THE HOLY STAR

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The book of Matthew. Chapter 2, Verses 7 to 9.

Herrod called the Magi secretly. He sent them to Bethlehem and said, "Go and search for the child. As soon as you find him, report to me, so that I too, may go and worship him."

After they had heard the King, they went on their way, and the star they had seen went ahead of them, until it stopped over the place, where the child was.

The star of Bethlehem; a subject of wonder, for centuries. The shining beacon in the eastern sky, that guided the shepherds and the wise men to their destination, so many years ago. But what was the actual, true nature of this guiding beacon? Today, we're going to look in to a few possibilities.

So, what are the options?

- Well, it could have been, a miracle. If this was the case, then absolutely nothing that we discuss here, can scientifically explain it!
- Was it just a myth, or a legend? It's mentioned in the book of Matthew, and could have been added, simply to give more significance to the birth of Jesus.
- Or, could it have been an actual, astronomical event? A spectacular phenomenon, that was later documented in the gospel.

Before we can decide, we need to know, a few facts.

Our story begins, around two thousand years ago - during the Imperial Roman period. At the time, the night sky looked almost exactly the same as it does now. There was virtually no light pollution, so our ancestors would have had amazing views of the heavens.

The known world was mainly under the control of the Roman Empire, and the emperor at that time, was Ceasar Augustus. In the story of the nativity, Ceasar Augustus ordered a census, and demanded that all people within the empire should be made to register, and they must do this in their ancestral home. In order to do this, Joseph and Mary would travel to Bethlehem, which is a five-day journey from their home in Nazareth, around about the time that Mary would go in to labour.

It's stated in the book of Luke, that when Joseph and Mary arrived in Bethlehem, that they could not find accommodation, because the town was so busy due to the census. Despite Mary's condition, their low status and income didn't allow for any bargaining, and so, unfortunately, there was no room, at the inn.

You would be forgiven for thinking that Jesus was born on December 25th in the year zero. But records show that this was not the case.

Modern calendars date from the Roman empire. In 525 AD, a monk called Dionisius, attempted to fix the date of Christmas, by working out all the reigns of the emperors, back to the founding of the empire in 753 BC.

However, Dionisius made two crucial mistakes. Firstly, there was no year zero. The Calendar advanced from 1 BC, straight on to 1 AD. Because of this, one year was incorrectly added to his calculations. The other mistake was regarding Ceasar Augustus, who reigned under his real name of Octavian, for a period of four years. Dionisius counted both these periods separately, and so a further four years were added erroneously. As a result of this, it is more accurate to assume that Jesus was actually born around the year, 5 BC.

We know from the book of Matthew, that Jesus was born during the reign of King Herod, and that he ordered all male children under the age of two to be killed. This was known as the massacre of the innocents. Jesus was age one at the time, and we know that Herod died shortly after the Slaughter. But can we accurately calculate the date of his death? Thanks to the history books, along with astronomical records, the answer is yes.

A Jewish scholar, called Flavius Josephus, wrote that King Herod died soon after a lunar eclipse, but before the Jewish festival of Passover, which occurs in the springtime, each year. A lunar eclipse occurs, when the Sun, the Earth and the Moon, are all in perfect alignment, causing the Moon to become darker, as it passes in to the shadow of the Earth. Sometimes a red colour can be seen on the Moon’s surface, because some of the Sun’s light, is refracted through the Earth's atmosphere, and gets dispersed, like a prism.

By using astronomical calculations, we can see that indeed, there was a total lunar eclipse around that time, that fits with the description given by Josephus. As seen from the Middle East, the Moon passed in to the Earth’s shadow, on the evening of March 23rd, in the year 4 BC. If Jesus was age one at the time, this supports the theory that he was born in the year 5 BC.

So, if this is all correct, why is it, that we celebrate the birth of Christ, in December?

From the 3rd century BC, the romans celebrated the feast of Saturnalia. This was typically held in the third week of December, to coincide with the winter solstice. During the celebration period, all regular activities came to a halt. Businesses, courts, schools, and other social patterns were suspended, while people spent time doing more fun activities. Feasting, playing, singing, exchanging gifts and home decorations, were some of the activities people enjoyed, during this time. Thus, the Saturnalia celebrations are the source of many traditions that we associate with Christmas.

After the year 336 AD, the Romans celebrated the festival of Sol Invictus. This means, “The Undefeated Sun”, in reference to the rebirth of the Sun, following the winter solstice. It was held on December 25th, each year.

Because there was no room at the inn, Joseph and Mary, had to look for any shelter they could find, as Mary was very close to giving birth, that night. A local houseowner, offered an empty stable for the night. This was an offer which they gladly accepted.

Of course, in the nativity story, Joseph, Mary, and the new-born baby Jesus, were visited by different groups of worshippers. They were the shepherds, and the wise men. The shepherds lived in Palestine, and they represent the understanding that Christ coming in to the world is for people of every social standing, not just the wealthy, or wise.

The Saxon Scholar, the Venerable Bede, stated that the three wise men were most likely to be priests or astronomers, as opposed to kings. He suggested that they represent the three parts of the known world at the time. That of, Europe, Asia, and Africa. It's not even clear from historical texts if the wise men all came from the same country or not, but wherever they came from, the star that they followed must have been something really special, and really unexpected!

So, given what we know, what could the star of Bethlehem have actually been? It needs to fulfil certain criteria:

- It must be a rare event,
- It must have occurred in the East, as seen from the Holy Land,
- It needed to have remained in the sky for some time,
- It must be a singular, special or spectacular event,
- And it must be compatible with the probable date of the Nativity.

So, Let's look at the possibilities!

There's some evidence to show, that the star could have actually been, a comet, and there’s none more famous, than Halley’s Comet. Comets are rocky icy bodies that visit the inner solar system from great distances, sometimes on very long elliptical orbits, that see them return, time and time again. In the case of Halley’s comet, it returns to the inner solar system every 76 years. The last time we saw it was in 19 86. It will return in the year 2061.

Edmund Halley had noticed that a bright comet had been visible in 1531, 1607 and 1682. He concluded that this was probably the same comet returning each time, and predicted that it would once again return in 1758. He died before its return, but he was correct, and so, the comet now bears his name.

The comet was also seen in 1066, and is depicted on the Bayeux Tapestry. But it was also seen in the year 1300. Just two years later, the Italian artist, Giotto di Bondone, painted this scene. It shows the adoration of the Magi, at the stable in Bethlehem. Di Bondone was obviously inspired by the recent comet, and included it in his painting.

So, it's entirely possible that Halley’s Comet, could had been the star of Bethlehem. However, if we perform the calculations, we realise that Halley’s Comet came around in 12 BC, and not in 5 BC, which is what we're hoping for, and so, we will have to discount it from our list of candidates.

Next on our list, is the possibility of the star being a planetary conjunction. A conjunction occurs when two or more planets appear to be very close to each other in the night sky. At the time the Bible was written, just 5 planets other than the Earth were known. Of those, the two brightest and most impressive to observe, were Jupiter, and Venus.

Venus takes around 225 days to orbit the sun, but Jupiter takes almost 12 years. So, from the earths point of view, it is quite rare to see them in the same part of the sky. This graphic shows the planets at the same time each day over a few weeks. As you can see, they very quickly appear to coincide, then move apart again just as quickly. If the Magi truly were wise men, they would have known what the object was and that this was going to happen, so they would not have regarded it as a special event, and would not have followed it. So, once again, we will remove this possibility from our list.

Could it be, that the star in question was a shooting star?

From time to time, larger than normal meteors, enter the earth's atmosphere, creating intensely bright objects, with a fiery tail behind them. These events, are however, very short lived. So, it's impossible to contemplate them as a potential way marker for the Magi

But what if there were considerably more of them? Roughly every 33 years, the Earth passes through a particularly dense cloud of dust, which causes greatly elevated numbers of shooting stars, in what we call, the Leonids meteor shower. Usually, for this shower, you could expect to see about 50 to 80 meteors per hour, but during these rare events, the total number can rise to over 100,000 per hour! This is a depiction of the Leonid storm in 1833. As you can see, those that witnessed it were terrified by the spectacle, with many of them dropping to their knees, to pray.

This simulation shows what such storms look like. Although very impressive to the naked eye, the meteors are observed in a very random fashion, and can appear in any direction, at any time. There is simply no way that the Magi could have attempted to follow a display such as this. So, let's take shooting stars off our list of candidates too.

Where does this leave us then?

Could it be, that the star of Bethlehem, was simply that; a star that became incredibly bright very quickly? How could this be possible? Well, there are a couple of ways that stars can suddenly increase in brightness:

Firstly, there's a supernova. When a large star uses up all its hydrogen at the end of its life, its core collapses, and then rebounds, causing a huge explosion that is brighter than anything else in the galaxy. This then fades away after a few weeks, leaving a gaseous remnant behind.

The second possibility is that of a nova. This occurs, when a white dwarf star, is found in close proximity, to a larger, red giant star. The smaller, denser dwarf, feeds off the tenuous atmosphere, of its larger companion, creating what we call, an accretion disk. This disk, consisting mostly of hydrogen, is thermally heated by the hot white dwarf star. It eventually reaches a critical temperature, causing the ignition of rapid runaway fusion. This sudden increase in energy, expels the atmosphere into interstellar space, creating the envelope that we see as visible light during the nova event. Once again, this all settles down within a few weeks, or months. But critically, a nova does not produce a long-lasting remnant after it has exploded. The two stars can either settle down to a steady state again, or in the case of this simulation, be destroyed completely, scattering the remaining material, which then disperses, after a number of years.

Both of these mechanisms would produce a phenomenon, that closely resembles what we are looking for. So, do we have any historical evidence that this actually happened?

During the 1950s, research began in to thousands of years of Chinese astronomical records. By comparing them to modern calculations, they turned out to be extremely accurate. More recently, Korean, Arab, and Japanese records have also been discovered.

All of these records go back thousands of years. So, if there had been a nova or supernova visible around the time of Christ, it would most likely have been faithfully recorded.

There is a passage, in Han Shu, the book of the Han dynasty, which was written in the first century AD, that states that in the second month, of the second year, of *Chien Ping*, a *Hui Sing* appeared for more than 70 days, in the constellation of *Chien Nui*. A *Hui Sing* translates as a guest star, or scintillating star. *Chien Nui* is the constellation of the Ox, and the second month of the second year of *Chien Ping*, works out to be around late march, in the year 5 BC.

Korean records tell us that in the 54th year of *Hyokkose Wang*, on day *I-Yu*, of the third month, a *Poh Sing*, appeared, in the constellation of *Hoku. Poh Sing*, translates as a bushy star. *Hoku* is found near to the bright star Altair, in Aquila. Day *I-Yu* of the 3rd month, of year 54 of *Hyokkose* corresponds to March 31st, but in the year 4 BC.

If we make the assumption, that the one-year discrepancy between these two accounts is due to an error, similar to that of Dionisius, then they do seem to be referring, to the same bright object. The Chinese record, places it near to the constellation of the Ox, which is shown here. The Korean record, places it near to the star Altair, which is here. Given that both of these records are over two millennia old, and originate from two different cultures, they share a remarkable correlation.

And so, although we may never know for certain, what the star of Bethlehem was, a nova would seem to fit the bill very well. It certainly would have been a rare, and spectacular event, which remained visible for a number of weeks. As seen from the Holy Land, it would have risen directly in the east, around midnight. And, as we've heard, two historical records that date it very close to the probable date of Christ's birth.

In conclusion, given the various astronomical phenomena that we've looked at; could it be, that thousands of years ago, two stars happened to approach each other close enough to interact, and cause the huge flare up of brightness that we've discussed? The light from that interaction, then travelled for many centuries, across the cosmos, over an unfathomable distance, and eventually became visible from Earth, just at the time, that Christ was born.

Was this, a celestial coincidence?

Or, could it have been, a miracle?