

Bread in Birka and on Björkö

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This article focuses on bread deposits in the cremation graves in Birka and from the Ormknös A and B cemeteries on Björkö. Some of these deposits were found in a fragmentary state. Methods used to establish the original number of bread loaves are taken up as well as their size and morphology. The provenance of the loaves is discussed; whether the grave bread was baked in individual households or in a town bakery. Various other aspects of the grave bread are also discussed; the distribution as well as the symbolic function of the charred loaves.

Introduction

Birka, on the island of Björkö, is located in Adelsö parish in the province of Uppland, central Sweden. The island lies in Lake Mälaren, which, during the Viking Age, constituted a gulf of the Baltic Sea with brackish water (fig. 1). The natural resources then were considerably richer than they are now. During this period, the sea-level at Björkö is estimated to have been c. 5 m higher (Miller & Hedin 1988), also there was a warmer period during the



Figure 1. Map showing the location of Birka. From Gräslund 1980.

Viking Age and the Early Medieval Period (Lamb 1982). The Viking Age was a period when agriculture and stock-farming were expanding, as new land became available through the regressive shoreline displacement and as agricultural technical innovations were made. Björkö's position implies good communication possibilities, and its role as a trading center is confirmed by rich archaeological finds from various foreign areas. Birka is the first urban site in Sweden, with an identifiable town area which has deposited a mighty (c. 2 m) soot- and ash-comprising cultural layer, the "Black Earth". Around the part of this area facing inland there is a town rampart. Outside the rampart several cemeteries are located, which together comprise at least 2300 graves (Gräslund 1980:4). Many archaeological excavations have been carried out here in the course of time and many works, both scientific and popular, have been published on them. Therefore I will not touch upon the interesting research history of Birka, but instead refer to earlier publications (e.g. Hallström 1913; Geijer 1938; Arbman 1940–43; B. Ambrosiani et al. 1973; Gräslund 1980; Kyhlberg 1980a; K. Ambrosiani 1981; Arwidsson 1984; 1986; Jansson 1985; Duczko 1985; Hägg 1986; B. Ambrosiani & Clarke 1992; Holmquist Olausson 1993; B. Ambrosiani & Clarke 1995).

The question of provisions – what to eat and how to preserve it – was of course of crucial importance for the inhabitants of Birka. Raw material could not have been produced in sufficient quantities on this small island, but had to be transported from the mainland for sale and consumption. The animal part of the diet of Birka's inhabitants has earlier been discussed on the basis of the osteo-

logical finds (Ericsson 1987:4; Ericson et al. 1988) and is perhaps possible to reconstruct, as now about six tons of animal bone remains have been found in the Black Earth of Birka. Also avian eggshells, which probably can be identified by bird species, will give further information about the meat diet (Johansson 1995:126f). What part was played by plant-based foods, however, has been more difficult to ascertain. The remains of cereals, seeds, berries and fruits cannot always be discerned with the naked eye during the course of excavation (hazel-nut shells are exceptions) and both cultivated root vegetable and collected edible roots are difficult to identify. The principal evidence on which to base reconstructions about vegetable diet comes from finds of carbonized bread or possibly other types of cereal-based foods and from remains found inside ceramic vessels (from both solid and liquid foods); these traces can be subject to chemical analysis.

The research presented in this article will suggest that foodstuffs and drinks of various kinds were common as grave-gifts during the Viking Age. For this reason the graves have a great deal potential as sources of information concerning animal and vegetable dietary habits and may in addition reveal details about contemporary cultivation. In using them as such sources, however, one must assume that the everyday diet is likely to have differed from that suggested from funeral deposits, which presumably also exhibit food with specific symbolic value.

This article discusses a part of this archaeological material, viz. the charred bread (definition see Hansson 1994:8) found as funeral deposits. Especially I wish to suggest answers to the following questions considering the grave bread in Birka and on Björkö:

- What factor determined the distribution of the bread? Why is it present in some graves – not others?
- Where were the bread loaves baked, for the living and for the dead – in a “town bakery” or at the domestic hearths?
- What was the function of the bread?

Material

On Björkö there are several cemeteries (fig. 2):

- Hemlanden
- The cemetery north of Borg
- Borg
- The cemetery south of Borg
- Grindsbacka
- Kärbacka cemetery
- Ormknös A
- Ormknös B

Both Ormknös A and the small cemetery at Salviksgropen (Ormknös B) are discussed in the thesis of Lena Holmquist Olausson (1993). The name Ormknös B, is not explicitly mentioned in the thesis of Anne-Sofie Gräslund, who included Ormknös B in the larger grave area of Ormknös (Gräslund 1980:4–6).

Excavations were made of more than one thousand graves, 566 cremation graves and 544 inhumation graves, on Björkö by Hjalmar Stolpe from 1873–95. In all the cremation graves that he excavated, except those in the cemeteries of Grindsbacka and Kärbacka, Stolpe discovered the remains of bread loaves. The Archaeological Research Laboratory later carried out excavations, at Kärbacka (Site 109) in 1985, at Ormknös A (Site 111) 1975–78 (Arrhenius et al. 1978; Arrhenius 1990) and Ormknös B (Site 116) in 1977 (Holmquist 1985; Holmquist Olausson 1993). In the Kärbacka cemetery, no bread remains were found. However, both the cemeteries of Ormknös A and B produced charred grave-bread. Thus a miniature bread loaf was found in the rectangular stonessetting A2:a at Ormknös, containing a single child's grave, even though funeral rites for child burials on Björkö are considered rather unusual (Gräslund 1972–73). The grave is dated to the ninth century (Arrhenius 1978a:50). It thus dates from the oldest period of the Birka-complex and produced plenty of finds, including rivets interpreted as originating from a boat. The child also received what appears to be a small iron Thor's hammer ring (Arrhenius 1978a:50f).

In the only cremation grave to be excavated at Ormknös B, situated c. 200 m north of the cemetery of Ormknös A, miniature bread loaves were also found, this time in a highly elaborated grave which included both the body of the horse of the deceased and his horse's equipment (Holmquist 1985).

These “isolated” cemeteries, Kärbacka and Ormknös A and B, are situated outside the main Birka-complex (Holmquist Olausson 1993:43). It has been suggested that there existed early settlements on Björkö consisting of independent farms before the establishment of Birka itself (Arrhenius 1976). The cemetery of Ormknös was in use both before and at the same time as the Birka-complex (Arrhenius 1990:73f), and could very well have belonged to such an early farm (Arrhenius 1990); likewise Kärbacka may have formed one of these settlements outside Birka (Holmquist 1985; Holmquist Olausson 1993). Thus these cemeteries should not be included in the large Birka-complex but should be considered as a type of cemetery belonging to an independent farm (Arrhenius 1978b:57).

Methods

Morphological classification

To be able to gain as much information as possible in order to interpret the distribution and function of the bread loaves placed as funeral deposit in Birka and on Björkö, it is necessary to make a close analysis of both their morphology and content. In terms of morphology it was possible to make use of material collected from the original excavations made by Stolpe and to consider this along with the recently excavated fragments from the Ormknös A and B cemeteries.

All bread fragments were examined under a stereo microscope at a magnification of 10× or higher, when necessary. In many cases it was possible to observe which side of the bread loaf had been turned to the baking slab or pan, as this side was often more blackish and slightly concave. In some cases there were also charred wood fragments and other charred botanical remains, maybe burned onto the bread during the baking process.

In those cases where the bread loaves were fragmentary, examination of the edges was carried out to separate fractures from original outer edges. The bread fragments then were recorded in 1:1 drawings and the original edges marked in. In those cases in which it seemed probable that the original loaf had a circular form, a circle was drawn around the fragment to estimate the original diameter. The prehistoric bread loaves were seldom symmetrical so any assessment of diameter must be approximate (Hansson 1994a:15) and has to be understood more as a tendency than as a definitive size. In the fractures it is also possible to discern the porosity of the bread and to decide whether it was leavened or not. In Bj 105c there was a fragment with a very porous sponge-cake like structure; it is not quite clear if this is a bread.

Microscopic and chemical analyses

Hakon Hjelmqvist (1984) in an elaborate and pioneering study, analysed 29 bread loaves containing identifiable botanical material found in cremation graves belonging to the Birka-complex. The ingredients, observed in his analyses of the grave bread are listed here in table form (table 1).

The present author's analyses were performed on bread loaves from the cemeteries of Ormknös A and B. These microscopical analyses were made using similar methods to Hjelmqvist's and the two analyses are therefore complementary.

In the experiments conducted in the present study the small samples, taken from the carbonized bread loaves were dissolved in 30% hydrogen peroxide and 25% ammonia (1:1), to bleach and separate the individual components from one another and thus identify the cell-wall patterns and other diagnostic micro-remains. Finally microscopic slides were made with glycerol/ethanol 1:1 solution (for further information on the method, see

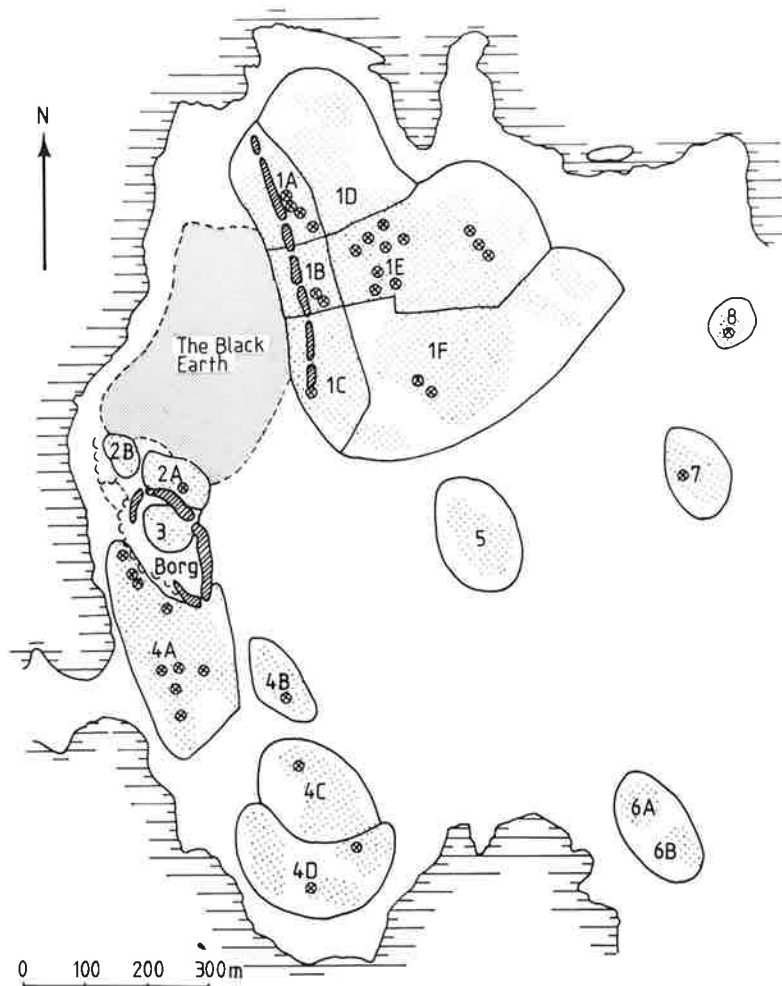


Figure 2. Map showing the cemeteries on Björkö. 1. Hemlanden, 2. The cemetery north of Borg, 3. Borg, 4. The cemetery south of Borg, 5. Grindsbacka, 6. Kärrbacka cemetery, 7. Ormknös A, 8. Ormknös B. Bread graves marked, except for Bj 49, 105, 106, 114a, 123, 158b, 159, 171, 172, 173, 181, and 1148a, where the location of the graves is not known. Drawing by

Hansson & Isaksson 1994:21f; Hjelmqvist 1982:236). For identification, cell reference material for cereals and other seeds was prepared by cooking fresh caryopses in distilled water. Husks (palea and lemma) from cereals, which are not free-threshing, were also prepared. With a scalpel, under the microscope, the cell layers were then separated from each other and stained with safranin. Thereafter slides were made with glycerol/ethanol 1:1 (cf. Dickson 1987:96). In some cases also carbonized plant material was used as a reference for comparative purposes. Reference literature used: Moeller 1928; Hopf 1954; Hjelmqvist 1977; 1984; 1990, Körber-Grohne & Piening 1980; Körber-Grohne 1981; Holden 1986; 1990; Dickson 1987; 1989; Colledge 1988. The chemical analyses were carried out at the Archaeological Research Laboratory, Stockholm University.

Considering the differences between the Birka graves and those in the isolated cemeteries of Ormknös, and taking into account the similarity of the grave-gifts discovered in them (Arrhenius 1990:134) it becomes important

Table 1. Content, morphology, size and distribution of funeral deposits chosen as indicators for wealth together with Thor's hammer rings and sex of the deceased in the cremation graves containing bread in Birka and on Björkö. (m=male, f=female, ch=child, gl=glass, br=bronze, g/s=gold/silver, T=Thor's hammer rings. Data from Arbman 1940; Ström 1984.

Grave no.	Morphology	Size (cm)	Wealth indicators	Sex	Thor's hammer rings	Content ¹
49b ²	—	—	—	—	—	
65	circular	5–10	—	—	T	
69	undet.	undet.	—	—	—	
77b	oval	>5	g/s	f	—	
78 ²	—	—	g/s	—	—	
79a ^{2,4}	—	—	—	—	—	
80c	circular	<5	g/s	—	—	
82b	circular/oval	>10	—	—	—	
93a:1	rectangular?	<5	—	m?	T	wheat, rye
93a:2	oval	<5	—	—	—	
93a:3	undet.	undet.	—	—	—	
93a:4	undet.	undet.	—	—	—	
97a	circular	5–10	—	—	—	
102 ³	undet.	undet.	br	—	—	
105c ³	circular	5–10	—	—	—	
106:1	circular	<5	—	—	—	hulled barley
106:2	undet.	undet.	—	—	—	
114a	circular	<5	—	m	—	hulled barley, oats
123b ³	undet.	undet.	—	—	—	
124	undet.	undet.	gl	—	—	
126	rectangular?	>5	—	f	—	barley, wheat
158b ^{2,3,6}	undet.	undet.	br	f	—	hulled barley, oats, vetches
159	rectangular?	undet.	g/s	?	—	hulled barley, oats
163	undet.	undet.	g/s	—	—	
171	figure-of-eight?	undet.	g/s	—	—	hulled barley
172	circular	<5	—	—	T	hulled barley
173:1	circular	<5	—	—	—	hulled barley, wheat
173:2	circular	<5	—	—	—	
181	circular	<5	g/s	—	T	hulled barley
188	circular	<5	—	f	T	hulled barley, oats
208 ^{3,6}	undet.	undet.	g/s, gl	f	T	wheat, flax
304	circular/oval	undet.	g/s	f	—	hulled barley, peas
322:1	circular	<5	—	—	—	
322:2	circular	<5	—	—	—	
343 ^{3,6}	undet.	undet.	—	—	—	hulled barley, oats
348	circular	<5	g/s	f	—	oats, inner bark?
376a	undet.	undet.	—	—	—	rye
382	circular/oval	>5	—	—	T	emmer wheat, peas
387	circular	undet.	—	—	—	cf. spelt wheat, flax
391:1	circular, indents	<5	g/s, gl	f?	—	wheat
391:2	circular	<5	—	—	—	wheat
394	undet.	undet.	—	—	—	einkorn, flax
418 ^{2,3}	undet.	undet.	g/s, br	f	—	
427	circular	<5	g/s	—	—	
429	undet.	undet.	—	—	—	hulled barley, vetches
449:1	undet.	undet.	—	—	—	hulled barley, oats
449:2 ⁵	circular	<5	—	—	—	
469:1	oval	>5	—	—	—	hulled barley, peas
469:2	oval	>5	—	—	—	
469:3	oval	>5	—	—	—	
996:1	circular, indents	<5	—	—	—	barley, wheat, flax?

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996:2	circular, indents	<5	—	—	—	
996:3	circular.	<5	—	—	—	
996:4	circular	<5	—	—	—	
1028b:1	circular	<5	—	f	—	barley, wheat
1028b:2	circular	<5	—	—	—	
1046	undet.	undet.	g/s, br	f	T	
1058a	circular/oval	5-10	g/s	m	—	hulled barley
1148a	circular	>10	—	m	—	hulled barley, oats
20300,	undet.	undet.	g/s, gl	f	—	emmer wheat, einkorn, oats
1932 III ²						
<u>Site 111</u>						
A2:a	circular/oval	<5	—	ch	T	hulled barley, oats
<u>Site 116</u>						
A2:1	circular	<5	gl	m	—	emmer wheat/spelt wheat, oats
A2:2	circular	<5	—	—	—	emmer wheat/spelt wheat, oats
A2:3	circular.? (undet.)	<5? (undet.)	—	—	—	emmer wheat/spelt wheat

¹ Not known from which bread the sample was taken, if the grave contains more than one bread (except Bj 391 and bread from site 116).

² Bread missing

³ Designation to bread somewhat uncertain. The fragments miss over- and underside. All pieces have the same structure in the fractures as other bread, therefore they here will be designated to bread. The fragment from the cremation grave Bj 105c, however, has a different, lighter and more spongy structure, in spite of certain doubts also this fragment will be called bread(?).

⁴ Bread from "Bj 79b" is analysed (pers. comm. Hakon Hjelmqvist). However, this bread does not exist. Probably the bread sample was given the wrong grave number.

⁵ Additional bread fragments found among stored charcoal

⁶Notes about the somewhat uncertain bread loaves (Arbman 1943):

Bj 158b – Kleines Fragment eines verkohlten Brotes

Bj 208 – Stück eines verkohlten Brotes

Bj 343 – Stücke eines verkohlten Brotes. (Observe that the storing box also has a note: *Bj 173*. Greta Arwidsson has on the same note indicated a possible mixing)

to compare bread loaves from the two areas. This comparison should be made both in terms of ingredients and, if possible, (the miniature bread loaves from Ormknös A and B are in a fragmentary condition) in terms of morphology.

Results

Newly discovered bread

During his excavations, Hjalmar Stolpe observed deposits in the form of bread, altogether 49 bread loaves in 37 cremation graves (Arbman 1943; Gräslund 1967:258). In several cases these loaves still had their original form, and some of them were threaded on filaments of iron, or, in the case of bread from grave Bj 97a, of bronze (Hallström 1913:83; Arbman 1943:44). In those cases where the bread loaves were preserved in an almost complete condition there was no difficulty in deciding to which type of food-remain they belonged. But Stolpe also very creditably observed small carbonized bread fragments. There must have been problems in separating these fragments from pieces of charcoal, and certainly later examinations have revealed pieces of bread among the charcoal saved from the graves.

In 1975 Ingmar Jansson, then at Uppsala University, examined charcoal and bones from the cremation graves from Birka, located in the Museum of National Antiquities, Stockholm. Material, difficult to identify, but which

feasibly could constitute bread, was taken out. In 1990 the author examined this material as well as the carbonized bread from cremation graves already identified at the excavation.

In this re-examination fragments of carbonized bread were found and these additional bread finds originated from the graves Bj 65, 69, 77b, 82b, 102, 105c, 123B, 124, 163, 449 and 996. Also Prof. Greta Arwidsson noticed a possible bread find in Bj 418, or as she expresses it: "zwei nicht bestimmbare (Brot??)" (1984:273).

Thus among the charcoal material from the excavations in Birka stored in the Museum of National Antiquities, fragments of charred bread from twelve separate cremation graves were found. Of these newly discovered fragments several appear to come from graves already classified by Arbman as containing bread. The fragment from Bj 65 may possibly have been the one mentioned by Arbman (1943:27), that in grave Bj 996 is probably from a loaf described by Arbman (1943:419), and in grave Bj 449 a miniature bread loaf in three pieces with c. 3 cm diameter was discovered which duplicated a find mentioned by Arbman (1943:126). In total the re-examination of the charcoal material suggests that an extra eight cremation graves containing bread should be added to Arbman's total of 37, with probably an extra eight bread loaves to be counted.

Arbman also observed carbonized bread during his own archaeological excavation of grave no. 1932 III (SHM 20300) at the south end of the rampart (Arbman

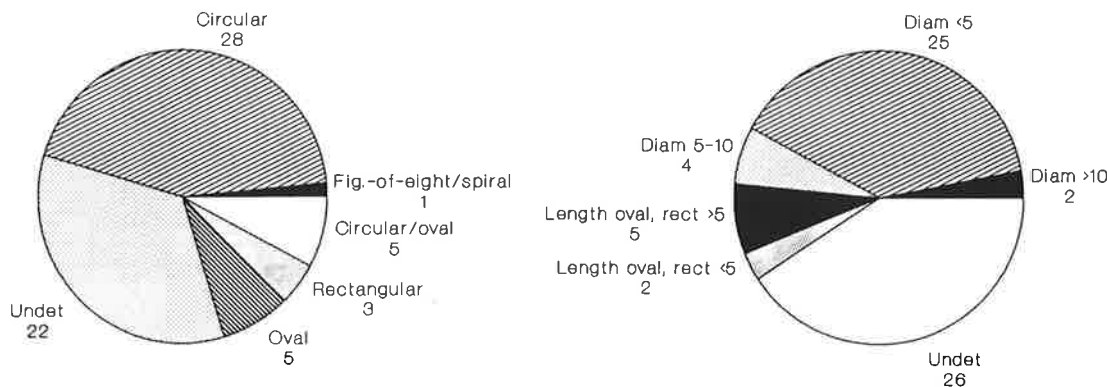


Figure 3. Distribution (in numbers) of the various forms (left) and sizes (right) of the charred grave bread from Birka and Björkö.

1932; 1943:484). During excavations carried out by the Archaeological Research Laboratory at the cemeteries Ormknös A and B a further four miniature bread loaves have been found.

The 48 graves in Birka and on Björkö containing carbonized bread, comprise at the very least 64 bread loaves, although many of these are in a fragmentary state, are difficult to classify, and therefore the total number could be higher. The graves Bj 93A and 996 each contain four bread loaves, for instance; grave Bj 469 has three and this is probably the case also in grave A2, Site 116 (table 1).

Bread in wealthy graves

Cremation funerals in Birka appear to have been conducted across all social groups in the society (Steuer 1969:214); thus one can investigate whether economic differences could be traced between "bread graves" and "bread-less graves". Unfortunately the inhumation funerals cannot be included, which excludes about half of the inhabitants which possibly had their origin outside central Svealand (Jansson 1994:19f).

To be able to determine economic status of the graves, grave-gifts made of gold, silver, glass and bronze were used as a parameters for wealth. Glass beads, gold- or

silverfoil beads, or small fragments of bronze, were not used. It should be observed that while this is a simplified model, it should however give enough evidence for our present purpose (various definitions have been published by other archaeologists).

According to this definition 42% (20) of the "bread graves" (48) contain deceased with grave-gifts indicating wealth. Of the total number of cremation graves in Birka, Ormknös A and Ormknös B (575), 20% (113) contain deceased with gifts indicating wealth. Thus the proportion of "rich bread graves" is higher than the average; "bread graves" tend to mark rich burials. Further, both men, women and a child received bread loaves as funeral deposits (table 1).

Morphology and size

Concerning the forms of the 64 bread loaves, 22 of them were too fragmentary (or missing) for a safe classification of their morphology, and the size was not possible to establish for 26. Of the bread loaves possible to classify, small circular bread loaves less than 5 cm in diameter dominated (there were 25 in all). There were four circular bread loaves 5–10 cm in diameter, and two circular bread loaves more than 10 cm in diameter. Also there were five oval bread loaves, three rectangular(?), and "cloverleaf formed" bread with indents (counted as circular, see table 1). Five bread loaves could be either circular or oval and one piece of bread was interpreted as a figure-of-eight by Arbman (1943). The bread loaf in grave Bj 1148A with a diameter of 17–18 cm (Arbman 1943) could have been baked in a turnable iron pan, even if no traces of this can now be discerned on the bread loaf (Hansson 1994a:15). Such iron pans have been found in archaeological contexts in Iron Age Sweden (Keyland 1989(1919); Campbell 1950:123; Orrling 1981:35), but are more common in Norway (Grøn 1927:56f; Währen 1978:547). The bread may also have been leavened, as the structure is slightly porous (Hansson 1994a), and in that case it might have been baked in ashes or under a ceramic pot (table 1, fig. 3).

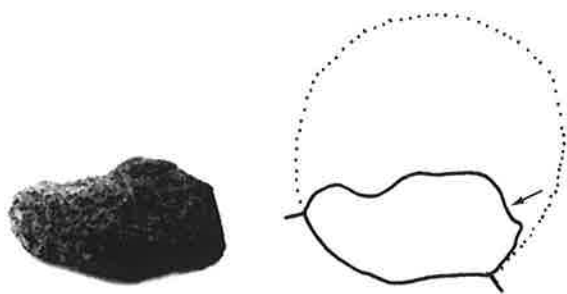


Figure 4 The carbonized bread from Ormknös A. (a) Actual size. Photo by the author; (b) reconstruction, arrow indicating where sample was taken.

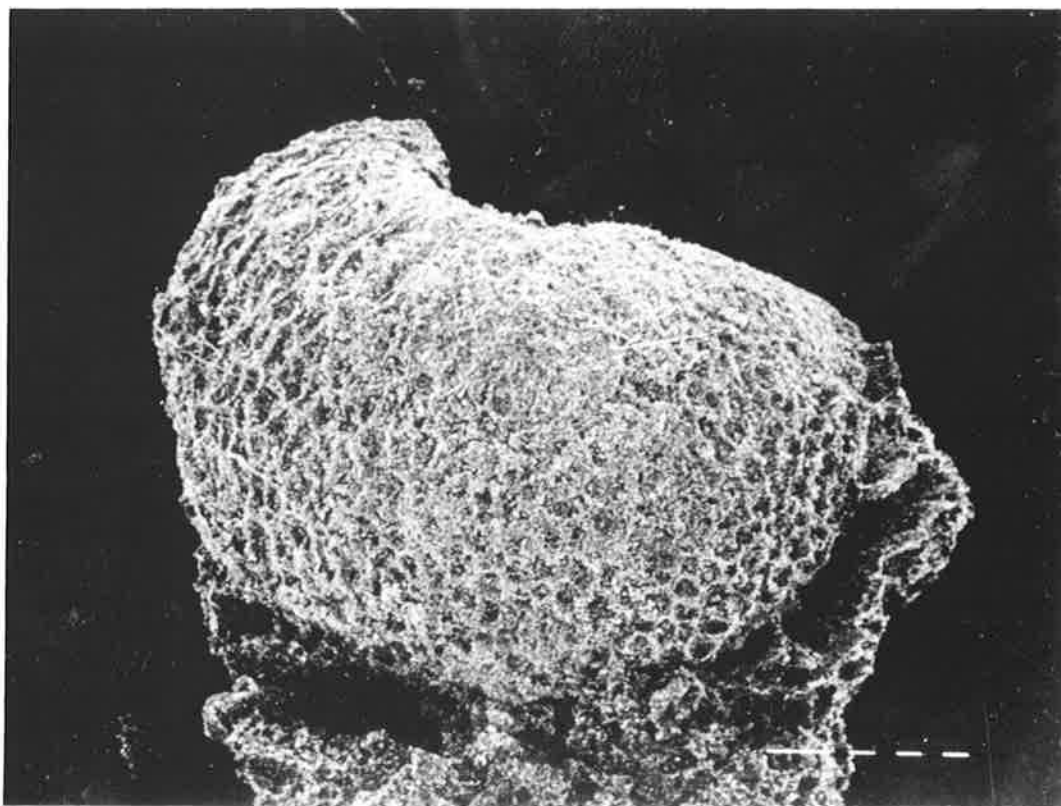


Figure 5. Seed from the underside of bread from Ormknös A, 60 \times . SEM-micrograph by the author.

Carbonized bread from Ormknös A

The miniature bread, or biscuit, found in a grave at Ormknös A had a compact structure and a thickness of c. 0.5 cm. The underside was partly damaged; therefore this may not be the original thickness (fig. 4). The bread was probably circular with a diameter of c. 4.5 cm; however, it may have had an oval form, in which case the size would have been different.

The upper-side of the biscuit was greyish and the underside blackish and somewhat concave (as far as can be judged). Plant fragments were visible under the stereo microscope (10 \times), among them the remains of a seed (fig. 5). The seed may have stuck to the underside of the bread during baking, or it could have been mixed into the dough together with the flour. Occurrences of weed seeds in prehistoric bread have been documented elsewhere (Robinson & Siemen 1988:700; Hjelmqvist 1990:11–14; Hansson 1994a:15ff). The seed was removed and studied under the scanning electron microscope. The epidermal layer was severely damaged or missing. The discernable tissues may perhaps form the layer beneath the epidermal layer of the testa. The form of the seed has a slight resemblance with false cleavers (*Galium spurium*), a rather common weed-seed during Viking Age in this part of Sweden.

Examination of a small sample from the bread from Ormknös A under a phase contrast microscope (fig. 6) revealed several cereal tissue fragments from the fruit

wall, transverse cells with rounded endwalls and angular lacunae which is diagnostic for barley (*Hordeum vulgare*). Also tissue fragments of the epidermal layer from husks were observed with evenly thick meander formed cells, which is also typical for barley. As elements of the husks were found, the cereal must be identified as hulled barley (*Hordeum vulgare* var. *vulgare*). Further, epidermal cells from the husks of oats (*Avena* sp.) were found. The cell windings were not evenly thick but had narrower parts and resembled slightly a zig-zag pattern. In the slides free starch and unidentified tissue fragments from cereals could also be observed. As contaminations there were fine sand grains and cells from wood. The chemical analysis reveals that the biscuit contained 1% protein and the Cu content was 0.03 mg/100 mg and Zn 0.02 mg/100 mg dry weight.

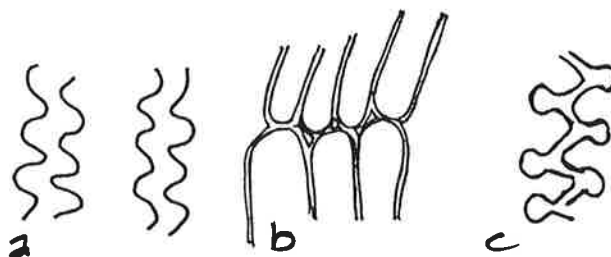


Figure 6. Bread from Ormknös A. (a) epidermal cells from husks of barley (*Hordeum vulgare*); (b) cells from the transverse cell layer of barley; (c) epidermal cells from husks of oats (*Avena* sp.) Drawing by the author.

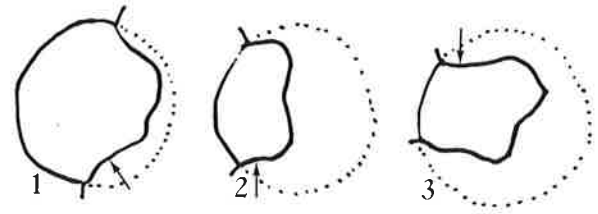


Figure 7. Bread from Ormknös B. (Left) fragments, actual size. Photo by the author; (Above) reconstructions, arrows indicating where samples were taken.

It could be established that this small biscuit was baked from flour made out of hulled barley (*Hordeum vulgare* var. *vulgare*) and oats (*Avena* sp.). The compact structure indicates that the bread was not leavened.

Bread fragments from Ormknös B

Six small fragments of bread were found at Ormknös B. My interpretation is that they constituted at least three different very small cakes. Two of them can possibly be reconstructed with the help of the original outer edge (fig. 7). These outer edges of the cakes are unfortunately rather small, therefore I would like to stress, that this is a *suggested* reconstruction. The bread structure is compact and the fragments are more blackish on the underside, where no botanical remains could be discerned, and the upperside was greyish. Samples for analysis were taken from three of them.

Sample 1. The sample was difficult to dissolve and had to be heated as it had not dissolved after 24 hours. It contained epidermal cells from husks of emmer wheat/spelt wheat (*Triticum dicoccum/spelta*) forming uneven meander windings and also epidermal cells from husks of oats (*Avena* sp.), reminiscent of an irregular zigzag line. The epidermal cells from husks of emmer wheat/spelt wheat were predominant. Some of the tissues had a greenish colour, probably caused by metal salts from copper, which was present in artefacts in the grave. As contamination in the sample fine sandgrains also occurred.

Sample 2. As contaminations a few fine sandgrains were found. Epidermal cells from husks of emmer wheat/spelt wheat (*Tr. dicoccum/spelta*) and oats (*Avena* sp.) were observed, in the same proportions as above (fig. 8). Also aleurone cells were discerned, probably from a wheat, judging from the breadth of the cells and the relatively thin cell walls. The sample also produced some degraded pollen grains. These could constitute a contamination but we cannot exclude the possibility that the pollen grains originated from honey as an ingredient in the cake.

Sample 3. Aleurone cells from a wheat were found. Also transverse cells were present; they had no angular

lacunae and the cell walls were pitted, but they were not as thick as the cell walls from transverse cells of bread wheat (*Triticum aestivum*). Probably these cells also can be identified as emmer wheat/spelt wheat (*Tr. dicoccum/spelta*) (fig. 8).

One of the pieces of bread contained 0.4% protein and the content of Cu was 0.06 mg/100mg and Zn 0.04 mg/100mg (table 2).

Discussion

Distribution

The cemeteries on the island of Björkö with c. 575 excavated cremation graves are unique, because of the great number of excavated graves from a limited prehistoric period, which makes it possible to analyse the distribution of the bread loaves both in the cemeteries and within the grave itself, and also to compare the bread loaves. Eight per cent of the cremation graves contained bread as a funeral deposit. Also there were loaves with a very special morphology hitherto not found in any other locality. However, sporadic finds of bread, dough, porridge or grain-paste have occurred at other localities in Europe.

Of the other Nordic countries, in Denmark only a few bread loaves have been found. In Norway no prehistoric bread is recorded, neither in Finland, with the exception of Åland. Why are then so many bread loaves found in Sweden? Can the cause be, that this type of find was observed very early in Sweden, and consequently there has been an awareness by the Swedish archaeologists of this type of food remains as grave-gifts? Or is the explanation more archaeologically significant? One detail that is suggestive is the relationship that seems to exist between Birka's position as an international trading center and the fact that bread deposits are found along the Viking Age trading route to the east, for example in Långängsbacken on the island of Åland in the Baltic Sea (Kivikoski 1980; Núñez 1995:116, 119). Further, bread has also been found in a female cremation grave at Porani, Grobina in Latvia, dated to the Vendel Period (Nerman 1958:80) and in the hillfort Apoule in Lithuania (G. Zabiela, pers. comm.). This bread is not dated, so here one has to be cautious about the Scandinavian impact. But if we go fur-

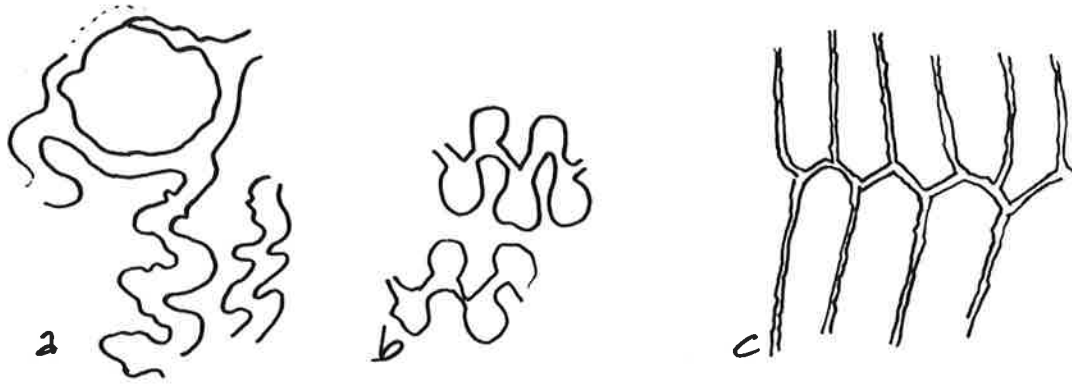


Figure 8. (a) Epidermal cells from husks of emmer wheat/spelt wheat (*Triticum dicoccum*/*Triticum spelta*); (b) epidermal cells from husks of oats (*Avena* sp.); (c) transverse cells from emmer wheat/spelt wheat (*T. dicoccum*/*T. spelta*).

ther east into Russia, Staraja Ladoga has also produced a so-called bread loaf with a dating to AD 810–830, in this case a model made of burned clay (E. Rjabinin, pers. comm.). Also in the cemetery at Timerevo bread has been found, threaded on a metal filament (Fechner 1963:15) in a way resembling the bread loaves found in Birka. In Ukraine, at Raiki, west of Kiev, there are further finds of both bread and porridge(?), dated from the ninth to the thirteenth centuries (Pashkevich 1991:249f). Up to a point the distribution of bread resembles the distribution of Thor's hammer rings made of iron (cf. Gräslund 1992:190), which seem to be common as funeral deposits in graves in the Mälaren valley area, but which are also found in Russian graves with Scandinavian impact. The difference between these two types of grave-gifts is that the Thor's hammer rings are made of metal, possible to detect also in inhumation graves. Bread is not preserved unburned. Interestingly the majority of the Thor's hammer rings are found in cremation graves. Could the grave bread also be more closely linked to the cremation graves than to inhumation graves, which are considered to mirror a foreign funeral tradition?

It is tempting to imagine that these bread finds might be linked to the cultural tradition prevailing in Birka, especially that concerning the funeral customs. The trading connections and also other contacts eastwards from eastern central Sweden and especially from Birka, were vital during the Viking Age. Actually we have an eye-witness description by the arab Ibn Fadlan of how the Rus at Volga planned a cremation ship's burial for a chieftain. Among the foodstuffs listed as offered to the deceased as grave-gifts he recorded bread (Togan 1939:92).

Grave bread might feasibly have been a common grave-gift in the whole Central Europe, but in that case it has not been found to any large extent, partly perhaps unobserved on account of its similarity with charcoal pieces, and partly because the organic material is preserved better in cremation graves, which during this period were more common in the Nordic countries. Also different types of bread finds are observed. Bread imita-

tions made of clay, sometimes tempered with grain, chaff and leaves (Gimbutas 1971:51, 158) are present within Slavonic areas (Gimbutas 1971; Hajnalová 1991; E. Rjabinin, pers. comm.) and have hitherto not been found in the Nordic countries. There are also a few finds of miniature bread loaves found in Scythian contexts mostly from an older period (c. 500–200 BC) than the majority of the Swedish carbonized grave bread. This latter is dated at the very earliest to the Pre-Roman Iron Age (Hjelmqvist 1990), but mainly comes from the Viking and Vendel Periods. This information is based on available literature and personal communication with Baltic and Russian archaeologists. The pattern of bread distribution and bread types in the eastern countries might possibly change with a deepened study.

On Björkö the grave bread was more often found in graves with grave-gifts indicating wealth than in graves with grave-gifts *not* indicating wealth (fig. 9), a fact for which I have no good explanation. The deceased in graves containing swords as a funeral deposit, a marker for the highest social position (Steuer 1969), had no bread at all as funeral deposit. Only "bread grave" Bj 69 contained any weapon according to the definition by Thålin-Bergman (1986:10). But there are on the whole few weapons in the cremation graves where bread is found and these two are found together only in one grave.

When comparing bread from the "isolated" cemeteries on Björkö, Ormknös A and B, with bread from the cemeteries traditionally linked to the Viking-Age town of Birka, the bread from Ormknös A and B did not differ as far as could be observed, neither in content nor in morphology. The only difference appeared to be that on the bread from Ormknös A and B no traces of any iron filament can be discerned. However, even here it should be pointed out that the bread from Ormknös A was not complete and the cakes in Ormknös B probably comprise some of the smallest bread hitherto found. They also contain emmer wheat/spelt wheat, a high-status cereal, and we cannot exclude the possibility that honey may have been present, thus indicating wealth or a festivity bread and not any ordinary everyday bread.

*Where were the bread loaves baked
– for the living and for the dead?*

Björn Ambrosiani and Kenneth Svensson (1992:27) presume that butchers, fishers and bakers constituted a substantial share of the craftsmen in Birka. But although some kind of baker may have existed, as far as I know no traces of a bakery were found at the archaeological excavations in the “Black Earth” the settlement area in Birka. An oven was present (K. Svensson, pers. comm.), but if it is a baking oven or not has not been possible to decide. Even if it was a baking oven, it might not indicate a bakery. To judge from the grave bread, of which very few loaves appear to have been leavened, an oven was not necessary when baking. A baking slab, iron pan or similar would have sufficed generally; in a few cases baking under the ashes or under a ceramic pot seems to have been the method. However, a distinction must be made between grave-bread and bread for the living. About the latter we know very little.

To co-ordinate bread baking in bakeries is, however, a very old phenomenon. Pharaoh Rameses III (c. 1200–1168 BC) had his own bakery (Währen 1963:23), and in Jerusalem a bakery from the seventh century BC was excavated (Währen 1978:546). During Classical Antiquity in Rome, permission to light fires was limited because of the danger of fire in the dense settlements (Carcopino 1984:46), and in such a situation it was practical to use bakeries to minimize the danger of fire. In Europe with the introduction of Christianity, monasteries were formed, and these also had their own bakehouses. Also bakehouses with an early dating (ninth century) are found in England (Hagen 1992:10) and during the Middle Ages it was common also that manor houses had their own bakehouses (Granlund 1980:309). In English towns at that time, there were even municipal ovens for the use of those who had no ovens of their own (Sheppard & Newton 1957:29).

The prerequisite for the need of bakeries is a densely populated, stratified society, where the diet to a large extent is based on cereal products, or possibly where the

consumption of cereal-products implies a high status. In Birka the excavated osteological material shows, that meat and fish were important as a source of nourishment. It is considerably more difficult to get information about the role of the cereals within the everyday diet. No depots of cereals have been found. The limited analysis of plant macrofossils carried out, shows that occasionally carbonized cereals are spread over the excavation area (Hansson 1993b; 1994b; 1995b). The “Black Earth”, however, signals an early urban settlement, the product of trading and handicraft of various kinds. Thus Birka was not a farming settlement. The preparation of the crops, a farm based activity, which leaves traces in the form of plant macrofossils, probably did not take place to any noticeable extent in Birka (Hansson 1993a:138). It is likely that not only cereals, but also ready ground flour were transported to Birka for consumption. Perhaps here, for instance in connection with the upper part of the society, there could have existed some form of bakehouses or persons with special knowledge of “the higher baking art”, who could be called in to bake for the wealthy households at times of festivity. During later times in Sweden and Denmark there is evidence for such an activity (Nordin-Grip 1941; Hansen 1954). Birka appears to have been the first place in Sweden to use beer spiced with hops – at least it is probable that the fruitlets from hops found in the “Black Earth” of Birka and in the sediment layer in Björkö Strait outside the “Black Earth” should be interpreted in this way (Hansson, in press). This shows the international character of the Viking-Age town of Birka concerning the drinks; perhaps it was as modern when it came to foodstuffs such as bread.

During this time bread was served in noble families at banquets and on other occasions. The Bayeux Tapestry (illustrating the battle of Hastings AD 1066) shows a man baking bread or cakes outdoors. Here there is also a scene usually interpreted as a meal with plates on the long table in front of William the Conqueror and his half-brother bishop Odo (Rud 1994:71). In my opinion the plates could as easily be interpreted as bread. The poem of Rigsthula mentions that bread at the houses of nobles is

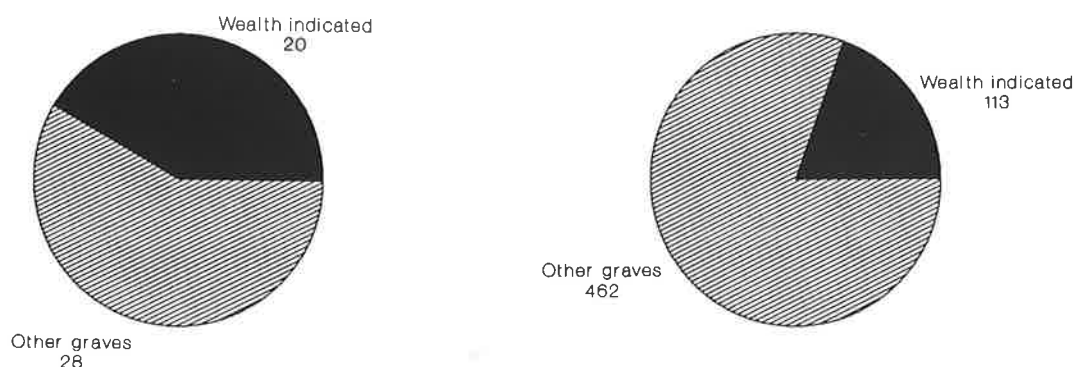


Figure 9. Frequency of funeral deposits indicating wealth incrementation graves containing bread (left) compared to frequency in all excavated cremation graves (right).

laid directly on the table on the white linen table-cloth (*Den poetiska Eddan*, transl. Collinder 1993:150). It was not unusual that the bread loaf served as a plate; perhaps similar scenes also took place in the Viking-Age town Birka.

Could the Birka bread have been bakery made? No traces of any baking ovens have been found in Birka. In my opinion, an oven is a prerequisite for a bakery. Baking of leavened bread requires an oven or some similar construction. Unleavened bread requires only a hearth and can be baked during normal food preparation in the home. Most of the grave-bread is unleavened, the remainder could have been made from sour-dough, which could be adequately baked under the ashes. The surviving grave-bread shows a variety of forms. Products of a town bakery would be expected to be of a more uniform character. Therefore, I presume that bread for the dead was prepared at the domestic hearth.

Bread content

In Swedish prehistoric bread, barley (*Hordeum* sp.) was the most common cereal, followed by oats (*Avena* sp.). The speltoid wheats, einkorn, emmer wheat and spelt wheat, have a somewhat higher frequency in bread (Hjelmqvist 1984; 1990) than in the analysed impressions in ceramics, where for instance emmer wheat and einkorn constitute less than 1% during this period and spelt wheat about 2% (Hjelmqvist 1979:54). It should be observed that Hjelmqvist's survey also comprises south Sweden, although the majority of the prehistoric bread is found in central Sweden. The frequency of the various cereal sorts differ in north, central, and south Sweden (Viklund 1994). Hjelmqvist, noticing the occurrence of the speltoid wheats in the grave bread from Birka, was surprised to see that these old-fashioned cereals were still in use in the Mälaren valley (Hjelmqvist 1984:272). His

later analyses of carbonized prehistoric bread from other localities in Sweden than Birka show, however, that here also the bread dough contained flour from speltoid wheats, even in somewhat higher frequency than in the bread loaves from Birka (fig. 10). Thus it is likely that these cereal sorts have been chosen just for bread baking.

For the comparative analysis (fig. 10) the frequency of each sort of cereal, present as bread ingredient, is measured in another way than through the analysis of plant macrofossils or through impressions in ceramics. Finds of cereals in bread are based on occurrence, but only one occurrence per bread is counted. An exact quantitative relation between the various cereals in the same bread loaf is difficult to measure.

The crucial differences emerging from any comparison between the Viking Age bread loaves from Birka and Björkö and those from other sites dated to the Late Iron Age (fig. 10), are the presence of flax (*Linum usitatissimum*) and vetches (*Vicia* sp.) in the bread loaves from Birka and Björkö, where also more oat flour and less barley flour was used for the dough. In classical texts flax with its fat content of c. 40%, was considered a high-status foodstuff and an important ingredient in bread. The low content of barley in the Birka loaves also points to finer bread than in the other Late Iron Age finds. Regarding the vetches, we do not know if the inmixing is deliberate or not. In Central Europe vetches were cultivated in prehistoric times while in Birka vetches might be a wild growing species.

There are large differences between bread found at Helgö, Ekerö par., Uppland (an island not far from Björkö), discovered in house structures from site V, radiocarbon-dated to the Early Iron Age, on the one hand, and the Birka bread and other Late Iron Age bread, on the other hand. None of the bread loaves from Helgö were threaded on metal filaments or had traces of rust (as far as could be discerned with the naked eye). Twenty of these

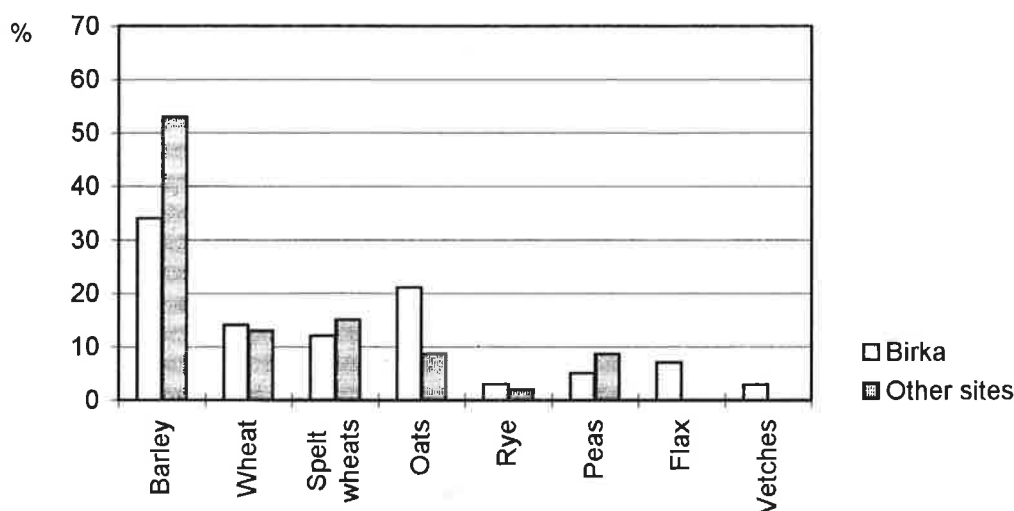


Figure 10. Identified ingredients in 33 bread loaves from Viking Age Birka (58 identified tissues) and in 27 bread loaves from various Late Iron Age sites in Sweden (47 identified tissues). Data from table 3, and Hjelmqvist 1984; 1990.

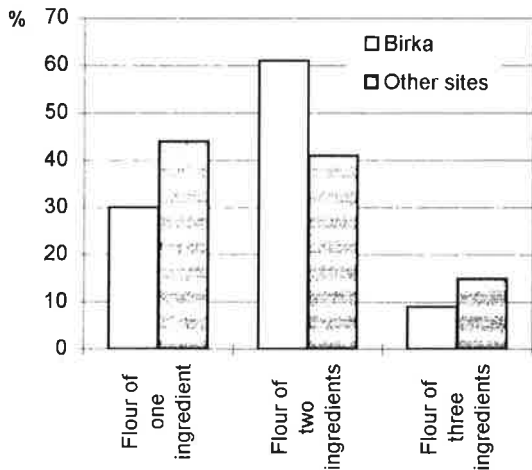


Figure 11. Bread loaves from Birka (33) and bread loaves from various Late Iron Age sites in Sweden (27) containing one, two or three ingredients.

bread loaves were analysed by Hakon Hjelmqvist. The ingredients differ from the ingredients of the bread found in Birka and on Björkö and also from other grave bread dated to the Late Iron Age. The bread from Helgö contained neither bread wheat, nor any speltoid wheats (especially bread wheat is considered a high-status cereal). Of the bread loaves, 17 contained hulled barley and oats, two of them barley, and one bread loaf oats and gold-of-pleasure (*Camelina sativa*). Pea flour was added to six of these bread loaves (Hjelmqvist 1984:271; Holmqvist & Arrhenius 1964:141ff). To use seeds of gold-of-pleasure in the diet is unusual during the Late Iron Age, or at least there are few finds of gold-of-pleasure from that period. This plant was more common as a field weed or in cultivation during the Early Iron Age. The lack of wheat in the bread loaves found at a settlement seem to point to a low-status or everyday bread.

Hakon Hjelmqvist has discussed the fact that different cereals sometimes together with peas and flax were so often included in the bread. The reason might be an improved baking quality, but also it may be that cereals were cultivated together. Oats and barley are not seldom found together as ingredients in bread (*Olaus Magnus* 1555, book 13, chapter 13). These cereals have similar cultivation demands neither of them are free-threshing. Thus, both oats and barley must be threshed in the same way. Similar conditions prevail for emmer wheat and einkorn (Hjelmqvist 1984:271). Bread baked from flour ground from cereals grown on the same field, most often oats and barley, even had a special name, "double-mix" (Sw: *tvebland*) (Campbell 1945:19). Right up to our own time, indeed, peas have been cultivated together with cereals (Hansson 1987:13).

When examining the ingredients in the grave-bread found in Birka and on Björkö, it was found that the majority (61%) of the analysed bread contained two ingredients. The majority (44%) of the analysed bread from other localities, dated to the Late Iron Age, contained

only one ingredient (fig. 11). This calculation should be understood only as a tendency as analyses of bread are difficult to perform, we also need more microscopical analyses of bread for comparative studies before we can draw any conclusions from such a study.

In the bread dough, there exist different ingredients, not only flour from cereals, peas and other seeds, but also liquid and perhaps other unknown substances like fat. A way to trace these unknown substances but also to test the microscopic analysis, is to make chemical analyses. Protein content and trace elements were therefore measured in the bread from Ormknös A and B. The protein content of the analysed bread lies within the measurements, earlier discussed, for charred prehistoric Swedish bread which contains no apparent inmixing of ingredients of animal origin and is *not* fermented (Hansson & Isaksson 1994:26; Hansson 1995a:46). The known nutritive substances in carbonized grave bread, the results of the protein, amino-acid, lipid (fat), copper, and zinc analyses have earlier been discussed, as well as the habit of mixing pea flour into the dough, which to a great degree raises the protein content (Hansson & Isaksson 1994; Hansson 1995a). In this case no fatty-acid analysis was carried out. Earlier analyses of bread found in grave Bj 1148a in Birka, and "bread" from Västergården (Site 6), Bergshammar parish, in the province of Södermanland, showed no traces of lipids. Isaksson suggests that "this might reflect post-excavational treatment and the long time-span since excavation." He says at the same time that "if the original lipid content was high, there ought at least to be traces in the sample of the more stable lipid classes, such as saturated fatty acids and waxes" (Hansson & Isaksson 1994:26).

There are very few protein analyses carried out on prehistoric bread loaves or other food remains. For the Nordic countries the samples are carbonized. But there are also analyses on seven Egyptian bread loaves dated to 2999–1449 BC, where the protein content varied between 1.8% and 2.7% (Leek 1973:203). Thus there is a difference, though not very large, in the amount of protein between prehistoric charred and dried bread remains.

Bread as symbol

Metal-threaded bread

A special detail worth mentioning is the metal filaments on which some of the bread loaves were threaded, made of iron, and in one case of bronze. To succeed in threading a bread on a metal string, the bread must have a viscous and soft consistency; if the bread is too hard and brittle it will crack. When the soft bread later dries and hardens, it sticks to the filament. Another possibility is that the dough is worked out, and at this stage a hole is made, the bread is then baked, and later it is threaded onto the metal filament through the hole made in advance. According to the drawing by O. Sörling (Hallström 1913:84) of the missing bread from Bj 97a it

is obvious that the hole in the bread is larger than the filament which suggests that the hole was made in advance. But most often it was not. In one of the bread loaves from grave Bj 1028b and the bread from grave Bj 173, the filament was threaded through the bread without making the hole in advance (Arbman 1940, Pl. 282). The viscous bread substance was pushed forward by the thread, creating an elevation on the upperside and a corresponding pit on the underside.

For some of the bread loaves one can only suspect that they were originally threaded. The iron is gone, destroyed by the rust, but there are still traces of rust on both the upper- and the underside of the loaf, marking the place where the filament was threaded through the bread. At least 15 of the loaves seem to have been provided with a metal string: bread from graves Bj 93a, 97a, 126, 172, 173 (two loaves), 181, 188, 391, 469 (three loaves), 996, 1028b (two loaves) (fig. 12).

There are three oval bread loaves, Bj 469, threaded together as a small bundle on an iron string. One can see that they were soft when threaded on the string together, as they have formed after each other. They must have been dried hanging, to judge from the straight form of the bread loaves.

However, it is surprising that these bread loaves were threaded on metal strings at all. To put them on any string must mean that they were going to be hung up and the hanging up must have had some function, for instance drying. Why was it then necessary to dry the bread loaves? Did the baking take place long in advance of the burial? Or is the bread's use as grave bread secondary? And why are *metal strings* chosen for the hanging up? Metal was an expensive material during the Viking Age; it would have been more natural to use for instance bast, an osier or a string of flax or hemp (the latter was found in the "Black Earth"). It is also astonishing that such relatively small bread loaves are threaded on metal filaments. Do these need to hang up for drying? Or was this a normal way of storing all bread loaves irrespective of size and form? One explanation is, that "festive bread loaves" have been baked in advance, and that these bread loaves have been kept and used for various festivities, and that it is exclusively these special "festive bread loaves", which have been hung up in this way. The metal strings, though, make this explanation rather implausible.

In later times a similar method was used in Österbotten, Finland. There it was common to bake a kind of unleavened rye bread in large, thin cakes, in which the hole was as large as the diameter of a thimble and placed near the edge. The cakes were then put together two by two with two wooden sticks, attached in the middle with a string, which was then hung up over the bread pole (Vilkuna 1939:179). This way of hanging up bread for drying was used across large areas of Finland. The string between the sticks often consisted of an osier. "In Lillkyro one of the sticks was pointed, thus it was possible to prick it as a needle through the fresh cake, and

there was no need to make a hole in advance. It is interesting that only the special, unusual and old-fashioned bread loaves were hung up in this way: in Nyland it was the Christmas bread, and in Österbotten it was the blood bread (Sw. *paltbröd*), prepared during the autumn slaughter. It is obvious that the oldest preparation process was retained, when drying bread, intended for Christmas and other special occasions." (Vilkuna 1939:180f, my transl.). These processes are suggestive for the bread from Birka, although here the loaves are not threaded two by two to hang up over a bread pole in the way Vilkuna describes.

One possible reason why the bread or the bread bundle was threaded on a metal string might be, that it was important that the string should survive the ritual cleaning fire of the pyre. This would make it easier to find the carbonized bread or bread bundle after the burning, enabling the bread loaves to be picked up and placed into or beside the grave urn.

Morphology and location in the grave

In Birka and on Björkö all bread loaves were deposited during the Viking Age, or a part of it (c. AD 750–975), a time period of c. 200 years and in spite of the relative contemporaneity the bread loaves show a variety of forms.

One bread loaf (Bj 171) is interpreted as a pretzel (fig. 12) (Arbman 1943:73), but it could as well have been formed as a spiral or the like. Spiral-formed bread was used in Ancient Egypt (Währen 1963:23), also, ring-formed bread was used during Classical Antiquity (Berg 1963). The actual bread fragment can be described as small, circular in cross section and slightly bent along its 2.7 cm length. The sectional diameter is 1.2 cm. Hansen mentions that pretzels seem not to have existed in Denmark in older times (Hansen 1954:182), and Berg claims that the pretzel belongs to urban culture (1963:63). Thus, it is not sure that this Birka bread loaf should be interpreted as a pretzel. In prehistoric times there were other symbols, for instance the triquetra and the triskele, which could form the basis of a bread loaf with the curved characteristics suggested by the Birka find.

Among the grave bread there is also a bread type, slightly resembling a four-leafed clover with indents and decorative impressions. Indents on bread are reported to have been common on traditional Scottish and Irish unleavened bread baked from oats or barley flour (Campbell 1950:116).

On Björkö and in Birka such decorative elements and the variety in bread forms strengthen the hypothesis that these bread loaves had a symbolic function as grave-gifts and therefore were looked upon as very special and valuable.

This conclusion is supported by the very close association between the bread loaves and the grave urn, which, as has been noted, suggests some important function for

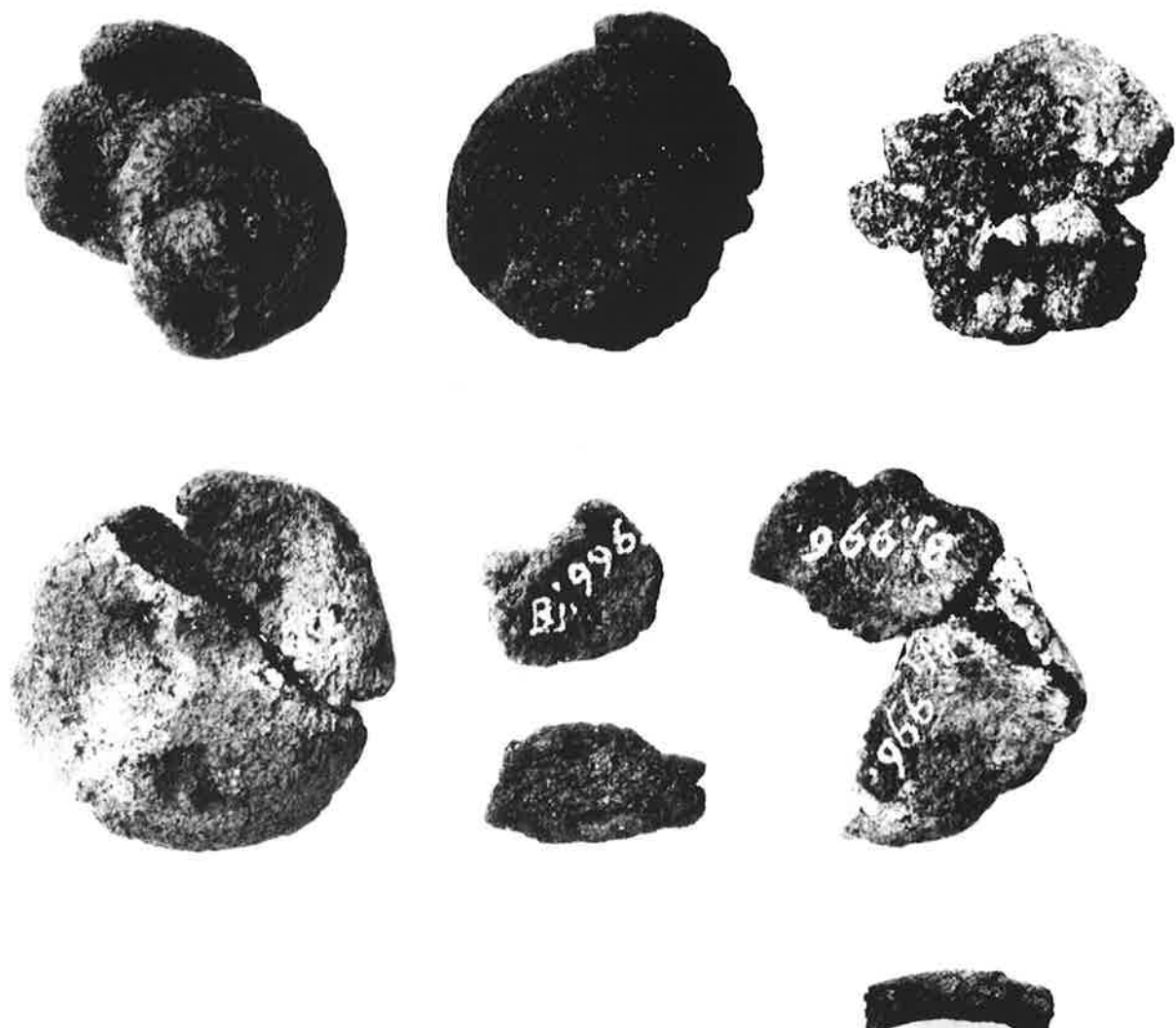
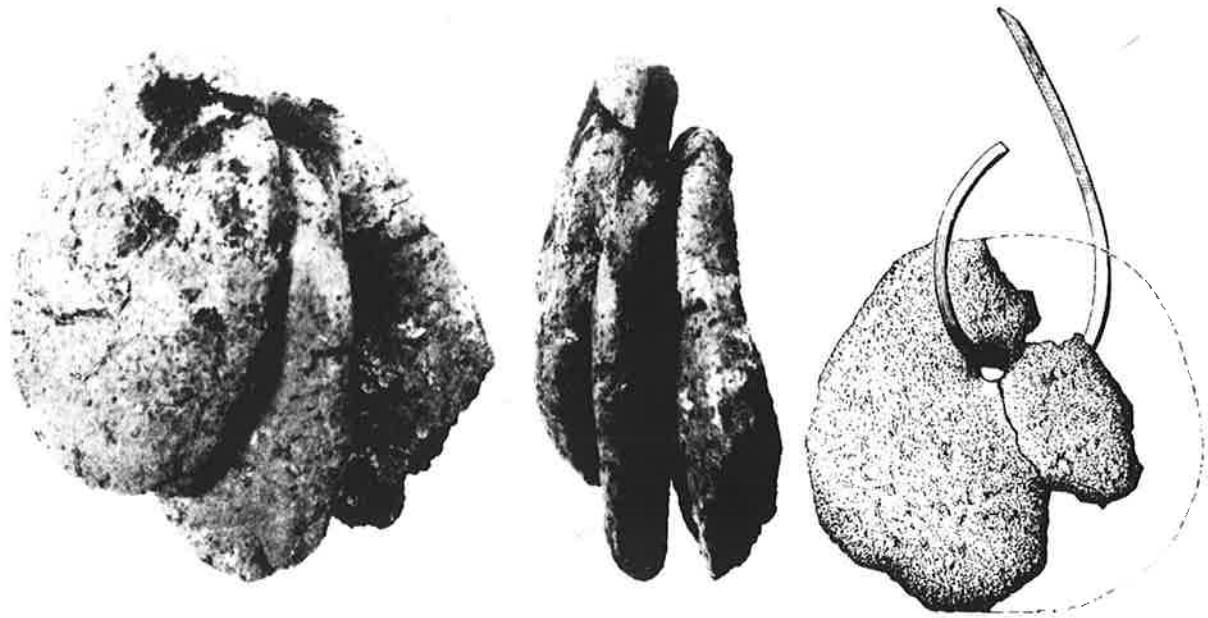


Figure 12. Bread from cremation graves at Birka , actual size. (Top, from left to right) Bj 1028, Bj 173, Bj 391, (above) Bj 996, (right) Bj 171, (below) Bj 469, (below, right) Bj 97. Photo ATA.



the bread in the burial ritual. In eleven of the cremation graves it is possible to link the bread loaves to the grave urn. In all of these graves (with the exception of Bj 65) a single large, thick-walled, ceramic vessel was found, in some cases broken. In those graves where bread was found in the cremation layer, the grave had often been disturbed, probably because of secondary burials. Here also it seems likely that the bread loaves were placed in or near the grave urn originally.

Broadly established traditions

The probable symbolic function of the bread in the Björkö graves, would follow very widely established traditions. Cereals and bread, independent of form, had a deep symbolic significance already during the archaic Sumerian era some thousands of years ago; for the Sumerians bread = > food = > life (Währen 1967).

In Egypt, the hieroglyph denoting food shows a stylized head with a line representing a mouth; beside the head is a triangle, a sign for bread. Thus mouth and bread together mean food (Währen 1967). One could also say that life itself was symbolized through cereal and bread meaning fertility and rebirth: “[Bread] symbolizes the light of the sun and the great luminous spaces intimately linked with the power to fend off the forces of darkness, the underworld, death. Sunlight, symbolized by bread, magically fecundates the earth. Likewise woman is magically fertilized by the male “seed”, as the vegetable seed fertilizes the earth.... Bread is a symbol of life in perpetual regeneration, of the reproductive principle (seed), of the continuity of existence...” (Camporesi 1993:15). Eliade in his study of patterns in comparative religions explains the connection between cereals (bread) and the dead: “... agriculture is pre-eminently a handling of fertility, of life reproducing itself by growth; and the dead are specially drawn by this mystery of rebirth. Like seeds buried in the womb of the earth, the dead wait for their return to life in their new form” (1958:350).

Christianity, which adopted and expanded this rich system of symbols gave bread the central role in the Sharing of the Eucharist, the very foundation of Christian worship (Muller 1995:8f). For the wafer dough only flour from the finest, most superior cereal, bread wheat, could be used.

Swedish written records show that the form and content of bread varied depending on the time of year, and various feastdays, and the different functions for which it was baked (Campbell 1950; Olsson 1958). Some of the bread loaves were considered to possess magic power, they could cure illness, promote fertility or could invoke blessings on people, domestic animals and crops. Examples of this tradition in written sources are innumerable (Hammarstedt 1895). The Icelandic saga *Heimskringla* describes Odin laying his hands on the heads of his men and giving them “bjanak”, when he sent them out in war or on other errands (*Heimskringla*, ed. Olason 1946:6).

Rydberg claims that the word “bjanak” could be the same as the Scottish-English word “bannock” and the Gaelic “banagh”, meaning bread (1886:70). Certain caution should be used when interpreting this description; it could be a later Christian insertion, and a number of alternative interpretations are possible.

At a general level, then, bread has frequently been used in a symbolic way. The question here is what specific function it served in the graves on Björkö and in Birka. This can be inferred by the other tokens placed in the graves, also in association with the grave urn, which indicate the themes celebrated in these burials.

In cases where the content of the grave urns can be ascertained they appear to have contained burned bones and specific varieties of grave-gifts. Eggshells and bones from a cock, hen or a chicken have been found in some of the grave urns in Birka, and in some cases the bird appears to have been deposited unburned on top of the grave urn after cremation. In the “bread graves” however, any hen or cock bones discovered have been burned and there are no traces of eggs having been deposited. The egg has been interpreted as a symbol of resurrection or regeneration, and in cases where the bird appears to have been placed unburned above the grave urn, its symbolic meaning may be the same (Arbman 1946:73ff). Alternatively some sources mention that a cock could symbolize watchfulness. As far as grave-gifts are concerned, Thor’s hammer rings made of iron have been discovered in the graves, mostly cremation graves, nine of them “bread graves” (table 1), as have metal pendants in the form of Thor’s hammers, “strike-a-lights” and shields (Arrhenius 1961). The “strike-a-light”, signifying life-giving and purifying fire, and the shield, decorated with a whorl pattern as a sun symbol, are generally associated with ideas of fertility (Gräslund 1992:190f). It is also sometimes suggested that the god Thor is associated with crops and harvest (Tegnér 1981:172). Taken as a whole, then, these other grave deposits suggest a symbolic significance for the grave bread discovered in the cremation graves linked to themes of fertility and regeneration, which is also expressed in the widely established symbolism for bread.

Conclusions

What factor determined the distribution of Viking Age bread? First is the cremation itself. Without a burning, bread would not survive at all, and the distribution would be impossible to trace; therefore all inhumation graves are excluded in this examination. The prehistoric carbonized loaves are often in a fragmentary condition and resemble pieces of charcoal; they are thus difficult to observe, which suggests that bread may be present more often than the finds suggest. The distribution was examined on three different levels, with the following results:

- In addition to the cremation graves in central Sweden, and especially Birka, grave bread also occurs on the

Finnish island of Åland, and a few bread loaves are known from graves and other contexts with Scandinavian impact in Latvia and in Russia. Up to a point the distribution of bread and Thor's hammer rings corresponds. It is suggested that the distribution of bread here is linked to the cultural tradition prevailing in eastern central Sweden.

- At least 64 bread loaves have been found spread through 48 (8%) of the excavated cremation graves. In Birka and on Björkö, graves containing bread together with other grave-gifts indicating wealth occurred more often (42%) than in the total amount of cremation graves (20%). Both men, women and a child received bread as grave-gifts. The distribution factor of bread loaves in Birka and on Björkö might be determined by wealth and not by sex or age. There could also be other determining factors not yet found.

The fragmented bread loaves from the cemeteries at Björkö are difficult to compare to the bread loaves connected to the Birka-complex, but no decisive difference in size, morphology and content can be observed. It seems that both the bread from the cremation graves at Birka and on Björkö formed a part of a common funeral tradition during this period.

- In the graves, the bread was most often placed in or beside the grave urn, which might point to a symbolic act. Thus, here it seems that the determining factor for the distribution was the function.

Where were the bread loaves baked – for the living and for the dead – in a “town bakery” or at the domestic hearth? “Town bakeries” in the modern sense are not likely to have existed in Birka, but certain families with a high social rank could very well have had a special person skilled at baking, linked to their house. There must, however, have been a distinction made between bread for the living and bread for the dead. Most probably the grave bread was prepared at the domestic hearth.

Both the cereal and bread had symbolic meaning. Some of the carbonized bread loaves in the cremation graves in Birka and on Björkö have quite special morphology and are threaded on metal filaments and possibly also baked from choice cereals. The placing of these bread loaves in or beside the grave urn together with grave-gifts bearing a very distinct symbolic meaning give the bread a strong ritual character. It is likely that the grave bread here indicates fertility and regeneration which is shown very early in the broad cultural tradition.

This survey of the prehistoric carbonized bread in Birka and on Björkö has focused only on certain details. But the survey has also generated new questions, which must be discussed in the near future. The analysis of carbonized bread will contribute to a growing awareness of the existence of bread as a deposit to be observed in excavations. Once bread is on the menu of items to be searched for, it seems likely that the number of finds may increase dramatically. This should enable progress to be made, not only in analysing the role of bread as a deposit

in burials, but on the more general level of understanding the diet of the living in the Vendel and Viking Periods.

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