By John Winter

Sicco with his XP Goldmaxx Power

The earliest navigation device

Sicco Siegers has been detecting for over 15 years and lives in the Netherlands, in the town of Zutphen, which happens to be twinned with Shrewsbury in Shropshire. The town isn't well-known outside the Netherlands, but it has a long history and archaeological excavations have taken place over many years.

Recently he was invited – with his XP Goldmaxx Power – to explore the dumped soil excavated from an archaeological site, when he made an extraordinary and rare discovery. Many archaeological excavations had already shown that a wealth of important finds were likely to be exposed by the digging so archaeologists were on hand to monitor the work.

A medieval instrument

The strange object from the 14th century, an ingenious medieval instrument, was a quadrant used by sailors and also as a tool for telling the time. I suppose this portable sundial was an earlier model for the modern watch and the portable TomTom type GPS navigation system. What makes the quadrant so special is that it is the oldest specimen known in Northern Europe and has enormous historic value.

The Museum of History of Science in Oxford states in general terms on its website: "The 'quadrans vetus' or 'old quadrant' is one of the most ingenious of medieval instruments and it is also extremely rare.

The face of the quadrans vetus is used for calculating the time from the altitude of the sun."

Alderman Hans La Rose said: "With this find Zutphen has added a fantastic and unique object to its already rich heritage collection; moreover it shows how much 'up to date' the town already was seven hundred years ago. I hope that the quadrant will take pride of place in our local museum."

When he first found the bronze quarter circle in the spoil heap, Sicco set it aside thinking it was insignificant and, like the city archaeologists, paid more attention to the Roman coins that his partner had discovered. But it was a different story after exhaustive and careful cleaning and when all the lines and markings appeared. Sicco's discovery subsequently proved to be the star find, having great significance and, by a careful study of the stratification of the layers could be dated securely to the period to 1300-20. This was virtually a century before the previously recorded quadrants of this type used by Richard II in this country.

The earliest quadrants in Europe were of the type now known as the quadrans vetus (old quadrant), a universal design dating back to the 9th century in Baghdad that showed unequal hours. This universal design becomes slightly inaccurate as the latitude increased from the typical values found in Islamic regions to those of northern Europe.

The move from unequal hours to equal hours seems to have occurred gradually throughout the 14th century, linked to the spread of tower clocks. Naturally, there was a need for a quadrant to indicate these hours and the obvious and simplest development was for a design based on the quadrans vetus, the type found by Sicco.

The rather simple but well made copper-alloy quadrant is 62mm in radius and 1mm thick, engraved on one side only and, rather surprisingly, has both of the sights firmly in place, as is the swivel mount (still moveable) for the missing plumb bob. From illustrations I have seen in ancient manuscripts I am somewhat surprised at the size of the one unearthed by Sicco. From the photograph you can see that it sits comfortably in the palm of his hand.

In the journal of the British Sundial Society (BSS Bulletin 26i, March 2014) John Davis gave a comprehensive and learned account of the Zutphen Quadrant in which he said: "As well as being slightly bent, the quadrant has at least two significant cracks, starting at the 14° and 34° points on the limb and propagating inwards. These are evidence of 'season cracking' along grain boundaries due to the exposure in the soil and usually associated with small amounts of ammonia. Considering the long exposure, they do not suggest a particularly poor-quality brass."

The metallurgy also provided an extra set of clues, enabling archaeologists (for example) to date the origin and history, as well as an understanding the state of metal smelting, working and distribution in medieval Europe.

How it worked

I'm not as clever as the mariners of years ago. To me, the device looks suspiciously like a sundial and the geometry of the Zutphen quadrant is all Double Dutch to me. Literally! Simply, it worked by holding the instrument against your nose and pointing to the sun, you could, with help of the shadow on the dial caused by the string of a plumb bob, read the time. A mariner could also work out latitude and thus his position when at sea.

But this device isn't that simple. My cleverer readers may get a greater understanding by studying the schematic representation of the quadrant shown in the illustration opposite.

Archaeologist Michel Groothedde said that the device was an invention from the Arab world and became popular in Europe between 1300 and 1500. He also thought that the Zutphenese sundial originally belonged to a trader. The old wood

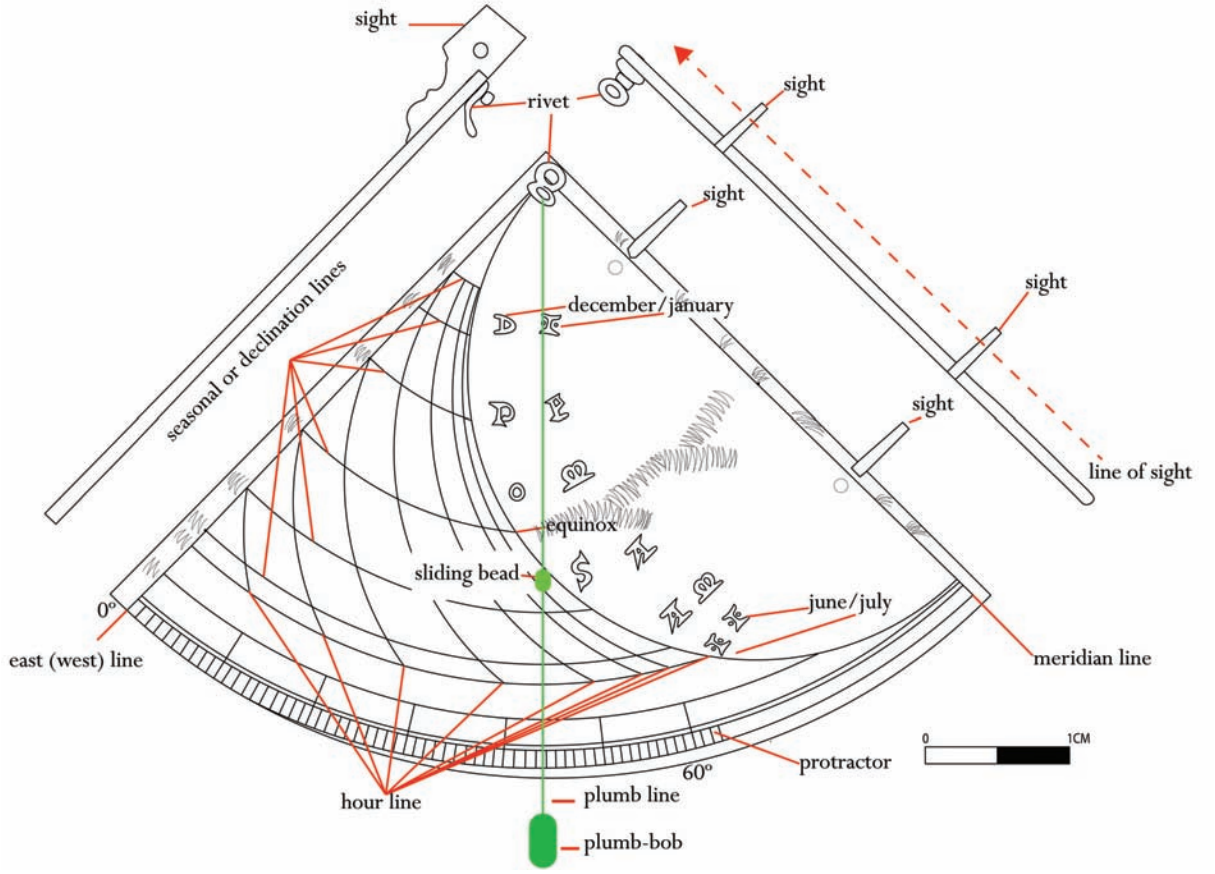

Image © Hans Westerink

market where the item was found was the financial centre of the city in the Middle Ages, and full of warehouses, home of the richest merchants.

Michel also has a theory about the instrument's usage; "Because of the marks on the sundial only the latitude between Belgium and Norway could be found; and that is exactly the trading extent for the Zutphenese traders at that time. The instrument could not be used either northwards or southwards from that area because of the wrong angle relative to the sun."

Another theory was that the quadrant could have also been the property a churchman who had to pray at exact times, so it was necessary that time be measured. The ordinary man did not really care what time of day it was!

The fact is that we do not know who the user was, but can assume that he was a member of the educated merchant class and wealthy enough to afford such an instrument. He'd be intelligent enough to understand how to work it … and also be interested in telling the time.

The last word goes to Zutphenese clock restorer Melgert Spander who also wishes that the sundial stays in his city. He said: "I am wild about the fact that this timepiece was found in Zutphen. It tells me about its important place in history. This object belongs here at home."

We tend to assume that life was simpler and less sophisticated in former times. The old quadrant, however, demonstrates that medieval time-telling was certainly much more challenging than it is today.

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