

Star of Bethlehem

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The Place

Apollo Earth

On their trip to the Moon, the astronauts of Apollo 17 captured this rare image of the full Earth – centered on Africa, birthplace of humanity.

This is an ancient land. The Nile River still flows northward into the Mediterranean - just as it did when the great pyramids rose on the Plain of Giza. Eastward, the Red Sea splits and encircles the Sinai Peninsula, dividing two continents and separating Egypt from the sacred sites of Judaism, Christianity, and Islam.

Trade routes once ran northward from incense kingdoms at the southwestern tip of the Arabian Peninsula. Caravans bringing frankincense and myrrh traveled up the eastern coast of the Red Sea, past the Gulf of Aqaba, and northward toward the Dead Sea -- journeys foreshadowing the gifts of the wise men.

The Jordan River flows southward into the Dead Sea, where its precious water evaporates, leaving a salty brine. King David, King Herod, Jesus, and John the Baptist walked the paths of the Dead Sea.

Qumran

Below cliffs on the Dead Sea's northwestern shore lie the ruins of Qumran, a refuge where scribes copied the Dead Sea Scrolls and prepared themselves for the arrival of a messiah. These messianic prophecies were well known throughout Judea and in the regions beyond.

Jerusalem

Mountains west of Qumran are home to the most cherished of all cities, Jerusalem -- a city already ancient when the wise men arrived 2,000 years ago in search of the Christ child.

MidEast
Map

To reach Jerusalem, the wise men may have journeyed for months, skirting the desert whenever possible. They may have come from Persia, Babylonia, Mesopotamia, Arabia, or even Ethiopia in East Africa. They could have been court advisors, predicting events based on their study of the stars and traveling great distances to attend a royal birth or the crowning of a king.

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The Event

3 Bible quotes

Now when Jesus was born in Bethlehem of Judea 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.”

Then Herod, when he had privily called the wise men, inquired of them what time the star appeared. And he sent them to Bethlehem and said: “Go and search diligently for the young child; and when ye have found him, bring me word again that I may come and worship him also.”

When they had heard the king, they departed, and lo, the star which they saw in the East went before them ‘til it came and stood over where the young child was. When they saw the star, they rejoiced with exceeding great joy.

Stills of wise men
Filling dome

For 2,000 years, artists have depicted the wise men and the star – on paintings, stain glass windows, and holiday cards. Their art illustrates some of what we know and a lot of what we don’t know concerning these mysterious men and the star that they followed.

Although there were three gifts: gold, frankincense and myrrh, we do not know that there were three wise men. Although we often show the wise men wearing crowns, we do not know that they were really kings. Often we show a brilliant star streaming light into a manger with the Christ child surrounded by the wise men. Yet it is possible that the wise men reached Bethlehem months after the birth of Jesus and that the object they followed was not a brilliant star.

Perhaps the wise men were astrologers or mystics using the motions of heavenly bodies to predict events on Earth.

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Egypt animatin

The Calendar

Astronomer priests had watched the sky and made predictions long before the arrival of the wise men. In ancient Egypt over 5,000 years ago, astronomers used rising and setting positions of stars to align the faces of the pyramids at Giza. Passageways inside the great pyramid of Cheops led to the North Star and to the middle star of the hunter Orion’s Belt.

Egyptian priests recognized that the bright star Sirius would appear in the morning twilight just before the Nile River’s annual flood -- an event that turned this barren desert into fertile farmland and marked the beginning of a new year in the world’s first solar calendar.

Orion in last image Rising in the East before Sirius is the hunter Orion with the three stars of his belt pointing downward toward Sirius. To some, these three stars represent the Wise Men journeying to Jerusalem.

Like the astronomer-priests of ancient Egypt, the wise men searched for events in the heavens that would predict events on Earth, such as the birth of a king. Once we determine the date of Christ's birth, we can search the heavens at that time for signs of a royal event.

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Caesarea

The Season

In 45 B.C. Julius Caesar visited Egypt and adopted its solar calendar, complete with leap days every four years. He decided to set the winter solstice as December 25th and to begin the new year on January 1st. This Julian calendar was used throughout the Roman Empire at the time of Christ's birth. Julius Caesar's choice of December 25th as the winter solstice is probably the reason Christ's birth is celebrated on that date today.

sun paths

Each day the sun moves from east to west across the sky. At the summer solstice the sun's path is highest and the day is much longer than the night. At the winter solstice, the sun's path is lowest and the night is much longer than the day.

tent

A festival at the winter solstice could celebrate the return of longer days and the promise of warmer weather for the upcoming year. In our modern calendar, the winter solstice falls on December 21st or 22nd.

clouds

The Emperor Aurelian proclaimed December 25th as the Birthday of the Unconquered Sun. Early Christians began to celebrate Christmas on this date in the 4th century.

*fade to
Saturnalia*

December 25th also followed the Roman harvest festival called the Saturnalia. The modern Christmas traditions of gifts, games, eating and drinking, and the burning of candles may have come from the Saturnalia festival.

*Shepherds
Mary And Joseph*

But is December 25th the actual date of Christ's birth? The gospel of St. Luke described shepherds watching their flocks at night. Spring is the lambing season in Judea, a time when shepherds are most likely to be outside in the evening. In winter the sheep are in folds to protect them from the cold. A birth in the spring near Passover would also explain why there was no room for Mary and Joseph in Bethlehem. Jerusalem and all the surrounding areas would have been very crowded during the Passover celebration.

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Monastery
With text slides

The Year

In the sixth century, the monk Dionysius tried to reset the calendar of Julius Caesar to begin with Christ's birth. He set the date of Christ's birth as December 25th of the year he called 1 B.C. He began the Christian era on

January 1, 1 AD. - just six days later - to agree with the start of the Roman year. The letters AD are from the Latin “anno domini” meaning “in the year of our lord”. However, Dionysius did not know that a zero year is needed between 1 BC and 1 AD. The concept of zero did not exist in European mathematics at the time of Dionysius. He also miscalculated the dates of Augustus Caesar’s reign by about 4 years. With this uncertainty, we need more information to determine the exact year of Christ’s birth.

Jerusalem
At night

According to Matthew, Christ was born when Herod was on the throne in Jerusalem. The Jewish historian, Josephus, reported that Herod died before the feast of Passover that followed an eclipse of the moon.

Lunar eclipse

Such an eclipse occurred on the morning of March 13th, 4 BC. Most of Jerusalem would have been asleep for several hours when the dark part of the Earth’s shadow first touched the Moon at 1:45 AM. Within a few minutes the bite out of the Moon’s disk became obvious. At 2:53 AM the eclipse reached its maximum with 35 percent of the Moon hidden from the sleeping city.

Mesada

King Herod probably died in late March or early April of 4 BC – between the March 13th eclipse and the beginning of Passover on April 10th. Biblical scholars think that Christ was born 2 to 3 years before Herod’s death, making the spring of 7 or 6 BC most likely for Christ’s birth.

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Wisemen, meteor
comet, planets

The Star

Now that we know when Jesus was born, we can recreate the sky and look for special stars. The wise men would have called any celestial object a star. A planet was a “wandering star” because it wandered among the fixed stars. A comet was a “hairy star” because its tail resembled a beard. A meteor was a “shooting star.”

image

In 1301, the Italian artist Giotto di Bondone painted a comet as the Star of Bethlehem hovering over a stable and pointing toward the Christ child.

Comet

Comets do make elegant direction indicators – they can move across the sky and seem to "point" downward with their tails extending up from the horizon.

china
video comet

However a bright comet would have attracted the attention of King Herod and his court. Chinese astronomers kept very good records of celestial objects and observed no comets at this time. Comets were also considered omens of evil and harbingers of disasters. A comet is an unlikely candidate to herald the birth of a king.

nova

The mathematician and astronomer Johannes Kepler suggested that a supernova, or new star, might have been the Star of Bethlehem. A supernova is not really a new star, but an old star exploding in death. A supernova is so violent that it may be visible in the daytime. As the explosion continues, a supernova can retain its brilliance for months or even years.

But a supernova would not move through the star field to lead the wise men to Jerusalem. Also the scribes of King Herod's court would have recorded a brilliant supernova. Finally astronomers have found no supernova remnants dating back to an explosion at the time of Christ's birth.

3 charts

Perhaps the Star of Bethlehem was really a wandering planet. In the first century AD, astronomers thought that planets were perfect spheres circling the Earth. In 1543, the Polish astronomer Nicholas Copernicus proposed a new model of the solar system with the Sun at its center. In this heliocentric model, all planets circle the sun in similar orbits. Mercury and Venus lie inside Earth's orbit while Mars, Jupiter and Saturn lie beyond.

Galileo study

In 1610, the astronomer Galileo Galilee looked through his newly invented telescope and saw images that supported the sun-centered solar system of Copernicus.

On Venus he discovered phases like those of the moon. These phases were consistent with a planet orbiting the sun, not the Earth. On the moon, he found mountains and valleys – more like Earth than a perfect heavenly sphere. As he watched Jupiter, Galileo discovered four moons – all orbiting Jupiter, and not Earth.

Galileo's observations changed our perspective forever. We now know that planets are distant worlds in their own orbits, not perfect spheres orbiting the Earth. But we must remember that the wise men thought the planets circled the Earth and that these wandering objects could foretell Earthly events.

Zodiac band

Ancient astronomers drew a line through the star field to mark the Sun's apparent path and surrounded it with Zodiac patterns. In the spring, the sun is in front of Aries, the ram, first of the Zodiac constellations. Next to Aries, we find Taurus, the bull, followed closely by Gemini, the twins. Summer begins while the sun is in Gemini. As summer continues, the sun moves through Cancer, the crab, and Leo, the lion, a pattern associated with summer's heat. By early autumn the Sun reaches the constellation Virgo, goddess of the harvest, signaling the end of the growing season. Virgo is followed by the smaller pattern of Libra, the scales. As winter approaches, the sun's apparent path descends into Scorpius, the scorpion. Sagittarius, the archer, follows with his bow aimed toward the Scorpion's heart. During

rainy winter weather, the sun appears in front of the water-related constellations: Capricornus, the sea-goat, and Aquarius, the water bearer,. Last of the Zodiac band is the third water pattern: Pisces, the fish,. If the Star of Bethlehem were really a planet or grouping of planets, it would have occurred in one or more of these constellations – probably in a pattern associated with Judea.

3 coins

Recently Dr. Michael Molnar, an astronomer and coin collector, studied ancient Roman coins minted in the first century AD in Antioch, Syria. These coins show Aries, the Ram, looking at a star over its shoulder. According to the Roman astrologer, Marcus Manilius, Aries was the constellation representing Syria, including Judea. A rare celestial event in Aries could have indicated the birth of a king in Judea.

Simulation

Ancient astronomers knew exactly where the sun was in the star field, even though they could never see the sun and the stars at the same time. This was the sky in mid-May of 7 BC, facing South. The Sun was in Taurus and the crescent moon was in Aquarius. Jupiter, the royal planet, and Saturn were close together in Pisces.

As we move from 7 to 6 BC, the moon will race around the Earth once each month while the Sun drifts eastward through the Zodiac band.

In late May, the brighter Jupiter passed Saturn with both planets moving eastward. As the Earth moved between these planets and the sun, the wise men could have seen both planets slow down, stop, and reverse directions. Once again the faster moving Jupiter passed Saturn at the end of September with both planets now moving westward. Finally Jupiter passed Saturn for the third time in one year with both planets moving eastward in early December. This is called a Triple Conjunction – a rare event that could have attracted the attention of the wise men.

If the wise men were watching, they would have seen Mars join Jupiter and Saturn for a planet massing in February 6 BC. Then the sun entered Pisces and moved past the planets, hiding them from direct view. The bright planet Venus followed the Sun into Pisces.

Our story continues in mid-April with the sun and the constellation Aries on the horizon at dawn. For the best view, we must also face East. Once the sun reached Aries, the planets became visible in the eastern predawn sky, rising before the sun. If the wise men faced East at dawn on April 13th, 6 BC, they would have seen Jupiter, Saturn, Venus, and the crescent moon above the rising sun. By April 15th, the moon had passed Venus and was close to Saturn. It had become a very slender crescent as it approached the sun. At this time, the sun, Jupiter and the moon were in Aries.

On April 17th, the dark moon covered Jupiter just before sunrise. At dawn, the royal Jupiter reappeared, conquering both the moon and sun as it climbed upward from the Eastern horizon with both Saturn and Venus in view. For an astrologer, this would have been a powerful harbinger of a king's birth in the lands associated with Aries, including Judea.

wise men

Perhaps the wise men decided to search for this child and set out across the desert after the heat of summer. When they reached Jerusalem, they were told to turn south to Bethlehem. In the southern sky, they found Jupiter in Aries once again. On December 19, 6 BC, Jupiter stopped its backward motion and stood still in Aries – hanging below the waxing gibbous moon. The wise men could have observed that the royal planet Jupiter “stood over” the horizon and led them south to Bethlehem and to the Christ child.

wise men

No scientific explanation can fully explain the vision of the Wise Men. But this interpretation fits the astrology practiced at the time and the words of St. Matthew. However, if we accept the literal Biblical interpretation that the wise men actually saw and followed a visible star, then we can come to only one conclusion: their observation is not an astronomical object, but a miracle.

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Jerusalem

Sky

Searching for the Star

Each year tourists journey to the Holy Land to celebrate Christmas. But to see the sky over Bethlehem 2,000 years ago, just go outside – to a place far from modern city lights. There you will find the Moon, Aries, the ram, and the hunter Orion, with the three stars of his belt pointing to the brilliant Sirius. The stars of that first Christmas are with us today

animated

sunrise

And the December sun still follows its lowest path of the year – just as it has for all of recorded history -- over the deserts of Judea or over the fence in your own backyard.. Each year under the winter sun, we share the warmth of the holiday season. Traditions based on the stars of Christmas will be special as long as you and your family celebrate the holidays under the starry night.

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