

## Vikings could have steered by polarized light

February 3rd, 2011 in Other Sciences / Archaeology & Fossils



Image: Donsimpson via Wikipedia.

**(PhysOrg.com) – The Vikings are said to have been able to navigate with the aid of "sunstones" that allowed them to see the sun on cloudy or foggy days. Now scientists in Hungary and Sweden say the sunstones could have been polarizing crystals.**

The Vikings were the dominant seafaring explorers of much of Northern Europe and Britain from around 900 to 1200 AD. They were able to navigate their way around the thousands of kilometers of the north Atlantic with great skill and without the help of the [magnetic compass](#), which was not then known in Europe. In the long days of summer at high latitudes they would also have had limited or no views of the stars to help them navigate.

Legend has it that these great Scandinavian [sailors](#) used a "sólársteinn," or sunstone, to help them, and stories mentioning the sunstone include the saga of King Olaf and Sigurd, the Icelandic hero. The king asked Sigurd where the invisible sun lay in the cloudy sky and then used a sunstone to check Sigurd's answer.

Danish archaeologist Thorkild Ramskou suggested in 1967 that the sólársteinn could have been a piece of Icelandic spar, which is calcite in the form of a transparent, polarizing crystal. These crystals are common in Iceland. Other candidates for sunstone include cordierite or tourmaline, both of which are common in Scandinavia.

A polarizing crystal allows only light polarized in one direction to pass through, and it appears dark or light depending on its orientation to the [polarized light](#). Sunlight becomes polarized through the scattering of air molecules in the atmosphere, with the line of [polarization](#) at a tangent to concentric circles with the sun at their center. Ramskou postulated that the Vikings could have rotated a polarizing crystal to check the direction of polarization and deduce the position of the sun when it was hidden by fog or was just beneath the horizon.

Scientists Gábor Horváth from the Eötvös University in Budapest, Susanne Lkesson from Lund University, and colleagues around Europe, have been investigating Ramskou's hypothesis since 2005

because it had never been tested.

The researchers began by asking volunteers to identify the position of the sun in 180-degree fisheye lens photographs taken in northern Finland of the sky under twilight, foggy or cloudy conditions. They found the volunteers were inaccurate, making errors of up to 99 degrees.

This led Horváth and Lkesson to conclude the Vikings were unlikely to have relied on guesses using naked eye observations.

Then in 2005, the pair crossed the Arctic Ocean on the Oden, a Swedish icebreaker. During the trip they measured the polarization patterns of the sky under a wide range of weather conditions. They were surprised to learn that polarization patterns were very similar on clear and cloudy days, although the polarization was weaker in overcast conditions. This suggests the Vikings could have used this information if they had polarization crystals.

Horváth and Lkesson next plan to see if volunteers can use polarization crystals to determine the sun's location in a range of weather conditions.

The [Vikings](#) and earlier seafarers used a number of navigational aids including using special sundials, the stars, migration paths of birds and whales, coastlines, distant clouds over islands, and so on. The sunstone could have been another important tool in their navigational aids kit.

The research paper is published in the *Philosophical Transactions of the Royal Society B*.

**More information:** On the trail of Vikings with polarized skylight: experimental study of the atmospheric optical prerequisites allowing polarimetric navigation by Viking seafarers, Gabor Horvath et al., *Phil. Trans. R. Soc. B* 12 March 2011 vol. 366 no. 1565 772-782. [doi:10.1098/rstb.2010.0194](https://doi.org/10.1098/rstb.2010.0194)

© 2010 PhysOrg.com

"Vikings could have steered by polarized light." February 3rd, 2011. <http://www.physorg.com/news/2011-02-vikings-polarized.html>