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Dark Skin, Blue Eyes

The Barum woman lived just over a millennium after the woman from Österöd and 500 years after the first seal hunters on the island of Stora Karlsö. But she is far more of a celebrity.

She is exhibited in the Swedish History Museum in Stockholm, where she used to be known as the Bäckaskog woman. The name has been changed because archaeologists and locals in Skåne, the southern province where she was found, have always called her the 'Barum woman' after the village where she was discovered.

One reason why the Barum woman is so much better known is that her skeleton is so well preserved. Visitors to the History Museum can view her in a glass case, seated in approximately the same position as at the times of her burial and discovery (though archaeologists disagree on certain details, such as the angle at which she was originally leaning).

When the skeleton was first discovered in 1939 at Lake Oppmanna, just outside Kristianstad in Skåne, the archaeologists assumed they were looking at a man – admittedly a very short one at barely 1.55 metres (5½ feet), but definitely a man. After all, he had been buried with a bone arrow accompanied by flint arrowheads and a chisel made of elk bone – gifts that were clearly suited to a male. He hit the headlines as 'the Barum fisherman'.

However, in the early 1970s the skeleton was re-examined and an expert at the History Museum identified some typically female characteristics. One of these was the same kind of damage to the pubic bone as that identified in the Österöd woman from Bohuslän. They were interpreted, in accordance with the knowledge of the time, as showing that she was a

woman who had borne about 10 children. Moreover, isotopic analyses showed that she had by no means lived on fish alone, but rather on deer, elk and other forest-dwelling mammals. Viewed in conjunction, the analyses of her bones and teeth suggest that she was aged between 35 and 40 at the time of her death.

In the information provided by the History Museum, the 'Barum fisherman' was transformed into a hunter and mother of 10 – a real Swedish matriarch, perfectly in tune with the seventies' zeitgeist. However, according to more recent insights from sports medicine, the damaged pubic bone may not necessarily signify that the Barum skeleton belonged to a mother of 10. She may have had fewer children but have engaged in strenuous activities as a hunter.

The History Museum has also had a model-maker reconstruct the Barum woman's appearance on the basis of her skeleton. She and I are about the same height. It is quite an experience to stand face-to-face with a person who lived nearly 9,000 years ago. She looks almost uncannily real; the sculptor has done a skilled job based on the archaeologists' brief. He has made her light-skinned, with greenish eyes and hair of an indefinite, but fairly light colour, with a sprinkling of grey. Her hair is lank, tied back simply at the nape. She has no embellishments or adornments.

I can't help wondering whether she was really so plainly attired. What I have learned so far about Stone Age people is that they left plentiful traces of jewellery and pigments. I have in mind a woman from Bad Dürrenberg in Germany, who lived at about the same time as the Barum woman and whose skeleton is displayed in the Museum of Prehistory in the German city of Halle. There, by contrast, the scientists told their illustrator to lay the decorations on thick, including animals' teeth, wild boar tusks, feathers and stripes of red pigment.

Another question is whether the Barum woman really was as light-skinned and light-haired as the model in Stockholm's History Museum. She may very well have had both darker

skin and darker hair. However, she probably had blue eyes, no matter what colour her skin was.

The vast majority of individuals from the hunting Stone Age in Europe whose DNA has been analysed belong to mitochondrial group U. Many of them, like me, belong to U5. Some – again like me – belong to subgroup U5b1. This is true of the two individuals from Bonn-Oberkassel who were buried together with a dog 14,500 years ago. The same applies to their near relative from Loschbour, Luxembourg, who lived about 8,000 years ago. He was in his forties when he died, 1.6 metres (5¼ feet) tall, weighed about 60 kilos (132 pounds) and was interred with red ochre scattered over his head.

There are also DNA analyses of two people found in the Spanish cave of La Braña, near the Atlantic coast of northern Spain. These two individuals also lived nearly 8,000 years ago and belong to mitochondrial group U5b, but they are part of a different subgroup known as U5b2. The one most thoroughly analysed was a well-built man in his twenties. The drawings published by the Spanish research team along with their scientific article depict him with black hair and dark skin, more or less like an African. Yet his eyes are light blue.

Blue eyes and dark skin are an extremely rare combination today, but many Ice Age people seem to have had such an appearance. Blue eyes, dark hair and dark skin seem to have been commonplace in much of Europe. There is a degree of uncertainty as regards genetic analyses of human pigmentation. The level of probability is lower than the norm in scientific studies published by scientific researchers. Moreover, the colour of people's skin and hair is influenced by dozens of genes. However, a number of gene variants have a particularly decisive impact, and several studies published by rival research teams, all pointing in the same direction, are now available.

Quite simply, it looks as if many people among Europe's original population of hunters had black hair and quite dark skin. It is self-evident that the people who first arrived from the Middle East looked like that; after all, they had come from Africa, where everyone was dark. But as late as 8,000 – or even 5,000 – years ago, many European hunters still bore the original gene variants from Africa, meaning that they were probably quite dark-skinned.

A few millennia later, nearly all Europeans were born with light skin. The original gene variants from Africa had undergone a transformation. There must have been factors at work that enabled light-skinned people to thrive better in Europe's northerly latitudes, to survive in greater numbers and to have more children who survived in their turn.

The most obvious mechanism has to do with the sun and its ultraviolet rays. Too much sun is dangerous, resulting in burns, skin cancer and, probably, reduced immune defence. That was why the forerunners of humans in Africa developed dark skin as soon as they had lost their protective covering of hair, millions of years ago. But when some people began to migrate northwards to latitudes where the sun's rays are weaker, they were at less risk of being burned. Indeed, their dark pigmentation could even pose problems by preventing the skin from producing vitamin D.

Vitamin D deficiency is a serious condition. It is one of the causes of rickets, which results in poor-quality teeth and crooked bones. In particular, it leads to malformations of the pelvis, which must have been devastating for young women in prehistoric Europe when they had to give birth for the first time. There was a major risk that both the mother and the baby would die. If that happened, the woman's genes were not passed on to the next generation. This must have resulted in a rigorous process of elimination, with light-skinned people whose skin could readily produce vitamin D passing on their traits in greater numbers.

This was not necessarily a major problem for Europe's early population of hunters, many of whom ate large quantities of fatty fish, with coast-dwellers consuming meat and liver from

seals and dolphins as well. This enabled them to meet their vitamin D needs. However, for those who lived in the far north – in today's Sweden, for example – and lived chiefly on plants and inland mammals, lighter skin may have been an advantage.

With the transition to agriculture, the pressures that favoured light skin increased throughout Europe. The food eaten by farming people was generally poorer in vitamin D than the hunters' diet. So two complementary factors seem to have played a role in gradually lightening the once-dark skin inherited from African forebears: the sun was weaker in northerly latitudes, and people's diet changed as farming took hold.

Individuals who lived nearly 8,000 years ago were found in Motala, in the Swedish province of Östergötland, and subjected to DNA analysis. They were discovered in the course of a few excavation seasons in 2009 and 2010.

The excavation site, known as 'Kanaljorden', lies next to the River Motala. Eight thousand years ago the site was strategically positioned on the shores of Lake Vättern, next to a torrential watercourse that led down to the sea. It was easy to reach the spot by boat from a number of directions, making it an ideal venue for feasts.

In total, archaeologists have found the remains of about 15 people. However, oddly enough, there are only a few bones from each individual – specifically, their skulls. These skulls had been placed on the bed of a small lake just a few metres deep. They were found lying next to some large boulders that had been piled together to form a kind of platform.

The archaeologists have only been able to find a whole skeleton for one individual – a newborn baby. Vestiges of wood reveal that the adults' skulls were mounted on stakes. A wooden art object has also been found, a large fish carved out of a plank. This, too, appears to have been mounted on a pole.

Why did these unfortunates end up on the lake bed? One interpretation is that they were the victims of a conflict; their enemies, who emerged victorious, stuck their heads onto long stakes as trophies. After all, they died at a time when competition for resources seems to have intensified.

However, the archaeologist Fredrik Hallgren, the former project leader at the site, prefers another explanation. His theory is that small groups of people from different areas met once a year on the River Motala at a collective encampment. This would have happened at a time when there was ready access to sufficient food to keep all the participants fed for a few weeks. It was probably in spring, when the sea trout were making their way upstream. Family and acquaintances from a widespread network seized the opportunity to meet. They fished and feasted together, exchanged information and gifts, socialised, and looked for a partner. And they also held a solemn ceremony to bury their dead.

Adults who had died in the course of the year were too heavy to be carried all the way to the camp; that was why only their skulls were brought there. The small body of the baby, however, was light enough for its parents to carry. Most of the skeletons seem to have been clean. Either the relatives of the dead people had scraped off the flesh with knives, or the bodies had been allowed to decompose in the ground until they were exhumed and the bones were taken to the great ceremony. In one case, however, a head seems to have been placed in the lake just a short time after the individual's death, as vestiges of the brain are still preserved inside the skull.

Fredrik Hallgren imagines that the skulls and the large wooden fish would have been set on poles over the surface of the water and that they would have played an important role in the ceremony.

In my mind's eye, I picture these people holding their ritual early in the morning, when the sun was veiled in a thick mist. There would have been fires burning on the shores. They would have sung in honour of the dead, played instruments and danced.

Archaeologists have examined isotopes in the bones that show the type of bedrock in the regions where these people lived. Apparently none of them come from Motala, where the skulls were found. Rather, they spent most of the year in three separate places up to 50 kilometres (30 miles) away. Some of them came from the forests of Södermanland to the north, others from the forests to the south and the Baltic coast to the east. Some of the women seem to have moved at around 20 years of age, which probably indicates that they met a man at that time and moved to join his group.

An international team of researchers has helped to conduct DNA analyses of seven individuals from Motala. These analyses show that they belonged to haplogroups U5a1, U2e1, U5a2 and U5a2d. The researchers have also examined their nuclear DNA, which provides far more information than mitochondrial DNA alone. The results show that the people found in Motala were quite closely related to other Stone Age hunters from all over Europe and even from distant Siberia. They are most similar to other Stone Age hunters from the same region – those found on the islands of Stora Karlsö and Gotland, the oldest of whom is 9,400 years old, while the youngest dates back about 5,000 years.

At the time of writing, the DNA of over 20 Stone Age hunters from Sweden has been analysed. The genetic results suggest that the vast majority had blue eyes. Some of them still had the original genes from African times that make for a dark skin. However, the majority – about two out of three – had acquired the gene variants that produce a fairer complexion.

So most of the people living on Gotland and in the Motala region during the hunters' Stone Age had lighter skin than their close relatives on the Atlantic coast. There was variation, just as there is today; some were a little darker, others a little lighter-skinned. On average, the hunters of that time appear to have had somewhat darker skin than modern Swedes; besides, they were outside all day, so they were more tanned than many Swedes today.

Many of them also had a specific gene that is common today in China and other East Asian countries, as well as

among the indigenous peoples of the Americas. This gene is believed to be responsible for strong hair with thick strands, comparatively small breasts in women, and front teeth with a particular shovel shape, common among Chinese people.

As for me, I have blue eyes, very blonde hair and very fair skin – like the stereotypical Swede. But the truth is that far from everyone in today's Sweden looks like me. There are plenty of people with dark hair and brown eyes who can trace their origins within the Nordic region back hundreds of years. And now DNA research suggests that both dark hair and dark skin have been here ever since the ice sheet melted and the first people arrived here.