

## Twinkle, twinkle, little star...

...how I wonder what you are. So runs the nursery rhyme, but this question has also been asked of the star of Bethlehem that, according to chapter 2 of Matthew's gospel in the Bible, led 'wise men from the east' to the birthplace of Jesus Christ. Cynics scoff at this account, and even some theologians have said it is unscientific and without historical evidence.

Far from it! The description fits well the behaviour of a comet: it made a new appearance, moved slowly across the background of familiar stars, and 'stood over' Bethlehem – a phrase used widely of tailed comets in ancient literature. The rate of movement (consistent with a journey of a couple of months for the wise men) and the reported directions of sighting initially in the east and later the south (the way from Jerusalem to Bethlehem) agree not only with a comet in general, but with a specific comet recorded completely independently by Chinese astronomers as being visible for about 70 days in the year 5 BC – one of three observed by them in the 30-year period from 20 BC.



Who were the 'wise men' (also referred to as Magi) and what made them undertake this journey? The tradition of 'three kings of orient' began only about 500 years later and is based on a particular interpretation of some Old Testament verses and the identification of their gifts of gold, frankincense and myrrh for the new-born king. The gospel account says nothing of kings, nor gives their number or names. They

were without doubt religion-based astronomers/astrologers (there was no distinction in those days, as there was none between alchemy and chemistry in the Middle Ages), who studied the skies and interpreted their observations in terms of significant present and future events. This was a well-known occupation in the area of Persia (modern Iran), Mesopotamia (Iraq) and Arabia; frankincense and myrrh were valued products derived from Arabian plants.

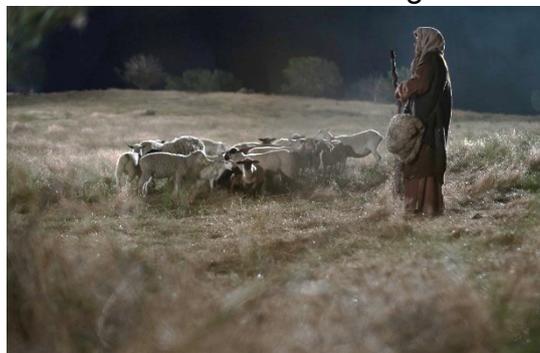
In 7 BC the large planets Jupiter and Saturn were close together (a conjunction) three times in the sky, in the star constellation Pisces, a fact important enough to be recorded on a contemporary clay tablet found near the site of Babylon; this would have signified a forthcoming birth of a Jewish king. In 6 BC Mars joined in to give three planets together, something that happens only once every 805 years and would have been taken as a sign of a great historical event about to happen. So the comet of 5 BC, appearing in the east in the constellation





Capricorn, triggered an urgent need to set off and find the newly born special king in Israel. That the wise men went to Herod in Jerusalem is only natural: where else would they expect to find a king? They didn't follow the star there – it was behind them in the east. It was the Jerusalem priests who identified Bethlehem, from an Old Testament prophecy of the expected Messiah, and now the comet was indeed before the wise men, having moved round to the south in the meantime, as recorded by the Chinese.

As for the date, the comet was visible in the spring of 5 BC; our celebration of Christmas 'in the bleak mid-winter' is a tradition established rather later and not at the time, and Jesus was almost certainly born around the time of the Jewish Passover (near Easter for us), when the milder weather allowed sheep and shepherds to be out in the fields at night as also recorded in Luke's gospel. Herod is reckoned to have died in 4 BC, and Jesus lived with his family for a couple of years in Egypt as refugees to keep out of his way, before returning to their home in Nazareth. The notoriously cruel Herod (who murdered several members of his own family) had all boys in Bethlehem up to 2 years old killed, fitting with the set of astronomical features he had heard from the wise men.



So it all fits together, and Matthew's account in the Bible is fully consistent with what we know from history and from astronomy. Indeed, it serves to fix the data of Jesus' birth within a period of just a few weeks in the spring of 5 BC. Our calendar, with the change from dates BC to AD (or BCE to CE if you prefer) centred supposedly on this birth, was set about 500 years later and proves to be a few years wrong, but that's not a bad attempt for its time!

As with strings of archaeological discoveries in the Middle East over many years, here history and science support the Bible's account previously scorned by experts lacking this evidence. January 6th is the traditional day for celebrating the coming of the wise men to Bethlehem, and it's neither a nursery rhyme nor a fairy tale.

[This material is drawn from a much longer and more detailed scholarly article published in the journal *Science & Christian Belief* in 1993 (volume 5, pages 83–101), which you can read at <http://www.asa3.org/ASA/topics/Astronomy-Cosmology/S&CB%2010-93Humphreys.html>; it was written by Sir Colin Humphreys, Professor of Material Science at Cambridge University, who spoke at one of our Tyne Valley 'Big Questions – Any Answers?' events in 2017, on the subject of miracles.]

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*Modified version of the article in the Tyne Valley Express for January–February 2018*