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Mammoths in Brno

The Czech city of Brno is classic ground for anyone with an interest in genetics. I have been here once before to write about the monk Gregor Mendel. It was he who showed in the 1860s that hereditary traits are passed on in discrete units, which we today know as genes. The monastery where Mendel worked still exists, having been refurbished after years of decline during the communist era. Monasteries were less than popular at that time. Biology, too, was regarded with great suspicion – particularly when Joseph Stalin held sway in the Soviet Union. Genetics was a particular taboo, held to be bourgeois and counter-revolutionary.

Now I am in Brno for the second time, I take the opportunity to have another look at the Augustinian monastery and museum that present Mendel's life and work. The curly tendrils of a few pea plants in bloom are to be seen outside the entrance. Peas were the plants Mendel focused on, being easy and practical to work with. Cultivation was followed by calculation, time and again: yellow peas, green peas, red flowers, white flowers, tall plants, short plants, and so on. On the basis of seven characteristics he identified in peas, Mendel formulated the laws of heredity and described dominant and recessive traits.

It took over 40 years for Mendel's findings to reach the world outside Brno. But once they started to be applied, they revolutionised the breeding of plants and domestic animals, and virtually the whole of biology. Unfortunately, his findings have also been misinterpreted. Today we know that heredity rarely works as simply as with Mendel's green and yellow peas. Most characteristics are considerably more complex; they are affected by many different genes, as well as by environmental factors.

After visiting the Mendel Museum, I take the tram a few stops further on. This time, I've come to Brno to learn more about the great European Ice Age culture that followed the Aurignacian culture, known as the Gravettian.

Outside the city are a number of Europe's most important Ice Age sites, the most famous of which is Dolní Věstonice. Many of the finds from these sites are on display at the Anthropos Pavilion on the outskirts of Brno. On the tram, I attempt to communicate with a group of Czech ladies in late middle age, to find out where I need to get off. English doesn't work, so I resort to my extremely basic Russian. When they finally grasp what it is I want to know, they exclaim, 'Aha! *Mamut!*' One of them gets off at the same stop, not because she herself has any business there, but just to point me in the right direction. On arrival, I see what they were referring to. A gigantic woolly mammoth dominates the museum, two storeys high. The calf alongside the full-grown mammoth is nearly the size of a cow.

In the upper level I view the famous triple grave of three young people, all of whom died in their teens or twenties. In the middle lies a crippled woman whose skeleton displays apparently congenital deformities. She is on her back, with a man on either side of her. One of them lies face down next to the woman, his arm entwined with hers. The other is a little further away, but his hand is outstretched over the woman's pubis. Their heads are sprinkled with ochre, as is the woman's crotch and the man's hand.

Two of these individuals can be described as my relatives. Their mitochondrial DNA belongs to group U5, just like mine. But their U5 is a very early variant that does not correspond to any that exists today. The third individual – the one whose hand rests on the woman's pubic area – belongs to group U8.

One interpretation is that the man and the woman belonging to group U5 are siblings, while the man from group U8 is the woman's partner. Brother and sister lie alongside one another, their arms entwined. The woman's partner lies a little further away, but his hand rests on her

genital area. Their position in the grave reflects their relationship in life.

The young people in the triple grave lived approximately 31,000 years ago. But the oldest finds at Dolní Věstonice go back all of 34,000 years, according to the most recent datings. All of them have been assigned to the Gravettian culture. The tools and art objects of the Aurignacian and Gravettian cultures differ quite markedly.

At one of the city's universities I meet Jiří Svoboda, the Brno archaeologist in charge of the excavations at Dolní Věstonice. A quiet man in his sixties, he is among Europe's most respected archaeologists. Svoboda is convinced that the Aurignacian and Gravettian cultures represent two distinct waves of migration into Europe. The appearance of the artefacts indicates that the people of the Gravettian came from the south, from the Middle East and Mediterranean coastal areas.

The only individual belonging to the Aurignacian culture whose DNA has been analysed is the Kostenki-14 man from Russia, who belonged to the U2 haplogroup. The three Gravettian individuals from Dolní Věstonice belong to the U5 and U8 groups. While that circumstance provides rather little DNA evidence for Svoboda's theory of two separate migratory waves, there is no counter-evidence. He may well be right, and analyses of fossil DNA may provide more evidence in his favour in the long run.

If the theory is correct, the Aurignacian and Gravettian cultures both originated in the Middle East some 50,000 years ago and arrived in Europe in two separate waves. The group from which both originated included 'Ursula', a woman from haplogroup U who became the foremother of all the individuals falling into a total of nine subgroups: U2, U4, U5, U8, and so on. People belonging to the original group in the Middle East made repeated attempts to migrate into Europe. However, just two waves of migration during the Ice Age had a permanent impact: the Aurignacian culture, which arrived here over 43,000 years ago, and the Gravettian culture, which appeared some 34,000 years ago.

The rich finds from Dolní Věstonice provide a huge amount of information about life in central Europe between 34,000 and 20,000 years ago. The evidence shows how the people regularly returned to their settlements. Some of them may have lived permanently at Dolní Věstonice. They were highly specialised in hunting mammoths, but their diet also included hares and birds.

There are a number of finds of personal ornaments, such as perforated foxes' teeth and beads, but fewer than is usual in remains from the Aurignacian culture. The Gravettians seem to have focused on decorating their headgear.

A number of art objects have been preserved. The most famous of these is the 'Venus of Dolní Věstonice', a large-breasted female figure made of fired clay. She is several thousand years older than the oldest ceramic vessels we know of, which were found in Japan and China.

The people of Dolní Věstonice were nomads who had no desire to lug heavy ceramic vessels around, Svoboda explains. They cooked their food in containers made of hide, heating the water with hot stones taken from the fire. That was the Stone Age version of our kettles – and it was a surprisingly effective method.

Instead, they used clay to make miniature figures of both animals and people, which archaeologists have discovered in large numbers. Many of them are broken, and the vestiges have been found directly next to hearths. It looks as if the inhabitants of Dolní Věstonice moulded objects out of clay, then put them on the fire before they had had time to dry out completely. That made the moisture in the clay expand, and the object explode like popcorn. We can only speculate about whether exploding clay figures were a party piece just for entertainment, or whether they were part of some rite.

Another notable occupation in Dolní Věstonice seems to have been bashing each other over the head. It looks as if clubs or other hard objects were involved. Many skulls show signs of serious injuries, though they healed before the individuals concerned died of some other cause.

One of the questions hotly disputed by researchers is whether the people of Dolní Věstonice kept domesticated dogs. The excavations have revealed many wolf bones, some of them from unusually small wolves. Many archaeologists interpret these small wolf skeletons as a sign that they were more probably tame dogs.

Svoboda is diplomatic when discussing this subject. He works with a number of other researchers whose views on the matter vary considerably. However, he draws attention to a factor that may be decisive: though there are large numbers of bones from animal prey in the settlements, none of them appear to have been gnawed by dogs. What that suggests is that wolves approached human settlements because they could readily gain access to meat there. But they remained on the periphery and did not become our tame companions until later. I shall return later to the heated debate about the first dogs.

The Venus of Dolní Věstonice is quite corpulent, as are many other female figures of which archaeologists have found fragments. They have so much subcutaneous fat that the skin on their backs falls into folds. This is something of a paradox, as bones and teeth reveal that the people of Dolní Věstonice suffered periodically from famine. Life could be hard on the plains of central Europe, with huge temperature swings. Finally, about 20,000 years ago, it grew so cold that people could no longer remain there. This was the beginning of the very coldest period of the Ice Age.

Central Europe was no longer habitable. The mammoth hunters of Dolní Věstonice moved to regions where the climate was milder and life more bearable. As for me, I now travel down to south-west France and Spain. I have reason to believe that some of my forebears made their way to that region.