

The Star of Bethlehem

By Orla O'Donnell, Education Support Officer

Christianity is the world's largest organised religion with 2.1 billion followers. Although the Christian faith is divided into many denominations, all its followers share one basic belief in the birth and life of the man they call Jesus Christ. One element of the birth of Jesus that has always fascinated the scientific minds of astronomers was the majestic star that the Wise Men followed to see the baby Jesus. Astronomers and historians have for years tried to find an astronomical phenomenon to explain the wondrous star that the Wise Men were said to have been guided by. In this article I will review some of the main theories connected with the Star of Bethlehem and try to explore the possible answers to explain this enduring mystery.

First we must set the scene, when would it have been possible for Jesus to be born? His followers celebrate the birth of Jesus on the 25th of December. Historians have uncovered that this is not his actual birth date but was selected by the Romans to coincide with a pre-Christian solar festival called 'Saturnalia'. The year of the birth of Jesus is not known exactly, this is due to miscalculations by a Roman monk called Dionysius Exiguus who made some major mistakes when calculating our calendar. For example, he stated that Jesus was born during the 28th year of the reign of Roman emperor Caesar Augustus but he failed to realise that during the first four year of Augustus' reign he was known as Octavianus. This error, and others, mean that his calculated year of Christ's birth is off by a few years. Modern historians have undertaken much research and have estimated the date of the birth of Jesus as being between 7 and 2 BC.

So now we have an estimated date, the second question we must ask ourselves when investigating the star of Bethlehem is who were the Wise

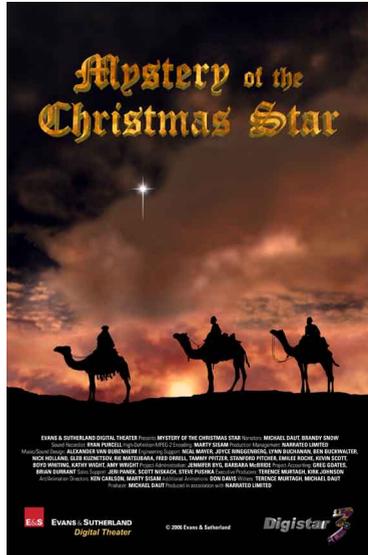


Image Credit: Evans & Sutherland

Return of a favourite show Armagh Planetarium screens this show every December.

Men and how did they know so much about astronomy? It is not certain where in particular the Biblical Wise Men originated from but Mesopotamia, Parthia, Syria and Persia in the East have been suggested as possible locations. The Wise Men are also quite commonly referred to as the Magi. This is often misinterpreted to imply that they were magicians and this was not the case.

The Magi were priests of the Zoroastrian religion, which is one of the world's oldest monotheistic religions, founded by the prophet Zoroaster in Iran approximately 3500 years ago. Zoroastrianism is still practiced today with the majority of the community located in India. All the religion's major festivals are linked to celestial activities so information on astronomy is important to its devotees. During Roman times the Magi would

have been widely known as knowledgeable men who would have most importantly been recognised for practicing astrology. In contrast the Jewish people did not practice astrology, viewing it as a pagan practice so they would therefore be largely unaware of any changes in the night sky. To them anyone with in-depth knowledge of celestial phenomena may have seemed almost magical. So now that we know the pedigree of these men we can look at some of the possible suggestions to explain the Christmas Star.

“The exact year of the birth of Jesus is not known”

We all know that not all the twinkly lights in the night sky are stars. The Magi did not have the advantages of telescopes to allow them to have such detailed views of the night skies. They called any astronomical object a star; meteors were shooting stars, comets were hairy stars and planets wandering stars. That some were vast spheres of blazing nuclear fire many light years away, others balls of rock, gas and ice in our planet's neighbourhood, or specks of inter-planetary grit vaporising mere miles above their heads was unknown to them. It is almost certain that the Star of Bethlehem was not a star as we define them today. So what kind of celestial object was the 'Star of Bethlehem? Let us review some of the possibilities.

“The Magi called meteors shooting stars, comets hairy stars and planets wandering stars”

The first possibility we will review is that the Star of Bethlehem may have been a meteor. These are singular and transitory events, lasting mere seconds. A meteor would have moved across the sky very rapidly and not have given the Wise Men enough time to travel all the way from their homes to Bethlehem. We can quickly eliminate the possibility of the Star of Bethlehem being a meteor. A bright comet could be a real contender as they can remain visible to the naked eye for



Guiding star? A brilliant comet is a stunning spectacle. This is Comet Hale-Bopp photographed in 1997.

weeks at a time as they make their vast, lazy loops through the inner Solar System. There are two points that seem to remove the possibility of a comet being the explanation for the Star. Comets were interpreted at the time as a bad omen and would have signalled the death of a king to ancient scholars of the skies rather than the birth of one. The most famous comet of all, Halley's, had already made an appearance in 11BC, this is too early to fit with the estimated birth of Christ and it is unlikely that two brilliant comets appeared so close together in time.

The next theory, which initially sounds more plausible, is that the 'Star of Bethlehem' was a supernova or nova. Novae are enormous explosive eruptions from the surface of white dwarf stars, events which are very difficult to predict, occurring every thirty years or so in our skies. A nova flares up and becomes extremely bright, lasting for a few days or weeks. Supernovae are the spectacular results of the death of stars. A supernova is a star that suddenly blows itself apart and the resulting energy produces an intense light which can persist for days or months. The explosion of a star could have been magnificent enough to signal the birth of a King making

a supernova a very real contender for the star of Bethlehem. There is however another possibility that would have resulted in a wondrous sight in the night sky.

“Halley’s Comet had already made an appearance in 11BC”

The Magi as I have described were scholars of the night skies and they would have been aware of the light produced by the bright planets like Venus (which they would have called a wandering star). If two or more of these planets came together they could produce a spectacular result. This rare occurrence when planets meet in the sky is referred to as a conjunction and would have been a marvellous sight in the heavens. Although planets in conjunction appear close to each other, this is a trick of our perspective; in the Solar System they are still separated by tens or more millions of kilometres. Could the Star have been a bright conjunction of planets? If it was, why would the Magi have seen it as signifying the birth of the King of the Jews?



Image Credit: via wikimedia.org

Adoration of the Magi Giotto di Bondone (1267-1337) based the Star in his painting on Comet Halley. Giotto would have observed the comet during its 1301 apparition. Nearly seven centuries later ESA's successful probe to the comet was named after this Italian artist.



Image Credit: NASA/ESA

Distant supernova Supernovae are incredibly bright events. The point of light to the lower left in this image is Supernova 1994D in galaxy NGC 4526. The galaxy is about 55 million light years (16.9 Mpc) from us yet we pick out this individual star.

Which of these possibilities is the most likely? Well, to learn more I suggest you come to Armagh Planetarium to see our show the 'Mystery of the Christmas Star' which is running for the month of December. We'll look forward to seeing you.