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The Nebra Sky Disc in Halle

The Bronze Age can be said to have begun when the Bell Beaker culture in the west and the Corded Ware culture in the east merged, producing the Unetice culture.

Initially, the Bell Beaker people and the Corded Ware people rigorously maintained their respective defining features when living in proximity to one another. Their ceramic vessels were shaped and patterned in different styles. While the Corded Ware people buried women lying on their left side and men on their right side, both facing south, the Bell Beaker people did precisely the opposite. They placed women on their right side and men on their left side, both facing north.

But about 4,300 years ago, such distinctions began to melt away, and the Unetice culture began to emerge. While this culture has left most traces in the Czech Republic and Slovakia, it extended from Germany to Ukraine and as far south as Austria.

The most remarkable find from the German Unetice period – and, indeed, the whole German Bronze Age – is the Nebra sky disc. The way this was discovered might have come straight out of a detective novel. But it's a true story.

In 1999 two treasure hunters with a metal detector went looking for spoils near the German town of Nebra. Using a metal detector without a licence is classed as a crime in Germany, as it is in Sweden, and dealing with finds in the way these men did is indisputably criminal. They discovered a bronze disc ornamented with gold, the size of a substantial pizza plate, together with two bronze swords, two bronze axes, a chisel made of the same metal and a spiral bracelet in bronze. The day after, they sold all these finds for 31,000 Deutschmark to a receiver of stolen goods in Cologne.

Over the next two years, the artefacts were sold on several times for up to a million Deutschmark. In 2001, the bronze disc was offered for sale on the black market at 700,000 Deutschmark. However, Harald Meller, the chief antiquarian in the federal state concerned, had been tipped off about the sale. He put in a bid and arranged a meeting with the sellers in the Swiss city of Basel. The police secretly monitored the transaction and arrested the sellers, and after further investigation the original treasure hunters were detained. They ended up serving prison sentences.

The Nebra sky disc is spectacular – so much so that some experts initially claimed it must be a modern forgery. It weighs several kilos. The disc itself is made of bronze covered in green verdigris as a result of oxidation. Pieces of gold plate are attached to the bronze disc. These represent a new moon, a full moon and a cluster of stars. Of the three pieces of gold plate that once adorned the edges of the disc, one is now missing.

Meller and his staff have had a series of tests conducted to check that the find is genuine. One such test involved comparing earth on the disc with soil from the place where the treasure hunters say they found it. And the results appear to confirm that it was found on the top of the Mittelberg, near the little town of Nebra, a few dozen kilometres south of Halle.

The researchers have also studied the design of the swords, the isotopes in the metal, and impurities in the gold and the bronze alloy. They discovered that the treasure was buried about 3,600 years ago, though the individual artefacts had been in circulation for centuries by that time. The copper in the bronze disc appears to have come from the Alps, not so very far from Nebra, but the gold is from Cornwall in England.

The two pieces of gold plating that covered part of the edge of the disc were not there from the outset, but were added later. They span an angle of 82 degrees, which happens to be the exact angle between sunset at the summer solstice and sunset at the winter solstice at the latitude of Nebra. The

sky disc thus served to predict both the winter and the summer solstice, the turning points of the year. It had the same function as the great solar observatory at Goseck and the stone circle of Stonehenge. But the sky disc is so very much smaller – a portable instrument that could be taken out when it was required to make observations and hold ceremonies.

At an even later stage, craftsmen added an additional piece of gold plate to the margin of the sky disc. This resembles a stylised miniature boat. The gold in the stars, the two 82 degree angles and the stylised boat was processed at different times and contains different proportions of silver. It was clearly added by three craftsmen on three separate occasions.

In 2012 Harald Meller nominated the sky disc for recognition by UNESCO, and a year later it was proclaimed an item of World Heritage. The statement justifying the decision describes it as ‘one of the most important archaeological finds of the twentieth century’ and continues: ‘It combines an extraordinary comprehension of astronomical phenomena with the religious beliefs of its period, that enable unique glimpses into the early knowledge of the heavens.’

I get to see the sky disc on a visit to the Museum of Prehistory in Halle. It is a very solemn occasion. As a visitor, I first have to pass through an antechamber with information about the context of the find. Then I can enter the ‘holy of holies’, as my companion, Bernd Zich, puts it. The room is very dim, and I practically have to fumble my way around the display case in the centre by touch. Its interior is all the brighter; the dramatic illumination gives a sense of the magic powers with which the people of the time would have endowed the gilded bronze disc. In the darkness next to the wall sits a museum attendant, watching my every move. Another, smaller case on the wall displays the other items found in the same cache: a bracelet, a chisel, two axes and two swords. Such doublets – like twins – are a common feature of Bronze Age finds.

Bernd Zich is a department head at the Museum of Prehistory. He features in Chapter 21, in which I noted that he had discovered the world's oldest known wheel tracks. Now he explains how leading German archaeologists interpret the sky disc.

When the first farmers arrived in Germany, astronomy was already very important to them. It was linked with the farming year; they wanted to keep track of phenomena such as the winter and summer solstices and the vernal and autumn equinoxes. Many large structures in Hungary and Germany, including Goseck, have been interpreted as solar observatories, which served to enable people to observe and celebrate the winter solstice. Archaeologists in England believe the earliest formations built near Stonehenge had a similar role.

But the Nebra sky disc is about 3,000 years more recent than the Goseck observatory. Human knowledge of the movements of celestial bodies developed over these three millennia. Some ingenious people managed to find a solution to an awkward problem: the fact that the solar year and the lunar year are not a perfect match. Twelve lunar months are 11 days shorter than a solar year. This lack of harmony must have appeared baffling at one time.

If you add an additional lunar phase every three years, the solar and lunar years more or less keep pace. In Zich's view, this would have been secret knowledge of great religious significance. The most powerful leaders had their own 'astronomers' who were able to interpret the course of the sun, moon and stars. These experts knew – partly thanks to the sky disc – when it was time to add an extra month.

One way of dealing with the problem is described in a cuneiform text from Babylon that dates back around 2,700 years. This states that you need to add an intercalary month every spring when a particular phase of the moon – not a new moon, but a crescent that has been waxing for a few days – is near the Pleiades star cluster.

The Nebra sky disc depicts exactly this position, with seven gold dots, the number of stars in the Pleiades that are visible with the naked eye, next to a crescent moon of exactly

the right size. Those able to interpret the message of the bronze disc thus knew, about 4,000 years ago, what the Babylonians set down in writing over a millennium later.

Greek writings that are approximately contemporaneous with the Babylonian ones also mention the Pleiades as an important marker showing the time to plough and the time to gather in the harvest.

Those wishing to immerse themselves in the astronomy of early European Bronze Age cultures can make their way from the Museum for Prehistory in Halle to Nebra, which lies a few dozen kilometres to the south-west. On an elevated site very near the spot where the sky disc was found on the Mittelberg, the regional authorities have set up a large, lavish information centre. This contains a planetarium and an exhibition designed both for children and for adults with a specialist interest. One of the things I learn there is that the site where the disc was found on top of the Mittelberg was a place of worship and burial for several millennia – from the Palaeolithic to the Iron Age – before it fell into disuse.

The astronomers who mastered the art of interpreting the sky disc were probably in the service of a rich individual with a great deal of power. At the time of the Unetice culture, society was beginning to become far more stratified, and the most important leaders were starting to acquire more and more wealth, power and status. One of the signs of this is the burials known as ‘chieftains’ graves’ (*Fürstengräber* in German), large tombs containing valuable gifts.

Dalia Pokutta, an archaeologist based in Gothenburg, has recently written a thesis on her study of the diet of a number of individuals buried in chieftains’ graves. Studying isotopes has enabled her to discern whether they ate much meat and other forms of protein, or whether they lived mainly on plants. Rather surprisingly, her results show that the people buried in these large, lavish tombs had an almost ascetic diet. She compares them to Indian yogis. Her interpretation is that those interred in chieftains’ tombs were regarded as priests or shamans, rather than as people whose power was based on their economic assets.

The graves Dalia Pokutta studied Dalia Pokutta are in Poland. They are part of the Unetice culture that lay behind the sky disc. Her thesis and many other signs suggest that the early Bronze Age societies of Europe were what we now call theocracies, in which religious leaders had a very strong influence. Priests played an important role. But the same was true of traders, warriors and artists.