FOOD AND DRINK IN EUROPEAN PREHISTORY

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Abstract: There is a wealth of archaeological evidence, from bones excavated in prehistoric middens, piles of fruit stones and sea shells, that give us concrete indications of food consumed at various prehistoric sites around Europe. In addition to this information, we have pollen analysis from settlement sites and charred plant macrofossils. Wetland archaeology informs us in much more detail about not only the types of foods that were being eaten in prehistory but also, in some cases, their cooking techniques. This paper will explore whether or not a popular misconception about the daily diet in prehistory has its roots in the analysis of stomach contents of various bog bodies found in Europe.

Keywords: bog bodies, cooking techniques, ethnology, fogous, prehistoric Europe, salt production

INTRODUCTION

The interpretation of cooking in the prehistoric period is not as difficult as one may imagine. There are various quotations by the Classical historians that lead us to believe that food tastes and traditions were as varied in ancient Europe as they are today. The Greek historian Diodorus Siculus tells us, *c.* 50 BC, that a visit to an Iberian Celtic chief may lead to the offer of a chunk of bread and the best cut of some spit-roasted meat (Diodorus Siculus 1699: Ch. 11:212). By contrast, hospitality on ancient Cyprus at the time of Herodotus, *c.* 450 BC, may have taken the form of a dish containing fish cakes made of minced sun-dried fish (Herodotus 1957: Book 1, para. 200). There is also a wealth of archaeological evidence, such as the bones of animals found in ancient middens, or piles of discarded fruit stones, or sea shells (Andersen 1985:54). We can study pollen analysis from ancient sites, and charred plant macrofossils (Straker 1991:161). Also, evidence from the stomach contents of various well-preserved bog bodies provides us an insight into their last meal (Turner and Scaife 1995:81). It is important to take account of regional tastes, just as in European food studies today.

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COOKING TECHNIQUES

Cooking techniques in ancient times must also have varied quite considerably throughout Europe. Very simple techniques are quoted in Herodotus' account of Scythian cooking (Herodotus 1957: Vol. 2, Book 4, para. 61):

> Now the Scythian land is wondrous bare of wood: so this is their device for the cooking of flesh. When they have flayed the victims, they strip the flesh from the bones and throw it into the cauldrons of the country, if they have such: into these they cast all the flesh, and cook by lighting a fire beneath with the bones of the victims. But if they have no cauldron, then they cast all the flesh into the victims' stomachs, adding water thereto, and make a fire beneath with the bones which burn finely: thus the ox serves to cook itself, and every other victim likewise.

Ethnographic studies of small-scale cultures today teach us that adaptation to the environment one lives in is essential to survival. Therefore, if there is no wood to cook with, then the bones of your prey can be used for fuel. If there is no cooking pot, then the animal's stomach can be used. There is an example of this self-sufficient practice in the lives of the Siriono tribe of Bolivia today (Holuberg 1997:159):

> Little care is taken in dressing game, which is done either by men or women. Animals with hair, such as monkeys and peccaries, are first singed whole in the fire, and the burned hair is then scraped off with the fingernails or with a small section of a midrib of a motacu palm leaf. The animal is then gutted with a sharp piece of bamboo, after which the whole carcass is sometimes (but by no means always) perfunctorily washed before it is cooked. Birds are hastily plucked and then singed in the fire and gutted. If an animal is small it is usually cooked whole, but if it is too large for a pot (or too large to roast rapidly) it is quartered or cut up into smaller pieces with a bamboo knife. Armoured animals like the armadillo and tortoise are usually thrown in the fire and left there to roast in their shells.

The use of the natural resources available to the Scythian people in Herodotus' account for the preparation and cooking of their quarry is comparable to the practices of the Siriono people today, based upon minimum effort, as in so many hunter-gatherer groups. Given the fundamental need to travel light on a hunting expedition, since the carcass of the quarry would have to be carried home to camp, a makeshift cooking pot or utensil would have been needed to cook meals while travelling away from camp on hunting expeditions.

Cooking with heated stones

In Ireland, Britain and Sweden there is evidence for a type of cooking method using heated stones placed into a water pit. In Ireland, these sites are called *Fulachta Fliadh*

and more than 4,000 sites of this type have been identified (O'Drisceoil 1990:157). They appear as mounds of fire-cracked stones, usually of crescentic or horseshoe form. In the centre of this horseshoe, excavations reveal a typical watertight trough or pit, into which the heated stones were dropped during use (e.g. Keating 1908:326):

> It was their custom to send their attendants about noon with whatever they had killed in the morning's hunt to an appointed hill, to kindle raging fires thereon, and put in them a large number of stones; and to dig two pits in the yellow clay of the moorland, and put some meat on spits to roast before the fire: and then to bind another portion of it with grasses in bundles. And set it to boil in the larger of the two pits, and keep plying with stones that were in the fire, making them seethe often until they were cooked. And these fires were so large that their sites are seen today in Ireland burnt to blackness and these sites are called filacht fian by the peasantry meaning cooking places.

Athenaus, quoting Posidonius, also mentions the Celts in Europe cooking meat in water (Tierney 1960:247): 'Their food consists of a few loaves of bread, but large quantities of meat prepared in water or roasted over coals on spits.' This account closely mirrors the Irish data. Last year, at Biskupin in Poland, where a substantial Iron Age lakeside village has been reconstructed, I was demonstrating this particular technique to the general public. It is a very effective method of cooking any joint of meat. The basic principles for cooking meat in this way are the dropping of red-hot stones into a water-filled, wood-lined trough. Victor Buckley (1990:170) has conducted research into the most effective types of stones to use and re-heat in the fire:

> A number of tentative conclusions can be drawn from the combined evidence gleaned from the experimental testing of shatter variation in different rocks and the random analysis of samples from two sites in different geological areas. First, drift-derived material was most commonly used and, though the type of drift material was different, sedimentary rocks were preferred. Secondly, igneous and some metamorphosed rocks are very reusable and may present a problem for archaeologists, particularly in Northern areas, who may find a different morphology for *Fulachta Fliadh* owing to this lithic longevity.

Although burnt mounds are widespread in Ireland, it is interesting to observe the absence of *Fulachta Fliadh* in Counties Galway, Limerick and Clare. This is probably due to the prevalence of limestone bedrock (O'Kelly 1954:144), since limestone, on contact with heat and water, would turn to calcium hydroxide. So although this is an efficient way to cook meat, it probably did not merit the carrying of stones long distances for cooking; suitable rocks in the local geology could influence the distribution of the use of this method of cooking.

The size of the meat joints that I used in my experimentation at Biskupin[1] averaged five kilograms. Each day, we were plied with three such joints of beef or pork to cook and, on two occasions, a whole lamb was supplied. The stones which were found in the locality were fine-grained granite, similar to the ones that I had used previously in Cornwall. These stones were heated in a fierce fire for about one hour until they were red hot. About a dozen were then dropped into the water trough and the ensuing sizzle and whistling noise was quite deafening. It takes approximately 15 minutes for red-hot stones to release most of their heat into the water; consequently, the water gradually came to the boil as a pan might on a conventional cooker. The meat was wrapped in long fresh wayside grasses, in the fashion described by Keating (1908). These grasses had to be tied tightly with string – on this occasion, spun nettle fibre. Linen string is a good alternative but it tends not to have the elasticity of the nettle fibre and, on some occasions, goes slack in the water. Once the water was boiling, the grass-wrapped meat was ready to drop into the trough. Hot stones were regularly added to the trough over the course of two hours to ensure the water kept simmering. At the end of this time, the meat was taken out, and the grasses removed to reveal on each occasion consistently well-cooked meat. After crisping the sides of meat on some hot stones taken out of the fire, the meal was ready to eat. This left the water-filled trough full of meat juices and fat from the meat far too nutritious and tasty to waste. Various tests were conducted to discover the uses of such fat-rich water. The easiest method involved the mixing of a little bread dough, before dropping it into the trough half way through the meat cooking. This dough dumpling takes on the flavour of the meat from its juices and fat. When the meat is taken out, the dough dumpling provides tasty bread to eat with it. This dough required no extra effort or stones over and above those needed to cook the meat. In the seventeenth century AD, the cooking of herb-flavoured dough dumplings in cauldrons with boiling meat was common practice (Masson 1974:120). This fat-rich pudding would have been savoured since most of the flavour of meat is usually released from its fat and juices during cooking.

A typical feature of prehistoric settlements in Cornwall are piles of small round pebbles, thought to function as either sling shots or as pot boilers. The result of many experiments into the uses of these small stones in cooking demonstrates that they are surprisingly efficient in several ways. In one experiment investigating the use of pot boilers in the making of soft cheese, a layer of small beach stones was arranged on the ground and a fire was made on top of them. A large pot was placed on a low table a few metres away from the fire. Into this pot was poured one litre of whole milk, and a small bowl of sour cream to increase the acidity and help separate the curds and whey. With the use of a pair of hazel-stick tongs, five stones were dropped into the milk. The stones did not release their heat immediately but, after a few minutes, the milk began to steam. Three more stones were added and the milk began to boil. Almost immediately, the curds separated from the whey, which was subsequently strained through some rushes (*Juncus effusus*) to leave the soft cheese. The advantages of using hot stones to heat the contents of cooking pots became immediately apparent, not least in avoiding smoky fires.

Food can be prepared at some distance from the fire, leaving a space for people to either warm themselves, or spit-roast some meat. All that is needed to keep many different pots simmering is the periodic addition of more fire stones. As the stones cooled in the pots, they could be thrown back into the fire for re-heating.[2]

Baking in clay

Another cooking technique that can be demonstrated is the baking of fish in clay. There are some archaeological indications for the cooking of food in clay in stone-lined pits. Higgenbotham's excavation of a Neolithic long barrow and a Bronze Age round barrow at Woolley Barrows, north Cornwall, is an example (Higgenbotham 1977:10). The excavation of the long barrow exposed a large stone area extending up to 9 m from the edge of the mound. Resting upon this stone surface was a small hearth, 0.60 m by 0.70 m, bounded by siltstone blocks, at the centre of which the soil had been scorched to a light red colour. On top of this contemporary stone surface were small fragments of amorphous, slightly burnt and reddened clay. These were suggested by the excavator to be contemporary with the Neolithic flint in the barrow. An interpretation of clay baking is consistent with the amorphous burnt clay fragments.

Another example of these peculiar lightly fired clay fragments can be found at the excavation of the Bronze Age cairns at Stannon, on a part of Bodmin Moor which is particularly rich in prehistoric monuments (Harris et al. 1984:141). Cairn 1 exposed at its centre a pit that had been dug into the subsoil to a depth of 35 cm. The pit was round and 1 m in diameter. Its sides sloped to the bottom rather like a cauldron and it was lined with small stones. The bottom of the pit contained large carbonized chunks of wood which were preserved due to the wet conditions. This pit had been back-filled with soil and a flat stone had been placed on top. Eight stones were placed around the edge of the carefully infilled pit, which acted as supports for eight larger stones, which were placed leaning against them. This was repeated several times in what appeared to be a spiral pattern. Over this structure was piled a large number of small moorland stones. Of the two pits in cairn 2, one was long and rectangular while the other was a small round pit next to it. The rectangular pit had a soil infill and the small round one contained traces of charcoal. However, between these two pits was a piece of soft, shapeless, lightly fired clay. The third pit was a typical cairn burial containing a decorated biconical urn. Since only one cairn contained a burial, it seems probable that the other two were part of the mortuary ceremonies connected with it. This is especially likely in the case of cairn 1, which was carefully covered by a flat stone supporting the petal-like structure of stones on top. It is possible that some sort of funerary meal was consumed at the burial, since the small fragment of soft, anomalous clay found between the two pits in cairn 2 is consonant with the baking of food rather than any other typical ceramic function. Since clay baking produces large quantities of fired clay, the expectation was that larger quantities would have been found than was the case. Thus the discovery of a single piece raises problems in the cooking hypothesis.[3] Nonetheless, the curious shape of the pit in cairn 1 led me to a further experiment.

Ceremonial earth ovens associated with funerals are well documented by anthropologists studying the Maori peoples of New Zealand and in Polynesia.[4] I wished to test the notion that the Stannon pit was an earth oven of similar function. The reconstruction of the Stannon Cairn 1 pit showed that the cauldron shape had a spectacular effect on the ferocity of the fire within it, owing to the smooth airflow in and out of the pit. It became apparent that the specific purpose of the stone lining in the pit was likely to have been as a base for an earth oven (Fig. 1). The fire can be lit directly on top of the stones in the pit before clamping; a second hearth nearby can heat the other half of the stones needed for the upper part of the pit. During my experiments, it became clear that the fierce fire in the pit heated the stone lining in the pit to redhot in half the usual time. A joint of meat wrapped in a few giant burdock leaves (*Arctium minus*) was placed on the hot stones, after the removal of the unburnt wood. The stones from the second hearth were added to the top and turf was placed over the whole for insulation. After three hours, the meat was taken out of the pit cooked to perfection, with the original stone lining left intact for use on another occasion.

Figure 1(a).

Figure 1(b).

Figure 1(c).

Figure 1. *Reconstruction of the Stannon stone-lined cooking pit.* ***(a)*** *The meat is dropped into the fire-heated pit;* ***(b)*** *The meat is covered with extra stones heated from a side fire;* ***(c)*** *The top level of the pit is covered with a freshly-woven mat and a layer of soil.*

The reconstruction of this cairn pit proved to be a very efficient earth oven base, suggesting that funerary cooking may have taken place at Stannon.

A further indication that food was clay baked in settlements was encountered at the Bronze Age lowland settlement of Tret-hellan (Nowakowski 1991:57,140). The excavator's description of remains found in house 142 strongly suggests the remains of a clay-baked meal:

> The most significant feature about this hearth was the amount of burnt clay it produced; the only context within the entire settlement which produced burnt clay fragments in this quantity. Much of the clay was found as hard baked amorphous lumps, many of which displayed surfaces apparently smoothed and moulded by hand and through the careful piecing together of some fragments it was discovered that some originally formed parts of a shallow clay dish . . . also found in pit 3046 similar pieces of clay a deep red in colour. Very friable pieces of fired clay of which only two pieces join to form the edge of what appears to be the triangular rim of a larger flat-based object.

This interpretation is quite plausible but, on close inspection, the triangular shaped pieces do not suggest a dish (Fig. 2). When a joint of meat is wrapped in river clay, it is very difficult to carry it to the fire to dry before baking. If, however, a piece of wood is placed underneath it, this makes the task much simpler. This wooden plank enables one to move and turn the clay-covered joint around the fire before baking. When the clay is dry, the joint is dropped on top of the fire and the wooden plank is burnt away during the cooking process. At the end of the allotted cooking time – usually two hours for a 3-kg joint – the clay has to be broken apart.

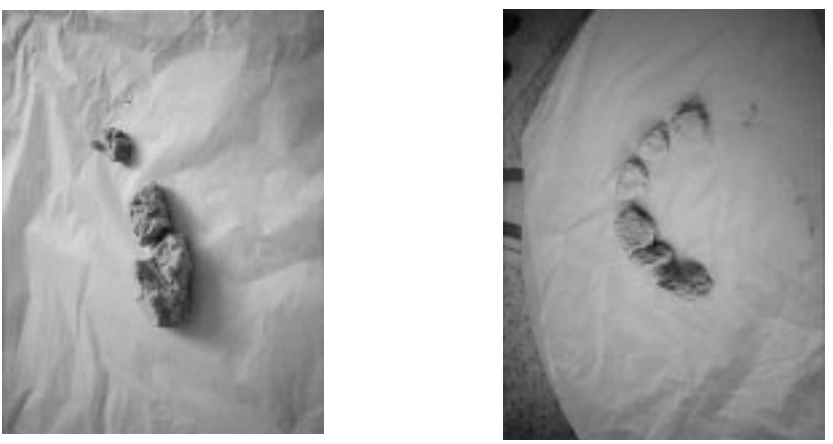

Figure 2. ***(a)*** *Friable burnt clay, Trethellan, with possible bone impressions on the rough side and smooth, featureless outer surface, suggesting a clay bake of a bird or small mammal.* ***(b)*** *Fragments of burnt clay, Trethellan, interpreted by Nowakowski as coming from a possible dish. The alternative is that they derive from the clay casing of a clay bake for a joint of meat, as replicated in experimental cooking.*

At that point, it is always soft and friable because of the use of readily available riverine clay. This clay is not plastic enough to be used for pottery but is wholly adequate for use in baking food.

In an experiment in clay baking conducted at the Lago di Ledro Pile-dwelling museum in northern Italy, fine white lacustrine clay was used to cover one fish and some raku ceramic clay to cover the other. After an hour in a fierce open fire, the two fish were examined. The raku clay, usually considered the best type of clay for bonfire firing of ceramics, had cracked open and the fish had been exposed to the ferocity of the fire, leaving little more than a charred fish skeleton! The other fish was still perfectly sealed beneath its covering of this otherwise less useful white silty clay; upon cracking open the silty clay, a perfectly cooked succulent fish was revealed. It was interesting to find that the good ceramic clay was inadequate for the purpose, while the clay conversely useless for ceramic manufacture was perfect for this specific task. It is because alluvial clays are often not of sufficient quality for the firing of ceramics that their cooking residue appears in archaeological contexts as soft and friable, easily misinterpreted as daub.

(a)

(b)

Figure 3. ***(a)*** *King carp laid out on burdock leaves* (Arctium minus*) and stuffed with wild plums prior to being covered with clay and baked in the fire.* ***(b)*** *King carp tied with nettle fibre string and placed on a flat piece of wood ready for application of clay covering.*

During my demonstrations in Poland, some alluvial clay was smeared over a 3-kg king carp, which had been previously wrapped in wild herbs, and tied with nettle fibre string (Fig. 3). The fish was placed onto a split log and put to the side of a fire pit for 1 hour, then turned and dropped onto the fire for 1 hour 30 minutes. At the end of this time, the clay was broken off and the fish was cooked to perfection. The rough pieces of fired clay, however, took on an almost identical appearance to some of the clay fragments found at Trethellan.

At Lago di Ledro, another interesting cooking technique was attested in the Bronze Age lake settlement. A loaf made from the flour of coarsely ground cereals was discovered, looking like a large doughnut. It is suggested that the dough had been wrapped around a previously heated stone that was found at the site (Tomasi 1982). The efficiency of the earth oven as a cooking technique must have occurred to many cultures on a global scale. Not only does the method leave the community free from work for four or five hours, but it also saves considerable amounts of fuel. Given appropriate local geological conditions, the *Fulachta Fliadh* also fulfilled a need as a successful method of cooking food for hunting expeditions, as is substantiated by the large number of such sites in Ireland. The use of pot boilers in my own experiments is a far superior method to cooking liquids in pots on the edge of a smoky fire, also leaving the fireside free for the community to warm themselves.

GRAIN

Bread, the staple of life, is mentioned many times by Classical writers and it may be assumed that, since the discovery of bread wheat in the early Neolithic of Europe, it was a staple of prehistoric diets too. A rare example is the yeasted bread discovered preserved in the late Neolithic levels at Douanne, on Lake Bienne in Switzerland (Audouze and Buchsenschutz 1991:125). Yeast production today, and throughout prehistory, has been linked with the brewing of beer and wine. 'The interdependence between the grain and the yeast, between bread and fermenting liquor, was certainly established in the earliest times and has persisted throughout history' (David 1977:90). Further testimony for the link between brewing and baking was found on the Beni-Hasan site in a tomb of the Middle Kingdom in Egypt *c.* 2000 BC in the form of a wooden model of a brewhouse and bakehouse (Wilson 1998:18, Fig. 16). Certain fruits, such as the grape (*Vitis* spp.) and the elderberry (*Sambucus nigra*), are host to large amounts of wild yeast on their skins. Fermenting wine or beer can be added to flour to produce leavened bread. Pliny the Elder commented on this practice (Pliny 1967: Vol. 5, Book 18:68):

> When the corn of Gaul and Spain of the kinds we have stated is steeped to make beer the foam that forms on the surface in the process for leaven, in consequence of which those races have a lighter kind of bread than others.

This is not the opinion we generally have of the bread baked by barbarian Celts. One would assume that the Roman bread was lighter and finer than that of the

Celts but, if this were so, Pliny would presumably have made a point of stating this. Experiments with food preservation indicate that it is possible to preserve a wild yeast concentrate for some months until required for use. It is well known that the Celts in particular were very fond of wine and beer. Strabo comments on the European Celts (Strabo 1969: Vol. 2:75): 'They also drink beer: but they are scarce of wine, and what wine they have made they speedily drink up in merry feasting with their kinsfolk'. The fermenting of grain to make alcohol is thought to have begun at the same time as the first cultivation of grain. The growing of grain had become widespread between Iran and Turkey around 10,000 years ago (Harris 1997:8). In ancient Mesopotamian texts in the third millennium BC, there is said to be a list of 19 different types of beer made according to the combinations of grains and herbs used in their manufacture (Davidson 1992:23). The cultivation of grain did not spread to northern Europe until the start of the Neolithic, *c.* 6,000 years ago (Robinson 1993:35). In Britain, a small quantity of grain impressions has been found on Neolithic pottery on sites such as the Abingdon causewayed enclosure, in Oxfordshire, with evidence for the cultivation of emmer wheat, *Triticum dicoccum*, and six-row barley, *Hordeum vulgare* (Avery 1982:48). More widespread evidence of grain cultivation in Britain, however, is not found until the Bronze Age about 3,500 years ago (Parker Pearson 1993).

It is highly probable that the origins of beer making are related to the practice of grain storage in pits. The Classical historian Diodorus Siculus comments on how the ancient Britons harvested their grain (Diodorus Siculus 1699:22):

> They dwell in mean cottages, covered for the most part with reeds or sticks. In the reaping of their corn, they cut off the ears from the stalks, and so house them in repositories underground.

There is widespread archaeological evidence for these grain storage pits throughout Europe.

> Storage pits can be distinguished from innumerable pits found all over protohistoric settlements by their characteristic shape. They are usually circular in plan and generally small, being only rarely more than 3 m in diameter. The depth is usually equal to or greater than the maximum diameter. The opening was originally smaller in diameter than the maximum diameter of the pit. These characteristics stem from the need to have as large a storage capacity as possible with the smallest possible opening, which usually seems to have been worked out so as to allow a man to get inside.
>
> (Audouze and Buchsenschutz 1991:129)

In different regions these pits vary in shape and size,[5] but the basic principle is the same. A large hole is dug into the ground, most commonly a bell shape, essentially a large rounded hole with a narrow neck at the top. Grain is poured into the pit after the harvest and a plug of clay was used to cover it, with a layer of turf on top to stop the clay from drying out. Although there is no evidence for these clay plugs, they are

the most logical top for the pits, and could have been ploughed out over the centuries to leave no traces of their existence. The grain on the edge of the pit had contact with the damp earth. This grain then began to germinate, thereby utilizing all the remaining oxygen in the sealed pit, releasing carbon dioxide in exchange. When the oxygen was fully consumed, the germinating grain died and formed a crust on the outer edge of the pit. The grain within was sealed in a vacuum and would keep for years without deteriorating. Experiments into the use of these types of storage pits were undertaken by Peter Reynolds at Butser Ancient Farm (Reynolds 1976:41), and it was found that the grain stored for a year in the pit was in a better condition than grain stored in a modern electrically heated granary for the same length of time. However, by the following spring almost all the grain would have been removed from the pits and used, leaving grain that was beginning to germinate. Germinating wheat and barley have a pleasant taste, akin to that of liquorice; it may well have been a popular food in the spring. Unfortunately, it is only at the beginning stage of the germination that the grain tastes good. If left a week too long, the germinating grain goes mouldy, and is wasted as a food. It is not unrealistic to assume that someone made an attempt to preserve this sprouting grain by drying it in a kiln. Once baked, the grain sprouts would have changed to malt – a completely different food with a pleasant odour. This malted grain could have been ground to a flour on a quern and added to water to make an enjoyable malt drink. It may also have become an important food, since more vitamins and minerals are contained in the malted grain than in its un-sprouted state. This is because sprouting grain releases the plant sugars and starches in order to make a new plant. It is also not hard to imagine a refreshing tasty drink was made of the malted grain. If left for another day, the surplus malt liquid would have started to ferment, leading to the discovery of alcoholic beverages.

The link between cereal cultivation and the production of beer, not to mention yeasted bread as a by-product, gives us a totally different conception of the staple food of prehistoric Europe. Coupled to this, the comment by Pliny the Elder that the bread of the barbaric Celts was of finer quality than that of the civilized Romans demonstrates how unwise it may be to assume a positive correlation between the quality of food and the achievements of the Roman empire.

The cultivation of these cereal crops, however, was interdependent with the domestication of animals.

> Although cattle were fully domesticated at least by the sixth millennium BC, they were not systematically used as traction animals until the later fourth millennium, when a specific technology was developed to make use of this. The most important applications were to the plough and the cart. The plough increased production and made economic the cultivation of a range of poor quality soils; it thus resulted in the colonisation of a wider area than had been possible under previous systems of cultivation. Both the ox-cart and the horse, as well as the pack-donkey, opened up the possibilities of bulk transport.
>
> (Sherratt 1981:262)

Animals were much more important to prehistoric societies than simply as a meat source. Large numbers of female animals would have been needed so there would have been a working stock, and a breeding population of animals for these agro-pastoral societies. Therefore the growing of cereal crops and the ensuing need for large herds of draught animals would have occupied increasing amounts of the time of established farmers, in turn leading to the need for more substantial dwellings and storage facilities. Rowley-Conwy suggests that cultivating the land was not necessarily an inevitable advance for hunter-gatherer societies. 'We call hard but boring work ''the daily grind'' a reference to milling cultivated grain, and current research is showing that you didn't take up farming unless you had to' (Rowley-Conwy 1997:7). However hard work it might have been for the first farmers, the many and various benefits of the sedentary lifestyle and resultant development of new technologies such as ceramics and metallurgy would have far outweighed the drudgery.

DAIRY FOOD

There is little doubt that dairy foods were an important part of the prehistoric diet of northern Europe, from as early as Neolithic times. The secondary products revolution categorizes one of the secondary uses of draught animals for milk (Sherratt 1981:276):

> Milk has several advantages. From a dietary point of view, it supplies the amino-acid lysine, which is missing in a cereal-based food. It contains fat, protein and sugar in a balanced form, and is a useful source of calcium. Being liquid it is easily handled, and can be converted into a variety of storable products.

Archaeology now has concrete evidence that milk products were consumed throughout Europe from the Iron Age due to a new testing technique developed by R.P. Evershed and S.N. Dudd (Evershed and Dudd 1998:1478): 'The stable carbon isotope compositions of individual fatty acid components of remnant fats preserved in archaeological pottery vessels show that dairying was a component of archaeological economies'. Tentative evidence supporting the notion of dairy cattle in the British Neolithic comes from the high proportion of calf bones excavated at many causeway camps in southern Britain. 'The cattle bones from Hambledon Hill are primarily those of older females and young calves. One archaeologist has interpreted these as the kill residue from a dairying herd kept in the settlement enclosure of Hambledon Hill' (Parker Pearson 1993:48). This may indicate not only the consumption of veal but the need for a large supply of milk for the community. The management of cattle herds continued through the Bronze Age and, in some areas, took on a ritual significance at various burial mounds. At the Bronze Age barrow of Irthlingborough, 184 cattle skulls had been deposited (Parker Pearson 1993:78), perhaps an indication of the prestige and wealth of the deceased.

Later, in the Iron Age, Strabo tells us that one of the trade goods exported to Europe from Britain prior to the Roman invasion was that of hides (Strabo 1969: Vol. 2:253): 'It bears grain, cattle, gold, silver, and iron. These things are exported from the island as also hides, slaves, and dogs.' Strabo also comments on the cattle in Britain when he talks about the inhabitants of the Cassiderides, thought to be the Scilly Isles and Cornwall (Strabo 1969: Vol. 2:157): 'They live off their herds . . . As they have mines of tin and lead, they give these metals and the hides from their cattle to the sea traders.' These quotations support the conclusion that large herds of cattle were a common sight in parts of Iron Age Britain. If so, milk would have been available all year round, and especially plentiful, sweet and rich in the spring. The storing of surplus dairy produce would have been important to such a culture, as plentiful supplies of milk are hard to conserve through the summer months.

This problem was partly overcome by storing butter in wooden containers and burying them in marshlands or peat bogs. Deep in the peat levels of the marsh, the surplus butter would keep fresh during the summer months, only to be removed when required during the winter. Archaeologists in Ireland have discovered large quantities of this bog butter. 'Many discoveries of this ''bog butter'' have been made, ranging in quantity from a few pounds to as much as a hundredweight' (Renfrew 1985:15). An exceptional find of bog butter was made in a wooden stave bucket containing at least 5 kg of ancient butter, now preserved in the Royal Cornwall Museum store, in Truro. Mr H. Maulslay found this butter in the neighbourhood of Ougherard, County Galway in 1906. He reported (information supplied by Truro Museum): 'This cask containing Irish Butter was found when turf was being cut five feet below the surface in solid peat' (Fig. 4). It is a pale yellow in colour and a grainy consistency, and it smells quite dreadful. The length of the tradition of eating butter in Ireland is still uncertain. Strabo thought it warranted mentioning that the Celtiberians ate butter instead of olive oil with their bread, even though they had access to olive oil in the south of Spain (Strabo 1969: Vol. 2:75): 'instead of olive oil they use butter'.

Figure 4. *Stave bucket containing bog butter, Ireland (Royal Cornwall Museum, Truro).*

However, bogs are not a good environment for storing hard cheeses, which would have been an important source of protein and calcium in societies' diet in the winter months. Hard cheese needs a suitably cool, dark place to store as it matures. In prehistory, the obvious place for winter storage of cheese would have been caves. Not only does a cave store the cheese perfectly, it can impart flavour to the cheese in the form of localized moulds that live in the cave. Cheeses made of ewe's milk such as Roquefort are said to acquire their unique flavour from moulds that live in the caves of that region. In Britain, the famous Cheddar cheese was developed

Figure 5. *Clay vessel filled with milk and hot stones during the process of soft-cheese making.*

in the caves of the Cheddar gorge, where the extensive network of limestone passages and galleries was used to store and mature this cheese (Fig. 5). Caves, however, are not necessarily a widespread feature in the north European landscape. The artificial alternative is an underground structure such as the fogous of Iron Age Cornwall – also known as souterrains (Fig. 6) – also found in several other parts of Britain. Fogous and souterrains may well have been constructed partly for this purpose, as well as possibly for the storage of wines and meads. As many as 200 examples of souterrains have been discovered in Scotland dating from the first century BC to the third century AD. On Orkney and Shetland, they are built entirely underground while, in eastern Scotland, they are only partly subterranean (Dyer 1990:139). It is possible, however, that not all British prehistoric communities made cheese; Strabo comments (1969: Vol. 2:255) of the British: 'some of them although well supplied with milk make no cheese'. This might account for the lack of these archaeological features in some parts of Britain. In his description of the Germans, Tacitus mentions underground stores

Figure 6. *Iron Age fogou of Carn Euny, Cornwall.*

such as fogous and souterrains (Tacitus Germania 1948:16): 'They have also the habit of hollowing out caves underground and heaping masses of refuse on the top. In these they can escape the winter's cold and store their produce.' This indicates that the practice of making artificial caves for food storage was widespread in Europe. The secondary product revolution, including the use of milk products, must have had a major effect on farming settlements. Ceramics had to be developed to store and strain the milk during the making of cheese and butter. Storage facilities were needed to preserve surplus butter for the winter months, and underground caves sought or made to mature cheese products. Also the size of a family herd would have become a status symbol indicated by the number of cattle that could be consumed at a burial, with the deposition of cattle heads as a testimony to this status.

SALT

Another favourite Celtic food was bacon or ham. According to Strabo: 'their flocks of sheep and herds of swine were so very large that they supply an abundance of salt meat, not only to Rome but most parts of Italy' (Strabo 1969: Vol. 2, Book 4:243). The communities around Lake Hallstatt, in Austria, were salt miners and it may be conjectured that some members were skilled in making salt meat. In southern Britain, although there are no salt mines, there is archaeological evidence for a chain of salt producing centres along the coast. These are well documented at sites such as Trebarveth in Cornwall, where there are large concentrations of briquetage – remains of rough ceramic trays which are filled with seawater and suspended over a pit fire to produce salt (Peacock 1969:47). As the water boiled away, more sea water was added until a thick block of salt filled the entire tray. The contents of the trays would be left to go cold before the ceramic tray was broken away from the block of salt, which was then ready for local storage or inland trade.

In parts of southern Europe, salt marshes were established to harvest this precious commodity (Mollat du Jourdin 1993:135):

> The water's path followed a similar route. A conduit was placed into the breakwaters separating the compartments of the marsh. Gravity caused the water to flow toward a reservoir (a tidal reservoir) where concentration began, then through little canals towards the salt beds; at the lowest level (evaporating pans), the salt crystallized.

There still survives in Cornwall a pilchard salting works that preserves and presses this particular fish in the traditional way. Huge vats are filled with the day's pilchard catch un-cleaned. Bags of salt are then poured onto them and they are left in this vat for six months. The fish are then packed into small barrels and pressed for a few weeks to complete the preservation process. All the produce of this small firm is sent exclusively to Padova and Verona in the autumn to be distributed to the mountain villages in the Veneto region. Salted pilchard is used as a seasoning for stews and savoury food, in much the same way as was garum in ancient times.

Figure 7. *'Prehistoric' feast, featuring a whole clay-baked salmon (foreground).*

Garum was a salty fishy sauce that the ancient Romans used as a seasoning for savoury foods instead of salt. There is still the remains of a Roman garum-producing centre at Alminjeka, in southern Spain, where large sunken clay pots were used to ferment the salt fish sauce (Figs 7 and 8). Strabo refers to a fish-salting industry near Gibraltar, though this was apparently just one of the commodities produced by these people (Strabo 1969: Vol. 1:33)

> There are exported from Turdetania large quantities of grain and wine, and also a olive oil, not only in large quantities, but also of best quality. And further wax and honey . . . and they have salt quarries in their country, and not a few streams of salt water; and not unimportant, either is the fish-salting industry that is carried on, not only from this country, but also from the rest of the seaboard outside the Pillars.

The process was almost identical to the pilchard works except the fish were pulverized after salting and flavoured with grape juice before being distributed in amphora to the Roman Empire. Such examples of long-term continuity in food processing practices are an important indication of social memory in many parts of Europe.

Bog bodies

The analysis of the stomach contents of a great many bog bodies from throughout Europe has produced strikingly similar results. Dagten man from Germany, Huldremose woman from Denmark and Lindow man from England are three good examples to compare as they are widely distributed geographically, yet all date to the Iron Age. Dagten man was found in Germany in 1959, although it was not until 1967 that his stomach contents were analysed (Turner and Scaife 1995: 148). The body of this 30-year-old man had been decapitated (his head was found 3 m away from the rest of his body) and his body

Figure 8. *Barrel of salted pilchards, ready for export to north Italy.*

also had several stabs and injuries which it is believed were inflicted after death. These injuries were probably inflicted when his body was pegged down in the bog with stakes. It is reasonable to assume that this man did not fall into the bog by accident! In his study of German folk tales, Struve discusses the pegging of bodies down in bogs (Struve 1967:33–76): 'such persons criminals, suicides, victims of violence or accident, were rendered harmless . . . so as not to return and haunt the living'. Tacitus also mentions this practice in his studies of the Germans (Tacitus Germania 1948:12):

> The traitor and deserter are hanged on trees, the coward, the shirker and the unnaturally vicious are drowned in miry swamps under a cover of wattled hurdles. The distinction in the punishments implies that deeds of violence should be paid for in the full glare of publicity, but that deeds of shame should be suppressed.

The contents of Dagten man's stomach represented a typical list of contents from these bog bodies: wheat, millet chaff and weed seeds such as corn spurry (*Spergula arvensis*), persicaria (*Polygonum lapathifolium*) and fat hen (*Chenopodium album*).

The Huldremose woman's body had a last meal of wheat, rye, corn spurry and chaff before being pegged down with a willow post or stake 3ft long lying obliquely across her breast (Turner and Scaife 1995:147). This practice of pegging down bodies or encasing them in a cage of stakes is well represented in wetland archaeological finds.

Lindow man in England was garrotted; his throat had been cut and he also suffered from two blows to the head. The contents of his stomach were wheat or rye and barley chaff. Turner observed (Turner and Scaife 1995:76): 'the bran of the wheat or rye and the chaff of the barley were reported as being the most dominant components of the food debris'. The large amounts of chaff in this body point to a different conclusion about whether or not this gruel was apparently a common last meal. It has been suggested by some that the particular weed seeds found in this gruel had perhaps some sort of ritual significance. It occurs to me that the reason for the large amounts of chaff and weed seeds in the stomach contents could have a very squalid explanation. It could have been floor sweepings, made into gruel, in fact prison food for the condemned criminal. This would be in keeping with Tacitius' observations that only the shameful criminals were deposited in the mire and pegged down. They certainly would not have been a suitable gift for the gods as a sacrifice.

THE WILD HARVEST

The diet of the prehistoric peoples of Europe was rich and plentiful, as is indicated by excavations of the contents of settlement middens from the hunter-gatherer period to the end of the Iron Age. At a Neolithic Narva culture site in north-west Russia, hunting and gathering still played a large part in their economy. Forest game

such as elk, wild pig, red deer, brown bear, marten, beaver and badger were hunted. At coastal sites, the remains of seal and mallard are commonly excavated. Also fish remains from pike, catfish, pike-perch, carp, perch and carp-bream were consumed. (Dolukhanov 1992:96). At Porth Killer on Scilly (Ratcliffe and Straker 1996:62), a late Bronze Age midden exposed a wealth of finds that testify that the diet of the people of this settlement was certainly not tedious. The list of bone remains is as follows (Table 1):

Table 1. Food resources recovered from the Porth Killer late Bronze Age midden

Fish	Birds	Shellfish	Sea mammals	Land mammals	Domestic animals	Wild plants	Domestic plants
wrass	shelduck	limpet	whale	boar	cattle	chickweed	barley
whiting	thrush	periwinkle	grey seal	red deer	sheep/ goat	fat hen	emmer wheat
bass	puffin	scallop				small nettle	Celtic bean
saithe	cormorant					wild radish	oats
dab	gannet					sheep's sorrel	
mullet	redwing						
conger eel	razorbill						
pollack	spotted flycatcher						
gurnard	heron						
common eel	godwit						
plaice	wren						

It is perplexing to imagine the amount of nutrition that could be acquired from a wren, although it was perhaps a vital ingredient in a stock or stew! Puffins, however, are still hunted in the Faroe Isles, in possibly the same way as that used by the Porth Killer inhabitants. Here is a description of the method of catching from *The Anthropologists' Cookbook* (Jackson 1997:37):

> The fowler sits in a traditional site on the cliffs and awaits the returning birds. There may be as many as fifty sites along the bird cliffs which have been in use for centuries. The fowler lays his pole alongside the rocks so that it cannot be noticed, but he holds it ready. When a puffin is hurling towards the site, the fowler sweeps up his pole into an arch which, hopefully, transects the puffin's flight. The only puffin allowed to escape is the 'herfing-bearer', that is a bird coming back with little fish hanging out of its coloured beak for its young. In the spring-time adult puffin are caught sitting in their burrow. A shaft is sunk down a little way from the entrance to the puffins' underground tunnel, and a short stick with a bent 6-inch nail at the end of it is inserted in the hole. The puffins are dragged out and their necks are broken.

The relative ease with which these reasonably sized birds are caught would have made them a regular dish on the prehistoric menu. The Porth Killer list continues with several species of shellfish; sea mammals, and even some domestic animals,

were hunted. The presence of domestic cattle, sheep, and goats would indicate a milk supply, and ultimately perhaps cheese and butter-making. Indicators of crops grown at Porth Killer from plant macrofossils are the main domestic cereals and pulses. All of the wild plant macrofossil remains came from species which I have tasted in my researches, finding them extremely palatable. The remains of the midden at Porth Killer are typical of many shoreline settlements around Europe. During the Iron Age, despite the development of arable farming of cereal crops and pulses, as well as the domestication of pigs, sheep and cattle, the practice of gathering or hunting wild foods was still a very important contribution to the diet. This was especially true of game animals, such as the wild boar, red deer, roe deer, wolf, hare, bear, beaver, lynx, otter and ducks, all of which were found at the Biskupin Iron Age settlement in Poland (Piotrowski 1992:90): 'Wild animals apart from supplying extra meat and skins also provided the inhabitants of Biskupin lake village with horn and bone for the manufacture of tools.' Therefore, a bountiful wild harvest may be assumed during the whole of prehistory, ready for the consumption of the peoples of Europe. The sea and rivers were teeming with fish, the forests with game and the marshlands with an abundance of waterfowl. The technology needed to hunt this game is evident from archaeological finds of fish traps, harpoons, spearheads and arrows throughout Europe. It is assumed that the need to settle and acquire other technologies such as pottery and metallurgy was instrumental in the people of Europe giving up the hunter-gatherer lifeways, rather than the lack of game to hunt.

CONCLUSION

In this paper, I have attempted to use a combination of archaeological data, experimental evidence, historical information and ethnographic sources to provide insights into the various methods which prehistoric communities had mastered in the pursuit of the edible. It is clear that, whatever the final meal of those who were deposited and/or pegged down in the bogs of northern Europe, there was a wide range of foodstuffs available to prehistoric European communities, in response to which they developed many different methods of cooking and food preparation. At the basis of the study is the close relationship between the food and cooking resources available to communities on a local and regional level. Just as Herodotus alludes to the Scythian people's adaptation to their environment, so it is clear that the absence of certain geological substrates means that the development of certain methods of cooking, such as those reliant upon heated stones in limestone areas, are highly improbable. However, by the same token, when a specific practice in food preservation, cooking or storage takes root, there is a strong probability that it will remain in that region for long periods, if not millennia. The similarities in cooking techniques found in northern European archaeology and those represented in ethnographies of similar areas cannot lightly be disregarded. Heated stones form an important cooking technique, as is reflected in the widespread distribution of fire-cracked mounds in later prehistoric Europe. The significance of clay baking, in both settlement and mortuary contexts, is important; also the use of what has previously been thought

of as artifactually sub-standard alluvial clay as the best material for the clay baking of foods is interesting. The residue of this particular cooking technique – friable, anomalous clay fragments – may have been ignored as daub from ovens, walls or floors. The possibility that cairn pits could have been used for such culinary purposes as earth ovens for funerary feasts should not be dismissed

The connection between the growing of grain and the brewing of alcohol is well substantiated. What has been overlooked is the link between this brewing practice and the lightness of the bread consumed. The debate over secondary dairy products is related to the production of cheese and butter, as well as their storage in bogs, caves, fogous or souterrains – the latter's main function possibly being as cheese-maturing stores. The continuing modern trade in salt fish between Cornwall and northern Italy substantiates the long-term nature of cooking and eating trends, perhaps showing that some tastes at least have not changed through the millennia.

The wild harvest throughout prehistory in Europe was plentiful and reliable. Almost all the meats and fish we catch today were eaten, plus a wealth of wild berries, and nuts from the forests, to say nothing of the abundance of edible herbs and seaweeds. Dairy produce such as butter and cheese were stored and consumed. Beer, mead and wild fruit wines were made and, as a consequence of this production of beer, leaven was available to make fine yeasted bread.

These were hardly the ingredients of a hand-to-mouth existence; rather, the enormous diversity of food and drink available in prehistoric Europe would have provided the basis for cultural choice of specific dishes, styles of cuisine and overall food and drink preferences which would have, equally, differentiated region from region and united households, communities and wider alliances through the reciprocal exchange of hospitality.

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NOTES

1. In the nine-day festival at Biskupin, my team was also able to demonstrate how raw materials might have been utilized on a daily basis. One member of my team made the bones of the previous day's joints into bone needles. The other two members made platters and serving baskets out of local grasses, and sewed them together with the bone needles.
2. This technique was also used in Hawaii, but instead of dropping hot stones into a ceramic pot, a calabash (i.e. a hollowed out gourd) was used as the container. Fish was thought to be delicious by the Hawaiian Islanders when cooked in a calabash with hot stones (Wise 1965:99).
3. An alternative hypothesis is that the mourners took home a piece of the clay from the wake of the deceased, as a memento of their farewell meal.
4. In the Maori whakau ceremony, the oven was large enough to cook a meal for the entire funeral party. In other ceremonies, such as those connected with exhumation and

the tohi rite over children, a number of ovens were prepared to provide a meal for all present (Buck 1974:501). On Tikopia Island in Polynesia, the earth oven was also used, and described as a pit in the ground in which food is cooked by being laid on hot stones and covered with leaves (Firth 1957:94).

5. A. Villes has observed that, in Champagne in the La Tène period, the average diameter of the aperture was 60–70 cm (Audouze and Buchsenschutz 1991:129).

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BIOGRAPHICAL NOTE

Jacqui Wood is an independent researcher and experimental archaeologist, and also the Director and Founder of the Cornwall Celtic Village which is a reconstructed Bronze Age/Iron Age settlement in Cornwall. She has worked for English Heritage for over seven years running an Ancient Technology Camp for 12-year-old children at Chysauster Ancient Settlement near Penzance, and has served a three-year term of office on the Council for British Archaeology's National Education Committee, as well as being a member of the General Committee of the Cornwall Archaeological

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ABSTRACTS

Nourriture et boisson dans la préhistoire européenne

Jacqui Wood

De la faune provenant des fouilles de dépôts de cuisine préhistoriques, au tas de noyaux de fruits et de coquilles marines, nous avons une profusion d'evidence archéologique qui nous donne une indication concrète du type de nourriture consommée sur différents sites préhistoriques européens. A toutes ces informations on peut ajouter les résultats obtenus par l'analyse des pollens de sites sédentaires et les macrofossiles de plantes carbonisées. L'archéologie des régions marécageuses nous apporte des informations trés détaillées non seulement en ce qui concerne la nourriture de nos ancêtres préhistoriques mais aussi au sujet des techniques de cuisine utilisées. Cet article se penche sur l'origine d'une misconception populaire au sujet de la diète journalière en préhistoire, et se demande si l'analyse du contenu de l'estomac de plusieurs corps retrouvés dans les tourbières de l'Europe pourrait bien être responsable.

Speise und Trank in der Europäischen Prähistorie

Jacqui Wood

Es gibt eine Vielfalt an archäologischen Zeugnissen, aus prähistorischen Abfällen ergrabene Knochen, Haufen von Obstkernen und Muschelschalen, die uns konkrete Hinweise auf Nahrung geben, die auf verschiedenen prähistorischen Fundstätten Europas verzehrt wurde. Zusätzlich hierzu stehen uns Pollenanalysen aus Siedlungen und verkohlte Makroreste von Pflanzen zur Verfügung. Die Feuchtbodenarchäologie liefert weit detailliertere Informationen nicht zur zu den Nahrungsmitteln, die unsere prähistorischen Vorfahren aßen, sondern auch zu ihren Kochmethoden. Dieser Artikel untersucht, ob eine verbreitete falsche Vorstellung von der täglichen Ernährung in der Prähistorie in der Analyse von Mageninhalten von verschiedenen europäischen Moorleichen wurzelt.