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The Rock Engravers

Not many researchers get to have their findings presented in the form of a wall-to-wall carpet. But that honour has fallen to Johan Ling, an archaeologist at the University of Gothenburg. The carpet occupies a whole room at the Vitlycke Museum in Bohuslän. Visitors walking around it can trace Europe's Bronze Age trade routes.

The carpet was inspired by an article, which Ling published in 2013. Rarely has a Swedish archaeological study attracted so much attention. Suddenly the Bronze Age appeared in a new light.

The article presented the first ever incontrovertible proof that both people and goods had circulated on a far larger scale than had previously been known. Older generations of archaeologists were only able to study the appearance of metal objects. The conclusions they drew were based on shapes, ornamentation and their own imagination. But the latest technology has made it possible to study isotopes and trace elements in metal, as German researchers have done with the Nebra sky disc. Ling is now able to show that there were links between Sweden and the Mediterranean, the Alps and the Atlantic all of 3,600 years ago.

Just take the axehead found in the River Jösse outside Arvika in the province of Värmland. Made of solid bronze, it weighs about 1.5 kilos (3½ pounds). There is a hole in it for the shaft and, though made of bronze, it is similar to a stone axe in shape. Researchers have somewhat different opinions on whether bronze axes of this type were used for practical tasks, or whether they were essentially status objects. Such axes may have had standardised weights, which would mean they could be used as bronze ingots representing a specific value. The axe type is known as a Fårdrup axe, after the place in Denmark where they were cast. Ling himself thinks this particular one is more likely to have been cast in Värmland,

even though no hearths used for casting metal have yet been found there. At any rate, archaeologists agree that it must have been cast in Scandinavia.

Copper ore occurs in areas to the north of Arvika, and you might well imagine that the copper in an axe found in the River Jösse would come from that region. Yet that is not the case. Isotopes in the metal reveal that the copper is not from Värmland at all – but from Cyprus.

At that time there was a great deal of copper mining on Cyprus. Copper ingots from the island went on long journeys. The copper that ended up in the axe, found in the River Jösse, was probably shipped via the Bosphorus and the Black Sea, then along some of the great rivers of Europe – perhaps the Danube or maybe the Dnieper.

Another axe from more or less the same period was found on the island of Öckerö, in the northern part of the Gothenburg archipelago. It is also cast in solid bronze, though the technology used was more sophisticated. This axe is of a type known as a palstave – and we are not just talking shiny status symbols any more. Palstaves were definitely designed to split lengths of timber into planks. They were highly effective tools with a sharp, curved blade. The shape of the axe reveals that it must have been cast in England or France. The copper, however, is from neither place – it comes from Lavrion in Greece. Raw copper was probably transported from the Mediterranean up one of the French rivers, the Rhône or the Garonne. It was then unloaded in England, mixed with tin and cast to make the latest model of palstave.

Ling has so far investigated about 40 bronze objects found in Swedish provinces including Dalsland, Bohuslän, Halland, Småland and Skåne. They have been shown to contain copper from the Alps, Spain, Portugal and Sardinia, and, in some cases, even from Greece and England.

Bronze is an alloy of copper and tin. There is very early evidence for copper mining in Europe. Copper artefacts

found in Serbia and Romania are just as old as agriculture in those regions, going back about 8,500 years. The people of the Varna culture on the shores of the Black Sea in Bulgaria could already smelt copper and gold 6,600 years ago. This is shown by a number of spectacular burial finds. One such artefact is a large penis sheath in gold, belonging to a man in one of the graves at Varna, and the grave also contains other gold objects weighing about six kilos (13 pounds) in total. Ötzi the Iceman, who died in the Alps about 5,300 years ago, was carrying an axe made of copper with a high arsenic content. Such copper becomes harder and easier to cast than other types, but it is no match for bronze axes.

It is unclear where people first learned how to purposely mix tin and copper to make bronze. A number of early bronze artefacts about 5,000 years old have been found in central Asia and the Mesopotamian city of Ur in Iraq.

To make bronze, you need tin, and tin mines were far rarer than copper mines. There were only a few places where tin could be mined. One such area was Cornwall in southern England. Several pieces of evidence have now emerged that suggest large-scale tin production began in the region around 4,200 years ago. That was just after the Amesbury Archer had died and the timber structures at Stonehenge had started to give way to megaliths. All the early European bronze artefacts analysed so far contain tin from Cornwall – including the gold plates in the Nebra sky disc.

The map on the carpet in Vitlycke Museum shows networks extending over much of Europe. They included the rivers of central Europe, just as old-time archaeologists believed. But the maritime routes along the Atlantic coast were at least as important. This can be seen from all the artefacts found in Denmark and Sweden but originating in Spain, Portugal, France and England. In view of how ocean currents flow, it seems quite clear that one of the destinations would be the west coast of Sweden. Paddling from southern England to the western Swedish seaboard essentially meant following the ocean currents.

These long-distance trading voyages called for a new type of boat. One decisive step was the technology of building boats from planks, rather than making them from hide or dugout tree trunks. The Danish National Museum in Copenhagen houses a vessel built using this method, known as the Hjortspring boat. Though it was built in the early Iron Age, around 350 BC, we have reason to believe that the people of the Bronze Age were already able to build such boats.

It is absolutely clear that the Hjortspring boat was designed for battle. Alongside it, in the bog where it was discovered, 169 spears and lances, 11 swords, a number of pieces of chain mail and the remains of about 80 shields were found. The vessel's prow and stern were identical, and it was perfectly symmetrical in structure. The oarsmen simply had to swivel 180 degrees to change direction at lightning speed, and they could disappear in the same direction they had come from.

Danish researchers have had a team of elite rowers test a replica. The athletic men managed to row nearly 100 kilometres (60 miles) in a single day. At that speed, a vessel can reach England from the coast of Jutland in under a week. The English Channel is just over 30 kilometres (20 miles) wide, a distance that a good team of rowers can cover in half a day.

Cutting lengths of timber into planks of exactly the right thickness called for axes. While stone and copper axes were some help, the big breakthrough came with the bronze axes. Once the technology of casting artefacts in bronze was well established on the Atlantic seaboard, things moved very fast.

A virtuous circle came into being: better metal axes enabled people to split timber into planks and build more seaworthy vessels. Better vessels made maritime transport faster and safer, enabling people to exploit newly discovered deposits of copper and tin. New mining sites provided raw materials for more bronze axes, which became more and more effective, and so on.

The result was an explosive development in the direction of a new type of society – one in which wealth, trade and aristocracy became far more important than in the past. Against this background, it is not surprising that certain men came to have a very large number of descendants – so many that they account for over half of Europe's modern-day population. Boats and metal can account for the dispersal of haplogroup R1b along the Atlantic seaboard and for the fact that the dispersal got under way at the time of the Bell Beaker culture.

The fact that R1a became so common further east is also linked with the successful pastoralist cultures that already existed at the end of the Stone Age, and doubtless also with the domestication of horses. But the best explanation for the fact that my forebear 'Ragnar' became the forefather of nearly one in seven family history researchers with Swedish ancestry is the Bronze Age trading network. This is the picture that emerges when, with Peter Sjölund's help, I study the dispersal of men with the R1a-Z284 mutation, descended from the individual I have dubbed 'Ragnar'.

A year has passed when Peter Sjölund and I meet for the second time. It is a sunny Sunday in October 2014, and we are at the Genealogical Association in Solna, looking at maps produced by some Russian enthusiasts. The Russians are genealogy researchers with an IT background who have set up a firm called YFull specialising in the analysis of Y-chromosomal DNA. They have collected data from a large quantity of published research, but also from private family history researchers, particularly the pioneers who have taken the 'Big Y' test.

On the maps we can see that 'Ragnar' appears to have lived somewhere near Denmark, probably in Jutland or Schleswig-Holstein. His lineage was there 4,500 years ago, at the time when the Corded Ware culture was dominant in this region. From there, one of Ragnar's descendants moved across to Sweden some 3,900 years ago. This must have been a sea voyage, and he probably landed on the west coast. It looks as if he arrived at exactly the same time as rich treasures of bronze began to make their appearance in Sweden.

The Bronze Age man who came here about 3,900 years ago would eventually have a huge number of descendants of his own, including my grandfather Eric, my father and my brother. Our forefather probably spoke an Indo-European language, which may have been a kind of Gothic, as the archaeologist Kristian Kristiansen believes.

When the trade in bronze reached Scandinavia, the people living there obviously had to pay for all the ingots they purchased. One of their main means of exchange was amber.

This golden-brown, translucent stone could be found on sandy beaches along the west coast of Jutland and in the southern Baltic. Amber was already seen as valuable and special in Palaeolithic and early Neolithic times. Amber beads and other objects often featured among grave gifts in Scandinavia.

But just as bronze started to become increasingly common in Scandinavia, people there stopped burying amber grave gifts. Instead, large quantities of amber have been found in graves and hoards elsewhere in Europe. And the most extensive finds of Bronze Age amber are at exactly the same locations as some of the main copper mines.

At the beginning of the Scandinavian Bronze Age, amber came mainly from western Jutland. However, Scandinavian Bronze Age rulers seem to have taken control over other amber-rich regions further east, along the shores of Poland and Germany. There also seems to have been a network of maritime routes across the Baltic. At the end of the Bronze Age, about 3,000 years ago, a bronze workshop emerged in Hallunda on Lake Mälaren, now a suburb south of Stockholm. In Bronze Age times, Hallunda was an important settlement on a sea inlet.

The carpet in Vitlycke Museum allows you to follow trade routes in all directions, with flows of metal going up to Scandinavia and amber from the Baltic flowing in the other direction. The routes from the Mediterranean, the Black Sea

and the Alps ran via major rivers such as the Elbe, the Danube and the Vistula, and, above all, along the Atlantic coastline.

And Cornwall, in England, was a nerve centre in this trade. The tin mine – a rarity – was in Cornwall, and it was there that bronze ingots were produced.

Three shiny yellow substances were greatly valued during the Bronze Age: gold, bronze and amber. There must have been other important wares as well. The wrecked vessel known as the Uluburun provides unique evidence from the eastern Mediterranean. The Uluburun was found just off a cape near the Turkish town of Kaş. On the basis of the annual rings in its timbers and other evidence, it is estimated to have sunk over 3,300 years ago.

The cargo of the Uluburun included 10 tonnes (22,000 pounds) of copper and a tonne (2,200 pounds) of tin – exactly the right proportions to cast 11 tonnes (24,250 pounds) of bronze. There was amber from the Baltic, gold, and semi-precious stones such as quartz and agate. There were also over 100 terracotta jars containing goods such as glass beads, resin, olives, almonds, pine nuts, figs, grapes and pomegranates. Other luxury items included ivory, hippopotamus teeth, tortoiseshell and ostrich eggs.

Less is known about the goods that were traded from northern Europe, apart from amber. Halle an der Saale in Germany contributed salt from its salt mines. In all probability, furs and slaves were shipped southwards from Scandinavia. However, salt, furs and slaves leave less obvious traces than bronze, gold and amber.

In contrast, the images engraved on rocks by Bronze Age people are still there several millennia later.

Johan Ling wrote his doctoral thesis on Bronze Age rock carvings. Such engravings have been found at many places worldwide. But the largest concentration, including some of the largest and most striking images, is to be found in the municipality of Tanum, in Bohuslän. This is the site of

Vitlycke Museum, and the whole area around it has been declared a UNESCO World Heritage Site.

What was new in Ling's thesis was that he systematically compared rock art locations with geologists' estimates of the position of the coastline in earlier times. This reveals a pattern that is far from obvious to a person walking around among fields, grazing land and copses in the farming landscape of Bohuslän.

Today's Vitlycke lies several kilometres from the coast, a long way from seaside resorts such as Hamburgsund, Grebbestad and Fjällbacka. But the sea level during the Bronze Age was 15 metres (50 feet) higher than it is today. At the time when the Bronze Age people were engraving their rock art, the rocks were right on the shoreline. Vitlycke, for example, lay some way up a large sea inlet. This immediately makes it clearer why boats are such common motifs in these pictures. There are thousands of examples.

In the past, many archaeologists focused more on the farming landscape. They took it for granted that the people who engraved the images were primarily farmers. This led them to regard the boats as essentially symbolic, an element of Bronze Age religion. But we now know they were also an important part of everyday life.

Real boats presumably looked much like the ones depicted in the rock art. Although these are often highly stylised, their shape is clearly reminiscent of the Hjortspring boat. Prow and stern alike are elongated into points. The prows are sometimes adorned with an animal head. In many cases there are a series of short lines sticking up out of the boat, representing oarsmen. The large petroglyph at Vitlycke, just a few hundred metres from the museum, includes an image in which a number of rowers, all clearly distinguishable, are raising their oars in greeting. Lur players and acrobats performing backflips can be seen on other boats. There is absolutely no doubt about the existence of bronze lurs, which are a type of long blowing horn; 60 or so have been found, particularly in Denmark and southern Sweden, many having been placed in lakes and bogs. In most cases they were used in pairs. Some can still be

played, giving us an inkling of how Bronze Age music may have sounded.

The most celebrated image on the Vitlycke rock represents a man and woman kissing. Their sexual organs are also joined. A common interpretation is that the couple in the picture are deities engaged in 'the holy wedding'. Such ritual weddings and fertility rites are known from much of Asia and Europe, from India to Iceland. In Greek mythology, it is Zeus and Hera who are thus united. In the *Poetic Edda*, the servant Skírnir describes how the god of fertility, Freyr, woos the giant (*jötunn*) Gerðr, who eventually yields. The *Edda* text is written like a play, according to modern experts in literature. One can picture the culmination of the final act in the trysting grove, with Freyr and Gerðr in the main roles.

Even more often than boats, the rock engravings feature what are known as cup marks – small, round dimples in the rock. Archaeologists believe such marks are particularly often associated with burial places. They are often linked with death, burial and rebirth. Cup marks can thus also be viewed as a kind of fertility symbol. And there is some actual evidence for that interpretation in Swedish history, according to an anecdote from Tisselskog, Dalsland, from the years of poor harvests in the 1860s. The farmers went to church and implored God to help them – in vain. But when the harvests continued to fail, they arranged for a young man and woman to have intercourse, in public, on an ancient rock pocked with cup marks. The young man's semen was collected and mixed with seed in one of the cups.

A more peculiar type of fertility rite is intercourse between people and animals. This, too, can be seen in the Vitlycke rock carving, which features a scene where a man is having sex with a horse. Here, too, there are clear parallels with ancient myths that recur throughout the Indo-European language area. Sex between man and beast is a variant of the holy wedding; the mare is actually an avatar of the fertility goddess.

Vedic scriptures from ancient India – contemporaneous with the Swedish Bronze Age – tell of a ritual called the

Ashvamedha. This involved making white stallions compete with each other, after which the victor was throttled. Strangling the horse was believed to be more honourable than cutting it with sharp implements. The dead horse was placed on a bed under a capacious cover. While the corpse was still warm, the queen crept under the cover and feigned intercourse by placing the stallion's penis between her thighs.

As late as the twelfth century, the monk Gerald of Wales describes a pagan rite that he observed in Ireland. The local clan was to choose a chieftain. The man selected as chieftain was obliged – according to Gerald – to have intercourse with a white mare first, in front of the whole clan. The mare was then killed, cut into pieces and cooked in a cauldron. The new chieftain was obliged to bathe in the cauldron and eat some of the meat. The rest of the meat was shared out among the onlookers.

Incidentally, it is interesting that white horses appear to have held such significance for Bronze Age people. Leif Andersson, a geneticist from Uppsala working on domestic animals, has identified a gene borne by horses whose coat greys over the years, eventually turning completely white. He has clear evidence that people began to breed horses early to accentuate that particular trait.

There is some uncertainty about when domesticated horses first arrived in western and northern Europe. It is unclear whether there were any horses at all in Sweden and Denmark during the Battleaxe period. However, horses were definitely present in the Bronze Age, and they were very important, not least in mythology. As mentioned earlier, the oldest known vestiges of horse-drawn wagons with two wheels were found at the River Tobol in western Siberia. They are approximately 4,000 years old. But it was not long before very similar vehicles reappeared in the Bohuslän rock engravings.

The Vitlycke rock engraving includes a man driving such a two-wheeled chariot, clearly drawn by a horse. The man holds the horse's reins in one hand and a hammer in the other. Before him, a flash of lightning can be seen. The most

likely interpretation is that the man is a thunder god – the Bronze Age counterpart of the god later known to the Vikings as Thor. The thunder god's attribute was an axe or a hammer, with which he would strike to produce thunder and lightning.

The Celts called the god of thunder Taranis, while the Romans called him Jupiter and the Greeks Zeus. But everything suggests that the god of thunder and weather is far older, and that he was already known to the early Indo-Europeans. According to a reconstruction by linguists, the Indo-Europeans' sky god was called something like 'Diyéus' – quite similar to the Russian word for 'day', *день* (pronounced 'dyen'), and the French for 'God', *Dieu*. In Lithuanian, the sky god is called 'Dievas'. The early form of this Indo-European god seems to have been a father figure responsible for the sky and the day.

There was also a divine sun. Often, the sun was depicted as a wheel. The ancient Vedic scriptures of India contain many such references, which also occur in Greek plays and the *Poetic Edda* from Iceland. The Swedish rock engravings include many images showing how the sun moves during the day and at night, often borne by a ship.

Another common motif shows the sun riding in a horse-drawn vehicle. The most spectacular example is the Trundholm sun chariot, now displayed at the Danish National Museum in Copenhagen. It was found in a bog and probably dates back to the early Bronze Age. A horse cast in bronze stands on a little chariot. It is pulling a huge sun in the shape of two bronze discs, one side of which is gilded. One interpretation is that the gilded side represents day, while the disc made only of darker bronze symbolises night.

There are also images showing horses drawing the sun forth during the day, when it is light, while it is carried through the underworld by boat at night.

My thoughts turn to the Sun Salutation, which I learned on a yoga course a few years ago and still perform several times a week. It is a good way to stretch the muscles in your back and legs and strengthen your shoulders and arms. When

I was on the course at a yoga institute in Stockholm, I found the religious aspects of the teaching quite irksome. Before we started our yoga practice, we were supposed to recite verses from ancient Vedic scriptures, and the instructors made a big thing out of the fact that we were learning to perform movements going back several thousands of years. Personally, I was only interested in the physical exercise, especially balance and suppleness, aspects that yoga emphasises more than modern Western exercise programmes. Now, reading the literature on early Indo-European myths, I realise that the Sun Salutation may well have the same origins as the Trundholm chariot and the suns in the rock carvings.

The acrobats of the Bronze Age must have put a great deal of effort into improving their balance, strength and suppleness. Tiny bronze statuettes of acrobats performing backflips, like those in the rock carvings, have been found in Denmark. To judge by their appearance, there were both male and female acrobats. The female ones wore a special kind of short skirt made of woollen cords and clinking bits of bronze.

These acrobats probably played a set role in rites and provided entertainment at great feasts held by Bronze Age rulers to consolidate their power. Just as important were the poets – or the bards, to use the Celtic word. Today, poetry is often viewed as something elevated above the rest of society. But in the Bronze Age, poets were an essential part of the apparatus of power. They played a kind of PR role. It was the court poet's job to sing the praises of his lord and master as eloquently and convincingly as possible.

Two important objects used at ritual feasts out of doors were camping chairs and drinking vessels. Pictures of folding chairs have been found from Egypt to Scandinavia, and physical remains have been found in Danish bogs. Drinking vessels were sometimes made of bronze, rarely of glass, but more often of finely polished and decorated pottery. It seems clear that they contained alcohol.

And there is a fair bit of chemical evidence of what Bronze Age rulers used to raise a toast when sitting on their folding chairs, listening to poets and lute players and watching acrobats

perform. The US anthropologist Patrick McGovern, the world's leading expert on the history of alcoholic beverages, has analysed shards of drinking vessels from Denmark and Gotland. He has come up with a recipe for what he calls 'Nordic grog'.

His research covered grave finds from four sites, the oldest from the early Bronze Age, the most recent (on Gotland) from the beginning of the Iron Age. All the beverages contained honey, produced by bees from flowers including lime tree blossom, dropwort, white clover and heather. Some drinks also contained vestiges of barley or wheat, as well as traces of cranberries, lingonberries, bog myrtle, yarrow, juniper berries, and spruce and birch resin. In two cases – the older of which is 3,100 years old – traces of wine made from grapes can also be detected.

McGovern's conclusion is that pure mead brewed using only honey was a status symbol drunk only by the highest-ranking people. However, Bronze Age people often mixed that exclusive honey with barley or wheat. In other words, they brewed a mixture of mead and beer, to which they added herbs and berries. 'Nordic grog' was also spiced up with wine on occasion. This wine was probably imported from the south along trade routes used for amber and other wares. The wine mixed into these beverages is yet another piece of evidence of the extensive networks that already existed in Europe by the Bronze Age.

For me, there is no doubt that boats and metal were two of the main driving forces behind the growth of Bronze Age networks within Europe. But the book by US archaeologist David Anthony is called *The Horse, the Wheel, and Language*. He chooses to emphasise the role played by domesticated horses in dispersing Indo-European languages and the Bronze Age lifestyle throughout Europe. Apart from trading in metal, this lifestyle included a new mythology, a heavily stratified class-based society and woollen clothing. Large flocks of sheep were part and parcel of the pastoralist culture, which spread from the steppes in the east. People began to wear clothing made of wool, rather than just of hides and

plant fibres. The custom of showing group allegiance through particular colours and checked patterns may even have arisen at this early stage. This thought occurs to me on observing the marketing of tartans by Scottish-themed boutiques and firms like Burberry today.

David Anthony may well be right that horses played a decisive role in historical development. Admittedly, there are only a few finds of horses that show signs of having been domesticated from the Corded Ware period in central and northern Europe. There are rather more from the Bell Beaker period. But a little later, once the Bronze Age was well under way, horses became much more common. No doubt it was horses that took the Indo-European culture eastward and southward, for example to India.

Burials of people belonging to haplogroup R1a have been found in Kazakhstan and Krasnoyarsk, Siberia. These are between 3,800 and 2,300 years old and appear to represent the equestrian culture of the steppes on its way to the east.

Multiple factors were involved when the new networks and the new class system took over in Europe and parts of Asia: wheels, wagons, boats, bronze, woollen cloth, Indo-European languages, horses and amber. And we should not forget that they included trading in slaves.