Egyptian tomb mystery may be world's first protractor

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The bizarre object to the right was found in the tomb of an ancient Egyptian architect. For over 100 years, it has languished while archaeologists debated its function.

Now, a physicist has thrown her hat into the ring, arguing that it is the world's first known protractor. The intriguing suggestion – which has drawn scepticism from archaeologists – is based on the numbers encoded within the carvings on its surface.

A new angle (Image: Jane Maria Hamilton)

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The architect Kha helped to build pharaohs' tombs during the 18th dynasty, around 1400 BC. His own tomb was discovered intact in 1906 by archaeologist Ernesto Schiaparelli in Deir-al-Medina, near the Valley of the Kings. Among Kha's belongings were measuring instruments including cubit rods, a levelling device that resembles a modern set square, and what appeared to be an oddly shaped empty wooden case with a hinged lid.

Schiaparelli thought this last object had held another levelling instrument. The museum in Turin, Italy, where the items are now exhibited identifies it as the case of a balancing scale.

But Amelia Sparavigna, a physicist at Turin Polytechnic, suggests that it was a different architectural tool – a protractor. The key, she says, lies in the numbers encoded in the object's ornate decoration, which resembles a compass rose with 16 evenly spaced petals surrounded by a circular zigzag with 36 corners.

Sparavigna says that if the straight bar part of the object were laid on a slope, a plumb line would revealed its inclination on the circular dial (as illustrated in this graphic).

Significant numbers

The fraction of one-sixteenth features in a calculus system the Egyptians used, says Sparavigna, and they also identified 36 star groups called the decans, which later formed the basis of a star clock. She suggests the object was "a protractor instrument with two scales, one based on Egyptian fractions, the other based on decans".

But Kate Spence, an archaeologist at the University of Cambridge who specialises in ancient Egyptian architecture, is not convinced and maintains the object is simply a decorative case. She says that unlike those on known measuring instruments, the markings in question are not particularly accurate: "When the Egyptians want to be precise, they are." She says the Egyptians tended to define angles by measuring the two sides of a rectangle, and that no similar instrument is known.

Reference: arxiv.org/pdf/1107.4946

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