



Astronomy

La Société Guernesiaise

Star of Wonder

The Wise Men who visited the infant Jesus in Bethlehem were, as recorded in the Gospel according to St Matthew, guided by a star.

In the words of the hymn, a *star of wonder*. Certainly, for hundreds of years astronomers, historians and theologians have wondered about the identification of the star, and many theories have been postulated.

The suggestions have included a wide range of possibilities: a nova or supernova, a star which varies in brightness, a comet, a bright planet, a conjunction of planets, the eclipsing or occultation of a planet or star by the moon, and meteors or shooting stars. Another possibility put forward is that the star did not exist at all, the story being just a legend.

To resolve these questions we must first resolve several issues: the details of the account itself, the date of the star's appearance, and other historical records.

The traditional wording of the account appears in the King James Version:

Now when Jesus was born in Bethlehem of Judaea in the days of Herod the king, behold, there came wise men from the east to Jerusalem, saying, "Where is he that is born King of the Jews? for we have seen his star in the east, and are come to worship him." ... When they had heard the king, they departed; and, lo, the star, which they saw in the east, went before them, till it came and stood over where the young child was. When they saw the star, they rejoiced with exceeding great joy.

I have long puzzled about whether the phrase 'we have seen his star in the east' means that they were themselves in the east when they saw the star, or whether they saw the star in the eastern part of the sky, and if the latter then how could the star lead them westwards to Jerusalem and then southwards to Bethlehem? Of course, no star stands still; they all appear to move as the earth rotates. A star could easily, therefore, appear to move westwards. But what was special about this one?

The wording in the New English Bible possibly gives a more accurate translation of the original Greek:

After his birth astrologers from the east arrived in Jerusalem, ... 'We observed the rising of his star' ... and the star which they had seen at its rising went ahead of them until it stopped above the place where the child lay.

So the rising of the star must mean that they saw it as it rose above the eastern horizon, and it then led them to Bethlehem.

To identify which star or celestial phenomenon it was we need to have some idea of the date. We know that it happened after Jesus's birth, and while the Holy Family was still in Bethlehem. This could be within a period of up to two years. Scholars differ in their analysis of the date Jesus was born, but there seems to be a general consensus that it was between 8 BC and 1 BC, and was most likely between 6 BC and 3 BC.

The appearance of a nova or supernova – stars which suddenly flare up – would certainly have been of great interest to the Magi. Contemporary Chinese records shows that novae or supernovae were observed in both 5 BC and 4 BC, the first one remaining visible for 70 days. However, they do not fit the biblical description, as they would have not 'stopped' over Bethlehem.

The Chinese records could, however, have been of bright comets, which would not move with the stars, and which could appear to stop. But we would expect Herod and his astrologers to be well aware of them. Also, comets were generally regarded as ill omens, not good ones, so it seems unlikely that the star of Bethlehem was a comet.

It has been argued that the star was a variable one, especially Mira, which has a large range of brightness, from second magnitude to invisible, with a period of 11 months. I do not find this very convincing, however, as again it would not appear to stop, and it would appear too regularly to be considered unusual.

Neither do meteors – which are fleeting – or lunar occultations of planets or stars – which are fairly common, seem to fit Matthew's description. And the Magi would hardly have been fooled by a bright planet, such as Jupiter or Venus.

That leaves us with a 'conjunction' or grouping of two or more planets, possibly with bright stars. These happen regularly, so it would have to be a really unusual one to have created such interest. But it would also have to be something which non-astronomers would not easily have noticed. Rather, it was an event whose significance was apparent only to those intimately familiar with the night sky.

There are several conjunctions which warrant further investigation, such as a conjunction of Jupiter and Venus in 3BC, a triple conjunction of Jupiter and the bright star Regulus in 3 BC, and a conjunction of Jupiter, Venus and Regulus in 2 BC, and a conjunction of Venus and Jupiter, also in 2 BC.

I have modelled them on a computer, and the one which I favour is a triple conjunction (ie three successive conjunctions) of Jupiter and Saturn, in 7 BC. At the end of May that year they approached within a degree of each other – equivalent to about two widths of the moon. This was visible in the east, in the couple of hours before sunrise. They then separated and joined up again at the beginning of October, again within a degree, this time visible all night, moving with the stars from east to west. Finally, at the beginning of December, the two planets approached again just a degree apart, in the south, moving south-west and west during the evening.

There are several significant aspects of these events. Firstly, triple conjunctions are a kind of planetary dance with two of the three bright outer planets (Mars, Jupiter and Saturn) lining up with the Earth on three successive occasions within a year. They are relatively rare events, especially for the slow-moving Jupiter and Saturn. The previous one with these two planets was 140 years earlier, and it would be more than 300 years before the next one.

Secondly, this series of conjunctions occurred entirely in the constellation Pisces. The Magi were most likely Chaldeans, who had a reputation for astronomy and astrology. Although Pisces is not an outstanding constellation, it is suggested that it held particular astrological significance in respect of the birth of a king, especially with the involvement of the regal planet Jupiter.

Finally, and most importantly from an astronomical point of view, the looping motion of Jupiter and Saturn would give them the appearance of stopping, not over a particular place, but with respect to the stars. The 'stopping' associated with the third and final conjunction would have been south or south-west (depending on the time of evening the observation was made) in the general direction of Bethlehem as observed from Jerusalem.



So, could the star of Bethlehem have been two planets? The theory may not, of course, be right, but if there is an astronomical explanation that in no way lessens the event's wondrous quality.

Related links (some with an alternative view):

- [Bethlehem Star](#)
- [Xmas Star](#)
- [Can we find the Star of Bethlehem in Far Eastern Records?](#)
- [Mira Ceti and the Star of Bethlehem](#)
- [Common Errors in "Star of Bethlehem" Planetarium Shows](#)

Books: *The Star of Bethlehem: An Astronomer's Confirmation* , by David Hughes (Walker & Co., New York, 1979) *The Star of Bethlehem: An Astronomer's View* , by Mark Kidger (Princeton University Press, 1999) *The Star of Bethlehem: The Legacy of the Magi* , by Michael Molner (Rutgers University Press, 1999) *The Star of Bethlehem* , by Patrick Moore (Canopus Publishing Ltd, 2001)

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