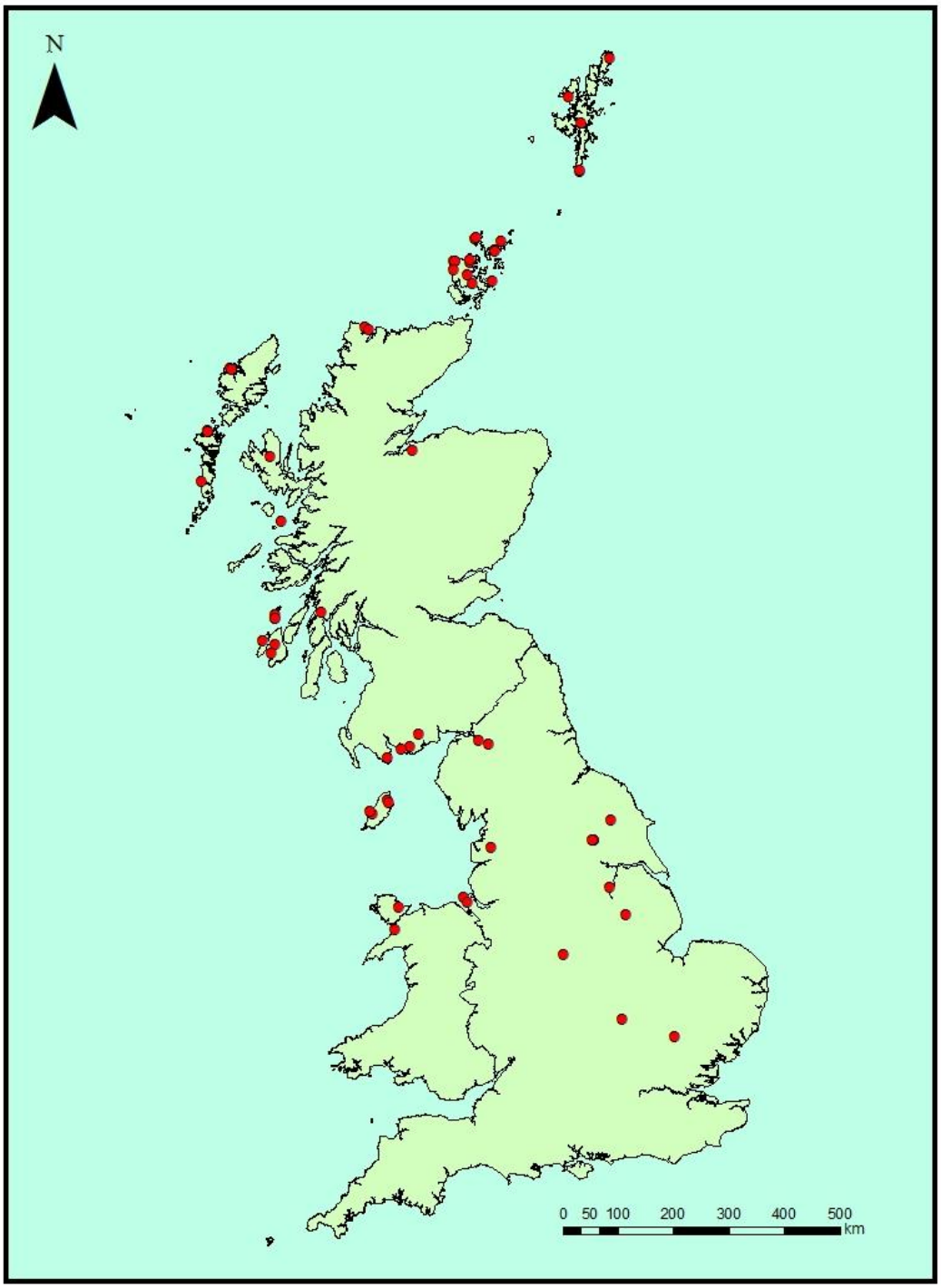
3. Summary – Finds are recorded in either secondary accounts of excavations or as incidental finds with minimal investigation. Bead finds may be thoroughly described, but often mentioned in a passing reference in the interpretations of the site.

4. Thorough Investigation – Finds from securely excavated sites and publications which clearly detail the beads finds and/or contain significant sections on the study of this artefact.

Examples of incorrect or revised descriptions are present in some publications of early excavations or sites with large assemblages. Many sites contained examples of Roman or late medieval beads in their context. As this study focuses on beads produced in the Viking-Age, these much earlier or later bead types have been excluded.

The sites

A total of 67 sites were identified as relevant to this study. These sites are located within the modern day countries of England, Wales and Scotland (including the Scottish Isles). Sites from Ireland which contain Viking-Age beads fall outside of the scope of this study. Furthermore, a recent PhD thesis by Johanna O'Sullivan has thoroughly studied the appearance of Viking-Age glass beads in Ireland (2013).



Map 1: The distribution of Viking-Age beads in Britain as identified in this study. Contains Ordnance Survey data © Crown copyright (Digimap 2014).

The sites were chosen based on the characterisation of the sites as 'Viking' in the literature. These determinations are based on the features of the site, evidence for ritual or cultural behaviours, distinctive craft techniques and the identification of material culture related to Scandinavian culture. There are a small number of included sites which are not explicitly defined as Scandinavian, but contain evidence for Scandinavian or related social

and economic influences in the early medieval period. The criteria for the inclusion of these sites is the approximate date for the deposition of the material, the location of the site, and the occurrence of beads which had potential to be in circulation in the Viking-Age. The long circulation history of many bead types, and possible use of beads as heirlooms, means that it is often difficult to define a chronological 'end' for any type (Welch 1999: 94). By including sites with suggestive (rather than stated) evidence of Scandinavian influence, the bead finds can be included in the overall discussions of the production and trade of beads.

The archaeological records of many sites are often complex due to evidence for different activities and contexts. In this study, simplified definitions for each site which relate to the main context in which the beads assemblages were found have been applied. For example, beads within evidence of a production workshop (production), within a burial (burial) or within the remains or vicinity of housing structures (settlement). To clarify these terms further, the term 'settlement' incorporates sites with evidence of occupation of any type; towns, rural communities and individual farmsteads. The term 'production' is not applied to disregard other mechanisms (such as occupation) which may have resulted in the deposition of the beads. Rather, as stated above, it is meant to reflect the dominant means through which the beads were most likely to appear at the site. The burials included in this study only represent those containing beads (for overviews of burials in the different areas see Redmond 2007, Graham-Campbell & Batey 1998, Wilson 2008, and Griffiths 2010). These burials are typically inhumations without coffins, often with minimal or no surviving skeletal evidence (Redmond 2007; Graham-Campbell & Batey 1998). There are examples of burials with stone settings, in mounds, and in cist or lintel graves (Redmond 2007; Graham-Campbell & Batey 1998). Examples of traditionally Scandinavian burials include two possible cremations (Lamba Ness and the Knowe of Moan) and two boat burials (Scar and Machrins Machair) (Graham-Campbell & Batey 1998: 57, 59, 138, 90).

Aims

This research seeks to better understand the mechanisms behind patterns in the appearance of Viking-Age beads in British sites in a multi-scale approach. This research will be structured into life cycle stages (production, trade and use) identified as significant to the analysis of these Viking-Age patterns. The discussion of this analysis aims to contextualise these patterns within studies of Viking-Age beads in Scandinavia, and the

wider debates regarding the society and economy of the Viking World. There are five objectives in this study:

Objective 1

To present the Viking-Age bead forms in the database, with recognition of the distinctive contexts of specific areas (Scottish Isles, Mainland Scotland, England, Wales and Isle of Man), and sites which have contributed to the appearance of beads.

Objective 2

To analyse patterns relating to the conditions and processes behind the production of beads in Viking-Age Britain.

Objective 3

To analyse patterns relating to the conditions and processes behind the trade and distribution (where appropriate) of beads in Britain.

Objective 4

To analyse patterns relating to the social use of beads in the presentation of personal identity and the expression of cultural beliefs in burial contexts in Britain.

Objective 5

To contextualise and discuss the analysis of these patterns, and the inferred social and economic relationships within the themes and debates highlighted in relevant studies from Scandinavia.

This study aims to fit alongside existing trends in research regarding the production and trade of artefacts in the Viking world, and the relationship between beads and personal identity. Due to the preliminary nature of this study, it is focused on social and economic patterns which are directly related to beads. The context of the production of beads and the processes of trade are key economic themes which emerge in the study of artefacts. They are particularly relevant to the perception of an extensive cultural system such as the Viking world. The analysis of the use (stage) of beads has been restricted to the context of personal identity and burial sites. These provide the most visible examples of uses for beads beyond obvious statements of their adornment properties. The examination of the

role of beads in expressions of personal identity will specifically focus on the ways in which beads are used to determine and express aspects of sex (gender), age and cultural beliefs. The focus on the relationship with sex and gender is particularly relevant as the strong relationship between beads and female dress in Viking-Age archaeology has led many published accounts to interpret the appearance of significant bead assemblages in male graves as anomalies (Solberg 1985). This study aims to explore these assumptions and question the relevance of these ideas to Scandinavian burials in Britain. Further research on aspects of personal identity in the burials of Viking-Age Britain (particularly on wealth, status, roles and ethnicity) is beyond the scope of this study.

In the following chapters, the five objectives are addressed in turn. The second half of this chapter introduces the bead material. In Chapter 2, a literature review focusing on the key thematic issues related to the appearance of beads in Scandinavia, and a brief review of the relevant literature regarding bead finds in Britain are presented. In Chapter 3, an outline of the historical and archaeological evidence for Scandinavian settlement in Britain during the Viking-Age is presented. This section will provide brief introductions to the sites used in this study. In Chapter 4, the methods used to analyse the bead finds and the patterns relating to the selected themes will be presented and explained. In Chapter 5, the results of this analysis will be presented with appropriate pictorial representations. In Chapter 6, the results will be discussed in relation to thematic ideas from Scandinavia and the wider Viking world. This chapter will also conclude the findings of this study.

Introduction to the material

In order to discuss the bead forms and patterns in the archaeological record of Viking-Age Britain, it is necessary to introduce the material, manufacturing techniques, and site data from Scandinavia. These points form the foundation upon which ideas regarding the production, trade and use of Viking-Age beads are based. The first section of this chapter will focus on amber, gemstone and glass, and will broadly address the characteristics inherent in the materials as well as the modes of bead production for each. Discussions of these materials are relevant as they are the most significant and/or commonly found forms in the archaeological records of Viking-Age Scandinavia and Britain. Following this, a discussion of the temporal bead trends in Viking-Age Scandinavia will begin by introducing the seminal work *Trade Beads and Bead Trade, ca. 800-1000 A.D.* by Callmer (1977). This discussion will then focus on the key bead trends evident in the assemblages from key Scandinavian sites located in the modern countries of Denmark, Norway, Sweden and Germany. Finally, selected broad trends in the appearance of bead types across Viking-Age Scandinavia will be outlined based on Callmer's research (1977, 2003a). Due to the inaccessibility of many publications and the constraints of the research, it is not possible to include data from every excavation at each Scandinavian site. It is hoped that by focussing on the key points in both the broad and site specific beads trends, useful comparisons for the patterns in Viking-Age Britain may be observed.

The raw material

Important Viking-Age bead materials which provide significant information regarding production and trade are amber, gemstones and glass. Amber is an organic material made of fossilised tree resin (Panter 2000: 2473; Causey 2011: 32). Its level of transparency is related to the amount of air bubbles trapped in the material (Causey 2011: 37). In terms of colour, oxygenised material darkens over time from clear or yellow hues to brown, orange and red hues (Causey 2011: 38). As amber is relatively soft, it is worked into artefact forms by cutting the raw material to shape, using a borer to drill the perforation, and finishing using a lathe and/or other abrasive materials to smooth (Callmer 2003b: 346).

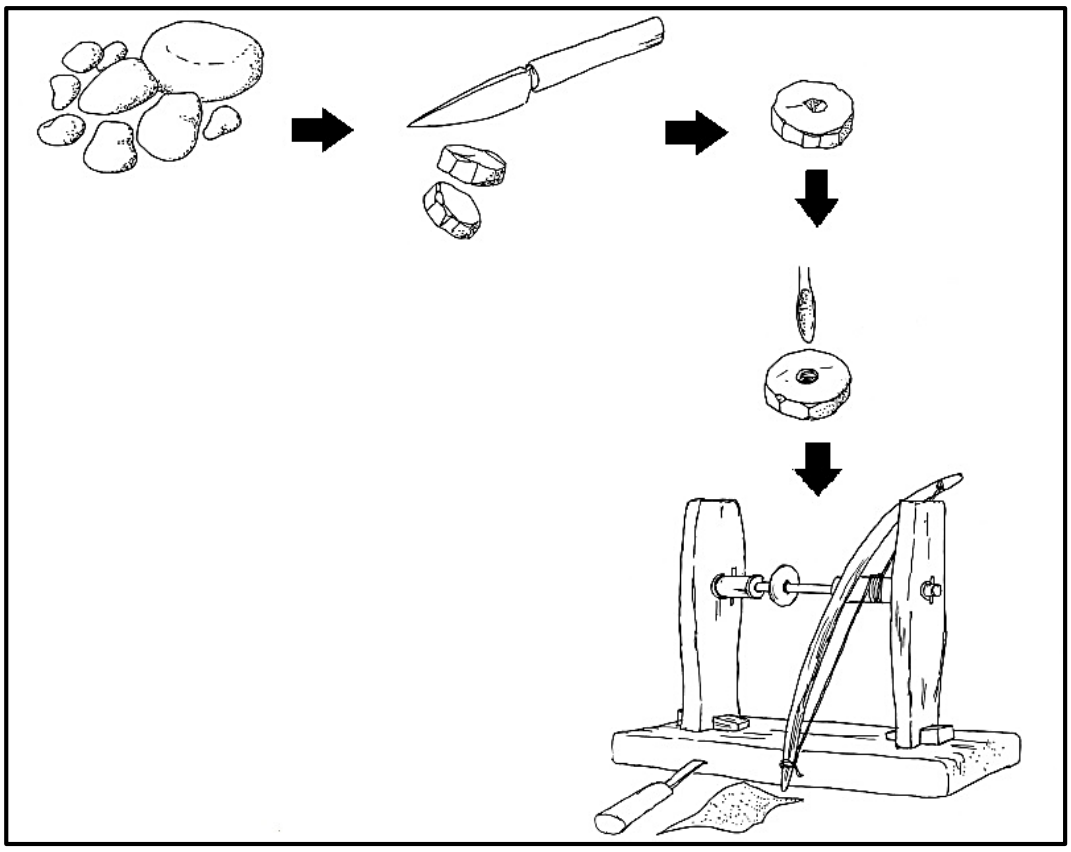


Figure 2: The steps for the manufacture of an amber bead; the raw material, cutting to shape, perforating, and smoothing. Image modified from Callmer (2003b: 346).

The popularity of amber beads is evident in the frequency of examples from early European contexts (Resi 2011: 107). The most common source for the amber in Viking-Age sites is from the Baltic area (Panter 2000: 2473; Resi 2011: 107). This zone of Baltic amber begins in the southern and central Baltic coastal areas and is distributed through western Jutland, Northern Germany, the Netherlands, and East Anglia (Resi 2011: 108). Amber from other important sources was in circulation largely before the Viking-Age; Etruscan amber was a significant source in c. 6th century Britain (Panter 2000: 2473). While the distribution of amber is largely the result of trade, trapped air bubbles allow amber to float from sources close to shoreline; small amounts can therefore be transported via water (Causey 2011: 37).

Notable gemstone materials for the manufacture of Viking-Age beads are rock crystal and cornelian (Resi 2011: 154). Both materials demonstrate important trade links and are distributed throughout Scandinavia and central/eastern Europe during the Late Iron Age (Resi 2011: 154). Rock crystal beads are produced from single quartz crystals and occasionally quartzite, where the rock contains quartz grains which have been compressed

together (Resi 2011: 149). The material usually appears clear or frosted (Resi 2011: 149). In a description of the working of rock crystal at the site of Valldal in Norway, the process involves reduction in the size of the crystal through chopping and retouching, and rounding by striking small blows on the uneven areas (Myhre (2005: 84) cited in Resi 2011: 153). The final form is then smoothed by 'quartize' stones (it is unclear whether this word is meant to be quartzite) (Myhre 2005: 84, cited in Resi 2011: 153). Cornelian can be characterised as a translucent material with a red or orange-red colouration (Resi 2011: 147). It is a slightly softer material than quartz, and is worked mainly through a process of polishing and drilling (Resi 2011: 147). A shared characteristic in the appearance of rock crystal and cornelian in Scandinavian sites is that both materials are imports to the area (Resi 2011: 144). Rock crystal has a wide range of possible Viking-Age sources (Resi 2011: 144). Sources in Western Europe (including local Scandinavian sources) are possible (Resi 2011: 144). Eastern sources are also likely due to the similar distribution patterns of finished rock crystal and cornelian beads (Resi 2011: 144-5). Cornelian beads have a more restricted raw material origin, and are therefore regarded as a product imported in a finished state from Eastern trade centres (Resi 2011: 144). Based on natural sources of cornelian and the distribution of trade, it has been suggested that the manufacturing origin for cornelian beads imported in the Late Iron Age may be more accurately located in Iran, India and Caucasia (Resi 2011: 145).

Unlike naturally occurring amber and gemstones, the glass used for artefacts in the Viking-Age was man-made. The most common chemical compositions for glass in the early medieval period included soda or potash, lime, and silica (Whitehouse 2003: 302). The colouration of glass is created by the addition of certain chemicals, either as a deliberate part of the manufacturing process or as a result of accidental inclusion (Bayley 2008: 2522-3). Opaque glass can be achieved by adding an opacifying agent or subjecting the glass to heat treatment (Henderson 1995: 68). It is a commonly held view that much of the vessel glass (or cullet) found in Viking-Age sites was used as a source of pre-made glass for bead production (Gaut 2011: 174). While this theory has some merit, experimental studies have determined that cullet is an imperfect material source for the production of beads as 'gas bubbles and impurities' frequently become trapped in the glass when re-melted and combined (Gaut 2011: 175). The ideal glass form for bead production are chunks of manufactured glass (and possible thick vessel bases), which is then re-melted or chipped into the desired form (Gaut 2011: 175). While the reuse of vessel glass cannot

be ruled out, it is clear that the relationship between raw material, waste material and bead products in Viking-Age sites needs to be studied in a holistic manner to further understand mechanisms of bead production (Gaut 2011: 175). Sources for raw glass imported into Scandinavia are located in production centres in the Mediterranean and the 'Near East' (Gaut 2011: 237).

The main method for the production of beads was to wind the melted glass onto a metal rod, and then shape it using tools, such as a spatula (Callmer 2003b: 350; Callmer 2002: 138; Sode 2004: 90).

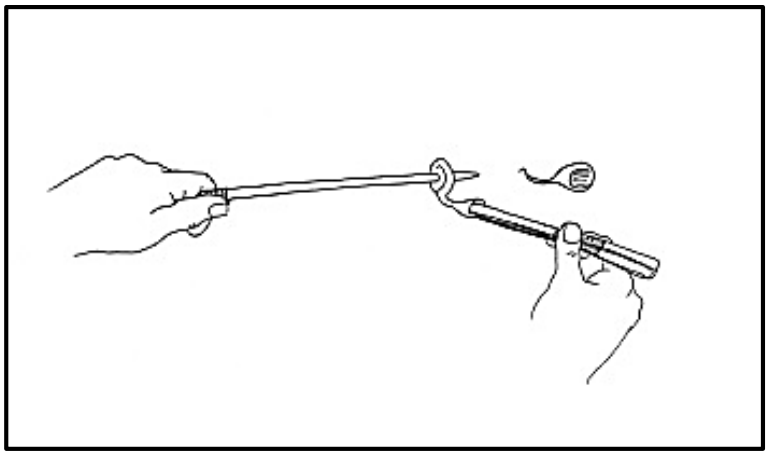


Figure 3: The production of glass beads by winding the melted glass around an iron mandrel (Sode 2004: 86). Image modified from Callmer (2003b: 350).

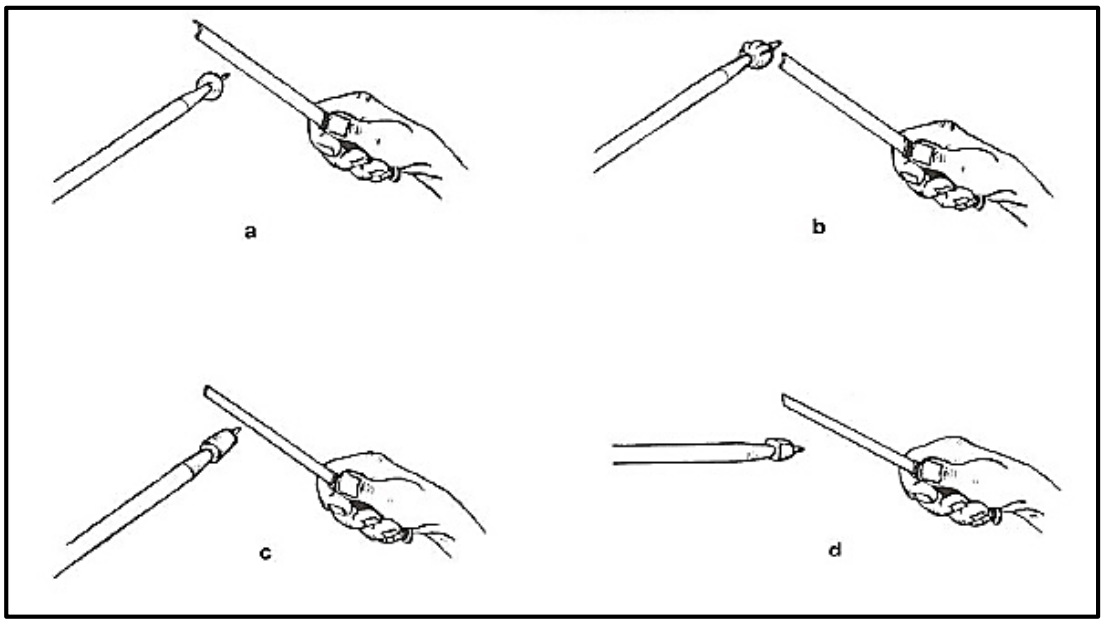


Figure 4: The production of different bead shapes using a forming iron; a) round/oval, b) melon, c) cylindrical, d) square. Image modified from Sode (2004: 90).

Composite beads were made by fusing a collection of rods together to create a specific design (Callmer 1977: 33). This technique produced mosaic beads (Callmer 1977: 33). Glass could also be blown; this method was often used to produce segmented beads using crimping tongs (Callmer 1977: 33). Cold cut beads are manufactured by cutting the glass and polishing in a manner similar to the working of gemstones (Callmer 1977: 33). Decoration was made by applying sections of a composite design, or applying melted glass to wound beads using rods (Callmer 2003b: 350; Sode 2004: 91).

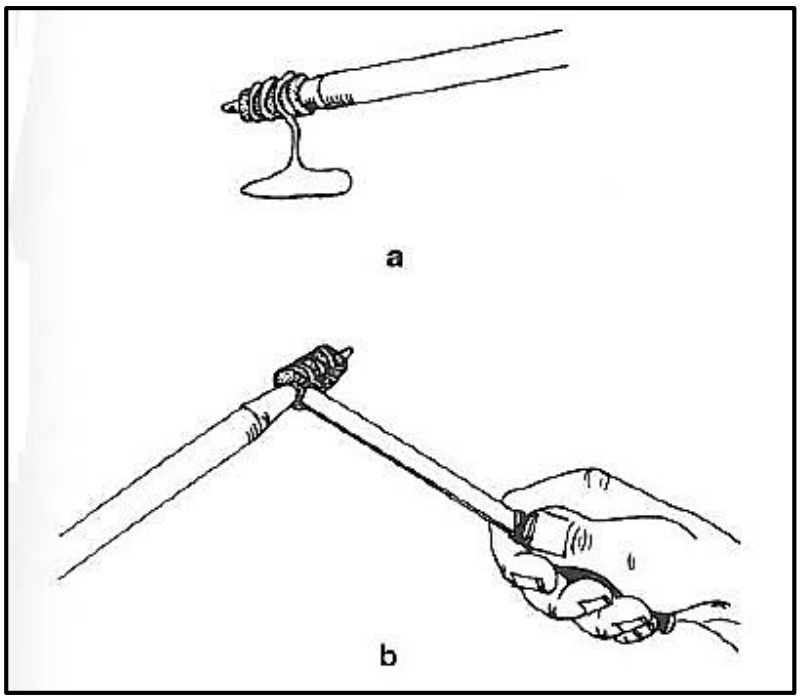


Figure 5: Applied and combed thread decoration on a cylindrical bead; a) the secondary glass material is wound, b) the comb pattern is produced by dragging the edge of a tool (in this case a spatula) through the material. Image modified from Sode (2004: 91).

The appearance of bead types in Scandinavia

The appearance of locally manufactured and imported bead types and materials in Viking-Age Scandinavia was subject to frequent change over time (Callmer 1977: 9). To understand this change it is necessary to refer to Callmer's work (1977). The hypothesis for his study was based on the idea 'that the bead material of the Viking Period is subject to chronologically relevant changes' (9). Callmer hoped to demonstrate the chronological potential inherent in the bead assemblages by attempting to define restricted chronological phases of bead types in the archaeological record based on systematic classification and regional reviews (7-10). Based on collections from museums and other sources (refer to

Callmer 1977 for a list of sites used), a classification of the beads was created based on a hierarchy of specific features (33). The first feature was the raw material type (excluding amber beads), then the production technique, and finally by the form of the bead in regards to the shape, proportion, size, translucency, colour and decoration (33). The division by material and production type (and by decoration for the glass beads) created 16 broad classes of beads with multiple individual types (42-55). In some categories, such as amethyst or jade beads, there was no further division as individual types could not be distinguished (55). Other categories, particularly for glass beads, contained hundreds of individual types based on the intersection of each feature of the bead's form (42-55. Refer to Callmer 1977 for list of individual types).

To understand the appearance of these types in relation to specific sites, it is useful to discuss selected finds of amber, gemstones and glass beads from published excavations of Scandinavian sites. As Callmer does not include amber beads in his study, it is necessary to look to other literature for classification models. Two studies in particular have attempted to create typological systems for amber beads (Resi 2011: 111-2). Stjernqvist's 1998 study of Iron Age finds from Sweden created a general classification based on shape (Resi 2011: 111-2). The key descriptive terms of round, annular, barrel-shaped, cylindrical, discoidal, flat or wheel-shaped, 'berlock' and biconical were used in this study (Resi 2011: 111-2). Tempelmann-Mączyńska's 1985 study of beads from the Roman Iron Age and early Migration Period included a classification of amber beads which was far more detailed. This study sought to incorporate production technique, decoration and accurate shape descriptions as attributes in the classification (Tempelmann-Mączyńska 1985: 23). Most of the descriptions of amber bead types use similar terms for the shapes as those outlined by both Stjernqvist and Tempelmann-Mączyńska (Resi 2011: 111-2). Amber beads may be divided into categories based on shape, form and colour (Resi 2011: 112-3). Evidence for this production is present in several sites in Scandinavia (Callmer 2002; Bencard *et al* 1991; Resi 2011: 110-1). A discussion of amber beads present in two craft production sites at Ribe in Jutland and Kaupang in Vestfold may provide useful data for the appearance of amber bead types (Bencard *et al* 1991; Resi 2011).

Table 1: Amber beads from the 1970-76 excavations north of Ribe Å by bead type and stratigraphic position, after Bencard *et al* (1991: 101-3). Recent and medieval finds are not included (102-3).

	Phase 2: c. 730; c. 759	**Phase 3**	**Phase 3-4**	**Phase 4**	**Not phase-assigned**
Bead Type					
Natural	3	2			
Flat, nearly square	1	2			1
Turned and ground beads					
Cylindrical		2		3	
Biconical		2		2	
Ring-shaped		1			
Unfinished	2				
Broken	8		1	1	
Total	14	9	1	6	1

The closest source of amber to Ribe are sources from the Jutish coast (Magnus 2003: 130). The proportion of raw and semi-manufactured beads to finished beads has led to the interpretation that the amber beads worked at Ribe were for a non-domestic market (Magnus 2003: 130). At Kaupang, there is a large amount of evidence for amber working from both early and the more recent (1998-2003) excavations (Resi 2011: 110-1).

Table 2: Finished amber bead types from the 1998-2003 excavtions at Kaupang (Resi 2011: 112-4). The number of discoidal beads is stated as 28; however, the count of the number of different variation of these forms is 29. The larger number has been used in this table. This has affected the total.

Bead Type	**Cross-section**	**Total**
Discoidal		29
	Flat-oval	18
	Oval	9
	Nearly rectangular	2
Biconical		10
	Lentoid	4
	Discus	6
Barrel-shaped		4
Cylindrical		7
	Square (rounded edges)	2
	Facetted (sharply angled edges)	1
	Rounded	3
	Octagonal, facetted	1
Annular		1
Individualistic/Irregular		2
		53

The 1950-74 excavations at Kaupang recovered 21 amber beads from the settlement area and 27 amber beads from the graves at Bikjholberget (Resi 2011: 110). These beads appeared in annular, round, barrel-shaped and discus-shaped forms (Resi 2011: 110). It is clear that both Ribe and Kaupang share similarities in the types of amber beads present, such as biconical and cylindrical shapes. Data from Table 1 suggests the manufacture of a wider range of bead forms occurred in the middle and late phases. There is insufficient chronological data from publications on Kaupang to make a statement regarding phases. As there is no work which attempts to bring together the classification of amber beads with a chronological phasing, it is beyond the scope of this chapter to discuss changes in amber bead types over time.

Carnelian and rock crystal beads have been recovered from the 1990 excavations at Birka (Ambrosiani 1995: 53). The data from this site is not clearly defined; there are 65

examples (42 of cornelian and 23 of rock crystal), which consist of 38 facetted forms, 23 spherical forms and four forms classed as other (Ambrosiani 1995: 57). At Kaupang, gemstone beads form part of the jewellery assemblage from both settlement and burial contexts (Resi 2011: 143).

Table 3: Cornelian and rock crystal bead types from Kaupang, after Resi (2011: 144).

Bead Material	**Bead Type**	**Number**
Cornelian		43
	Spherical	9
	Facetted discoid	7
	Facetted spherical	5
	Facetted polyhedrical	10
	Facetted prismatic	10
	Other shapes	2
Rock Crystal		54
	Spherical	20
	Facetted discoid	3
	Facetted spherical	8
	Facetted polyhedrical	6
	Facetted prismatic	8
	Facetted biconical	3
	Other shapes (including almost barrel-shaped)	6

The high quality cornelian beads represent a range of shape types similar to amber beads, with the addition of facetting in many examples (such as facetted discoid) (Resi 2011: 146-7). Various shades of red were represented (Resi 2011: 147). Whilst some of the beads appear to be in a rough state, there is no raw or semi-manufactured evidence to suggest that cornelian beads were produced at Kaupang (Resi 2011: 148). Evidence for raw and worked rock crystal material is present, however, it is unclear whether this was the result of bead-making activity (Resi 2011: 152-3). The range of rock crystal forms are similar to those present in the cornelian assemblage (Resi 2011: 144). However, the rock crystal assemblage contains a significant proportion of spherical beads, and some examples of almost barrel-shaped forms (Resi 2011: 150). It is clear from both Birka and Kaupang that spherical and facetted forms were common forms for these material types.

Figure 6: Rock crystal, and cornelian beads from Kaupang, with a fragment of a jet bracelet and an amethyst bead (Pedersen 2000).

Other mineralogical types present in the Kaupang assemblage include amethyst, fluorspar and jet/jet-like. Two amethyst beads and two fluorspar beads were also recovered during various excavations in the site's archaeological history (Resi 2011: 143). The amethyst beads are of low quality; one bead is a worked pebble and the other an irregular ovoid shape (Resi 2011: 154). The fluorspar appear to be worked pebbles and may be indicative of the use of a local source (Resi 2011: 154). There are 23 artefacts made from jet and jet-like material at Kaupang, including at least two examples of possible beads (Resi 2011: 123-5). Evidence indicates that the material was imported in a worked state (Resi 2011: 125). Three pieces of raw jet material, along with a cannel coal or shale, semi-manufactured artefact (either a ring or bead) and an unfinished shale bead, suggest that there was small scale local working of jet and jet-like material (Resi 2011: 125).

Glass beads have produced the most variation in the stratigraphy of Viking-Age sites due to the high number of individual types (Callmer 1977: 42-55). At Birka on the island of Björkö in Lake Mälaren, glass beads appeared throughout the stratigraphy with a high number of spherical, ring-shaped, cylindrical (particularly of blue or yellow) and

segmented beads (often either blue or foil covered) found in the 1969-71 excavations (Ambrosiani 1992: 76; Ambrosiani 1995: 53).

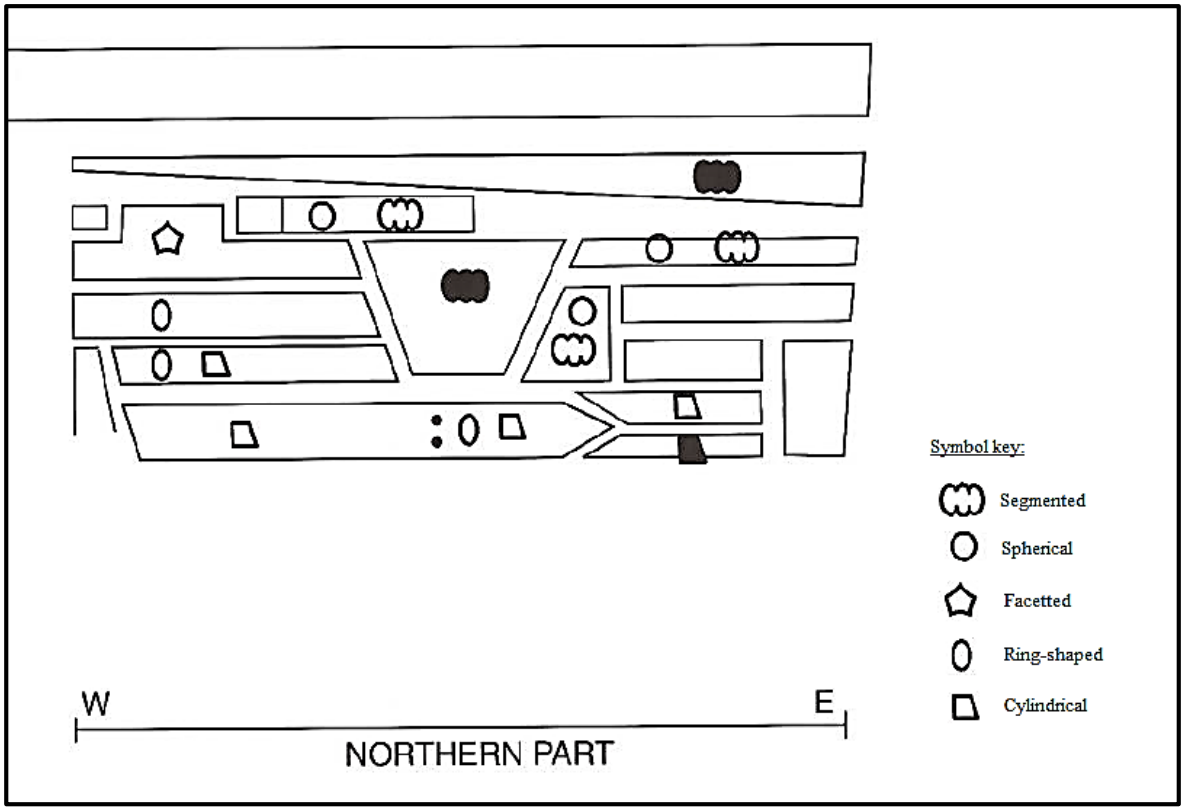


Figure 7 : Pictorial representation of the stratigraphic distribution of the dominant bead shapes from the 1990 Birka excavations (Ambrosiani 1995). Filled symbols represent finds of > 50% of that type; unfilled symbols represent find of between 25-50% of that type (Ambrosiani 1995: 56). Adapted from Ambrosiani (1995: 57).

A pattern of 'spherical beads of various colours and materials' was found throughout the stratigraphy, while segmented, facetted and cylindrical glass beads occupied more distinctive phases in the early 9th and 10th century layers (Ambrosiani 1992: 76). This pattern is supported by further data from excavations in 1990 (Ambrosiani 1995: 62).

Many of the production phases at Ribe align with those outlined by Callmer as broad trends appearing in Scandinavia during the Viking-Age (1977, 2003a).

Table 4 : Patterns in the appearance of glass beads in phases of occupation at Ribe. Based on observations by Sode 2004 and Sode *et al* 2010.

	Phase 1/1A, c. AD 704-725	**Phase 2, c. AD 725-760**	**Phase 3, c. AD760-800**	**c. Mid-8th century**	**End of 8th century**
Trends in colour	Transparent blue Opaque white	Transparent, dark cobalt blue	Transparent, dark cobalt blue	Opaque red Brown Green	
Trends in shapes	Annular Barrel-shaped Short cylindrical Biconical	Annular Short cylindrical Melon shaped Polyhedral	Annular Short cylindrical Melon shaped Polyhedral	Wound cylinder	
Trends in decorative forms		Applied eyes Dark blue with monochrome or polychrome thread Blue oval beads with mosaic eyes Mosaic chequerboard Herringbone (‘reticella’)	Filigree glass (reticella) Wasp	Wasp	
Imported forms			Metal foil Green drawn	Metal foil Green drawn	Mosaic eye Metal foil Drawn glass beads

Two key trends are present in assemblages from Ribe. The ‘wasp beads’, which have been used to demonstrate the earliest layers of Ribe (dating from at AD 700), were assumed to have been imported from Central Europe (Frandsen & Jensen 1988: 229). However, more recent assessment of the manufacturing evidence has placed most of the

production at the site (Sode 2004: 95). Imported glass beads (metal foil, drawn, mosaic eye and drawn glass tube beads) appear in Ribe by the end of the 8th century and dominate the assemblage, placing the site in line with a trend which occurred throughout Scandinavia at this time (Sode 2004: 83, 95-9).

Evidence for glass working from the 1998-2003 excavations at Kaupang is well supported by the waste material as well as finds of imported soda glass, blocks of raw glass, tesserae and semi-manufactured beads (Gaut 2011: 169). There is some evidence that polychrome and bichrome cable decorated beads were produced locally (Gaut 2011: 232). It is clear from the raw material, the finished and semi-finished beads and the waste manufacture, that wound annular beads of translucent blue, opaque white and green/yellow-green glass were the most commonly produced types at this site (Gaut 2011: 169, 232).

Figure 8: A selection of bead types and bead manufacturing waste from Kaupang (Pedersen 2000).

Glass bead working at Hedeby mainly produced monochrome, foil and polychrome types, with evidence for complicated production techniques such as millefiori (Steppuhn 1998: 111). These sites appear to share several broad patterns in the production and importation of glass beads during the Viking-Age. However, artefactual evidence suggests that some bead types produced were limited to local markets (Steppuhn 1998: 111). Beads

produced at Hedeby have been found in sites from Szczecin to Staraya Ladoga; however, certain bead types manufactured at the site, such as flat beads, appear to have been traded within an exclusively domestic market (Steppuhn 1998: 111).

As stated above, a key part of Callmer's study was the idea that changes in bead types were chronologically significant in the identification of distinct phases within the archaeological record (1977: 9). The chronological analysis was based on the 'earliest appearance, maximum representation or representations, and ultimate disappearance' of the bead types, with allowances for the re-use of beads at a later date (56). The bead types were placed into groups based on shared characteristics and associated dateable material (56, 76). The broad chronological trends in stylistic bead changes largely relate to patterns of importation and local production (Callmer 2003a: 41). A summary of the important trends in imported and locally produced forms is shown in Figure 9.

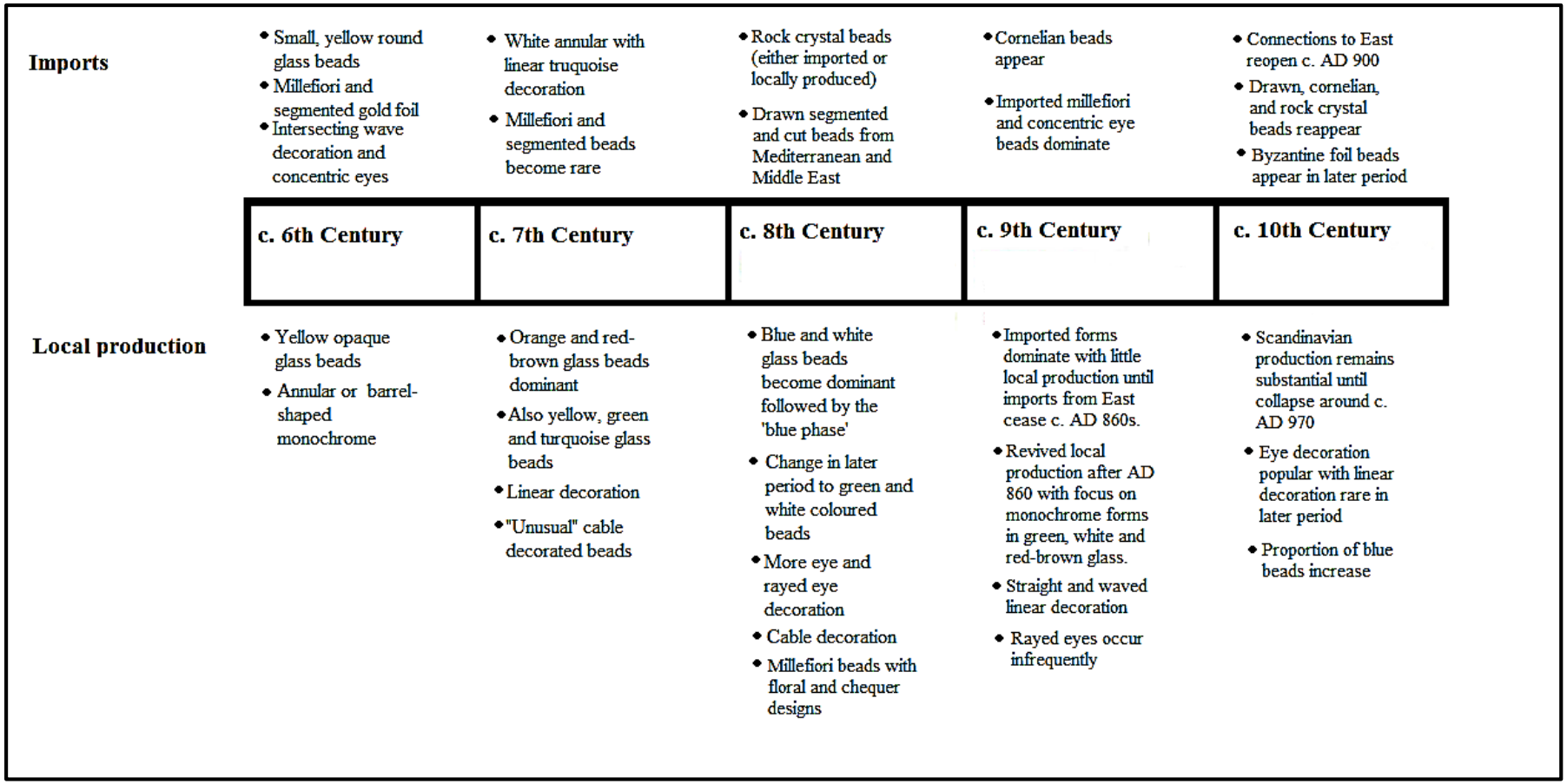


Figure 9: Timeline of key trends in the appearance and change of bead trends over time. Summarised from Callmer (2003a: 41-5).

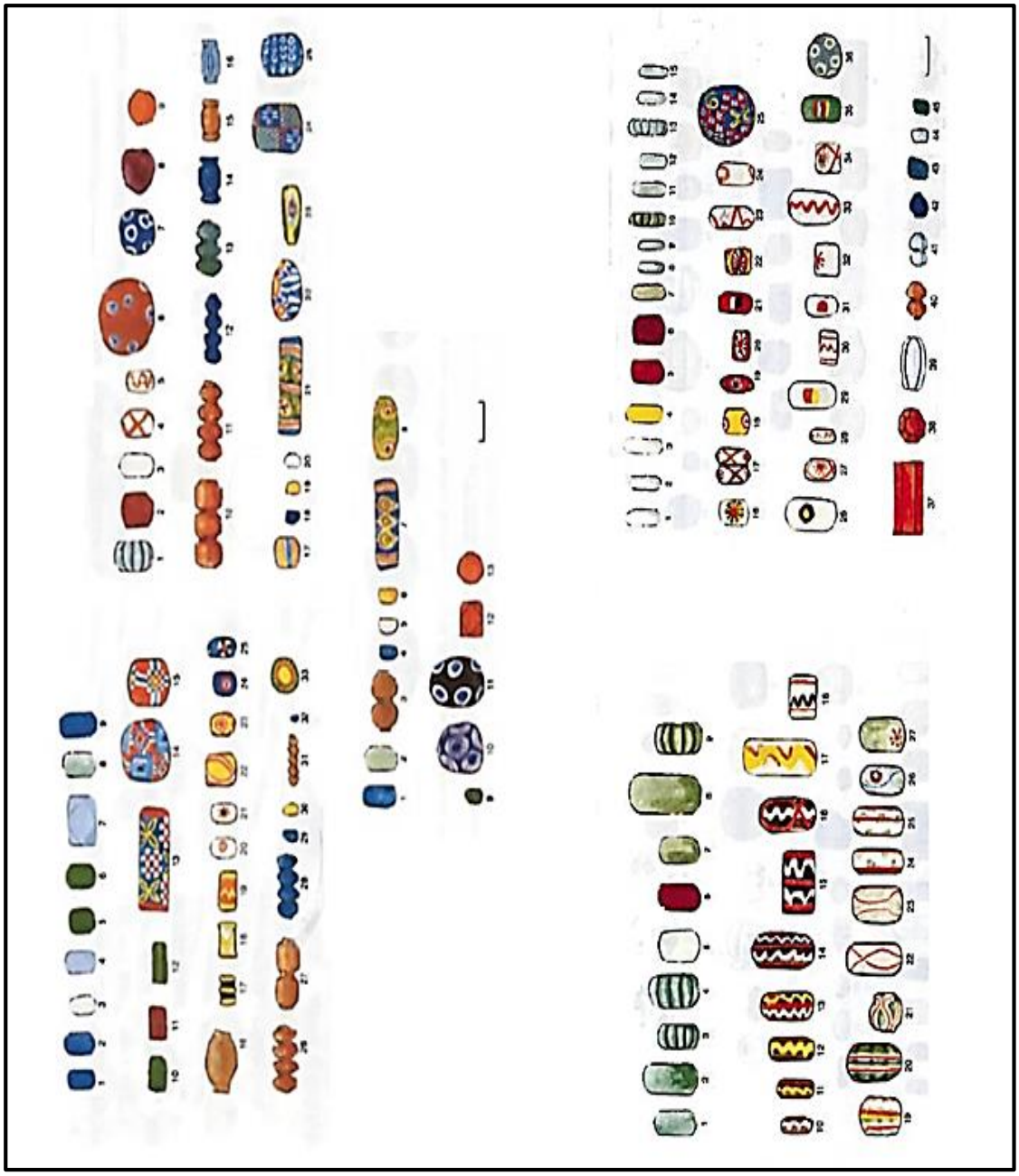


Figure 10: Beads from Scandinavia and the Baltic region. Modified from Callmer (2003a: 42-43). Top: Imported and locally manufactured beads dating to the late 8th century to c. AD 800, and the early to mid-9th century. Bottom: Imported and locally manufactured beads dating to the mid to late 9th century, and the early 10th century.

From the information presented in Figure 9, it is clear that the attributes of colour and decoration, along with the number of imports and number of locally produced beads, fluctuate over time. The illustrations from the late 8th to early 10th century in Figure 10 clearly show the changes and continuities in bead types over time (42-3). These trends were strongly influenced by the relationship between local production and imported forms (44-6). This relationship became unbalanced when the imports from Eastern sources

flooded the market in the 9th century and caused a decline in the volume of Scandinavian production (44). The cessation of these imports of beads (which coincides with the disappearance of Arabic dirhams) correlates to a revival of the local industry (44). By the 10th century the two systems of import and local production appears to have reached an 'equilibrium' (45). This relationship is demonstrative of how closely the elements of production and trade were connected within the economy of the Viking-Age.

Summary

The appearance of beads in the archaeological record of Viking-Age Scandinavia presents a complex picture of resource use, importation, and production. Each of these factors contribute to the apparent changes in bead types over time as broadly characterised by Callmer (1977). In regards to the appearance of these trends in the archaeological records of key sites, the lack of chronological data from many sites means that it is difficult to accurately compare the data with Callmer's phases (2003a). Ribe provides the clearest examples of a site which appears to support parts of the key trends, particularly in Eastern imports and glass beads. As with all seminal works, it is necessary to question the basis upon which these influential ideas are formed. Callmer's typochronology is not without faults; it has been critiqued by Näsman who states that the absolute dating of the bead phases is 'based on a shaky and not easily comprehensible foundation' (2003: 231). As this publication is now more than 30 years old, there is certainly a need to re-evaluate Callmer's finds in the light of new data and chronological frameworks from Scandinavian sites. However, it is clear that the data presented from the key sites still supports many of the key points in the change of bead types over time. This is a sufficient basis for the necessary task of further analysis and discussion regarding the wider thematic ideas behind the social interactions and economic processes occurring across the Viking World at this time.

Chapter 2: Beads in the Viking World: Scandinavia and the West

To contextualise the patterns of production, trade and use of beads in the Viking World, it is first necessary to review the social and economic systems in Scandinavia during the Viking-Age. This chapter will review selected studies from Scandinavia which discuss the development of production, trade and use practices around the Viking-Age period. This review of this literature will contribute to the holistic understanding of the role of beads within these systems. In terms of the overall structure of this study, this chapter will present Scandinavian parallels for the British bead examples included in the database. The time periods discussed in each work vary from the early to late Scandinavian Iron Age period to the Viking-Age. Developments in the production, trade and use of beads in Scandinavia will be associated with key Scandinavian sites where applicable. During the review of this literature, several important and interconnected themes were identified as relevant to discussions of Viking-Age beads. These can be broadly defined as: structure of craft production, the development of urbanism, trade networks and burial rituals. As stated above, limitations in the accessibility of literature has made it impractical for this chapter to review much of the Scandinavian literature related to beads and the thematic issues. The literature was selected based on the presence of an analysis and/or discussion which presented a meaningful argument related to the larger ideas and themes identified in this chapter, and the wider objectives for this study.

Studies of the Viking-Age beads in Scandinavia

Beads were often lost or overlooked in many early archaeological investigations into the Viking-Age; however, some early discussions focus on ideas of typology and chronology in association with particular sites (Callmer 1977: 7). Attempts to create an organised and systematic reference guide were often a part of the analysis of the material culture of a specific site (Callmer 1977: 7). Specific mention of beads most frequently appeared in brief notations of styles and types within the records of site finds (Callmer 1977: 7). Arguably the first attempt at the broad categorisation and deliberate study of beads from the Viking-Age was Callmer's work in 1977. This piece of literature remains a key reference source for the typology and chronology of beads from comparative regions of Scandinavia dating from AD 800 to 1000 (7). The movement of beads around

Scandinavia during this time period (and their ability to represent 'intercultural relations'), are further aspects discussed in Callmer's work (Callmer 2003a: 38). These ideas have continued to be discussed in literature regarding Viking-Age trade networks (see Sindbæk 2007a, 2007b). The appearance of beads in finds from Viking-Age burial and settlement sites continues to be a key source of information regarding production, trade and use (Callmer 2003a: 38). Recent work on these sites has centred on the discussion of beads in trade networks and craft production areas, particularly in substantial 'town' sites such as Kaupang with large quantities of beads and bead related manufacturing remains (Gaut 2011: 170).

Crafts, urbanism and trade in the Viking-Age

The themes of craft production, urbanism and trade networks are interconnected elements in the interpretation of the production and movement of artefacts in Scandinavia throughout the Viking-Age. Craft production is characterised by the modes of production employed by itinerant or permanent craft persons (Callmer 2003b). These modes of production have been used to define the appearance of seasonal or permanent markets, trading places and towns (Callmer 2003b; Sindbæk 2007a). Several key sites have been the focus of recent work on towns and urban development (Clarke & Ambrosiani 1991: 1). In the Viking-Age, towns significantly changed the contexts in which the production and consumption of goods took place (Skre 2007: 450). The role of towns and trading sites in local and long distance trade networks have been frequently discussed in scholarly attempts to characterise the nature of trade connections during this period (Callmer 1977, 1994; Sindbæk 2007a, 2007b, 2010). Early ideas of the diffusion of artefacts alongside urbanism have developed into more complex network theories of communication and trade (Callmer 1977; Sindbæk 2007b: 61).

To return to the role of craft production, two models of production are significant to the understanding of the relationship between the production and circulation of goods (Skre 2007). These are serial production (manufacture of goods for a market consisting of many consumers) and artisanal production (the manufacture of unique, often one-off, items requested directly by a consumer) (Skre 2007: 450). In Scandinavia, serial production rose to prominence from the 8th century in correlation with the establishment of large market and trading places, along with towns (Skre 2007: 450). This created an environment where the availability of widespread products was concentrated (Skre 2007: 450). The evidence

from craft production activity at a site is indicative of the activities engaged in, the structure of the production environment, and the intensity of production (Feveile 2012, Skre 2011; Hyenstrand 1992). It has been argued that the conditions for the production of specialised crafts in the Viking-Age required access to raw material, a large consumer base and an environment of protection which encouraged economic growth (Callmer 2003b: 358-9). Trading places and town sites contain evidence for specialised craft production activities such as glass working and metal casting in dedicated areas (archaeologically visible workshops), which often require access to imported materials (Skre 2007: 453). The conditions of a seasonal market created a pattern of production which was often based on locally available materials (such as comb making or iron working), with different production activities shifted around the site each season (Skre 2007: 453). Therefore, the nature of craft production at a site has a significant effect on the development of the layout, features and finds visible in the archaeological record.

The role of dedicated craft persons in the development of production from artisanal to serial is significant, as

> …strongly specialised craft production supplied early medieval society with a wide range of both functionally important and symbolically loaded artefacts, which the local agrarian social units had no capacity to produce (Callmer 2003b: 343).

For many activities, such as metal casting and glass working, the craft person is seen as the holder of 'exclusive' knowledge regarding the production techniques of that craft (Callmer 2003b: 337, 340). The production of polychrome beads, for example, requires specific knowledge of the characteristics of the different glass materials, particularly when heated and worked (Callmer 2003b: 349). In this model, the proportion of the population with access to this knowledge is necessarily restricted to a small group (Callmer 2003b: 342-3). The demands of specialised production removes these activities from the sphere of domestic production to more established environments of trade and manufacture, such as towns (Callmer 2003b: 341). Callmer argues that models with local and stationary craft producers do not fit the pattern of widespread settlement in Scandinavia in the early and high medieval periods (2003b: 343-4). One of the key aspects of this argument is the idea that for a craft person to maintain a high level of sophistication in manufacture, production must be voluminous, frequent, and therefore serve a large consumer base (Callmer 2003b: 343-4). To achieve this ideal, it is suggested that these craft persons may have been itinerant, moving between the key seasonal and urban production sites in Scandinavia and

further afield (Callmer 2003b: 344, 359). The circulation of different craft persons has been suggested as an explanation for some of the changes in bead styles in the stratigraphy of certain sites (Sode 2004: 86-7; Frandsen & Jensen 1988: 229).

This model of itinerant craft persons has been recently critiqued in discussions of Viking-Age comb manufacture. A similar model was proposed to explain patterns in the appearance of the manufacture and distribution of this artefact in the archaeological record (Ambrosiani 1981: 32, 34, 39-40). This model places emphasis on the peripheral scale of operation as suggested by the limited concentrations of waste material at manufacturing sites, and the spread of similar comb types across Scandinavia, Frisia, Russia and Britain (Ambrosiani 1981: 38-41, 50). Recent work on Viking-Age combs from north-east England has shifted focus to a regional understanding of the way these artefacts have been 'produced, exchanged and distributed' (Ashby 2011: 303). Through close examination of the variation in combs across the geographic area and time period, Ashby presents a model in which production is a more complex process (2011: 305-12). Evidence from northern England suggests that the relationship between north-eastern England and Scandinavia was not a one-way diffusion of ideas from Scandinavia which circulated with itinerant craft persons from one location (Ashby 2011: 316). Rather, the characteristics of Scandinavian comb making served to influence the comb making industry in England (Ashby 2011: 309, 312). Further to this, Ashby argues that the sources for raw material in the northern Danelaw supports locally based connections in industrial activity, rather than 'a network of peripatetic craftsmen' (Ashby 2011: 305). The applicability of this critique to the model of itinerant glass bead-makers is unclear considering the specialised nature of production. Further analysis of the manufacturing evidence in sites from Scandinavia is required.

Recent excavations have demonstrated new insights into the urban development of sites in the Viking-Age, particularly in relation to trade (Clarke & Ambrosiani 1991: 1). Trade was a key feature in several pre-Viking settlements; early Germanic Iron Age sites such as Lundeborg, Dankirke and Helgö were convenient points along sea trade routes (Näsman 1991: 35-6). Goods from origins in Western and Central Europe, and the Baltic are found to have passed through these sites, demonstrating that long distance trade connections were established from around the 5th century (Näsman 1991: 35). However, the rise of urbanism in the 8th century led to a higher rate of appearance of and development in trade related sites (Näsman 1991: 36-7). Examples of these sites include ports (Ribe, Hedeby and Åhus), trading sites (Paviken on Gotland) and central places

(Kaupang) (Näsman 1991: 36-7). Many large trade and town sites later developed from these early trade-based sites (or from nearby seasonal sites) (Näsman 1991: 36). For example, Dankirke is thought to be the predecessor to the early seasonal marketplace at Ribe (Näsman 1991: 36; Feveile 2012: 126). This marketplace became permanent for a short period before disappearing for 150-200 years, and reappearing in the 11th century as a high medieval town in another nearby location (Feveile 2010: 104). There are many sites which have been identified as a Viking-Age town; often quoted examples include Hedeby, Birka, and Kaupang (Clarke & Ambrosiani 1991: 56, 73; Skre 2011: 444). One aim of these urban studies has been to consider what constitutes a 'town' in the Viking-Age (Clarke & Ambrosiani 1991: 3). Certain organisational and appearance based aspects have been discussed in the formation of a set of defining characteristics (Clarke & Ambrosiani 1991: 3). These include topography, historical review, how the town was established, outlying food sources, and the appearance of trade and craft production in the archaeological record (Clarke & Ambrosiani 1991: 3; Sindbæk 2007: 120). Many of these sites were created as basis for political power and control; Kaupang and Hedeby were strategically located along the late 10th century borders of the Danish kingdom (Skre 2007: 445). The relationship between religious and political central places and nearby market or town sites (for example Kaupang and Skiringssal), demonstrates how craft production economy, urbanisation, and trade networks are frequently bound together with political motives in the development of sites (Skre 2007: 446-7).

Discussions regarding the development of Viking-Age towns and the role of trade in this process, often focus on how these sites were connected to each other and to centres outside of Scandinavia (Näsman 1991; Blindheim 1982). Early views of this relationship were defined by contemporary diffusionist theory; trade and ideas passed from town to town in a relatively linear (down-the-line) model (Sindbæk 2007a: 119, 2007b: 60). Large settlement (emporia) sites, in Scandinavia were often located at notable points or intersections in the lines of trade connecting local and long distance trade networks (Sindbæk 2007b: 60). Kaupang was situated within a network of trade along the northern shores and the surrounding inner hinterlands (Pilø & Skre 2011: 17). Birka had extensive trade links within the northern European network, as evidenced by Slavonic and Norwegian trade goods found at the site (Ambrosiani 2012: 98-9). Hedeby's location on the Jutland peninsula connected the North Sea trade system with the Baltic Basin (Carnap-Bornheim *et al* 2010: 513). Callmer describes these sites as 'large centres of diffusion'

within Scandinavia where beads were moved through in bulk to be disseminated through local networks (1977: 56, 174). These sites were connected to more distant centres where selected bead styles originated; namely India, Middle East and the Mediterranean (Callmer 1977: 174). These sites are viewed as centres in dendritic shaped networks, often in association with 'specialised trade' such as the slave and fur trade (Callmer 1977: 175-6). These models explain the urban development of Scandinavian sites (such as Hedeby, Birka and Kaupang) as a result of influences from 'old cultural centres' in areas such as the Mediterranean or Middle East (Sindbæk 2010: 432).

A more complex view developed later based on the excavation of a number of significant trade sites (Sindbæk 2007a: 119). Investigations into these trading places focused on how they form dense patterns of trade in a particular region (Sindbæk 2010; Callmer 1994). These patterns were situated in local and regional places of trade, with some sites connected to 'supra-regional networks' (Sindbæk 2010: 432; Callmer 1994: 53). For example, certain areas (such as the island of Gotland) appeared to have a high density of trading places for the small size of the locality (Carlsson 1991). Excavation on Gotland revealed several harbours dating from the Merovingian period which were used by small local farms, or the local community for short periods (Carlsson 1991: 152-3). Larger trade harbours at Paviken, Visby and Fröjel, were also found to contain evidence for craft production activities and trade, which appeared to serve a wider area (Carlsson 1991: 148, 156-7). A number of these sites with evidence of trade (particularly long distance trade), have been equated with the label 'embryonic towns' (Sindbæk 2010: 434). This assessment is based on the idea that the evidence of trade and craft production is equal to a direct connection with long distance trade in the site (Sindbæk 2010: 434, 436). However, the nature of these sites can be better explained as trade-based settlements placed for the even distribution of local trade and the re-distribution of long-distance trade (Sindbæk 2010: 432).

Attempts to clarify the misconceptions around the applicability of the terms emporia and town in relation to long-distance trade has led to the rise of network models (Sindbæk 2007a; 2007b). Sindbæk introduces the term 'nodal points' to characterise sites which appear to have 'an exclusive role in long-distance trade' before the 11th century (2007a: 121; Skre 2007: 453). These nodal points are significant sites dating to the 8th and 9th century; Ribe, Kaupang, Birka, Åhus, Truso (Poland), Groß Strömkendorf and Hedeby (both in Germany) (Sindbæk 2007a: 121). A distinctive archaeological pattern was

identified by quantifying selected imported artefacts (including glass beads), at each site (Sindbæk 2007a: 121-3). The resulting pattern linked the sites through communication and trade activities occurring at a similar scale (Sindbæk 2007a: 121-3). Pottery forms a large part of this assemblage of imported materials on which the reconstruction of the network is based (Fulminante 2014: 171). This means that this model is based on connections of trade relating to material which is most likely to survive intact in the archaeological record (Sindbæk 2013: 74). The shared chronology and conditions of these nodal points separate them from other sites publicised as important towns in the Viking-Age (Sindbæk 2007a: 124-6). With regards to the difference between these nodal points and other trading sites in the Viking-Age, Sindbæk argues,

> …it is not trade as such that distinguishes 'great' and 'small' sites, but specifically the role as nodal points for long-distance traffic… The nodal points thus differed from more local markets. The latter were served by local traffic and doubtlessly communicated with the nodal points, but not with the long-distance traffic that travelled between them. (2007a: 126).

The continued functionality of these nodal points depended on the long-distance traders and markets users; their topographic and geographic locations meant that they formed 'hubs' for long-distance trade within the web of local connections (Sindbæk 2007a: 129). The presence of specialised craft production activities at each nodal point suggests the presence of expert craft persons and reliable raw material sources for the production of goods on a large scale for local and foreign markets (Sindbæk 2007a: 126). The connections in this model create a chain of links from neighbour to neighbour, connecting areas of this international network over long distances through a certain number of links (Sindbæk 2007b: 61). The international scale of these hub connections creates a 'small world' of trade networks and explains how artefacts in the Viking-Age appear to be so regularly spread (Sindbæk 2007b: 61). It is not unusual for Scandinavian artefacts produced from these hubs to appear in settlement and burial sites at the outer edges of the Viking world (Sindbæk 2011).

Burial sites: beads, society and burial rituals in Viking-Age Scandinavia

Beads, along with other artefacts of personal adornment, are often interpreted as signifiers of personal identity (Hayeur-Smith 2003: 228). The selection and arrangement of such items contains coded information relating to aspects of identity on a 'cultural level' which can be read and interpreted by those in the same or similar social group (Hayeur-

Smith 2003: 228). Key information represented by these artefacts relate to age, status, gender and role (Hayeur-Smith 2003: 228-9; Dommasnes 1982). For archaeologists, the picture of this presentation is incomplete as finds are often found divorced of their intended social context as well as without the associated items (such as clothing) which contribute to the overall construction (Hayeur-Smith 2003: 228). Therefore, Viking-Age jewellery has a special role in attempts to investigate questions of identity (Hayeur-Smith 2003: 228). A key source for deliberate constructions of personal identity is through burial rituals. Burials of the Viking-Age have been a significant source for these artefacts in Denmark, Norway and Sweden (Skre 2007: 18-9).

Aspects of pre-Christian Viking-Age burial rituals which are frequently studied include the grave form, the treatment of the body and grave goods (Dommasnes 1982: 72). A passage from Snorri's *Heimskringla* suggest specific burial customs for Vikings based on Norse mythology; the dead were cremated with all of their worldly possessions as wealth for the afterlife in Valhalla, with great men commemorated through monumental burials and raised stones (Hollander 1964: 11-2). However, archaeological evidence suggests that burial customs in Scandinavia during the Viking-Age were subject to significant variation across regions and communities (Price 2012: 257-8). The decisions regarding burial rites for the deceased depended on a variety of intersecting factors; age, gender, status and role were particularly relevant. Through 'social norms' general patterns of burial rituals based on these factors can be identified in the archaeological record (Svanberg 2003: 20). The most archaeologically visible burial rituals often relate to rich or monumental burials (Price 2012: 263). While cremation and inhumation graves can be characterised as rich, chamber-graves, mounds, and boat burials are thought to taken a large amount of effort in construction and therefore represent a person of high rank (Price 2012: 263). These highly visible burials may represent the importance of leading figures in the community; this has been suggested in relation to the appearance of large male boat-burials at Valsgärde dating to the Vendel Period and Viking-Age, as other deceased are cremated 'regardless of their gender, status or age' (Ljungkvist 2008: 51). Rituals regarding the treatment of the body and deposition of grave-goods are similarly associated with societal position (Solberg 1985: 61). The key assumption in the equation of rich and/or highly constructed burials with high rank/status is that the burial customs reflect aspects of the deceased's life (Dommasnes 1982: 72). This idea is most clearly demonstrated in the assessment of burial goods, which are assumed to have been owned by

the deceased and/or are symbolic of the deceased's role in the community during their lifetime (Dommasnes 1982: 72).

If goods buried with a deceased are reflective of their life, then the analysis of these artefacts contributes to the understandings of the relationship between artefacts of personal adornment and the presentation of personal identity (Hayeur-Smith 2003: 228). Literary sources have presented specific modes of dress which appear to be supported in the grave-good assemblages (Solberg 1985: 68; Dommasnes 1982: 73). Poems and archaeological finds have shown that women in the Viking-Age often wore oval brooches at the shoulders to attach an apron or dress (often with a string of beads in between) and implements such as knives, keys and toiletry equipment (Solberg 1985: 70; Hayeur-Smith 2003: 228). Men of free status in the Viking-Age had a legal requirement (particularly in Norse areas) to carry specific weaponry in accordance with their wealth (Dommasnes 1982: 73; Solberg 1985: 68-9). From the small number of identified child burials dating to the Viking-Age, it appears that small bronze bells, toys and mirrors are artefacts associated with children (Welinder 1998: 188). There is also some evidence that large numbers of beads were attached to outfits or worn as ornaments by children in certain areas (Welinder 1998: 188). There are also examples of deceased children who were treated in a similar manner to adults, with gender-specific artefacts such as weapons or dress-ornaments in numbers comparable to finds in adult graves (Welinder 1998:188, 192-3). For adults, the acquisition of particular artefacts possibly occurred at different life stages; a key example are oval brooches as a status symbol restricted to married Viking women (Hayeur-Smith 2003: 230). Similarly, white cowrie shells in female graves aged between five and 15 in Gotland have been interpreted as symbolic representations of the gender and age of the deceased (Thedéen 2010: 103, 109). It is clear that studies of these grave goods often involve more than one aspect of the identity of the deceased.

Studies which have focused on the analysis of the wealth and status of the deceased often use statistic valuations of the grave goods (see Ringstedt 1997; Solberg 1985). Graves with high numbers of goods, and/or large numbers of high quality goods are interpreted as representative of the deceased's social importance (Solberg 1985: 61). In a study of chamber graves from Birka, Ringstedt uses a type value method to statistically analyse the wealth of the graves (1997: 133). This analysis was based on specified categories of artefacts; weaponry, equestrian equipment, jewellery, beads, personal objects other than jewellery, trade related items, tools, and household objects (Ringstedt 1997:

135). From this study, beads appear to be a low-value artefact occurring in high frequency; beads formed 56% of the total number of artefacts (Ringstedt 1997: 134). However, Ringstedt raises the point that beads may in fact have a high social or symbolic value which is not made apparent using the type value method (1997: 134).

One of the ways in which the presence of beads has been used in the analysis of grave assemblages is to define the gender of the burials (see Dommasnes 1982; Solberg 1985; Ringstedt 1997). In many cases due to poor preservation of remains or the practice of cremation, it is not possible to make any determinations of sex based on skeletal remains (Gräslund 1981: 82). Instead aspects of habitual presentation during life, such as modes of dress, are used to make an educated estimation of sex (and, by inference, gender) (Dommasnes 1982: 73; Solberg 1985: 65). Therefore, studies such as Solberg's determine female graves based on '*…at least one conical or oval brooch, five or more beads…and/or textile utensils*…' and male graves based on the appearance of '*at least one weapon*' (1985: 63, 65, emphasis in text). Graves with less than five beads are disregarded as they can also appear in male graves (Solberg 1985: 65). Therefore, a distinct relationship between beads and women of the Viking-Age is created (Solberg 1985: 65). However, these studies such are not without issues. Gendered burials account for only a small amount of the total number of burials and cannot therefore be reliably representative of population demographics (Stylegar 2007: 83). The male-gendered artefacts, such as weaponry, are often more readily recovered by archaeologists (Stylegar 2007: 83). This skews the probability of finding artefacts used to assess wealth in more male burials (Stylegar 2007: 83). Furthermore, the higher rate of change in female dress accessories over time makes it difficult to maintain a set criteria of artefacts which denote wealthy women (Stylegar 2007: 83). Evidence from the study *Iron Age Man in Denmark* found that while most of the beads in Viking-Age graves were found in female graves, there was one grave of a possible male which also contained beads (Sellevold *et al* 1984: 234). This example, coupled with the inherent issues in sex determinations based on osteology, has lead the authors to state that caution must be applied when using beads as 'sex determining criterion' (Sellevold *et al* 1984: 29, 234).

Scandinavian studies which expand further on the relationship between gender and artefacts have analysed the gender roles suggested by the patterns of the goods appearing within male and female graves (Dommasnes 1982). In a study of 213 Late Iron age graves from Sogn in Western Norway, Dommasnes sought to answer whether archaeological

remains could form a secure basis for statements regarding role as well as status in this society (1982: 70). This study revealed that agricultural and cooking related artefacts were slightly more common in women's graves, while blacksmithing, carpentry, hunting and mercantile related artefacts were mostly restricted to male graves (Dommasnes 1982: 77). However, there were exceptions which indicate that the separation of labour roles based on gender was not a strict societal rule (Dommasnes 1982: 77, 80). It has been suggested that specific social circumstances affected the division of roles between the sexes; namely the absence of men away on Viking raids (Dommasnes 1982: 83). This may have resulted in the appearance of engagement in subsistence activities and the attainment of particularly high rank in female graves of the Viking period as women took over traditionally male roles (Dommasnes 1982: 83).

In more recent discussions of gender roles, it has been argued that material culture patterns are suggestive of women in more active roles within trade (Stalsberg 1991: 77). This is based on the appearance of silver weights and scales in female graves in Russia, Birka and in Norway (Stalsberg 1991: 78-9). Stalsberg argues that as the archaeological record has demonstrated that women had economic responsibilities within the home and farm (as evidenced by symbolic artefacts such as keys), it is possible that they held a similar responsibilities in commerce (1991: 80). Furthermore, Øye argues that the importance of textile production at many urban sites indicates that this production may have been run by high status women (2010: 303). This interpretation is based on the idea that textiles were traditionally produced by women, and the appearance of high status burials with strong connections to textile working (Øye 2010: 303). It is argued that such an intensive and sizeable industry required a figure with organisational and administrative power; possibly a parallel to the hierarchy found in textile production in contemporary sites to the south of Europe (Øye 2010: 303). Evidence of prestigious textile equipment such as needle-boxes, are found in more burial deposits than in occupational deposits in the Black Earth at Birka (Øye 2010: 303). It is possible that these deposits are a symbolic reference to the role of the deceased women (Øye 2010).

Beads in Britain: a literature review

In order to effectively discuss the character of Viking-Age bead assemblages in Britain, a brief review of literature regarding bead types, use and bead production will be presented in this section. The selected literature reviewed here are the most relevant discussions of Anglo-Saxon and Viking-Age beads in England, with a brief overview of bead production and types from Ireland. These studies focus on the themes of typology, use, production and raw material types.

Typologies, and chronological phases of bead types the Anglo-Saxon period

Key to understanding patterns in the appearance of beads in the archaeological record of Britain is recognising the pre-existing history of local bead production. The archaeological record of the Roman and early Anglo-Saxon periods demonstrate evidence for the local manufacture of beads, and imports from Ireland and Europe before the arrival of Scandinavian settlers (Welch 1999: 1). The most comprehensive reference guide for bead types appearing in the Anglo-Saxon period is *The Glass Beads of Anglo-Saxon England c. AD 400-700* (Guido 1999). This study aimed to contribute an extensive reference for bead types dating to the Anglo-Saxon period across England based on first-hand observation, including the study of beads in Europe and Scandinavia (Welch 1999: 3). The pictorial and textual representations of the bead types provide a useful framework for identification of similar forms. In particular, the appearance and manufacture of similar bead types in Europe adds to the discussion of the trade of the beads in this early period.

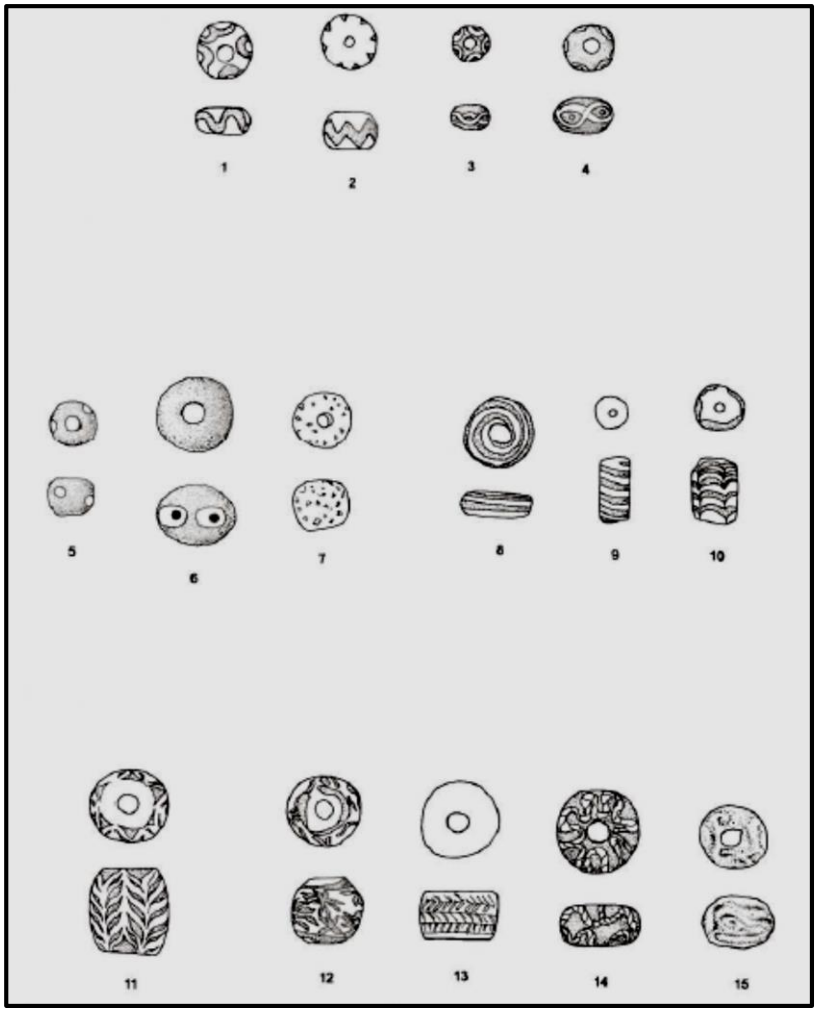


Figure 11: The decorative motifs of glass bead types in Guido (1999: 15).

This book was written from the point of view of a 'bead specialist' concerned with creating an accurate typology and providing dating information for reference purposes (Brugmann 2004: 2; Welch 1999: 3, 10). Therefore, the types presented by Guido are broadly descriptive rather than systematic. Guido aimed to create tight date ranges alongside the typology; however, inaccuracies in the dating of burials based on material culture prevented the formation of an accurate chronological sequence (Brugmann 2004: 3). The resulting correlations between time period and bead types are generalised statements (Welch 1999: 94).

Based on post-doctoral research, Brugmann sought to build on Guido's work by using a sample set of 32,231 beads from 106 Anglo-Saxon graves (excluding cremations) across England (2004: 3, 5). Brugmann's site selection criteria, and typological system are clearly defined. The typology was based on the methodical treatment of bead appearance/form and production and incorporated elements from several Continental

studies (4, 19-26). Comparisons between the appearance of specific chronological groups of types in England, and selected Continental frameworks resulted in a series of phases in development and change over time (42-3).

Table 5: Summary of the chronological bead phases in Brugmann (43, 70).

Bead group		**Chronological phase**	**Date range**
A		Early phase grave goods	
	A1		c. AD 450-530
	A2		c. AD 480-580
	A2b		c. AD 530-580
B		Between Early and Final phase grave goods	
	B1		c. AD 555-600
	B2		c. AD 580-650
C		Final phase grave goods	c. AD650

Significant for the beginning of the Viking-Age in Britain is the last phase (Phase C), c. AD 650 to the end of the practice of interring grave goods with Anglo-Saxon burials (70). The bead types in this phase demonstrate the move away from continental bead fashions (except for the appearance of amethyst beads), with beads instead showing 'vague links' to Scandinavia (70). However, Brugmann states that this chronology is problematic (70). The bead phases relate to the deposition of the beads rather than the production and use, and the dates do not include independent verifications based on accompanying material culture such as brooches (70).

Beads in Anglo-Saxon grave assemblages

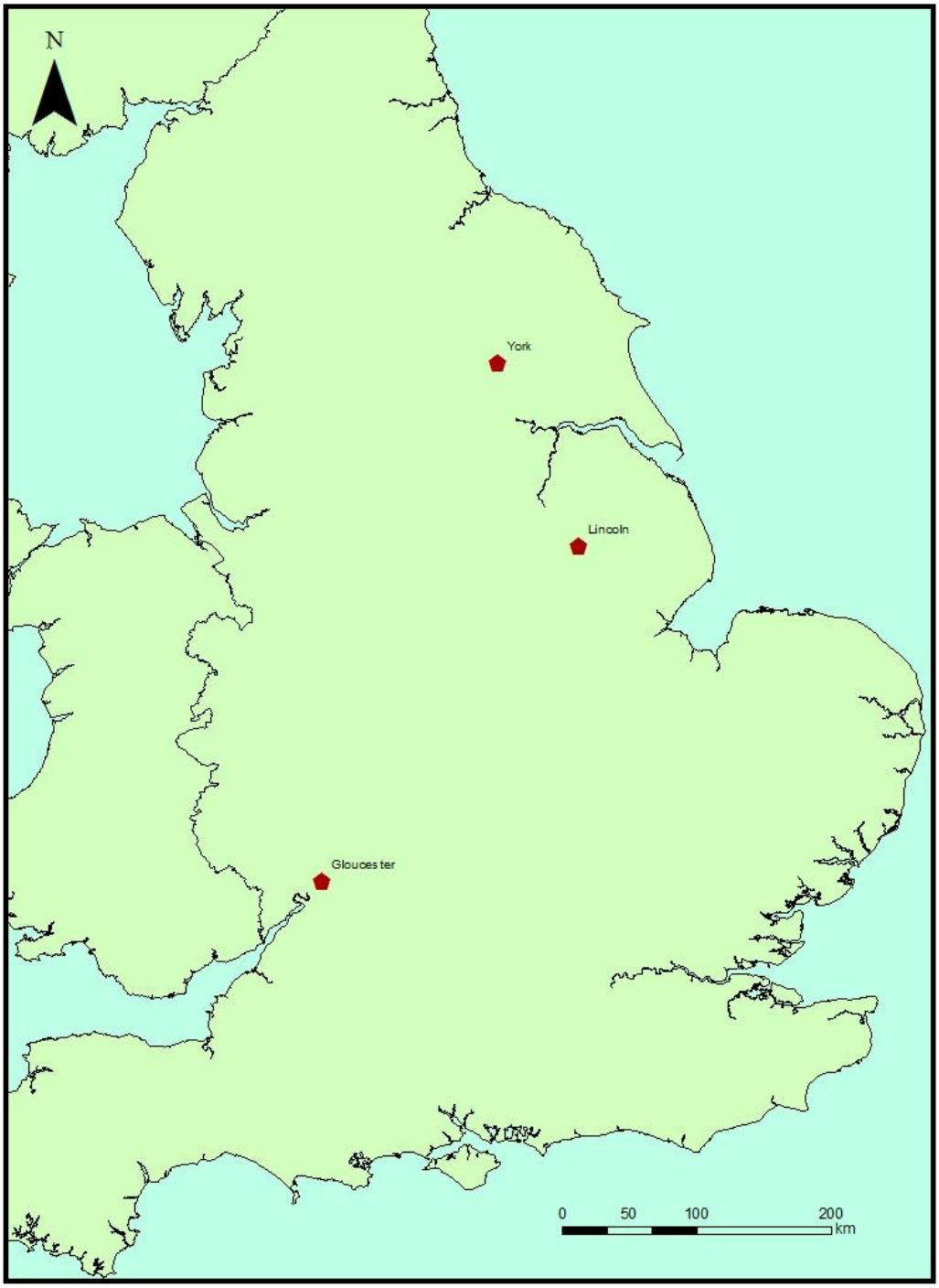
The use of beads in Anglo-Saxon graves is broadly outlined by Stoodley in his study of the relationship between gender construction and burial rites (1999: 20). Stoodley states that beads are a frequently recovered artefact, with monochrome and polychrome glass beads forming the bulk of the finds (20). Beads made of amber, jet, rock crystal, metal and shell beads are also frequently found (20). There is evidence for regional and temporal preferences; for example, amethyst beads are most common found in East Kent, amber

beads are common in the 6th century and orange frit beads are common in the 7th century (20). In terms of the relationship between sex and beads in the Anglo-Saxon period, Stoodley states that 'necklaces of beads, and small collections of beads are female-linked' (34). In fact, Stoodley goes on to state that 'collections of more than one bead are exclusively female', with small collections of three or four beads are considered to be slight indicator of femininity (35, 76). While there are a small number of male graves with single bead finds (excluding sword beads), finds of this type are not considered to be jewellery (35). It has instead been proposed that these single finds were fastened to clothing (perhaps in a functional capacity as buttons), or placed in deposited containers (35). With regards to burial customs, this pattern matches expressions of feminine gender which emphasise the female body through grave goods associated with dress (74-5). In contrast, expressions of masculine gender are separated from the body and based on a 'martial image' through the inclusion of weaponry as grave goods (74-5). When this data is considered along with other factors of personhood, aspects of the deceased's wealth, status and ethnicity had a greater effect on the composition and richness of masculine grave assemblages (139-40). Expressions of femininity appear to be similar across social boundaries of status and ethnicity (140).

The production of glass beads: Anglo-Saxon to Viking-Age England

The study of beads from the Anglo-Saxon period has been a part of wider study of glass and glass-working in England. Beads, vessels and windows form the majority of the evidence for the use and production of glass (Bayley 2000a: 137). Naturally coloured soda-lime-silica glass was the common material for the manufacture of windows and vessels (as well as some examples of beads) (Bayley 2000a: 137). Many bead types and other decorative forms of glass (such as enamel) contained colourants and/or further compositional chemicals such as lead oxide (Bayley 2000a: 137). A key debate in these discussions is whether beads were produced in Britain or imported (Bayley 2000a: 138). There is only minimal evidence for early medieval glass manufacturing and working in England (Bayley 2000a: 137). Possible evidence for this manufacture includes crucibles with glass waste, furnaces and glass production materials and waste (Bayley 2000a: 138). However, it is unclear how many of these finds are related to bead production (Bayley 2000a: 138). However, Bayley argues that to contend that all Anglo-Saxon beads must therefore be importations is an argument based on negative evidence (2000a: 138).

Studies of the glass working industry in the Viking-Age have also involved discussions regarding the production of beads. Evidence for local production is more visible in this period, with the appearance of high lead glass products and techniques in the 10th century from Eastern Europe (Bayley 2000a: 139-40; Bayley 2008: 16). The production of high lead glass is evidenced from Gloucester, Lincoln and York (Bayley 2000a: 139).



Map 2: Known high lead glass manufacturing centres of the Late Saxon/Viking-Age in Britain. Based on Bayley (2000: 139-140). Contains Ordnance Survey data © Crown copyright (Digimap 2014).

At Lincoln, glass artefacts, production remains, and glass-working equipment were found in sites across the city (Bayley 2008: 1). Nearly 90% of the high-lead glass finds came from the Flaxengate site (Bayley 2008). Although there were several examples of alkali glass in the assemblage, evidence from the crucibles suggest that only high-lead glass was being actively worked at the site (Bayley 2008: 4). Scrap lead found in context

with glass-working crucibles suggests that the high-glass lead may have been made on site, rather than imported and re-melted (Bayley 2008: 10). Tesserae and beads of typically Roman glass types are interpreted as either residual finds (in the case of the beads) or importation for 'small-scale glass working' (Bayley 2008: 14-5). It is evident that the rise of high-lead glass production in the 10th-11th centuries did not completely eclipse previous manufacturing methods at the site (Bayley 2008: 16).

Evidence for Anglo-Scandinavian bead production at York includes high-lead glass manufacturing dating to the 11th century (Bayley & Doonan 2000: 2519-20, 2528). Two sites (22 Piccadilly and 16-22 Coppergate) contained evidence for high-lead glass working crucibles and manufacturing waste, which were not found in the manufacturing evidence from other sites in York (Bayley & Doonan 2000: 2520). However, the connection between the evidence for glass working at 22 Piccadilly and 16-22 Coppergate (particularly of residue on crucibles) and the bead products is not without issue (Bayley & Doonan 2000: 2525). Comparisons between the residue and beads of similar material contain different chemical compositions (Bayley & Doonan 2000: 2525). When the chemical compositions of glass and glass waste are identical, the appearance of each material is different (Bayley & Doonan 2000: 2525). Bayley & Doonan state that further appreciation of the relationship between the products and manufacturing waste may benefit from 'a larger programme of analyses' (Bayley & Doonan 2000: 2525). This does not significantly affect the initial interpretation of this production as localised in these sites due to the restriction of finds (Bayley & Doonan 2000: 2525). There is also evidence for the working of soda glass to produce blue coloured beads contemporary to the high-lead glass production (Bayley & Doonan 2000: 2526-8).

Glass working in the early medieval period in Ireland was closely connected to metal-working, as many jewellery designs incorporated glass or enamels insets (Edwards 2008: 287). The industry was also 'concentrated on high-status secular sites…and major monasteries' (Edwards 2008: 288). It is unclear whether the soda-lime-silica glass material was imported, or manufactured on site (Edwards 2008: 288; Henderson 2000: 151). From an early date in the medieval period, millefiori glass rods from the eastern Mediterranean were imported into Ireland (Edwards 2008: 287). In the 7^{th}-8^{th} centuries, developments in glass working lead to the creation of an Irish form of millefiori (or mosaic) design using chequerboard rods and blue-white millefiori insets (Edwards 2008: 287). Bead types in this later period appear in blue, white and yellow, often decorated with trails, spirals and

cabling (Edwards 2008: 287). String-beads with cable decoration have been found in Scandinavian contexts, particularly in Norway and Sweden, dating to the 9th century (see the Methodology chapter for more detail on String-beads) (Briggs 1985: 101). Scandinavian bead types have been found in Viking period contexts, such as the male burial at Kilmainhaim-Islandbridge cemetery in Dublin (Briggs 1985: 94, 101). Several examples from this site have been identified as 9th century types from Callmer's 1977 typology (Briggs 1985: 101, 102).

The production of non-glass beads: identification of raw materials

Discussions regarding non-glass beads in Viking-Age sites have focused on the identification of the material (Hunter 2008). Jet is a type of fossilised wood which has a black colouration with a glossy finish when polished (Resi 2011: 123). As the source for jet in the Viking-Age is restricted to one location (Whitby in North Yorkshire), the accurate identification of jet is significant for the understanding of the movement of materials across Britain (Hunter 2008: 103). The term 'jet-like' covers other mineral compositions (cannel coal, lignite, oil shale and bitumen) which can have the same appearance as jet (Resi 2011: 123). Hunter highlights inaccurate labelling of jet and jet-like materials from Viking-Age sites, stating that 'terms such as jet, shale, lignite and cannel coal [are] being used interchangeably or according to personal preference' (2008: 103). In a chemical analysis of the 'jet' artefacts (beads, bangles and finger rings) found in Viking-Age sites in Scotland (with two examples from Denmark and the Faroe Islands respectively), Hunter found that only two examples were of jet (2008: 103, 109-10). While the identification of amber is frequently accurate, issues arise when the material is analysed for its provenance. An analysis of amber from the 16-22 Coppergate site in York, concluded that while most of the samples fit the chemical signature of Baltic amber, four samples did not (Panter 2000: 2474). The samples could only be assigned as non-Baltic amber due to scarcity of chemical information from other potential sources (Panter 2000: 2474). There is a possibility that the amber came from a local source or was imported from another transoceanic source; there is evidence for indigenous amber in Ireland (Panter 2000: 2474, 2501; Briggs 1985: 104).

Summary

The aim of this chapter was to provide a background for the social and economic processes which affected the production, trade and use of beads across the Viking World. The wider thematic issues presented are intrinsically linked. The conditions which allowed for craft persons to move towards more serial production of beads were the rise in urbanism and long-distant connections, which also allowed for the development of important Viking-Age emporia sites. Trade networks connected the outer areas of Scandinavia with these central sites, and in turn with sites from distant centres in the Middle East and Mediterranean through a few links. This made local and imported goods accessible throughout Scandinavia; it is not unusual then to find objects from the markets of Ribe or Birka at the farm site of Borg in Northern Norway or the rich female burial at Ytre Kvarøy in Nordland (Sindbæk 2011: 58-9). Viking-Age burial rituals dictated that personal items must be buried with the deceased, which limited inheritance practices and helped to create demand for products (Callmer 2002: 152). While these practices varied over time and across geographic areas, the assemblages of goods from many burials offer insights into the personal identity of the deceased. The quantity of burials has allowed many studies to investigate the relationship between artefacts such as beads, and aspects of personal identity (age, wealth, status, gender and societal roles), which allow for a greater understanding of life in Scandinavia during the Viking-Age.

The current state of bead studies concerning Viking-Age Britain is focused on the production of beads within the context of the wider early medieval glass working industry, and the identification of non-glass materials. Developments in Anglo-Saxon glass working are often discussed in a framework which spans the whole of the early medieval period to connect with later developments in the Viking-Age. However, there has been more emphasis on creating broad bead typologies, analysing change over time, and determining the use of beads in burial customs from Anglo-Saxon studies. This research aims to further develop discussions of the appearance of bead types and the use of beads in Viking-Age Britain. These aspects relate to the social and economic processes which occurred in the wider Viking World. By focusing on the ideas of production, trade, and use of beads in burial customs, it is hoped that this study will present a different approach to the study of beads, with comprehensive comparisons to Scandinavian material. This approach may inspire further developments in the study of Viking-Age beads in Britain.

Chapter 3: The Viking-Age in Britain: history and sites

In order to comprehensively present the context for the Scandinavian bead finds, it is necessary to outline a broad account of the Scandinavian presence in Britain during the early medieval period. This chapter will describe key aspects of the archaeological and historical evidence for Scandinavian presence in the areas of Scotland (including Orkney, Shetland and the Hebrides), the Isle of Man, Wales and England. Further discussion at a regional level will be undertaken where appropriate. The socio-political and economic zones of the Danelaw, the Orkney Earldom, and the Irish Sea region will be outlined and discussed with regard to the influence of these zones on the formation of Scandinavian settlement. Due to the sizeable number of sites in the database, a brief summary of the general context of each will be covered in this chapter. Further site details can be seen in Appendix A.1.

Viking-Age Scotland

Evidence for Scandinavian settlement in Scotland is based on historical references, sagas, place names and archaeological remains (Ritchie 1993: 30). In particular, the linguistic and material culture evidence has led to the general characterisation of the settlers as Norse; although Danish settlers (and raiding parties) may have also been present at this time (Fellow-Jensen 2011; 398; Ritchie 1993: 15). Scandinavian settlement in Scotland was largely rural; family owned farms were widespread across Scandinavian controlled territory (Ritchie 1993: 33). There appears to have been significant economic differences in the settlement of Scotland when compared to Scandinavian settlement in Ireland and England (Ritchie 1993: 32). Key to this difference is the lack of evidence for any major trade and craft production centres, similar to those evidenced in Dublin and York (Ritchie 1993: 32). Long distance trade connections do not appear to have been concentrated at a particular site (Ritchie 1993: 33). It is likely that the majority of imported goods in the archaeological record were personal belongings of the first Norse settlers in the early period (Ritchie 1993: 37). Later developments focused on the importation of specific resources such as timber (Ritchie 1993: 37). In general, the economy was a mixture of farming activities and exploitation of local resources (Ritchie 1993: 35-7). Craft

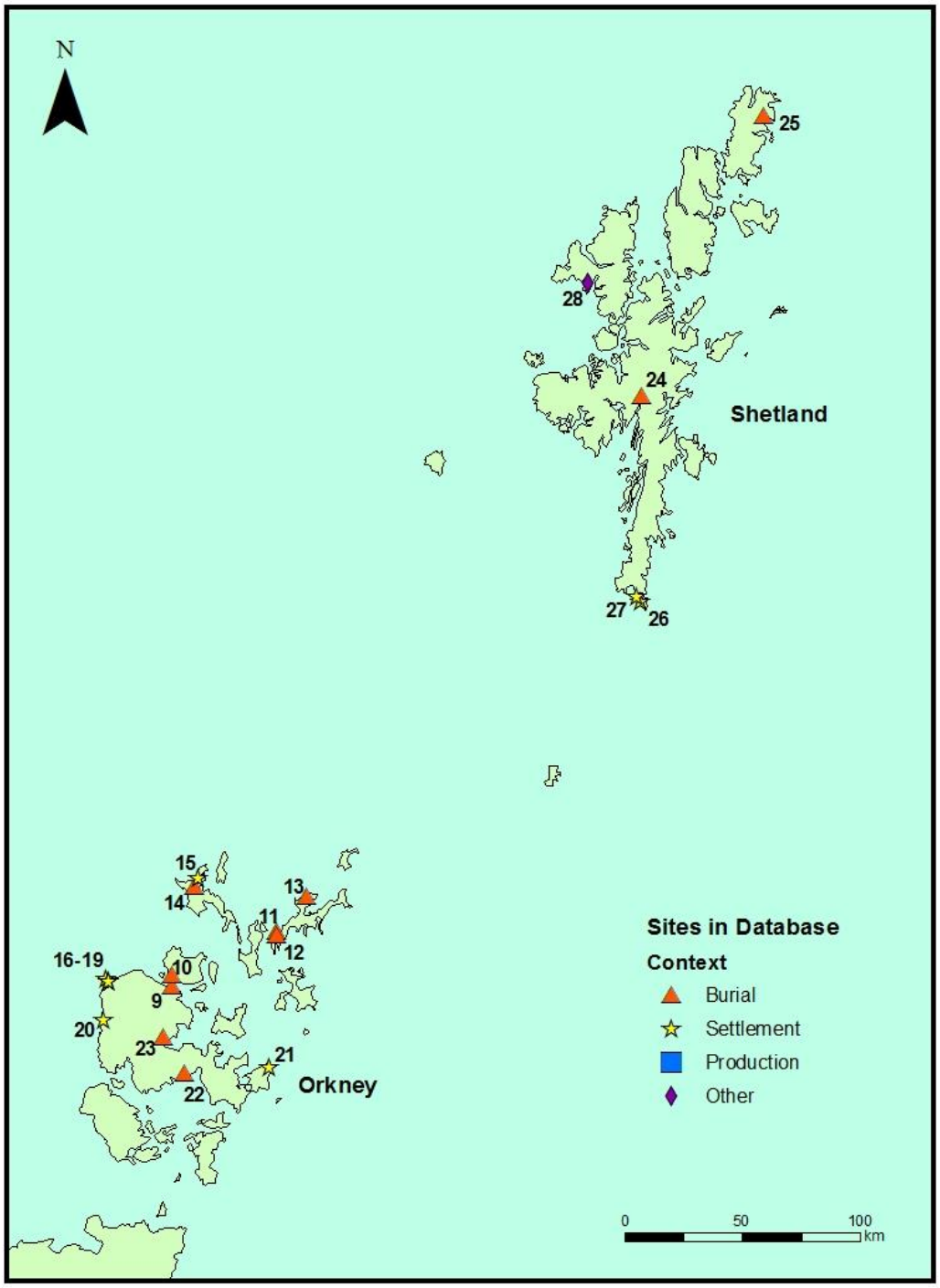
production was localised and small-scale with evidence for specialised craft activity (such as metal working) at a restricted number of sites (Ritchie 1993: 37).

Interaction with (or at least recognition of) pre-existing cultural groups by the incoming Scandinavian settlers is evident in the archaeological record. For example, evidence from cemeteries suggests that these sites were used or reused by Norse settlers without the destruction of the earlier Pictish graves (Ritchie 1993: 25). Early Norse graves were constructed in a pagan tradition with the inclusion of burial goods, while the Christian traditions of the Pictish dictated burial without goods (Ritchie 1993: 25). The nature of this relationship between the pre-existing native population and the early Norse settlers is a much debated issue in Viking-Age studies (Ritchie 1993: 21). The interaction between the Pictish peoples and the Norse settlers has been the focus of this debate. The evidence for dense Norse settlement suggests that the Pictish population was quickly removed in some way (Ritchie 1993: 25). However, this is contradicted by phases of shared material culture at certain sites (Ritchie 1993: 26-7). The debate centres around two characterisations based on these lines of evidence; the total domination of Pictish peoples by the Norse, or peaceful co-existence between these two groups (Ritchie 1993: 25-6). Current arguments have critiqued both ideas and suggest that the interaction was more complex than the fixed pattern of relations specified in these early theories (Barrett 2004: 215).

Orkney and Shetland

The Northern Isles of Shetland and Orkney contain some of the most important archaeological remains of Scandinavian settlement (Graham-Campbell & Batey 1998: 54). The linguistic and archaeological evidence attest to the enduring impact of Scandinavian settlement in this area (Graham-Campbell & Batey 1998: 54). The initial theory for the early presence of Scandinavians was that the islands functioned as bases for the Vikings who raided in Britain and Ireland in the late 8th century (Forte *et al* 2005: 265). However, more recent archaeological work has challenged this view (Graham-Campbell & Batey 1998: 54). The importance of Orkney in particular lies in the establishment of the Orkney Earldom, as recounted in saga tradition (Forte *et al* 2005: 266). This account states that the foundation of this Norse power base occurred as compensation for the death of the son of the Earl Rognvald of Møre (Forte *et al* 2005: 266). Other theories behind the establishment of this dynasty suggest a more deliberate operation; either sanctioned by the ruler Harald

Hárfagri, or as an ‘independent initiative organised by Rognvald and his sons’ (Forte *et al* 2005: 266). However, many archaeologists are sceptical of the connection to Harald Hárfagri as it is likely that the literary evidence is ‘modelled on the much later activities of Magnus Barefoot’ (Barrett 2003: 96). Over time the territory of the Orkney Earldom grew to incorporate Caithness and Sutherland, Shetland, the Hebrides, as well as a presence in Ireland and attempted exertion of power in the Isle of Man (Forte *et al* 2005: 273). The settlement of Orkney was not solely restricted to a base for political expansion (Forte *et al* 2005: 268). The island served as a connecting place for the Atlantic trading route connecting Dublin and York with Norway, Iceland and Greenland (Forte *et al* 2005: 268). Archaeological evidence for Scandinavian settlement in Shetland is less dense than in Orkney; however it contains examples of large settlement sites such as Jarlshof (Graham-Campbell & Batey 1998: 63-5). The environment on the Shetland Islands was less accommodating to farming activity (Graham-Campbell & Batey 1998: 63). Resources of soapstone played an important part in the trade economy of the islands (Graham-Campbell & Batey 1998: 63). It appears that settlement was restricted to the ‘most environmentally favoured areas’; these areas continued to be the focus of settlement through to the modern day (Graham-Campbell & Batey 1998: 65).



Map 3: The distribution of database sites in Shetland and Orkney; 9. Brough of Gurness, 10. Westness, 11. Lamba Ness, 12. Braeswick, 13. Scar, 14. Pierowall, 15. Quoygrew, 16-19. Birsay (Brough of Birsay, Buckquoy, Brough Road Area 2 & Area 3), 20. Bay of Skaill, 21. Brough of Deerness, 22. Greenigoe, 23. Knowe of Moan, 24. Housegord, 25. Clibberswick, 26. Jarlshof, 27. Old Scatness, 28. Hillswick. Contains Ordnance Survey data © Crown copyright (Digimap 2014).

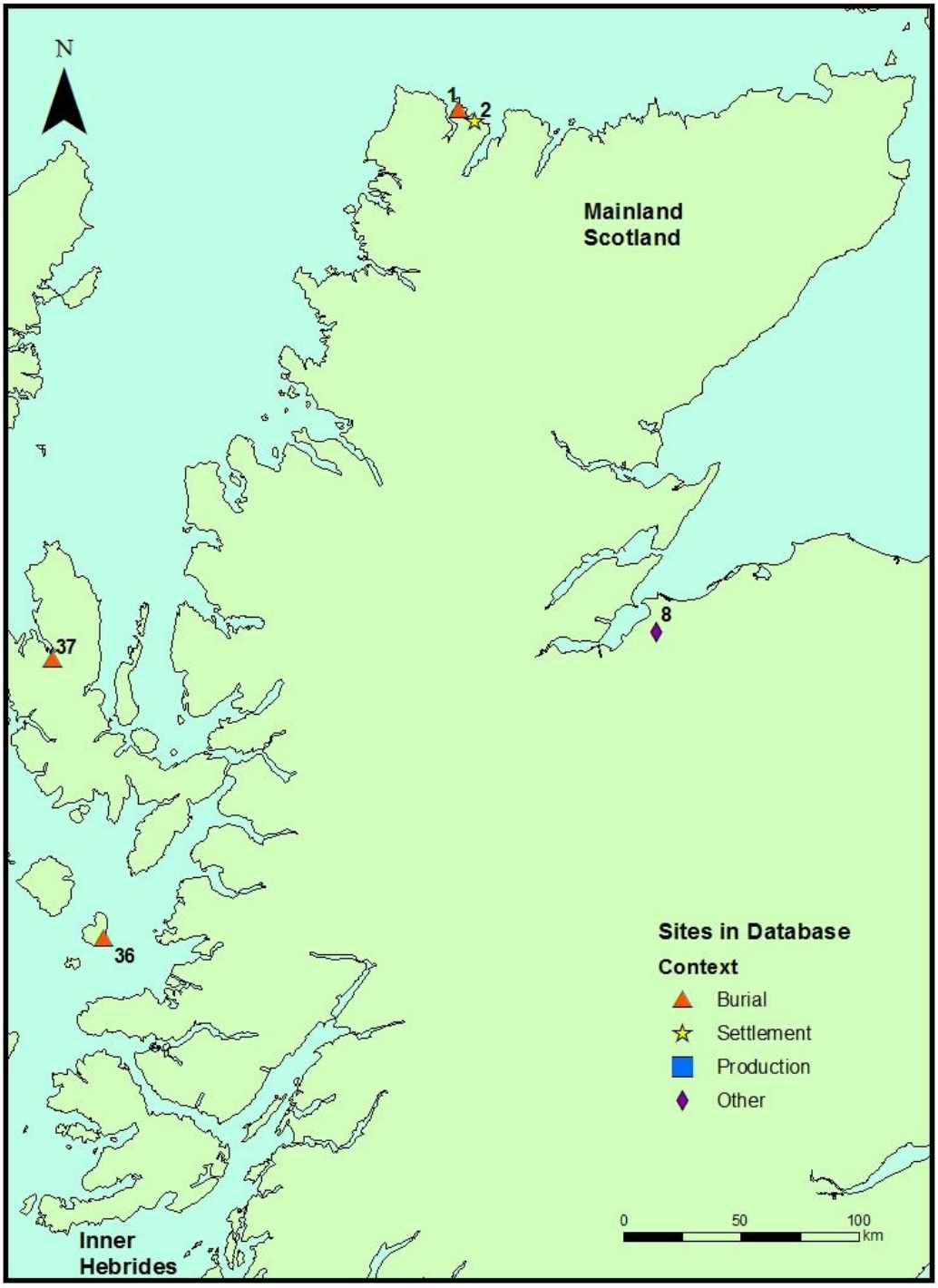
Orkney contains a wealth of archaeological sites; however, the data from many of the settlement sites suffers from underdevelopment in studies regarding 'basic questions of date, place and infrastructure' (Hunter *et al* 1993: 272). More recent excavations at the

settlement sites of Quoygrew and the Bay of Skaill have sought to place evidence of contact and economy within the broader context of the islands (Barrett 2012a; Griffiths & Harrison 2011). The Birsay area has always been a focus for archaeological excavations, particularly as the Brough of Birsay has been interpreted as the seat of the Orkney Earldom (Hunter *et al* 1993: 272). The organisation of the structural remains suggests that this site has a more specialised function than other settlement sites (Hunter *et al* 1993: 272-3). The name Birsay is also thought to derive from the name *Byrgisherað* found in the *Orkneyinga saga*, which is a term denoting an administrative stronghold (Morris 1993: 285). The site also contains evidence for pre-Viking-Age occupation, a feature shared by the nearby site of Buckquoy (Hunter *et al* 1993: 273). Evidence from Buckquoy in particular has been used to demonstrate the transition from Pictish to Norse phases of occupation, characterised by social interaction between the groups (Hunter *et al* 1993: 273; Graham-Campbell & Batey 1998: 164). Further evidence of settlement activity in this area (Brough Road) suggests a developed settlement context within the wider Birsay environment (Graham-Campbell & Batey 1998: 164). Orkney contains the largest concentration of recorded pagan Norse graves (Graham-Campbell & Batey 1998: 54). Burials in the database include single burials (Greenigoe and Knowe of Moan) including the high status boat burial at Scar, areas with clusters of single burials (Lamba Ness/Braeswick) and cemeteries (Pierowall, Westness, and the Brough of Gurness). A further site of significance is the Borough of Deerness. The remains of this site include a chapel dating to the 10th-12th century and structural remains of up to 30 buildings (Gaimster *et al* 2010: 423). The site's importance relates to the religious beliefs of the later Norse inhabitants as the chapel has been interpreted as the earliest demonstration of Scandinavian Christianity in the Atlantic settlement area (Gaimster *et al* 2010: 423).

Sites from Shetland include two burials sites (a child's grave at Housegord and a female grave at Clibberswick) as well as a cache of beads (Hillswick) (Graham-Campbell & Batey 1998: 64). It is suggested that this cache may be the remains of a female burial (Wainwright 1962: 148). Further bead finds have been recovered from the sites of Old Scatness and Jarlshof. These sites are significant multi-period settlements with structural and artefactual evidence for distinct Norse phases of occupation (Dockrill *et al* 2010; Hamilton 1956). Jarlshof is the most well-known example of Norse settlement in the Shetlands; however the multi-period complexity and many early excavations, has meant

that the chronology and relationship between the phases of occupation is ambiguous (Graham-Campbell & Batey 1998: 156).

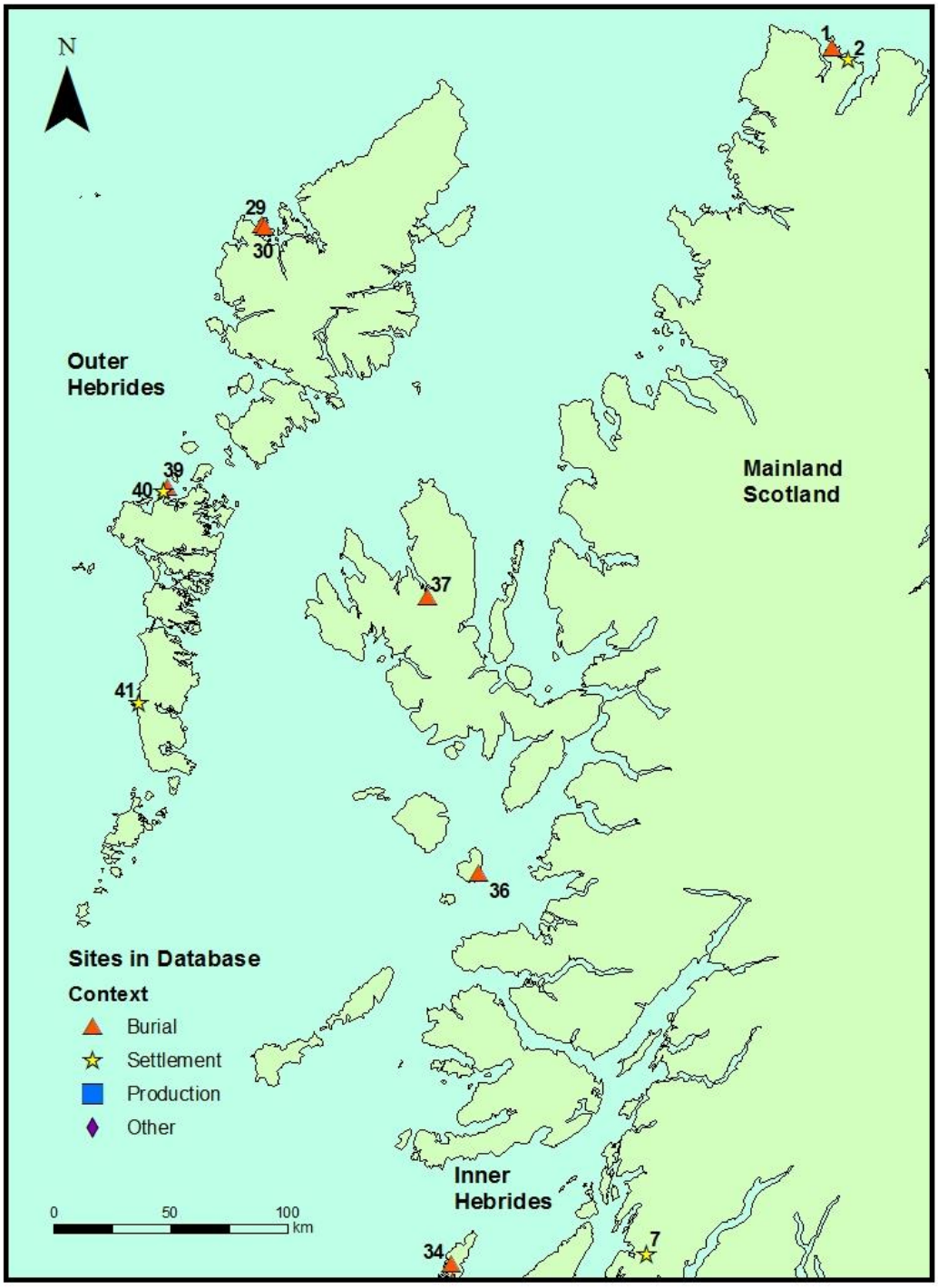
Caithness and Inverness



Map 4: The distribution of database sites in northern Scotland and the Hebrides; 1. Balnakeill, 2. Sangobeg, 8. Croy, 36. Kildonan (Eigg) and 37. Tote (Skye). Contains Ordnance Survey data © Crown copyright (Digimap 2014).

Despite the close proximity to prominent Norse settlement in Orkney, the archaeological evidence is limited in these areas (Ritchie 1993: 72). It has been suggested that the regional names of the northern areas of mainland Scotland (Caithness and Sutherland) have linguistic roots in Norse; *Katanes* meaning 'headland of the cats' and *Suðreland* or 'Southland' (Ritchie 1993: 72). It is likely that settlement in these areas occurred later than in the Isles (Ritchie 1993: 72). The database sites from the Caithness area are the burial of a young male at Balnakeill and the settlement at Sangobeg (Batey & Paterson 2012; Brady *et al* 2007). The site of the Pictish hoard at Croy is located further south in Inverness (Anderson 1876).

The Hebrides and Argyll & Bute



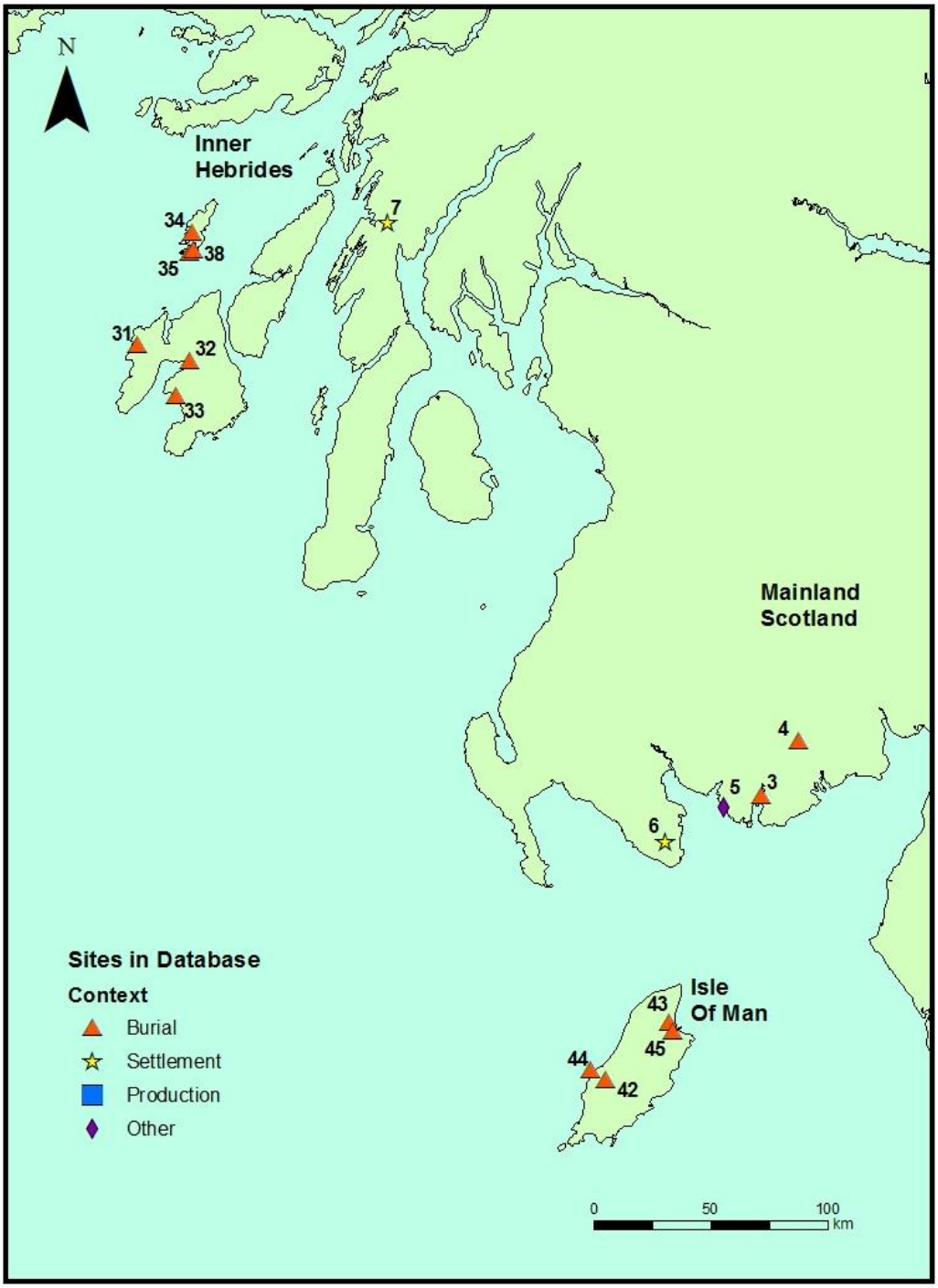
Map 5: The distribution of database sites in the west of Scotland including the islands of the Hebrides; 1. Balnakeill, 2. Sangobeg, 7. Dunadd, 29. Bhaltos (Lewis), 30. Cnip (Lewis), 34. Machrins Machair (Colonsay), 36. Kildonan (Eigg), 37. Tote (Skye), 39. North Uist, 40. Coilegan An Udal (North Uist), 41 Bornish (South Uist). Contains Ordnance Survey data © Crown copyright (Digimap 2014).

Evidence for Norse presence in the west of Scotland is dominated by grave finds which were often discovered and excavated in the 19th century (Ritchie 1993: 77). Very

few grave and settlement remains are visible today (Ritchie 1993: 94). The burials which have been used in this study are located on the islands of Lewis, North and South Uist, Skye, Eigg, Colonsay, Oronsay and Islay (see Maps 5 and 6). Some of the most important sites in the Hebrides are the burials on Lewis. The small cemetery at Cnip (also known as Kneep) consisted of the burials of two females, two males and three children dating from the late 9th century (Redmond 2007: 81; Graham-Campbell & Batey 1998: 74). One of the female graves discovered in 1979, contained a rich array of burial goods consistent with Scandinavian dress traditions (Graham-Campbell & Batey 1998: 74). A further female grave with recognisably Scandinavian artefacts (found in the early 20th century) attests to a strong Scandinavian influence in this area (Redmond 2007: 81; Etheridge *et al* 30-31). The settlement remains at two multi-period sites in North and South Uist (Coilegan An Udal and Bornish) consist of structures, material culture and subsistence economy which demonstrate recognisable Scandinavian characteristics (Webster & Cherry 1972: 203; Sharples 1999).

Evidence for Scandinavian presence in the mainland areas of Argyll and Bute is limited to chance finds and Norse derived place-names (Graham-Campbell & Batey 1998: 84-5). The site of Dunadd in Argyll was a Scottish stronghold attributed to the Scottish royal dynasty, Dál Riata (Lane & Campbell 2000). The site appears to have been occupied from at least the sixth century (Craw 1930: 111). There is no evidence for Norse settlement in the central area of the kingdom, suggesting that the strength of the Dal Riata kingdom and its strongholds (such as Dunadd) kept the Norse settlers out (Graham-Campbell & Batey 1998: 84-5).

Dumfries & Galloway



Map 6: The distribution of database sites in the south west of Scotland including the islands of the Hebrides, and the Isle of Man; 3. St Cuthbert's, 4. Blackerne, 5. Castle Haven, 6. Whithorn, 7. Dunadd, 31. Ballinaby (Islay), 32. Newton Distillery (Islay), 33. Cruach Mhor (Islay), 34. Machrins Machair (Colonsay), 35. Carn Nan Bharraich (Oronsay), 38. Druim Arstail (Oronsay), 42. St John, 43. Cronk Yn Howe, 44. Peel Castle, 45. Claghbane. Contains Ordnance Survey data © Crown copyright (Digimap 2014).

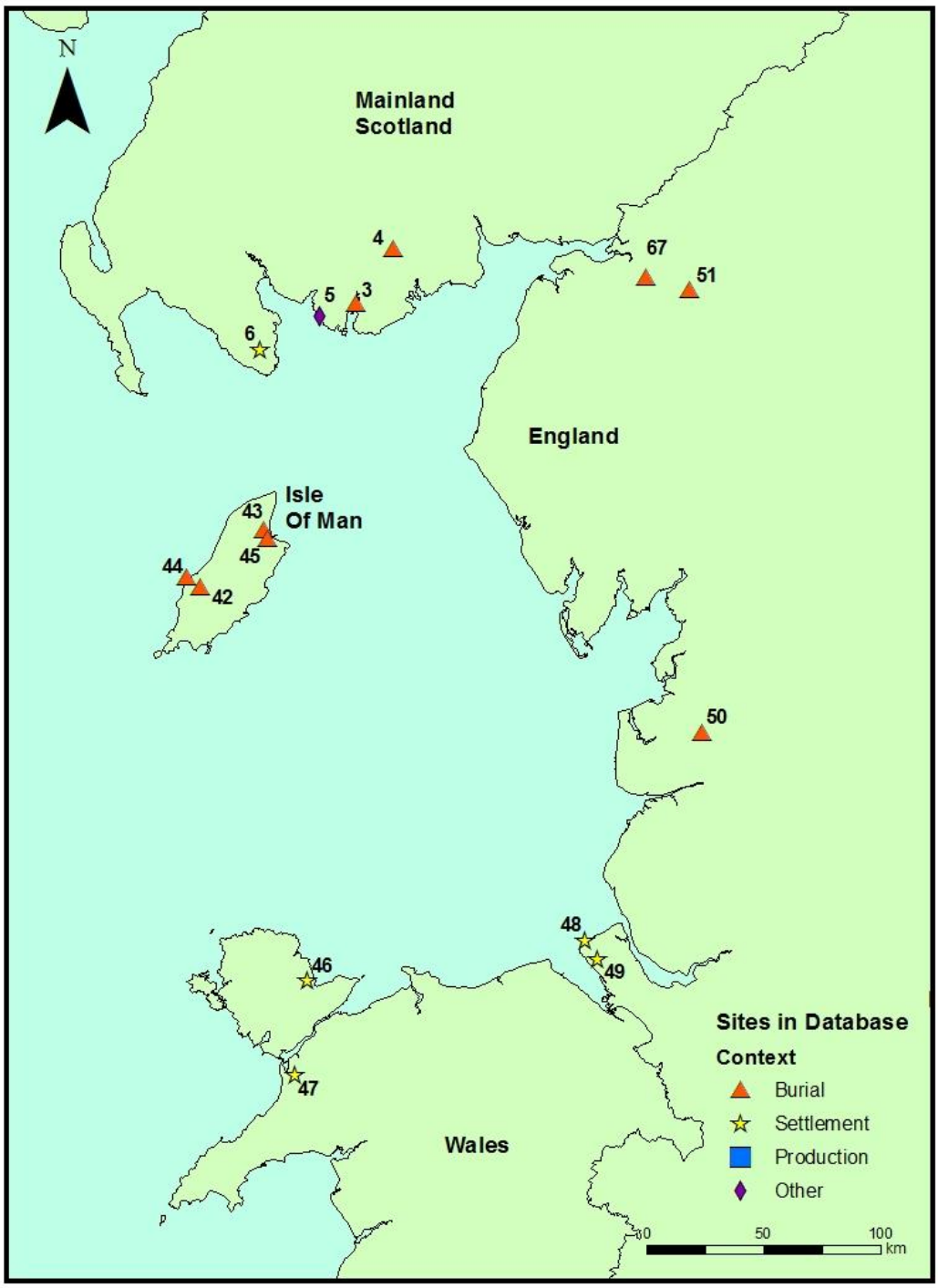
The area of Dumfries and Galloway was a part of the kingdom of Northumbria in the early medieval period, with a mixture of Briton, Irish and Anglian settlers (Ritchie 1993: 21). The small amount of archaeological evidence for Scandinavian presence is restricted to the county of Kirkcudbright and at Whithorn (Cowan 1991: 63). Passing references in the *Chronicle of Man*, *Njal's Saga* and the *Orkneyinga Saga* suggest King Magnus Barelegs of Norway visited and subsequently ruled Galloway in the 11th to 12th centuries (Cowan 1991: 65). However, this evidence is subject to tentative interpretation of names and descriptions of the area (Cowan 1991: 65). Place-name evidence has been studied to some extent; however many of these place-names appear to be much later than the Viking-Age (Cowan 1991: 64). Cowan concludes that the Scandinavian presence in Galloway was 'not significant' and that much of the evidence has been conflated in the interpretations of historians and archaeologists (1991: 71). It is suggested that the area was largely overlooked by Scandinavians as it was not a direct route to any key trade destination (such as York), and that the local population likely provided significant resistance against any incursions (Cowan 1991: 71).

The sites in this area consist of the burial at St Cuthbert's (in a Christian cemetery), the possible burial or cache at Blackerne, surface finds from the Iron Age dun at Castle Haven and the monastic site of Whithorn (Redmond 2007: 76; Grieg 1940: 109; Barbour 1907; Hill 1997). Excavations at Whithorn uncovered evidence for a suggested Hiberno-Norse settlement on the slope of a hill close to the ruins of the medieval priory (Hill 1991: 30). This area has been intensively settled since the early eighth century (Hill 1991: 32). However, the scarcity of finds and manufacturing evidence suggest that Scandinavian contact rather than settlement is reflected in the early phases of this site (Hill 1991: 34).

Viking-Age Isle of Man

The Scandinavian colonisation of the Isle of Man was a significant period in the history of the island (Wilson 2008: 11). The significance of this colony to early medieval and Viking-Age studies lies in the rich archaeological heritage and the establishment of the island as a polity (Wilson 2008: 11). Evidence for Scandinavian settlement from the ninth to the mid-eleventh century is found in studies of 'archaeology, numismatics, place-names and epigraphy' (Wilson 2008: 22). Burials form a large part of the archaeological evidence for early Scandinavian settlement (Wilson 2008: 25). There are 24 early Norse inhumations, in the form of single burial mounds or flat burials, which are described as

‘pagan, or semi-pagan’ (Wilson 2008: 27). Continued or residual pagan beliefs regarding the interment of grave goods has created a rich material culture record (Wilson 2008: 26). Despite the relationship between this practice and Scandinavian paganism, the material culture is not strongly connected to Scandinavian origins; instead many artefacts demonstrate insular origins (Wilson 2008: 55). As with many other areas of Scandinavian settlement, it is difficult to characterise the relationship between the native population and the incoming Scandinavians (Wilson 2008: 13). The seizure of land on the island has been described by Wilson as ‘almost certainly brutal and probably bloody’, with the native Manx population reduced from land owners to labourers or slaves (2008: 87, 89). However, it appears that the interaction between these two cultural groups was complex; social mobility on the island is suggested to have been driven by intermarriages (Wilson 2008: 13). Runic inscriptions, which feature Gaelic and Norse names arranged to suggest intermarriage (or parent/child relationships), have been used to support this argument (Wilson 2008: 77). Linguistic evidence suggests that this relationship was not ultimately fatal for the Manx population (Wilson 2008: 13). Rather, a proportion of the population must have continued to speak the original Celtic based language, as a version of this arose again in the 13th century (Wilson 2008: 13).



Map 7: The distribution of sites in the south west of Scotland, the Isle of Man, Wales, and North West England. This area has been termed the Irish Sea system due to the trade links within this area, including Ireland. The sites shown are: 3. St Cuthbert's, 4. Blackerne, 5. Castle Haven, 6. Whithorn, 42. St John, 43. Cronk Yn Howe, 44. Peel Castle, 45. Claghbane, 46. Glyn, 47. Hen Gastell, 48. Meols, 49. Irby, 50. Claughton Hall, 51. Townfoot Farm, 67. Carlisle Cathedral. Contains Ordnance Survey data © Crown copyright (Digimap 2014).

The database sites located on the Isle of Man are all burial contexts. Claghbane is an exceptional example; it has been interpreted as a 'cenotaph burial of weapons' (Cubbon 1983: 18). Reasons for this unique burial are thought to relate either to the practice of

burying grave goods despite the lack of a body (possibly lost at sea), or to new Christian burial rites (with the separate burial of the body in a Christian cemetery) (Cubbon 1982: 450-1). However, it is also argued that the site may be the result of the removal of objects during the reuse of burial sites for later inhumations (Wilson 2008: 51). The sites of St John and Cronk Yn Howe appear to be associated with unsecure mound burials (Wilson 2008: 38, 50). One of the most significant burials is that of the so-called 'Pagan Lady' excavated from Peel Castle (Freke 2002). The deceased middle-aged female was interred with a range of grave goods which appear to support interpretations of wide ranging cultural links (Freke 2002: 97). This burial contains the largest assemblage of deliberately deposited beads (71 total). Alongside the other 10th century burials, the 'Pagan Lady' is thought to be a part of a group of 'Scandinavian settlers who had been brought up in a non-Christian Scandinavian tradition' due to the inclusion of grave goods (Wilson 2008: 47; Freke 2002: 96-7).

The Irish Sea system

The Irish Sea primarily incorporates the Isle of Man, the surrounding body of water and the connected coastal areas of Ireland, south west Scotland, north west England and north Wales (Griffiths 2010: 16). The movement of Hiberno-Norse from Dublin in the early 10th century established the basis for Scandinavian presence in the Isle of Man, and the coastal areas of Britain (Griffiths 2010: 21). This created shared cultural influences (particularly Irish and Scottish) in Scandinavian settlement within this area, as evident in expressions of imagery and material culture (Griffiths 2004: 133, 135). It has been argued that stylistic developments in metal work from this area gave rise to distinctive 'Irish Sea' types in the 10th century (Griffiths 2004: 135). The trade network consists of connections between harbours which are in turn connected to other centres through overland routes (Griffiths 2010: 18). The contemporary rise of Dublin as a trading town, the regeneration of the trading site at Meols, and the significance of York as a manufacture and settlement site, meant that these sites formed important points in this trade network (Griffiths 2010: 21; Griffiths 2004: 135; Hall 2012: 379). By the eleventh century, the Isle of Man became key to controlling the Atlantic trade route to Dublin, leading to invasions of the island for political and economic reasons by Norse and Irish rulers (Wilson 2008: 24, 120-1).

Map 8: Map of the Irish Sea area (including Ireland) with notable sites and areas (Griffiths 2010: 17).

Viking-Age Wales

Evidence for Scandinavian presence in Wales is best understood within the context of the connections between this area and the other locations (particularly the Isle of Man and Ireland) in the Irish Sea system, and northern England (Redknap 2012: 401). The area was subject to Viking raids (and therefore, contact with Scandinavians) from AD 852 (Redknap 2012: 401-3). Evidence for Scandinavian settlement in Wales depended greatly

on place-name data in early studies (Redknap 2012: 403). Subsequent revisions of this data have discounted many of these examples; the remaining names are derived from navigational points and personal names (Redknap 2012: 403; Redknap 2004: 143). The lack of any linguistic relationship between Welsh place names and the Scandinavian place-names suggests that Scandinavian influence was minimal (Redknap 2004: 143). Based on documentary, place-name and archaeological evidence (particularly of hoards) it has been suggested that Scandinavian settlement was focused in the north-west at Anglesey and Arfon, and the north-east at Tegeingl (Davies 1990: 52). Anglesey in particular was the focus for an attempt to establish a Scandinavian settlement by the Viking leader, Ingimund, who was expelled from Dublin c. AD 902-3 (Redknap 2012: 402). In the later period it is likely that this initially minimal presence in northern Wales was extended to some form of Scandinavian rule (Redknap 2012: 407).

Archaeological evidence for the presence of Scandinavians in Wales is largely limited to a handful of possible burials, hoards, and isolated material finds (Redknap 2012: 406). Only two sites from Wales have been included in the database. Excavations at Glyn, Llanbedrgoch in Anglesey have uncovered the best evidence for Scandinavian settlement in Wales (Redknap 2012: 406). This site contains an early farming settlement dating to AD 600 at the earliest, with activity in the 9th century which suggests Scandinavian influence (Redknap 2004: 147, 150). In particular the evidence demonstrates several patterns of trade networks: artefacts of Scandinavian, Irish Sea and Irish character; hack silver economy; weights with parallels to sites in the Isle of Man and Ireland; ceramics from Chester; and items of personal adornment similar to those found at Whithorn, Dublin, Meols and York (Redknap 2004: 168). The site of Hen Gastell is located on a hill near Briton Ferry in West Glamorgan (Wilkinson 1996: 1). The site contains evidence for activity from the 6th century but has been identified as a possible location of the 12th century castle of a Welsh lord (Wilkinson 1996: 1).

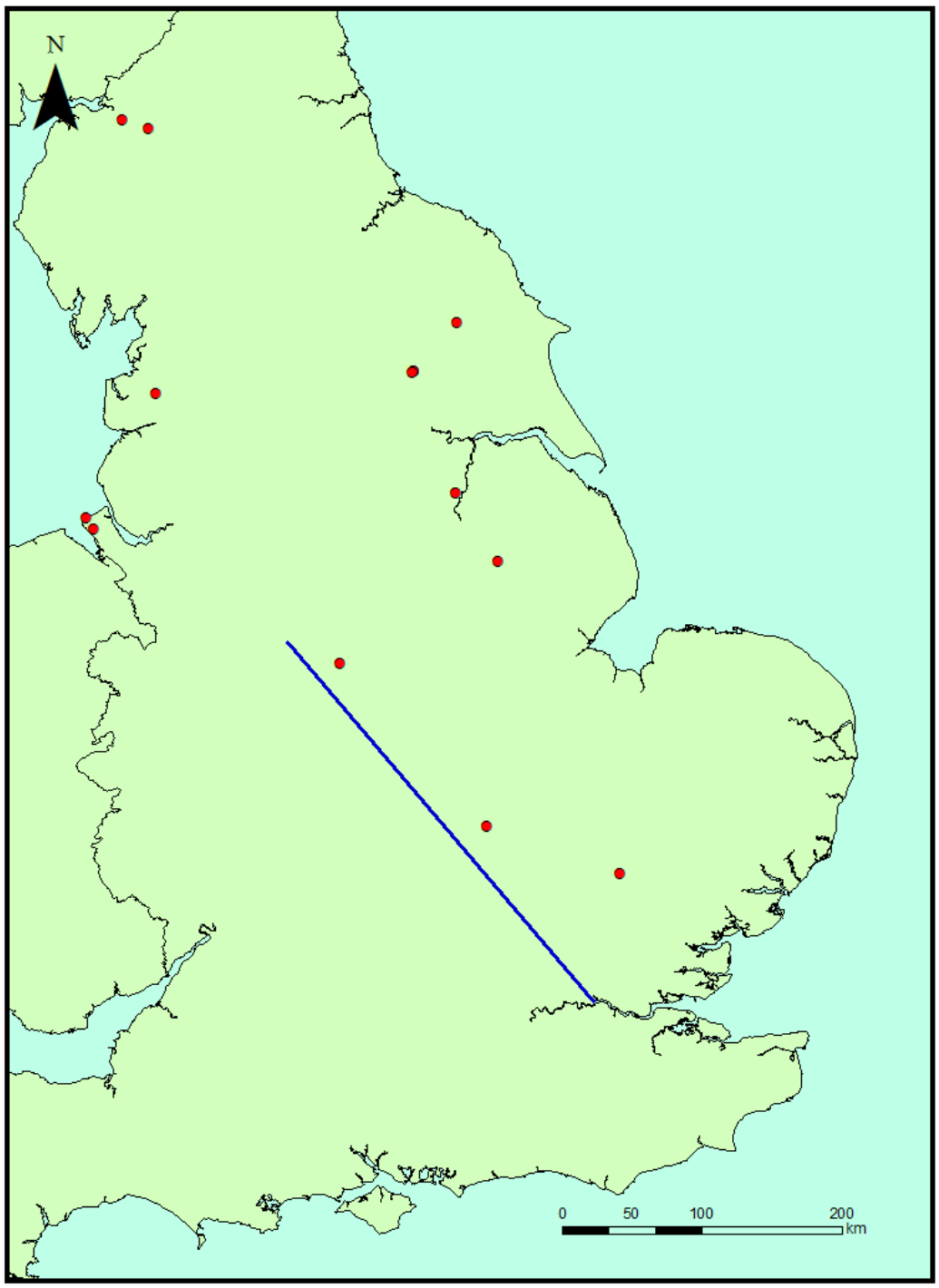
Viking-Age England

Based on linguistic and literary evidence, the Scandinavian presence in England has been characterised as Danish, often with a strong military emphasis (Richards 2007: 9). However, focus on one ethnic group ignores the complexity of the identities and associations between areas of Scandinavia at this time (Richards 2007: 15). The early raids (beginning in AD 840) into Anglo-Saxon controlled areas became more purposeful over

time; over-wintering by raiding parties occurring in AD 850 (Forte *et al* 2005: 66-7). The nature of this presence changed in the AD 860s as the Anglo-Saxon chronicles recorded battles between Anglo-Saxon and Viking (Great) armies (Richards 2007: 32). This activity demonstrates a clear military strategy with the aim of settling England by force (Richards 2007: 34). The success of these mobile campaigns is evident in records of land partitions in Yorkshire, East Mercia and East Anglia (Richards 2007: 35). However, recognisably Scandinavian burials in England are few, and Scandinavian settlement (particularly rural settlement) appears to be 'invisible' to archaeologists (Richards 2007: 9, 189). One of the explanations for this minimal evidence is that the interaction between Scandinavian migrants and Anglo-Saxons created groups with a hybrid, assimilated or entirely new culture (Richards 2007: 9). Major excavations of town sites such as York and Lincoln have demonstrated definable populations of Scandinavian migrants; yet the character of these sites can be better described as Anglo-Scandinavian (Richards 2007: 9).

The Danelaw

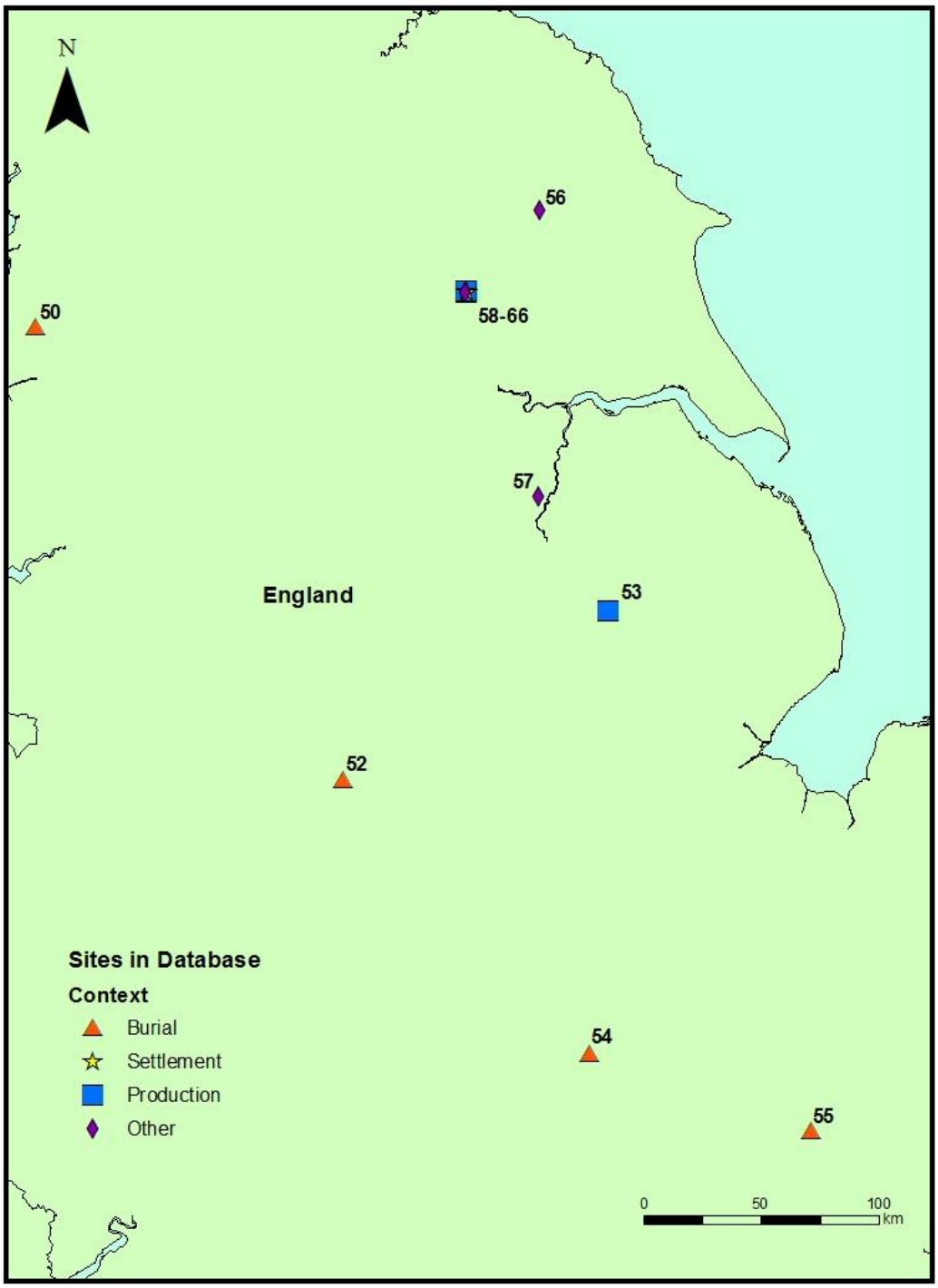
This socio-political area in the north and east of England was controlled by Scandinavians throughout the Viking-Age. It has been long stated that Danish laws and customs enforced this control and shaped the society in this area; however, the extent of this influence is a much debated topic (Richards 2007: 35; Holman 2001: 3-4). This area incorporated much of the north and east of England including Yorkshire, Nottinghamshire, Derbyshire, Leicestershire, Lincolnshire, Northamptonshire, Huntingdonshire, Cambridgeshire, Bedfordshire, Norfolk, Suffolk, Essex, Hertfordshire, and Middlesex (Holman 2001: 5).



Map 9: Map with the approximate boundary line of the Danelaw. This line is based on common depictions of the Danelaw boundary. However, the actual location of this boundary is unclear. Contains Ordnance Survey data © Crown copyright (Digimap 2014).

A key issue with the delineation of this area is that the term has been variously applied in the historical record, usually to places where people of Scandinavian origin had settled (Holman 2001: 5). The influence of these settlers also varies significantly; while major settlements such as York suggest a clear Scandinavian influence in Yorkshire, other areas appear to have little to no evidence for such influence (Holman 2001: 5). This

cultural area was subject to fluctuations under Scandinavian political control over time due to different socio-political events (Holman 2001: 6). One source of evidence for significant Scandinavian influence in this area is the density of place-names of Scandinavian origin (Richards 2007: 55).



Map 10: The distribution of database sites in England; 50. Claughton Hall, 52. Repton, 53. Flaxengate, 54. Harrold, 55. Saffron Walden, 56. Near Malton, 57. North Lincolnshire, 58-66. York (Bishophill, Clifford Street, Walmgate, 16-22, Coppergate, 22 Piccadilly, All Saints Pavement, 6-8 Pavement,

Parliament Street sewer trench, 34 Shambles). Contains Ordnance Survey data © Crown copyright (Digimap 2014).

As demonstrated in Map 10, most of the database sites located in England are within the Danelaw area. Sites to the North-West (Meols, Irby, Claughton Hall, Townfoot Farm, and Carlisle Cathedral) are in a more ambiguous position in relation to this socio-political sphere (Holman 2001: 6). However, their location means that they are within the Irish Sea system. The site contexts for the bead finds in England vary considerably. Some sites are find spots (Near Malton, North Lincolnshire, and Bishophill). A small number are burials which vary in context. Two appear to represent clear links with Scandinavia (Repton and Townfoot Farm), two sites are too poorly recorded to make any secure connections (Claughton Hall and Carlisle Cathedral), and two sites interpreted as demonstrating clear links with Anglo-Saxon culture, or as Anglo-Saxon burials (Harrold and Saffron Walden). There are also sites with clear connections to economic activity (Meols, Lincoln and York) which are also settlement sites (Irby is another settlement site). York is one of the most frequently discussed area of Scandinavian occupation in England (Mainman & Rogers 2000: 2451). The sites within York which appear in this database, range from find spots (Bishophill), settlement and/or commercial areas (Parliament Street Sewer Trench, All Saints Pavement, and Walmgate), and areas of or nearby craft production activity (Clifford Street, 16-22 Coppergate, 22 Piccadilly, 6-8 Pavement, and the later site at 34 Shambles). One of the key features of the archaeological evidence from York is the wealth of material relating to daily life and craft activities focused around the areas of Coppergate, Piccadilly and High Ouse gate (Mainman & Rogers 2000: 2451). A wide range of craft industries are represented, including non-ferrous metal working, amber working, bone/ivory/horn working, antler working, stone working, glass working, and jet working (Mainman & Rogers 2000: 2451).

Summary

It is clear from the summaries in this chapter that archaeological, documentary and linguistic evidence has contributed to the overall understanding of the establishment of Scandinavian settlement in Britain. Much of this settlement was shaped by significant events. Certain sites formed bases for Scandinavian political and economic power over vast areas of Britain. While there were distinct conditions which affected the development of Scandinavian settlement in each area, there are obvious social, political and economic

connections between many of the focal points of Scandinavian settlement. These connections are important for the understanding of the social and economic development of the (often hybrid) communities which arose in these areas.

Chapter 4: Methodology

In this chapter, the methods used to organise and analyse the data will be discussed. The information regarding Viking-Age beads from published sources was compiled into excel spreadsheets. Each record of a bead or group of beads contains every available detail regarding the morphology, with notes on the manufacture and context information. This information was used to create useful categories of bead types in an organised system for comparisons with classifications from other bead studies. The organisation of the bead types into a system based on characterisation will be detailed further below. Callmer's (1977) study of beads appearing in Viking-Age Scandinavia is the seminal research on the bead types in circulation at this time period. While this research provides useful comparative material, a critique of his classification will also be presented below. The main analysis of this study is the appearance of beads in patterns which infer processes of production, trade, and use in burial contexts. This analysis used data regarding the morphology of the beads in combination with information from literature on the location and context in which the beads were found, in order to detail and outline the relevant patterns. Further detail on the specific methods used in the analysis of these patterns (including a discussion of relevant themes and ideas), will be presented below.

Bead classifications

The classification of artefacts has a pragmatic purpose in the organisation of large numbers of artefacts (Read 2009: 19). The defining features on which typologies are based (material type, function, style, shape, technology, time period or region), generally align with the questions proposed in the research (Read 2009: 20; Rouse 1960: 314). Some studies seek to create a definitive typology for an artefact which can be applied across sites; one of the first attempts to create a universal frame work for the study of beads was Beck in 1928. Beck recognised the need for a universal guideline for the description of beads in research to mitigate situations where one type of bead is labelled differently across publications (1928: 1). This study provided researchers with a standard terminology and measurements to apply to studies of beads from different geographic areas and time periods. While some of these methods have been adopted, studies of beads generally continue to be framed within the conditions of a specific site assemblage. The following

section will critically discuss the typology of one such study: Callmer's research on Viking-Age beads from Scandinavia (1977).

Callmer's study attempts to classify beads on a wide geographic and chronological scale (7). The aim of the work was to create a typology for Viking-Age beads which could then be used to create an accurate 'typochronology' (Näsman 2003: 231). The systematic typology and chronological framework in this study has been used as a reference guide for comparable types appearing in other Viking-Age sites. The typology was based on extensive first-hand study of the bead assemblage. To recognise the wide variety of bead forms, Callmer's typology uses multiple attributes with highly specific criteria to define a type. The delineation of these attributes often incorporates a mathematical element in both the terminology and the measurements (33-35). For example, the listed shapes are labelled using terminology borrowed from geometry (33-35). The resulting terminology is cumbersome; shape 145 is 'planum parallel rhomboid discoid with facetted edges' (35). There are few site typologies which apply this level of detail; most literature sources, such as of Meols or York, use more standardised terms such as annular, globular and cylindrical (Tyson 2007 247-8; Mainman & Rogers 2000: 2592).

One of the most useful aspects of Callmer's typology is the descriptions and diagrams of glass bead decoration (36-42). While these descriptions also contain a high level of (and arguably overemphasis on) detail, this decorative framework provides an excellent guide for comparisons with studies of beads from other Viking-Age sites. For example, motif '351 nonframed circular eye with rectilinear rays' (37) has been directly identified on at least one example from Peel Castle (Freke 2002: 342). Another useful aspect of Callmer's study are the groups created based on shared attributes from these types (78-91). These groups are discussed with regards to their chronological appearance in Scandinavia, and their manufacturing provenance (78-99). By creating these groups, Callmer demonstrates changes in the character of beads in Scandinavia over time (9). This data can be used to understand the origins of particular bead types, and compare their chronological history in Scandinavia with their chronological history elsewhere (for example in Britain). However, it must be noted that more recent publications on urban sites within Scandinavia have shed more light on the appearance and manufacture of bead types (Sode 2004). In light of the critique regarding the unsecure foundations behind Callmer's chronology (Näsman 2003: 231), this work is most valuable as a broad framework for typological comparisons.

Bead characterisation

As discussed in the previous section, a key part of the study of beads is the creation of a system of typology. However, it was determined that the creation of the new typology based on the beads in the database would not contribute any new insights into the understanding of Viking-Age beads in Britain, particularly as the data was obtained from secondary sources. The application of Callmer's (1977) well-developed bead typology was deemed too unmanageable for this study. Therefore, it was decided that to effectively organise and represent the data, the beads would be characterised based on discrete traits. A simple and broad characterisation with minimal divisions within categories was applied to the beads in the database. The breadth allows for comparative analysis with existing typologies based on shared attributes. By characterising the beads in this manner, this study is able to present the forms in a flexible manner to accommodate the varied nature of the assemblage and the information available on each example. Further detail on the recorded information can be seen in the original records for each bead (Appendix A.2 & A.3). This characterisation was also designed to be applicable across all raw material types.

As the physical appearance of bead types is the key basis for many organisational systems (and as the majority of the sources focus on the form of the bead), it was decided that the characterisation would be based on discrete traits relating to form. The traits chosen for this research are raw material, shape, colour (including transparency/opacity) and decoration. The terminology used for these traits draws on general literature regarding bead classification (Beck 1928), literature on the classifications of beads from Viking-Age Scandinavia (Callmer 1977), and literature on the classification of beads from various sites in Britain (Guido 1999; Mainman & Rogers 2000: 2592). As stated above, the data was derived from accessible literature, with some determinations made based on the appearance of bead in images (both drawn and photographic), and first-hand observations where possible. The coding system uses an arbitrary alphabetical, numerical and word based method similar to classifications in the consulted literature (Callmer 1977: 33-7; Hirst 2000: 126). The coded divisions may incorporate several bead examples, or divide the beads into individual categories based on the appearance of one example. The following sections detail the terminology and appearance of the traits in the database assemblage.

Raw Material

As discussed previously, most of the raw material types have distinctive attributes relating to the natural appearance or manufacture of the material. These attributes allow for identification of type by observation. However, there are examples in the database where attributes of one material type are indistinct from another type. Scientific testing to reveal such details as the chemicals involved in glass production or the raw material origin for amber, have been applied to a small number of examples (see Mainman & Rogers 2000; Bayley 2008). These details are only available in a small number of sources; therefore this aspect has not been included as a method of characterising the bead assemblage.

Table 6: The raw material categories and coding used in the characterisation of the bead assemblage.

Raw Material Types	
A.	Glass
B.	Amber
C.	Jet/jet-like
D.	Metal
E.	Cornelian
F.	Crystal
G.	Bone/animal organic
H.	Shell
I.	Stone/Clay
J.	Faience
K.	Unknown

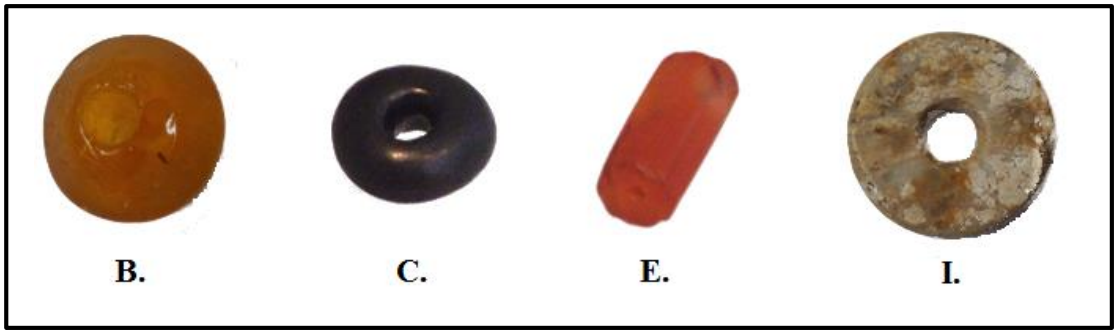


Figure 12: Examples of beads of different raw material types. Left to right: cornelian bead from the Brough of Birsay; amber bead from 16-22 Coppergate; jet bead from Kildonan; marble bead from 16-22 Coppergate. All photographs by author, courtesy of YAT and the National Museum of Scotland) (2014).

Shape

The shape of the bead is usually based on a visual assessment, which occasionally employs a system of measurement to identify certain shapes (Mainman & Rogers 2000: 2592). For the purposes of this characterisation, the shape categories have been kept intentionally broad. Additional divisions within a shape type which appear in other studies (for example small, large, and long biconical in Guido 1999: 13) were not applicable due to the limits of the source material.

Table 7: The shape categories and coding used in the characterisation of the bead assemblage.

Shape types	
a.	Annular
b.	Globular
c.	Cylindrical
d.	Melon
e.	Segmented
f.	Biconical
g.	Discoid
h.	Spherical
i.	Other
j.	Unknown

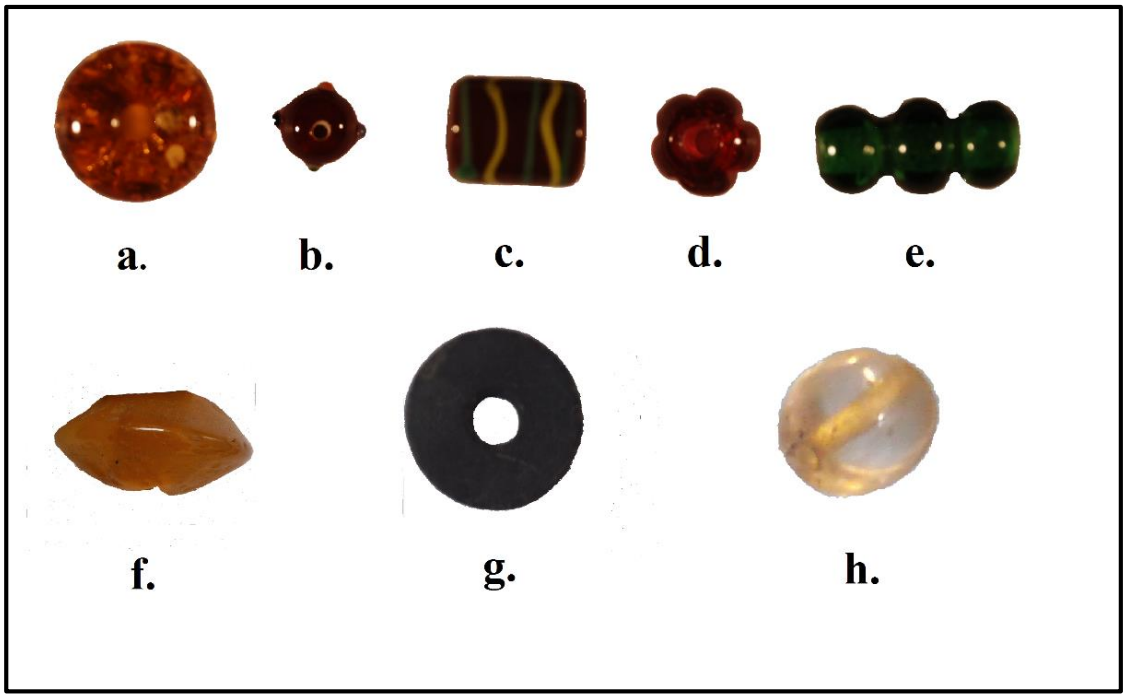


Figure 13: Selected examples of bead shapes with appropriate coding. All photographs by author; bead replicas were used, except for discoid (g) and spherical (h) examples (courtesy of YAT and Saffron Walden Museum) (2014).

The majority of the shape labels are standard types found in most bead studies. Decisions regarding the definition of certain labels are as follows:

- The term *Melon* has been chosen to describe beads with an exterior surface which is curved into segments (see example above). In the literature, these beads have been labelled as fluted, melon, gadrooned and dimpled (Tweddle 1986: 221, Paterson *et al* 2014: 47, 82, Mainman & Rogers 2000: 2592).
- *Annular* and *Globular* beads have definitions based on dimensional requirements (Mainman & Rogers 2000: 2592). For annular beads, the ratio for the height to diameter is less than 1:2 (Mainman & Rogers 2000: 2592). For globular beads the ratio for the height to diameter is greater than 1:2 (Mainman & Rogers 2000: 2592). However, the application of this dimensional principle varies across the literature. In most cases, the original determination of the shape type from the literature has been kept as further examination of the bead was not possible.
- The category of *Other* has been included to incorporate shapes which do not fall within the definition of the most common shape categories listed above.

Colour

Table 8: The colour and opacity categories, and coding for the characterisation of the bead assemblage**.**

Colour types: Translucency		**Colour**	
1.	Translucent	**.1**	Blue
2.	Semi-Translucent	**.2**	Red
3.	Opaque	**.3**	Green
4.	Unknown	**.4**	Brown
		.5	Black
		.6	Yellow
		.7	Orange
		.8	White
		.9	Grey/Silver
		.10	Colourless
		.11	Foil (silver/gold)
		.12	Polychrome
		.13	Unknown

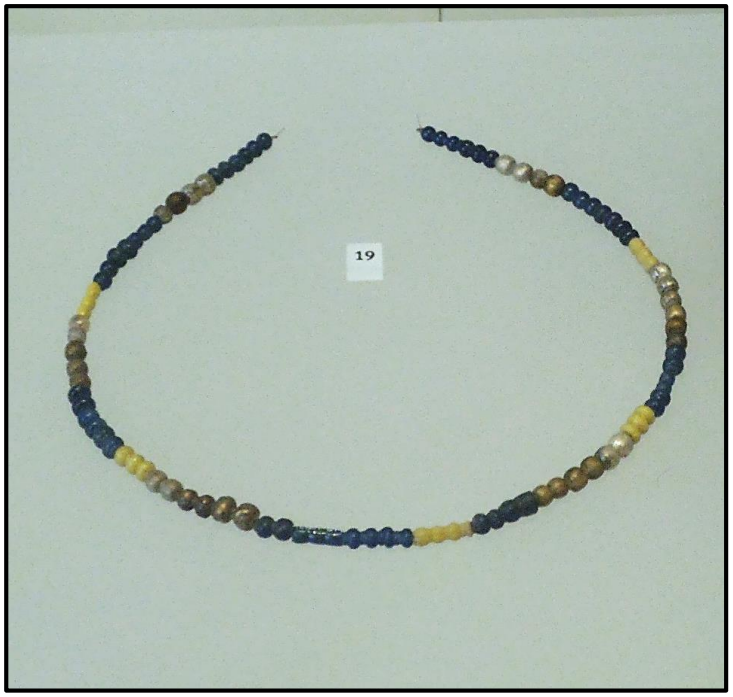


Figure 14: Necklace of segmented beads from Burial A at Cnip, including examples of silver and gold foil coloured beads. Photograph by author, courtesy of National Museum of Scotland (2014).

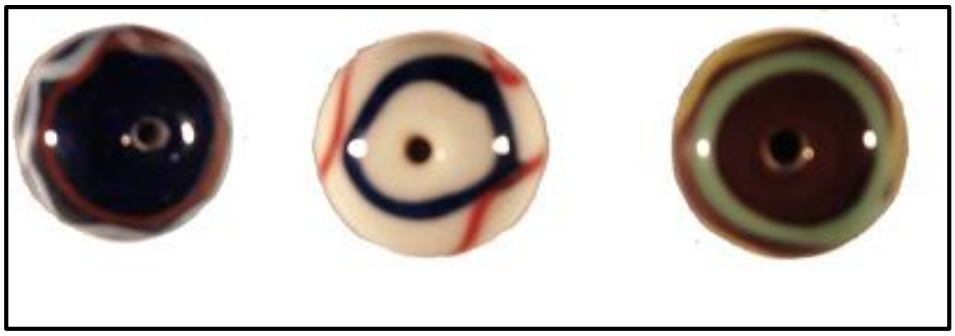


Figure 15: Examples of polychrome beads. Photograph of bead replicas by author (2014).

The colour of naturally occurring materials (amber, jet, bone, stone, cornelian, and rock crystal) and some manufactured materials (metal) are generally restricted in range. Glass and faience beads demonstrate visible choices in style as the colour of the raw glass is manufactured through the addition of chemicals (Bayley 1999: 89-92). The determination of the colour of a bead is a subjective process based on observation. This process can be complicated if the material (for instance glass) varies in colour across the body of the bead or if the material has decayed (Beck 1928: 52). There is no standard analytical method for the scientific assessment of the colour of beads (Brugmann 2004: 24). The Munsell chart could be used with correct light conditions in a first-hand examination (Brugmann 2004: 24). The labels used for the colour of beads in the database are as follows:

- The labels for single colour (monochrome) beads have been reduced to one basic colour label. For example, shades of turquoise and aquamarine are counted as *Blue* beads. The reason for this simplification is to facilitate discussions regarding the appearance of broad patterns in colour types.
- Examples of beads with colours which blur the line between two labels (for example *Blue-Green*) have been distinguished in line with standard assessments in the literature.
- The label *Foil* relates to a specific manufacture technique in which colourless beads are produced with a metal insert or coating which creates a gold or silver effect (Guido 1999: 78).
- Beads which have more than one colour due to the appearance of decoration have been labelled *Polychrome* beads in order to avoid confusion with beads of mixed colours.

Decoration

The majority of decorated beads in the assemblage are glass beads. There are two metal beads and a stone bead which are also decorated. The main patterns of decorative styles are simplified into key descriptive terms.

Table 9: The terms used to characterise the decorated beads in the assemblage.

Decoration types:	**Sub-Categories**
Mosaic	
	Millefiori
	Millefiori motif
Eye	
	Framed Eye
	Raised Eye
Herringbone	
String	
Twist	
Linear	
	Waved
	Zigzag
	Trail
Spiral	
Moulding	
Filigree	
ND (no decoration)	
Unclear	

Figure 16: Examples of decorated beads in a necklace from Grave 1 at Westness, Orkney. Decorative styles include: 1. *Mosaic*, 2. *Millefiori*, 3. *Eye*, 4. *Herringbone*, 5. (Combed) *Zigzag*, 6. (Crossed) *Waved*. Photograph by the author courtesy of National Museum of Scotland (2014).

Figure 17: *String* and *Twist* decorated beads. Right: *String* decorated bead from Hen Gastell (Gathering the Jewels. Copyright Neath Museum). Left: Bead fragment with *Twist* decoration. Photograph by author, courtesy of YAT (2014).

Decorated beads have a wide range of different motifs and styles which appear under various labels in the literature. The following labels were chosen for the bead decoration:

- *Mosaic* beads are manufactured with 'elaborate combinations of different kinds of coloured glass' to create a composite decoration (Beck 1928: 68). In this study, the term has been used as the main category for composite decorated beads, and is applied to examples which do not clearly exhibit a style with another specific name.
    - *Millefiori* decoration has been included as a sub-category of *Mosaic* as it has the distinction of containing floral motifs within the design (Beck 1928: 68).
    - *Millefiori motif* has been adopted in order to distinguish the appearance of a singular floral pattern from a cut millefiori rod and applied to a bead, from the manufacture of composite patterning.
- *Eye* decoration is the application of a distinct spot or dot (Beck 1928: 63).
    - *Framed Eye* is used to describe examples where a small dot is applied over a larger dot.
    - *Raised Eye* is used to describe a round protuberance of applied glass, occasionally with another dot applied in the centre.
- *Herringbone* is a term used to describe the appearance of beads decorated with a linear pattern in alternating directions from the site of Dunadd (Guido 2000: 175). This form is also known by a variety of other names, most notably as reticella (Guido 2000: 175). However, the use of the term reticella is problematic as it is derived from a much later development in glass working (c. 16th century) (Sode 2004: 91).
- *String* has been used to describe the raised bichrome linear pattern applied to beads (commonly known as 'String-beads') (Campbell 1996: 22; Guido 2000: 176). In some literature, the *Herringbone* and *String* designs have been linked together under the broad heading of 'Cable', also known as 'Reticella' on the continent (Laing 2006: 149). Laing distinguishes three types of cable bead; 1) annular beads with one bichrome cable, 2) the herringbone pattern created when more than one bichrome rod is fused together in alternating directions (*Herringbone*), and 3) beads with bichrome twists applied to either end (*String*) (2006: 149).
- *Twist* has been used to describe bichrome twisted cable which appears within the body of the bead (Guido 1999: 76-7).

- *Linear* has been used to incorporate all decorative styles consisting of lines (applied or incised), excluding the subcategories outlined below.
    - *Waved*, *Zigzag*, and *Trail* are sub-categories of *Linear*. *Trail* is used to label the straight line appearing around the circumference of a bead. The motifs *Waved* and *Zigzag* are closely related. In this study, the label *Waved* is applied to the appearance of lines with rounded arches and a wide interspace between each curve. The label *Zigzag* is applied to the appearance of lines with sharper arches and narrow interspaces.
- *Spiral* has been used to label applied decoration in the shape of a spiral.
- *Moulding* and *Filigree* have been included to describe the cast decoration of two decorated metal beads.

One attribute which is commonly used in the classification of beads is size. This attribute has been excluded from the characterisation as the recording of this feature is too infrequent in the literature. For this attribute to add meaningful data to the existing categories, an even application is necessary.

The production and trade of beads

The methods for the analysis of the patterns of production, trade, and distribution of Viking-Age beads used in this study have largely focused on the bead types and provenance information. These patterns can be better understood when the bead types are analysed in relation to their raw material origin, manufacturing origin and the place of deposition. The analysis of this relationship can be framed in a series of questions:

- Was the raw material sourced locally (either within the site or the regional area), or imported into Britain?
- Based on the bead types and the manufacturing evidence found, what bead types were produced in the production sites within Britain?
- What bead types are considered to be imports into, or products of Scandinavia during the Viking-Age?
- In light of the manufacturing origins for different bead types, how were the beads circulated around Britain? What connections and relationships can be inferred through the movement and deposition of these bead types?

It is clear from these questions that patterns in the appearance of Viking-Age beads operate at different geographic scales. Therefore, the analysis of these processes moves between scales at site level, region level, and across the wider Viking world. The methods involved the quantitative analysis of selected bead types. These types represent the clearest evidence for patterns of production and trade. One bead type (decorated glass beads) required a more specific method of analysis. For this analysis, a grid table (Table 23, Appendix E) of the primary/body colours, the secondary/decoration colours, and the key decorative motifs was created. The data from Table 23 was used to create groups which share colour and/or decorative features. These groups may be more easily analysed for their provenance and distribution data. Maps were created for the visual analysis of the distribution of certain materials. Two key material sources (jet/jet-like material, and amber) were chosen to illustrate the distribution of sites, raw material sources (where applicable) and/or manufacturing sources. These maps were created using a GIS programme with the coordinate data for the relevant sites.

Beads in burial contexts

This section will focus on the most archaeologically visible use of beads; in the material culture of burial sites. The aim of this section is to present the ways in which Viking-Age beads were analysed for their involvement in the construction of personal identity. The analysis of this relationship was focused on three key areas:

1) Analysis of the arrangement of beads in burial sites as display items, using data regarding where the beads were located within the graves in relation to skeletal and/or artefactual material. This information has been quantified and presented to show the most common ways in which beads were arranged as personal adornment.

2) A quantitative analysis of the archaeological determinations of sex and age was undertaken for the burial sites. The relationship between the terms sex and gender is important in this analysis. The term sex relates to the biological characteristics which can be observed in skeletal materials (Hays-Gilpin & Whitley 1998: 3). While definitions of gender vary, it is usually associated with the idea that ‘cultural values [are] inscribed on sex categories’ (Hays-Gilpin & Whitley 1998: 3). Artefacts fall within this latter definition as items associated with (projected) ideas of gender in the past. The purpose of this analysis was to create a backdrop for further quantitative

analysis of the bead finds found with different sexes and ages. The analysis of the association of beads with gender in Britain can then be compared to studies in a Scandinavian context. It is hoped that this comparison will contribute to the critique of gender determination through artefacts.

3) An analysis of the appearance of single finds was motivated by interpretations in the literature which suggest that these finds represent a specialised role for beads beyond personal adornment. Based on these interpretations, beads appear to have been used as amulets or talismans. It is thought that large examples of single find amber beads in male and female burial contexts are representative of the use of amber in a protective role (Magnus 2003: 135). Another example are talismans known as 'sword beads' were attached to the scabbard of a sword (Magnus 2003: 133). By studying these single finds, the relationship between these uses of beads and Viking-Age belief systems can be discussed.

Summary

To conclude this chapter, the methods used to characterise the assemblage and analyse the selected patterns reflect the conditions of this broad scale study. This study has used a system of organisation with broad categories based on the discrete traits of raw material, shape, colour and decoration. This characterisation of the beads allows for the inclusion of multiple assemblages from different sites. By organising the beads in this manner it is still possible to make meaningful comparisons with other broad studies from Scandinavia (Callmer 1977). The analysis of the patterns of production, trade and use in burial contexts used the most relevant evidence from the bead types and site contexts to contribute to the understanding of social and economic interactions in Viking-Age Britain.

Chapter 5: Results

The preceding chapter outlined the methods used to characterise the bead assemblage, and analyse the data for patterns of production, trade, and the use of the beads within burials. This chapter will present the main trends in bead types appearing in Viking-Age Britain and the analysis of these types for evidence which contributed to the appearance of the patterns listed above. In order to understand the presentation of the results, the organisation of the data is as follows. As indicated above, the presentation of the analysis results will move between scales of site, region/area, and beyond as appropriate. The initial two sections (the key trends of the assemblage and the analysis of trade and production) were analysed by dividing the total assemblage into two broad categories. These categories are: 1) sites at which bead assemblages are found with or near evidence of commercial production (termed production sites), and 2) sites at which the beads have appeared as a result of deliberate or accidental deposition (termed non-production sites). This division allows for an examination of the data in recognition of the higher volume of finds within assemblages from production sites with considerable craft working activity. The patterns in each of the life cycle stages connect and overlap. However, only the stages of trade and production have been presented in a combined section as the results of the analysis for these processes are better understood together. The division between the remaining sections (distribution and bead use in burials) has been made in order to organise the data more efficiently and focus on the most relevant patterns. The percentage figures in the following sections are rounded to one decimal point. In order to include the material from each site, the analysis of the bead types in the assemblage was based on the records of a bead type rather than the count of each individual example of a bead type (unless otherwise stated). While in most cases the count of each individual example of a bead type is the same as each record for the bead, there are records where the individual count of a group of beads is unknown (see Appendix A.2 for details).

The character of the assemblage

The database of Viking-Age beads used in this study has a total 499 recordings from 61 non-production sites (including seven records where the beads are grouped and/or the number is unknown) and 371 recordings from six production sites (with 18 examples from 6-8 pavement and 34 Shambles where multiple beads have been recorded in groups – see

Appendix A.2 & A.3 for details). The full characterisation of each bead type in the assemblage (as described in the previous chapter) can be seen in Appendix A.2 & A.3, and has been used to produce concordance tables (Tables 18-20 and Table 22 in appendices B and D) comparing these forms with Anglo-Saxon and Viking-Age Scandinavian types (Guido 1999; Callmer 1977). Selected key characteristics of bead types are presented in this section to further analyse the appearance of these Viking-Age types in Britain.

The raw material

The number and percentage of each type of raw material present at the non-production sites are displayed below (Table 10).

Table 10: Number and percentage of raw material types at non-production sites. The category of unknown material includes examples which cannot be identified to one category.

Material	**Glass**	**Amber**	**Unknown**	**Jet/Jet-like**	**Stone**	**Bone/animal organic**	**Cornelian**	**Metal**	**Crystal**	**Faience**	**Clay**	**Total**
Count	380	52	19	14	15	9	3	2	2	2	1	499
Percentage	76.1 %	10.4 %	3.8 %	2.8 %	3.0 %	1.8 %	0.6 %	0.4 %	0.4 %	0.4 %	0.2 %	99.9% (100%)

The proportions of raw material types present from the non-production sites demonstrate the clear predominance of glass beads (76.1 %). In comparison, the next most frequently occurring material type (amber beads at 10.4%) forms a much smaller proportion of the total. The remaining raw material types (and beads of unknown material) each form less than 5% of the total number. Despite the low numbers of these materials, the presence of a variety of material forms demonstrates a wide range of bead types in these sites. A more comprehensive understanding of this range of types requires closer examination at a site level. With reference to the non-production sites (Appendix A.2), it becomes apparent that certain raw material types are restricted in location. The metal, rock

crystal and two of the cornelian beads derive from the same site (Saffron Walden). The faience examples derive from two sites on the Isle of Man (Peel Castle and St John).

As a point of comparison with Table 10, the raw material types present in the 16-22 Coppergate (hereafter referred to as Coppergate) assemblage are presented in the table below (Table 11). The assemblages from the other production sites (22 Piccadilly and 34 Shambles (hereafter referred to as Piccadilly and Shambles), Flaxengate, Clifford Street) contain material forms restricted to either glass or amber. The site of 6-8 Pavement (hereafter referred to as Pavement) contains four amber beads (with evidence for amber working) as well as the glass beads (MacGregor 1982: 152).

Table 11: Number and percentage of raw material types present in Anglo-Scandinavian contexts at Coppergate.

Material	**Glass**	**Stone**	**Bone/animal organic**	**Amber**	**Shell**	**Metal**	**Total**
Count	228	21	16	14	6	1	286
Percentage	79.7%	7.3%	5.5%	4.8%	2.0%	0.3%	99.6% (100%)

Table 11 demonstrates a clear predominance of glass beads (79.7%), followed by stone beads (7.3%) and amber beads (5.5%). The presence of six distinct raw material types shows a wide range of materials present for one site. This is a reflection of the high number of different craft working activities. There is clear evidence for working of other artefacts of amber, bone/antler, metal and stone at Coppergate (Mainman & Rogers 1999: 1903). While there is evidence for jet-working at the site, the only possible bead find from the later 11th and 12th century contexts is more likely to be a pendant due to the size and decoration (MacGregor 1978: 41).

Tables 10 and 11 establish the predominance of glass beads at this time. It is important to note the differences in the scale implied by each table. The higher percentage of amber in Table 11 correlates to the fact that there are more sites included which contain

amber. To compare the data from Table 10 with these (non-production) sites at a site level, it is clear that there is a higher number of amber beads found at Coppergate (14 complete beads). The largest assemblage of amber beads from a non-production site comes from Peel Castle (10 beads total). Two interesting trends are the lack of jet/jet-like manufactured beads and imported beads of cornelian and rock crystal at Coppergate. The working of jet and jet-like material at York appears focussed on the production of other artefacts types. The lack of cornelian and rock crystal beads suggests that these beads were not imported for sale in the urban market at York.

The glass types

As the glass beads in the database form the greatest proportion of types, a closer examination of the appearance of this material type will reveal important information regarding the key patterns in the variation of types. One commonly analysed variation in glass bead assemblages is to establish the proportion of undecorated (often monochrome) and decorated beads. The recorded percentages of undecorated, decorated and unknown glass types from the non-production sites is presented in Figure 18.

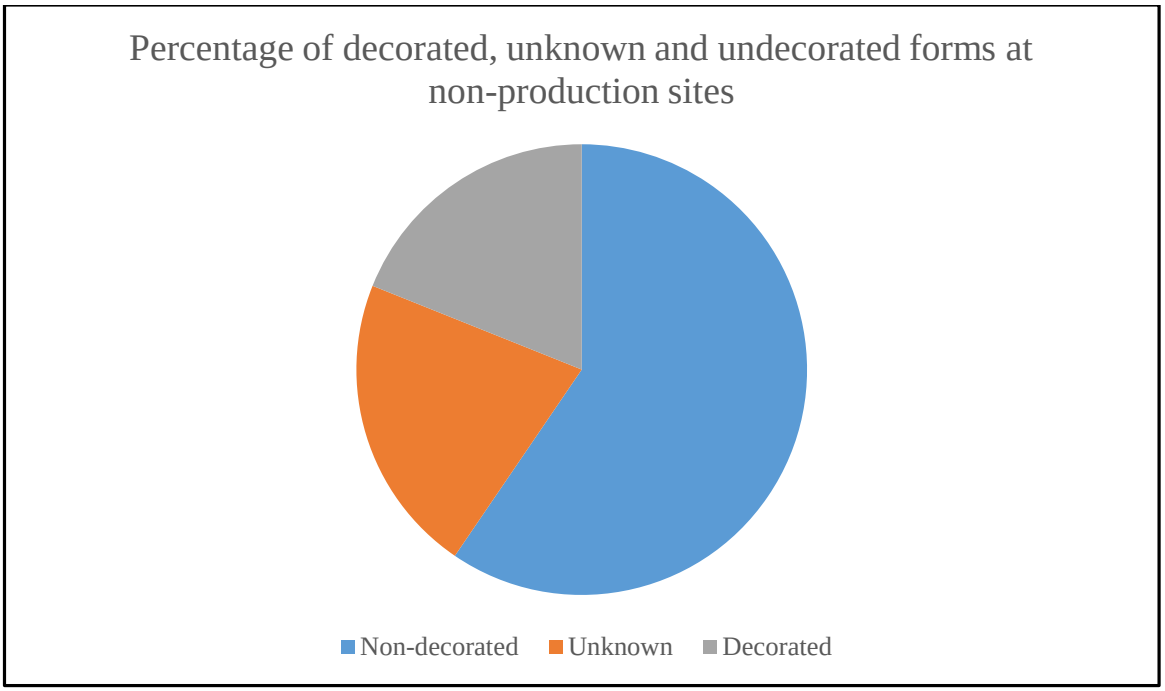


Figure 18: Percentages of undecorated and decorated glass beads on the non-production sites. Beads identified as glass and those identified as possibly glass have been included. The unknown category incorporates beads where there is insufficient information to determine if the bead was undecorated or decorated.

Figure 18 shows that more than half of the glass beads (59%) from these sites are undecorated. The recorded number of decorated beads (22%) slightly outnumbers the records where this information is unknown (19%).

Figure 19 presents the percentages of decorated and undecorated glass beads from the production sites.

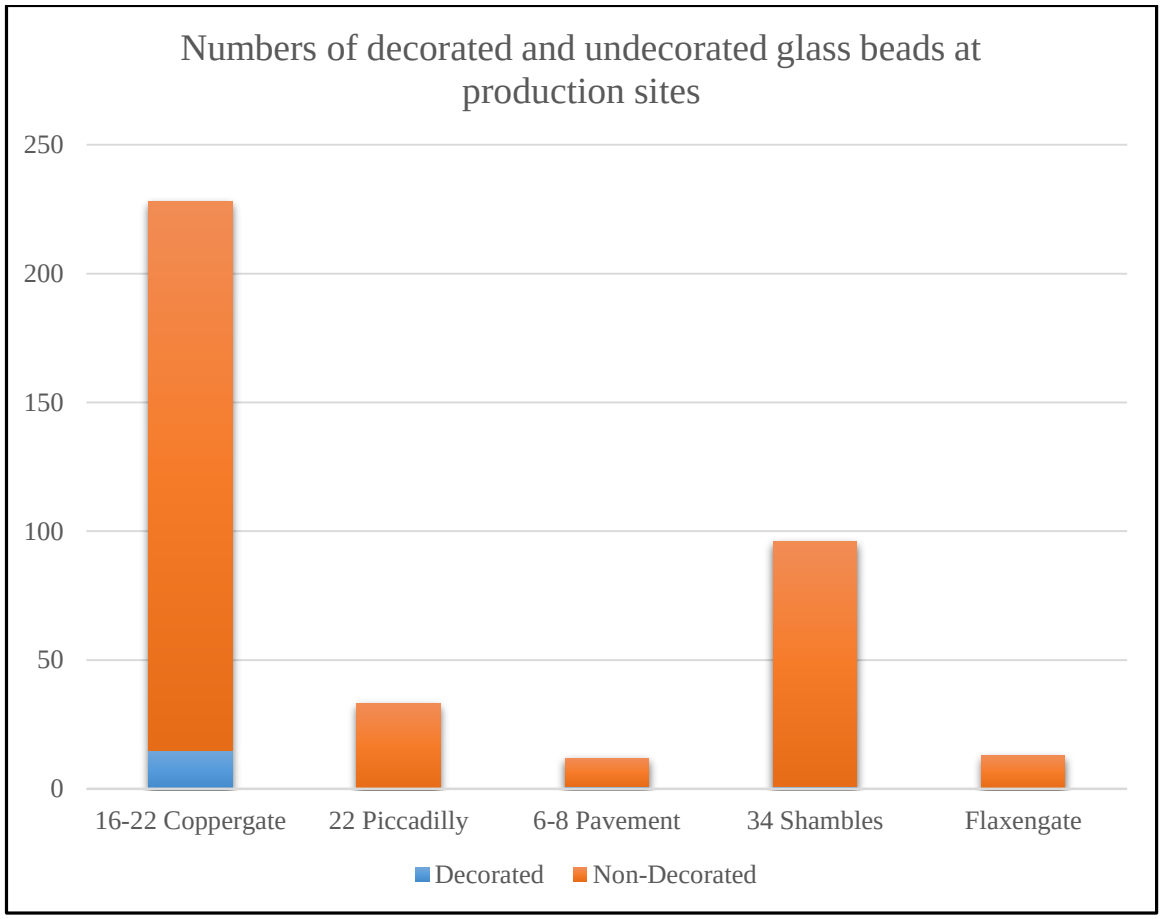


Figure 19: Recorded decorated and undecorated glass beads types at production sites. Due to the well-written records from each of these sites, an unknown category is unnecessary.

It is clear from Figure 19 that undecorated forms also predominate at the production sites. It is important to note that decorated bead forms are not restricted to glass types. Two metal beads from the grave at Saffron Walden (427, 428) contain moulded patterning. A bead of black stone from Old Scatness (187) appears to have an incised linear pattern (Dockrill *et al* 2010: 256).

The attributes of colour and decoration style in decorated glass bead types are too complex to be analysed in a simple, quantitative manner. Further information on the variations in colour and decoration can be seen in Appendix A.2 & A.3, and in the analysis

of the stages of trade and production below. As the dominant glass bead type in the database is undecorated, the variation in colour of these forms can be analysed further in order to gain a more detailed understanding of the appearance of this type.

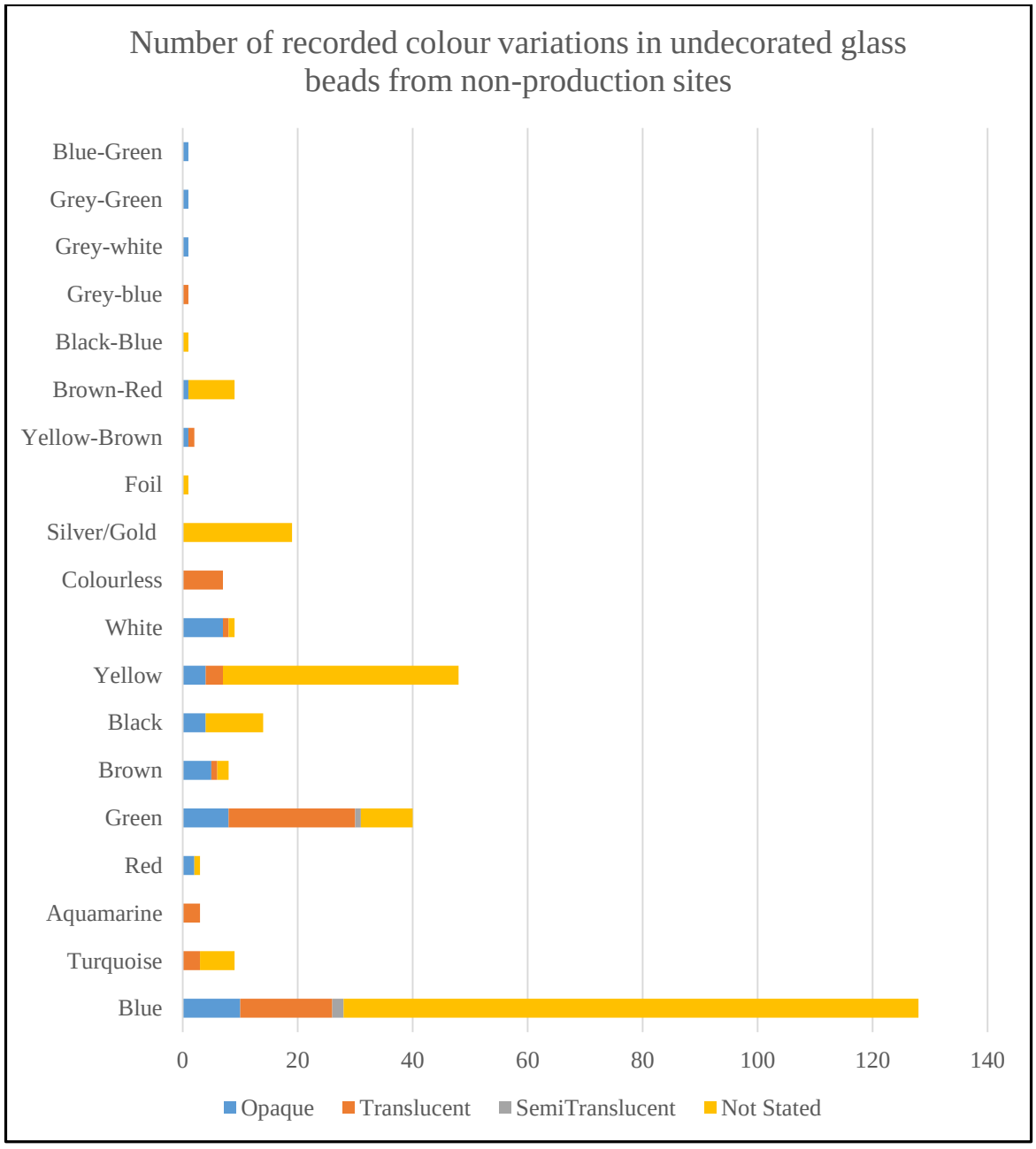


Figure 20: Numbers of undecorated glass beads of different colours at non-production sites. Colours of a different shade (for example Dark and Light) have been incorporated into the main colour group (for example Blue or Green). The records not included in this graph are: five records where the colour is unknown, one record of a bead as 'opaque' and five records of blue and white or white, brown and blue in an unknown combination (mixed, applied decoration or a shade between two colours).

Figure 20 is a representation of the colours present in the database assemblage. There are many further distinctions which can be made in the analysis of this attribute. The trend

from the above graph shows the clear dominance of blue undecorated bead types (128 total), followed by yellow types (48 total). In regards to the distribution of different colour types across the sites, particular types are present in large concentrations at one site. For example, the burial (A) at Cnip on Lewis contains all of the recorded silver/gold beads (Dunwell *et al* 1995). Of the two most common colours, 45% of blue glass beads came from the Knowe of Moan on Orkney, and 75.6% of yellow glass beads came from Meols on the Wirral Peninsula.

To understand the range of colours within a manufacturing context, the following series of pie charts represent the coloured glass bead types from production sites. The labels for the colours at each site reflect the specific variations present in each assemblage. As there is a wide variety of colours at Coppergate, a simplified pie graph was created with broad colour types in order to maintain the comparative integrity of the pie graph series. A bar graph showing further details of the variation in colour at Coppergate has also been included.

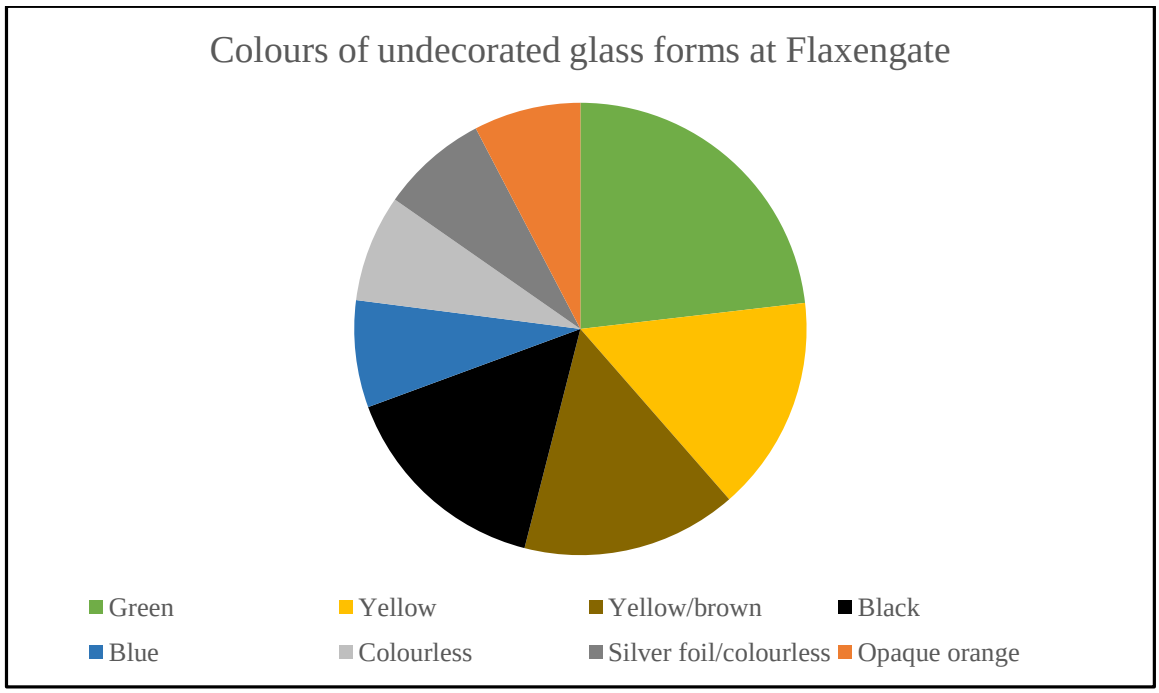


Figure 21: Percentages of the different colours in the undecorated glass bead assemblage at Flaxengate, Lincoln. The data is based on the count of each type in the assemblage.

There is a wide range of colours at Flaxengate, which are relatively evenly distributed in frequency. While there is a dominance of green types (23%), it is not an exceptional proportion of the assemblage. The range of colours present at Flaxengate are affected by the presence of high lead glass working at the site, which typically produces

shades of yellow, with copper added to produce green or a very dark green which appears black (Bayley 2008: 4).

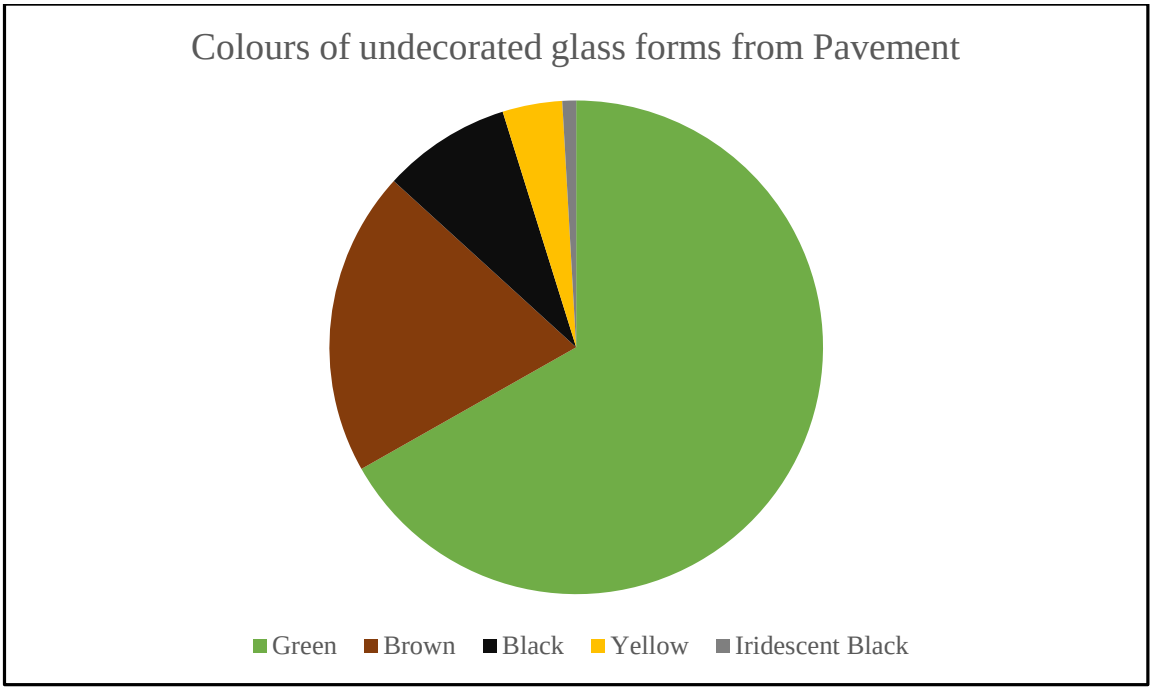


Figure 22: Percentages of the different colours of undecorated glass beads from the assemblage at Pavement, York. The data is based on the count of each type in the assemblage.

The predominant colour at Pavement is clearly green (67%) followed by brown (20%). There is a more limited range of colours from this site and no blue examples. There is no evidence for glass bead working at this site; therefore it is likely that the glass material came from a nearby craft workshop (Mainman & Rogers 2004: 474).

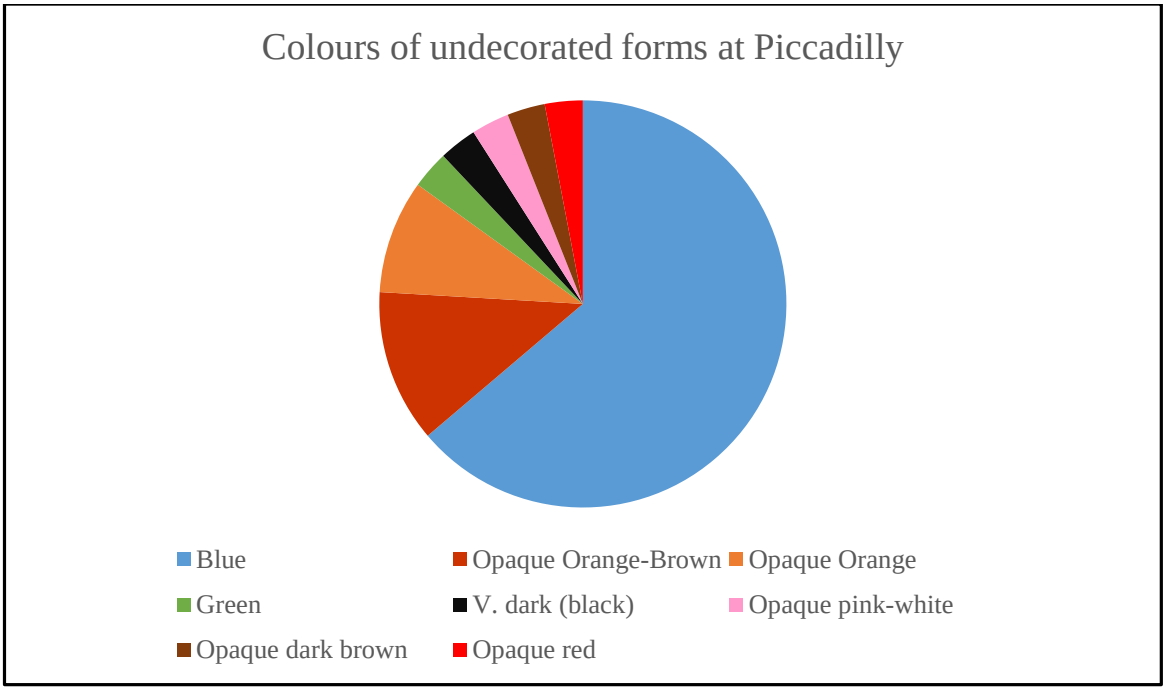


Figure 23: Percentages of the different colour of undecorated glass beads in the assemblage at Piccadilly, York. The data is based on the count of each type in the assemblage.

There is a wide range of colours at Piccadilly with blue forms (64%) as the predominant type. This is due to the recycling of blue soda glass for the production of beads (Mainman & Rogers 2004: 474). The opaque pink-white colour is not found elsewhere.

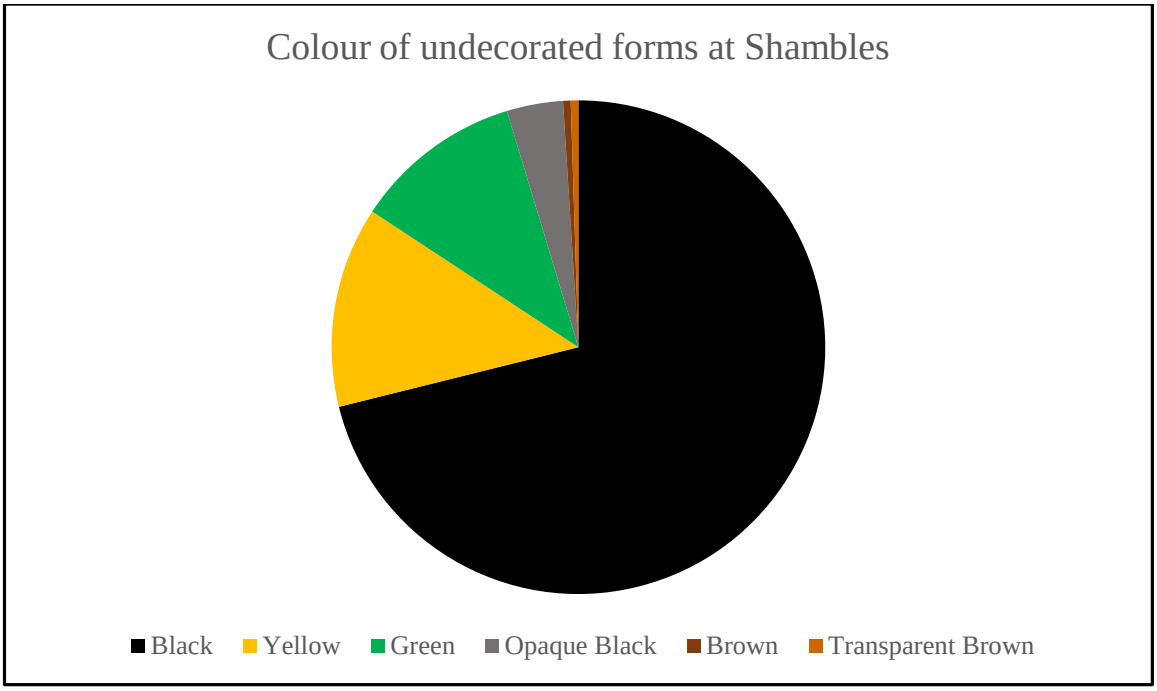


Figure 24: Percentages of the different colours present in the undecorated glass beads in the assemblage at Shambles, York. The data is based on the count of each type in the assemblage.

The assemblage from Shambles shows the clearest dominance of one colour type with black undecorated glass beads forming 71.4% of the total. As with Pavement, the colour range at Shambles is more restricted and contains no blue types.

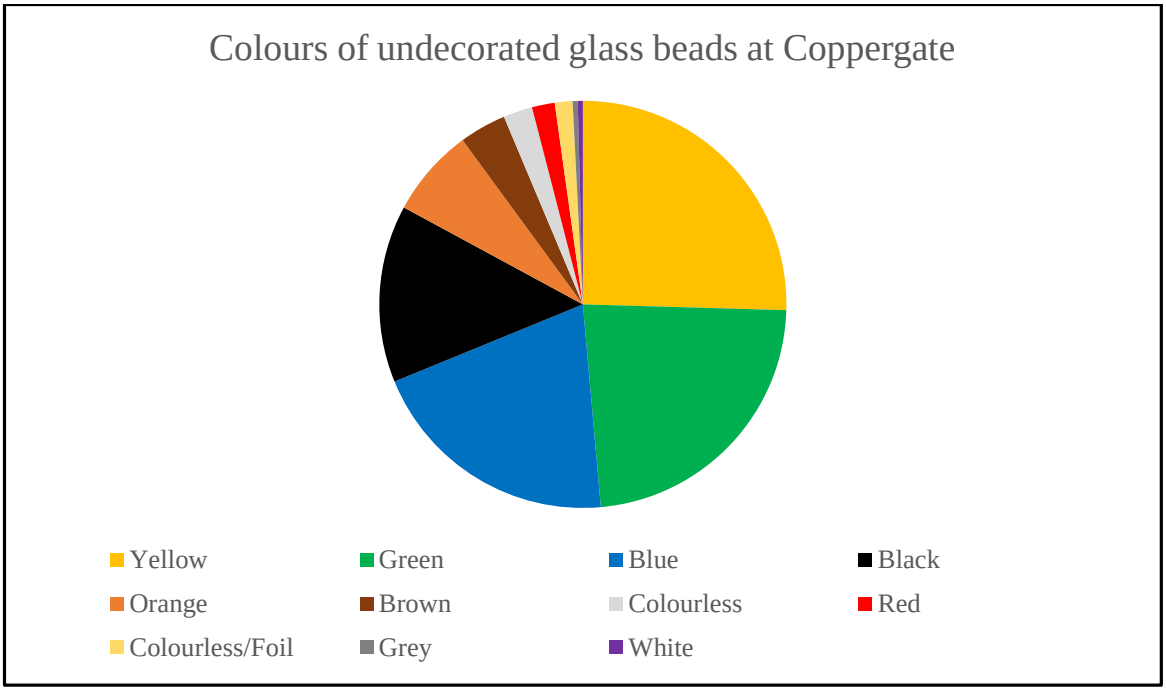


Figure 25: Percentages of simplified colour types in the undecorated glass bead assemblage at Coppergate. The data is based on the count of each type in the assemblage.

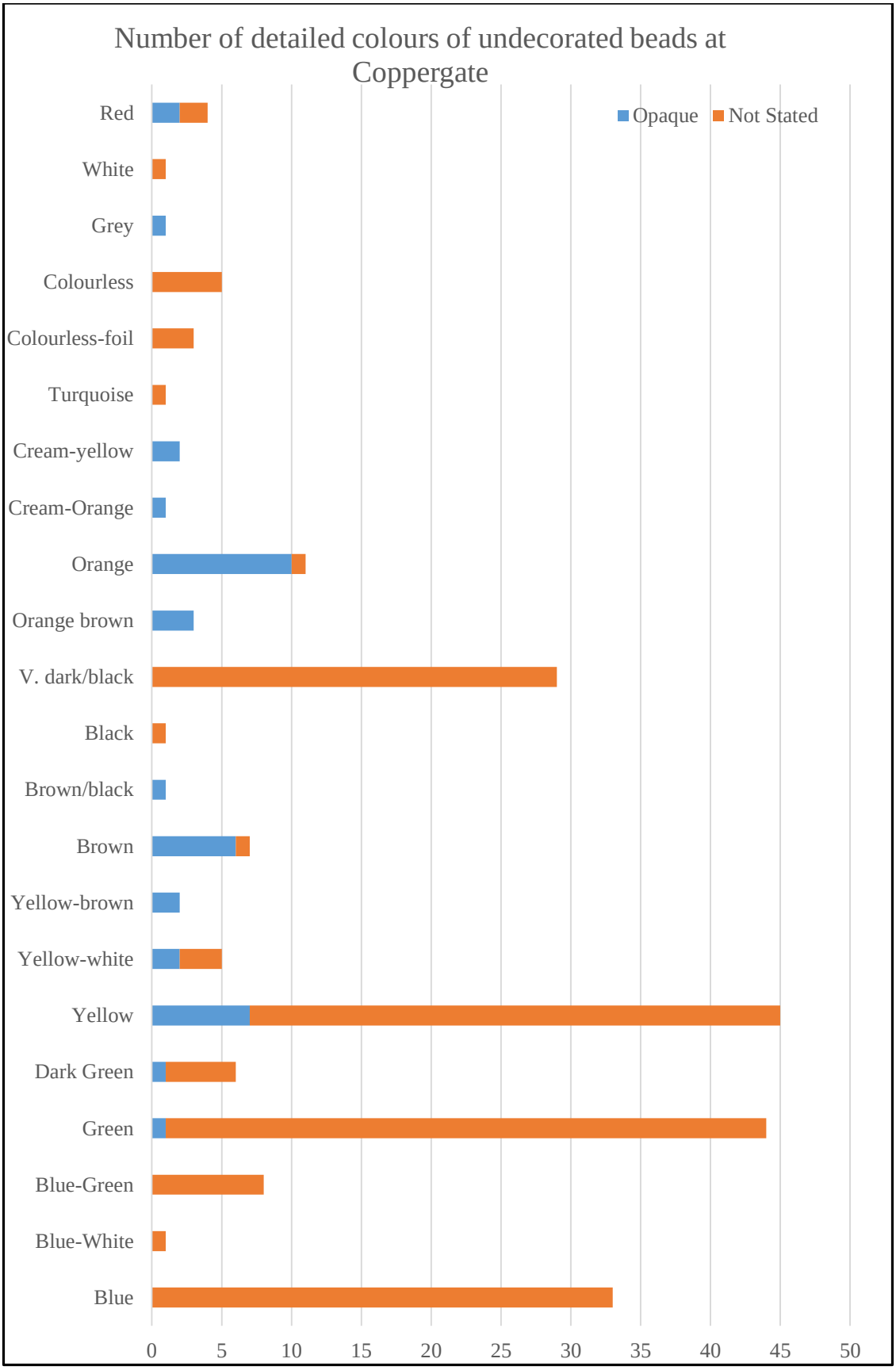


Figure 26: A more detailed representation of the numbers of colour types in the undecorated glass bead assemblage at Coppergate. The data is based on the count of each type in the assemblage.

Figures 25 and 26 demonstrate a predominance for yellow, green and blue glass beads. As with Flaxengate, there is evidence for high lead glass working at Coppergate which influenced the colour types produced (Bayley & Doonan 2000: 2519). However, the large number of blue beads at the site attests to the continuation of soda glass manufacturing/working (Bayley & Doonan 2000: 2526). The colour range for this site is wide, with many variations combining two colour labels, for example blue-white or yellow-brown. The determination of these colours may be the result of the aims of the catalogue for the assemblage. An interesting aspect of the assemblage at Coppergate is the appearance of orange or orange shaded colours which do not appear in any other sites in the database.

The analysis of the colour variation in the assemblages from the production sites demonstrates patterns shared across the sites, and patterns which are specific to each site. Green is the dominant colour for glass beads at two sites; however, the percentage of green examples at Piccadilly visibly exceeds the proportion of this type at Flaxengate. Of the remaining three sites, each has a different colour type which forms the largest part of its assemblage; blue glass beads at Pavement, black glass beads at Shambles and yellow glass beads at Coppergate. Three sites are dominated by one colour by more than 50% (Piccadilly, Pavement and Shambles) while the remaining two sites (Flaxengate and Coppergate) have a more even distribution of colour types. Pavement and Shambles have a more restricted range of five to six colours. Flaxengate and Piccadilly have a slightly wider range of eight colour types each, while the Coppergate assemblage contains the widest range of colours (22 total). The high lead glass working at Flaxengate and Coppergate has clearly affected the colour types produced at each site. The appearance of individual colour examples at Pavement and Coppergate demonstrate the production of distinctive forms. Patterns in dominant colours at production sites can provide an insight into possible specialisation of manufacture by craft workers. Evidence from Piccadilly, Pavement and Shambles suggest specialisation in the manufacture of green, blue and black beads, respectively. When compared with other production sites (particularly in Scandinavia), this data can add depth to discussions of craft working practices and bead type trends in the Viking-Age.

Production and trade

In analysing patterns of production and trade of the bead types in the database, there are several lines of evidence which were followed to establish an understanding of these processes. These are the location of the source for the raw material types, the inferred location for production for beads of different materials, the shape of the amber beads in the assemblage, and the colour and decoration style of decorated glass beads.

Local resources and local production

Evidence for the use of local resources and production of beads is clearest in some of the less frequently occurring raw material types. While there is evidence for the local use and production of jet and jet-like beads, this pattern will be discussed below in the distribution section. To provide a site specific example of the local production of beads from locally sourced and imported raw materials, Table 12 presents the relevant bead types from Coppergate.

Table 12: The appearance of locally produced beads of shell, bone, antler, metal and stone, with raw material origins and bead characteristics.

Material	Species identification	Raw material origin	Bead characteristics
Shell (6)	Probably oyster	Not stated - use of materials from subsistence	Flat/discoidal, diameter range 12-12.5 mm
Bone (12)	One from a cattle, remainder unknown	Assumed local - use of materials from subsistence	Mostly disc with one spherical, diameter range 9.5 mm and 14.5 mm
Antler (4)	Red deer (one not stated)	Local hinterland of York	Disc shaped, diameter range 10 mm to 13 mm
Metal (1)	Sheet copper	Assumed local	Globular, diameter: 10.5 mm
Stone (21)	Steatite	Shetlands – possibly reused from earlier imported vessel	Cylindrical? (fragment), diameter: 11 mm
	Mudstone	Sources in proximity to York and Yorkshire area as well as southern Scotland and Cumbria.	Discoid, shades of grey to black, diameter range 9 mm to 18 mm
	Siltstone	Sources in proximity to York and Yorkshire area as well as southern Scotland and Cumbria	Discoid, grey, diameter: 11 mm
	Marble	Mediterranean area – possibly reused from earlier imported form	Discoid, greyish white, some examples with yellowish inclusions, diameter range: 9 mm to 13 mm
	Crinoid ossicle in calcite	Sources in Yorkshire (particularly Great Scar and Wensleydale carboniferous rock groups)	Discoid, diameter: 4 mm
	Unknown quartzitic rock	Not stated	Discoid, translucent grey/white, diameter: 12 mm

Table 12 provides well-researched and (in many cases) scientifically analysed examples of bead types. Many of these types demonstrate the use of local resources within

York and its surrounding hinterland. The source for the bone and oyster material can be attributed to the subsistence practices within the settlement (Hall & Kenward 2004: 397). The appearance of bone beads may also be attributed to the presence of bone working activity. The establishment of antler-working crafts is well evidenced from the site, suggesting that the production of antler beads may be related to this activity (MacGregor, Mainman & Rogers 1999: 1905). The metal bead may also be the result of activity on an individual level from sheet copper manufactured in the Coppergate/High Ousegate area (Mainman & Rogers 2004: 467). The stone beads are the clearest example of the use of the resources from the local hinterland. One exception to this is the appearance of marble. While there are some British sources for marble in north-western Scotland and Ireland, the evidence for quarrying of this material is minimal (Gaunt 2000: 2598). Therefore, it is most likely to have travelled to York as a trade item (Gaunt 2000: 2598). It may be that the marble material was imported as another artefact form, which was subsequently worked into a bead (Gaunt 2000: 2598).

Against the example of the Coppergate site, it may be possible to define similar trends from other examples of organic and stone materials. Table 13 presents the material types from the non-production sites and the material/production origin where possible.

Table 13: A list of beads examples from non-production sites which may be representative of local resource use and/or local production.

Material type	Site	Material Origin	Production origin	Bead characteristics
Bone	Westness	Assumed local	Assumed local	Three beads, discoid, possible cylindrical and spherical, coloured light brown, grey and white/grey
	Brough of Deerness	Assumed local	Assumed local	One individually found, others in group with jet-like beads, number unknown. No further information
	Tote	Assumed local	Assumed local	Suggested as possible ivory, irregular, roughly circular
	Bornish	Assumed local	Assumed local	Possible globular in grey colouration
Stone (type unknown)	Westness	Unknown	Unknown	Three beads, all examples discoid and coloured white
	Old Scatness	Unknown	Unknown	Discoid black with incised linear design
Claystone	Jarlshof	Local?	Assumed Local	No further information
Clay	Pierowall (grave 16)	Local?	Assumed Local	Burnt, irregular globular shape, grey colouration
Tooth/ Tusk (possible seal)	Brough of Birsay	Assumed local	Assumed local	Oval shape

The pattern suggested by Table 13 is of assumed use of local resources for small-scale production of beads. The small number of these beads suggest this bead-making activity occurred on an individual level for personal use. Without formal identification of the bone and stone types, it is impossible to definitively state where the raw material source is located. However, as with the situation at Coppergate above, it is likely that the

materials are products of subsistence practices and the use of resources in the surrounding hinterland. For example, the possible seal tooth or tusk found at the site in Orkney was likely locally sourced due to the native seal population found on the island (Wickham-Jones 1998: 9).

Locally produced vs. imported amber beads

Amber is presumed to be an imported material in British sites. The clear evidence for the production of beads within Britain challenges interpretations which infer that the amber beads are also imported (Mainman & Rogers 2000). As the use of Baltic amber and amber bead-making are widespread across the Viking World, it is difficult to distinguish between amber beads which have been manufactured within Britain and beads manufactured in other areas such as Scandinavia. One attribute of amber beads which may highlight some distinctive difference is the shape of the beads. This technique has been used in early studies comparing steatite vessels in Shetland with those found in Scandinavia as the composition of the material did not allow for clear comparisons to the raw material origin (Forster & Bond 2004: 221). The proportions of different shape styles found at the production sites in York (Figure 27), and in non-production sites (Figure 28) are compared below.

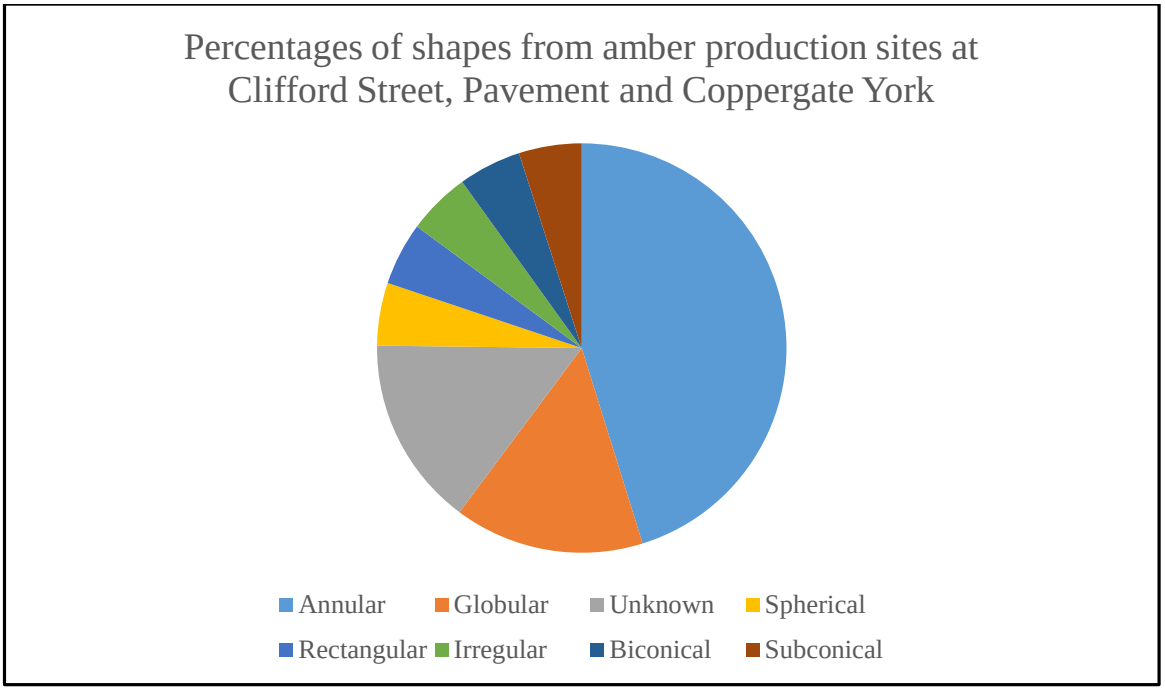


Figure 27: Percentages of different shape types from the catalogue of amber beads in the Anglo-Scandinavian layers at Clifford Street, Pavement and Coppergate, York. The graph excludes examples which cannot be identified to one shape type.

Figure 27 is based on 21 finished or near finished examples from three sites at York (three from Clifford Street, four from Pavement and 14 from Coppergate). The beads have been grouped into broad shape categories identified in the literature and from the characterisation of the beads. Fragments and irregular forms have been included in the related shape category. There is a large amount of amber working material from Clifford Street and Coppergate, including unfinished and broken beads. A clear preference for annular amber beads can be seen across the sites (45%). All of the examples from Pavement are annular, as are two from Clifford Street (the third is an example of irregular globular, counted here as globular). Coppergate contains the most variation in the shape of the beads with examples from all of the listed shape types. However, this variation is also a reflection of the larger number of beads from this site.

To compare the shape styles from the British manufacturing sites, the variations in shapes from the non-production site finds is presented in Figure 28 below.

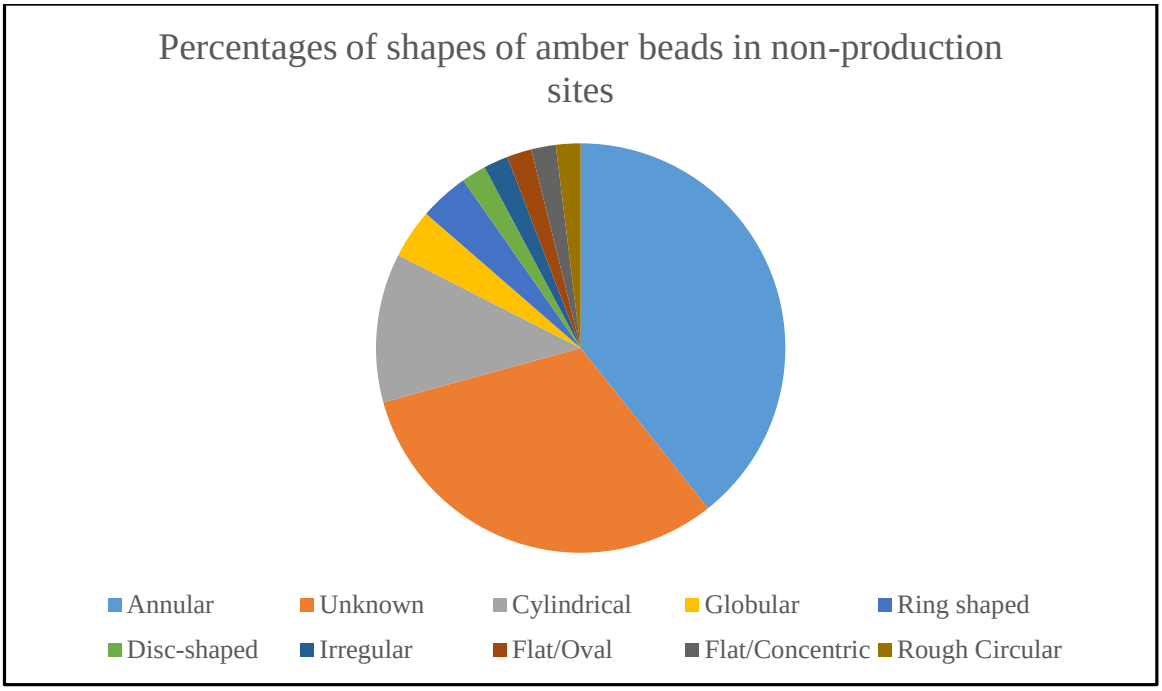


Figure 28: Percentages of different recorded shape types from non-production sites across Britain. This graph only includes the records identified as amber. Fragments of an identifiable shape have been included in the appropriate shape type. Fragments which could not be identified to a shape were excluded.

There are 51 records of identified amber beads (excluding one record of fragments). The most common shape is annular (39%). There is a high proportion of records where the shape of the amber bead is unknown.

To compare Figure 27 and Figure 28, it is clear that they share two common shape types. The pattern for a predominance of annular amber beads is represented at both sites. Globular beads are present at both sites, with greater number at the production sites in York. Biconical, Spherical, Sub-conical and Rectangular beads appear to be restricted to Coppergate. Cylindrical beads and varieties of flat (oval, disc and concentric) or Ring-shaped beads appear restricted to non-production sites. It has been suggested that amber beads in a 'flattened disc' shape may have been common in Viking-Age Scandinavia (Magnus 2003: 127). The ring-shaped bead appears in the typology of beads from Tempelmann-Mączyńska (1985). A Scandinavian origin is therefore possible for these 'flat' types. In order to determine the origin of each amber bead example, the specific time period and context of each non-production site must be taken into account. This affects the ability to make broad statements as to whether the amber beads are trade objects, brought with settlers or if they represent the movement of a product of Anglo-Scandinavian urban activity.

Evidence for importation

Comparisons between imported bead types which appear in the database and typological groups created by Callmer (1977: 94-9) are presented in Table 21 (Appendix C) alongside the provenance determinations made in the study. Table 21 provides useful data for locating the manufacturing centres of the glass (undecorated and decorated), faience, cornelian and rock crystal beads compared in the concordance tables (Tables 18-20, Appendix B). However, more recent excavations and studies from around the Viking World have produced more information regarding the production of beads in the Viking-Age. In light of this, an analysis of the possible manufacture locations for selected bead forms are presented below.

Table 14 presents the bead examples with the best evidence for identification as importations into Britain.

Table 14: Examples of bead types which are definite imports into Britain.

Material	**Site (s)**	**Raw Material Origin**	**Production Origin**
Cornelian	Saffron Walden, Brough of Birsay	Eastern import	Eastern Production
Rock Crystal?	Saffron Walden	Possibly eastern or Scandinavian?	Possibly eastern or Scandinavian?
Metal (silver)	Saffron Walden	Scandinavia?	Scandinavia?
Faience	St John Peel Castle	Mediterranean?	Mediterranean?
Steatite	Jarlshof	Norway?	Not clear
Serpentine	Carn Nan Bharraich, Glyn	Norway?	Not clear

Arguably, the only material with clear raw material and manufacturing origins from outside of Britain are the cornelian beads (Resi 2011: 144-5). Rock crystal beads are generally considered to have manufacturing origins outside of Britain (Resi 2011: 144-5). However, they also have a wide distribution in England before the Viking-Age (Huggett 1988). The metal beads share similarities with finds from Birka (Evison 1969: 340). However, there is a possibility that the metal beads were locally manufactured as the pendants found with the beads are thought to have been made locally in a Scandinavian style (Kershaw 2013: 69-70). As these beads largely come from one context and/or have

little evidence for trade related importation into Britain during the Viking-Age, it is possible that they represent movement with an individual from Scandinavia rather than trade activity (Evison 1969: 341). It is unclear where the faience beads may have been produced. Freke suggests that the example from Peel Castle is an antique bead possibly from the Mediterranean (2002: 339). Similarly, the example from St John is described as a common Roman type which is suggestive that it was also in circulation pre-Viking-Age (Megaw 1937: 237). The steatite and so-called serpentine (another type of soapstone) are likely to be imports, possibly as other artefacts which were later turned into a bead.

Imported decorated glass bead types

In order to understand the patterns in imported glass beads, this section focuses on detailing the trade of decorated types. Decoration styles provide a more tangible link to certain locations of glass bead production during the Viking-Age based on the manufacturing evidence for the production of these types. There are 73 examples of decorated glass beads from non-production sites and 16 from production sites. Decorated beads from the production sites have been included as it is unclear whether they were also manufactured at the same site. As stated previously, Table 23 was created to divide the decorated glass bead types into groups which can be used to infer relationships between styles and the location of manufacturing centres (see Appendix E). Clusters of shared attributes were reviewed for their potential to be grouped and then linked to a possible manufacturing location. It was not always possible to link a group to one specific location. The bead groups produced from the data in Appendix E is presented with the areas of likely production in Table 15 below.

Table 15: Groups of decorated glass beads which share simplified attributes (primary and secondary colour and/or decorative style). The number, find location and possible production origin are also included. The decorated beads used for this analysis are from non-production and production contexts. Tables 18-20, 21 and 22 in appendices B, C and D provide more detailed comparisons between the database material, and the Scandinavian material and Anglo-Saxon material.

Group number	Number	Location of Sites in Britain	Possible origin for bead production
1 – Herringbone Blue/White	4 (5)	SW Scotland, Orkney, Inner Hebrides	Irish bead – cable bead. Similar design found at Ribe c. 8th C
2 – Millefiori motif	3	Isle of Man	Scandinavia
3 - Mosaic	3 (?)	Orkney, Shetland	Suggested as North west Europe. Ribe produced evidence of chequerboard.
4 – Waved (black with white wave)	2	North East England, SW Scotland	Suggested in literature as Celtic development (Whithorn). Parallels with earlier Anglo-Saxon suggested as European imports and from Ribe.
5 – Linear Horizontal (blue with white)	2	Orkney, Shetland	Suggested Scandinavian for Old Scatness example. Mediterranean/East for the Westness example
6 – Millefiori motif and Waved	2	North England, Isle of Man	One type is suggested as Scandinavian (Townfoot Farm), the other as an Eastern import (Peel Castle).
7 – Trail and Eye	3	Orkney, North Scotland, Shetland	Examples from Croy is suggested as Pictish.
8 – Trail and Waved	2	Inner Hebrides, Southern England	The example from Ballinaby may be from Scandinavia.

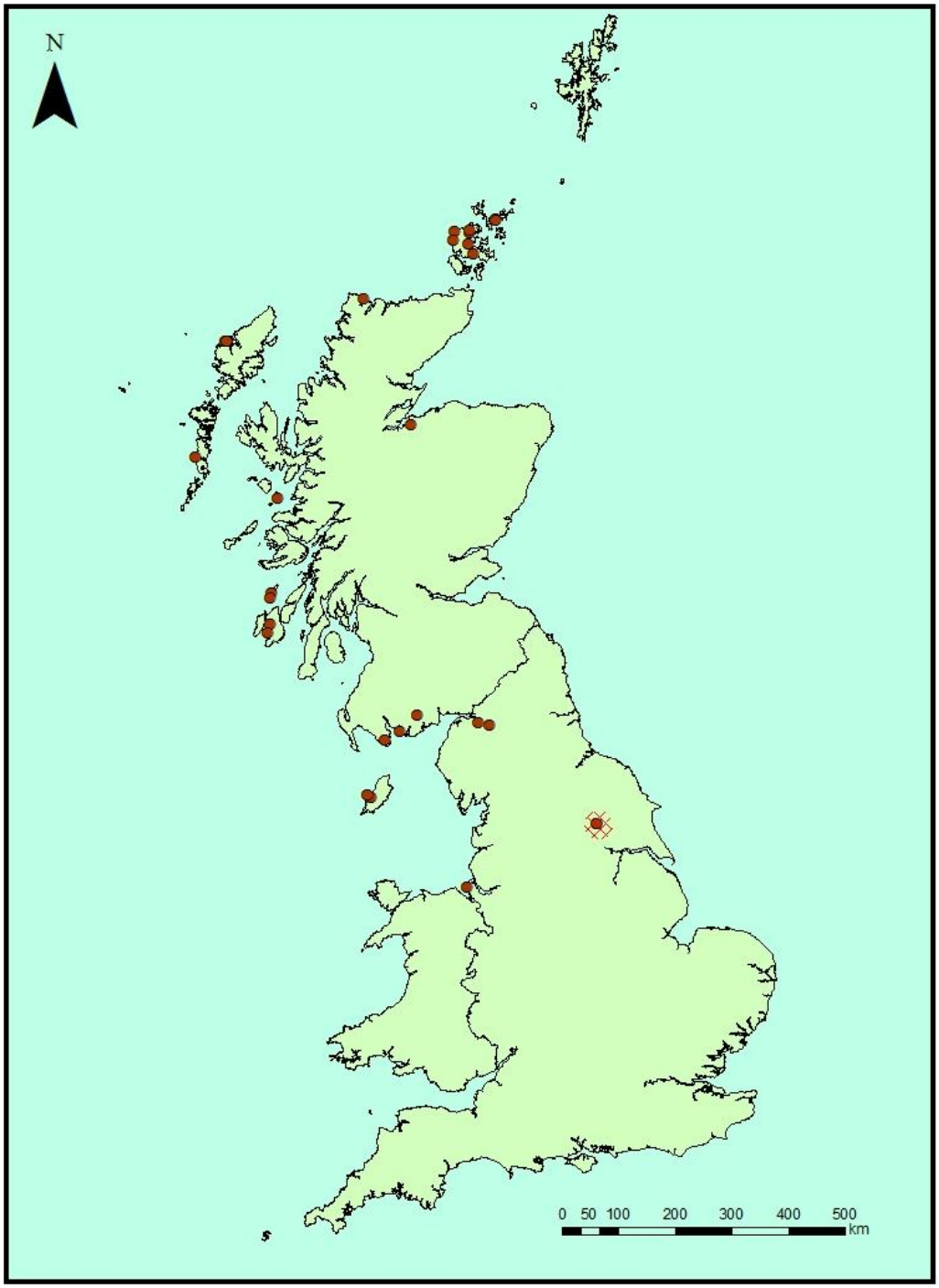
There are few instances where the primary/secondary colours and the decorative style are the same across multiple sites. However, the attributes of beads in groups 1, 4 and 5 appear to be closely shared. Group 1 is the most homogenous group. The herringbone design has been identified as originating in Ireland from the 7th century to the 9th century and from Ribe in the 8th century (Guido 2000: 175-6). Group 4 has a more common decorative design and is grouped based on the shared colour combination. Waved examples have been found in pre-8th century Anglo-Saxon contexts (see Guido 1999). The

provenance of beads in Group 6 is better understood when divided further by the shape (cylindrical and segmented respectively). The segmented examples fall into a group which has been discussed as an import into Scandinavia from areas around the Mediterranean or the Middle East (Callmer 1977: 98). The example from Old Scatness is identified as Scandinavian in the literature (Dockrill *et al* 2010: 348-9). The remaining groups are based on similarities in the decorative style only. As with group 6, variations in the colour and/or other attributes of these beads suggest that they may be individually representative of different origins. However, the pattern suggested by Table 15 is that many of the examples originate in Scandinavia and/or known production/trade centres to the East.

Distribution

The following distribution maps detail the locations of the amber, and jet/jet-like finds. The distribution of materials demonstrates the movement of bead types around Britain, and the relationship between sources of raw material and locations of production. The presentation of the distribution of selected forms is also useful for displaying clusters and gaps in the geographic spread of bead types.

The distribution of amber beads

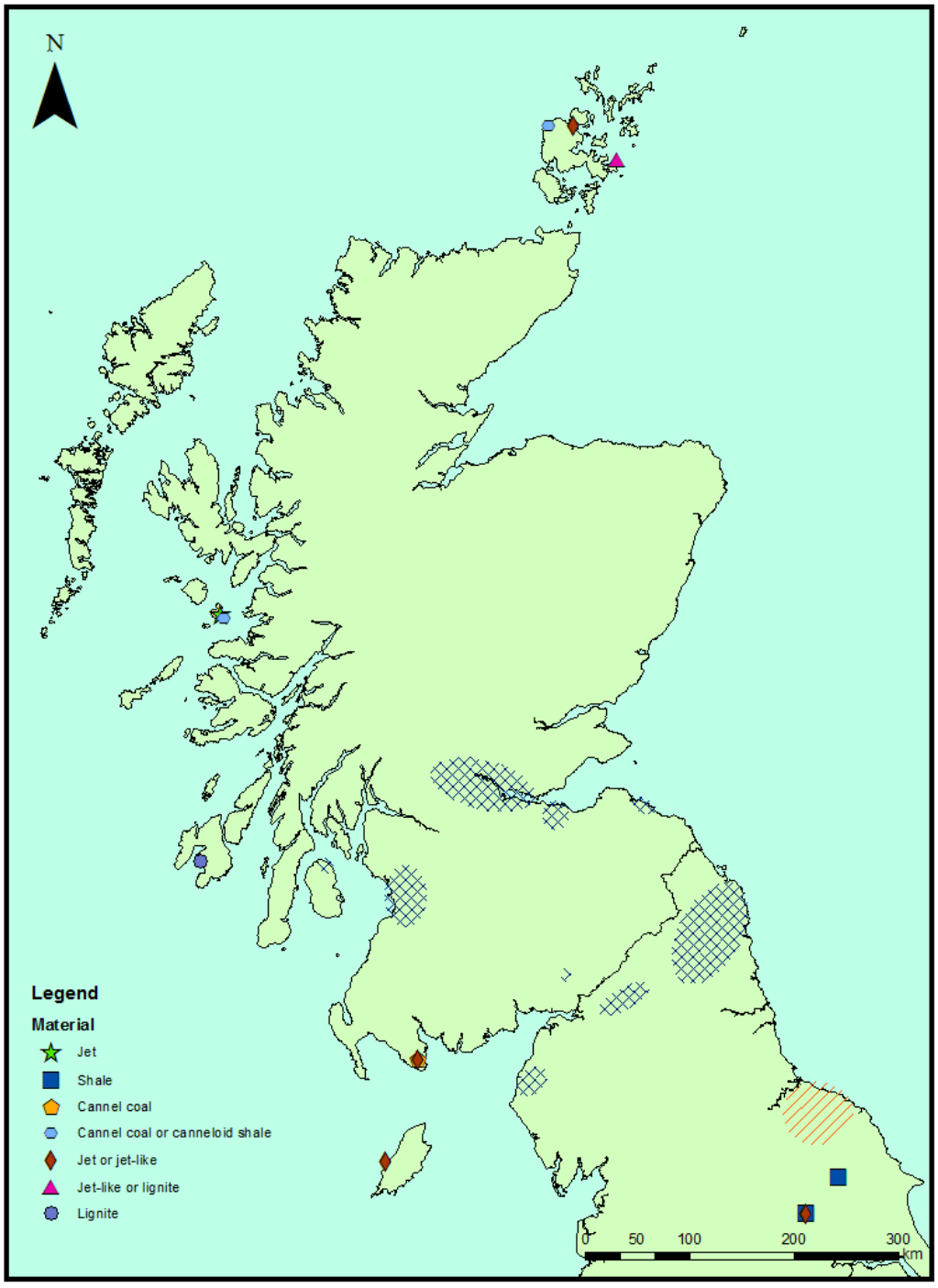


Map 11: Locations of finds of amber beads from the database. The red cross-hatching indicates the location of the amber working sites in York. Contains Ordnance Survey data © Crown copyright (Digimap 2014).

In the database compiled for this study, there are 29 sites containing amber. Of these three are production sites (from York), four are categorised as settlement sites, and two are classed as other (one is an unsecure find at an Iron Age Dun and the other a part of a hoard). The remaining sites are burial contexts. There is a clear pattern of numerous finds

of amber in Scotland particularly around Orkney. As amber beads appear to be most commonly found in burials, it is likely that this pattern is due to the high number of burials found in this area. There is a distinctive lack of amber bead finds of the Viking-Age in the Eastern areas of mainland Scotland and most of England and Wales. The lack of amber beads in England is an interesting trend considering the location of amber craft working activity in York.

The distribution of beads of jet and jet-like materials



Map 12: Database sites with Jet and/or jet-like beads. The approximate location for the source of jet (Whitby) is shown in diagonal lines. Possible cannel coal/oil shale sources are shown in cross hatching, after Hunter 2008 (104, Fig 1). Contains Ordnance Survey data © Crown copyright (Digimap 2014).

Of the nine sites where these materials are found, three sites are settlement sites, one represents a find spot and five are burial sites. In terms of the accurate identification of the material, examples from three sites (Cruach Mhor, Brough of Birsay and Kildonan) were identified by XRF in Hunter's 2008 study. The examples from Whithorn were also studied

scientifically by X-radiography, XRF and examination of physical characteristics of the artefacts (Hill 1997: 441). Apart from the examples from Peel Castle, which were not scientifically analysed (Freke 2002: 341), is not stated whether the identification of material from the remaining sites (Walmgate, Near Malton, Brough of Deerness, Peel Castle and the Brough of Gurness) was verified by scientific analysis. It is assumed that the results are based on physical characteristics of the artefacts and the experience of the analyst. The identification of the example from the Brough of Gurness (which is now lost), is stated as ambiguous (Hunter 2008: 114).

Hunter identifies raw material sources for jet at Whitby, and possible cannel coal/oil shale sources from Scotland (2008: 104). Evidence for the manufacture of artefacts from cannel coal, canneloid shale and lignite are evident in sites from Shetland, and oil shale manufacture is evident from Orkney (Hunter 2008: 113-114). The working of jet and jet-like material involves cutting the material, turning, and smoothing/polishing (Resi 2011: 125). There is a wide distribution of jet and jet-like materials, however, the number of sites and finds is significantly less than finds of amber beads. There is a lack of jet and jet-like bead finds in England and Wales as well as most of Mainland Scotland. As stated above, there is evidence for the working of jet and jet-like materials at York. There is also evidence for manufacture in Dublin (Mainman & Rogers 2000: 2500). Beads of jet or jet-like materials found in early medieval excavations at Flaxengate (Lincoln) have been considered Roman deposits, however, there is some potential 11th century evidence of the working of this material into other objects (Mann 1982: 12, 45).

Beads in the context of burial sites

It is likely that beads in the Viking-Age were most commonly used as personal adornment, particularly as jewellery. Models of dress and accompanying artefacts have been meticulously recorded from sites across the Viking world to form a conceptual idea of the standard burial costume/assemblage for male and female adults (Hayeur-Smith 2003: 228). This section will present the data from the records of the burial sites in the database in order to discuss three related ideas; 1) how the beads were displayed as adornment, 2) the determinations of sex and age from the burials, and how beads contribute to these determinations as a gendered artefact, and 3) the specialised function of single finds in an amuletic role. Each burial was analysed (despite the lack of human remains in many contexts) as each has been determined to belong to a gendered person or persons.

The use of beads as display goods

Figure 29 is a pictorial representation of the location of the bead finds within various burial context in relation to the artefacts and/or the human remains. This data is intended to show how beads were arranged on the deceased's body and/or in the vicinity of another artefact as part of the personal adornment of the deceased.

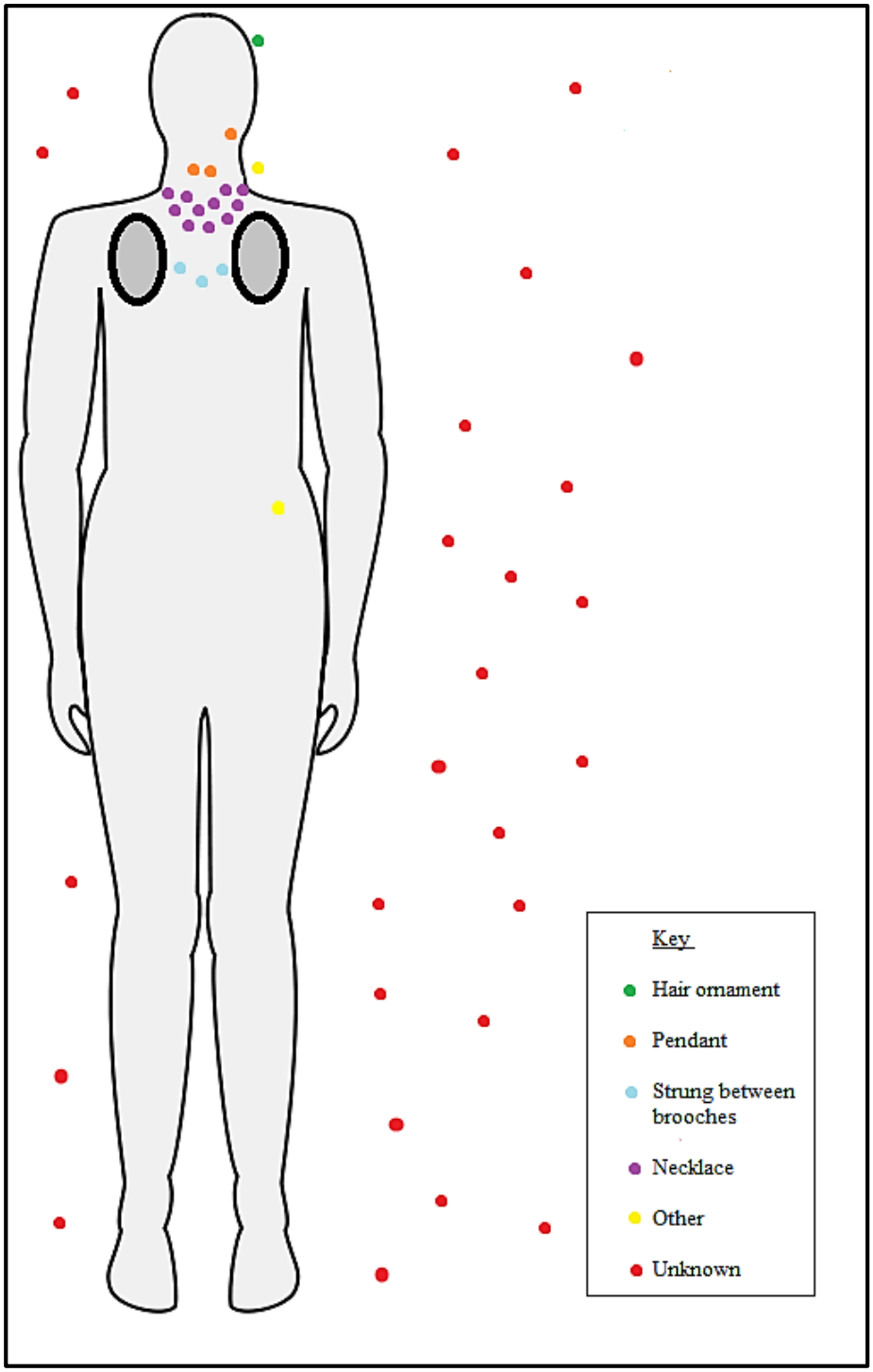


Figure 29: A visual representation of the recorded locations of beads found in grave sites, in relation to skeletal and/or artefacts. Each dot is a record of a grave site with bead finds with information regarding the location. Based on data in Appendix F. The interpretations for the jewellery type formed by the beads (such as necklaces) have been taken from the literature. Illustration by author with aspects from clipart.org.

The most common area for beads to be found was in the neck/head zone of the deceased, leading to interpretations that the beads were either a necklace of multiple beads, or a small number of beads in association with a pendant of another material such as a

whetstone (Graham-Campbell & Batey 1998: 64) or even a Thor's hammer (Biddle & Kjølbye-Biddle 2001). Three finds of 1-3 beads have been considered here as pendant to highlight the possibility that the beads were the central focus of the adornment and functioned as a pendant. However, these two terms (necklace and pendant) can be generally used to describe similar uses of beads for adornment worn from the neck. There are three recorded cases of beads found in direct association with brooches, as well as cases where the beads were found in the vicinity of the chest area. These finds indicate that the beads were strung from or between the brooch finds. The category of 'Other' consists of two finds which have been interpreted as representing a different display/use of the beads. The find of a single bead at Townfoot Farm (Grave 5) in part of a complex of materials is thought to have belong in a pouch or purse at the deceased's belt (Paterson *et al* 2014: 113). A bead found in the neck area of the deceased in a grave at Harrold has been interpreted as a sword bead or a clothes fastener (Eagles & Evison 1970: 44). Due to the unsystematic nature of the excavations and small size of the artefact, many beads were recovered from unsecure or unrecorded contexts.

The determination of the sex and gender

Figure 30 is intended to illustrate the archaeological determinations of the sex of the deceased, as well as what these determinations were based on. As the literature varies in content, some of the determinations differ from one source to the next. Each site has been included despite the unreliability of some of the sources and the questionable nature of the label of 'burial' for some sites. The burials at two sites (Claughton Hall and Kildonan Grave 2) have been identified as primarily male based on the presence of artefacts associated with male gender. However, the additional presence of artefacts associated with female gender has led to the suggestion that both sites are examples of mixed gender interment. These sites have been counted as mixed graves based on artefacts in the graph.

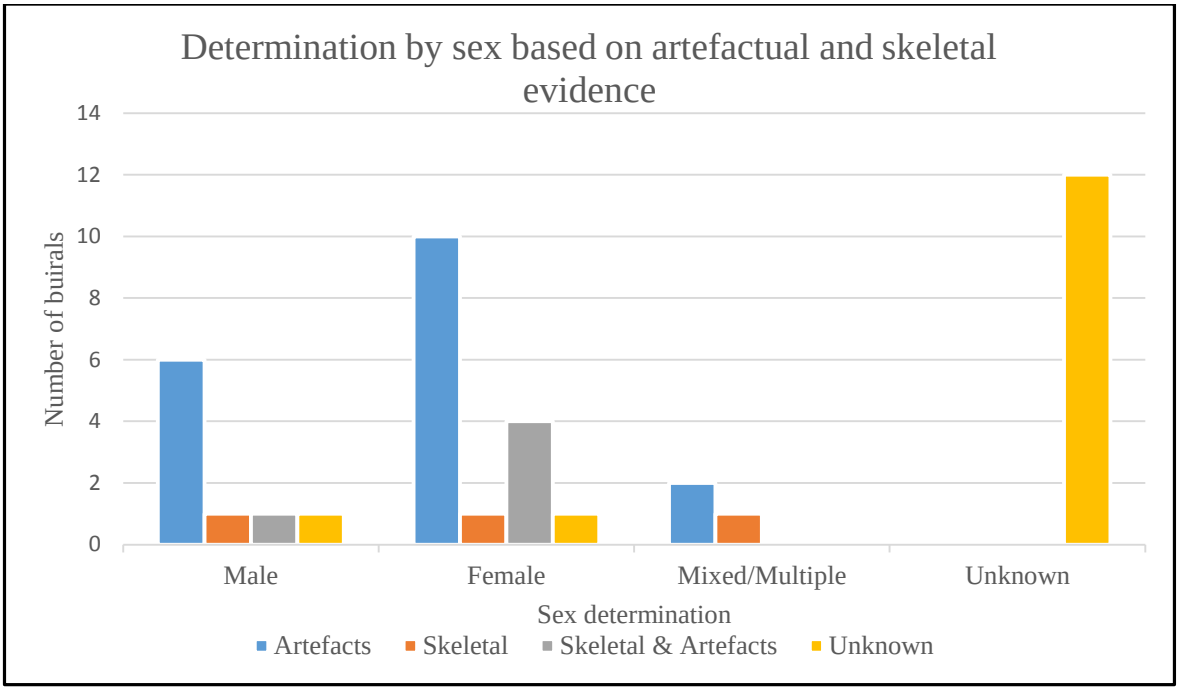


Figure 30: The number of burials identified in the literature as male, female, mixed or unknown. Identifications are matched to the known evidence (skeletal and/or artefactual) where possible. The sex of the deceased was not identified at every site. Four individuals identified as children were not included as they could not be sexed due to their young age.

Figure 30 shows that most of the graves were sexed based on the artefacts present in the site. Artefacts are often the only basis for any identification of sex due to the decomposition of the skeletal material. The majority of the publications do not define a distinction between gender and sex. Where skeletal evidence is able to provide a biological foundation, it is likely that the sex of the deceased is the aspect determined. However, terms of 'male' and 'female' used to identify biological sex are also stretched to identify gender. Recurring patterns of artefact and gender associations across Viking-Age burials (such as with jewellery types), create a reference for these sex/gender determinations. However, such assumptions can be problematic, particularly if the grave assemblage does not follow the characteristics dictated by these gendered associations. Some of the determinations of sex based on skeletal material and artefacts are antiquarian assessments. Therefore it is unclear if the investigation of the skeletal remains was conducted in a reliable manner.

The determination of age

To add another dimension to the association of beads with different aspects of personhood, the burials in which age was identified are presented below.

Table 16: Precise age determinations from burial sites in the database. Based on observation and/or specific skeletal evidence.

Site	Individuals	Age range
Cnip Burial F	Infant	6-9 months
Cnip Burial B	Child	6 years
Balnakeill	Male, young adult	9.5-14.5 years
Scar	Child	10 years
Scar	Male	30+ years
Scar	Female	70+ years
Cnip Burial A	Female	35-45 years
Repton	Male	35-40 years

There are only a few determinations of age from the database burials. However, the range shown by this select group suggests that beads are not exclusive to adult burials.

Number of beads in burials by gender

Figure 31 shows the number of single finds, finds of less than five beads (excluding the single finds) and finds of more than five beads in relation to the determinations of gender in the literature. The numerical parameters are based on Solberg's study, where the one of the criteria for determining the deceased as female (based on artefactual remains) was the presence of more than five beads (1985: 65). Single finds have been included as they have potential to represent specialised roles which may also be gendered (see further below).

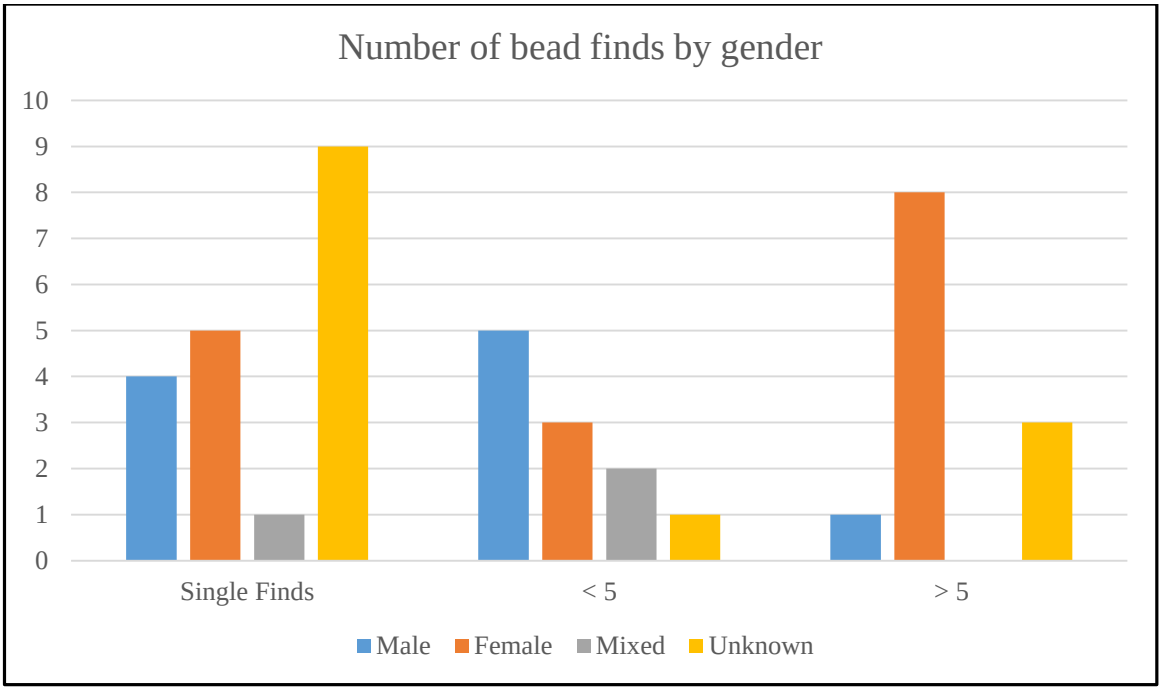


Figure 31: The records of beads finds in single, less than five and more than five amounts, by the identified sex of the deceased. Graves of children and sites with an unknown number of beads have been excluded.

The trends outlined in Figure 31 appears to broadly support the assertion that larger quantities of beads are found with female graves. Correspondingly, there is a higher number of male graves containing less than five beads. However, there is at least one outlying example of a male grave with more than five beads (Grave 3, Townfoot Farm). The similar numbers of single finds for male and female contexts suggests that that single finds are not gender specific. However, these numbers are overshadowed by the greater number of single finds from burials which could not be sexed.

Single bead finds

Single finds of beads are not unique to burial sites. There are 26 sites in the database with single finds. Of these, 10 can be considered to be accidental losses at find spots or within settlement contexts (Sangobeg, Coilegan An Udail, Hen Gastell, Irby, Near Malton, North Lincolnshire, All Saints Pavement, Bishophill, and Brough Road - Areas 2 & 3). Single finds from burial contexts which are suggestive of beads in a specialised role are presented in more detail below.

Table 17: The site and material type of single finds within burial contexts, including the characteristics of the beads and graves sites.

Site	Material of single bead	Bead characteristics	Burial characteristics
St Cuthbert's	Glass	Black?, diameter of 15 mm	Burial in Christian cemetery, assumed male based on artefacts. Found pre-1925.
Blackerne	Amber	Unknown	Unknown – context of site could be either burial or cache. Found 1756.
Lamba Ness	Amber	Possibly amber, diameter of 28 mm	Cremation, female based on artefacts. Found c. 1915.
Bhaltos	Amber	Cylindrical/oblong, reddish brown, length of 30 mm	Female inhumation. Found 1915.
Cnip (Burial B)	Amber	Annular, diameter of 18.5-19 mm	Deceased a child. Excavated 1991.
Newton Distillery	Amber	Unknown	Cist grave suggested female based on artefacts. Found 1845.
Machrins Machair	Amber	Unknown	Mound burial, bead found in soil. Excavated late 19th C
Cronk Yn Howe	Glass (Decorated)		Mound burial (possibly female) over lintel graves. Excavated 1984-91
Peel Castle	Glass (Decorated)	Unknown	Uncoffined grave of infant. Unclear if part of burial deposit due to location. Excavated 1982-88.
Harrold	Glass	Flat disc, polychrome decorated (circumferential trail)	Male based on artefacts. Anglo-Saxon cemetery. Excavated 1951-2.
Carlisle Cathedral	Amber	Annular, diameter of 8 mm	Unknown – adult. Excavated 1988.
Claghbane?	Glass	Annular? Red with possible decoration (insets)	Cenotaph burial. Excavated 1979.

Finds of single beads have been interpreted as representing beads in specialised roles. Many of the graves in Table 17 are poorly recorded and were often the subject of unsecure excavations. This lack of information particularly affects sites of single amber finds (Blackerne, Newton Distillery, Machrins Machair, and Carlisle Cathedral). Amber beads were considered to have magical properties; therefore single finds of this type have been interpreted as amulets (Freke 2002: 339; Graham-Campbell & Batey 1998: 149-50). The finds of amber at Lamba Ness and Bhaltos may represent amulet beads in female graves, particularly as they are large examples (Magnus 2003: 135). The bead from Cnip (Burial B) may be an amulet bead in a child's grave; however, this magical association is not a consistent trend in child graves from Viking-Age Scandinavia (Magnus 2003: 135). The glass bead from the pre-12th century child grave at Peel Castle is decorated with an eye motif (Freke 2002: 339). This eye motif has been interpreted to serve a protective function against evil (Freke 2002: 339). The decorated glass bead from the female burial at Cronk Yn Howe does not appear to have any symbolic motifs and therefore, may not have had an amuletic role. Further examples of amulet beads may be represented in the female grave at Newton Distillery, and the grave at Machrins Machair. However, without more information on the form of the beads the assessment remains unclear. The bead from the grave at Carlisle Cathedral is too small to be characteristic of an amuletic bead. Another interpretation for single beads in male graves (in association with swords), is that they functioned as talismans (the so-called sword beads). It is possible that the single finds of glass beads from Claghbane, Harrold, and St Cuthbert's are representative of sword beads as they are all found in graves containing swords where the deceased is identified as male. Claghbane has been included as while it contains no skeletal material it is suggested to be a cenotaph burial (Cubbon 1983: 18), and therefore symbolic of a deceased individual.

Summary

The data from the Viking-Age beads used in this study presents with evidence for a range of different economic and social patterns. It is clear that there was local production of beads of all materials except for the gemstone and faience examples. This local production incorporates the use of local and imported resources, including possible reuse of materials originally in another form. Furthermore, this local production appears to be present at a commercial craft working scale for materials of jet, amber and glass. Bead-

making on an individual level is suggested by beads of organic materials. In terms of trade, selected groups of glass beads provide the clearest evidence for relations with Ireland, Scandinavia, Western Europe, the Mediterranean and the Middle East. The finds of gemstone beads in the burial at Saffron Walden may be illustrative of a situation where the beads travelled with an individual settler or settlers. The context of deliberate depositions of beads in burials across Britain confirms the common view of beads as items of personal adornment associated with female graves. However, the use of beads is not restricted to this role, as evidenced by the presence of beads in male and child graves. Furthermore, selected bead finds present with evidence for roles beyond personal adornment, as amulets and sword beads.

Chapter 6: Discussion

The results of this study have highlighted a number of patterns and ideas which will be discussed in this chapter. Patterns in the appearance of beads from the Viking-Age sites examined in this research can be summarised into a few key trends. The majority of the sites (42 of 67) contain less than five beads. Five sites contain more than 50 beads, including the production sites with contexts in which hundreds of beads were found. The main material groups are glass, amber, jet/jet-like, stone and organic animal material. The beads appear frequently in annular, globular and cylindrical shapes, or in forms approximating these. There is a clear predominance of glass across Viking-Age Britain. Only 15 of the 67 sites in the database do not contain glass beads. One of the reasons for the dominance of glass bead finds is the fact that they are present in high concentrations at certain sites, particularly those with more than 50 beads. Glass beads are most commonly of monochrome and undecorated varieties. The majority of monochrome types are blue glass beads, followed by yellow and green types. Decorated beads, while occurring in lower frequencies, appear to be widespread across all site types.

A precise comparison of these patterns against broad trends of the 6th to 10th century Scandinavia (as outlined by Callmer: 2003a), is difficult, as this research has taken a different approach. However, there are trends that can be compared at a general level. The focus on the production of (often wound and annular) monochrome beads in Scandinavian centres is a characteristic shared by production centres in Britain (41, 44-5). Chronological changes in dominant colour types in Britain and Scandinavia can be usefully compared. To restate these Scandinavian trends, the popularity of colours in glass beads appears to increase and decrease in phases; blue, green, brown and yellow in the 6th century, orange and red-brown in the 7th century, blue and white in the early 8th and the 'blue phase', green and white in the late 8th century, and an increase of blue beads again in the 10th century (41, 44-45). High frequencies of blue beads in Scandinavia occur just prior to the beginning of the Viking-Age in Britain (8th century) and again at a time (10th century) when Scandinavian settlement is well-established, particularly in urban centres. The high frequency of yellow and green glass beads occurs at a much earlier period, although the frequency of green beads rises again just before the start of the Viking-Age in Britain. Several of these colour based phases do not appear to have significantly affected the appearance of forms in Viking-Age Britain. There are examples of brown, orange, red-

brown, white and blue/white beads in the assemblage, but they do not appear in numbers comparable to the appearance of these types in Scandinavia. Similarly, the domination of imported forms (such as cornelian, and millefiori) from Eastern sources in the 9th century does not appear to have significantly affected the appearance of these imported forms in Britain (44-45). This may be due to the cessation of Eastern imports into Scandinavia c. AD 870 or the trade connections between Britain and Europe during this period (44). To understand the causes behind the appearance of beads in the archaeological record of Viking-Age Britain it is necessary to discuss the stages of production, trade and use.

The production of beads in Viking-Age Britain

The raw material types, along with the context of the finds within the sites, provide the strongest evidence for processes in bead production at different scales. Evidence for the production of beads from materials such as bone, stone, shell, and antler, suggest manufacture at a domestic scale for personal use, either in the adornment of the maker or as a gift. Examples of domestically produced beads appear at settlement sites in Orkney, Shetland, the Hebrides, and the production sites in York (see Tables 12 and 13). Finds of this type are limited in number, and represent the use of easily accessible materials from within the site or the wider hinterland. In terms of sources, it is notable that the some of the raw materials used are probably by-products of subsistence practices (for example bone from cattle), derived from the reuse of material from a former artefact (such as a soapstone vessel), or produced in relation to craft working (for example off cuts from bone and antler working). Evidence for bead production as a by or side product to other industries can be seen at York. The presence of a productive bone and antler industry suggests that beads of this type could be a side product of a craft such as comb making. Similarly, the sheet copper bead may be linked to the metal working industry, and the large number of stone beads suggest that they may be the result of (or linked to) a small-scale craft working. Further to this, many of the organic and stone beads were found together which indicates they come from a limited number of jewellery forms (Mainman & Rogers 2000: 2598). These finds may be representative of the personal manufacture discussed above, or alternatively, they may represent an artisan producer-consumer relationship in Viking-Age York.

Bead finds of amber, jet and jet-like materials appear to represent *unspecialised* craft working in a site. The identification of this craft working activity as *unspecialised* is based

on the manufacture of beads from a naturally occurring material using techniques such as cutting, shaping and polishing (Callmer 2003b: 346). While this craft working requires firm knowledge of the materials, it does not require the specialised knowledge behind the manufacture of man-made materials such as glass (Callmer 2003b: 346, 349). Evidence for jet working indicates that it was a minor or small-scale industry in Viking-Age York and Lincoln (Mainman & Rogers 2004: 478; Mainman & Rogers 2000: 2607; Mann 1982: 46). Evidence for amber working suggests it was a more established industry in York (Mainman & Rogers 2000: 2607). While amber and jet working appear within urban sites, evidence for the working of jet-like materials has been found in more rural contexts (Hunter 2008: 107-108). The importation of jet-like materials to these sites (in Orkney and Shetland) from nearby areas suggests that production may have been organised into craft production, rather than as bead-making on an individual scale (Hunter 2008: 107-8).

Specialised craft working appears to be restricted to the manufacture of glass beads in urban sites. The skill and knowledge necessary for the manufacture of different glass bead types defines this production as *specialised* (Callmer 2003b: 349). The data from this study does not contribute any further evidence to the debate as to whether craft persons were itinerant or stationary. Evidence from York suggests that the glass working craft person/s specialised in the manufacture of different coloured beads in various areas/workshops (for example Shambles, Piccadilly and Pavement). The main glass workshop in production during the Viking-Age is thought to be located in the northern area of the Coppergate site and the Piccadilly site (Mainman & Rogers 2000: 2607). The glass industry at Coppergate appears to be a mixture of Scandinavian/European influenced forms (such as the production of high lead glass), forms which have a long and widespread history of production (such as blue soda glass beads), and forms which parallel finds from Anglian deposits at Fishergate (such as annular, globular and melon shapes) (Bayley & Doonan 2000: 2527-8; Mainman & Rogers 2000: 2594). The high volume of finds from these sites is suggestive of an industry with a sizeable consumer market (Mainman & Rogers 2000). However, it is unclear whether this market was located within the urban and hinterland areas of York, or extended further to other medieval market places (Mainman & Rogers 2000: 2607).

Aside from craft working, raw material types demonstrate connections within and outside of Britain. Within Britain, the restriction of the source of jet in the Viking-Age to one location (Whitby) draws connections between this area and sites containing jet beads

in the Hebrides, and possibly Orkney, Dumfries and Galloway, and the Isle of Man. Further to this, jet is one of the materials in which trade from Britain to Scandinavia can be assessed. A significant number of jet finds at Kaupang demonstrates a link to British centres based on the trade of finished objects and (possibly) the supply of jet in its raw material form (Resi 2011: 125). Archaeological evidence shows this material spread through many areas of Scandinavia; jet artefacts have been found at Birka, Ribe and Hedeby and other settlements, as well as a number of 9th and some 10th century burials (Resi 2011: 125-7). At one level, amber finds represent trade links to the Baltic or to the Baltic via centres elsewhere in Northern Europe. It has been proposed that the trade route for Baltic amber from the Southern Baltic went through western Jutland, Northern Germany and the Netherlands to the coast of East Anglia (Resi 2011: 107). The trade in raw amber (which occurred pre-Viking-Age) was greatly increased by demand from craft workers in Viking-Age Britain (Mainman & Rogers 2000: 2605). The wider connections between Continental Europe and Britain also influence the types of glass beads manufactured in the production sites. At York, the appearance of barrel-shaped, biconical and segmented beads is limited to Anglo-Scandinavian contexts; these shapes are stated to be common finds in Scandinavia (Mainman & Rogers 2000: 2594-6). Similarities in bead forms make it difficult to define one point of origin for the manufacture of types. The characteristics of finished amber and monochrome glass beads in particular do not provide clear enough examples to identify whether finished products were made within Britain or outside, from centres such as those in Scandinavia.

The trade of beads in Viking-Age Britain

It is clear in this study that Viking-Age beads in Britain were sourced from a wide range of local and international production centres. Particular bead types (namely decorative glass, gemstone, and metal beads) provide evidence for 'world' trade connections between Britain and Ireland, Scandinavia, and (through European trade centres) the Mediterranean, and so-called 'Eastern centres' (Resi 2011: 145). Trade links between Ireland and Britain are evident in the appearance of early Christian decorated glass bead forms (such as herringbone and string) in Argyll and Bute, Orkney, Wales and the Isle of Man (Guido 2000). These beads may represent the continuation of pre-Viking connections as it is possible that the herringbone beads from Argyll and Bute have been present from the 7th century (Guido 2000: 176). Beads of this herringbone style were also

produced in Ribe in the 8th century (Sode 2004). Based on the provenance data from Callmer's bead groups, there are several undecorated and decorated glass bead types with possible origins in Scandinavia (1977: 94-9; see Appendix C). Decorative styles include millefiori motif, mosaic, waved, eye, and linear designs, as well as combinations of these decorative styles (see Table 15 and Appendix C). Many types (also) originated in Western Europe, the Mediterranean, Middle East and Central Asian areas (Callmer 1977: 94-9). This demonstrates a multiplicity of production centres for glass beads and evidence for shared stylistic ideas. Other types (segmented and faience beads) are also thought to originate from production centres outside of Scandinavia (Callmer 1977: 98-9). Cornelian and rock crystal were imported from the eastern connections with Asia, Iran and India (Resi 2011: 145). These types of beads are considered to be representative of the vast trade connections between Scandinavia and the wider Viking World (Callmer 2003a). It is likely therefore, that the presence of these beads in Britain occurred through intermediary Scandinavian urban centres. However, some of the beads appearing in Britain may represent travel with an individual who was not involved in trade.

Beyond the appearance of imported bead forms, a number of sites contain artefacts which infer engagement in trade with the wider Viking world. This engagement was facilitated through local and transoceanic networks. Finds of lava querns and hones from Viking-Age Lincoln are evidence for indirect connections to the Rhineland and Norway (Mann 1982: 46-7). It is likely that direct trade occurred at other British centres, with these artefacts then traded on to Lincoln (Mann 1982: 46-7). It is suggested that the economy of Lincoln was more engaged in local trade networks as a regional centre (Mann 1982: 46-7). Evidence from York suggests a more prominent role in facilitating economic connections between England and Europe, perhaps as a 'nodal point' (Sindbæk 2007a). To restate, the criteria for a 'nodal point' is the presence of long-distance traffic, and the trade of imported artefacts of a similar nature with other nodal points (Sindbæk 2007a: 119, 121). Further to this, evidence of significant production activity in domestic (textile, iron working and comb making) and specialised (copper alloy and glass working) artefacts is required (Sindbæk 2007a: 126). There is definitive evidence for long-distance trade at York, including Eastern silks, Baltic amber, quern stones from the Rhineland, and stone material from southern Scandinavia (Mainman & Rogers 2004: 460). There is also evidence for engagement in 'local and regional' resource networks, particularly for bone and antler (Mainman & Rogers 2000: 2607). Production at the site includes textile working, ferrous

and non-ferrous metal working, bone and antler crafts (including comb making) and glass working (Mainman & Rogers 2004: 464). In light of the ideas presented in the network model, York can be understood as a hub within the local network in the north of England and nodal point for long distance trade (Sindbæk 2007a; Mainman & Rogers 2000: 2607). The distribution of imported bead types across Britain was likely facilitated through these urban sites with long distance connections such as York or Dublin. Market sites such as Meols may have been an additional intermediary between the urban sites and British consumers. However, the nature of certain finds (particularly in burial contexts) suggest that they may have belonged to Scandinavian migrants, or were inherited by first or second generation settlers. This connects back to the idea presented above that imported beads may have been carried by individuals to Britain, rather than distributed through trade networks. Therefore, the acquisition of these beads may have occurred in Scandinavian centres by consumers who then travelled with their personal belongings to Britain, where these imported types were subsequently deposited.

The distribution of beads in Viking-Age Britain

The distribution of Viking-Age beads in the database correlate with the main areas of Scandinavian settlement. To contextualise the distribution of these Viking-Age beads within Britain, it is useful to briefly discuss the appearance of pre-Viking material. Comprehensive studies of this nature mostly focus on Anglo-Saxon England. Two studies which cover relevant material are Huggett (1988) and Guido (1999). Huggett discusses the distribution of a range of imported materials, and argues that this distribution indicates different exchange systems during the Anglo-Saxon period (1988: 63). Two of the selected materials are amber and crystal beads (Huggett 1988: 63). Based on records of the occurrence of these materials at cemetery sites, it was demonstrated that amber and crystal beads were highly concentrated in central and eastern areas of Southern England (Huggett 1988: 65, 71, Figure 1 and 4). Guido's (1999) study of glass beads includes distribution maps for selected bead types. To summarise the text and map data presented in this study, the majority of forms are found in Kent, often in high concentrations. East Anglia and the Midlands are also areas in which glass bead types occur in high frequencies. The most northerly distribution for particular forms is Yorkshire, with at least one example in Northumberland. Bead finds in areas to the west and south-west are significantly lacking. In sum, the picture presented by these studies is of high numbers of particular bead types in

the Eastern areas of Anglo-Saxon England, including many counties which later formed part of the Danelaw.

The distributional data from studies of other Viking-Age artefacts allows for further comparisons with the distribution evidenced in this study. The relationship between brooches and beads has been established above (see Figure 29). Kershaw's (2013) recent work, focusing on the distribution of Anglo-Scandinavian and Scandinavian metal artefacts (largely uncovered through metal detection), has shed new light on brooch types in the Eastern areas of the Danelaw. A map of Scandinavian and Anglo-Scandinavian jewellery demonstrates intensive clusters around Norfolk (185). The density of finds in this area is due to the high level of metal detector use (186). There appears to be some cluster patterns around the areas of York and Lincoln, in the North-East of the Danelaw (185). There is a scattered spread of distribution in areas to the south near the boundary of the Danelaw (185). Two sites (Harrold and Saffron Walden) within this southern area, are similarly distributed. These sites are stated to have Anglo-Saxon influences which may correlate to their location along the Danelaw boundary (Kershaw 2013: 69; Wilson 1976: 402-3; Guido 1999: 332). Kershaw states that sites in the north west of England, in Cumbria (such as Claughton Hall, Carlisle Cathedral and Townfoot Farm) and in Cheshire (such as Meols and Irby) may be within areas of Norse influence or exchange (186). Notable gaps for bead finds from the Viking-Age appear in much of mainland Scotland, particularly central and eastern areas, and the south west areas of England beyond the Danelaw boundary. To develop a holistic understanding of the appearance of imported beads (including Scandinavian forms) in England, future studies may find it useful to incorporate data from non-Viking/Scandinavian sites of the period.

The deposition of beads in Viking-Age graves: personal identity and amuletic beads

The beads studied in this research were dropped, discarded or deliberately deposited by a person or persons who lived during in the Viking-Age. Burial sites are a setting in which aspects of an individual's identity become visible. The remains, burial structure and material culture of the deceased provide information regarding their personal identity. The analysis of the association between the sex/gender of the deceased and bead deposition clearly supports the view that beads are an artefact which was commonly placed with women as an item of personal adornment. This association is also apparent in early Anglo-

Saxon graves, often with large numbers of beads (Stoodley 1999: 34-5). Literary sources provide further evidence of the relationship between beads and women in descriptions of female dress. One of the clearest descriptions of female dress occurs in *Eirik's saga* (Hayeur Smith 2004: 84). In one passage, the dress of the female diviner is detailed; this attire includes 'a necklace of glass beads' (Hayeur Smith 2004: 84). Beads can be understood as one of the components which make up the expression of female gender (Hayeur Smith 2004). It is likely that the appropriate expression of feminine gender was a necessary part of identifying and belonging to Viking-Age social groups (Hayeur Smith 2004).

Determinations of sex have a strong correlation with interpretations of gender in Viking-Age graves. There is evidence for that biological sex was considered to be synonymous with gender expression in the Viking-Age, as implied in texts such as the Norwegian Gulafling Law and the Icelandic law code (Grágás) (Norrman 2000: 377). Both texts advocate punishment for transgressions in cross-dressing (Norrman 2000: 377). The comedic value of the *Thrymskvida* is the transgression and subversion of gender norms (Orchard 2011: 99; Clunies Ross 2002: 181). This occurs when Thor is dressed in bridal attire in an attempt to masquerade as Freya (including the possible involvement of beads; 'broad gem-stones sitting on his chest') (Orchard 2011: 99; Clunies Ross 2002: 181). However, it has also been argued (based on skaldic verses) that 'gender was determined by actions and could, possibly, be independent of sex' (Straubhaar 2002: 261). In this interpretation, gender is a social expression based on the roles taken by men and women during their lifetime (Straubhaar 2002: 261). Examples of situations where gender identity changes include, women becoming masculinised by acting assertively, or men becoming feminised through advanced age or engagement in homosexual acts (Straubhaar 2002: 261-2). The relationship between beads and gender in burial contexts is complicated by other aspects of personal identity (such as status and wealth) involved in the customs dictating the deposition of material culture (Dommasnes 1982; Solberg 1985). Furthermore, the ability to accurately correlate patterns of dress and expressions of personal identity in the archaeological record is dependent on the burial customs of an area, and of those involved in burying the deceased (Dommasnes 1982: 71, 83). In light of the proportion of graves in the database in which sex was determined based solely on artefacts, these factors are a reminder that gender is a complex aspect of personal identity. Material culture which is interpreted as related to male or female gender is suggestive rather than concrete evidence

of sex, particularly when personal preferences and cultural backgrounds complicate the contextual basis for interpretations.

Evidence from the database shows that beads formed at least a small part of Viking-Age dress for a small proportion of the male population. While the number of burials in this study is small, there are clear associations between men and single finds or finds of less than five beads. The case of Grave 3 at the Townfoot Farm site demonstrates the use of more than five beads in a necklace composition belonging to a male; although the possibility has been raised that the items were worn in a pouch (Paterson *et al* 2014: 82). If the arrangement of beads was intended as a necklace, then the addition of three silver rings to this jewellery composition is a 'prominent feature' and has a parallel in a necklace found in the burial of a male at Ship Street, Dublin (Paterson *et al* 2014: 82). The interpretation of this necklace is unclear; it is suggested that while there may be some significance to this display of adornment, it could equally represent 'a reflection of personal taste or wealth' (Paterson *et al* 2014: 151). This particular example and its interpretations are an anomaly amongst the data, which generally follows the pattern of minimal bead finds from male graves in Scandinavia (Solberg 1985). In terms of age, there is not enough secure data from the skeletal material to make significant comments on a relationship between beads and particular age groups. Based on the available data, there appears to be examples of beads deposited at each stage of life, from infant to elderly. As stated above, the intersections of other aspects of personal identity and burial rites may be more influential in the decision to inter the deceased with grave goods.

The pattern of beads which appear to have a possible amuletic role demonstrates a use for beads beyond personal adornment. Evidence from the database suggests that single finds of amber and glass beads may have been deposited as amulets in the graves of women and children. The association between single finds of amber (with or without other bead forms), is noted in the graves of children (and women) in the early Anglo-Saxon period (Meaney 1981: 67, 71). Talismans in the form of single glass 'sword' beads were found in three male graves. These sword beads are discussed as an artefact with a clear amuletic role in Anglo-Saxon male graves (Meaney 1981: 28). To connect the use of beads in this manner to Scandinavian cultural ideas, it is necessary to briefly examine ideas regarding magic and religion in the Viking-Age. Hayeur Smith discusses amulets and talismans as part of 'the magical dimension of Norse paganism' (2004: 83). This understanding is based on idea that magic serves a specific purpose (a 'means to an end')

rather than the more complex role of religion in society (Hayeur Smith 2004: 83). Therefore, amulets are objects which engage in this idea of magic by representing an attempt to exert control over the outcome of a situation (Hayeur Smith 2004: 83, 85-6). While this is particularly relevant to the role of sword beads as talismans during fighting, the inclusion of amulets in burials could be seen as an attempt to control the outcome of the deceased's afterlife through the protective properties of amber beads or a bead decorated with an eye motif (Hayeur Smith 2004: 83). Items such as Thor's hammer pendants (such as the one found in Repton, Grave 511) are more directly associated with religion due to the connection with a specific deity (Hayeur Smith 2004: 86; Biddle & Kjølbye-Biddle 2001: 40).

To further complicate the cultural background behind the use of beads as amulets, Hayeur Smith suggests that there is a connection between certain bead types to deities in Icelandic contexts (2004: 90). For example, amber beads are connected to the deity Freya (Hayeur Smith 2004: 90). In light of these discussions, it is possible that the use of beads as amulets blurred the line between the magical and the religious elements of Norse paganism (Hayeur Smith 2004: 83). The use of beads in a magical or religious capacity is difficult to accurately interpret from the archaeological record, particularly in light of factors such as personal preferences (Hayeur Smith 2004: 89). Furthermore, there is a risk of projecting ideas regarding amulets from later texts backwards into the early Viking-Age (Fuglesang 1989: 15). In light of the nature of the evidence for beads as amulets from the database, perhaps it is better for these examples to be understood within their site specific context rather than as a wider pattern of behaviour in the Viking-Age Britain.

Conclusion

The patterns suggested by the appearance of beads in Viking-Age sites are in part the result of the stages of production, trade, and use in the life cycle of this artefact. There may be many factors which have influenced the appearance of beads in archaeological contexts; their value within Viking-Age society, the wealth or status of a deceased individual, and the techniques used to excavate sites. By focussing on the study of beads within this life cycle framework, it is hoped that this study has illuminated some of the ways in which the study of Viking-Age beads can be furthered in Britain. Works such as Callmer (1977) and Guido (1999) provide useful comparisons for understanding the trade and movement of beads in the pre-Viking and Viking-Age periods. However, in light of new data from

excavated sites and studies conducted since these publications (within Scandinavia and Britain), a wider range of ideas and information can be used to update the understanding of beads in the Viking-Age.

It is clear that bead-makers worked with many different locally sourced and imported materials at different scales of production. Individual bead-making and small scale production occurred across many sites using materials left-over from other activities, imported material from transoceanic sources, or material transported over small distances to the site from the hinterland or neighbouring area. The use of local materials demonstrates engagements in regional networks of trade. Evidence for specialised production of glass beads within Viking-Age England is influenced by continued and introduced glass working techniques. The local production of Scandinavian and Anglian types, as well as the introduction of high lead glass manufacturing techniques from Eastern Europe, demonstrate that the bead-makers at Coppergate worked within a well-connected system of craft working knowledge (Mainman & Rogers 2000: 2594-6; Bayley 2008: 16). The Viking-Age connections between Britain and the wider Viking world is also evident in imported bead types. The database assemblage for this study contains examples of Scandinavian, Anglo-Saxon, Irish, Western European and Eastern forms in circulation before, during, and (in all probability), after the Viking-Age. While it is often difficult to accurately identify the origin of manufacture (Mainman & Rogers 2000: 2605), bead forms from Mediterranean, Middle Eastern, and Central Asian areas demonstrate engagement in a long distance trade network which connected urban sites such as York to intermediary emporia sites in Scandinavia.

The role of beads within economic processes of production and trade form only part of the life cycle of a bead. As these beads are a product manufactured for a consumer, the appearance of Viking-Age beads in Britain is also influenced by the use of beads. It must be recognised that some of the bead finds were purchased in Scandinavia, and the subsequent movement of these artefacts across the North Sea occurred with a Scandinavian migrant. Viking-Age burials are important sources of information regarding the use of beads to express (and determine) personal and cultural identity. The arrangement of beads into jewellery forms such as necklaces or as an attachment to brooches is one expression of Scandinavian female identity. However, this gendered association is not exclusive as there are many examples where small numbers of beads were deposited in the burials of men and children. Beyond this role in personal adornment, the appearance of beads in a

functional role as an amulet or talisman provides a slight insight into the magical and possibly religious beliefs of the deceased and their local community.

It cannot be said that beads in and of themselves were instrumental in founding the economic networks of the Viking World in the early medieval period. Nor are they objects which contain inherent signifiers of 'Scandinavian-ness' which can be read in the archaeological record of Viking-Age Britain. However, beads are one of a number of proxies for the development of these ideas and interactions. Patterns in the appearance of beads (alongside other material culture) demonstrate engagements in similar markets, traditions and ideas throughout the wider Viking World. The incorporation of finds which might otherwise be excluded in other research designs (particularly beads which have been lost), has created a broader representation of these patterns. Beads are therefore a small but significant part of the interactions and processes which shaped Viking-Age society in Britain.

Appendix B

Concordance Tables 18-20 - Comparison with Scandinavian forms

A comparison between the types listed in Callmer (1977) and the forms which appear in the database of this study. Comparison with undecorated glass forms excludes database entries of unknown shape or colour. Decorated glass forms of unknown shape are included to demonstrate further information on the provenance of decorative styles.

Key: D = diameter, T = thickness/W= width, L= length, H= height.

Table 18: Gemstone and faience beads

Database type	**Callmer (1977) Types**	**Key descriptive points**
Ec 4.13 ND, Ec 4.4-7 (both facetted)	T009 (Group Ta)	Cornelian, cylindrical, facetted 8 sides
Fh 1.10 ND	S001, (Group Sb) S002	Rock crystal, spherical
Jd 4.1 ND, Jd 3.1 ND?	R001 (Group Ra)	Faience, melon shaped

Table 19: Undecorated glass beads

Database Type	**Callmer (1977) Types**	**Key descriptive points**
Aa 1.1 ND	A171, A173 (Group An), A200 (Group Ao)	Glass, annular, blue (range of shades), translucent, two examples folded manufacture
Aa 1.3 ND	A340? A341?	Glass, annular, translucent, green (range of shades)
Aa 1.10 ND	A001 (Group Aa)	Glass, annular, colourless, translucent
Aa 2.1 ND (singular example)	None	Glass, annular, semi-translucent, blue (appearing dark), D 18 mm x H 8 mm

Database Type	Callmer (1977) Types	Key descriptive points
Aa 2.3 ND (singular example)	None	Glass, annular, semi-transparent, green (medium-dark), D 22 mm x T 7.5 mm
Aa 3.1 ND (singular example)	None (Closest to A190)	Glass, annular, translucent, blue (dark), D: 6mm
Aa 3.4 ND	None	Glass, annular, opaque, brown
Aa 3.5 ND	A030 (Group Ad)	Glass, annular, opaque, black
Aa 3.6 ND	A060 (All Group Ag), A061	Glass, annular, opaque, yellow
Aa 3.6-4 ND (singular example)	None	Glass, annular, opaque, yellow-brown, D18.5 mm x 9.1 mm
Aa 3.8 ND (singular example)	None (Closest A020-3, A025, A371)	Glass, annular, opaque, white, D 20 mm
Aa 3.9-3 ND	None (Closest to A360)	Glass, annular, grey-green, opaque, D: 11 mm
Aa 4.1 ND, Aa? 4.1 ND	A170, A171, A172, A173 (Group An), A190, A200, A210, A230? A231? (Group Ao), A250? A290, A291, A292, A293 (Group Ar)	Glass, annular, blue (range of shades)
Aa 4.1-3 ND (singular example)	None (Closest to A260-4, A270-1, A280)	Glass, annular, blue-green, D 19.2 mm x H 9.6 mm
Aa 4.3 ND, Aa? 4.3 ND	A340? A341? A342? A350? A351? A360?	Glass, annular, green (range of shades?)
Aa 4.4 ND	None	Glass, annular, brown
Aa 4.5 ND	A030 (All Group Ad), A032	Glass, annular, black
Aa 4.6 ND	A040,	Glass, annular, yellow

Database Type	Callmer (1977) Types	Key descriptive points
	A041, A042, A043 (Group Ae), A050 (Group Af), A060, A061 (Group Ag)	
Aa 4.6-4 ND	A120 (Group Ak)	Glass, annular, yellow-brown
Aa 4.10 ND (singular example)	A001 (Group Aa), A012 (Group Ab)	Glass, annular, colourless, D: between 3 and 17 mm
Aa/d 4.1 ND (singular example)	None	Glass, annular with nicks/cuts on outer edge – gadrooned?, blue
Ab/h 4.5 ND (singular example)	Close to A033?	Glass, globular? Spherical?, black
Ab 1.1 ND	A171, A172 (Group An), A200, A230 (Group Ao)	Glass, globular, translucent, blue (range of shades)
Ab 1.3 ND	A340? A341? A342?	Glass, globular, translucent green (range of shades)
Ab 1.4 ND (singular example)	None	Glass, globular, translucent, brown, D 3.5 mm x T 2 mm
Ab 1.6 ND	A041 (All Group Ae), A042, A043	Glass, globular, translucent, yellow.
Ab 1.6-4 ND (singular example)	None (Closest to A120)	Glass, globular?, translucent, yellow, D: 14 mm
Ab 2.1 ND (singular example)	None (Closest to A210)	Glass, globular, semi-translucent, blue, D: 15 mm
Ab 3.1 ND	A190 (Group Ao), A250?	Glass, globular, opaque, blue (range of colours)
Ab 3.1-3 ND (singular example)	A260, A261 (Group Ap)	Glass, globular, translucent, blue-green, D 8.1 mm x H 7.6 mm
Ab 3.3 ND	A360?	Glass, globular, opaque, green (range of colours)
Ab 3.4 ND	None	Glass, globular, opaque, brown
Ab 3.4-5 ND (singular example)	None	Glass, globular, opaque, brown-black, D 8.2 mm x H 7.4 mm

Database Type	Callmer (1977) Types	Key descriptive points
Ab 3.5 ND	A030 (All Group Ad), A032	Glass, globular, opaque, black, D: 9 mm to 11 mm
Ab 3.6 ND	A060 (All Group Ag), A061	Glass, globular, opaque, yellow
Ab 3.6-4 ND (singular example)	None	Glass, globular, opaque, yellow-brown, D 8.8 mm x H 5.5 mm
Ab 3.8 ND, Ab 3.9-8 ND	A020 (All Group Ac), A021, A022, A025, A371	Glass, globular, opaque, white, D: size range between 3 and 11 mm
Ab 4.1 ND	A170, A171 (Group An), A190, A200, A210, A230? A231? (Group Ao), A240? A241? A250? A290, A291 (Group Ar)	Glass, globular, blue (range of colours)
Ab 4.1-3 ND	A260, A261, A262 (Group Ap), A270, A271, A280 (Group Aq)	Glass, globular, blue-green, D: between 6 and 17 mm
Ab 4.1-8 ND (singular example)	None	Glass, globular, blue-white, D 8.4 mm x H 5.5 mm
Ab 4.2 ND (singular example)	None (Closest to A100)	Glass, globular, red, D 2.3 mm x H 1.9 mm
Ab 4.3 ND	A340? A341? A350? A351? A360?	Glass, globular, green (range of colours)
Ab 4.4 ND (singular example)	None	Glass, globular, brown, D 6.2 mm x H 5.0 mm

Database Type	Callmer (1977) Types	Key descriptive points
Ab 4.5 ND	A030 (All Group Ad), A032, A033	Glass, globular, black
Ab 4.6 ND	A040, A041, A042 (Group Ae), A050 (Group Af), A060, A061 (Group Ag)	Glass, globular, yellow
Ab 4.6-8 ND (singular example)	None	Glass, globular, yellow-white, D 116 mm x H 8.9 mm
Ab 4.7 ND (singular example)	A080 (Group Ai), A090 (Group Aj)	Glass, globular, orange, D 7.6 mm x H 4.8 mm
Ab 4.10 ND (singular example)	A001 (Group Aa), A013 (Group Ab)	Glass, globular, colourless, D 13 mm x H 12.6 mm
Ac 1.1 ND	A174 (All Group An), A175	Glass, cylindrical, translucent, blue (dark)
Ac 1.1 ND	None	Glass, cylindrical – rectangular prismatic, translucent blue (turquoise)
Ac 1.4 ND (singular example)	None	Glass, cylindrical, translucent, brown, D 4.5 mm x H 5.5 mm
Ac 1.6 ND	A044 (Group Ae)	Glass, cylindrical, translucent, yellow
Ac 2.6 ND	None	Glass, cylindrical, semi-translucent, yellow
Ac 3.2 ND	None	Glass, cylindrical, opaque, red
Ac 3.2-4 ND (singular example)	A135 (Group Al)	Glass, cylindrical, opaque, red-brown, D: between 6 and 8 mm
Ac 3.3 ND	A361?	Glass, cylindrical, opaque, green (range of shades?), D: between 6 mm and 8 mm
Ac 3.4 ND	None	Glass, cylindrical – tubular, opaque light brown, D: 9.3 mm X L: 7.4 mm
Ac 3.5 ND (singular example)	None	Glass, cylindrical, opaque, black
Ac 3.6 ND	None (Closest to A044)	Glass, cylindrical, opaque, yellow

Database Type	Callmer (1977) Types	Key descriptive points
Ac 3.6-4 ND (singular example)	None	Glass, cylindrical, opaque, yellow-brown, D 10 mm x L 6 mm
Ac 3.7 ND (singular example)	None	Glass, cylindrical, opaque, orange
Ac 3.8 ND (singular example)	A024 (Group Ac)	Glass, cylindrical, opaque, white
Ac 4.1 ND	A174, A175 (Group An), A294 (Group Ar)	Glass, cylindrical, blue (shades unknown)
Ac 4.2 ND (singular example)	None	Glass, cylindrical, red, D 2.6 mm x H 1.3 mm
Ac 4.1-3 ND (singular example)	A272 (Group Aq)	Glass, cylindrical, blue-green
Ac 4.3 ND	None (Closest to A343? A361?)	Glass, cylindrical, green (range of shades)
Ac 4.5 ND	None	Glass, cylindrical, black
Ac 4.6 ND	A044 (Group Ae), A063 (Group Ag)	Glass, cylindrical, yellow, D: between 3 mm and 8 mm
Ac/e 4.5 ND (singular example)	None	Glass, cylindrical/segmented, black
Ad 1.1 ND	A177 (All Group An), A178	Glass, melon, translucent, blue (dark), D: between 9 and 14 mm
Ad 1.3 ND	A300 (Group As)	Glass, melon, translucent, green (medium to dark), D: between 9mm and 20 mm
Ad 1.6 ND (singular example)	A045 (Group Ae)	Glass, melon, translucent, yellow, D: between 6 mm and 8 mm
Ad 1.8 ND (singular example)	None	Glass, melon, translucent, white, D 8 mm x L 6-7 mm
Ad 1.10 ND	A006 (Group Aa)	Glass, melon, translucent, colourless, D: between 9 and 14 mm
Ad 3.1 ND (singular example)	A295?	Glass, melon, opaque, blue (shade unknown), D 13 mm
Ad 3.8 ND (singular example)	None (Closest A036)	Glass, melon, opaque, white (-pink), D 10 mm x W 9.9 mm x T 6 mm

Database Type	Callmer (1977) Types	Key descriptive points
Ad 4.1 ND	A177, A178 (Group An), A211 (Group Ao), A295 (Group Ar)	Glass, melon, blue (turquoise and unknown shades)
Ad 4.3 ND	A300 (Group As), A345 (Group Av)	Glass, melon, green, D: between 6 mm and 14 mm
Ad 4.5 ND	None	Glass, melon, black
Ae 1.1 ND (singular example)	E060	Glass, segmented (five), translucent, dark blue, D: between 3mm and 11 mm
Ae 3.1 ND	None	Glass, segmented, opaque, blue
Ae 3.6 ND	E030?	Glass, segmented, opaque, yellow, D: between 3 mm and 11 mm
Ae 3.6-8 ND	None	Glass, segmented, opaque, yellow-white
Ae 3.8 ND	None (Closest to E020)	Glass, segmented (two?), opaque white
Ae 3.10 ND (singular example)	None	Glass, segmented (one), opaque, colourless (coloured layer)?
Ae 4.1 ND	E060, E062?	Glass, segmented, blue (range of colours?)
Ae 4.1-3 ND (singular example)	None	Glass, segmented (two), blue-green
Ae 4.1-8 ND (singular example)	E064	Glass, segmented (two & 3), blue-white (lined)
Ae 4.3 ND	E080	Glass, segmented, green
Ae 4.6 ND	E030	Glass, segmented, yellow
Ae 4.6-8 ND	None	Glass, segmented, yellow-white
Ae 4.10 ND	E001	Glass, segmented, colourless
Ae 4.11 ND, Ae 4.11? ND	E110, E130	Glass, segmented, foil
Af 3.7 ND	None	Glass, biconical, opaque, orange
Af 3.7-4 ND (singular example)	None	Glass, biconical, opaque, orange-brown
Af 4.1 ND	A176 (Group An)	Glass, biconical, blue (shades unknown)

Database Type	Callmer (1977) Types	Key descriptive points
Af 4.10 ND (singular example)	None (Closest to A004)	Glass, biconical, colourless, D 6.1 mm x H 3.5 mm
Ah 1.1-9 ND (singular example)	None	Glass, spherical, translucent, blue-grey, D 7 mm
Ah 1.10 ND (singular example)	None	Glass, spherical, translucent, colourless, D 8 mm
Ah 3.1 ND (singular example)	None	Glass, spherical, opaque, blue, D 2.5 mm
Ah 3.4 ND (singular example)	None	Glass, spherical, opaque, brown (dark), D 7 mm
Ah 3.6 ND (singular example)	None	Glass, spherical, opaque, yellow, 3 mm x 3 mm
Ah 4.3 ND (singular example)	None	Glass, spherical, green, D 10 mm x L 10 mm
Ah 4.6 ND (singular example)	None	Glass, spherical, yellow

Table 20: Decorated glass beads.

Database Type	Callmer (1977) Types	Key descriptive points
Aa 1.12 Zig Zag	None	Glass, annular, translucent, polychrome: green with (opaque) yellow combed zig zag, D 21-23 mm x L 11 mm
Aa 1.12 Trail	Close to B382 (Group Bd)	Glass, annular, translucent, polychrome blue with (opaque) white trail in irregular triangles
Aa 3.12 Waved	None	Glass, annular, opaque, polychrome: yellow-brown with two green-brown crossing waves
Aa 3.12 Waved	None	Glass, annular, opaque, polychrome: brown with white waved line, D 13.6 mm x H 6.8 mm
Aa? 3.12 Eye	B025 (Group Bn)	Glass, annular?, opaque, Polychrome: white with at least two blue eyes
Aa? 3.12 Mosaic	G040 (Group Ga)	Glass, annular?, opaque, Polychrome: yellow-white

Database Type	Callmer (1977) Types	Key descriptive points
		with red and black squares in a possible chequerboard mosaic
Aa? 3.12 Mosaic?	Close to G040? (Group Ga)	Glass, annular? opaque, polychrome: brown-red with yellow and black squares – possibly mosaic?
Aa 3.12 Trail	Unknown	Glass, annular, translucent, polychrome: blue with yellow-green decayed trails, D 10 mm X H 4 mm
Aa 4.12 Waved	Close to B414 (Group Bb?)	Glass, annular (fragment), polychrome: blue with opaque yellow waved line in crossed/chain pattern, D: 22.5 X H: 10.8
Aa 4.12 Waved	B052 (Group Bd)	Glass, annular, polychrome: Black (or very dark green) with a white waved line, D: between 15 mm and 20 mm.
Aa 4.12 Waved/Trail	B545 (group Bc)	Glass, annular, polychrome: green with two red trails either side of a yellow waved line
Aa 4.12 Eye	None	Glass, annular, polychrome: blue with white eyes
Aa 4.12 Eye	Unknown – could be B240? (Group Bl)	Glass, annular, polychrome: yellow,
Aa 4.12 Raised Eye/Twist	None	Glass, annular, polychrome: black, yellow, blue, white
Aa 4.12 String	None	Glass, annular, polychrome: mix of glass in body with main colouration of dark blue, opaque yellow/brown twisted cable decoration, est. D 35 mm x H 17 mm
Aa 4.12 Twist	None	Glass, annular, polychrome: turquoise with yellow cable decoration, L 13.2 mm x H 8 mm

Database Type	Callmer (1977) Types	Key descriptive points
Aa 4.12 Trail	Close to B389 (Group Bd)	Glass, annular, polychrome: blue with an opaque yellow concentric trail D: 11 mm X H: 4.5 mm
Aa 4.12 Trail	Close to B389 (Group Bd)	Glass, annular, polychrome: blue with an opaque white concentric trail D: 15.4 mm X 4.3 mm
Aa? 4.12 Herringbone, Aa 4.12 Herringbone, Aa 1-3.12 Herringbone	K001 (Group Ka)	Glass, annular?, polychrome: blue with white lines in a herringbone/possible false reticella pattern
Ab 1.12 Framed Eye/Raised Eye	Close to B005 (Group Bm)	Glass, globular, translucent, Polychrome: colourless with red disc and cluster of yellow applied blobs
Ab 3.12 Linear/Raised Eye	None	Glass, globular, opaque, polychrome: red with white random linear pattern over top of applied yellow blobs, D 9 mm x L 6 mm
Ab 3.12 Trail	None	Glass, globular, opaque, polychrome: brown with light brown concentric circle
Ab 3.12 Raised Eye	None	Glass, globular, opaque, polychrome: brown with cream applied blobs
Ab 3.12 Waved	B052 (Group Bd)	Glass, globular, opaque, polychrome: black with white wave, D 15.5mm x H 9.7
Ab 3.12 Millefiori motif	B030 (Group Bn)	Glass, globular ?, opaque, polychrome: white with central blue eye and straight red and white rays with no border, D: between 6 mm and 11 mm
Ab 4.12 Trail	None	Glass, globular, polychrome: dark blue with white concentric trial, D 15.1 mm x 13 mm
Ab 4.12 Trail/Raised Eye	Close to B438/440 (Group Bm)	Glass, globular, polychrome: blue with white waved trail

Database Type	Callmer (1977) Types	Key descriptive points
		and applied blobs, D 22 mm x H 11 mm
Ab? 4.12 Herringbone	K001? (Group Ka)	Glass, globular? polychrome: blue with grey-like linear pattern in a herringbone pattern – possibly incised?
Ab? 4.12 Zigzag	Close to B409 (Group Bf)	Glass, globular?, polychrome: blue with white combed zigzag
Ab? 4.12 Framed Eyes	B480 (Group Bg)	Glass, globular? polychrome: white eyes with smaller blue eyes in the centre.
Ac 1.12 Waved/Eye	None	Glass, cylindrical, translucent, polychrome: grey-green with two waved bands of red on white and four eyes of same red/white colour in each interspace
Ac 3.12 Linear	B225 (Group Ba)	Glass, cylindrical ?, opaque, polychrome: yellow with two black crossing waved lines, D: between 6 mm and 11 mm
Ac 3.12 Linear	None	Glass, cylindrical, opaque, polychrome: blue with white horizontal lines, D 8.5 mm x L 10 mm
Ac 3.12 Trail	B391? (Group Bf)	Glass, cylindrical ?, opaque, polychrome: white with red and blue trails in spiral horizontally along surface of bead
Ac 3.12 Waved	Unknown	Glass, cylindrical ?, opaque, polychrome: white with blue waved line around circumference, D: between 6mm and 20 mm
Ac? 3.12 Waved	B018 (Group Ba)	Glass, cylindrical?, opaque, polychrome: black/blue with blue and white crossing waves
Ac 3.12 Millefiori motif	Close to B238 (Group Bn)	Glass, cylindrical, opaque, polychrome: yellow with

Database Type	Callmer (1977) Types	Key descriptive points
		straight black and white rays around a central red eye, D: between 6 and 11 mm.
Ac 3.12 Millefiori motif/trail	Close to B089 (Group Bq)	Glass, cylindrical, opaque, polychrome: green/black with decayed white trail around three millefiori discs of red eye with yellow rays
Ac 3.12 Millefiori motif/waved	Literature states close to B268. Close to this, however, Callmer example has red body colour. (If considered as this then Group Bp)	Glass, cylindrical, opaque, polychrome: brown with white crossing waves around three red millefiori discs
Ac 3.12 Millefiori motif	Close to B090 (Group Bh)	Glass, cylindrical, opaque, polychrome: black/red with black and white curvilinear rays, a red and white central eye and a red border
Ac 3.12 Millefiori	G002 (Group Ga)	Glass, cylindrical, composite made, multi-coloured with clear floral design
Ac 3.12 Millefiori motif/Zig zag	Close to B090 (Group Bh)	Glass, cylindrical ?, opaque, polychrome: black with white zigzag in a chain pattern with red and white raised eyes, D: between 12 mm and 17 mm
Ac 3.12 String/Raised Eye	None (B447 closest)	Glass, cylindrical, opaque, polychrome: blue with translucent blue and white collars at each end and three knobs at the centre of the beads consisting of swirled blue and white glass, D 5-7 mm x L 17 m
Ac 3.12 Framed Eye/ Raised Eye	B090 (Group Bh)	Glass, cylindrical, opaque, polychrome: black with discs (?) encircling red blobs with a black eye at the centre, D 14mm x L 13 mm

Database Type	Callmer (1977) Types	Key descriptive points
Ac 4.12 Linear/Raised Eye	Unknown	Glass, cylindrical, polychrome: interlacing lines and multi-coloured bosses
Ac 4.12 Trail/Zigzag	None	Glass, cylindrical, polychrome: blue with yellow linear circumference line and cream/white zigzag
Ac? e? 3.12 Trail	None	Glass, wound cylindrical or segmented?, opaque, polychrome: dark brown with yellow trail in twist around external surface, D: 6 mm
Ad 3.12 Trail	None	Glass, melon, opaque, polychrome: green with circumferential yellow band,
Ad 4.12 Trail	None	Glass, melon, polychrome: blue with light blue trail, D 12 mm
Ad 4.12 Trail	None	Glass, melon, polychrome with white circumferential threads, D 12 mm x T 10 mm
Af 3.12 Waved	None	Glass, biconical, opaque? Polychrome blue with white waves in crossed pattern, L 7.9 mm x H 5.6 mm
Af? 4.12 Trail/Eyes	None	Glass, biconical?, polychrome: dark blue with white enamel trail and yellow eyes
Af 4.12 Trails/Waved	None	Glass, biconical, polychrome: v. dark/black with white/cream concentric trials and irregular waves, D 9.6 mm, H 6.0 mm
Af 4.12 Linear	None	Glass, biconical, polychrome: yellow with red crossing lines in a diamond pattern
Ag 4.12 Trail	None	Glass, discoid, polychrome: green with white trail in spiral

Database Type	Callmer (1977) Types	Key descriptive points
		pattern on circumference of bead
Ai 1.12 Raised Eye	None	Glass, other – oval, translucent, polychrome: green with irregular yellow applied blobs, D 10 mm x 7 mm
Ai 1.12 Trail/Eye	Close to B563 (Group Bm?)	Glass, other – circular, Translucent, polychrome: blue-green with red trail and yellow/green eyes
Ai 1-3.12 Herringbone	K001 (Group Ka)	Glass, other – barrel-shaped, translucent blue with opaque white, rows of blue and white twisted rod in a herringbone/possible false reticella? Pattern, D 9 mm x H 9 mm
Ai 4.12 Eye	Close to B426 (Group Bn)	Glass, other-circular, polychrome: blue with three green and white insets, D c.8 mm
Ai 4.12 Raised Eye	None	Glass, other-irregular square, polychrome: blue with applied white knobs with a blue eye in the centre
Ai 4.12 Millefiori motif	Close to B082 (Group Bq?)	Glass, other – Barrel-shaped, polychrome: v. dark/black with green blobs and yellow lines, D: between 9 and 20 mm
Aj 1-3.12 Raised Eye/Twist	Unknown	Glass, fragment of tripartite?, translucent green with yellow knob surrounded by opaque white and blue-green cable
Aj 3.12 Waved/Eye	Close to B438? (Group Bm)	Glass, fragment, opaque?, polychrome: blue with yellow eyes and crossed waves
Aj 3.12 Waved	Close to B016? (Group Ba)	Glass, shape unknown, opaque, polychrome: white with blue crossing waved lines

Database Type	Callmer (1977) Types	Key descriptive points
Aj 4.12 Linear	None	Glass, shape unclear, polychrome: yellow with blue dash markings
Aj 4.12 String/Eye	None	Glass, shape unclear, polychrome, blue with white and blue cabling and yellow spots
Aj 4.12 Herringbone?	K001 (Group Ka)	Glass, shape unclear, polychrome: blue and white, possible herringbone (based on photograph)
Aj 4.12 Spiral	None	Glass, fragment, polychrome: yellow with black/brown coloured spirals
Aj 4.12 Waved	Close to B381, B382 (Group Bd) B383, B384? (Group Bf)	Glass, polychrome: blue with white waved line

Appendix C

Bead groups and provenance information

Table 21: The provenance information for forms identified as similar to types in Callmer's (1977) bead groups.

Summary of key features (database examples)	**Bead group (Callmer 1977: 78-91)**	**Provenance (Callmer 1977: 94-99)**
Annular, globular, Melon colourless	Aa	Scandinavia or West Europe
Annular, globular, colourless	Ab	Scandinavia or West Europe
Globular, cylindrical, white	Ac	Scandinavian (except A370 – Mediterranean or Middle East import)
Annular, globular (possibly melon), black	Ad	Scandinavia or West Europe
Annular, globular, cylindrical, melon, yellow	Ae	Scandinavia or West Europe
Annular, globular, yellow	Af	Scandinavia or West Europe
Annular, globular, cylindrical, yellow	Ag	Scandinavia or West Europe
Globular, orange	Ai	Scandinavia or West Europe
Globular, orange	Aj	West European
Annular, yellow-brown	Ak	Scandinavia or West Europe
Cylindrical, brown-red	Al	Scandinavian or West European
Annular, globular, cylindrical, melon, biconical, (dark) blue	An	West/Central Europe (A176)
Annular, globular, melon, blue	Ao	Scandinavian
Globular, bluish green	Ap	Scandinavia or West Europe
Globular, cylindrical, bluish green	Aq	Scandinavia or West Europe
Annular, globular, cylindrical, melon, turquoise	Ar	Scandinavian
Melon, green	As	Scandinavia or West Europe
Melon, grey green	Av	Scandinavian

Waved (crossing)	Ba	Scandinavia, Baltic Littoral, Staraja Ladoga
Waved (crossing)	Bb	Scandinavia
Waved/Trail	Bc	Scandinavia, Baltic Littoral, Staraja Ladoga
Waved, Trail	Bd	Majority Scandinavia, possibly Western Europe
Zigzag (combed), Trail, Waved	Bf	Scandinavian or Western Europe
Eye	Bg	Mediterranean or Middle East
Millefiori motif, Millefiori motif/Zigzag, Raised Eye/Framed Eye	Bh	'West Turkestan'- Central Asia
Eye	Bl	Western Europe
Framed Eye/Raised Eye, Trail/Raised Eye, Trail Eye, Waved/Eye	Bm	Western Europe
Eye, Millefiori motif,	Bn	Unclear – Scandinavia likely; possibly Western Europe
Millefiori motif/Waved	Bp	Scandinavian, Baltic Littoral and Staraja Ladoga
Millefiori motif/Trail, Millefiori motif	Bq	Not Stated
Segmented	Ea	Byzantine or Caliphate
Composite beads (eye, spiral, flower and chequer pattern)	Ga	North Western Europe
Herringbone (Reticella)	Ka	West Europe
Faience	Ra	Mediterranean?
Rock crystal (small spherical)	Sb	Western and Southern Asia
Cornelian	Ta	Iran or India

Appendix D

Concordance Table 22 - Comparison with types appearing in the Anglo-Saxon period.

A selection of bead forms which share similar features with bead types appearing in Guido's (1999) study of Anglo-Saxon England, are presented below. Due to the broad descriptive nature of Guido's study, this comparison is restricted to examples which share similarities in shape, colour and decoration style with the bead types dating to the Anglo-Saxon period.

Table 22: List of examples from the database with similar features to types created by Guido (1999), including provenance information.

Site	Bead database number	Anglo-Saxon types AD 400 to 700	Possible origin
Peel Castle	297, 316, 334, 340, 355, 357	Type 1i	Unknown
Sangobeg	004	Type 2i	Possible Rhineland imports
Westness	032	Type 2i	Possible Rhineland imports
Quoygrew	086	Type 2i	Possible Rhineland imports
Peel Castle	344	Type 2i	Possible Rhineland imports
Townfoot Farm	422	Type 2i	Possible Rhineland imports
Parliament St Sewer Trench	437	Type 2i	Possible Rhineland imports
Whithorn	017	Type 2vi	Europe
Peel Castle	306	Type 2ix	Possibly Rhenish origin
Whithorn	009	Type 3i	Possibly Frisian/Frankish

Knowe of Moan	163	Type 3i	Possibly Frisian/Frankish
Jarlshof	182, 183	Type 3i	Possibly Frisian/Frankish
Ballinaby	261?	Type 3i	Possibly Frisian/Frankish
Peel Castle	332, 335	Type 3i	Possibly Frisian/Frankish
Repton	424	Type 3i	Possibly Frisian/Frankish
Bay of Skaill	098	Type3iiia	Europe – the Netherlands one example
Peel Castle	356	Type 3iv	Suggested local – Norfolk and Suffolk
Westness	033	Type 3v	Frankish
Quoygrew	082, 083	Type 4i	Manufacture known locally and in Netherlands
Knowe of Moan	159, 160	Type 4i	Manufacture known locally and in Netherlands
Peel Castle	343	Type 4i	Manufacture known locally and in Netherlands
Peel Castle		Type 4vi	Possible local manufacture
Peel Castle	294, 299, 305, 309, 313, 317, 321, 323, 324, 325, 331, 349, 350, 352	Type 5i	Possibly local
Walmgate	440	Type 5i	Possibly local
Brough of Birsay	448	Type 5i	Possibly local
Townfoot Farm	453, 457, 458, 460, 461, 464, 472	Type 5i	Possibly local
Meols	492	Type 5i	Possibly local
Whithorn	491	Type 5i	Possibly local
Peel Castle	308, 326, 328	Type 5v	Local manufacture?

Ballinaby	255	Type 5ix	Possible Frankish
Townfoot Farm	423, 462, 451, 463	Type 5x	Local manufacture?
Peel Castle	310, 318	Type 5x	Local manufacture?
Whithorn	018	Type 5x	Local manufacture?
Dunadd	499, 500	Type 6i	Manufacture known from Netherlands
Westness	036-9, 055, 061-4, 068	Type 6i	Manufacture known from Netherlands
Quoygrew	085	Type 6i	Manufacture known from Netherlands
Brough of Birsay	091, 450	Type 6i	Manufacture known from Netherlands
Jarlshof	186	Type 6i	Manufacture known from Netherlands
Old Scatness	188-9	Type 6i	Manufacture known from Netherlands
Cruach Mhor	265	Type 6i	Manufacture known from Netherlands
Peel Castle	304, 358, 361, 365, 367, 369	Type 6i	Manufacture known from Netherlands
Claughton Hall	420	Type 6i	Manufacture known from Netherlands
Townfoot Farm	467-8	Type 6i	Manufacture known from Netherlands
Bornish	473, 474, 476	Type 6i	Manufacture known from Netherlands
St John	290	Type 6ii	Possibly local or Western

			continental Europe
Peel Castle	338	Type 6ii	Possibly local or Western continental Europe
Jarlshof	185	Type 6iii	Possibly local or Western continental Europe
Westness	052	Type 6vi	Early Anglo-Saxon examples from Frankish Rhineland. Later Viking period examples from Sweden and Denmark
Brough of Birsay	090, 093	Type 6vi	Early Anglo-Saxon examples from Frankish Rhineland. Later Viking period examples from Sweden and Denmark
Knowe of Moan	150-6, 167	Type 6vi	Early Anglo-Saxon examples from Frankish Rhineland. Later Viking period examples from Sweden and Denmark
Peel Castle	348	Type 6vi	Early Anglo-Saxon examples from Frankish Rhineland. Later Viking period examples from Sweden and Denmark
Bay of Skaill	097	Type 6vii	Not stated

Jarlshof	184	Type 6viii	Not Stated
Bornish	282, 478	Type 6viii	Not Stated
Castle Haven	007	Type 6ix	Unknown
Townfoot Farm	452	Type 6ix	Unknown
Westness	054	Type 6x	Not Stated
Croy	023	Type 6xiv	Unknown
Peel Castle	333, 345	Type 8i	Europe, particularly northern Europe and southern Denmark for annular examples
Claughton Hall	419	Type 8i	Europe, particularly northern Europe and southern Denmark for annular examples
Dunadd	510	Type 8i	Europe, particularly northern Europe and southern Denmark for annular examples
Townfoot Farm	465	Type 8i	Europe, particularly northern Europe and southern Denmark for annular examples
Westness	034, 043, 044, 057, 058, 059, 060, 065, 067?	Type 8i	Europe, particularly northern Europe and southern Denmark for annular examples
Ballinaby	252, 256, 262?	Type 8i	Europe, particularly northern Europe and southern Denmark for annular examples

Westness	042	Type 10a	Rhineland and Frisia; Ireland; or Scandinavia
Harrold	426	Type 11b	Possibly English production
Brough of Deerness	100	Type 13	Continental Europe (first in Mediterranean in Roman)

Appendix E.

Table 23 – decorated glass bead types

Table 23: A grid table of simplified data regarding the primary (body) and secondary (decoration) colours and decorative styles of decorated glass beads arranged into clusters. This table is the basis for the groups presented in Table 16.

Site	Blue	White	Black	Yellow	Green	Red	Brown	Herringbone	Millefiori/Millefiori motif	Mosaic	Trail	Eye	Raised Eye	Waved	Crossing waves	Combed zigzag	String	Twist	Spiral	Linear (Horizontal)
Dunadd (501)	1	2																		
Dunadd (504)	1	2																		
Dunadd (506)	1	2																		
Westness (046)	1	2																		
Ballinaby (257) (Secondary colour grey)	1																			
Peel Castle (327)		2	1& 2			1& 2														
Peel Castle (307)		2	2	1		2														
Peel Castle (337)	2	1& 2				2														
16-22 Coppergate (CG055)			1	2	2	2														
Westness (042)	1	2		2		2														
Westness (035)		1	2			2														
Westness (053)			2	2		1				?										
Hillswick (191-201)				1?																
Dunadd (502)	1			2	2															
16-22 Coppergate (CG048)	1			2																

Site	Blue	White	Black	Yellow	Green	Red	Brown	Herringbone	Millefiori/Millefiori motif	Mosaic	Trail	Eye	Raised Eye	Waved	Crossing waves	Combed zigzag	String	Twist	Spiral	Linear (Horizontal)
Townfoot Farm (452)	1	2																		
16-22 Coppergate (CG49)	1	2																		
North Lincolnshire (436)	1& 2																			
6-8 Pavement (PV014)		2					1													
16-22 Coppergate (CG050)							1/2													
16-22 Coppergate (CG052)		2	1																	
34 Shambles (SH017)				2	1															
Peel Castle (346)				2			1													
Harrold (426)		2			1															
Westness (056) (Secondary colour grey)						1														
Croy (023)	1	2																		
Westness (033)	2	1																		
Ballinaby (260)	1& 2	1																		
Repton (425)	1	2			2															
Meols (396)				1																
Balnakeill (003)	1	2																		
16-22 Coppergate (CG051)		2					1													
Area 3: Brough Road (490)				2	1															

Site	Blue	White	Black	Yellow	Green	Red	Brown	Herringbone	Millefiori/Millefiori motif	Mosaic	Trail	Eye	Raised Eye	Waved	Crossing waves	Combed zigzag	String	Twist	Spiral	Linear (Horizontal)
Peel Castle (295) (Primary colourless)				2		2														
Peel Castle (370)			1& 2			2														
Whithorn (017)		2	1																	
16-22 Coppergate (CG054)		2	1																	
16-22 Coppergate (CG045)		2					1													
Castle Haven (007)	1	2																		
Peel Castle (356)	2	1																		
Bay of Skaill	2	1																		
Brough of Birsay (094)	2	1				2														
16-22 Coppergate (CG046)	1			2																
16-22 Coppergate (CG057)	1	2																		
Peel Castle (306)			2	1																
Peel Castle (363)				1	2															
Westness (054)	2	2	1																	
Peel Castle (298)				2	1															
Westness (051)	1	2																		
Hen Gastell (377)	1			2	1	1	2													
16-22 Coppergate (CG047)	1			2																

Site	Blue	White	Black	Yellow	Green	Red	Brown	Herringbone	Millefiori/Millefiori motif	Mosaic	Trail	Eye	Raised Eye	Waved	Crossing waves	Combed zigzag	String	Twist	Spiral	Linear (Horizontal)
Croy (494)				1			2													
Westness (041)	1	2																		
Old Scatness (190)	1	2																		
Peel Castle (362)		2	1			2														
Townfoot Farm (470)		2				2	1													
Townfoot Farm (469)			1	2		2														
Brough of Birsay (447)	1			2	2	2														
Croy (024)	1	2		2																
Jarlshof (181) (Colour unknown)																				
Ballinaby (255)				2	1	2														
Saffron Walden (433)	1	2		2																
16-22 Coppergate (CG056)		2	1																	
Cronk Yn Howe (291)		2			1	2														
16-22 Coppergate (CG058)	1			2																
Knowe of Moan (165)	1&2	2		2																
16-22 Coppergate (CG053)	1	2																		
Peel Castle (341)	1&2	2																		
Walmgate (441)	2	2	1	2																
Dunadd (503)	2	2		2	1															

Appendix F.

Table 24 – Location of beads in burial contexts

Table 24: The location of the bead finds within the context of burial sites. This table forms the basis for Figure 29.

Site Name	Bead number	Bead location	Directly associated material	Probable bead use based on location
Balnakeill	3	Neck area of skeletal remains	None	Suspended from neck – amber bead suggests amulet
St Cuthbert's	1	Unknown	Unknown	Unknown
Blackerne?	1	Unknown	Unknown	Unknown
Broch of Gurness	1	Mixed burial context	Unknown	Unknown
Whithorn	2	Unknown	Unknown	Unknown
Westness	39/40	Unknown	Unknown	Unknown
Lamba Ness	1	Unknown	Unknown	Unknown
Braeswick	3	Wrapped with other artefacts	Possibly one bronze tortoise brooch	Unknown
Scar	1	Soil (unsecure context)	Unknown	Unknown
Pierowall Grave 4	7	Upper torso/breast area of skeletal remains	In association with one tortoise brooch (left side) of a pair	Possibly strung between brooches or hung from left brooch
Pierowall Grave 10	Several	Unknown	Unknown	Unknown
Pierowall Grave 16	1	Unknown	Unknown	Unknown
Greenigoe	2	Unknown (no human remains)	Unknown	Unknown
Knowe of Moan	63	Found internally and externally in around the cist	Unknown	Unknown

Site Name	Bead number	Bead location	Directly associated material	Probable bead use based on location
		(Unsecure context)		
Housegord	1	Stated as same combination as at Cnip Burial B	Whetstone pendant?	Pendant/necklace?
Clibberswick	2	Soil (Unsecure context)	Unknown	Unknown
Bhaltos	1	Unknown	Unknown	Unknown
Cnip Burial A	44	Neck area	Bronze Oval brooches	Interpreted as hung from brooches in multiple strings
Cnip Burial B	1	Near jaw	Sandstone pendant	Pendant
Cnip Burial F	3	Amber found near jaw, position of other beads unknown	Possible iron artefact in association with one of the unsecure beads	Necklace – likely that all beads used in this way
Ballinaby	12	Unknown	Unknown	Thought to be necklace or 'festoon' (Graham-Campbell & Batey 1998: 124)
Newton Distillery	1	Unknown	Unknown	Unknown
Cruach Mhor	6	Unstratified surface finds	Unknown	Unknown
Machrins Machair	1	Soil (Unsecure context)	Unknown	Unknown
Carn Nan Bharraich (Grave 1)	2	Near the head	None	Unknown – pendant/necklace or hair ornament?

Site Name	Bead number	Bead location	Directly associated material	Probable bead use based on location
Kildonnan (Grave 2)	2	Possible soil find (unsecure context)	With whetstone?	Pendant/necklace?
Kildonnan (Grave 3)	2	Unknown	With whetstone?	Pendant/necklace?
Tote (Grave 2)	1	Unknown	Stated as being 'very close' to the bronze pin (Lethbridge 1920: 136)	Unknown
Druim Arstail	1	Stones of the mound (unsecure context)	Unknown	Unknown
North Uist?	Unknown	Unknown	Unknown	Unknown
St John's	7?	Unknown	Unknown	Unknown
Cronk Yn Howe	1	Unknown	Unknown	Unknown
Peel Castle (Pagan Lady Grave)	71	67 beads clustered around the neck/head area, three beads found in organic mass	Beads found with ammonite pendant. Organic mass included copper-alloy rod, copper-alloy fragments and a metal ring. These are interpreted as being part of the necklace	Necklace
Peel Castle (Adult male 10th C grave)	3	Grave soil	Unknown	Unknown
Peel Castle (Child 10th century grave)	8	Three of the beads near	Three beads at neck found	Necklace

Site Name	Bead number	Bead location	Directly associated material	Probable bead use based on location
		neck/head, five from soil	near copper-alloy bell	
Peel Castle (Child 12th century grave)	1	Grave soil	Unknown	Unknown
Carlisle Cathedral	1	Unknown	Unknown	Unknown, single find of amber
Claughton Hall	2	Held between two brooches	Tortoise brooches and molar tooth, possibly wrapped together in cloth	Possible hung from brooches? Or 'keepsake' (Edwards 1998: 15)
Townfoot Farm (Grave 1)	1	Close to head	None	Possible hair ornament
Townfoot Farm (Grave 2)	8	Six in neck area, two from plough soil	Oil shale ring, copper alloy chain link	Necklace
Townfoot Farm (Grave 3)	7	Neck area	Three silver rings	Necklace or possibly in bag/purse
Townfoot Farm (Grave 4)	1	Chest area	None	Unknown
Townfoot (Farm Grave 5)	3	Two found in neck area, one found with group of objects at hip area	Bead found at hip area with three small flints, silver coin, glass disc, remains of a knife, ringed pin, copper-alloy object	Beads at neck area necklace/amuletic pendant. Bead at hip are likely to have been in a purse or pouch.
Repton (Grave 511)	2	Neck, above right shoulder	Thor's hammer pendant	Necklace/pendant

Site Name	Bead number	Bead location	Directly associated material	Probable bead use based on location
Harrold (Grave 3)	1	Neck	Sword?	Sword bead? Or possibly clothes fastener
Saffron Walden	8	Assumed at neck?	Pendants	Necklace

NB: The bead finds from the plough soil of Townfoot Farm, Cumwhitton are not included. However, it is thought that these beads may have come from Grave 6 (Paterson *et al* 2014: 151).

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