

Hedeby in Wulfstan's days: a Danish *emporium* of the Viking Age between East and West

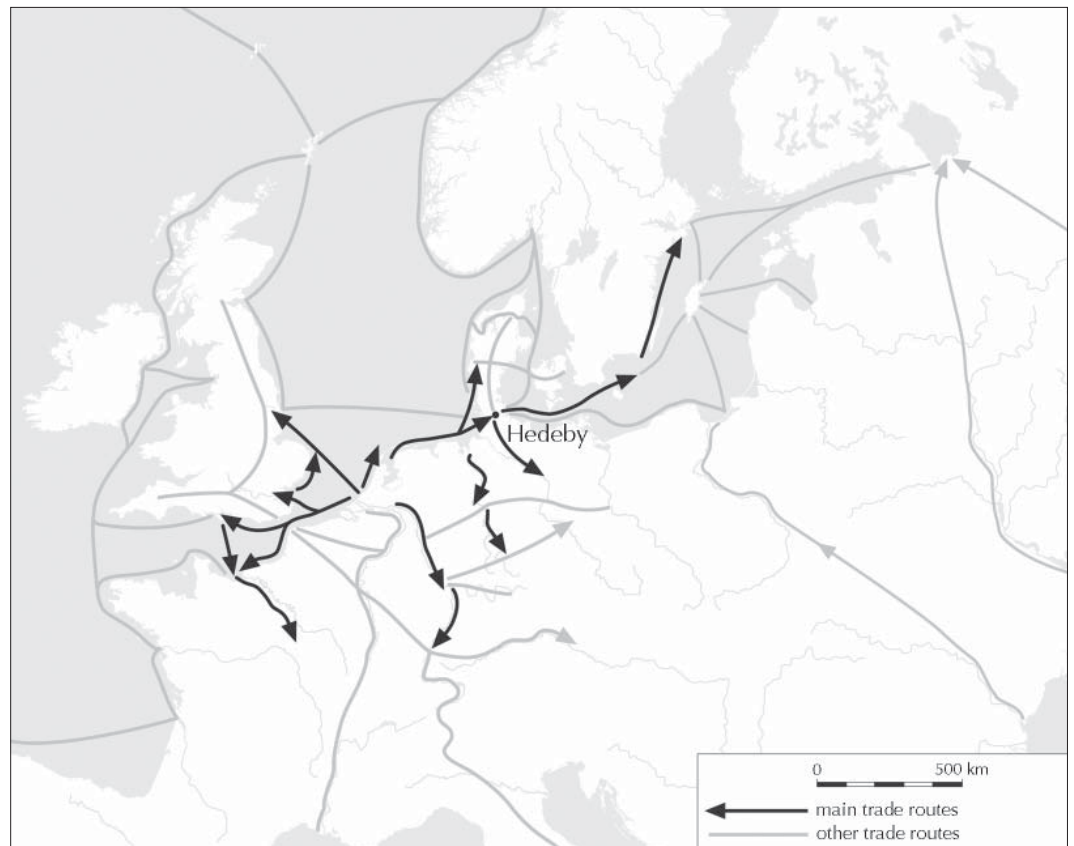
by Volker Hilberg

When Wulfstan reported at the court of King Alfred the Great (871-899)¹ on his journey from Hedeby to Truso, the Danish *emporium* of Hedeby on the border of the Frankish Empire and later German kingdom was experiencing rapid growth.² Due to its key geographical position at the narrowest part of the Cimbric peninsula between the North Sea and the Baltic basin, this place developed from a maritime landing place and naval base of the Danish kings to an international *emporium*. Its situation was also within a border

zone between Danish, Frisian, German/Saxon and Slavic interests and settlements.³

According to the first written record in the Frankish Royal Annals, King Godfrid gathered in 804 with his fleet and his cavalry at *Sliethorp*/Hedeby, a place at the southern border of his realm near an earthwork that protected the Danish border, the so-called *Danevirke*.⁴ Four years later, after the destruction of the *emporium Reric*, he went once again with his fleet to that place that was now named *portus*.⁵ It is presumed that

Fig. 1. Early Middle-Age trade routes. Drawing: R. Kühn, Stiftung Schleswig-Holsteinische Landesmuseen Schleswig. After Lebecq 1998: 76, fig. 9.



1. At Alfred's court, see Stenton 2001: 274; Wilson in Lund 1984: 4; Lund (1984: 5-14) is not concrete on date. See Lebecq 1987 for Ohthere's and Wulfstan's voyages during Alfred's reign; see Abels 1998: 188, n. 48; Jankuhn 1986: 135; critically Bately 2007: 26 ff.

2. Jankuhn 1984b: 436 ff; Callmer 1994: 63-65; Lebecq 2007. For *emporium* characteristics, see Verhulst 2000: III-III.

3. Jankuhn 1986: 53-55, fig. 24a; Näsman 2000: 57.

4. *Annales regni Francorum* s.a. 804 (Rau 1974); Lund 1995: 205.

5. *Annales regni Francorum* s.a. 808 (Rau 1974). For Latin *portus* as harbour, see Schlesinger (1972: 76); as town, see Verhulst (2002: 89, 91).

he settled the displaced merchants from *Reric* in *Sliesthorp*.⁶

By the 8th century, Denmark had participated more and more in the North Sea exchange and trading system between the Franks, Frisians and Anglo-Saxons. The Danish kingdom was able to establish a new commerce centre in Ribe and to take over the North Sea hegemony from the Merovingian kings by erecting and maintaining an international trade base.⁷ The first written records stress *Sliesthorp's* importance as a harbour near the Danish border and its military significance.⁸ Besides the importance of seafaring, Hedeby was also terrestrially accessible via the Hærvejen, a route which was of some importance for the Frankish/German kingdom's access to the Baltic Sea.⁹

The *emporium* of Hedeby was known as *Sliesthorp* or *Sliaswich* to the Germans, as *at Hæthum* to the Anglo-Saxons and as *at Haithum* or *Haithabu* to the Danes. (According to the late 10th-century Anglo-Saxon chronicle of Ealdorman Æthelweard, this *oppidum capitale* of the Angles was called *Slesuic* by the Saxons and *Haithaby* by the Danes.)¹⁰ As an international trading *emporium* Hedeby linked the Frankish-Frisian trade network of the North Sea region with the Scandinavian and Slavic Baltic Sea (Fig. 1).¹¹ Around 900 this role can be clearly seen by the production and distribution of bronze comb plates, which belong to single-sided composite antler or bone combs (Fig. 2).¹²

The cast plates, which are mainly decorated with an interlace motif in one or two horizontal fields, have a length of ca 12-14 cm. Moreover, the intact plates from Birka (chamber grave 944) are gilded and a small fragment from Hedeby (Hb 2003/4573) shows a dark applied paste, perhaps niello (Fig. 3, #6). The 17 known find spots of these plates (see Fig. 2) embrace wide parts of Europe with three focal points in the Baltic: one on Gotland, one in Birka, and one in Hedeby.

Only in Hedeby are several moulds known, and this form must have been very

common in the Danish *emporium*, as over 40 examples are present. From systematic metal detecting since 2003, we know now of 24 further fragments of bronze comb plates (see Fig. 3) which are distributed throughout the area inside the semi-circular rampart, except more or less for the northwestern corner (Fig. 4).¹³ The finds suggest that Hedeby possessed a special role in the production and distribution of these bronze comb plates. For the Baltic it seems as if Gotland, where they are present in several richly furnished burials of the late 9th to 10th centuries, played a decisive part in their distribution up to Birka and to the Russian woodlands.

To the west, in the North Sea area, these comb plates were found in Frisia, but also reached important towns like Anglo-Saxon London and the rivers Rhine and Mosel as far upstream as Trier in Upper Lotharingia. At this last site, a comb of this type was found in a coin-dated pit house in the vicinity of St Irminen that post-dates 911. That combs of this type were much more common in Viking-Age Denmark is attested by a very small, 2 cm-long fragment from the elite settlement of Lejre on Zealand. These quality cast comb plates from around 900 and later are unknown in Ribe and its surroundings.¹⁴ In Hedeby's hinterland, a comb of this type is so far only known from the settlement of Kosel West, and they are not present in the several known chamber graves of this region.¹⁵

Because of the abundance of archaeological find material, Herbert Jankuhn, one of the early excavators to work on the site, supposed as early as the 1930s that the heyday of the *emporium* of Hedeby was the second half of the 9th and first half of the 10th centuries.¹⁶ This interpretation is widely accepted.¹⁷

Due to Hedeby's prominent role in the inter-regional economic and trade systems, we could also expect to find a wide range of different burial rites and grave constructions. But Heiko Steuer's attempt to combine the different ethnicities known from written records (Frisians, Saxons, Danes, Swedes, Sla-

6. Schlesinger (1972: 77 ff.); for *Reric* merchants going to Hedeby, see Steuer 1984b: 189; Maund 1994: 35, following E. Roesdahl; also Lund 1995: 207; Lübke 2001: 24 ff.
7. Wood 1983: 19; Lund 1995: 205; Näsman 2000: 62-64; Lebecq 2007.
8. Näsman 2000: 57.
9. Jankuhn 1986: 55 ff., fig. 24b, plan I; Sawyer & Sawyer 2002: 110.
10. Laur 1999; Marold 2001; cf. Scheel & Paulsen 1930: 131, No. 227; Campbell 1962: 9.
11. Jankuhn 1953a, with two maps; Jankuhn 1958: 460-463, fig. 2; Lebecq 1983: 193-202, fig. 51; Lebecq 1998: fig. 9; Schwind 1984: 303; Hill (2001b: 107): Hedeby as a "depot for the transport networks to the Rhineland and to Scandinavia"; Steuer *et al.* 2002: 134 ff.; Lebecq 2007.
12. Jankuhn 1953b; Meier 1994: 154-156, see list 1.
13. Meier (1994: 155): a total of 11 specimens, unanalysed. From K. Schietzel's field-walking: five fragments.
14. Pers. comm. by C. Feveile, Den antikvariske Samling, Ribe.
15. Meier 1994: 209 ff., pl. 20.1; for the burials, Eisen-schmidt 2004.
16. Jankuhn 1944: 228.
17. Hill (2001b: 107): Hedeby's heyday began about 900.

Fig. 2. Top: distribution map of bronze comb plates in Northern Europe. Bottom: additions to finds list.



Bronze comb plates

Finds list after Meier 1994: 155 ff., with the following additions:

1. **Hedeby**, Gem. Busdorf, Kr. Schleswig-Flensburg: 6 fragments from surface survey: 1 fragmt. quadrant B9 (R 3.415), 2 fragmts. quadrant F3 (R. 3.205 and 206), 2 fragmts. quadrant F17 (R. 3.202-204); 1 fragmt. quadrant H40 (R 3.113). Twenty-four metal-detected finds: Hb 2003/700, Hb 2003/865, Hb 2003/1110, Hb 2003/1834, Hb 2003/2262, Hb 2003/2365, Hb 2003/3023, Hb 2003/4573, Hb 2003/4834, Hb 2003/8009, Hb 2004/8299, Hb 2004/8318, Hb 2004/8675, Hb 2004/8706, Hb 2004/8765, Hb 2004/8902, Hb 2004/9771, Hb 2004/9774, Hb 2004/10036, Hb 2005/11462, Hb 2005/11673, Hb 2006/12244, Hb 2006/12486, Hb 2007/14260.
2. **Lejre**, Roskilde Amt, Zealand. T. Christensen, *Journal Danish Arch.* 10, 1991: 180, 182, fig. 25.
3. **London-Queenhithe**, find Cu-3238 (1752). Unpublished, kindly permitted and information from Ms Lyn Blackmore, Museum of London Archaeology Service.
4. **Trier-Vereinigte Hospitien**, Kr. Trier-Saarburg. L. Clemens/H. Löhr, Jahresbericht des Landesamtes für Denkmalpflege, Abteilung Archäologische Denkmalpflege, Amt Trier, für den Stadtbereich Trier. *Trierer Zeitschr.* 61, 1998: 419-424, esp. 422 ff., fig. 27 (photo); L. Clemens in: *Beitr. Mittelalterarch. Österreich* 17, 2001: 53, fig. 10, 6 (drawing).
5. **Wiskiauten "Kaup"**, Kaliningrad oblast, Russia: barrow K 128/146 (2004). Kulakov 2002-2003: 75 ff., fig. 25.2.

18. Steuer 1984b; see also Brather 2004: 277-279, tab. 5.

19. Arents 1992, part 1: 208-219; Eisenschmidt 2004: 301.

20. Steuer 1984a: 362 ff.

vic people) with the different known grave types in Hedeby¹⁸ has been strongly rejected.¹⁹ Steuer's opinion that the Scandinavian portion of Hedeby's population amounted only to 5-10% of the total depends on the premise that the lack of grave goods in the 9th and 10th

centuries is the expression of a continental, Frisian-Saxon population.²⁰

But for early medieval vessels the passage via the Limfjord was also of high importance; this is signalled by many central places or 'productive' sites. In the eastern Limfjord

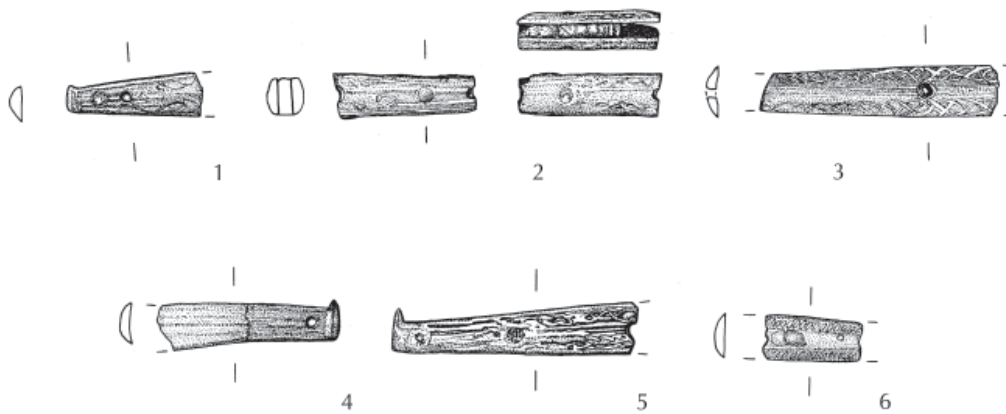


Fig. 3. Fragmented bronze comb rims from the systematic metal detection in Hedeby.

1 = Hb 2003/2365

2 = Hb 2003/4834

3 = Hb 2003/2262

4 = Hb 2003/8009

5 = Hb 2003/1110

6 = Hb 2003/4573

Drawing: J.-M. Murawski, Stiftung Schleswig-Holsteinische Landesmuseen Schleswig.



Fig. 4. Distribution of the metal-detected bronze comb rims in Hedeby.

21. Johansen 1992: 31-60, 79-91; Böhme 2001; Nielsen 2002: 210-212.

22. Nielsen 2002; Jørgensen 2003: 178 ff. Limfjord not noted as a trade route, see Lebecq 1998: fig. 9-10; but see Jankuhn 1958: 454; Jankuhn 1986: 124; Näsman 1991: fig. 2.

23. Merovingian coinage: Metcalf 1996: 400 ff., map 1. Carolingian coinage: Metcalf 1996: 422 ff., map 6, 7A, B; von Heijne 2004: 69 ff., 76-78, fig. 5.11. Tating ware jugs: Staecker 1997: 431-435; Stilke 2001.

24. Näsman 2000: 58; Nyman *et al.* 2003: 549 ff. Feveile stresses cultural deposits in the market area in the mid 9th century. For the 10th and 11th centuries only a little material is known from Ribe, and there are no features of this date (pers. comm. by C. Feveile).

25. According to *Annals of Fulda*; Schlesinger 1972: 78.

26. Rimbert, *Vita Anskarii* Ch. 24; Trilmich & Buchner 1961: 80 ff.; Scheel & Paulsen 1930: 69 ff., no. 105; Schlesinger 1972: 78.

are known e.g., Sebbesund, Postgården, Humlebakken or Lindholm Høje,²¹ and specialised production in textiles can be seen in nearby Bejsebakken.²² Also different object groups connected with the exchange of prestige goods from the 7th to the 9th centuries – like Merovingian and Carolingian coins or Tating ware jugs – are found in the Limfjord area.²³

It is believed that because of the advantages of its location Hedeby replaced Ribe as the leading international trading centre in Jutland in the course of the 9th century.²⁴ Additionally, it is possible to observe a thorough royal Danish interest in peaceful and growing trading activities with the Frankish kingdoms as expressed in King Sigfrid's treaty with the east Frankish king Louis in 873.²⁵ Before 888 Rimbert wrote that many merchants in Hedeby were baptised in Hamburg and Dorestad to promote trade relations, from which we can conclude that there were frequent contacts with these North Sea-based *emporia*.²⁶

The historical background

After a period of recession in the 6th and 7th centuries, the development of settlements in the surrounding parts of Angeln and Schwansen slowly began to increase during the 8th and 9th centuries, reaching its climax in the 10th century.²⁷ Comparing this to Anglo-Saxon relations of the late 9th century, Klaus Randsborg estimates a hinterland of about 600 km² supported Hedeby with provisions, which must have been even bigger if the *Danevirke's* protection is taken into consideration.²⁸

Hedeby's importance is closely connected with the different elites involved. From the time of King Godfrid there were both diplomatic and military contacts between the Danish kings and their entourages and the Frankish Empire.²⁹ Reciprocal gift-giving in the form of high-status items must have

circulated regularly between the Danish and the Frankish kings and embassies.³⁰ Written records tell of gifts on the occasion of Heriold's/Harald Klak's baptism in 826 in Mainz³¹ or of a sword with a gold grip given in August 873 to King Louis the German during a visit from a Danish legation of the royal brothers Sigfred and Halfdan.³² The Frankish imports in the boat chamber grave at Hedeby led Egon Wamers to interpret this burial as the interment of Heriold/Harald Klak.³³ In the decades around 900, Callmer's Phases V and VI of urbanisation in Scandinavia,³⁴ Hedeby still prospered. Several elite burials in wooden chambers in the settlement and its surroundings point to the growing influence of a local elite during the 10th century.³⁵

A new ideology spread through the Christian mission taught by Ansgar (d. 865) and Rimbert (d. 888) from the 820s onwards, where international trading places like Hedeby and Birka, as foci of power and communication, were of a high importance.³⁶ Ansgar received King Horich's (d. 854) permission to build a church in Hedeby and obtain a place to stay. But after some years this church was closed by Horich's son, Horich II, after the intervention of the *comes* Hovi, who seems to have been the royal official in Hedeby. But Horich II reconsidered his decision and after Hovi was replaced, he opened the church again and also allowed the use of a bell.³⁷

Disputes and turmoil between rival kings and princes are characteristic for the whole 9th and most parts of the 10th centuries in Denmark, which point to a multiple leadership with varying degrees of power.³⁸ After King Horich the Younger, there are no written records for decades.³⁹ Only Adam of Bremen relates in the 11th century – based on an oral tradition told by King Svend Estridsen (d. 1074/76) – that sometime after 891, when a Danish army had been defeated near Leuven/Löwen in Flanders and two Danish kings had been killed,⁴⁰ Olaf and his sons Chnob and Gurd came with their retinue from Sweden to take control of Denmark.⁴¹ Many researchers

27. Willroth 1992: 444-458; Müller-Wille 1994-1995: 39-56; Müller-Wille *et al.* 2002. For new data for Hedeby's surroundings, see Dobat 2004.
28. Randsborg 1980: 83-85.
29. Listed contacts from 777-887 in Maund 1994. For Hedeby, see Hilberg 2006.
30. Reciprocal gift-giving in early medieval Europe, see Le Jan 2000; Bazelmans 2000.
31. *Annales Regni Francorum* a. 826 (Rau 1974): Heriold/Harald was also given a shire in Frisia, 'Rustringen'; Scheel 1930: 36 no. 47.
32. *Annales Fuldenses* a. 873 (Rau 1960); cf. Scheel & Paulsen 1930: 42 ff., no. 63.
33. Wamers 1994.
34. Callmer 1994: 66-71.
35. Callmer 1994: 69 ff.; Eizenschmidt (2004: 262-264): chamber graves in Hedeby since the 9th century, with the boat-chamber grave and the chamber graves inside the rampart (second half of 9th to 10th centuries).
36. Lund 1995: 208-210.
37. Schlesinger 1972: 79; Scheel & Paulsen 1930: 73-75, no. 110 + 111; 88 ff., no. 143.
38. Maund 1994; Callmer 1994: 69-71.
39. Schlesinger 1972: 80.
40. *Annales Fuldenses* a. 891 (Rau 1960).
41. Schlesinger 1972: 80.

have therefore interpreted this as a “Swedish dynasty” ruling from Hedeby over Denmark, an assumption apparently strengthened by the presence of typical Swedish forms in runic inscriptions at Hedeby and by the elite burials in wooden chamber graves.⁴² In addition to the possibility that Olaf belonged to the Swedish dynasty, Niels Lund argues that Olaf could have been a member of the Danish royal family who was once driven away to Sweden and came back under better circumstances.⁴³

Widukind of Corvey mentions that in 934, the German king, Henry I, defeated the Danes, received their tribute and baptised their king, Chnupa.⁴⁴ It is likely that Adam’s Chnub is the same as that mentioned by Widukind, and two rune stones found near Hedeby reveal that this place was under Chnupa’s control. The so-called small and large Sigtrygg stones were made by Asfrid, Chnupa’s widow, for their son, King Sigtrygg.⁴⁵ The struggle for Hedeby and its surroundings in the 10th century between Chnupa’s dynasty and the German kings seems to point for an Ottonian predominance between ca 934/40 to 983.⁴⁶ Once again Hedeby’s border situation was paid a certain tribute.

In the 9th century several Viking raids and attacks on the Frankish Empire are attested, and large amounts of silver coins and objects found their way into the Scandinavian homeland.⁴⁷ It was of the utmost significance not only for the socio-cultural development in Scandinavia but also for the different Anglo-Saxon kingdoms in England that the Vikings were engaged in the British Isles from the late 8th century onwards.⁴⁸ Viking attacks and raids on Anglo-Saxon England are recorded since the reign of King Beorhtric of Wessex (786-802) in an initial phase and in the 840s in a second phase of much more destruction and threat. In a third phase, after the dispersal of the “Great Army” after 878, large parts of eastern and northern England, the then so-called Danelaw, fell under control of and were eventually settled by Scandinavian war

bands and their leaders.⁴⁹ The impact of insular fine metalwork on the material culture development, especially in Norway, is well investigated,⁵⁰. But the development of Scandinavian settlement in England, its extent and its relation to the native Anglo-Saxons, is much less known.⁵¹ In fact, there are no written records documenting Hedeby’s relation with the Anglo-Saxon realms before the end of the 10th century,⁵² but new archaeological data imply vivid contacts already during the 9th and early 10th centuries.⁵³

A hundred years of research in Hedeby⁵⁴

An outline of the excavations (Fig. 5)

In 1897 Sophus Müller identified an area of ca 25.5 ha inside the huge and well-preserved semi-circular rampart at the western side of Haddebyer Noor, an inlet of the Schlei fjord, as the place mentioned in local Viking-Age runic inscriptions as Hedeby.⁵⁵ At that time, only chance finds were known. In 1900, Johanna Mestorf, director of the *Museum für Vaterländische Altertümer* in Kiel, decided to start small-scale excavations throughout this area to reveal the place’s character. In the following years until 1915 and once again 1921, Wilhelm Splieth and Friedrich Knorr dug over 350 small trenches and revealed deposits and wooden remains of the *emporium*.

Also ca 500-700 inhumation graves from a huge cemetery inside the rampart were excavated between 1902 and 1912; the exact number of burials is very difficult to ascertain due to several imposing deposits and destruction from younger, overlying settlement structures.⁵⁶ Only in 1924 did Knorr very briefly relate the results of all his excavation campaigns.⁵⁷ The documentation of each year’s campaign, consisting of handwritten reports, scaled drawings and photos of selected features and also description cards and drawings of find material, has survived without any serious losses in the museum’s archive.

42. Runic inscriptions: Andersen 1987: 161 ff.; Stoklund 1999; chamber graves: Aner 1952: 107-115; Aner 1962. Jan-kuhn (1958: 478) and Steuer (1984b: 202 ff.): a “Swedish dominion” of Hedeby from 900-934; cf. Eisenschmidt (1994: 75-91): reaction to the growing Christian or Ottonian influence and pressure.

43. Lund 1982: 121; Stoklund 2001: 117-119, 122 ff.; Eisenschmidt 2004: 324 ff.; see also Duczko this volume.

44. *Widukindi res gestae Saxonicae* I, 40 (Bauer & Rau 1971); Scheel & Paulsen 1930: 80, no. 125; Schlesinger 1972: 80; Andersen 1987: 164 ff.

45. DR no. 2 + 4.

46. Schlesinger 1972: 80-82.

47. Steuer 1987: 156-168; Coupland 1995; Nelson 1997; Lennartson 1997-1998: 434 ff., 533-542; Wamers 2005.

48. Coupland 1995; Keynes 1997.

49. For the actual discussion, see especially Hadley & Richards 2000; Graham-Campbell *et al.* 2001.

50. Insular imports as booty and loot: Wamers 1985; Wamers 1998; Müller-Wille 2002; insular imports as an expression of a hitherto-unknown Christian mission: Staecker 1997: 445 ff.; Helgeson 2001: 209 ff.; Mikkelsen 2002: 117-121.

51. Hadley 2002.

52. Two runic inscriptions show relations with England. The Skarthi stone (DR no.3): Skarthi sailed to the “west”, and this campaign can be dated to the reign of King Swein Forkbeard. Another inscription, found in Schleswig/Slesvig cathedral (DR no. 6) and of a presumable 11th century date, tells that someone is buried in a place called “Skia” in England; see Laur 2001: 70; Lerche Nielsen 2001: 133-135.

53. Capelle (1968: 78): according to the small number of insular artefacts, the contacts from Hedeby to the British Isles were quite restricted. Cf. Clarke & Ambrosiani 1991: 62.

54. This section does not provide a detailed account of all scientific research conducted in Hedeby and its surrounding but instead discusses the basis of the relevant archaeological results and state of research. Cf. Stark 1988; Müller-Wille 2007.

55. Müller 1897: 636-642, figs 395-396; Müller 1898: 232-238, figs 143-144. DR no. 1 + 3. For the history of the Hedeby research, see Jankuhn 1984a; Unverhau 2002; Roesdahl 2002.

56. Jankuhn, unpublished manuscript: 2, 6-8; Arents 1992, vol. 1: 22-31.

57. In Knorr 1924 is a short summary of the excavated features.



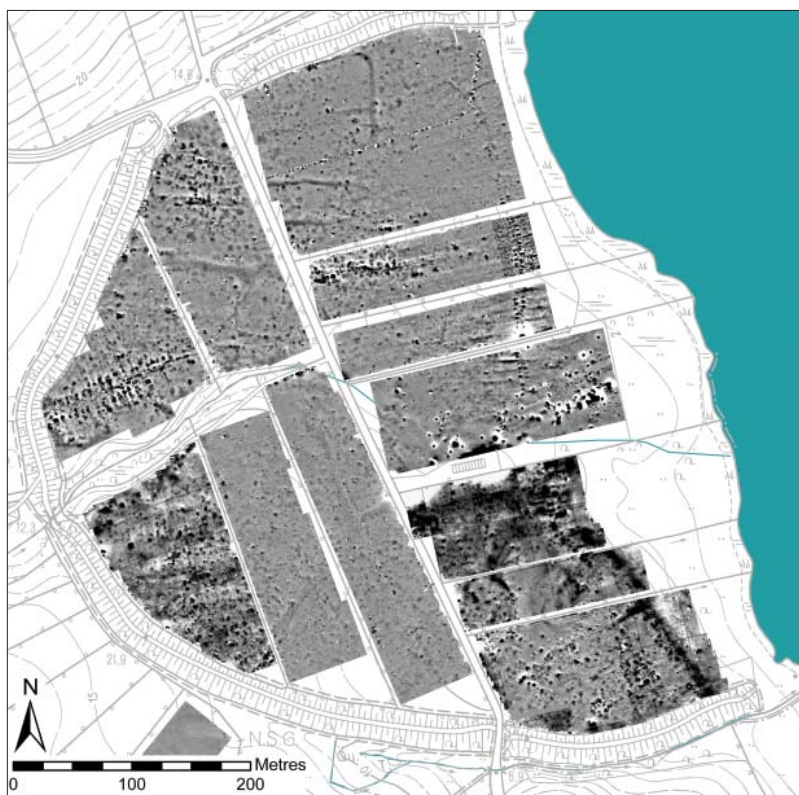
Fig. 5. Main excavation trenches in Hedeby.

The impressive boat chamber grave, investigated in 1908, was published in more detail in 1911, but a full analysis was not done until 1976 by Michael Müller-Wille.⁵⁸ But Knorr's excavations turned the attention also from the burials to the thick cultural layers near the coastline, especially in the depression crossed by a small creek.⁵⁹

The resumption of the excavations in 1930 started with a trial trench that was dug by Herbert Jankuhn over four years. This trial trench, in most parts not wider than 1 m, extended from west to east for ca 530 m and from south to north for ca 585 m. This trench was selectively widened because of special features: in the west, Jankuhn excavated a group of ten chamber burials which were surrounded by circular ditches, one cremation and two inhumation graves. This part of a cemetery was superseded by a younger settlement of several sunken-featured buildings consisting of different phases with wells and pits. Unfortunately the results of these excavations were never published in detail.⁶⁰

Since 1935, Jankuhn concentrated his excavations in the low-lying coastal areas, which are characterised by well-preserved wooden remains and an occupational stratigraphy up to 2 m depth.⁶¹ These continued in 1962 by Torsten Capelle and Kurt Schietzel from 1963-1969.⁶² The excavated settlement structures form the basis of our knowledge of Hedeby and its layout in the Viking Age.⁶³ Ca 5% of the area inside the semi-circular rampart has been excavated, but only a small part has been analysed and published.⁶⁴ Most wooden remains date to the 9th century; in the upper layers no wood has been preserved. Only a well, dated to after 1020 by dendrochronology, possesses the youngest date from Schietzel's settlement excavations.⁶⁵

To the north, lying at the southeastern slopes of a hill fort, remains of graves destroyed in the 19th century and a settlement pit have been found.⁶⁶ The function and date of the hill fort is unknown; its interior is covered by more than 50 burial mounds contain-



ing poorly furnished Viking-Age cremation burials.⁶⁷ In 1956 remains of inhumation and cremation burials were found south of the rampart, leading to large-scale excavations over several years. Klaus Raddatz, Heiko Steuer and Konrad Weidemann investigated large parts of a huge bi-ritual cemetery; in the eastern area near the coastline Raddatz and Steuer also excavated parts of an older settlement. Only the structures of the settlement were published by Steuer, and the cemetery has not yet been published in detail.⁶⁸

The actual state of scientific analysis and publication still remains unfinished in some important respects, i.e. no detailed analysis of the settlement structure exists apart from the first summarising reports.⁶⁹ An analysis of the harbour excavation from 1979-80 is also in preparation.⁷⁰ All burial finds still remain unpublished, with only an unpublished manuscript by Jankuhn and a hitherto-unpublished PhD thesis by Ute Arents.⁷¹

58. Knorr 1911; Müller-Wille 1976; Wamers 1994.

59. Knorr 1924: 27.

60. The best report on the structures excavated from 1930-33 is Jankuhn 1933; Jankuhn 1986: 93-95, fig. 42; for the chamber graves, see Aner 1952 (no detail of the burials and grave goods).

61. Jankuhn 1936; Jankuhn 1943.

62. Capelle 1964-1965; Schietzel 1969: 10-59; summary in Schietzel 1981.

63. Schietzel 1981; Schietzel 1984; Jankuhn 1986: 95-100, plan 2; Clarke & Ambrosiani 1991: 138-141 for Viking-Age street plans/plot arrangement.

64. Schietzel 1981: 21; Raddatz 1999: 364.

65. Eckstein 1976; Schietzel 1981: 68 ff.

Fig. 6. (left) Hedeby: combined results of the magnetic survey in 2002 by the Marburg, Munich and Vienna teams. Dynamics $c -10/+10$ nT.

Fig. 7. (right) Hedeby: simplified interpretation of the magnetic anomalies. Based on findings of the teams from Vienna and Marburg.

66. Jankuhn 1986: 80, 87; the materials of the settlement pit still remain unknown; critically Stark 1988: 49 ff.; Arents 1992, vol. 1: 14-18.

67. Jankuhn 1986: 68 ff.; 111 ff.

68. Steuer 1974; Steuer 1984b: 192-194; Jankuhn 1986: 100-102; Arents 1992, vol. 1: 44-53.

69. A PhD thesis on the dendro-dated settlement structures recently completed by J. Schultze.

70. PhD thesis by S. Kalmring, submitted in May 2008.

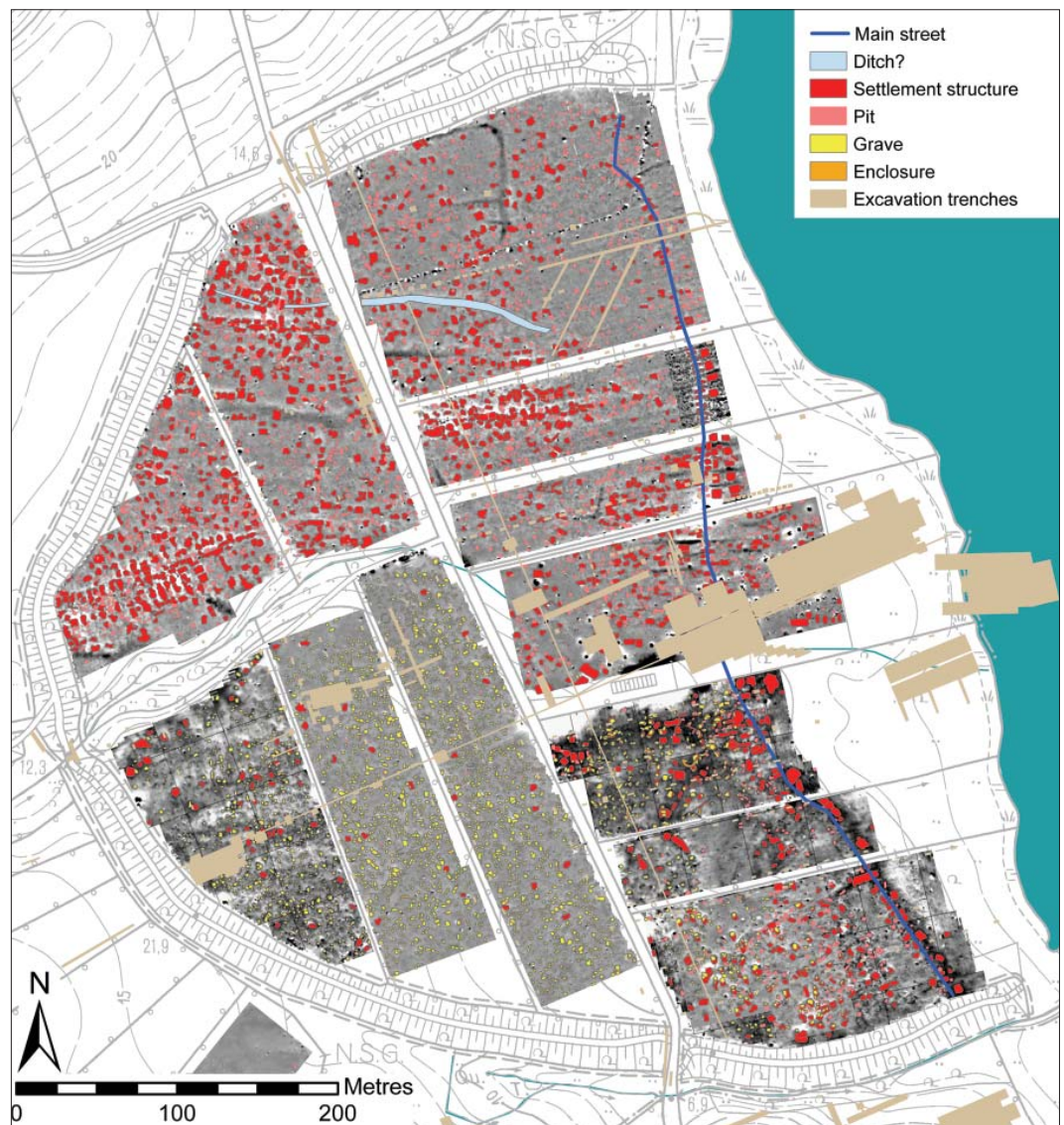
71. Jankuhn, unpublished manuscript, without illustrations; Arents 1992.

72. Schietzel 1981: 21 ff., map 23.

73. I would like to thank the members of the Bornholmske Amatørarkæologer and from the Schleswig-Holstein group for their kind support and my engaged colleagues of the Archäologisches Landesmuseum.

74. Stümpel & Borth-Hoffmann 1983; Utecht & Stümpel 1983; Kramer 1998-1999.

75. Geophysical teams from Kiel, Marburg, Munich and Vienna; project sponsored by the Deutsche Forschungsgemeinschaft and the ZEIT-Stiftung; preliminary summary in Neubauer *et al.* 2003.



Archaeological and geophysical prospecting

Another important contribution is systematic archaeological prospecting. During the 1960s, Kurt Schietzel conducted a systematic field survey inside the semi-circular rampart.⁷² Since 2003 the *Archäologisches Landesmuseum* has been engaged in a metal-detector survey with the assistance of the *Bornholmske Amatørarkæologer* and a group from Schleswig-Holstein; during seven campaigns about 11,500 metal finds were collected and measured precisely with a D-GPS system.⁷³

Since 1952, different geophysical methods have been applied at sea and on land for archaeological purposes.⁷⁴ A new, large-scale geophysical project started in 2002. During three weeks of fieldwork, a total of ca 29 ha inside and outside the semi-circular rampart (Fig. 6) were analysed by four teams using Fluxgate- and Caesium-magnetometer and ground-penetrating radar.⁷⁵ The different prospecting methods applied in the last years have provided for the first time new data for the whole settlement complex of Hedeby.

The development of an *emporium*: Hedeby in the 9th century

The layout of Hedeby's settlement structure was developed at the beginning of the 9th century. Much has been interpreted from the historical events in the year 808, but it is difficult to decide if these can be linked with the planning of Hedeby as an *emporium*. Neither written sources nor the dendro-chronological dates from excavated areas of the settlement point specifically to King Godfrid as a royal founder.⁷⁶ It is also remarkable that the place was still named *portus* when Godfrid arrived with his fleet and the captured merchants in 808. Nevertheless, a royal influence on the development of the *emporium* is accepted by many present authors.⁷⁷

Jankuhn's settlement model, consisting of three settlement nuclei at small streams – one to the south, a central one with workshop activities and a northern one, all of them with adjacent cemeteries – is mainly based on the excavated parts of Hedeby.⁷⁸ However, it is worth questioning whether the areas with the most intensive excavation activities were also the most densely settled parts of the whole settlement complex. Jankuhn's model, however, also takes into consideration Wolfgang Hübener's analysis of pottery: Hübener compared the horizontal distribution of different pottery wares and established that the oldest wares, like the metal finds, were only concentrated in a small area inside the rampart, in the depression of the stream, designated by Jankuhn as Hedeby's central nucleus. The younger pottery wares were distributed in a much wider area inside the entire rampart.⁷⁹

But it is unclear if the excavated parts of Hedeby really do form settlement nuclei. Even Jankuhn wasn't exactly sure if the excavated settlement areas belonged to different settlement nuclei or if they formed one settlement stretching along the shore.⁸⁰ To the south spread the oldest known part of the site, the so-called southern settlement (see

Fig. 5).⁸¹ It apparently consisted of pit houses. Thirty-three sunken-featured buildings, most of them with fireplaces, have been excavated and were found grouped together in several clusters. Additionally, several post holes, pits, perhaps three ovens and only one longhouse belong to this early settlement. The manufacture of iron is attested by several layers of slag; only one fragment of a mould and some sherds of imported pottery from Rhenish kilns have been found.⁸² Steuer proposes different models of Hedeby's settlement development and postulates that before the building of the rampart in the second half of the 10th century, the settlement stretched along the shore.⁸³

The new geophysical research done since 2002 reveals the lay-out of the *emporium* (see Fig. 6), but any precise dating must be concluded from the excavated structures. For the first time, however, the geophysical research and systematic metal detecting can provide an overview of and insight into the whole settlement complex (Fig. 7), if their limitations are taken into consideration.⁸⁴

In the northwestern corner inside the semi-circular rampart is an area of ca 3.7 ha to the north of the creek that is characterised in the magnetogram by parallel courses and many rectangular structures of an average size around 14.04 ± 3.20 m² with a high magneticism (± 12 nT to ± 50 nT). But also bigger rectangular structures of an average area of 28.28 ± 4.77 m² are present.⁸⁵ According to investigations done with ground-penetrating radar some of these structures possess a depth up to 1.7-1.8 m and can therefore be explained as sunken-featured buildings. Comparable pit houses were excavated in this area by Knorr in 1901 and 1921. In 1933, Jankuhn excavated a comparable sunken-featured building of 3.50 x 3.20 m with a preserved depth of 1.85 m. It was used for metal casting and eventually burnt down, sometime after 863-865 (a date provided by an Abbasid *dirham*).⁸⁶ A burnt-down workshop of this type would be characterised by

76. Schultze 2005.

77. Verhulst 2000: 112; Böhme 2001: 491 ff.; Skre 2007a: 45; Skre 2007b: 458-463.

78. Developed from Jankuhn in the 1960s, e.g., Jankuhn 1963: figs. 4-5; Jankuhn 1986: 79 ff., figs. 35-36, 38; still followed in Radtke 1999: 368.

79. Hübener 1952; Hübener 1959: 179 ff.; Jankuhn 1953c: 84, relying on Hübener's unpublished 1951 PhD thesis; Jankuhn 1958: 473; Jankuhn 1986: 79.

80. Jankuhn 1986: 87.

81. Steuer 1974: 15-19, pls 65, 1, 66, 67, 71.

82. Steuer 1974: 17, 19, 27.

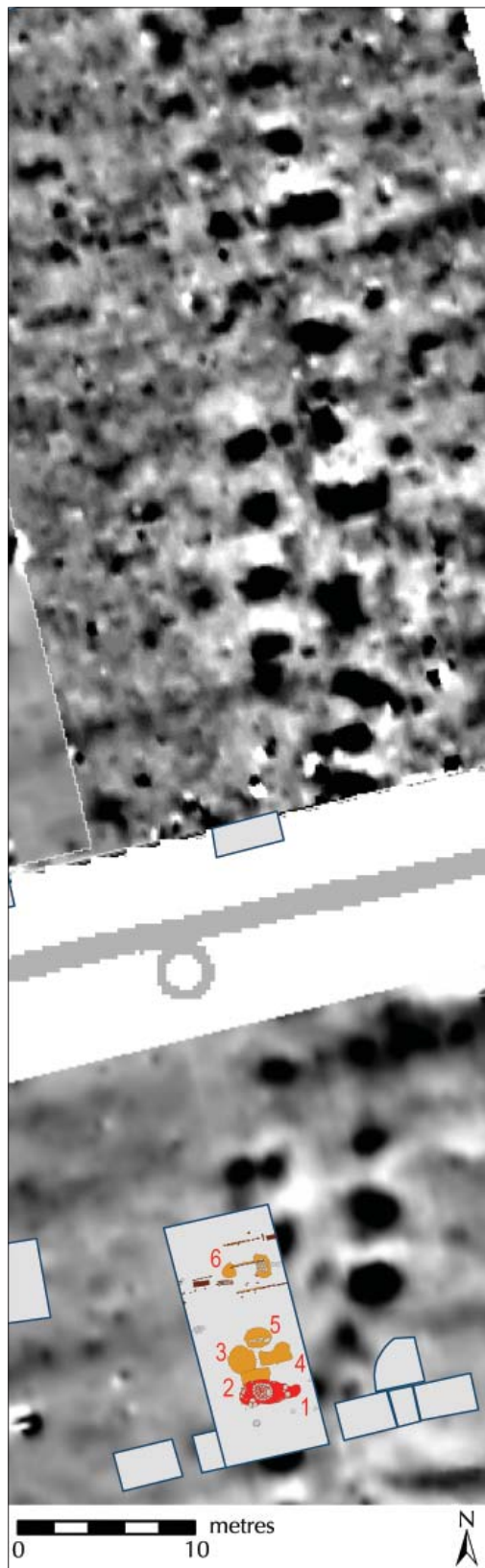
83. Steuer 1974: 154-161.

84. It is an important difference in the character of the data provided by a modern and careful excavation compared with that from prospecting methods like geophysical research or stray finds from metal detection.

85. Classification given by W. Neubauer of the Vienna team.

86. Wichmann 2007: 253 cat. no. 10.

Fig. 8. Hedeby: archaeological features from Carl Rothmann's excavations in 1913 in the workshop area.



87. Schietzel 1981: maps 28-29; Westphalen 1989: 28-36, figs 5-7.

88. Cf. the interpretation by Jankuhn 1986: 92.

89. Ulbricht 1978: 89 ff., map 2.

90. According to the interpretation of the Vienna team.

a high magneticism. Schietzel collected from his surface survey such a high amount of iron slag in this northwestern part of Hedeby to conclude that iron was processed there.⁸⁷ The magnetic structures in this part of the settlement could be interpreted as workshops of iron smiths;⁸⁸ any precise dating is at the moment impossible, but these structures seem to belong to Hedeby's younger phase in the 10th to 11th centuries. The magnetic structures seem to be related to the late 10th-century rampart, even the EW-oriented street runs to a corner in this rampart and may refer to a hitherto-unknown gate.

In the northeastern part inside Hedeby's rampart were also detected many rectangular structures with a high magneticism, sometimes aligned. These can also be interpreted as sunken-featured buildings or workshops. In this area there has been little excavation, but during the systematic surface survey of the 1960s a large amount of Viking-Age objects was collected. Ingrid Ulbricht believes that antler working took place due to the very high amount of production waste found.⁸⁹ The magnetic survey reveals structures in this northern area (see Fig. 7), as there are several rectangular anomalies that average ca 14.04 ± 3.20 m² and smaller, irregular structures interpreted as pits.⁹⁰ In this area, quite close to Ulbricht's postulated workshop, there have also been found through metal detecting three bronze comb rims that date to the late 9th to early 10th centuries (see Fig. 4).

Extremely revealing is a linear structure running parallel to the shore and which possesses smaller magnetic-signature structures lying in pairs opposite each other (see Fig. 6). This seems to be a street following the entire shoreline for ca 530 m, faced by houses with workshops on both sides (see Fig. 7). From the former excavations, mainly in 1911 and 1913, it is known that here were adjacent workshops for metal casting and glass production (Fig. 8) that can be dated to the second half of the 9th and 10th centuries. It was this area that Jankuhn designated as the "quarter of craft

activities” in the 1940s and later.⁹¹ This prospected street crosses the main excavation area of Jankuhn and Schietzel. It is visible there in all layers and was often named as a main street of the settlement.⁹² The accompanying magnetic anomalies could also be compared with small house structures and workshops (between 3-3.60 x 2.20-2.60 m; magneticism between +/-12 nT to +/-24nT) present in the fifth excavation layer, i.e., a younger phase of Hedeby’s settlement development. This street also crosses the stream with a small bridge, dendro-dated to 819.⁹³ As a consequence this street must have been existed in the early 9th century, but without more precise data its extension at that time is still unknown. However, streets of this type, stretching along the shore, seem to be characteristic for early medieval trading centres, like Sigtuna or Dublin.⁹⁴ In Hedeby this main street was apparently crossed by several streets running from the harbour to the core areas of the settlement, shown by Rothmann’s, Jankuhn’s and Schietzel’s excavations and also detected in the magnetometer survey (see Figs 6 & 8).

The known excavated harbour facilities were built after the mid 9th century and point to the *emporium*’s raised significance in a naval trade system.⁹⁵

Around 900, the settlement was still not fortified, and perhaps there existed a ditch in the north (ca 2.80 m wide, ca 1.30 m deep), visible in the magnetometer image for ca 210 m (see Fig. 7). But at the moment it is very difficult to interpret because it could only be compared with a corresponding profile in Jankuhn’s trial trench.

To the south-west of the settlement was a huge cemetery area with a boat grave of mid 9th century date as a focus (see Fig. 5). It is probable that the cemetery’s use started at the end of the 8th century with cremation graves in its western parts, whereas inhumation burials date to the 9th-11th centuries. The eastern part, the so-called *Südsiedlung*, was abandoned during the second half of the 9th century and the area was then used for in-

humation burials and chamber graves of 10th century date.⁹⁶ From systematic metal detecting only Viking-Age material from the late 9th to 10th centuries was collected; no older finds have yet been found. But on the sandy slopes in the southern part inside the later rampart were found characteristic southern Scandinavian objects from the Younger Germanic Iron Age (late 6th to the 8th centuries), pointing to the existence of an elite farmstead before Hedeby developed into an *emporium*.

In the same area from the rampart to the ca 6 m contour, thousands of small anomalies with a lesser degree of magneticism were investigated in 2002 (see Fig. 6). They could be interpreted as burials, but also circular ditches were detected in some cases (see Fig. 7).⁹⁷ Due to Jankuhn’s brief description of the excavated cemetery parts and Arents’ thesis, it seems clear that the cemetery developed from the west to the east, with the oldest burials in the southwestern part belonging to the middle of the 9th century.⁹⁸ It is likely that one large cemetery could have existed together with the 1930-31 excavated chamber graves⁹⁹, where also two ordinary inhumation graves and a cremation burial were found. Knorr’s and Jankuhn’s excavations point to the usage of this cemetery area for housing and production activities since the 10th century.¹⁰⁰ Settlement structures in the whole southwestern area were visible in the 2002 magnetometer survey, but the density of detected houses seems to be less than that in the northern parts of Hedeby. However, the whole area inside the rampart seems to have been settled at this time (see Fig. 7). In addition, data from the surface survey and systematic metal detecting point to settlement activities. But further research is needed to decide if the cemetery area outside and inside the late 10th-century rampart originally formed one burial ground.

One important question of the *emporium*’s power and religious topography still remains unknown. Until now, no representative hall, early church or pagan temple has

91. Jankuhn 1944; Jankuhn 1977.
92. Jankuhn 1943: 38-40, 49 ff., fig. 4; Jankuhn 1986: 98 ff., figs 39-40; Schietzel 1969: 19-21; Randsborg 1980: fig. 23.
93. Eckstein 1976; in detail, see Schietzel 1969: 21-26, figs 10-14.
94. Clarke & Ambrosiani 1991: 138-141, figs 4.23, 5.5.
95. Kalmring 2006; Kalmring 2007.
96. Steuer 1974: 160 ff.; Steuer 1984b: 192 ff.; Jankuhn 1986: 100-102; Arents 1992: 190-204; Eisenschmidt 1994: 99 ff., cat. nos 16-20.
97. Steuer (1984b: 203-209) considers circular ditches typical for Frisian and Saxonian graves of the 10th century; Eisenschmidt (1994: 38 ff.; 2004: 302) rejects this assumption pointing out that the Frisian and Saxonian graves in question are much older than their counterparts in Hedeby.
98. Jankuhn 1986: 105 ff.; Arents 1992, vol. 1: 174-190; Eisenschmidt 1994: 98 ff.
99. Arents 1992, vol. 1: 35 ff.; Eisenschmidt 1994: 96-98, cat. no. 4-13.
100. According to Jankuhn (1986: 107, 110), its precise date is difficult to determine.

been found inside the rampart or in its surroundings. But the presence of a royal residence can be concluded from the first several written records onwards.¹⁰¹ Also a church is known from written records, and it is possible that the first wooden church lies under the late 12th-century St Andrew's church in the wetland to the north-east of the hill fort near the Schlei (see Fig. 5).¹⁰² It seems to be in a typical topographical situation for a church outside a central settlement area, still occupying a prominent location.¹⁰³ Furthermore, Richard Hodges points out that the lack of monumental buildings and ritual components is typical for early medieval *emporium*.¹⁰⁴ The central meeting-place for cult and juridical purposes still could have existed in nearby Süderbrarup, ca 21 km north-east to Hedeby in Angeln. Besides the cult centre of the Roman Iron Age, a sacrificial bog, we know richly equipped chamber burials of the Viking Age on the Thorsberg, a possible Thing-place nearby, a holy spring dedicated in the Middle Ages to St Jacobus and a regional market still held today.¹⁰⁵

Hedeby's economic and socio-political development during the 9th century

Early medieval Hedeby functioned as a 'port of trade', a meeting point for traffic and transport connected with communication in a border environment.¹⁰⁶ This meant that it was possible here to come into contact with other seafarers or merchants who had knowledge of the other side of the Jutland peninsula, with its coastlines, seafaring routes and totally different conditions of movement influenced by high and low tide, especially in the North Sea basin. On the basis of Oht-her's and Wulfstan's reports, Jankuhn outlines trade routes around 900 from Hedeby in the North Sea basin to Dorestad in the Frankish-Frisian area and to London in the Anglo-Saxon realms; in the Baltic these routes led to Kaupang in Norway, to Birka

in the Mälaren region and to Truso at the mouth of the Vistula (see Fig. 1).¹⁰⁷

In the early 11th-century *West Saxon Colloquy* of Ælfric, a merchant answers the question concerning his usefulness for the early medieval society: "I board my ship with my cargo and sail to lands overseas, and sell my goods, and buy precious things which aren't produced in this country."¹⁰⁸ His cargo is vividly listed as existing of "purple cloth and silks, precious jewels and gold, unusual cloths and spices, wine and oil, ivory and bronze, copper and tin, sulphur and glass and many similar things."¹⁰⁹ Traded commodities are categorised by Hodges as prestige or utilitarian goods based on their occurrence within early medieval society.¹¹⁰ Following this, the 11th-century merchant's cargo can be seen more or less as raw materials or prestigious commodities. Viking-Age utilitarian goods like lava quern stones from the Mayen region, honestone, soapstone and antler from Scandinavia are not mentioned but existed in large quantities, also in Hedeby. Imported foodstuffs are known by faunal remains, whereas the presence of salt or slaves is archaeologically difficult to demonstrate.

Patterns of exchange

In the find material from over a 100 years of archaeological excavation and research in Hedeby, the *emporium's* significance in the exchange between the West (North Sea: Frankish-Frisian realm, Anglo-Saxons, Norway) and the East (Baltic basin, Russia and the Caliphate) is clearly visible. In some cases it is difficult to distinguish between imported or traded commodities because objects could have been used as vessels for traded goods or were in the possession of foreign people visiting Hedeby. Therefore foreign objects could have been transported with people and have only incidental importance to the mainstream exchange.¹¹¹

Hedeby itself lay at the border of a Western European economic region, where coins were used as money (*Münzgeldwirtschaft*),

101. Schlesinger (1972: 76 ff.) points out that for the planned *consilium* in 804 between Godfrid and Charlemagne, a representative hall was needed. Skre 2007b: 459.
 102. See Staecker this volume.
 103. Olsen 1999: 65 ff.
 104. Hodges 2000: 70-89; also Skre 2007a: 45.
 105. Löwe 1998: 20-22, 24-26; Eisenschmidt 2004: 543-556, map 24.
 106. Steuer 2003.
 107. Jankuhn 1986: 131, fig. 63.
 108. Hill 2001a: 77: "Ic astige min scyp mid hlæstum minum 7 rowe ofer selice dælas, 7 cype mine þingc, 7 bicge þincg dyrwyrð þa on þisum lande ne beoþ acennede." See Swanton 1993: 169-177.
 109. Hill 2001a: 77 ff.: "Pællas 7 sidan, deorwyrþe gymmas 7 gold, selcufe reaf 7 wyrte-mangc, win 7 ele, ylperban 7 mæstlingc, ær 7 tin, swefel 7 glas, 7 þylces."
 110. Hodges 1982: 104 ff., table 3.
 111. Radtke 1999: 376; Hall 2000: 315.

and an Eastern economic region, where coins were used as bullion (*Gewichtsgeldwirtschaft*).¹¹² At Hedeby, Steuer distinguishes several successive phases where coins were used as bullion and attempts were made to erect a coin-based economy.¹¹³ After a first attempt to strike coins in Hedeby in the second quarter of the 9th century, minting starts again around ca 900 after a period of recession throughout Scandinavia.¹¹⁴ The mint system seemed to be strongly influenced by the Frankish Empire, as the first coin types of the 9th century imitate the typical pennies struck at Dorestad.¹¹⁵ The motives of this early coinage rely on Charlemagne's pre-reform type before 793/94 (Malmer's type KG 3) or they also depict motives going back to Wodan-Monster *sceattas* (Malmer's types KG 5-6), whereas their weight and their size depend on contemporary coins.¹¹⁶

Apart from the weight-based economy, where coins were used as bullion, there was a money-based economy. This was temporarily established in Hedeby and its hinterland in the beginning of the 10th century, when the accepted coins were of Malmer's type KG 7, a further development of the earlier KG 3 type.¹¹⁷ As Mark Blackburn, Peter Ilisch and Ralf Wiechmann point out, it is important to contrast the use of money in Hedeby and its surroundings with the low frequency of coins found in north Saxony or in the German kingdom.¹¹⁸ However, these clusters cannot compare to the high loss and supposed use of coins in middle Anglo-Saxon England.¹¹⁹ At that time minting seemed to be concentrated in the *emporium*, but money circulated also in their hinterlands.¹²⁰ The monetary circulation in Hedeby was dominated by locally-struck coins, but Carolingian coins of several types are present, whereas Anglo-Saxon coins are rare.¹²¹ This latter seems to be characteristic for much of southern Scandinavia.¹²² The coins from Hedeby, and especially the high frequency of standardised weights from the late 9th century onwards¹²³ indicate the *emporium's* role in international trading networks.

At the end of the 9th century, Islamic economic influence in the Baltic was growing. After a marked decrease in the latter 9th century, the import of Kufic *dirhams* reached its climax in Hedeby during 890-950/70.¹²⁴ Around 900, *dirhams* were copied in Hedeby, made in false casts in a lead-tin alloy.¹²⁵

Contacts with the Islamic world and the Byzantine Empire are not only attested by coins; valuable commodities like carnelian and rock crystal and also mercury, sometimes together with fragmented remains of their original containers, found their way to the southern fringes of Denmark.¹²⁶ A Byzantine lead seal of *patrikios* Theodosius Baboutzikos, head of the imperial *Vestiarion*, dating to 820-860, points perhaps to official diplomatic contacts with Byzantium.¹²⁷ Comparable seals from Theodosius were also found in Ribe and Tissø and could point to the Byzantine emperor's interest in the north.¹²⁸ A recently uncovered "donative" *dirham* of the Caliph al-Mu'tamid 'alā Ilāh from 871/72 struck at Samarra (Fig. 9)¹²⁹ reveals perhaps more than indirect contacts through intermediate traders and travellers with the Caliphate, as it is confirmed by the visit of at-Tartūshi from Muslim Spain in the later 10th century. It is likely that slaves were the commodity very much in demand from the Baltic by the caliphates.¹³⁰

From the Carolingian Period onwards there are different wheel-thrown Rhenish ceramics together with different glass products from Frankish workshops or quern stones as raw material from the Mayen region present for ca 300 years.¹³¹ Wine was imported in wooden barrels and distinctive pottery vessels could also have been used as carriers for liquids.¹³² Weapons like swords and lances were a desired commodity.¹³³ For the production of fine metal ware or vessels, brass was needed and presumably imported as bars coming from the Rhineland.¹³⁴ A higher equivalent was needed for these transactions in the North Sea basin and golden *solidi* were struck for this purpose in the 9th century.¹³⁵

112. A comparable economic situation existed in the Danelaw from the 880s to the 920s; see Blackburn 2001.

113. Steuer *et al.* 2002; see Steuer this volume.

114. Callmer 1994: 66-68, 79; Malmer 2002: 122; Wiechmann 2007: 184 ff.

115. Malmer 1966; Hatz 1984; Malmer 2002: 120-122; von Heijne 2004: 70-72.

116. Malmer 2002: 121; the ave. weight of the early coins of types KG 3-6 is 0.80 g, i.e., ca half a Carolingian penny struck under Louis the Pious. Metcalf (1996: 410-419) suggests coins of types KG 5-6 being minted in Ribe; cf. Malmer 2002: 122.

117. Wiechmann 1996: 190 ff.; Malmer 2002: 124; Müller-Wille *et al.* 2002: 27-29, map fig. 19; Wiechmann 2007: 189, fig. 8.

118. Blackburn (1993) suggests that between ca 860 and ca 990 there was less coinage in circulation; Ilisch 2002: 235-237; for the Carolingian Period, Wiechmann 2004: 16-28; Verhulst 2002: 120-123.

119. Metcalf 1998; Bonser 1998; Blackburn 2003.

120. Wiechmann 2004: 28.

121. Wiechmann 1998; Hilberg 2007.

122. Blackburn & Jonsson 1981: 149-151, table 2; von Heijne 2004: 104 ff.

123. Steuer *et al.* 2002: 139 ff.

124. Noonan 1985; Steuer *et al.* 2002: 154; Wiechmann 2007: 196 ff.

125. Steuer *et al.* 2002: 155-159.

126. McCormick 2001: 610-612; Kelm 1997; Steuer *et al.* 2002: 159-162; Schietzel 2002.

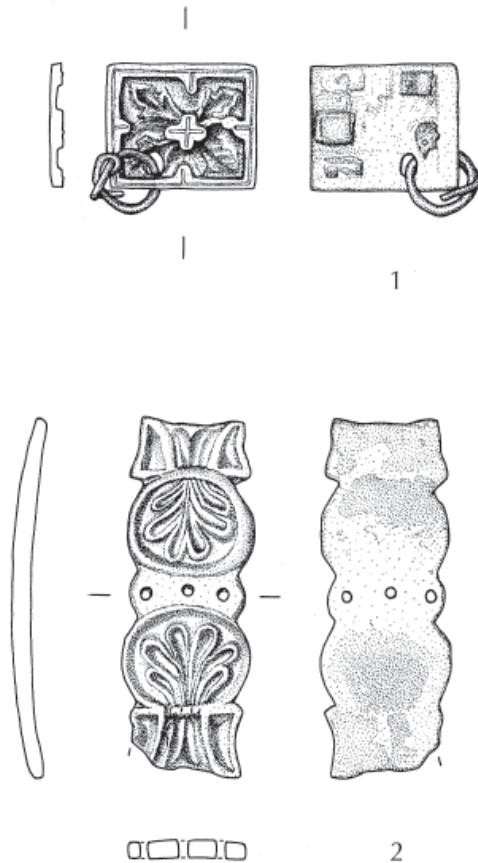
127. Laurent 1978; Jankuhn 1986: 129 ff., fig. 62; Shepard 1995; McCormick 2001: 226 ff. relates the seal with Theodosius' journey to Venice and Francia in 840.

128. Feveile & Jensen 2000: 13 ff., fig. 7c; Jørgensen 2003: 203 ff., fig. 15.25.
 129. Information kindly provided by L. Ilisch, Tübingen University.
 130. Henning 1992: 403-426; McCormick 2001: 759-777.
 131. Jankuhn 1986: 154-160.
 132. Jankuhn 1986: 152.
 133. Jankuhn 1986: 161-163; Müller-Wille 1984; Steuer 1987: 151-156.
 134. Sindbæk 2001.
 135. Hilberg 2006; Hilberg 2007.
 136. Jankuhn 1986: 156-158; Radtke 1999: 375.
 137. Jankuhn 1986: 153 ff.
 138. Steuer 1987: 156-168; Coupland 1995; Nelson 1997; Lennartson 1997-1998: 434 ff., 533-542; Wamers 2005; for the gripping beast style, see Fuglesang 1982: 126-145; Wamers 1999.
 139. Fuglesang 1982: 146-158; Maixner 2004: 20-23.
 140. Aside from dozens of moulds for tortoise or circular brooches, not yet studied in detail, the exhaustive analysis of the moulds for casting trefoil brooches by B. Maixner (2005) points to this result.
 141. Capelle (1968: 92): the flourishing of fine metal wares in Hedeby is strongly connected with vivid trade activities.
 142. Hodges 2000: 83 ff.
 143. Listed in Radtke 1999: 373-375. For manifold metal production, see Drescher 1983; Westphalen 2004.
 144. Steppuhn 1998: 92-99.
 145. Schön 1995: 35-43, 93-95, 101-103; Müller-Wille *et al.* 2002: 26 ff., fig. 18.



Fig. 9. Hedeby, detector find 2003/4191: “donative” dirham of the Caliph al-Mu‘tamid ‘alā llāh, 871/72. Mint: Samarra. 17.2 mm^ø, 2.70 g. Photo: C. Dannenberg, Stiftung Schleswig-Holsteinische Landesmuseen Schleswig.

Fig. 10. Carolingian metalwork from the metal detecting in Hedeby. 1 = bridle-fitting re-used as a brooch, gilded silver with niello, Hb 2004/11146; 2 = sword fitting, gilded bronze, Hb 2003/3618. Drawing: J.-M. Murawski, Stiftung Schleswig-Holsteinische Landesmuseen Schleswig.



Scandinavian imports are recorded with soapstone and schist from Norway and iron from Sweden.¹³⁶ Furs, leather, walrus ivory and other natural products are attested.¹³⁷ New artistic fine metalwork reached Hedeby and other central places and *emporium*, where it was produced in workshops: in the 9th and still in the 10th centuries, Carolingian metal objects circulated (Fig. 10), sometimes re-used as jewellery, and the gripping beast style dominated in Scandinavian metalwork.¹³⁸ Somewhere in the second half of the 9th century the Borre style emerged, which can be found on riding gear and horse equipment or newly-developed adornments like trefoil brooches, circular brooches and pendants.¹³⁹ From the production of fine metal ware it seems indisputable that Hedeby belonged to a Scandinavian world, attested by the large amount of moulds found during excavations that were used for typical Scandinavian objects.¹⁴⁰

Production at Hedeby

Handicraft production at Hedeby was also related to the settlement’s significance as a port of trade.¹⁴¹ Several scholars have recently stressed the significance of craft production for the early medieval economy and exchange system and its function relying on the production of commodities for the consumption in an *emporium* connected with the import of luxurious items and raw materials.¹⁴² Craft production in Hedeby embraced a variety of different commodities. Pottery was dominantly locally-produced wares; comb making must have been very important because over ca 340,000 fragments of red deer antler have been found; wood, leather and textile production are also demonstrated. A high standard of production was present in metal and glass making;¹⁴³ the latter’s production embraces not only beads but also locally-manufactured drinking vessels.¹⁴⁴ Quern stones from the Mayen region were also imported as raw materials, finished at Hedeby and distributed in the hinterland.¹⁴⁵ In particular, the produc-

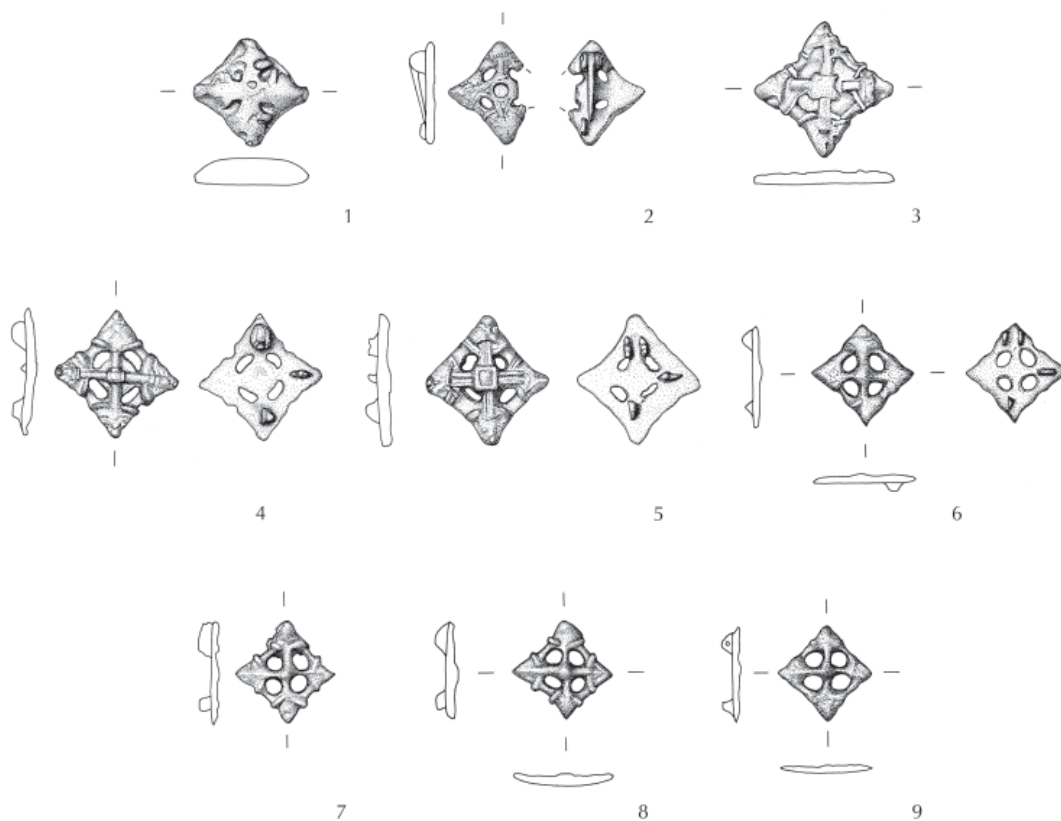


Fig. 11. Hedeby: quadrangular Borre-style models (1, 3) and brooches (2, 4-9) from systematic metal detection.

1 = Hb 2003/4572

2 = Hb 2004/10374

3 = Hb 2003/2723

4 = Hb 2004/6361

5 = Hb 2004/9204

6 = Hb 2003/822

7 = Hb 2004/8905

8 = Hb 2003/1641

9 = Hb 2003/3042

Drawing: J.-M. Murawski, Stiftung Schleswig-Holsteinische Landesmuseen Schleswig.

tion of textiles reached a climax in the last third of the 9th century, when new techniques and new types of fabric, the so-called *villosae*, were adopted, most probably from Frisian workshops.¹⁴⁶

At present, no comprehensive analysis of the remains connected with the production of fine metal ware has been conducted. Schietzel is very careful in his interpretation of the remains of moulds and crucibles as belonging to different workshops.¹⁴⁷ But the excavations from 1911 and 1913 permit an insight in the structure of production in the northeastern area inside the rampart.¹⁴⁸ Here, the different workshops lie very close together representing the western row of the 2002 detected main street stretching parallel to the shoreline (see Fig. 8). Beneath a glass oven of ca 3.50 x 1.50 m (see Fig. 8, #1), metal casting was done, as evidenced by two layers of burnt clay (see Fig. 8, #3-4) separated from the glass oven by another structure made of clay (see

Fig. 8, #2).¹⁴⁹ Several moulds were found in another oval area to the north of a stone feature of a length of ca 1.30 m. Crucibles were found to the south of these stones near production areas indicated by burnt clay (see Fig. 8, #5).¹⁵⁰ Several post holes and the remains of apparently burned wooden features especially in the northern excavated area, perhaps belonging to building structures or some kind of a protection or a parcelling could also be linked through moulds with metal casting, but any precise description of these features is lacking (see Fig. 8, #6). At the workshops in Ribe, Helge Brinch Madsen thinks that metal casting was done in the open, possibly behind a windbreak, and that these were apparently not in permanent use.¹⁵¹

That this craft area was in use in the 9th and 10th centuries is attested by dozens of moulds for circular brooches or pendants of the cast Terslev type, oval and trefoil brooches or by moulds for bronze comb rims.¹⁵² Its

146. Hägg 1999; Hägg 2002.

147. Schietzel 1981: 69-77.

148. These excavations were not documented very well; for an attempt to characterise this area, see Maixner (2005: 67 ff.), but a precise knowledge of the excavated features is still lacking.

149. In the brief excavation report, Carl Rothmann mentions only debris of glass and no moulds for metal casting found inside the oven.

150. See Steppuhn (1998: 94-96) who stresses the connection of glass production and metal casting.

151. Brinch Madsen 1984: 91-95.

152. Jankuhn 1977: 29; Kleingärtner 2004: 259, pl. 5.5; Maixner 2005: 67, 332 ff., cat. nos I, IV, VI, VII, XL, XLIII, XLV, XLVIII, LV, pls 20-21.

153. See Maixner 2004: 60 ff.

154. Two specimens excavated in 1962 published in Capelle 1968: 107, nos 99-100, pl. 9.2.3; others remain unpublished: KS 12370 (single find from 1909), KS 17934a and b (single finds from the Warnecke collection), a surface find in quadrant G16 (= R 3.446), a stray find in 1969.

Fig. 12. Hedeby, workshop area excavated in 1913: mould (ca 67 x 59 mm) for casting Borre-style quadrangular brooches and circular pendants or brooches of the cast Terslev type. KS 13710. Photo: V. Hilberg.



155. Kleingärtner 2004: 252-261, pl. 5.

156. The other model is the bigger variant: at 37.2 x 35.6 mm, its size is also a bit bigger than the cast brooches.

157. Kleingärtner 2004: 259.

158. Type IIC: Hb 2003/854 (fragmented and secondarily burnt, no remains of tinning preserved), Hb 2003/2407; IIIC: Hb 2003/3311.

159. Maixner 2004: 61, 159, list 25, nos 6-7; Jørgensen 2003: 201, fig. 15.23.4.

160. Eisenschmidt 2004: 101, cat. no. 07.13, pl. 60.12; Maixner 2004: 159, list 25, nos 4-5.

161. Maixner 2004: 140, cat. no. 99, pl. 13.2, 159, list 25, no. 1.2.8.9; British Isles, see Leahy & Paterson 2001: 194 ff.; also London, pers. comm. by Lyn Blackmore.

162. Jansson 1985: 36, fig. 23; Maixner 2004: 34 ff., pl. 1.1.

163. Nylén & Schönback 1994, vol 1: 82-88, fig. 73, 90-93, fig. 77; vol. 2: 108-111, fig. 139 (female boat grave 48), 172 ff., fig. 186 (female chamber grave 43).

164. Hedeby, detector finds Hb 2003/1199 and Hb 2006/13215, unpublished; Thumby-Bienebek, chamber grave 37A - complex 6, Kr. Rendsburg-Eckernförde; Quern "Scheersberg" Grab von 1928, Kr. Schleswig-Flensburg (strongly stylised); Langballigau barrow 1, Kr. Schleswig-Flensburg. Müller-Wille 1987: 40-42, fig. 7; 97, pl. 76; 77.1.

165. Ulriksen 1998: 174, fig. 134a.

relevance to the production in Hedeby can be demonstrated for one significant object group: very simple and small open-worked brooches of quadrangular form with a Borre-style animal head at each end (Fig. 11).¹⁵³ From the former excavations we know of five specimens of this type.¹⁵⁴ In 1913 a mould was found in the craft area at Hedeby (Fig. 12) which was used for casting rhombic brooches of a smaller variant of this type together with circular pendants or brooches of the cast Terslev type. This indicates a late 9th or first half of the 10th century date for this mould.¹⁵⁵ Due to systematic metal detecting, two models that were used for making moulds of this type have been found and further 21 brooches of this distinct Borre-style type (see Fig. 11).

A bigger variant, measuring 33-35.4 x 32-34 mm, and a smaller variant of 24.6-27 x 24.5-25.7 mm, are attested and point to a mass production of these simple brooch forms. In addition, all brooches of the bigger type differ in size and stylistic details; for the smaller and much more stylised brooches this can be seen in different sizes. The brooches of the bigger series also have an additional eye on the backside, a typical construction element of Scandinavian-type brooches. Only one brooch of the smaller series shows such an eye. There is one fragmented specimen of a middle sized variant of 28.4 mm that possesses a circular central panel and was gilded af-

ter it had been cast in bronze; additionally its backside was tinned but possessed no additional eye. It could have been made from one of the models measuring 30.7 x 29.4 mm, but unfortunately the central part of the model is now corroded.¹⁵⁶ Gilding of the face and tinning of the backside of a brooch is a typical trait of Scandinavian adornments,¹⁵⁷ and is further attested on small circular brooches of Jansson's types IIC and IIIC of presumed middle Swedish origin recently found by metal detecting in Hedeby.¹⁵⁸

All quadrangular brooches found in Hedeby are distributed over most of the area inside the semi-circular rampart with a significant concentration in the central and southwestern parts (Fig. 13), pointing to the areas in use during the late 9th and 10th centuries. From Gudme, on Funen, and Lejre and Tissø, both on Zealand, models are also known and supply evidence for the production of this brooch type in Viking-Age Denmark.¹⁵⁹ They are attested as grave finds in Træhede and Hesselbjerg, both on Jutland, or in the settlements of Strandby Gammeltoft, on Funen and also at Lejre on Zealand.¹⁶⁰ Their wide-spread distribution embraces both Norway and Sweden and reaches Anglo-Saxon England and the Danelaw but also Dublin on the Irish Sea.¹⁶¹

Quadrangular-arranged animal heads in Borre style are a stylistic feature that is common as a central motif on oval brooches of type JP 47 in the 10th century,¹⁶² or occur in a rectangular form as brooches in Tuna in Badelunda in central Sweden¹⁶³ or as mounts of the horse harness in Hedeby and its hinterland.¹⁶⁴ Another fragmented mount of this type is from the landing place of Vester Egesborg in the Dybsø Fjord in the southern part of Zealand.¹⁶⁵ An older and perhaps best parallel for the quadrangular brooch is a recently-found copper alloy mount from near Bawburgh in Norfolk (Fig. 14), which is decorated in the 9th-century Anglo-Saxon Trew-hiddle style and shows animal heads at the terminals and small interlaced animals in the



166. Geake 2002: 135, fig. 3a.
 167. Hodges 1989: 160, 164 ff.; Jankuhn 1986: 146.
 168. Steuer *et al.* 2002: 152-153.
 169. Pedersen 2004: 43-47.
 170. Trehiddle style: Wilson & Blunt 1961: 99-105; Wilson 1986: 96.
 171. Wamers 1985: 33 ff.; Østebø grave: Wamers 1985: cat. no. 79, pl. 29.7; Krogen possible hoard: Wamers 1985: cat. no. 112, pl. 29.6; Hedeby: Wamers 1985: cat. no. 170, pl. 29.8.
 172. For insular “imports” in Scandinavia: Wamers 1998.
 173. Webster & Backhouse 1991: 233; Thomas 2001: 39.
 174. Sevington, Wiltshire: ca 850 (Wilson 1964: 169-171, cat. nos 71-78, pl. 30.71-78); Trehiddle, St Austell, Cornwall: ca 868 (Wilson & Blunt 1961: 81, pl. 23; Wilson 1964: 189 ff., cat. nos 97-98, pl. 37.97.9); Talnotrie, Glen of the Bar, Dumfries and Galloway: ca 870s (Wilson & Blunt 1961: 121, app. C; Webster & Backhouse 1991: 273-274, cat. no. 248a; Graham-Campbell 1995: 4, fig. 4, check-list I, D, 4); Cuedale, Lancashire: ca 903/05 (Wilson 1964: 128 ff., cat. no. 13, pl. 17.13; Wilson & Blunt 1961: 121, app. C; Roesdahl *et al.* 1981: 76, cat. no. E25).
 175. Wilson & Blunt 1961: 97 ff., 120-122, Appendix C; Graham-Campbell 1982: 145-148 ff.; Thomas 2001: 39.
 176. Webster & Backhouse 1991: 233; Thomas 1996; Thomas 2001: 39-42.
 177. Thomas 2001: 39 ff.
 178. Jensen 1990: 34, fig. 13, no. x555.

Fig. 13. (above) Distribution of the Borre-style quadrangular brooches, models and moulds in Hedeby from all investigations.

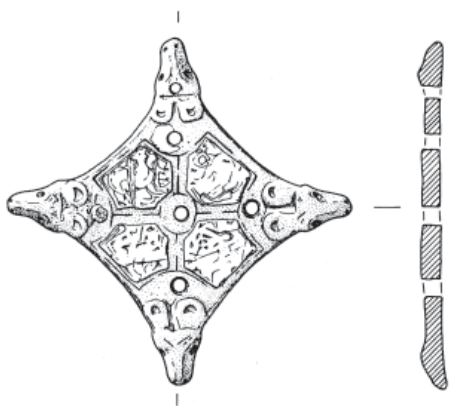


Fig. 14. (left) Copper alloy mount decorated in the Trehiddle style found near Bawburgh in Norfolk. Drawing: M. Hoyle, Norfolk Landscape Archaeology.



Fig. 15. Hedeby: strap ends decorated in the Trehwiddle style from all investigations. 1 = settlement find 1936 (Drescher R 3.210) 2 = stray find 1963 3 = detector-find Hb 2003/1105 4 = detector-find 2003/4385 5 = stray find 1980 (Drescher W 447) 6 = detector-find Hb 2003/850 7 = detector-find 2004/6299 Photo: C. Dannenberg, Stiftung Schleswig-Holsteinische Landesmuseen Schleswig.

179. Whitby: Peers & Radford 1943: 56 ff., no. 39, fig. 11,1; Wilson 1964: 196, cat. no.117, pl. XL. Cottam: Haldenby 1990: 57, fig. 4.16. They seem to be a variant of two distinct Northumbrian groups: Thomas 2001: 40, fig. 4.2; see also Bailey 1993; Philpott 1999.

four closed fields. Steven Ashley believes this mount to be an ancestor to the later quadrangular brooches made in the Borre style,¹⁶⁶ a theory which is strengthened here.

Insular and Anglo-Saxon relations

Besides a likely trade with utilitarian commodities such as wool, textiles and metal,¹⁶⁷ including perhaps also silver from English mines for the Hedeby coinage,¹⁶⁸ there are now from metal-detector surveys more objects of Anglo-Saxon ornamental metalware from the 9th and 10th centuries found in Denmark.¹⁶⁹ These items cannot be explained easily as loot or booty from the British Isles because they often are simple objects for everyday use. In his thesis on insular metalwork in Scandinavia, especially in Norwegian graves, Wamers also treats a small group of strap ends decorated in the Trehwiddle style¹⁷⁰ from a possible hoard and a male grave in Norway and one bronze example from the southern settlement in Hedeby (Fig. 15, #2).¹⁷¹

Strap ends of this type are not related primarily with an ecclesiastical context, like most of the other insular finds in Scandinavia.¹⁷² These strap ends are presumably

multi-functional, used for dress or as sword- or horse-harness fittings but also for bags or purses.¹⁷³ They mainly were used in the 9th century, and their presence in coin-dated hoards points to a long usage up to the early 10th century.¹⁷⁴

Strap ends of the Trehwiddle style are found distributed throughout the Anglo-Saxon realms with concentrations in East Anglia, former Deira and Southumbria. The first detailed discussion of these was made by David Wilson nearly 45 years ago; by now their numbers have increased intensively, especially through the exploding use of metal detectors.¹⁷⁵ Leslie Webster refers to some regional types, a result which is maintained recently through Thomas' analysis.¹⁷⁶ The strap ends are found very often on the so-called Anglo-Saxon 'productive' sites but also on ecclesiastical and royal centres or at trading places.¹⁷⁷

In Scandinavia they seem to be very rare: besides the known examples from Norway, which consist also of precious metal, they are only known in Glade Viding¹⁷⁸ in the vicinity of Ribe and in Hedeby. In Hedeby we know now a total of seven strap ends of the Trehwiddle style (see Fig. 15), three specimen from Jankuhn's and Steuer's excavations and four from systematic metal detecting. Only one specimen (see Fig. 15, #3) is made of silver with niello inlay; all the other strap ends are cast in a bronze alloy. All of these finds belong to distinct types within the large group of Anglo-Saxon strap ends of the Trehwiddle style and cannot be geographically attributed. Perhaps the worn-out, fragmented strap end excavated 1936 by Jankuhn (see Fig. 15 #1) belongs to a group characterised by looped Trehwiddle style animals in interlace. Close parallels in design and size come from Northumbrian Yorkshire: a strap end was found in the monastery of Whitby and another fragmented example at the 'productive' site of Cottam.¹⁷⁹

Besides these strap ends we also have two very simple hooked tags cast in bronze

(Fig. 16), which were used as dress fasteners and are also typical for Anglo-Saxon England.¹⁸⁰ Hooked tags seem to be uncommon in Scandinavia, and only from Birka is a precious silver pair known.¹⁸¹ It is possible that strap ends in the Trewhiddle style, simple hooked tags or also two fragments of typical Anglo-Saxon handled combs¹⁸² found in Hedeby could be linked with the presence of people from England, perhaps merchants, traders or travellers like Wulfstan. But these even can be associated with people travelling from Hedeby to the Anglo-Saxon realms.¹⁸³ New finds of these typical strap ends in the Trewhiddle style from Truso and Rjurikovo Gorodišče, Novgorod's predecessor, could attest that even the eastern shore of the Baltic Sea was in the focus of Anglo-Saxon traders' and seafarers' activities around 900.¹⁸⁴

At the same time, fine Anglo-Saxon metalware was used as precious cloak fasteners in women's dress. Hedeby grave 60 (= Arents grave 77) (Fig. 17) shows a mixture of a typical pair of Scandinavian oval brooches of JP type 17 belonging to the Berdal group¹⁸⁵ in combination with a circular plate with a plain back (52 mm^ø).¹⁸⁶ It consists of gilded silver with niello and decoration of an interlacing, cruciform design in four segments. The cross has a central roundel and geometrical interlace on each arm. The disc is broken in small pieces and is pierced three or perhaps four times near the edge. A bronze catch plate for the pin construction has, according to Knorr's excavation report, never been found in this grave. It seems as if this object could have been originally an Anglo-Saxon disc-headed pin of composite construction like the famous 8th-century triple pin set found in the river Whitham at Fiskerton, Lincolnshire.¹⁸⁷ The shafts of these pins are riveted to the discs, which are connected through lozenge-shaped links hanging in small holes near the edges. These pins are older (late 8th century), but other disc-headed pins of a smaller diameter (35 mm^ø and 30 mm^ø) from the 'productive' site of Cottam,

East Riding, Yorkshire, show a similar or even much more stylised cruciform design with an interlace decoration.¹⁸⁸ Even the reuse of former circular pin heads of this type as brooches is also attested in England.¹⁸⁹

The woman buried in grave 60 was equipped with a 18-bead necklace (of silver wire, six carnelian, four rock crystal, two amethyst, three opaque blue and two millefiori beads) and an iron knife, which is lost today. Nearby, the disturbed child's grave 110 (= Arents grave 128) was excavated in 1909; the deceased was equipped with a circular brooch of a distinct Anglo-Saxon type with a cruciform pattern emphasised by five bossed rivets and interlaced triquetras in the four segments. Both Capelle and Wamers think that this object was originally a metal fitting,¹⁹⁰ but its design and construction reveal that it really was made as a brooch belonging to an East-Anglian/Northumbrian group of circular brooches first discussed by Rupert Bruce-Mitford in 1956.¹⁹¹ These examples show the adoption of typical Anglo-Saxon dress accessories in the late 9th and early 10th centuries in Denmark.

Furthermore the development and appearance of typical Anglo-Scandinavian object types, such as strap ends of the multi-headed or double rim types, in the Danelaw or Irish Sea regions of northwestern Europe in the late 9th and 10th centuries can be observed at Hedeby (Fig. 18) and cannot be connected with or ascribed as booty or loot.¹⁹² It seems as if insular objects of a totally different character circulated or were apparently purchased, traded, or distributed in a Scandinavian *emporium* like Hedeby at that time. Only here we find several objects belonging to all categories of insular fine metalwork as defined by Wamers as dress jewellery, harness mounts, bronze vessels, balance scales and also metal ornaments.¹⁹³

Scandinavian (mainly Norwegian) copies of insular antecedents, like a "pseudo" penannular brooch found in Hedeby grave 156 (= Arents grave 179),¹⁹⁴ a fragmented this-

180. Graham-Campbell 1982: 144 ff., 146-148; Webster & Backhouse 1991: 235, cat. no. 196; Wiechmann 1996: 63-65, find list 26, map 75.
 181. Graham-Campbell 1982: 146 ff., fig. 4; Wamers 1985: cat. no. 144, pl. 30,5; Pedersen 2004: 46, 58 ff. The coin-dated hoard (t.p. 997/ca 1000) from List, Isle of Sylt, two silver hooked tags; Wiechmann 1996: 277, pl. 6, 3.4.
 182. Riddler 1990: fig. 1.1-2; Riddler 2001: 63.
 183. Scandinavian material in York: Hall 2000: 315-317.
 184. Pers. comm. by M. Jagodziński, Elbląg; Michailov 2003.
 185. Paulsen 1933: 25 ff.; Brinch Madsen 1984: 37-45; Arents 1992, part 1: 90; Eisen-schmidt 2004: 96 ff.
 186. Capelle 1968: 76, cat. no. 72, pl. 25; Wamers 1985: 109, cat. no. 164, pl. 3.1.
 187. Webster & Backhouse 1991: 227 ff., cat. no. 184; Wilson 1964: 132-134, cat. no. 19, pl. 18.
 188. Haldenby 1990: 51 ff., nos 1-2, figs 1, 1.2; see also Cramp 1964; Bailey 1970.
 189. Gilded copper-alloy brooch from Bigby, Lincolnshire: Sawyer 1998: 86, fig. 5.6.
 190. Capelle 1968: 77, 106, cat. no. 73, pl. 25,3; Wamers 1985: 34, 109, cat. no. 165, pl. 3.2.
 191. Bruce-Mitford 1956; Wiechmann 1996: 54 ff., list 20a, map 69.
 192. Thomas 2000: 237-255; Thomas 2001: 42-45, figs 4.4f, 4.5, 4.6.
 193. Categories according to Wamers 1998.
 194. Capelle 1968: 77, pl. 25,9; Arents 1992, vol. 1: 122; cf. also a "pseudo" penannular brooch from "Ireland" and a fragment from the Cuerdale hoard, Johansen 1973: 95, fig. 33, 34a.

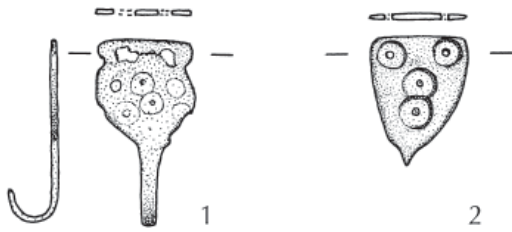


Fig. 16. (above) Anglo-saxon hooked tags found in Hedeby.

1 = settlement find 1963 (Drescher W 140), bronze

2 = detector-find Hb 2003/2474, bronze

Drawing: J.-M. Murawski, Stiftung Schleswig-Holsteinische Landesmuseen Schleswig.

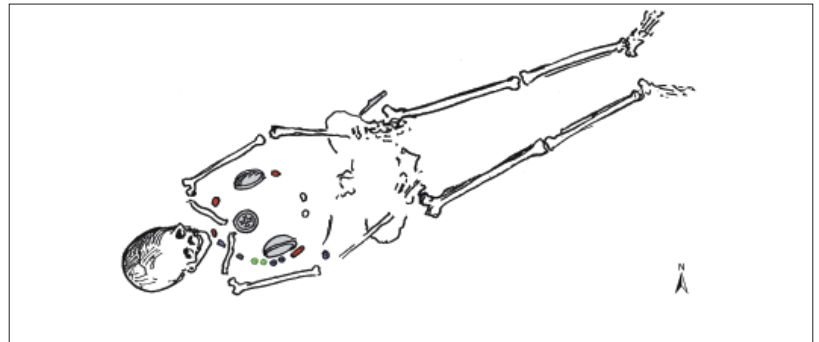


Fig. 17. (right) Plan and inventory of Hedeby grave 60 (Arents grave 77) with an insular circular plate decorated with an interlace pattern. Scale of grave plan 1:20; insular plate 52 mm.

Photo: C. Dannenberg, Stiftung Schleswig-Holsteinische Landesmuseen Schleswig.



Fig. 18. Metal-detected Anglo-Scandinavian metal-work from Hedeby:

Strap-ends of the multi-headed:

2 = Hb 2003/3445

4 = Hb 2003/4344)

Double rim types:

1 = Hb 2003/679

3 = Hb 2003/827

5 = Hb 2003/4202

Photo: C. Dannenberg, Stiftung Schleswig-Holsteinische Landesmuseen Schleswig.



the brooch Graham-Campbell group III,A in Hedeby grave 276 (= Arents grave 313),¹⁹⁵ both made of silver, or a pin found in 1904 as a settlement find,¹⁹⁶ became common in the 10th century and were not only adopted in the Scandinavian dress but also produced locally. This is attested by a almost complete mould (Fig. 19) and three fragments (Fig. 20) for bossed penannular brooches located as stray finds in Hedeby after World War I and classified by James Graham-Campbell as “a Norse copy of the Irish ‘bossed’ brooch-type” belonging to his group I,A brooches with openwork margins.¹⁹⁷ In the same context belongs a fragment of a bronze penannular brooch with sub-triangular terminals decorated with an interlace pattern recently found by metal detecting.¹⁹⁸ The same western influences are obvious in ringed pins, which were also found in large quantities in Hedeby.¹⁹⁹ All these finds from Hedeby point to a cultural interaction in the North and Irish Sea basins and vivid contacts from the late 9th century onwards.

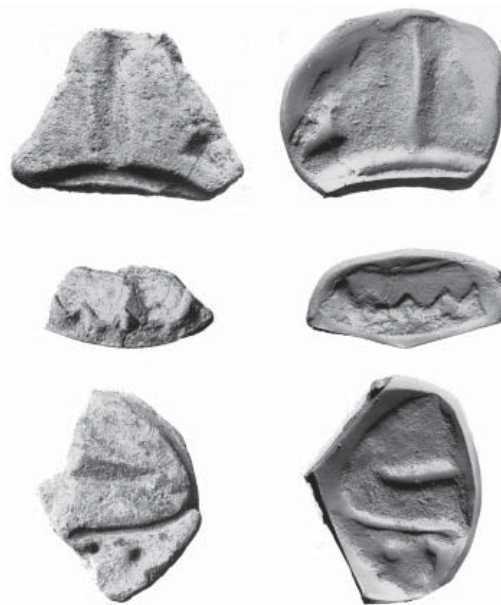
Hedeby's Baltic connection

Hedeby's Baltic connection, which is on one hand Scandinavian, seems to be dominated by contacts with Gotland. Also the relations to the eastern Baltic could have been spread over Gotland. An intensification of the contacts with the eastern Baltic can be observed in the 10th and 11th centuries as stressed by Michael Müller-Wille and Vladas Žulkus.²⁰⁰ The known metal adornments are explained by a personal mobility. The vivid role played by Gotlandic seafarers – as presumed by Ingmar Jansson and Lena Thunmark-Nylén²⁰¹ – is linked with the occurrence of typical Gotlandic dress ornaments, mainly box or animal-head brooches (Fig. 21).²⁰² Compared with the high amount of continental and southern Scandinavian materials or the various insular objects located by metal detecting, the Baltic component beyond Gotland, such as the eastern shore, is not well represented at Hedeby before its late phase.²⁰³



Fig. 19. Hedeby: mould for bossed penannular brooches, max. 8.0 x 6.75 cm. ALM KS 17926, from the former Warnecke collection. Photo: C. Dannenberg, Stiftung Schleswig-Holsteinische Landesmuseen Schleswig.

Fig. 20. Hedeby: three fragments of moulds for bossed penannular brooches and their casts done in the 1930s (to the right). Former Warnecke collection, now missing. Photos: H. Jankuhn, archive of the Archaeological Museum, Stiftung Schleswig-Holsteinische Landesmuseen Schleswig.



195. Capelle 1968: 77, pl. 25,2; Graham-Campbell 1987: 239 ff.

196. Capelle 1968: cat. no. 145, pl. 14.3; Graham-Campbell 1987: 238.

197. Capelle 1968: 79, pl. 25.7; Jankuhn 1986: 211, fig. 94.b and unpublished archive material. The mould was “the property of a well-travelled smith” or “copied from a well-travelled brooch” (Graham-Campbell 1987: 234-236).

198. Fragmented brooch Hb 2003/3480; Graham-Campbell 1987: 234; closely comparable with the bronze penannular brooch from Vambheim, Ulvik, Hordaland, see Graham-Campbell 1987: fig.1.

199. Jankuhn 1943: 143-148; Fanning 1990; Arents 1992, vol. 1: 126-129 (Gruppen 1-4).

200. Müller-Wille 1988; Žulkus 1997; see Žulkus and Bertašius this volume.

201. Thunmark-Nylén 1992; Thunmark-Nylén 2000; Jansson 1995.

202. Müller-Wille 1988: 753 ff., fig. 9.

203. See Jankuhn 1934: 113.

Fig. 21. (right) Fragmented Gotlandic brooches found in Hedeby:

1 = animal-head brooch Hb 2004/18108

2 = box brooch found in the 1950s, private possession Eckernförde

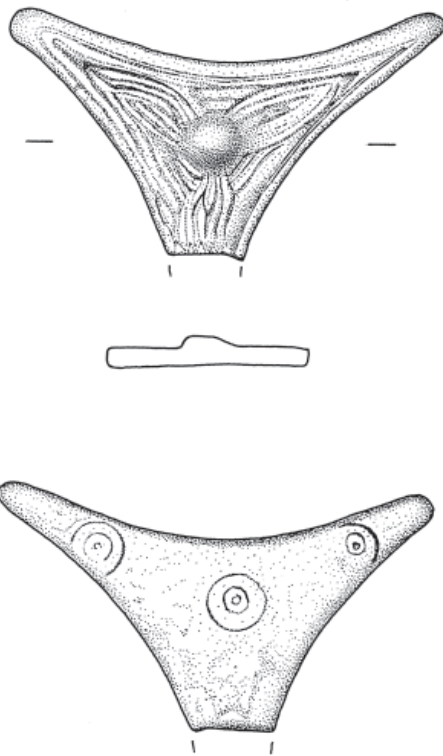
3 = animal-head brooch Hb 2003/721

Photo: C. Dannenberg, Stiftung Schleswig-Holsteinische Landesmuseen Schleswig.



Fig. 22. (below) Hedeby, stray find from surface survey 1969: bronze pin fragment with a triangular head of Saaremaa type (Drescher R 3.200).

Drawing: J.-M. Murawski, Stiftung Schleswig-Holsteinische Landesmuseen Schleswig.



204. Bliujienė 1999: 138-143, fig. 69-70, type IV. A close parallel is from Ralswiek, see Herrmann 2005: 121, fig. 1260. 205. Bartczak *et al.* 2004; of 274 coins, 270 are oriental and four from the west: 1 penny Hedeby KG3 (fig. 4), 1 penny KG5 (fig. 5), 1 penny Ethelwulf, king of Wessex (839-858), struck at Rochester ca 843-848 (fig. 6). All western coins are pierced with one or two holes, even a Wodan-Monster sceatta (fig. 8) has a suspension loop. Trewhiddle style strap end; pers. comm. by M. Jagodziński.

206. The bronze strap distributor from Quern (see note 162) of supposed 10th-century date could have a stylised counterpart in Czarny Las, Mazurian Lakeland. Wróblewski *et al.* 2003: 166, n. 44, pl. 5.16.

But it is possible that Wulfstan also met Gotlanders in the Danish *emporium* at Hedeby. It is very questionable and doubtful, however, if he also had direct contact with Balts or with Baltic Finns, who may be represented here by a bronze pin fragment with a triangular head of Saaremaa type (Fig. 22).²⁰⁴

Wulfstan's account attests to a sea route along the southern Baltic coast into the Prussian's land; in Truso there are 9th-century western pennies and a Trewhiddle-style strap end, pointing to western connections at this time.²⁰⁵ But at present it is difficult to discern more involved contacts/influences coming from southern Denmark.²⁰⁶ In the new metal-detector finds from Hedeby, a Baltic component, not from Gotland or from the Balts' territories, is not very visible before the 11th century. It seems as if natural commodities like amber or furs, but also slaves, must have predominantly come from the eastern shores of the Baltic.

Epilogue

When Wulfstan and Ohthere supposedly gave an account of their journeys at Alfred's court, Hedeby was the leading Danish *emporium* in the collective experience not only of Scandinavians but also of seafarers from many other countries.²⁰⁷ Hedeby was at that time a central node in a network of trade encompassing the North Sea littoral and the Baltic. All criteria of maritime-based *emporia*, as listed by David Hill,²⁰⁸ existed: its function as a commercial centre with a harbour, a large occupied area, no defensive works before 850, a craft centre and evidence of long-distance trade with prestige and utilitarian goods. The unfortified settlement stretched along the coastline with cemeteries situated on the higher slopes inland. Besides an urban-centred economy based around

long-distance trade in different commodities, regional or local networks of trade and production must have also existed, as is attested at places like Bejsebakken or Tissø. In Hedeby's rural hinterland several places are known also to have participated from the *emporium's* role in trade and production.²⁰⁹

The contacts with Anglo-Saxon England and the Danelaw region seem to be quite active in the decades about 900, which could be shown with the help of several different metal objects and fittings discussed above. Typically enough, Anglo-Saxon objects of these types are almost lacking in Danish places like Ribe in Jutland, Tissø on Zealand or Uppåkra in Scania. The Baltic connection did exist, but it was apparently dominated by people from Gotland, whereas relations to the eastern coast of the Baltic are difficult to trace at that early time.

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207. "Yet the reports of Ottar and Wulfstan, late ninth-century voyagers who reached the court of King Alfred and who both visited Hedeby, as well as other market places, should serve as a reminder that Scandinavian manufacturing and trading centres like these are likely to have been within the collective experience of the Scandinavians who invaded and settled England." Hall 2000: 315.
208. Hill 2001a: 75 ff.
209. Meier 1998: 277 ff.; Müller-Wille et al. 2002: 21-29.

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