

Did Galileo Discover Neptune?

Galileo saw the planet Neptune while observing the moons of Jupiter. His diaries hint that he may have realised the significance of what he had seen.

In 1612 and 1613 Galileo was observing the moons of Jupiter, whose existence he had discovered 3 years earlier. His notebooks also record a nearby star in a position where no star visible to such a small telescope exists.

"It has been known for several decades that this unknown star was actually the planet Neptune," says Prof David Jamieson, Head of Melbourne University's School of Physics. "Computer simulations show the precision of his observations, revealing that Neptune would have looked just like a faint star almost exactly where Galileo observed it."

Observing Neptune is one thing. Uranus was also seen many times by astronomers before William Herschel realised it was a planet rather than a star. However, Jamieson believes close analysis of Galileo's notebooks suggests he did more than mistake Neptune for a star.

On 28 January 1613 Galileo's notebooks include a note that this particular object had moved relative to a nearby star. Moreover, Jamieson found an unlabelled black dot on the 6 January page of the same year in a position that matches that of Neptune's on that night.

"I believe this dot could reveal he went back in his notes to record where he saw Neptune earlier when it was even closer to Jupiter but had not previously attracted his attention because of its unremarkable star-like appearance," Jamieson says.

Jamieson believes that, with his remarkable memory, Galileo placed the dot in the position he had seen it 3 weeks before. It might seem impossible to confirm, almost 400 years later, whether the dot on the 6 January page was put there that night or weeks later. However, in the days before mass production the ink used by Galileo varied slightly on a batch-by-batch basis.

Proton bombardment of this ink can reveal differences in the trace elements used in different batches. Jamieson suggested

to his colleagues in the University of Florence physics department that they test the ink of the mysterious dot to see which batch it came from.

Unfortunately, this being the International Year of Astronomy, the relevant notebook is currently on display. However, the Librarian of the National Central Library of Florence has agreed that testing can occur once it comes off display at the end of this month.

Modesty was not among Galileo's many fine qualities, and it seems strange he would have let such an important discovery – the first new planet observed for thousands of years – go unreported. However, Jamieson notes that Galileo, already under fire for so many controversial theories, would have been aware that extraordinary claims required extraordinary proof.

Alas, finding Neptune again would not have been easy. "It is two magnitudes too faint to be seen with the naked eye, and in his telescope would have looked no different from any other very faint star," Jamieson says.

"He probably searched the sky, night after night in ever-widening circles around Jupiter," Jamieson says. "However, he did not know about Newton's laws of motion and could not have predicted where Neptune would be."

If the ink analysis proves inconclusive there is another possible way Jamieson's intriguing hypothesis could be proved. Galileo was fond of protecting his claim on discoveries by sending them encoded as anagrams in letters to friends. This way, if he could not back them up no one would know. However, if his findings were confirmed he could produce the letters to prove he had beaten his rivals to the punch. Jamieson speculates that somewhere in Galileo's extensive letters might lie an anagram signalling his discovery of a new planet.

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