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Sowing and Sunrise

I travel to the German city of Halle to learn more about the first farmers in Germany, those known as the people of the Linear Pottery (LBK) culture, after the patterns on their pottery.

The Museum of Prehistory in Halle, founded in 1819, is said to be the oldest of its kind in the world. A solid edifice with huge sandstone pillars, it embodies the weight of tradition. Though the building itself is old, the displays are state of the art, accessible and based on sound educational principles.

One of the display cases contains a small wooden model of a typical building from the time of the Linear Pottery culture. It is a wooden longhouse built on posts, its outer walls attractively decorated with red and white zigzag patterns. Pressing a button next to the display case brings forth sounds that evoke life in the longhouse: intermingling voices, children's laughter, millstones grinding, the lowing of cattle and the cries of a goat being slaughtered.

A similar scene is depicted in a large picture on the wall painted by a talented artist attached to the museum. It shows the farmers of the Linear Pottery culture clad in simple hide garments, with red patterns on both their clothes and their skin. Bearded men are slitting a goat's throat. Men and women alike have long hair. Dogs, cows, sheep and goats wander about freely, but the people can avoid their animals by climbing into their stilt-house. Its walls are adorned with the skulls of cattle and geometric patterns painted in red pigment.

Bernd Zich, an archaeologist and the director of one of the museum's departments, guides me through the exhibitions and tells me about the first farmers in the region we now know as Saxony-Anhalt.

They arrived 7,500 years ago. The traces they left behind them stand in strong contrast to those of the hunters already living in the area. From the very beginning the farmers were fully equipped with a complete 'package' of agriculture. They kept cattle, sheep and goats, and they grew wheat and leguminous crops.

Zich believes the conceptual world of the farmers of the Linear Pottery culture was very much based on astronomy. Growing crops made it especially important to keep track of the sun and the solar year. They needed to know the right time for sowing. As farmers, they needed to plan ahead far more than the hunters had done. It was not enough just to rely on the path of the moon, as the lunar year does not correspond exactly to the solar year. Relying solely on the path of the moon would put you a whole month out after three years. That was why the vernal equinox, the summer solstice, the autumn equinox and the winter solstice were hugely significant.

In the areas inhabited by the farmers of the Linear Pottery culture, archaeologists have found the remains of several large structures that they call solar observatories. The best known of these is Goseck. It has been reconstructed to show how it once looked. On my second visit to Halle, I hire a car and head out there.

It is late November, with about four weeks to go until the winter solstice. The weather is cold and windy. First of all I visit the castle, which houses a small museum. The lady selling tickets at the entrance looks almost shocked to have a visitor on a Sunday in late November. There are no other visitors to be seen inside – a pity, as there is much to be learned here about the world's oldest signs of astronomical observation. Goseck is considerably older than the Egyptian pyramids and its better-known English counterpart, Stonehenge. On a map, researchers have marked all the solar observatories that have been identified from the time of Europe's first farmers – a dozen of them. The one furthest south is in Hungary, while the most northerly one lies outside Berlin.

All the observatories resemble one another, though there are minor differences. The basic pattern comprises a series of circles – an embankment on the outside, followed by a deep ditch, with concentric rings of tall oak posts set close to each other inside. At Goseck, the outer bank seems to have been used as a burial place. Archaeologists have discovered several vestiges of human skeletons interred in the embankment. At other points in the circle, people lit fires and buried objects. Archaeologists believe the centre of the circle was used to make offerings. A drawing exhibited in the castle museum depicts people about to sacrifice an ox at sunrise, on the morning of the winter solstice.

After a dose of theory in the little castle museum, I drive a few kilometres to the actual structure, which lies in the middle of a large, windswept field. It is a few hundred metres' walk, and the winds are chilly. No doubt it would sometimes have been at least as cold at the time when Germany's first farmers used the observatory; after all, its *raison d'être* was to let them know when the winter solstice had arrived.

The circular embankment surrounding the structure at Goseck has a diameter of about 75 metres (245 feet). There is an opening at the northernmost point, where I enter – just as the first farmers must have done for their sacrificial ceremonies. Their dwellings were due north of the observatory, which appears to have served as both temple and burial place.

There are similar openings to the south-east and the south-west. This means I can stand in the centre of the circle and look straight out in three directions: north, south-east and south-west. Today you can see a house through one opening and a few trees through the other. But when the observatory was in use there must have been an unobstructed view of both sunrise and sunset.

At the time of my visit, the weather is not only cold and windy, but clouded-over into the bargain. Moreover, I'm here in the middle of the day, not at sunrise, so some of the charm of the spot is lost on me. The castle museum has several pictures by an expert photographer on display. That photographer – unlike me – timed their visit to ensure clear

weather and the right time of day; the results are incomparably beautiful. The first rays of the rising sun, pointing towards a rosy horizon, gleam through the narrow gaps between the oaken posts. At that precise moment, you know the darkness of winter has begun to decline, and spring is on its way back. Once the moon has run its course a few times, it will be time to start sowing again.

Clearly, early hunting peoples also kept a close watch on the starry sky, not least in order to determine their position and direction. But it was probably the first farmers who started a cult of the sun and moon. People in today's Europe still experience aspects of that cult. We continue to celebrate the turning points of the solar year. For instance, our main feast day – Christmas, or Yule – is rooted in ancient festivities associated with the sun. The Bible is silent about the season of Christ's birth. It was early Christians who decided in the third century AD that the day of his birth should be celebrated at the midwinter solstice, on the same date as an ancient feast in honour of the sun.

Researchers have calculated the average speed at which farmers made their way towards Europe from the heartlands of agriculture on the banks of the Euphrates and the Tigris. If their speed had been unvarying, they would have moved about a kilometre ($\frac{2}{3}$ mile) a year. But that figure is misleading, as they are more likely to have migrated by leaps and bounds. Sometimes they moved very quickly, while at other times they remained in the same place for a long time.

The people of the Linear Pottery culture covered the distance from the banks of the Danube in Hungary to the area around Halle in Saxony-Anhalt, in central Germany, within just 300 years – about 10 generations. Throughout that time, and for a further thousand years, the Linear Pottery people settled in locations rich in loess. Loess is a soft, deep and fertile soil comprising fine particles blown by the wind during the last Ice Age.

At the time when the first farmers came to Europe, lush forests of hardwood broadleaved trees flourished in areas with loess soil. Lime trees, elms, ash trees and oaks had been

shedding their nutrient-rich leaves for millennia. This foliage had rotted, forming layers of the finest mulch a metre (3¼ feet) thick. The dense foliage of the treetops kept out the light, so there was practically nothing growing on the ground apart from spring flowers such as hepaticas (blue anemones) and wood anemones. Basically, all the farmers needed to do was cut down the trees, press seeds into the earth around the stumps and leave them to grow. Experiments show that a skilled person can cut down a substantial tree in under an hour using a flint axe.

However, the boundary between loess and non-loess soils runs through northern Poland and northern Germany. Here moraine takes over, with thin sandy earth and clayey soils that are full of nutrients, but hard. The farmers stopped at this boundary for over 1,000 years. Different methods were needed to be able to grow crops on the soils further north.

Thin sandy soils lend themselves to swiddening (slash-and-burn cultivation), a technique based on felling the trees in winter, burning everything on the ground in spring, sowing and harvesting. Crops flourish in the ash, which is rich in nutrients, but only for a few years. Later on, weeds and undergrowth take over and livestock can graze on the cleared land, while the people move on into the forest and create new clearings.

Clayey soils can be excellent for growing crops for those with access to wooden scratch ploughs (ards). But ploughs do not plough by themselves; they need something to pull them. About 6,000 years ago oxen took on far greater significance. This can be seen from a series of finds of statues and images featuring them. Their sudden importance may be linked with the plough and the wheel.

Bernd Zich of the Museum of Prehistory in Halle found the world's oldest known wheel tracks as a young man working on excavations in Flintbek in the north German state of Schleswig-Holstein. The tracks are an estimated 5,500 years old. Archaeologists in Flintbek had already found the traces of a plough. Similar tracks – up to 5,700 years

old – have now also been discovered in Poland, the Netherlands, Denmark and Sweden.

The oldest known image of a wheeled vehicle adorns a 5,600-year-old terracotta vessel in Poland. This was discovered in excavations at Bronocice and is now kept in Cracow's archaeological museum.

Zich believes that oxen and wheeled vehicles became so important that they rapidly acquired a mythological significance. He interprets some of the stone circles made by late Stone Age farmers as a kind of representation of such vehicles. When I first visited the Halle museum, the staff were in the process of setting up an exhibition about a stone circle representing a wagon.

Perhaps not everyone subscribes to the interpretation that the great Neolithic stone circles are actually a kind of wheeled vehicle. However, traces of wheels and ploughs undeniably began to appear about 5,700 years ago, and they radically altered the conditions for farming on different kinds of soil.

The same applies to the fine, soft loess soils. The first generation of people from the Linear Pottery culture in Saxony-Anhalt tilled fields the size of the relatively small garden of a detached house – about 500 square metres (5,400 square feet). One and a half millennia later, the fields had become tens of times larger. Oxen and wooden ploughs may partly account for this change.

With today's knowledge, it is impossible to be sure who invented the wheel and began to use ploughs with oxen as draught animals. Once the technology was there, it spread like wildfire everywhere between northern Europe and Mesopotamia. But in my view, northern Europe, particularly Jutland or northern Germany, might very well have been the birthplace of the wheel.

What came first – the chicken or the egg? Were farmers able to leave loess soils behind them and move northwards

only once they had invented the wheel and started to use ploughs and draught animals? Or did they begin to use ploughs and draught animals out of necessity, when they had already migrated northwards to areas with harder soils?

The areas around the coast of the Baltic Sea and in southern Scandinavia had a number of drawbacks for a farmer. Not only was the climate harsher and the soil harder to till, but the coastline was already peopled by vigorous hunters. But one day, about 6,000 years ago, a number of farmers from the region that is now Germany took that step. And after that things moved very fast.