

Diet, Cooking and Cosmology

Interpreting the Evidence from Bronze Age Plant Macrofossils

Peter Skoglund

The aim of the article is to discuss how the composition of Bronze Age macrofossil samples reflects different aspects of daily life like diet and cooking. The article argues that the increasing weed content in the Late Bronze Age macrofossil samples should partly be regarded as a new resource that was used in the cooking process. The contemporaneous increase in hulled barley at the expense of naked barley and wheat, might reflect a diminished interest in baking leavened bread and a stronger preference for cooked cereal-based dishes. These changes in the domestic sphere should be regarded as intimately connected with changes in the Late Bronze Age cosmology, in particular with the development of the Urnfield culture.

Peter Skoglund, Smålands museum, Box 102, SE-351 04 Växjö, Sweden.

INTRODUCTION

The aim of this article is to discuss how the Bronze Age macrofossil samples can be regarded as a cultural phenomenon, intimately linked to choices and decisions made in connection with the cooking process. From this point of view the macrofossil samples demonstrate different aspects of cultural traditions, for example, the type of plant food that could be eaten and how to prepare the cereal-based dishes. I will also argue that the composition of the macrofossil samples is part of an ideology expressing the cosmology of the Urnfield culture.

During the last ten years changes in the composition of Bronze Age macrofossil samples from southern and central Sweden have been discussed intensively. The debate has focused on how the changing composition of the macrofossil samples may reflect alterations in the agricultural system (Engelmark 1992; Gustavsson 1995, 1998).

The Ystad project that was concluded around the year 1990 demonstrated that there was a change in the cultivated crops at the transition between the Early and the Late Bronze Age. During the Early Bronze Age emmer, *Triticum diococcum*, spelt wheat, *Triticum spelta*, small spelt, *Triticum monococcum*, and naked barley, *Hordeum vulgare var. nudum*, were the most common plants to be grown. This changed during the Late Bronze Age when the speltoid wheats and the naked barley began to decrease and hulled barley, *Hordeum vulgare var. vulgare*, became the dominating crop. In the Late Bronze Age also new crops like oat, *Avena sp.*, millet, *Panicum miliaceum*, flax, *Linum usitatissimum*, and gold of pleasure, *Camelina sativa*, were introduced in small amounts (Engelmark 1992:371ff; Gustavsson 1998:66ff).

About this time the weeds also started to increase, in particular fat hen, *Chenopodium album*. The strong predominance of fat hen

has been explained as a result of the introduction of manured cultivation. Fat hen has a great demand for nitrogen and can therefore be seen as an indicator of manuring (Engelmark 1992:372; Gustavsson 1998:67). The change from naked barley to hulled barley has been given a similar interpretation. Hulled barley is thought to have greater requirements for easily soluble nutrients, especially nitrogen, and is thus benefitted by manuring (Engelmark 1992:372; Gustavsson 1998:67f).

Against this, Per Lagerås and Mats Regnell have questioned whether the change in the agricultural system was as dramatic as has been proposed. They have argued that there is no straightforward connection between the occurrence of hulled barley and fat hen on the one side, and the introduction of manured fields on the other (Lagerås & Regnell 1999).

Common to the debate concerning Bronze Age macrofossil samples is an interest in those activities that took place in the field. Little interest has been paid to the activities carried out around the hearth. Therefore, I will argue that there is a need for a broader debate. Issues like diet, cooking and cosmology are important factors if one wants to understand the changing composition of the macrofossil samples. In the following these matters will be touched upon.

DIET

The Danish scholar Hans Helbæk wrote in the 1950s several articles in which he stressed diet as an important factor, if one wants to

understand the composition of the macrofossil samples (Helbæk 1951a, 1951b, 1955, 1958). Helbæk argued that the weed seeds were intentionally collected and used in the cooking process. He proposed that harvesting was carried out with a sickle, that only the ears of the cereals were cut, and that the weeds were avoided. Thereafter the fields were fallowed and the weeds were intentionally collected in the fallowed fields (Helbæk 1958:107).

Contrary to this, Karin Viklund has stressed the importance of the cleaning process (Viklund 1998). She proposes that the crop was cut close to the ground, in a way that resulted in a mix of cereals and weeds (Viklund 1998:40ff). To get a clean cereal product that could be used for consumption and seed corn, the harvest had to undergo a series of threshing and cleaning processes. The purpose of cleaning was to separate the weeds and chaff from the threshed grains (Viklund 1998:60ff).

The cleaning could be carried out in different ways (Viklund 1998:60ff). To "winnow" meant that the mixture of grains, chaff and weeds that was left after the threshing, was placed in a winnowing-through and tossed in the air. By this action the lighter particles, like chaff and most of the weed seeds, blew away and the heavier grains and weed seeds fell back on the floor. Pouring the cereals from one container into another, outdoors in the wind, would give a similar result. Threshed cereals could also be flung by using a shovel. The lighter chaff and seeds were deposited closest to the person, while

by threshing the crop was separated into:	by cleaning the threshed grains were separated into:	the different products obtained by threshing and cleaning were used as:
threshed grain	heavy grain	seed corn
threshed grain	mid-grain and light-grain	ordinary food
threshed grain	light-grain and weed seeds	food in years of bad harvest and animal food
threshed grain	chaff	food in years of bad harvest and animal food
threshed straw		animal food

Table 1. Different kinds of products obtained by threshing and cleaning (after Viklund 1998:105f).

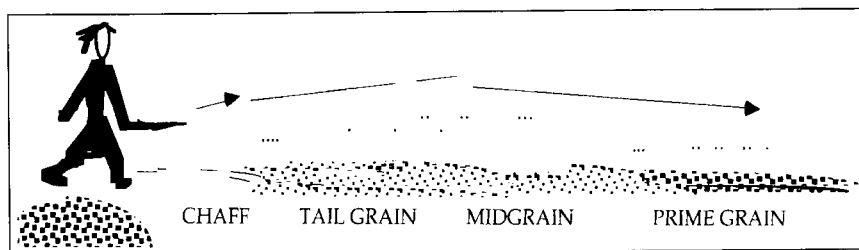


Fig. 1. Flinging implies cleaning the threshed grain from weed seeds and chaff and at the same time separating the cereal grain into sub-groups of different quality (after Viklund 1998:63).

the heavier particles ended up at some distance away (fig. 1). To improve the cleaning winnowing, pouring and flinging could be combined with sieving.

According to Viklund, the different kinds of products that were obtained by the cleaning processes were stored separately and used differently. The different kinds of products are listed in table 1.

A find that has been discussed both by Helbæk and by Viklund is the macrofossil samples from the Early Iron Age settlement at Vallhagar on Gotland (Helbæk 1955:690ff; Viklund 1998:56ff). At Vallhagar five substantial finds of macrofossils were made inside three different houses. The content of the samples varied between 0.02 and 1.1 litres. In three of the samples the components were different kinds of grains, while the other two samples contained grains mixed with various kinds of weed seeds.

The variable character of the samples from Vallhagar has also been discussed by Stig Welinder (Welinder 1992). He argues that the samples contain weed seeds from both short and tall growing species as well as weed seeds from both early and late flowering species. According to Stig Welinder, this means that the weeds were not harvested together with the cereals (Welinder 1992:114). Neither could the seeds have been sorted by flinging. Different fractions of weed seeds are joined together in a way that could not be a result of the flinging (Welinder 1992:114).

Helbæk and Welinder conclude that the

weed seeds have been intentionally added to the cereals. An example of this is the burned-down house No. 11, where two finds of macrofossils were made. One of the samples was totally devoid of weeds while the other contained 1093 weed seeds, which is one weed seed for every 0.1 cc of grain. This sample was found in a small wooden tub, indicating that it was about to be prepared and eaten about the time of the conflagration, whereas the other sample was found on the floor without any indication of its place in the domestic process (Helbæk 1955:690ff; Welinder 1992:114).

Contrary to Helbæk and Welinder, Viklund suggests that the sample from house No. 11 that contains weed seeds, represents a threshed cereal sample which has not yet been cleaned (Viklund 1998:56ff). If the crop was cut close to the ground and had not yet been cleaned, this would explain the high proportion of weed seeds. According to Viklund, the wooden tub that stored the seeds is similar in shape to the winnowing-through known from historical times. Thereby the find probably represents a vessel of seeds that was about to be winnowed at the time of the conflagration. The other macrofossil sample in house No. 11, which was totally devoid of weed seeds, might represent a product where the cleaning had just been finished.

Another find, also containing a lot of weed seeds, was made at Gørding in Denmark in 1949 (Helbæk 1951a). From a burned-down settlement, dated to the pre-Roman Iron Age,

a jar with a volume of about one litre was found. The jar was complete and identical to those jars found in contemporaneous graves. The size of the jar and the find context suggest that it is not a storage vessel, but a jar used in the cooking process. The jar contained 95 cc of cereals and weed seeds (table 2).

Species	Amount
Hulled barley <i>Hordeum vulgare</i> <i>var. nudum</i>	65 cc
Fat hen <i>Chenopodium album</i>	18 cc
Black bindweed <i>Polygonum convolvulus</i>	7 cc
Pale persicaria <i>Polygonum lapathifolium</i>	1 cc
Corn spurrey <i>Spergula Arvensis</i>	2 cc

Table 2. The main components of the Gørding find. In addition to the main components, 17 species were represented with 1–16 seeds, which makes a total of a further 86 seeds (after Helbæk 1951a:68).

The main contents were naked barley, fat hen, black bindweed, *Polygonum convolvulus*, pale persicaria, *Polygonum lapathifolium*, and corn spurrey, *Spergula arvensis*. In addition to these seeds the jar also contained small amounts of a further 17 species. Helbæk proposes that the high proportion of fat hen, black bindweed and corn spurrey means that these species have been intentionally collected, and thereafter used in the cooking process (Helbæk 1951a:68ff).

The Gørding find has also been discussed by Viklund, who argues that the plant material could be interpreted in terms of selection, a product obtained by cleaning the crop (Viklund 1998:78). The length, breadth and thickness of the grains indicate that it is a cleaned fraction from which the biggest, and perhaps also the smallest, grains have been removed. The abundance of the rather large seeds of black bindweed suggests that it does not represent a sieved fraction. Since the size

of the grain is so restricted, the sample probably represents a product obtained by flinging, probably tail grain or mid-grain.

Viklund's idea, that the weeds were harvested together with the cereals, and that weeds and cereals were thereafter sorted in different manners, seems quite convincing. At the same time, I would argue that it is possible to combine this notion with Helbæk's idea, that finds containing a lot of weeds were sometimes meant to be eaten.

This idea could be further elaborated by discussing the stomach contents of the Danish bog corpses, most of which are dated to the Late Bronze Age and pre-Roman Iron Age. There are of course several problems involved in using the bog corpses for creating a general picture of Late Bronze Age and Early Iron Age diet. The circumstances surrounding their death are unclear. Most scholars would argue that they are either victims that have been executed or persons that have been sacrificed (Glob 1969; Munksgaard 1984; Thorvildsen 1952).

These interpretations, together with the find circumstances, have favoured the idea that they are odd and spectacular finds, and that they could not be used for general conclusions. For example, the Danish archaeologist P. V. Glob argued that the bog corpses have been sacrificed, and that their stomach contents represent special meals eaten just before the sacrifices (Glob 1969:140). However, Helbæk, who studied the stomach contents of the Tollund man and the Grauballe man, was convinced that the macrofossils found in the stomachs of these bog corpses reflected normal meals. He came to that conclusion by comparing the stomach contents with the composition of macrofossil samples from contemporaneous Early Iron Age sites (Helbæk 1951b:325ff, 1958:106ff).

A common feature for the stomach contents of those three Danish bog corpses that have undergone a careful examination, is the dominance of vegetarian food. The stomachs contained a broad spectrum of seeds including

a high proportion of weeds (Brandt 1951; Helbæk 1951b, 1958). The stomachs of the Tollund man and the Borremose man contained seeds from about 20 different species respectively, while the stomach of the Grauballe man contained seeds from about 60 different species.

In the stomach of the Tollund man the bulk contents were seeds from hulled barley, flax and black bindweed (and others from the same genera) *Polygonum sp.*, mixed with small amounts of gold of pleasure, fat hen, corn spurrey and field pansy, *Viola arvensis* (Helbæk 1951b, 1958). The main ingredients in the last supper of the Grauballe man were seeds from hulled barley, black bindweed (and others from the same genera), and soft brome, *Bromus hordeaceus*, mixed with small amounts of wheat, oat, fat hen, corn spurrey, sheep's sorrel, perennial rye-grass, *Lolium perenne*, Yorkshire-fog, *Holcus lanatus*, ribwort plantain, *Plantago lanceolata*, and greater plantain, *Plantago major*. The stomach also contained small amounts of animal fat (Helbæk 1958). The last supper of the Borremose man was composed of seeds from black bindweed (and others from the same genera) and corn spurrey mixed with fat hen, sheep's sorrel and Yorkshire-fog (and others from the same genera), *Holcus sp.* (Brandt 1951).

Helbæk concludes that the last supper of the three bog men seems to have been a gruel or porridge based on cereals and weed seeds mixed with some fat. The fat in the porridge of the Tollund man was vegetarian fat, while the fat in the porridge of the Grauballe man was animal fat (Helbæk 1958:106).

The stomach contents of the bog corpses have also been discussed by Jimmy Jonsson (Jonsson 1991). He argues that the bog men's last suppers were made of flung seeds, like the tail grain or the mid-grain that often contain weed seeds and chaff. The composition of these fractions seems quite similar to the mixture of chaff, weed seeds and grains that were found in the stomachs of the bog

corpses (Jonsson 1991:24ff). Another alternative is that the seeds found in the stomachs had been winnowed. By repeating the winnowing it is quite easy to remove the chaff. Since the stomachs of the bog corpses contain chaff, it is reasonable that the seeds had only been winnowed once or twice. Jonsson concludes that the bog men had eaten dishes made of seeds that were badly cleaned (Jonsson 1991:19ff).

It has been suggested that weed seeds and chaff were only mixed with cereals in years of bad harvest or during famine years (Engelmark 1992:373; Rowley-Conwy 1988:189; Viklund 1998:105). However, Jimmy Jonsson, who studied a total of eight North-European bog corpses, concluded that seven out of eight stomachs contained high proportions of weed seeds and six out of eight stomachs contained chaff. It does not seem probable that all these persons should have died in a famine year (Jonsson 1991:35). It is more likely that people did not care very much whether the food contained some weed seeds and chaff. From historical times it is well known that peasants added weed seeds and chaff to the meal, to make the stored seed last longer. This was not only done in years of bad harvest but also in ordinary years (Keyland 1989:111ff).

The stomach contents of the bog corpses favour the idea that people did not only eat the cleaned products, but also the fractions made up of a mixture of grains, weed seeds and chaff. Therefore, returning to the Gørding find, it is quite possible that it represents a flung fraction as has been proposed by Viklund. According to the interpretations made above, such flung fractions were sometimes eaten. Maybe Helbæk was right in thinking that the seeds in the jar from Gørding were about to be cooked at the time of the conflagration.

Macrofossil samples from settlement sites demonstrate that an increasing amount of weeds were brought into the houses during the Late Bronze Age. This meant that they

Species	Free-threshing	Contains gluten
Emmer <i>Triticum diococcum</i>		X
Spelt wheat <i>Triticum spelta</i>		X
Small spelt <i>Triticum monococcum</i>		X
Naked barley <i>Hordeum vulgare var. nudum</i>	X	
Hulled barley <i>Hordeum vulgare var. vulgare</i>		

Table 3. Different kinds of wheat and barley and their characteristics according to the threshing process and the gluten content (after Hansson 1997:II:10; Helbæk 1951b:313, 1958:89ff).

became part of the domestic sphere. Hereby the households got a resource that could be used in the cooking process. How often this was done, and under which circumstances weeds were used in the cooking process, is impossible to estimate. However, the weed seeds and chaff found in the stomachs of the bog corpses, strongly indicate that it was acceptable to use these products in the cooking process.

Weeds are rarely found at settlements from the Neolithic and the Early Bronze Age, which indicates that in those days weeds were not used in the cooking process. Therefore it seems as if people's attitude towards what was possible to eat, and what was not possible to eat, changed at the transition between the Early and the Late Bronze Age. In the Late Bronze Age it became possible to use a broader spectrum of different kinds of harvested seeds in the cooking process. In the next chapter the cooking process will be further discussed.

COOKING

At the transition from the Early to the Late Bronze Age several changes took place in the composition of the cereals. The speltoid wheats decreased, the naked barley was replaced by hulled barley, and finally new crops like flax, oat, millet and gold of pleasure were introduced (Engelmark 1992; Gustavsson 1995, 1998). It seems reasonable to regard these changes in the macrofossil samples as partly due to choices and decisions made in connection with the cooking process. The

variable character of the plants does make it possible to discuss how the choice of different plants may have affected the cooking process.

Bread that is to be yeast-leavened must be baked with wheat which contains gluten (Hansson 1997:II:10). Barley, oat and millet contain far too little gluten, which in any case is of the wrong chemical composition, to produce the high, light and spongy bread that is baked from wheat-flour (table 3). Since wheat was in process in the Neolithic and the Early Bronze Age, leavened bread could have been baked by mixing flour from wheat with flour from other cereals.

Leavened bread requires uniform heating and space to expand, which could be attained by using an oven. Since no ovens have yet been found in Neolithic and Bronze Age contexts, it has been assumed that leavened bread was not baked in those days (Viklund 1998:143f). However, leavened bread does not necessarily require an oven; it could also be baked in a jar. In the Faeroes in the 19th century' leavened bread was baked in an iron jar placed at the fire (Campbell 1950:7ff). It seems probable that leavened bread could have been baked in jars, or in simple ovens, that have left no significant archaeological traces.

It has also been argued that the speltoid wheats are hard-threshed, and therefore were roasted to facilitate the separation of the chaff from the grains (table 3) (Hansson 1997:II:10). When roasted and heated the gluten proteins lose their elasticity and cannot work in the leavening process. An alternative way of

separating the chaff from the grains would, however, be to crush the grains and thereafter separate the grains from the chaff.

There is no clear evidence that leavened bread was baked during the Neolithic and the Early Bronze Age. However, I would argue, the fact that wheat was in process strongly indicates that leavened bread was baked. But, if too many other ingredients than wheat-flour were added, the leavened wheaten bread might not rise (Hansson 1997:II:12). The change from cultivating both wheat and barley, towards a predominance for barley, could therefore be interpreted as reflecting a diminished interest in baking leavened bread and a stronger preference for baking unleavened bread or making cooked cereal-based dishes.

Ann-Marie Hansson has listed three kinds of cereal-based dishes that were in process during prehistoric times; grain-paste, porridge and bread (Hansson 1997:II:5ff). Grain-paste and porridge are similar dishes prepared from whole, crushed or partly ground cereals. The difference between the dishes is that grain-paste is not cooked but porridge is always cooked. Bread differs from grain-paste and porridge in that the cereals that constitute the bread are ground and thereafter roasted or baked (table 4).

When making porridge one can avoid the labour-demanding grinding process and instead crush the cereals at a grain-stamp (fig. 2). Before the water mill was invented, grinding was a very labour-demanding process. Eighteenth-century records from the Faeroes say that one person had to grind a whole day to make enough flour to satisfy the

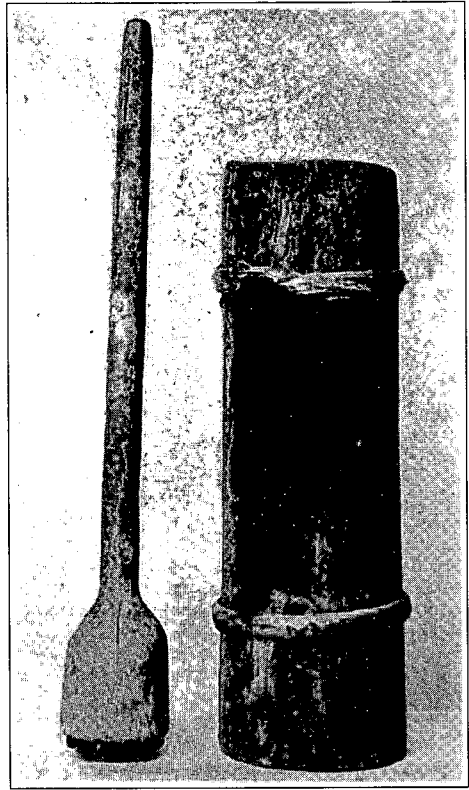


Fig. 2. Grain-stamp from Åsele parish, Lappland. It has been suggested that similar grain-stamps were used during prehistoric times. The vessel is 67 cm high (after Keyland 1989:135).

needs of the household (Campbell 1951:10ff). Even though these numbers are exaggerated, there is no doubt that grinding was the most labour-demanding part of the domestic process. In 19th-century Sweden it was common to make porridge of whole or crushed cereals. The hardness of the crushed cereals was compensated by letting the

	Grain-paste	Porridge	Bread
Treatment of the cereals	whole, crushed or partly ground	whole, crushed or partly ground	ground
Treatment of the dish	not cooked	cooked	roasted or baked
Temperature		100 C	200–300 C

Table 4. The main differences between the prehistoric cereal-based dishes (after Hansson 1997:II:5ff).

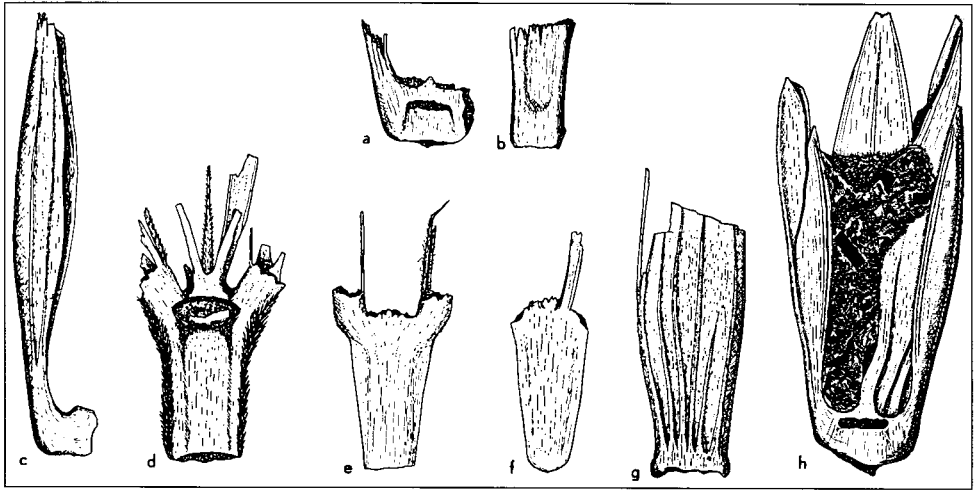


Fig. 3. (10 X) Different kinds of chaff and pieces of ears of wheat and barley found inside the stomach of the Borremose man (after Helbæk 1958:90).

porridge cook for several hours (Hansson 1997:II:7). Hereby the cereals got soft and a lot of grinding work was saved. The increase in barley at the expense of wheat at the transition from the Early to the Late Bronze Age might therefore reflect a more intensive use of cereal-based dishes – labour was now saved by crushing and cooking the kernels instead of baking leavened bread where the kernels had to be ground.

Perhaps the replacement of naked barley by hulled barley partly could have been due to an expansion of cooked cereal-based dishes. When threshing hulled barley, the kernel sometimes stays close to the chaff and the ears (table 3). In this respect naked barley differs from hulled barley. Naked barley readily parts from its chaff. It seems possible that the introduction of hulled barley, at the expense of naked barley, reflects a stronger preference for crushed and cooked cereal-based dishes, where the hardness of the chaff could be compensated by extending the cooking time. It is worth noting that the remains of the porridges found in the stomachs of the Tollund man and the Grauballe man contained several pieces of ears and chaff from wheat and hulled barley (fig. 3).

If there was a decreased interest in grinding the kernels to get a fine meal, one probably stopped favouring the free-threshed naked barley, and as time went by hulled barley came to dominate. A gradual change fits well with the fact that there are regional variations in the replacement of naked barley with hulled barley. In south Sweden this change took place at the transition from the Early to the Late Bronze Age, while in Denmark the same change occurred in the Roman Iron Age (Lagerås & Regnell 1999).

At the transition from the Early to the Late Bronze Age flax and gold of pleasure were introduced. These species should be regarded as new and important ingredients in the Late Bronze Age diet. Flax and gold of pleasure are very rich in fat compared with the cereals. Cereals contain 1–7% fat, while the oil content of flax and gold of pleasure could be estimated to 30–40% (Hansson 1997:48). When flax and gold of pleasure started to be cultivated in monoculture at the transition from the Early to the Late Bronze Age, this meant that they were desired crops, probably for their oil content (Hansson 1997:48). The introduction of flax and gold of pleasure favours the idea that it became more common

to make fat cereal-based dishes. Fat is the most concentrated source of food energy, and the introduction of new species rich in fat indicates that people's need for fat now to a greater extent than before was being satisfied by vegetarian fat.

To summarise, it seems possible that the changes in the macrofossil samples – i.e. the decreasing amount of wheat, the replacement of naked barley by hulled barley and the introduction of new crops – reflect a greater interest in making fat cereal-based dishes where the cereals were crushed and thereafter cooked. In the next chapter I will argue that the above-discussed changes should be seen as part of the changes in the North-European Bronze Age society.

COSMOLOGY

Contrary to the replacement of naked barley by hulled barley, which is due to regional variations, the introduction of oat, millet, flax and gold of pleasure seems to be a synchronous phenomenon in northern Europe at the transition from the Early to the Late Bronze Age. These plants have been documented in small amounts earlier, but it was now they became a substantial part of the cultivated crop (Harding 1989:174ff). This phenomenon could therefore be associated with the introduction of the Urnfield culture in northern Europe.

As Harry Fokkens has stressed, the introduction of the Urnfield culture should be seen not only as an economic and religious change, but as a change also involving the social organisation of society. A general decrease in the size of the houses has been interpreted as a change from multiple family households to nuclear family households (Fokkens 1997; Karlenby 1994; Skoglund 1999). These general changes in the size of the houses are highlighted at the Apalle site in central Sweden. This site offers a unique chance to study how the social organisation, and the organisation of the cooking process, changed at the transition from the Early to the Late

Bronze Age (Ullén 1994).

During the early settlement phase, 1200–1000 BC, the houses were longer than during the later phase of the settlement, 800–700 BC. The earlier houses were usually divided into two rooms, one larger and one smaller. The larger room was the entrance room, and here most of the artefacts were found. The entrance room never had a hearth. A shallow hearth was found in the inner room of the house. The main use of this hearth was probably for heating. Cooking seems to have taken place outside the houses, where several big cooking pits were found. Central at the settlement were also two heaps of fire-cracked stones surrounded by houses of the earlier period (Ullén 1994:252ff).

This picture changed during the later settlement phase, 800–700 BC. The houses were now built smaller and there was no clear room division. The hearth was made deeper than before and placed in the middle of the house. The centrality of the hearth is underlined by the fact that most of the finds occurred in connection to the hearth. Changes also took place outside the houses. The cooking pits disappeared, and the heaps of fire-cracked stones were replaced by six smaller refuse piles (Ullén 1994:252ff).

During the early phase, cooking was probably carried out by several households together outdoors, separated from the activities that took place indoors. In the later phase, cooking probably became a matter for the individual household and moved indoors. The hearth was made deeper and became a central gathering point in the houses. The cooking process was now combined with other daily activities that took place around the hearth (fig. 4).

As John Barrett has pointed out, there is usually a connection between ritual and everyday life (Barrett 1991:4ff). By metaphorical associations the everyday values are transformed into timeless truths, and when these values are recreated in ritual, they seem to derive from another timeless world.

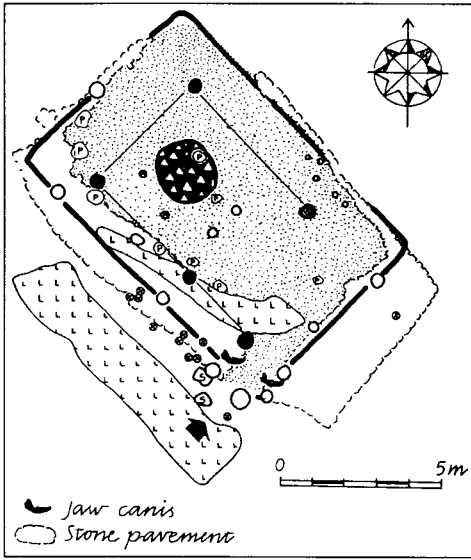


Fig. 4. House No. 2 from the late settlement phase at the Apalle site. The hearth is placed in the centre of the building, and here most of the finds were made (after Ullén 1994:256).

At the transition from the Early to the Late Bronze Age cremation was introduced. Several interpretations have been put forward concerning the purpose of cremation (Gräslund 1983, 1989, 1994). Often it is suggested that the use of fire helped to separate the soul from the body. The central position of the hearth in the Late Bronze Age houses at Apalle, might be connected with the central role of fire in the Late Bronze Age rituals concerning death. This is underlined by the fact that quern-stones and cooking vessels are artefacts often found both at settlements and in graves from the Late Bronze Age. Thereby they reconcile the differences between the domestic sphere and the rituals concerning death. The quern-stones found in graves are often complete and were probably put in the graves intentionally (Kaliff 1997:88ff). Pottery found in graves often contains organic materials. Sometimes the vessels containing the organic materials have been used to store the cremated bones of the dead person. Anders Kaliff has suggested that this reflects the

tradition of using ordinary cooking vessels as containers for the cremated bones (Kaliff 1997:101f).

It seems as if tools connected with the activities carried out around the hearth, also were used in the rituals performed at the cemetery. This is probably due to the way of conceptualising the world, using daily-life concepts while thinking of religious matters or *vice versa*. Using a structuralistic view, it is possible to argue that the transformation of the seeds – by crushing, grinding and then cooking them in a jar in the fire – could have been associated with the treatment of the dead person, the cremation of the body and the burial of the bones in an urn (Kaliff 1997:88; Skoglund 1996:25f). The microcosmos – represented by the house and the hearth – was thereby associated with the macrocosmos (Burström 1995:166ff; Leach 1976:60f). From this point of view, the house-urn is a metaphorical expression that stresses the connections between the activities carried out around the hearth in the house, and the rituals performed in connection with the cremation at the cemetery (fig. 5).

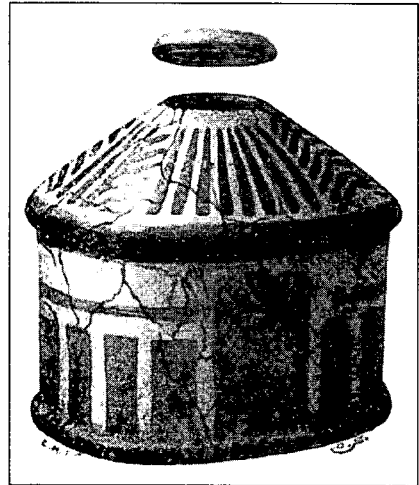


Fig. 5. The house-urn is a metaphorical expression that reconciles the differences between the domestic activities carried out in the house and the rituals performed at the cemetery (after Montelius 1917:95).

It seems possible to argue that the links between cosmology and cooking were reinforced at the transition between the Early and the Late Bronze Age. Ritual was made stronger by metaphorical associations with the work carried out around the hearth. This probably facilitated the contemporaneous changes in the choice of diet and in the cooking process.

To summarise, I would argue that the changes in the composition of the Bronze Age macrofossil samples are contemporaneous with the introduction of the Urnfield culture. Changes in agriculture, diet, religion and social structures should therefore be seen as different aspects of the same new cosmology.

SUMMARY

With macrofossil samples as a starting point, this article has discussed different aspects of daily life like diet and cooking as well as the connections between household, society and rituals concerning death. The conclusions can be summarised as follows:

- The increasing weed content in the Late Bronze Age macrofossil samples should

not only be seen as a result of technical innovations like the introduction of manuring or new harvesting methods. The weeds represented also a new resource that could be used in the cooking process.

- Neither should the increase in hulled barley only be seen as a result of technical innovations, like the introduction of manured fields. Issues like cooking and how to make cereal-based dishes must also be considered when discussing Bronze Age macrofossil samples.
- The Scandinavian Bronze Age agriculture is intimately connected with developments on the Continent. New ideas of how to organise agriculture and what food to eat, were probably part of an ideology expressing the cosmology of the Urnfield culture.

English revised by Laura Wrang.

ACKNOWLEDGEMENTS

I am grateful to Per Lagerås and Kristina Jennbert for constructive discussion and for their support in commenting on this article.

REFERENCES

- Barrett, J. C. 1991. Towards an Archaeology of Ritual. In: Garwood, P., Jennings, D., Skeates, R. & Toms, J. (Eds). *Sacred and Profane. Proceedings of a Conference on Archaeology, Ritual and Religion. Oxford 1989*. Oxford University Committee for Archaeology. Monograph No 32.
- Brandt, I. 1951. Planterester i et moselig fra Borremose. *Aarbøger for nordisk Oldkyndighed og Historie 1950*.
- Bringéus, N-A. 1988. (1:st edition 1970). *Matberedning*. In: Bringéus, N-A. (Ed). *Arbete och redskap. Materiell folkkultur på svensk landsbygd före industrialismen*. Stockholm.
- Burström, M. 1995. *Gårdstankar. Hus & gård i det förurbana samhället. Rapport från ett sektorforskningsprojekt*. Riksantikvarieämbetet, Arkeologiska undersökningar, Skrifter nr 14. Stockholm.
- Campbell, Å. 1950. *Det svenska brödet. En jämförande etnologisk historisk undersökning*. Stockholm.
- Engelmark, R. 1992. A review of the farming economy in South Scania based on botanical evidence. In: Larsson, L., Callmer, J. & Stjernquist, B. (Eds). *The Archaeology of the Cultural Landscape. Field Work and Research in a South Swedish Rural Region*. Acta Archaeologica Lundensia.
- Fokkens, H. 1997. The genesis of urnfields: economic crisis or ideological change? *Antiquity, Vol. 71. No. 272*.
- Glob, P. V. 1969. *Mossarnas folk. Järnålderns människor bevarade i 2000 år*. Stockholm.

- Gräslund, B. 1983. Jordfästning och likbränning. Vägen till livet efter detta speglat i bronsålderns och stenålderns gravskick. *Varia* 9. Oslo.
- 1989. Gånggrifternas funktion i ljuset av primitiv själatro. *Arkeologi och religion*. University of Lund. Institute of Archaeology. Report series No. 34.
- 1994. Prehistoric Soul Beliefs in Northern Europe. *Proceedings of the Prehistoric Society* 60. Cambridge.
- Gustavsson, S. 1995. *Fosie IV – Jordbrukets utveckling från senneolitikum till yngre järnålder*. Rapport nr 5. Stadsantikvariska avdelningen, Malmö museer. Malmö.
- 1998. The Farming Economy in South and Central Sweden during the Bronze Age. A Study Based on Carbonised Botanical Evidence. *Current Swedish Archaeology*, Vol. 6. Stockholm.
- Hansson, A-M. 1997. *On Plant Food in the Scandinavian Peninsula in Early Medieval Times*. Theses and papers in Archaeology B:5. Stockholm
- Harding, A. F. 1989. Interpreting the evidence for agricultural change in the Late Bronze Age in northern Europe. In: Nordström, H-Å & Knape, A. (Eds). *Bronze Age studies*. The Museum of National Antiquities, Stockholm. Studies 6. Stockholm.
- Helbæk, H. 1951a. Ukrudtsfrø som næringsmedel i førromersk jernalder. *Kuml. Årbog for Jysk Arkæologisk selskab*.
- 1951b. Tollundmandens sidste Maaltid. Et botanisk bidrag til belysning af oldtidens kost. *Aarbøger for nordisk Oldkyndighed og Historie* 1950.
- 1955. The botany of the Vallhagar Iron Age field. In: Stenberger, M. & Klindt-Jensen, O. (Eds). *Vallhagar. A Migration period settlement in Gotland Sweden I-II*. Köpenhamn.
- 1958. Grauballemandens sidste måltid. *Kuml. Årbog for Jysk Arkæologisk selskab*.
- Jonsson, J. 1991. *Varför förekommer ogräsfrön i mag-tarmkanalen hos bronsålderns och järnålderns mosslik?* Seminar paper, Institute of Archaeology, Umeå University.
- Kaliff, A. 1997. *Grav och kultplats. Eskatologiska föreställningar under yngre bronsålder och äldre järnålder i Östergötland*. Aun 24. Uppsala.
- Karlenby, L. 1994. The Bronze Age house in Central Sweden. An evaluation of two recent excavations. *TOR* 26.
- Keyland, N. 1989. (1:st edition 1919) *Svensk allmogekost*. Malmö.
- Lagerås, P. & Regnell, M. 1999. Agrar förändring under sydsvensk bronsålder. En diskussion om skenbara samband och olösta gåtor. In: Olausson, M. (Ed). *Spiralens öga – 20 artiklar kring aktuell bronsåldersforskning*. Riksantikvarieämbetet Arkeologiska undersökningar. Skrifter Nr 25.
- Leach, E. 1976. *Culture and Communication: The logic by which symbols are connected*. Cambridge University Press.
- Montelius, O. 1917. *Minnen från vår forntid. I Stenåldern och bronsåldern*. Stockholm.
- Munksgaard, E. 1984. Bog bodies – a brief survey of interpretations. *Journal of Danish Archaeology*, Vol. 3.
- Rowley-Conwy, P. 1988. Rye in Viking Age Denmark: New Information from Øster Aalum, North Jutland. *Journal of Danish Archaeology*, Vol. 7.
- Skoglund, P. 1996. *Elden som metafor. Bronsgjutning, brandgravskick och skärvsten i bronsålderns tankevärld*. Seminar paper, Institute of Archaeology, Uppsala University.
- 1999. De enskilda hushållens betydelse för landskapsutvecklingen under bronsåldern. In: Olausson, M. (Ed). *Spiralens öga – 20 artiklar kring aktuell bronsåldersforskning*. Riksantikvarieämbetet Arkeologiska undersökningar. Skrifter Nr 25.
- Thorvildsen, E. 1952. Menneskeofringer i oldtiden. Jernalderligere fra Borremose i Himmerland. *Kuml. Årbog for jysk arkæologisk selskab*.
- Ullén, I. 1994. The power of case studies. Interpretation of a Late-Bronze-Age settlement in Central Sweden. *Journal of European Archaeology* . Vol 2.2.
- Viklund, K. 1998. *Cereal, Weeds and Crop Processing in Iron Age Sweden. Methodological and interpretive aspects of archaeobotanical evidence*. *Archaeology and Environment* 14. Umeå.
- Welinder, S. 1992. *Människor och landskap*. Societas Archaeologica Upsaliensis. AUN 15. Uppsala.