

Star of Bethlehem: Going Back in Time to Examine Its Origins

-- Finding a scientific explanation for the legendary "Star of Bethlehem" has puzzled astronomers for centuries, only with recent technological advances have possible scenarios been found...--

It seems almost traditional at this time of year for stargazers to ponder the age-old question of the possible origin of the Star of Bethlehem. Was the so-called Christmas Star an unusual, eye-catching gathering of naked-eye planets, or was that fabled "sign in the sky" a meteor, comet, nova, or indeed something supernatural? And did it even exist?

New knowledge of the old astrological beliefs and modern computer-based planetary tables may yet shed new light on this age-old question. But before going back in time to explore the possible answers, one needs to understand the many problems behind the questions.

There are many factors that contribute to the puzzle, including the uncertainty in the actual date of Christ's birth and the terminology used to describe celestial events during the Star's appearance some 20 centuries ago. For instance, any heavenly object bright enough to attract attention was apt to be called a "star." Meteors, for instance, were "shooting" or "falling" stars; comets were "hairy" stars; novae were "new" stars and planets were "wandering" stars.

Fixing an elusive date

The Bible says nothing about the calendar date of the Nativity, but does refer to historical personages and events, such as the reign of King Herod. Modern historical research suggests that Herod may have died sometime between 4 BC and

1 BC by our present calendar. The Magi are said to have visited Herod just before he died, and presumably the birth of Christ and appearance of the Star came sometime before that.

And it is very doubtful that Jesus was born December 25. For one thing, the Biblical passage in *St. Luke*, "And there were in the same country shepherds abiding in the field, keeping watch over their flock by night," indicates that spring is the likely season; that was when the shepherds in Judea were tending the newborn lambs.

In ancient times, Dec. 25 was the date of the lavish Roman festival of Saturnalia. It was a time when gifts were exchanged; homes, streets and buildings were decorated; people came home for the holidays and everybody was in a happy, party mood. It has been said that early Christians chose the date of the Saturnalia in order to avoid attention and thus escape persecution.

When the Roman emperor Constantine officially adopted Christianity in the 4th century, the date of Christmas remained Dec. 25.

Christ's birth almost certainly did not occur 2,002 years ago. Our present chronology by which the years are numbered as AD or BC was conceived by the Roman abbot Dionysius Exiguus around 523 AD.

Unfortunately, Dionysius made two significant errors in his calculations. The first was his placement of 1 AD immediately following 1 BC, completely disregarding the mathematically required 0 in between. At that time in Europe, zero was not considered a number.

Second, Dionysius accepted the statement of Clement of Alexandria that Jesus was born in the 28th year of the reign of the Roman emperor

IN THIS ISSUE:

- | | |
|---|---------------------------------------|
| 4 | Update: Lott Steps down |
| 4 | Update: Bush gets Vaccination |
| 5 | Dreyfus Affair Begins/Emile Zola |
| 6 | Another Season for Friends/Race Track |
| 7 | Roots of the Christmas Tree |

Caesar Augustus. But Dionysius failed to realize that during the first four years of his reign this Roman ruler was known by his original name Octavianus, until the Roman senate proclaimed him "Augustus." So here alone we have an error of four years, but by the time it was realized our chronology was too well established to be changed.

As for the time for the appearance of the Star, most astronomers and Biblical scholars believe that it most likely occurred sometime between the years 7 and 2 BC. So this is the time frame that we need to explore to determine if there was anything unusual in the sky that might have caught the attention of the Magi.

What was it?

At least four theories have been advanced to explain the Star from a purely astronomical viewpoint. Possibly the first idea put forward was that it was an unusually bright fireball meteor seen streaking toward the horizon. But as most skywatchers know, such an object can be seen to flash across the sky in a mere matter of seconds – hardly long enough to lead the Magi halfway across the Orient to the little town of Bethlehem. So we can confidently lay this concept to rest.

Not so easily dismissed, however, is the possibility that the Star was a bright comet. Comets can remain visible to the unaided eye for weeks either in the predawn sky or at dusk. It is not impossible to conceive that a comet with a bright star-like head and long gossamer tail pointing like some cosmic finger toward the horizon could have drawn the Magi to Bethlehem.

The famous Halley's Comet, last seen in early 1986, also flared in the sky during August and September in the year 11 BC. However, most authorities dismiss it due to the poor time fit. Although it seems unlikely that another great comet could have appeared nearer to the accepted

time frame of the Star's appearance and went unrecorded, we can never really be sure.

Besides, comets were viewed as omens of evil, such as floods and famine as well as the death – not the birth – of kings and monarchs. The Romans, in marking the death of the Roman General Agrippa, for example, used the 11 BC apparition of Halley's Comet as a benchmark. With this in mind, comets would seem to be wrong as the heavenly sign that would signal the coming of a newborn king.

Exploding star

Perhaps the simplest answer is a nova or supernova outburst: a new star blazes forth where none had ever been seen and leaves no trace for us to find in the future. Although their names imply a new creation, these spectacular objects are in reality dying stars, although they are new (albeit temporary) additions to the nighttime sky. The appearance of a nova is unpredictable – a really bright one becomes visible perhaps once every 25 or 30 years.

Going on this assumption, we actually should be due for a bright naked-eye nova at almost anytime now, since the most recent one appeared back in 1975 (not far from the bright star Deneb in the constellation Cygnus). Most bright novae suddenly and unexpectedly flare into prominence literally overnight, attracting the instant attention of sky-conscious people. But after several days or weeks of such prominence, it gradually fades back to obscurity.

Even more spectacular – but much rarer – are supernovae; stars that suddenly blow themselves completely apart, briefly producing an incredible energy output equivalent to the combined light of an entire galaxy of stars. At the height of its outburst, a supernova can shine with a brilliance capable of casting shadows and can even be seen in broad daylight – truly a celestial announcement worthy of the birth of a king.

In our Milky Way galaxy, over the past thousand years, there have been four brilliant supernovae, in 1006, 1054, 1572 and 1604. Clearly, we are long overdue for another, though the stars don't necessarily play by any odds we might calculate.

Although a nova or supernova is the most satisfying explanation for the Star, there is a serious problem with it, in that there doesn't seem to be any definitive record of a bright nova appearing in the sky during the time that biblical historians believe the Magi made their journey.

One nova apparently did appear, bordering the constellations Capricornus and Aquarius during the spring of 5 BC. But the Chinese records, which describe this object, imply that it was apparently not very conspicuous at all.

Perhaps a planet

The final possibility is one or more of the bright naked eye planets. The likelihood that the Magi could have confused one or more of the familiar planets with a star seems remote. However, sometimes two or more of these restless wanderers come together in a striking conjunction. Perhaps a planetary grouping of particular beauty; an exceptionally close conjunction of two planets or groupings of three or more creating an eye-catching geometric figure in the sky may have taken place between the years 7 and 2 BC. A gathering like that would be quite unusual to the unexpecting eye.

One such event that is often cited occurred on the evening of Feb. 25, 6 BC involving Mars, Jupiter and Saturn, and happened in the constellation of Pisces, the Fishes. If you have ever visited a planetarium for the traditional Christmas show, you probably already know the thrill of watching as the planetarium projector races back through time to recreate this unusual event.

Another possible explanation for the Star of Bethlehem is the three-times passing of Jupiter and Saturn between May and December in 7 BC; a rare triple or "*great conjunction*."

Jupiter appeared to pass one degree north of Saturn on May 29; practically the same on Sept. 30; then finally a third time on Dec. 5. There is no doubt about the visibility of these events, mostly opposite to the Sun in nighttime skies. As for their astrological impact, the Magi would have certainly noticed that both planets did not appear to separate widely between their conjunctions. In fact, for eight consecutive months – the time it might have taken to travel the 500 miles or more from Babylonia to Judea – Jupiter and Saturn remained within three degrees of each other, from late April of 7 BC until early January of 6 BC.

A fist held on an outstretched arm covers about 10 degrees of sky.

But perhaps no other planetary grouping can equal that of the two brightest planets – Venus and Jupiter – for the explanation that we seek. And if we take the only known account of the Star literally, as given in *St. Matthew*, then what we really need is the appearance of not just one, but two "stars." The first appearance would have been seen well in advance of the Magi's arrival in Bethlehem, and the other at the end of their long journey.

Perhaps the signal for their star was to be a sign in the constellation of Leo, the Lion. To the early Israelites, Leo was a constellation of great astrological significance and considered a sacred part of the sky. A very close conjunction of Venus and Jupiter would have been visible in the eastern dawn sky of the Middle East from about 3:45 to 5:20 a.m. on Aug. 12, 3 BC.

When they first emerged above the eastern horizon, the two planets were separated by only about two-fifths of the Moon's apparent diameter or 12 minutes of arc. As a comparison, the separation of the stars Mizar and Alcor in the

handle of the Big Dipper is also 12 minutes. Planets this close are very striking, if they don't differ too much in brightness.

Incidentally, St. Matthew wrote that the Magi stated in their meeting with King Herod: "We have seen his Star in the East and have come to worship him." It has never been clear if they saw the star in the eastern sky, or if they saw it from the East. The fact that the Aug. 12, 3 BC conjunction of Venus and Jupiter occurred in the eastern sky and may have also started the Magi on the journey (from the East) to Bethlehem means that both bases are covered with their statement -- reported by St. Matthew -- to King Herod.

Venus ultimately vanished into the glare of the Sun, but Jupiter and Leo remained in the night sky during the next ten months. During this time a number of additional planetary conjunctions took place, all of which would have been of great importance to the priest-astrologers of the time.

Encore

Then, during June of 2 BC, as Jupiter and the stars of Leo began to sink into the western evening twilight, Venus again returned to this same region of the sky for an even more spectacular encore.

The Magi certainly would have especially taken note that on the evening of June 17, when Jupiter and Venus appeared even closer together than they did in the dawn skies of the previous August. As the planets slowly descended toward the horizon they got closer and closer together.

Finally, at 8:30 p.m. local time they drew to within a mere 0.6 of an arc minute of each other while appearing to hover some 15° above the western horizon. To the Magi the two brightest planets must have appeared to coalesce into one and glowed before them like a dazzling beacon over Judea. Eyeglasses were many centuries in the future, so only people with perfect eyes would have seen the planets separated.

See for yourself

Astronomy can tell us that all these planetary conjunctions indeed occurred. In fact, users of the software package [Starry Night Pro](#) can go back in time and view all these planet configurations for themselves on their home computers and try to judge which of these might have appeared the most impressive to the Magi.

But whether anyone actually observed them, and if any of these sent the Magi on their historic journey, are all matters for conjecture.

By Joe Rao



BUSH VACCINATED

Fulfilling his promise, Bush received the smallpox vaccination.

Bush is feeling "absolutely, positively fine," said White House spokesman Adam Levine.

On Dec. 13, Bush directed as many as 500,000 U.S. troops to get smallpox vaccinations, part of an effort to guard against bioterrorism. He promised at the time to get the shot himself, though he said his family would not, because the risk of a domestic attack did not justify it.



TRENT LOTT STEPS DOWN AS SENATE MAJORITY LEADER

Republican Senator Trent Lott resigned his leadership position in the Senate and the GOP two weeks after his verbal blunder that implied he favored racial segregation.

Senator Bill Frist is the only publicly declared candidate for replacement.

THIS WEEK IN HISTORY:**December 22, 1894****Dreyfus Affair Begins**

French officer Alfred Dreyfus is convicted of treason by a military court-martial and sentenced to life in prison for his alleged crime of passing military secrets to the Germans. The Jewish artillery captain, convicted on flimsy evidence in a highly irregular trial, began his life sentence on the notorious Devil's Island Prison in French Guyana four months later.

The Dreyfus case demonstrated the anti-Semitism permeating France's military and, because many praised the ruling, in France in general. Interest in the case lapsed until 1896, when evidence was disclosed that implicated French Major Ferdinand Esterhazy as the guilty party. The army attempted to suppress this information, but a national uproar ensued, and the military had no choice but to put Esterhazy on trial. A court-martial was held in January 1898, and Esterhazy was acquitted within an hour.

In response, the French novelist Émile Zola published an open letter entitled "J'Accuse" on the front page of the *Aurore*, which accused the judges of being under the thumb of the military. By the evening, 200,000 copies had been sold. One month later, Zola was sentenced to jail for libel but managed to escape to England. Meanwhile, out of the scandal a perilous national division was born, in which nationalists and members of the Catholic Church supported the military, while republicans, socialists, and advocates of religious freedom lined up to defend Dreyfus.

In 1898, Major Hubert Henry, discoverer of the original letter attributed to Dreyfus, admitted that he had forged much of the evidence against Dreyfus and then Henry committed suicide. Soon afterward, Esterhazy fled the country. The military was forced to order a new court-martial for Dreyfus. In 1899, he was found guilty in another show trial and sentenced to 10 years in prison. However, a new French

administration pardoned him, and in 1906 the supreme court of appeals overturned his conviction. The debacle of the Dreyfus affair brought about greater liberalization in France, a reduction in the power of the military, and a formal separation of church and state.

WHO YOU NEED TO KNOW:**Emile Zola**

(1840-1902)

Emile Zola was born in Paris. His father was an Italian engineer, who had French the citizenship in 1862. Zola spent his childhood in Aix-en-Provence, southeast France. When he was seven, his father died, leaving the family with money problems - his mother was largely dependent on a tiny pension. In 1858 Zola moved with his mother to Paris. In his youth he became friends with the painter Paul Cézanne and started to write under the influence of the romantics. Zola's widowed mother planned for him a career in law. However, Zola failed his baccalaureate examination but finally passed it. According to a story, Zola was sometimes so broke that he eat sparrows that he trapped on his window sill.

He went on to become a French novelist and critic, the founder of naturalist movement in literature. Zola redefined Naturalism as "Nature seen through a temperament." Among Zola's most important works is his famous *Rougon-Macquart* cycle (1871-1893), which included such novels as *L'ASSOMMOIR* (1877), about the suffering of the Parisian working-class, *NANA* (1880), dealing with prostitution, and *GERMINAL* (1885), depicting mining industry. Zola's open letter *J'ACCUSE* on January 13, 1898, reopened the case, where the Jewish Captain Alfred Dreyfus was sentenced to Devil's Island.

Zola died on September 28, in 1902, under mysterious circumstances, overcome by carbon monoxide fumes in his sleep. According to some speculations, Zola's enemies blocked the chimney of his apartment, causing poisonous fumes to build up and kill him.

SPORTS:

The Race Track

What exactly goes on at a race track? Here is the break down of the different kinds of wagers. There are two main types:

1. **Straight wagers** (These wagers only involve one horse):

Win: You collect only if your horse finishes first .The minimum wager is \$2

Place: You collect if your horse finishes first or second. However, if your horse wins, you only collect the Place payout. The minimum wager is \$2.

Show: You collect if your horse finishes first, second or third, but you collect only the Show payout. The minimum wager is \$2.

Across The Board: You are wagering on a horse to Win, Place and Show. You receive one ticket for all three wagers. If your horse wins, you receive Win, Place and Show payouts. If your horse finishes second, you receive Place and Show payouts; and if your horse is third, you receive the Show payout. Because you are actually placing three wagers, the minimum wager is \$6.

2. **Combination or "Exotic" wagers**(These wagers involve two or more horses):

Daily Double: To collect, you must select the winner of two races. For example, you must select the winner of the first race and the second race. Of course, you must place the wager before the first of your two races!

Exacta: To collect, you must pick the horses that finish first and second in exact order. For example, if you play a 3-5 exacta, the #3 horse must Win and the #5 horse must Place (come in second) for you to collect.

Exacta Box: Is made to guarantee the outcome of the first two finishers regardless of which horse wins. For example, if you box the #3 and #5 horses and either the #3 or the #5 horse wins and finishes second, you win.

Trifecta: Is similar to an exacta, except you must pick the horses that finish first, second, and third in exact order. This is a challenging wager that often yields large dividends.

Trifecta Box: Is made to guarantee the outcome of the first three finishers regardless of which horse wins. For example, if you box the #3, the #7 and #5 horses and either the #3 , #7 or the #5 horse wins, finishes second and third, you win.

Pick 3: To collect, you must pick the winners of three consecutive races. And, of course, you must make your selections before the first race of your Pick 3 wager. An excellent wager that offers great excitement and opportunity to score Big!

Superfecta: Is similar to an exacta and trifecta, except you must pick the horses that finish first, second, third and fourth in exact order. This is also a challenging wager that often yields dividends even larger than the trifecta.

ENTERTAINMENT:

'Friends' to Stay On Another Season

NBC's six "Friends" aren't breaking up yet. The network announced a surprise agreement Saturday to keep the top-rated comedy on the air for another season. No details of the agreement between the network, Warner Brothers Productions, Bright/Kauffman/Crane Productions and the six lead actors were released. But NBC spokeswoman Rebecca Marks confirmed the deal had been sealed early Saturday morning.

It was a welcome holiday present for NBC, which counts on "Friends" to kick off its powerful Thursday night lineup each week.

Jennifer Aniston, Courteney Cox, Lisa Kudrow, Matt LeBlanc, Matthew Perry and David Schwimmer are all being paid \$1 million per episode this season.

When NBC announced in February that "Friends" would be back this fall, it was said then that this would be the final year. But in the months to follow, NBC Entertainment President Jeff Zucker made certain the door remained open to a return. He consistently refused, in speaking publicly, to rule out the chance it would return.

The last two seasons have been a revival for the series. It drew strong reviews last season and was the No. 1 series of the year in the Nielsen Media Research rankings. "Friends" also won its first Emmy as best comedy series and Aniston won for best comedy actress.

The series is generally the highest-rated comedy this year, although the CBS drama, "CSI: Crime Scene Investigation," has supplanted it as television's most popular show.

Although the same thing was said when February's agreement was reached, Marks said Saturday that "I'm sure it will be the final year."

FEATURE:

The Roots of the Christmas Tree

People often wonder where the custom of having a tree in the home during Christmas time comes from. We will probably never know for sure. But there are several historical clues that point out where this custom came from.

An Ancient Symbol

Thousands of years ago, there were people who believed that evergreen trees were magical. Even in winter, when all the other trees and greenery were brown and bare, the evergreen stayed strong and green. People saw the evergreen as a symbol of life and as a sure sign that sunshine and spring would soon return. Candles, or the electric lights we use to decorate our trees today, are also an ancient symbol: the light of spring triumphing over the darkness of winter.

In ancient Rome, people decorated their homes and their temples with greenery during a special December feast. It was a happy time. No battles could be fought, the schools were closed, and people everywhere joined in the carnival-like atmosphere and gave each other presents.

Many pagan festivals used trees when honoring their gods and spirits. In Northern Europe the Vikings considered the evergreen a symbol and reminder that the darkness and cold of winter would end and the green of spring would return. The Druids of ancient England and France decorated oak trees with fruit and candles to honor their gods of harvests. At the festival Saturnalia the Romans decorated trees with trinkets and candles.

There have also been many legends surrounding the lore of the Christmas tree. In one story Saint Boniface, an English monk, came upon a group of pagans who had gathered around an oak tree and were preparing to sacrifice a child. To stop the sacrifice and save the child, the Saint flattened the oak tree with one blow of his fist. A

small fir sprang up in its place, which Saint Boniface told the pagans was the Tree of Life and represented the life of Christ.

The Modern Tree

So when did the Christmas tree go indoors? Legend has it that the tradition was begun by Martin Luther in Germany. He was a monk and church reformer who lived from 1483 to 1546. According to the legend, Luther was returning home one wintry night when he saw the stars twinkling in the sky through the tree branches. Luther was amazed by the sight, and when he arrived home, he was eager to tell his family about it. To help them understand, he went to the woods and cut down a small fir tree. Luther brought it indoors and decorated it with candles, which represented the stars he had seen.

The custom spread in Germany, and from there all over the world. In England, the Christmas tree first appeared when Queen Victoria married Prince Albert, who was German. In 1841, Albert set up a Christmas tree at Windsor Castle near London to remind him of his homeland. In some areas evergreen trees were scarce so the families would build a Christmas pyramid, simple wooden structures which they decorated with branches and candles.

The Christmas tree custom was brought to the United States by people from England as well as by many German immigrants who came in the 1800's. In the 1830's most Americans still considered the Christmas tree an oddity. One of the first public displays of a Christmas tree was set up by German Settlers in Pennsylvania. At the time many still considered the tree to be a symbol of pagans and it wasn't until the late 1800's that Americans began accepting the Christmas tree. And now it is common throughout the US to feature public displays of Christmas trees.

Early Christmas trees were often decorated with apples, nuts, cookies, colored popcorn and candles. The invention of electricity in the early 20th century and use of electrical Christmas lights helped spread the use of the Christmas tree.

Quote of the Week:

"I am little concerned with beauty or perfection. I don't care for the great centuries. All I care about is life, struggle, intensity. I am at ease in my generation." (Emile Zola, *My Hates*, 1866)

Fact of the Week:

America's first billionaire: Henry Ford.

Word of the Week:

Inert (in'ert) a. Destitute of the power of moving by itself; Sluggish; inactive.

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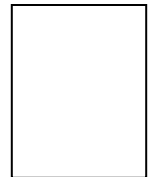
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