

Was the Star of Bethlehem a comet, an alignment between the Sun, the Earth, Jupiter and Saturn, a double eclipse of Jupiter by the moon, supernova or combination of all these events?

# STAR OF BETHLEHEM

NATIVITY YEARS

8<sup>BC</sup>

CENSUS ANNOUNCED

7<sup>BC</sup>

THE STAR APPEARS

6<sup>BC</sup>

CENSUS COMPLETE

5<sup>BC</sup>

JESUS IS BORN?

4<sup>BC</sup>

HEROD DIES

3<sup>BC</sup>

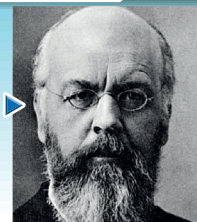
Roman Emperor *Caesar Augustus* orders census to calculate taxes. Census and tax collection take up to two years to complete

People return to their place of birth for census

Joseph and Mary travel to Bethlehem

Magi travel from Babylon to Jerusalem (up to 50 days by camel)

The exact year of Jesus' birth is uncertain, but *Gospel of Matthew* states the birth occurred **in the days of Herod the Great**. 19th-century historian *Emil Schurer's* history of the Jews in the time of Christ establishes that Herod died in 4BC, placing Christ's birth between the census announcement and death of Herod



**7BC – Triple conjunction:** In 1603 *Johannes Kepler* observes a conjunction of *Jupiter* and *Saturn* in which planets "line up" due to their orbits around the Sun. He calculates that a similar set of circumstances occurred in 7BC, with a triple conjunction of Jupiter and Saturn in *Constellation of Pisces* in May, October and December



**Triple conjunction:** Sun, Earth, Jupiter and Saturn in line three times in 7BC

Jupiter represents **King of the Gods**, Saturn represents **justice** and **Palestine**, while Pisces is associated with **Judea**

## Star in the East

According to *Matthew*, the star appeared twice before it "stood over where the young child was." The first appearance, most likely the triple conjunction in 7BC, is interpreted by the *Magi* – Babylonian astrologists – to signify that a Messiah-King will be born in the Israelite kingdom of Judea



**Babylon:** Leading centre in astronomy, astrology and mathematics – well aware of Jewish legend that a star will herald the Messiah



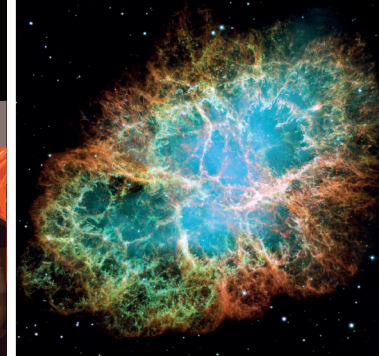
## 6BC – Second appearance

Using computer modelling, Rutgers University astronomer *Michael Molnar* matches *Matthew's* story to two lunar occultations (eclipses) of Jupiter in the east in 6BC



## Expectations of a third sign

Could the Star have been a bright comet? Possibly, but Magi would view a comet as an omen of evil – floods, famine and death – not the birth of a King



## 5BC – The final sign

While translating ancient Chinese astronomical records, 18th-century Jesuit scholar *Jean-François Foucquet* finds reference to a *k'o-hsing* or "visiting star" in the eastern sky during March-April 5BC. Chinese astronomers use the term *k'o-hsing* to describe novae or supernovae, including the stellar explosions of 1006AD, 1054 (*Crab Nebula*, above), 1572 and 1604

The first eclipse of Jupiter in Aries, a constellation also associated with Judea, is on March 20. Second, on April 17, coincides with Jupiter "in the east" and the five visible planets in alignment

## Rare event over Jerusalem

*Mike Dworetzky* and *Steve Fossey* of the University of London Observatory calculate that the chance of double eclipses of Jupiter, one month apart, with Mars in Aries would occur about once every 6,000 years

Sources: Kepler and the Star of Bethlehem by W. Burke-Gaffney, The Star of Bethlehem: The Legacy of the Magi by Michael R. Molnar, Lunar Occultations of Jupiter and Saturn by M.M. Dworetzky and S.J. Fossey

Pictures: Eclipse.net, NASA, ESA, J. Hester (Arizona State University)

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