FOOD

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THE HISTORY OF TASTE

EDITED BY
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WITH 28 ILLUSTRATIONS

Thames & Hudson

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CONTENTS

What is declining is a sense of a core or series of core cuisines, and especially the international sway of French cuisine. In New York, a city with thousands of restaurants at all price levels representing hundreds of nations and regions, the most endangered species are the elegant French restaurants of which only a few remain. This is not so much a reflection of the economics of owning a restaurant that produces a costly, labour-intensive cuisine, since there seems to be no limit to what high-end restaurants can charge (the most expensive restaurant in New York in 2006 was Japanese), but rather a shift in taste. In a 2003 *New York Times* article extolling the creativity of the 'Spanish' cooks of Catalonia and the Basque region, Arthur Lubow wrote with a certain patronizing pity about the failure of the French to keep up, but the French could just as plausibly be credited with refusing to follow fashion by their stubborn maintenance of certain established standards of authentic culinary practice and aesthetics.

An optimistic take on the future is that the movement towards authenticity will affect more than the wealthy amateurs of the great world capitals and influence countries that have rich culinary traditions but are not themselves in privileged places in the world economy. When the food in Ethiopia develops an authentic élan, benefiting its population in ways beyond what is popularly presented in Europe and America, that will be an accomplishment. There are some hopeful signs of the spread of movements that combine ecological stewardship, biodiversity, and revitalization of culinary traditions and practices in Asia and Latin America. Food and the future of food are matters of taste, but also of human freedom (as Sidney Mintz has shown in a study of slave diets in the New World). The way we collect, process, sell, buy and prepare food is both a necessary industry and a daily art that expresses what it is to be alive.

CHAPTER 1

HUNTER-GATHERERS AND THE FIRST FARMERS

The Evolution of Taste in Prehistory

ALAN K. OUTRAM

Discussing prehistoric peoples' taste in food is something of a challenge. By definition, prehistoric peoples left us with no written record of their likes and dislikes. Prehistorians must use the archaeological record as their primary source of evidence. They must sift through physical remains left by people thousands of years ago. In fact, archaeologists spend much of their time rooting around in ancient garbage for the remains of peoples' food and items of material culture. Through finding food remains, it is possible to demonstrate *what* people ate and, through the discovery of such items as hearths, ovens, cooking pots and serving vessels, it may be possible to shed light upon *how* food was prepared and consumed. However, trying to understand *why* people chose to eat what they did, and whether they enjoyed it, is a far from simple matter. Archaeologists must use many lines of evidence in order to address an issue as complicated as taste. These include the study of material culture, food residues, structural evidence, environmental context, ethnographic analogies, art, medical knowledge and the remains of humans themselves. They are helped in their work

by the very recent development of a raft of new biomolecular techniques for analysing past diet.

This chapter cannot possibly outline all the details of past diets, let alone tastes, for all cultures around the world within the several million years of our prehistory. What it does aim to do is to illustrate how archaeologists can get at issues of dietary taste and flag up a number of significant and interesting issues relating to food and taste within a very broad chronological framework. First of all, it is necessary to discuss our lines of evidence in a little more depth.

The types of food remains that archaeologists find are usually limited to those that are resistant to biological decay. Unfortunately, many food remains, being made up of organic matter, rot away quite easily. Perhaps the most obvious class of remains to survive well are animal bones. Bones are largely inorganic in makeup and, providing the soil is not too acidic, they tend to survive well for many thousands of years. Discarded animal bones can tell us significantly more than simply what species of animal people were choosing to eat. Zooarchaeologists can establish whether animals were wild or domestic, hunted or farmed. They can tell the age and sex of animals and reconstruct the demography of herds. With regard to hunted animals, this might tell us something about the hunters' preferences, whether these relate to good management of the wild herd, the season of the hunt or, indeed, to their particular taste. For farmed animals herd structure is more significant, since farmers will keep different ratios of male and female animals and cull at different ages depending upon what they primarily wish to exploit from that herd. Dairy herds look very different to meat herds or wool herds, for instance. Such husbandry choices will be influenced by economy and environment, but also by taste and cultural preferences. Bones often also bear the scars of butchery. Marks of cutting, chopping and sawing frequently form clear patterns that indicate how a given culture went about dividing up a carcass for distribution and consumption. Butchery is a very culturally engrained practice which, even today, shows very clear

regional differences and can relate to current fashion and taste in meat consumption.

Mammals, reptiles, birds and fish will all leave bones for us to find, but what of invertebrates? Molluscs and some crustaceans will leave their shells. Shells do not provide us with quite the same range of evidence as bones, but, for some molluscs that lay down annual growth rings, it is possible to tell something about age selections and even the season of collection. Insects do not have an inorganic exoskeleton, but one made from protein. This protein, called chitin, is quite tough, however, and tends to survive quite well in soils where bacterial action in limited, perhaps by low temperature, acidity or a lack of oxygen. After careful recovery, insect remains can often be identified to species level. In many cases, these insects were not themselves eaten, but they provide indirect evidence of what was eaten and how it was stored. Insect species are often very specific in their activities and diet, so that different species can be very accurately associated with the presence of particular foodstuffs or animals or storage conditions.

Under normal burial conditions, plant food remains do not survive well. Archaeologists see the best plant remains where biological decay has been inhibited by extreme conditions such as permanent water-logging, desiccation or permafrost. Such archaeological sites are relatively rare, but they open up an invaluable window into the range of organic foodstuffs otherwise missing from most archaeological excavations. Plant foods do survive in normal soils in several forms, however. As a result of cooking accidents, or more major disasters, some plant foods or debris, such as seeds, chaff, nuts and nutshells, will become burnt and carbonized. The carbonized remains retain their shape and can be extracted from the soil and studied. Seeds and nuts can tell us what was being eaten, but waste products such as chaff and weed seeds can tell the archaeobotanist even more. They can indicate how the plant was processed and stored and the presence of different weeds can imply different seasons of ploughing and harvesting. Evidence for plant foods and the general environment

also comes from the survival of pollen. Pollen is best preserved in acidic, anaerobic conditions, but its proteinaceous shell is so hardy that it survives to a certain extent on many archaeological sites. It provides evidence of what was growing in the area of a settlement. Another way in which plant foods leave evidence is through impressions. It is not uncommon to find the impressions of plants in the clay of pottery vessels.

Recently developed biomolecular analytical techniques have opened up new avenues for exploring human diet. Some of these techniques can also be applied to more cultural questions relating to how food was consumed, which, in turn, might tell us something about taste. Fundamental to several of the new methods is a better understanding of stable isotopes. The number of protons in the nucleus of an atom determines which element it is, but some have extra neutrons in the nucleus that make them heavier. For instance, carbon has three isotopes. Carbon-12 has equal numbers of protons and neutrons, Carbon-13 has one extra neutron and Carbon-14 has two. Carbon-14 is not stable and radioactively decays at a known rate. This fact has been the basis of radio-carbon dating which has been used since the late 1940s. Here we are interested in the stable isotopes. For many years it was thought that stable isotopes behaved in exactly the same way in chemical reactions, but it has transpired that, while their chemical properties are the same, many reactions are prejudiced when it comes to atomic mass. Biological tissues end up with different stable isotope ratios as a result of the origin of their constituent parts and the processes they have been through.

This has been revolutionary in facilitating the determination of human diet from the study of human remains. The human skeleton can reveal something about diet without chemical analysis. We can examine the dentition for different wear patterns and signs of decay associated with particular diets. Certain conditions, such as rickets, reveal particular dietary deficiencies and the general health and stature of a population are often related to the quality and abundance of food supplies. The stable isotopes ratios within

bones, however, can give a clearer indication of what was being eaten. The isotopes of carbon and nitrogen are particularly useful in this respect. Carbon isotope ratios can tell us the extent to which people were exploiting marine food, because the carbon cycle in the sea is very different to that on land. Furthermore, this method can tell the difference between two major classes of plants which handle their carbon differently. This has been helpful in identifying the development of maize as a foodstuff in North America, for instance. Nitrogen tells us about trophic level, which relates to how far up the food chain one is. Herbivores and vegetarians are at the bottom, then omnivores of various levels followed by carnivores. If a carnivore eats another carnivore then that is even higher. This happens quite commonly with fish. Pike are carnivorous fish and humans eat them regularly. This would give a very high trophic level.

The other main area of development has been in the study of food residues found in vessels, particularly pottery ones. Fats and waxes, derived from the original contents of vessels, soak into the fabric of pottery where they can survive for thousands of years. For some time, analysts have been able to give a vague indication of vessel contents from the particular fats and waxes present. For instance, they could identify specific waxes from brassicas, the cabbage family of plants, or be able to say the pot contained animal fat. Stable isotope ratios have refined the technique greatly, allowing species of animal to be determined in some cases, or even whether the fat came from meat or dairy products. Alongside this there has also been progress in identifying protein residues. This has been successful in some later prehistoric examples, but the preservation of protein residues tends not to be as good as that of fats. The importance of these methods of residue analysis is that they tie together the consumption of food with material culture in a way that studying bones and seeds does not. We can begin to say much more about cultures, fashions and tastes if we can demonstrate the context of their consumption. What was consumed from fine, decorated wares? What was consigned to

coarse pottery? Which foodstuffs were traded long distance in containers, such as amphorae, and were a valued commodity? Were particular foods associated with ritual or funerary vessels?

How might we be able to see which foods were selected by taste and which by necessity? The two things can be strongly connected. We have a tendency to crave what we particularly need. For example, we get a sweet tooth when quick energy is needed, and so on. However, particular tastes, taboos and fashions might actually become apparent because the nature of particular peoples' food choices seems illogical. Archaeologists who spend a lot of time modelling past environments in great detail and discussing the calorific requirements of past human groups are often labelled as 'environmentally deterministic'. This is meant as a great insult in archaeological circles, since such an approach appears to deny the rich tapestry of human cultural choices. Such studies may seem dull but they are useful, however. Only by knowing all the details of what was available in a given environment and which food resources were the most obvious for exploitation can we begin to identify the fascinating choices that humans make. For instance, if an island society was struggling to live off the resources of the land, then why did they choose to ignore abundant marine resources? It could have been for practical reasons, or due to a cultural taboo or simply a matter of taste. Such a holistic approach allows us to identify interesting questions which can then be investigated in more detail.

Archaeologists often appeal to the ethnographic record for ideas about the ways in which past societies may have behaved. Modern Western culture is very divorced from the kinds of society that existed in prehistory. By studying recent and modern communities that more closely resemble prehistoric ones, in terms of technology and social and economic organization, they hope to be made aware of possibilities beyond their immediate experience. They may even be able to draw analogies. Ethnographic analogy has gone in and out of favour within archaeological circles. It still forms a major part of many archaeological interpretations and is

invaluable in throwing up possible explanations for things modern Western cultures would have little understanding of. However, ethnographic analogy comes with a health warning. Recent and modern 'primitive' peoples are not prehistoric peoples and they are not preserved in aspic. Their cultures are dynamic and are affected by their changing surroundings. Furthermore, the environments in which surviving primitive cultures live are not always a good analogy for the past. For instance, there are no hunter-gatherer groups on record that live in an environment equivalent to temperate Europe. Ethnographic analogies are useful, but should be drawn with caution.

Our earliest ancestors may have had a very different sense of taste to us. What some of us might just force ourselves to eat in life or death desperation may well have been bread and butter to our hominid forebears. Establishing the diet of our very early ancestors is an incredibly difficult task. The earliest hominids date back to around 5 million years ago, in Central East Africa, but there is virtually no evidence relating to their food. Before about 2 million years ago, we can only make crude inferences about diet based upon skeletal morphology and dentition. Although the evidence is not always consistent, early hominids appear to have retained some ape-like tree climbing abilities and studies of tooth wear suggest that plant matter was still a major part of the diet. Perhaps they ate very similar things to modern great apes. One branch of the *Australopithicus* family (*boisei*) gained the nickname 'nutcracker man' on account of its heavy-duty, plant-processing dentition. From about 2 million years onwards, we begin to see more structured archaeological sites, where hominid remains are associated with animal-bone refuse and stone-tool production. Famous sites associated with *Homo habilis* include Olduvai Gorge in Tanzania and Koobi Fora in Kenya. Initially, it was simply assumed that these hominids were hunters and these sites contained the remains of their meals and tools. In some cases this interpretation has been completely reversed. At the cave site of Swartkrans in South Africa, a site dating to about 1.5 million years

ago, large numbers of animal bones were discovered in association with the remains of the hominid species *Paranthropus robustus*. In a landmark volume entitled *The Hunters or the Hunted*, C. K. Brain put forward a very detailed and convincing argument that the cave had originally been just a shaft into the ground that was unsuitable for occupation at the time. Its contents were not the food of hominids, but the food of wild animals including leopards. Indeed, Brain identified leopard tooth marks on a hominid skull. At this site the hominids were the prey. However, this is certainly not the case at many of the *Homo habilis* and later sites, but it is still not entirely clear that hominids were gaining their food from hunting.

Detailed studies of butchery and the carnivore tooth marks on bones from several sites, including Olduvai, show some very interesting patterns. Archaeologists have argued that the cut marks made by stone tools do not match expectations for the butchery of fresh carcasses of hunted animals, as established through ethnographic and experimental studies. In some cases, the butchery is concentrated in areas where meat was limited and carried out in a way that might indicate that the tissues were no longer entirely fresh. More importantly, some hominid cut marks overlie, and were therefore later than, carnivore tooth marks. This all implies that hominids at this date were not great hunters but, in fact, scavengers. They were probably high-ranked scavengers, but were, nonetheless, picking over the largely devoured carcasses of big cat kills that were in less than fresh condition. The debate over the extent to which hominids hunted or scavenged extends at least as far as the Neanderthals, some 150,000 to 28,000 years ago. It is clear that Neanderthals hunted large game, but some suggest that they scavenged too.

The implications for taste are blatant and simple. Prehistoric people had a stomach for things we would not dream of eating today. They would regularly eat things that we would think had gone off. We can demonstrate that they ate semi-rotten food, but did they enjoy it? It is highly likely that they did. While researching

early horse domestication in Kazakhstan, this author was offered a bowl of koumiss by a local horse herder. This is a drink made from fermented mare's milk. To the modern Western palate it is utterly vile. It provokes all the body's natural reactions to rotten food. Traditional Kazakhs love it. The herder was asked why he did not drink the mare's milk fresh. The answer is actually obvious; they cannot keep the milk fresh without a refrigerator. However, he had obviously never thought about it and paused before replying that the fresh milk tasted of nothing. The above discussion was about early hominids scavenging from potentially semi-putrid carcasses, but the point about acquiring the taste for 'off' food is relevant for the whole of prehistory and beyond. It is clear that some prehistoric peoples stored food very little, but there is also evidence of various storage methods such as smoking and drying. Also, they simply tolerated food that we might define as being 'off'. Some of the entomological evidence can attest to that. Taste depends upon what one is used to.

Whether from hunting or scavenging, it seems that the quantity of meat in the diet may well have significantly increased from the time of the tool-using *Homo habilis* onwards, when hominid brains start to get much larger. One theory, called the 'expensive tissue' hypothesis, suggests that eating more meat allowed hominids to evolve a smaller digestive tract. The gut uses up a lot of metabolic energy and the hypothesis suggests that wasting less metabolic resources on digestive tract has allowed for development in another type of expensive tissue, the brain. It is possible to extend this theory further and suggest that the first cooking of food would have made food even easier to digest. The first use of fire for warmth and cooking is attributed to *Homo ergaster/erectus*. The most famous early site with evidence for fire use is that of the Zhoukoudian cave in China, dating to between 500,000 and 240,000 years ago. Leaving evolutionary biology aside, the introduction of cooking clearly takes discussion of taste to a new level. People from that time onwards did not just choose what to eat, but how they liked it cooked. While with *Homo erectus* this decision may have merely

been between rare and well done, the technology and variety of cooking method would soon have as significant an influence on decisions of taste as the ingredients used.

With the arrival of *Homo sapiens*, between around 100,000 and 12,000 years ago, depending on where one is in the world, the debate about scavenging subsides somewhat. Our own species may well have opportunistically scavenged on occasion. This cannot be ruled out, but it is clear that we were highly effective hunters and gatherers from the start. The diet of hunter-gatherers varies tremendously depending upon the environment in which a particular group lives. In general, however, diets tended to be much more protein rich than we are used to. Hunting largely supplies protein, with accompanying animal fat. Important plant foods like nuts contain a balance of protein, fat and carbohydrates. Good sources of carbohydrate tend to be more limited. Wild seeds, fruits, roots and tubers will be the principal source, and many of these are only seasonally available. Modern Western diet, of course, is based upon farmed staples that are very high in carbohydrates. Carbohydrates are the easiest source of energy to our bodies and, in the form of sugar, they are even more easily metabolized. Modern Western society has an (over) ample supply of refined sugars. There is strong evidence that many hunter-gatherer groups in the past would, at certain times of the year, not only *need* sources of fat and sugar, but would have *craved* them. Necessity may well have driven taste.

Today, in the modern Western world, fat tends to be seen as a dietary villain. Fat is bad for our health and bad for the body beautiful. It is very high in calories and blocks our arteries. This paradigm is shifting, however. *Dr Atkins' New Diet Revolution* (1992) was not the first diet book to suggest that eating plenty of protein and fat, along with a low carbohydrate intake, was a healthy thing to do, but it was the first to catch on in a big way. Science is taking its time to catch up, but, at the time of writing, a number of properly controlled, independent, long-term studies have been published that back up Atkins's claims. This author

was not at all surprised. Viewed over the *longue durée*, it is the modern combination of vast quantities of refined carbohydrate with high-fat foods that is anomalous, not the diet Atkins proposed.

While no hunter-gatherers would have quite the access to carbohydrates that we do today, some had better sources than others. Those who lived principally from hunting animals, particularly high-latitude or Ice Age hunters, would have had very limited access to carbohydrates indeed. Small amounts would have been seasonally available from nuts, berries and a few other plant sources. A further, and critical, problem is that the animals they were hunting would be, for much of the year, rather lean. Eating just lean meat (protein) is very problematic. Digesting protein alone for energy is actually very inefficient and, if sustained, can cause damage to the liver and kidneys, dehydration, loss of appetite (even though one is starving) and the digestion of one's own muscle mass. Adding some carbohydrate to this diet is the best way to prevent these problems, but that was not an option for many hunting communities. Fat also has a 'protein sparing' action and a certain amount of fat is necessary in the diet. The body requires some 'essential' fatty acids and fats are also a good source of vitamins such as A, D, K and E. Seeking good sources of fat is the only solution in this situation.

Ethnographic accounts of hunters the world over suggest that it is often the fattiness of the animal that is most important, not how much meat it yields. Hunters tend to target animals they perceive to be fatty and will often test their kill, by cutting to the fat layer under the skin, to see if they were correct. If the animal turns out to be lean they may even abandon it entirely. Having warned against the inappropriate use of ethnographic analogies, it seems safe to use one here because this pattern is so universally present and the accounts so broad-ranging, from Alaska to Africa and Siberia to Australia. We have little experience of the problem, but pioneers in North America knew it all too well. During Lewis and Clark's famous coast-to-coast exploration of the continent between 1803 and 1806, Lewis writes in his journal

on 17 April 1805: 'we met with a herd of buffalo of which I killed the fattest I conceived among them; however, on examining it I found it so poor that I considered it unfit for use and only took the tongue.' On 25 April 1805 he wrote: 'we met with two large herds of buffalo, of which we killed three cows and a calf. Two of the former were but lean; we therefore took their tongues and part of their marrow bones only.' The tongue and marrow bones (see below) were the best sources of fat. The rest was left to rot. Captain Randolph B. Marcy also discusses the issue with some clarity in his 1859 work *The Prairie Traveler*: 'We tried the meat of horse, colt, and mules, all of which were in starved condition, and of course not very tender, juicy, or nutritious. We consumed the enormous amount of between five and six pounds of this meat per man daily, but continued to grow weak and thin, until, at the expiration of twelve days, we were able to perform but little labor, and were continually craving for fat meat.'

He not only needed fat, but *craved* it. The ethnographic record shows that fat is fairly uniformly liked by hunter-gatherer peoples. Indeed, despite decades of medical advice, most people in the modern Western world secretly, or not so secretly, enjoy fatty foods. It is very safe to conclude that fat sources were both important and very much to the taste of most prehistoric groups.

In fact, there is plenty of evidence that prehistoric peoples went to great lengths to exploit fat sources. One of the most reliable sources of fat in an animal is the skeleton. Long bones contain marrow cavities and marrow is primarily fat. Inside the ends of long bones and in the vertebrae and ribs there is spongy bone, which is also largely filled with fat. When an animal is starving it uses up the fat beneath its skin and surrounding its muscle first, before mobilizing the fat in its bones. Even an animal that dies of starvation will still have much of its bone fat remaining. That is why Lewis, and most hunter-gatherer groups, targeted the marrow bones. To obtain the marrow is simple: you break the shaft of a long bone and poke the fat out. However, fat is so important that many hunters wanted to exploit the fat trapped within the spongy

bone as well, and this is very difficult. To do this you have to break up the bones into little pieces, which is a very labour-intensive job. The fragments then have to be boiled in water to render out the fat, which floats to the surface and can be skimmed off after cooling. This may not be difficult in a modern context, but in an early prehistoric context, without metal cauldrons, this had to be carried out in pits, buckets or pots by heating up rocks and adding them to the water to bring it to the boil. This involves an incredible amount of effort and fuel for a relatively limited amount of fat. This practice, well known from many ethnographic and archaeological examples, leaves a very clear pattern in the archaeological record. There are large amounts of fire-cracked rocks, which were used to boil the water, mixed with lots of bones that are broken up in a very particular way.

Prehistoric hunter-gatherers not only had a particular taste for fat, but they would also have had taste preferences for particular kinds of fat. Several ethnographic accounts relating to Inuit and other Native American groups make it clear that the grease extracted from limb bones was preferred to that produced from vertebrae and ribs. The quality is related to levels of blood production that occur within those bones and the actual types of fat present in marrow or grease. The make-up and texture of the fat changes as you move down the leg of an animal. Just as we might discuss the best cut of meat, prehistoric people might well have been as interested in the choicest marrow and grease. These preferences are not just hypothetical, and can occasionally be seen in the archaeological record. This author has studied a bone assemblage from Greenland, where grease rendering was occurring on a large scale. However, it seems that the ribs were avoided almost entirely. A lot of blood is produced in ribs, and the grease rendered from them has a reputation for being rather poor. This selection was probably largely driven by taste.

We can also be fairly sure that prehistoric hunter-gatherers had something of a sweet tooth. It is no accident that the taste buds that sense sweetness are on the tip of our tongues. Their

presence there is an adaptive trait in our evolution. As outlined above, carbohydrates were in limited supply to hunter-gatherer populations in most environments and, in particular, sugar-rich foodstuffs were rare. Carbohydrates are very easily metabolized for energy and sugars are particularly easily absorbed. Carbohydrates are not only good because of their 'protein sparing' action, but they are also good to help people fatten up. People put on fat when their blood-sugar levels are high. Most modern people are not aiming to put on weight, but your average hunter-gatherer wants to provide an energy buffer for hard times. A taste for sweet things would have advantaged early humans in terms of natural selection. Sugars are relatively rare in the natural environment, but a sweet tooth would predispose an individual to seek them out, hence advantaging that individual over others. The ethnographic record shows that hunter-gatherers, such as the San and Hadza in Africa, will target sweet foods when they are available with a great enthusiasm and put on weight as a result. This genetic trait serves many modern societies less well. We have a vast supply of refined sugars and we lap them up in huge quantities, getting ever more obese. People very often ask why all the tasty food is bad for us. Well, it is because sweet and fatty food was hard to come by back in our evolutionary past and our prehistoric forebears really needed it. Unfortunately we have a glut, but still cannot help ourselves.

In prehistory, sources of sugar would have included fruits and berries, honey, maple syrup and a few other plant extracts. Collecting berries is simple enough and they are even storable by drying them. Berries can also be incorporated into pemmican. Pemmican is a well-known prairie food made from pounded dried meat, rendered animal fat and berries. Maple syrup is also known to have been added by some Native American groups. Pemmican is a high-calorie and very nutritious blend of protein, fat and carbohydrate, with a good range of vitamins, and stores really well. Direct evidence for prehistoric pemmican does not exist, but we know all the ingredients did. It seems very likely that it has

been an important recipe for thousands of years. The evidence for the use of fruit and berries comes from the remains, usually carbonized, of seeds and pips.

Collecting honey is a risky business, as bees are genuinely dangerous, and particularly so in the absence of protective clothing. It is likely that the use of smoke to calm bees is a very old tradition. The Hadza of East Africa certainly employ this technique, with various degrees of success. The danger underlines the importance, or perhaps desire, people bestowed on this food. We have archaeological evidence for the gathering of honey. At Cueva de la Arana in Spain there is a very late hunter-gatherer (*c.* 7,000 years old) cave painting of an individual collecting honey from a tree, with bees buzzing around. The painting is a little stylized, but what is depicted seems clear enough. In later periods in prehistory there is some evidence for bee keeping. Bronze Age, wickerwork beehives have been recovered from wetlands in Germany. Residue analysis of pottery might yield yet more evidence, as beeswax is decay resistant and chemically recognizable. There is also a very characteristic suite of pollen associated with honey, since bees visit a very particular set of flowers to collect their nectar and inadvertently collect pollen too. A number of Bronze Age vessels have been recovered from Scotland which contained pollen that could be associated with honey.

The land was not the only source of nutrition in prehistory. The sea is an exceptionally rich provider of food, including sea mammals, fish, molluscs, crustacea and even seaweed. Sea mammals and fish, in particular, have a distinct advantage over terrestrial quarry due to their constant fattiness. Sea mammals are covered in blubber and many fish are very oily. The extreme difficulties of trying to find sufficient fat to supplement an overabundance of lean meat simply do not apply in this context. Certain species of fish, including the cod family (gaddids), can be easily preserved by simple air drying, in appropriate climates, to produce what are called 'stock fish'. Blubber and fish can be rendered for oil, which can be stored as a foodstuff or fuel. To acquire some marine foods

necessitates one to be sea-going, including harpooning or net fishing from boats, but other food can be obtained from the shore. Seals come ashore during their birthing season or can be hunted through sea ice. Whales sometimes beach themselves. Fish can be caught by hook or collected *en masse* in estuarine fish traps. Shell fish and some crustaceans can simply be collected at low tide. A great advantage of living by the coast is that you have access to all of these marine foods, but also access to terrestrial ones as well.

Many hunter-gatherers that live in a purely terrestrial environment find that they have to move around constantly to find sufficient food. However, there are plenty of archaeological examples of hunter-gatherer communities that had a very settled existence on coastlines, estuaries or, indeed, major rivers. An example of a sedentary hunter-gatherer site on a river is Lepenski Vir on the Danube and there are many examples of sedentary coastal settlements. One of the most famous hunter-gatherer cultures to have lived a settled existence by the sea is the Ertebølle Culture in Denmark. The Ertebølle belongs to the very late Mesolithic period (*c.* 4500 BC), when Neolithic farmers had already moved into areas of inland central Europe to the south. We know that the Ertebølle people traded with the farmers for things such as polished stone axes. The Ertebølle people had permanent base camps, usually strategically placed to take advantage of both marine and terrestrial environments, and a series of smaller, temporary camps they used to exploit particular seasonal resources. Because of waterlogging, there is very good preservation at some Ertebølle sites. We know that they had sophisticated estuarine fish traps that employed wooden hurdles to channel fish into baskets, because some of these arrangements have survived for 6,000 years in relatively good condition. Common features of these late Mesolithic coastal cultures are shell mounds. So many shellfish were collected that they formed huge mounds of waste shells. Many of these mounds are still obvious today in many parts of the world.

Some shell mounds are very old indeed. Some, in South Africa date back to around 100,000 years ago, while there are

examples in Australia and Papua New Guinea that date to around 35,000 years ago. However, sedentary settlement of coastlines by hunter-gatherers and the mass exploitation of marine resources are generally seen as post-glacial, late Mesolithic phenomena. Why is this? Did people not have the taste for marine food before then? Some archaeologists have suggested that, as populations increased after the end of the Ice Age, hunter-gatherer societies became more complex, stratified and sedentary. This social change led to settlement, where the resources were good, on the coast. Many see this stage as part of a linear progression of increasing complexity that leads on to the adoption of farming. The truth of that matter may well have nothing to do with either changes in food preferences or society.

At the end of the Ice Age, as the glaciers melted, sea level rose considerably. It is still rising. The simple fact of the matter is that the vast majority of Palaeolithic and early Mesolithic coastlines are now underwater. So, when we compare Ertebølle with earlier neighbouring sites, it is not surprising that they do not look the same. The earlier sites were miles from the sea. It is very possible that much earlier, marine-based sites are sitting there on the sea bed waiting for us to develop techniques that allow us to investigate them. Indeed, this is beginning to happen. Late Palaeolithic cave art from sites such as Lascaux (France) and Altamira (Spain) famously portray animals such as bison, horses, aurochs and deer. These are all terrestrial animals that we know that people hunted and ate. In 1991, however, a diver called Henri Cosquer found an underwater cave off the French coast near Marseilles. Cosquer Cave, as it is now known, contains spectacular Palaeolithic pictures of marine life including seals, fish, auks and jellyfish. Recent inter-tidal and underwater excavations off the coasts of Denmark and southern Sweden are also showing that significant coastal settlements existed before cultures such as Ertebølle.

In the Americas, there are now alternative hypotheses for the peopling of that continent. Orthodoxy, based upon assumption and very little evidence, has always suggested that land-based

hunters arrived in America by passing across a land bridge from Asia. It is now clear that there are many very early coastal sites along the west coast of North America providing an alternative route that exploited marine foods. Even more controversially, but surprisingly plausible, once the evidence and ethnographic parallels are taken into account, it has been suggested that European Solutrean hunters could have made their way along the Atlantic sea ice to North America by exploiting marine resources in a way much like modern Inuit. Many other examples could be given. In particular, much could be said about marine resources and the peopling of Australasia. What is clear is that seafood has been enjoyed and valued by people for a very long time. The exploitation of marine and coastal resources probably played a major part in early human colonizations around the world.

It should be stressed that hunter-gatherer diets vary greatly, but we have identified a number of themes in taste that can probably be applied across a wide range of past cultures in different regions of the world. As discussed, hunter-gatherers would have particularly needed, and probably craved, both fats and carbohydrates, particularly at certain times of the year. But what would happen if the balance of diet suddenly shifted as it did with the advent of agriculture? As agriculture spread, so did the mass availability of carbohydrates, and, furthermore, carbohydrates that could be stored for use year round.

There are a number of places in the world where people independently discovered how to farm plants for food. The big three are the Near East, Central America and China. In the Near East, about 10,000 years ago, cereals such as wheat and barley were first domesticated. Between around 9,000 to 8,000 years ago important staples such as maize and beans were first farmed in Central America and rice was first cultivated in China. However, there are other later centres of plant domestication, such as potatoes in the Andes, sorghum in Sub-Saharan Africa and a few other significant examples. The idea of farming, and the raw materials needed, spread from these various foci. In the actual centres of

domestication, the wild versions of the crops would have already played a major role in peoples' diets before farming. However, in areas where farming was introduced, those foodstuffs would be very novel indeed. Imagine life without bread, potatoes, corn or rice and then imagine what it was like suddenly to have such commodities introduced in quantity, along with a completely new way of life. There is, of course, a vast amount of academic debate over the nature of the transition to agriculture in different regions of the world. There is argument over the speed of change, how complete the transition in economy initially was, and whether farmers moved and colonized land originally inhabited by hunter-gatherers. It is beyond doubt, however, that some areas adopted farming rather quickly and fairly completely. It could be argued that this is the case in southeast and central Europe, for instance, while the situation is rather more complex in Britain and even more confused in Scandinavia. Some of these dietary changes can be investigated with the use of stable isotope studies of human remains. A clear shift from marine to terrestrial diets is seen at the start of the Neolithic in Britain (*c.* 4000–2500 BC), for instance, and the arrival of maize is equally clear from carbon isotope ratios in American studies.

From the point of view of taste, it is interesting to know the extent to which we are dealing with farmers moving and colonizing or with indigenous peoples adopting a whole new range of foods and tastes. It is clear from the archaeological record that both things happened, depending where and when we are talking about. What is clear is that some groups adopted the new staple foods to the exclusion of many other possible resources. In the early Neolithic of Europe and the Near East, the result of the new diet appears to be a general decline in health. The new, carbohydrate-rich diet certainly resulted in many more dental caries (almost absent in the Mesolithic) and other health problems that could be associated with nutrient deficiencies. A more extreme case relates to early farmers in the South West of the USA. During the 'Pueblo II' phase, dating to around the eleventh century AD, the

conditions for maize cultivation were good and the inhabitants of the area ate little else. They had beans as well, but did not do much with them. All the evidence points to an absolutely monotonous diet of corn and yet more corn. Archaeologists have also noted that they had little variety in the way they cooked it. There are no structures that indicate the production of bread. They just ate ground, boiled corn. The result was very bad health indeed. They were getting plenty of calories but were deficient in many other nutrients and had lots of dental problems. After a period of drought, and temporary abandonment of the area, the 'Pueblo III' people who returned to the area had a much broader diet and were clearly in better health.

We can ask ourselves a number of questions about this. There are three possibilities from the perspective of taste. Firstly, they may have really liked their carbohydrate-rich diet and been perfectly happy with it, even if it was monotonous. Secondly, taste actually may have been much less of an issue then than it is now. Perhaps some people in the past cared little about taste at all. Lastly, they may not have liked the monotonous diet but were forced through economic circumstances to put up with it. This final suggestion does not really fit the evidence. The Pueblo II people had lots of resources. It has already been suggested that early humans might have evolved to like carbohydrate and fat. Perhaps this abundant source of carbohydrate did satisfy their taste and satiate them to the exclusion of other possibilities. However, such a concentration was certainly bad for health. A worse situation has befallen modern Western cultures, however. If we are hard-wired to like carbohydrates, we are even more fond of sweet things (as argued above). From the late nineteenth century onwards, refined sugars became very widely available in large quantities. Our sweet tooth has led us into consuming vast amounts of sugar, alongside an otherwise rich diet. The result of this is obesity and diabetes. Prehistoric tastes for carbohydrate rich diets may have led to health problems in the past, but we are facing a similar issue today.

The farming of animals came very slightly later than plant agriculture. Goats, sheep, cattle and pigs were all domesticated in the Near East between about 9,000 and 8,000 years ago. Horses and Bactrian camels were domesticated in Central Asia between about 6,000 and 5,000 years ago. Horses, it seems, were initially domesticated for food. The chicken was probably domesticated in Southeast Asia around 8,000 years ago, followed by the duck about 3,000 years later. Some other foci of domestication include turkeys in Mexico, llamas and guinea pigs in the Andes, rabbits in Europe and the reindeer in Scandinavia and Russia. Once again, generalization about the spread of livestock farming is not easy. In the Near East there was a period of time where only plant agriculture took place, but by the time farming arrived in Europe it was spreading as a package of mixed farming, and the degree of emphasis on plants or animals varied from region to region. On the other hand, in North America, the farming of plants continued without domestic animals. Plains Indian villages of about AD 1000, for instance, were large settled communities with maize and bean crops but animal products still came from hunted bison and deer. Conversely, in Central Asia, the economy was based on the husbandry of horses, cattle, sheep and goats, and agriculture was only introduced to areas of the steppe by Stalin, by force, in the mid-twentieth century.

Based upon the modelling of Neolithic herd structures in the Near East and southeast Europe, it appears that animals were initially simply kept for their meat. They were effectively 'walking larders'. Animals could be fed with crop waste or surplus grain and the animal would turn it into meat and keep that meat fresh (by living) until it was needed. Some archaeologists have proposed that there was a major change in animal husbandry at the start of the Bronze Age in these regions. This has become known as the 'secondary products revolution'. The secondary products in question are milk, wool and animal labour but we shall focus upon dairying here. In the Bronze Age in southeast Europe (*c.* 3300–1000 BC), it appears that herd structures changed to reflect animal husbandry

that most appropriately fits a model of mixed meat and milk exploitation. It is clear, however, that by the time the farming package reached other regions of Europe, milking was already established. Analysis of animal bones from British Neolithic sites always hinted at possible dairy herds, but a recent programme of pottery residue analysis indicates that milking was widespread from the very outset of the Neolithic in that region.

The adoption of dairying is very closely tied to an issue of taste. If we look at peoples of the world today, we find groups, including many in the Far East and others in parts of Africa for example, who absolutely abhor milk. Underlying their disgust is a digestive problem. They are intolerant of lactose, the sugar in milk, because they lack the ability to manufacture lactase, the enzyme that digests it. Milk makes them feel nauseous. On the other hand, north-west Europeans and many other groups have high levels of lactose tolerance. This is clearly a local evolutionary adaptation. The interesting thing is that all our early ancestors were lactose intolerant as adults. Humans, like many other mammals, lose the ability to digest milk soon after weaning. The big question is how humans overcame this problem in various regions to become reliant upon dairying economies? If humans were all naturally disgusted by milk, who first tried it and why? How did those groups develop the taste for a diet of dairy products?

It is important to stress that lactose intolerance is not the same thing as milk allergy. Somebody who is allergic to milk can suffer very serious reactions, but lactose intolerance only results in discomfort. In fact, lactose intolerance does not stop milk being digested as a food. Studies have shown that lactose tolerance does increase in intolerant people when they are regularly exposed to milk products. An individual can adapt to milk drinking, to a certain extent. In the long run, those genetically predisposed to lactose tolerance might also be evolutionarily favoured within pastoral societies. It is clear, therefore, that past groups could become adapted to milk consumption. This still does not address the question of overcoming an initial lack of tolerance or taste

for milk. Of course, milk does not have to be consumed in its raw state. Indeed, cultured and fermented dairy products, such as yogurt, buttermilk, sour cream, kefir and the aforementioned koumiss, involve the breaking down of lactose by bacteria or yeast in advance of consumption. This clearly would have reduced problems associated with lactose intolerance, but this raises further questions about who would have first tried such products? This again suggests that our prehistoric forebears may have had a different perception of the strong tastes associated with 'off' food. We have lots of ethnographic information about dairying and its role in many world societies, but it is difficult to identify the manufacture of cheese, yoghurt and other products in prehistory. Fat and protein residue analyses can only tell us whether a milk product was present in a vessel, not what type it was. Zooarchaeology can only hint at milk production, not what was done with it. There are some European Bronze Age pottery 'strainers' that have been identified as possibly being associated with dairy processing, but there are alternatives to this interpretation. There is much we can speculate on, but it is clear that milking was widespread in some early farming communities.

Returning to fermentation, sugars can be turned into alcohol. No chapter on prehistoric taste would be complete without a discussion of the origins of brewing. In the Old World, brewing is certainly well in place by the time of the first great proto-historic civilizations. In the third millennium BC, Sumerian and Akkadian texts make reference to beer that was probably made from barley. There are Mesopotamian illustrations of beer-drinking straws and Predynastic Egyptian models showing brewing vats. By classical times, large quantities of wine were being traded great distances in specially produced amphorae.

The evidence for prehistoric periods is rather less clear. In Europe, the arrival of alcoholic drinks is often associated with the spread of a particular type of pottery in the late Neolithic and early Bronze Age (2500–2000 BC). 'Beaker' vessels spread across most of central and western Europe at this time and, due to their design,

these have long been thought of as drinking vessels. The deposition of beakers in funerary and ritual contexts implies that their function had some social importance. As well as pottery beakers, with or without handles, there are a number of very fine gold beakers from this period. Several beakers from British sites have produced residues containing high concentrations of immature pollen, which might be indicative of the presence of honey and meadowsweet that is known to be used as a flavouring for mead. This evidence has been used to strengthen the argument that beakers were associated with the early consumption of alcoholic beverages. In Egtved, Denmark, a Bronze Age grave of a girl has been excavated revealing excellent levels of preservation. A bucket made from bark was recovered that contained the remnants of cranberries, wheat and honey. This too could be the residue of a brewed drink. The antiquity of fermented-milk drinks such as koumiss (from mare's milk), shubat (from camel's milk) and kefir (from cattle milk) is hard to prove, but it seems likely that such drinks date back as far as the origins of milking itself, since it may actually have been quite difficult to prevent the milk from fermenting. All the archaeological, historical and ethnographic information we have suggests that alcoholic drinks have always had great social significance. Intoxicating substances are clearly going to be viewed differently to other foodstuffs, particularly in times before their powers were understood. If the association of 'beakers' with alcoholic beverages is correct, then it is not surprising to find drinking vessels associated with high-status and ritual sites. Where does this leave taste? It is impossible to know what prehistoric people thought about the taste of alcoholic drinks. Today it is often said that such drinks are an 'acquired' taste, and one tends to acquire the taste for social reasons. The same may be true in prehistory.

As well as looking at the varieties of food available to prehistoric peoples and the evidence we have for their likes and dislikes, it is worth examining the evidence for the addition of herbs, spices and flavour enhancers. Salt, the most obvious flavour enhancer, is

very difficult to study archaeologically. Being so soluble, it tends not to leave residues and there is no way to identify its consumption from the human skeleton. We are reliant upon identifying salt-production sites. Salt can be mined as rock salt, but is more commonly produced by evaporating salt water from the sea, salt lakes or brine springs. In suitable climates, solar evaporation is possible. Natural evaporation of the salt lake at Zuñi, New Mexico, has probably provided salt at that sacred Native American site for thousands of years, while, in Early Formative, prehispanic sites in Veracruz, Mexico, pottery trays were manufactured for the purpose of solar evaporation. In prehistoric Europe there is evidence of salt production dating back to the Neolithic, but there is much clearer evidence from the Bronze and Iron Ages. The evidence takes the form of 'briquetage', which is coarse pottery formed into crucibles, pans and pillars. Briquetage is known from historic periods too. The pillars are intended to support the vessels above a heat source to encourage evaporation. Important European salt-production sites are often recognizable from the use of the Latin, *sal,* or Greek, *hals,* for salt. The Austrian site of Hallstatt lends its name to a whole period in the late Bronze Age and early Iron Age. The site and region is heavily associated with salt production, which may have led to the wealth that is displayed in the prehistoric cemeteries there. Salt was clearly valued, but it is a little less clear what it was valued for. As well as being a flavour enhancer, it is also a preservative. It is, however, clear that salty food was probably a feature of prehistoric diet.

The use of herbs and spices is even more difficult to assess archaeo- logically. There are many plants that can be used as flavourings and we use many still today. Pollen analysis will indicate that such plants were available in the past, and the survival of seeds might show that they were actually present on an archaeological site, but we have very little direct evidence for their use in cooking in prehistory. Linear B tablets from Mycenae provide us with some of the earliest evidence for their use. They refer to the use of coriander, cumin, fennel, sesame, celery seeds, mint and other

herbs and spices. It is clear that some were used in cooking, but the records show that they were also employed in the production of scented oils. In the Americas, the chilli pepper is an example of a flavoursome plant that was farmed in prehistory. It was domesticated along with maize and squashes in Central America, where it was clearly used in cooking. Interestingly, however, it was not adopted as a crop further north until the Spanish introduced it. Was this a matter of taste? The use of herbs and spices in the past is further complicated by their use as medicines. In most cases, we are left unsure whether a given plant was used for flavouring, medicine, preservative, perfume or any combination thereof.

A problem that archaeologists face is that we know very little about prehistoric recipes. We know about the ingredients, but rarely get evidence for how the ingredients were combined to make the actual dishes people ate. On the whole, archaeologists are reliant upon ethnographic analogies when reconstructing possible recipes. Pemmican, described above, is a good example of a recipe we see ethnographically that most likely existed in the past, but proving it is difficult. Very occasionally we do find the burnt remains of a finished food product, rather than just ingredients. Burnt bread is not uncommon, for instance. It is, however, possible to tell a certain amount about cooking methods from studying cooking utensils and structures. Cooking pots can tell us about boiling and chemical residues in the pots might tell us what was boiled. A wide variety of different oven and baking structures have been identified. These range from simple pits heated by hot rocks to complex, clay ovens. Bones sometimes provide us with evidence of the way meat was cooked. For instance, at the British Neolithic ritual site of Durrington Walls in Wiltshire it seems the people had a passion for roast pork. Pig bones dominate and they appear to have been butchered into joints. Only the bone ends are charred, suggesting that joints were roasted over the fire but the bone was only subjected to heat at the ends of the joint where it protruded out from the roasting meat. Feasting seems to have been one of the ritual activities that took place at this site.

Feasting and fine dining can be very important aspects of social activity in any society. Feasts can be used to display wealth and status through the conspicuous consumption of food and drink. Such display might involve eating rare, exotic or expensive foodstuffs. Alternatively, social status might be displayed through the finery of eating accoutrements. In this context, taste might not simply be an issue of what is favourable to one's palate, but a matter of fashion. Fashionable taste, and the wealth to support it, is often a mark of distinction in a class-based hierarchical society. Feasting certainly occurs in hunter-gatherer societies. For instance, Native Americans of the northwest coast, such as the Tlingit or Chinook, celebrate a feast called 'potlatch'. At these feasts gifts are given and much food is consumed. The events are usually designed to re-enforce social positions, but are also a forum for rivalry between powerful men, based upon levels of conspicuous consumption. We cannot prove it, but when we see evidence of mass consumption archaeologically, that apparently happened as a single event, we might well wonder whether such politics were being played out over meals in prehistory too.

The politics of feasting and fine taste certainly played their part in the formation of complex societies and the rise of civilization. In the Greek Bronze Age, for example, we see the rise of hierarchical societies based around palaces and these grow into the great Minoan and Mycenaean civilizations. The arrival of the first palaces is accompanied by a very obvious change in drinking and dining wares. Earlier in the Bronze Age, pottery was nice enough and was well made, but it was all very much on the same level. As palaces arrived, so did a clear pyramidal hierarchy of eating and drinking vessels. There are just a very few exquisitely fine pots, turned to be very thin-walled indeed, then a larger number of moderately fine wares, more coarse pots, and so on. As these pots tend to be found mixed together, it is possible that people are still feasting in large groups, but it is clear that the status of some is being displayed by what they are consuming their food from. Perhaps in the future, residue studies will reveal if they were eating

and drinking different things too. Zooarchaeology has provided us with some evidence in this direction. In the Neolithic in Greece animal exploitation was concentrated upon domestic species, but the proportion of wild species significantly increases in the Bronze Age. This was certainly not economically necessary and this trend has been interpreted as representing the establishment of hunting as an elite sport. These new elites were affirming their position through exclusive tastes.

Such behaviour had effects well beyond Greece. Similar fine tastes appear to have been adopted in Bronze Age chiefdoms in central Europe. Elites started to import fine drinking wares from the palatial societies to the south. Extra value could be placed on such imports because of their exotic nature. Similar elite tastes are apparent in the 'barbarian' world that lay outside the Roman Empire. For instance, in the late Iron Age in Britain, prior to the Roman invasion, tribal chiefs clearly imported Roman goods including fine tablewares such as Samian pottery and amphorae. The amphorae, of course, were imported for their contents and may represent new elite tastes in foreign foods and wines, not simply dining habits.

In periods before people recorded their thoughts, we will only ever be able to speculate on matters of taste. However, archaeologists have come a long way in being able to reconstruct past diets and much more will be possible in the future with advances in biomolecular analyses that will allow us to gain a much more holistic view of food production and consumption. Most studies of prehistoric food have concentrated upon economic aspects. Such studies were all about how people survived but, while this aspect is still very important, it is clear that mere survival is not what life is all about. Recent trends in archaeological research have stressed the important differences between 'food' and 'diet' and have drawn attention to the social context within which food is consumed.

It seems that some matters of taste may well have been heavily influenced by hard-wiring relating to our evolutionary past or our dietary needs, while others were dictated by environment

and availability. However, it is equally clear that there was a rich tapestry of choice in tastes operating in prehistoric societies. Such choices were driven by many social forces. Foods and drinks used in feasting might be chosen for their quality, exotic nature or even intoxicating qualities. Prestige in dining could have derived from quantity, rarity, novelty or fashionability of either the foodstuffs or the eating accoutrements. Religion and taboos would have played their part. Hardest to study of all, there must simply have been individual likes and dislikes, just like any of us have today.