

# Pondering the Mystery of the Christmas Star

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# Some Caveats

- There could very well have been no star at all! – some argue the star was an embellishment to the story
- If you agree to any of the following statements this talk is probably not for you:
  1. Clearly God did it so I find the idea of a physical explanation for the star blasphemous (have been told this)
  2. The whole thing was made up so only brain-dead morons would even talk about this (have been told this)
  3. non-believers have no right to talk about this (have been told this)
  4. I believe in a literal interpretation of the Bible and that it is in-errant, anyone who doesn't is going to hell



# Part 1

The Source Material



# The Gospel of Matthew

- **Matthew 2:1--2:** In the time of King Herod, after Jesus was born in Bethlehem of Judea, wise men from the East came to Jerusalem, asking, "Where is the child who has been born king of the Jews? For we observed his star at its rising, and have come to pay him homage."
- **Matthew 2:7--10:** Then Herod secretly called for the wise men and learned from them the exact time when the star had appeared. Then he sent them to Bethlehem, saying, "Go and search diligently for the child; and when you have found him, bring me word so that I may also go and pay him homage." When they had heard the king, they set out; and there, ahead of them, went the star that they had seen at its rising, until it stopped over the place where the child was. When they saw that the star had stopped, they were overwhelmed with joy.



# The Gospel of Matthew

- **Matthew 2:12:** And having been warned in a dream not to return to Herod, they left for their own country by another road.
- **Matthew 2:16:** When Herod saw that he had been tricked by the wise men, he was infuriated, and he sent and killed all the children in and around Bethlehem who were two years old or under, according to the time that he had learned from the wise men.



# The Gospel of Luke

- **Luke 2:1--7:** In those days a decree went out from Emperor Augustus that all the world should be registered. This was the first registration and was taken while Quirinius was governor of Syria. All went to their own towns to be registered. Joseph also went from the town of Nazareth in Galilee to Judea, to the city of David called Bethlehem, because he was descended from the house and family of David. He went to be registered with Mary, to whom he was engaged and who was expecting a child. While they were there, the time came for her to deliver her child. And she gave birth to her firstborn son and wrapped him in bands of cloth, and laid him in a manger, because there was no place for them in the inn.



# The Gospel – Key Points

- The Nativity was in the time of King Herod
- Wise Men Came from the East (we are not told how many!) after Christ's Birth and they had seen his star "at its rising"
- The Wise Men Saw the Star again at Herods palace and the star "went ahead of them" and they followed it to Bethlehem where it "stopped"
- About two years after the Nativity Herod had all baby boys 2 years old and under killed so he must have still been alive two years after the nativity
- There was a Census ordered by the Emperor Augustus
- Quirinius was the Governor of Syria at the time the Census was taken in Judea



# Other Sources

- Many Roman records dating back to this period have been found
- Roman records are very relevant since Roman rulers are mentioned by name in the Gospels
- Jewish Historian Josephus wrote about history of Judea around the time of the Nativity



# Part 2

Nailing down the Time Line



# Some Complications

- The Gospels were written many decades after the Nativity – not first hand accounts
- The Gospels have been translated and transcribed many times
- Not many dateable references in the text
- There was no single calendar in use at the time



# The Date-able References

- When was Augustus Emperor? (September 23, 63 BC – August 19, AD 14)
- When did Herod Die?
- When was the “registration” (census)?
- When was Quirinius Governor of Syria?



# Time-Line: King Herod

- Generally Accepted that Matthew's "Herod" was "Herod the Great"
- Accepted date for Herod the Great's Death is 4BC
- These dates match both Roman records and those of Jewish historian Josephus (mentions a Lunar eclipse before Herod's death)
- Coins show his successor was crowned in 4BC
- Some argue he died around 1BC based on another Eclipse - goes against Roman records and Josephus



# Time Line: King Herod

- Only other 'Herod' is his successor "Herod Archelaus" who was crowned in 4BC
- Herod Archelaus ruled until 6BC when he was exiled by Augustus
- Rome assumed direct rule when Herod Archelaus was exiled
- First Roman governor was Quirinius



# Time-Line: Census

- First Roman record of census in Syria (containing Judea) is 6AD
- Josephus also records the first Roman census in Judea at 6AD
- Roman records show Quirinius was responsible for the census in 6AD
- Before 6AD Judea was not under direct Roman Rule – so no Roman censuses!
- Some argue there must have been another census, no real evidence to support this



# The Elephant in the Room

- Matthew clearly states the nativity took place at least two years BEFORE the death of Herod
- Luke clearly states that the nativity took place while Quirinius was governor of Syria which happened AFTER the death of Herod
- Both can't possibly be correct!
- Some have argued that Quirinius must have been governor twice - no evidence and exceptionally unlikely



# Time Line: Conclusion

- Most biblical scholars believe Matthew over Luke (according to the internet)
- Only Matthew mentions the Star, so we will assume Matthew's version of events is correct
- Gives time frame of about 8BC to 6BC for the nativity



# Part 3

Examining the Context



# The Political Situation

- In short - very unstable!
- At the edge of the Roman and Persian Empires
- Lots of wars
- Judea about to fall under direct Roman Rule in a few years



# The Wise Men

- From Matthew:

- They came from the East (of Judea)
- They brought gifts of Gold Frankincense and Myrrh
- They are referred to as Magoi in the early Greek versions of the Gospels

- Implies:

- From Babylon or Persia
- Probably Zoroastrian Astronomer-Priests (Astrologers)



# Prophecies

- Prophecy could provide a good motive for the Magi to travel to Bethlehem. If they were expecting the birth of a new king of the Jews then the star would only need to be a signal trigger their journey.
- **The Bethlehem prophecy** (quoted by the Magi to Herod): "BUT YOU, BETHLEHEM EPHRAIM, THOUGH YOU ARE LITTLE AMONG THE THOUSANDS OF JUDAH, OUT OF YOU WILL COME FOR ME ONE WHO WILL BE RULER OVER ISRAEL, WHOSE ORIGINS ARE FROM OF OLD, FROM ANCIENT TIMES." — Micah 5:1-3 (according to the Masoretic text)
- **The Star Prophecy:** "THERE SHALL COME A STAR OUT OF JACOB, AND A SCEPTRE SHALL RISE OUT OF ISRAEL, AND SHALL SMITE THE CORNERS OF MOAB, AND DESTROY ALL THE CHILDREN OF SHETH." — Numbers 24:17



# The Meaning of 'Star'

- With our understanding of Astronomy we have a very narrow definition for a Star - a spherical ball of mostly hydrogen under-going nuclear fusion
- Historically the word Star had a much broader meaning - if it appeared on the night sky it was a star
- Our word "planet" comes from "wandering Star"



# Part 4

The Candidates



# Re-cap - The Star

- References to the Star

- Seen by the wise men "at it's Rising" before the wise men set off

- They saw it at Herod's palace and it "went before" them to lead the way to Bethlehem

- It "stopped" over Bethlehem

- NOTE: travel was slow and dangerous - weeks needed between sightings

- NOTE: Herod could not see the star - if he could he'd have followed it himself!



# The Candidates

1. Aurorae
2. Shooting Stars
3. Comets
4. Variable Stars
5. Novae & Supernovae
6. Planetary movements



# 1 – Aurorae

- An Aurora is caused by energetic particles from the sun colliding with our atmosphere to make it glow
- This is normally only visible near the poles unless there is an abnormally large amount of solar material hitting the earth. Even then it is usually only visible at higher latitudes but very occasionally it will be visible in low latitudes.





# Aurorae – Analysis

- Very rare in Judea – too far south
- Could possibly have some Astrological significance depending on where in the sky it appeared (grasping at straws!)
- Too short a duration
- Would have been obvious to Herod
- No recorded Aurorae in search period
- Conclusion – Very Unlikely

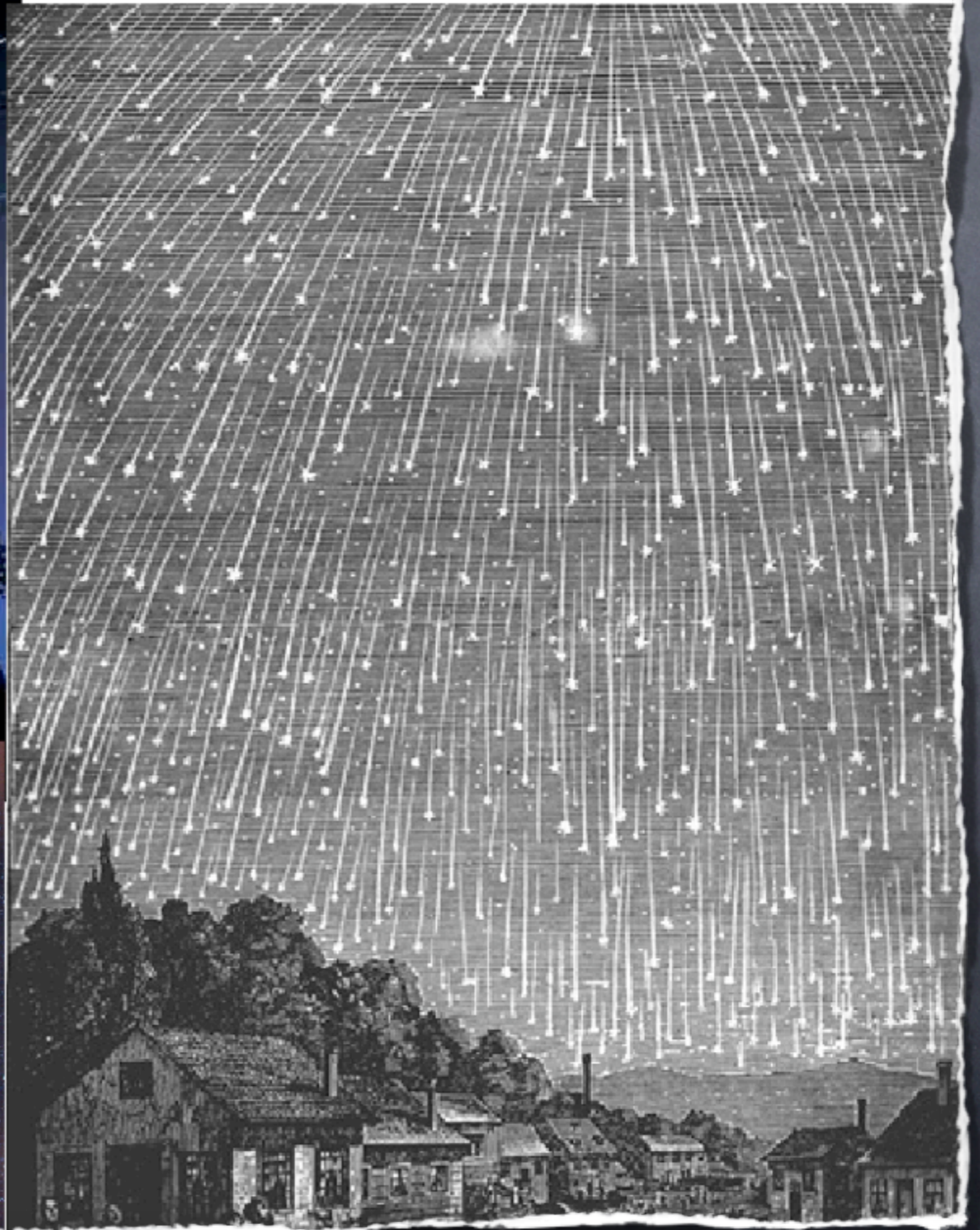




# 2 – Shooting Stars

- When interstellar particles hit our atmosphere they burn up blazing across the sky as a shooting star (meteor)
- On average shooting stars are only about the size of a grain of sand but if something bigger collides a really bright meteor (or fireball) results
- Sometimes we get hit by a whole band of dust and we get hundreds of thousands of shooting stars in an hour, this is called a meteor storm
- It is also possible for shooting stars to leave trails that last for several minutes and sometimes even several hours







# Shooting Stars - Analysis

- Fireballs or the radiants of Meteor Storms occur in a given constellation so they could have some Astrological significance
- Very Short Duration
- Would be easily visible by Herod
- No recorded meteor storms or fireballs
- Conclusion - Very Unlikely



# 3 – Comets

- The Star is commonly depicted as a Comet in artwork and on Christmas Cards
- Comets are dirty snowballs that occasionally come hurtling through our solar system and appear as stars with beautiful tails in the night sky





# Comets – Analysis

- According to Chinese Astronomers there was a Bright Comet visible for 70 days in 5BC.
- The Duration of the Comet fits perfectly
- 5BC is outside the 8-6BC time window
- Comets predict doom, not glorious events like the birth of Christ
- Herod would have seen it
- Conclusion – unlikely





# 4 – Variable Stars

- Variables Stars are stars that change in brightness periodically
- In most cases these changes are subtle, the star just brightening or dimming by a magnitude or two. However some variables are much more dramatic and can vary from being easily visible to the naked eye to being totally invisibles
- The Variable Star Mira in the Constellation of Cetus has been proposed as a candidate. It brightened a number of times during our search period



# Variable Stars – Analysis

- Variable Stars appear in a certain constellation so they have Astrological significance
- They appear as ordinary stars so only a well trained Astronomer would notice their presence
- Mira has a relatively short period (11 months) so it would probably have been known to the Magi
- Variable stars do not move relative to the background stars
- **Conclusion – Unlikely**



# 5 – Novae & Super-novae

- Novae and Super-novae both look the same in the sky but have different causes:
  - A nova is the sometimes periodic brightening of a star caused by a large explosion, but doesn't destroy the star.
  - A super-nova is the death of a star. Its core collapses inward, resulting in a neutron star which may eventually become a black-hole, while the outer layers are thrown off in a massive explosion.
- Both look like ordinary stars which appear from nowhere and slowly dim back into invisibility over a number of weeks or even months



# Novae & Super-Novae

- There were two novae around the time of the Nativity:
  - Chinese astronomers recorded a nova in the constellation of Auriga in April 4 BC
  - There are also reports of a nova in Capricorn which lasted for 70 days in March to April 5 BC. This would have risen in the east when the wise men set off for Herod's palace. A Nova in this part of the sky is very rare as it is a long way off the galactic plane.



# (Super) Novae – Analysis

- The duration of the 5BC Nova is about right
- Novae have astrological significance based on the constellation in which they appear.
- Neither Nova is in the most likely time period of 8–6BC
- Neither or these Novae appear to have any astrological link to the Nativity
- Novae are Stationary relative to the background stars
- **Conclusion: Unlikely**



# 6 – Planetary Phenomena

- The movements and relative positions of the planets would have been of huge significance to astrologers like the Magi
- The meanings of the motions would be determined by the planets involved, the constellations in which the events took place, and any stars they were involved or in the vicinity at the time
- These celestial dances play out over months
- These movements would only have been relevant to Astrologers so Herod would not have seen the “star”
- There are a number of possible planetary phenomena in our search period
- **Conclusion: planetary phenomena are the most likely candidates**



# The Planetary Candidates

- A number of Astrologically significant sequences of events unfolded around the time of the Nativity:

1. Jupiter's Retrograde Motion

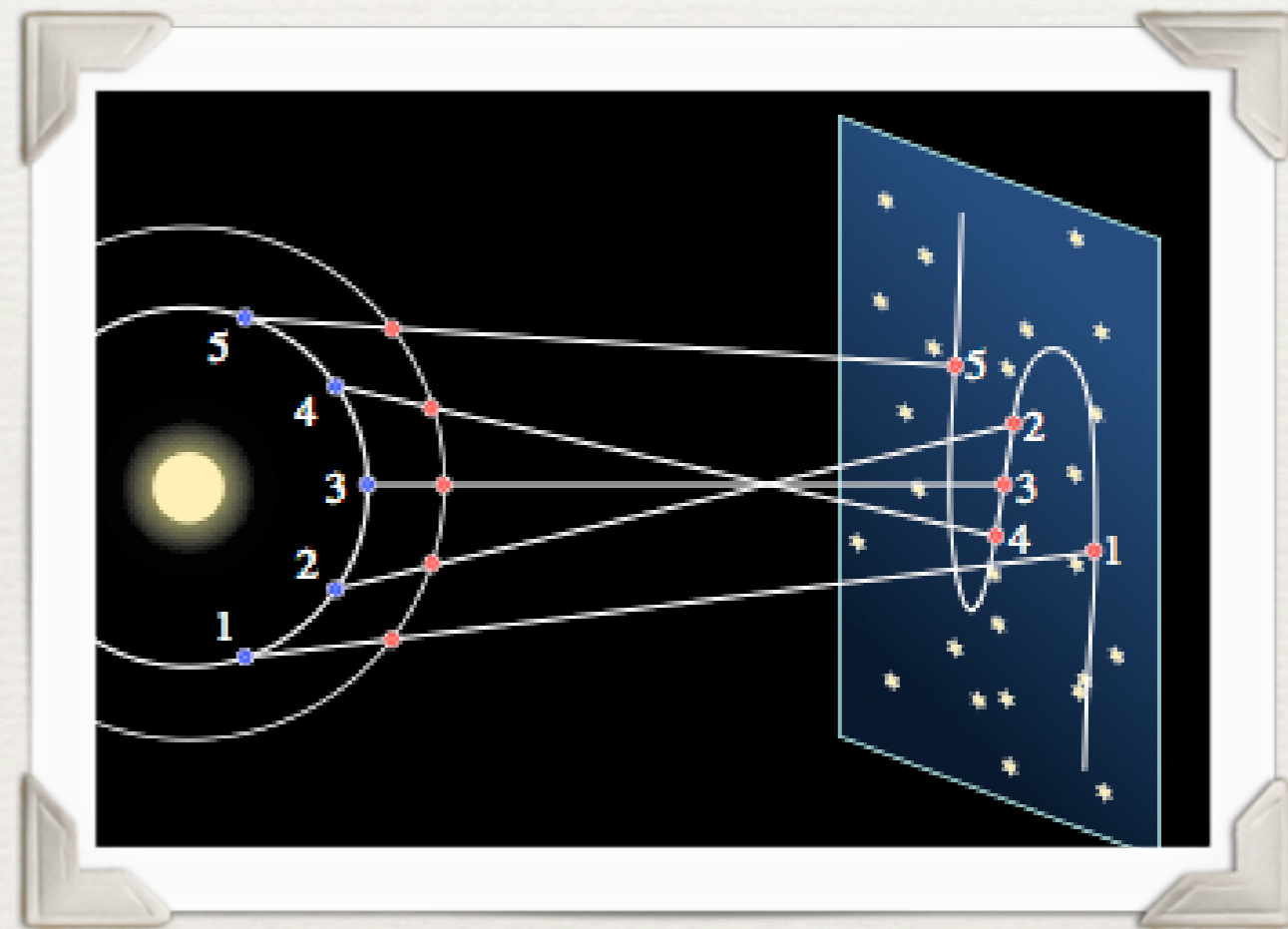
2. The Events of 3-2BC

3. Triple Conjunction of Jupiter & Saturn



# Aside - What is Retrograde?

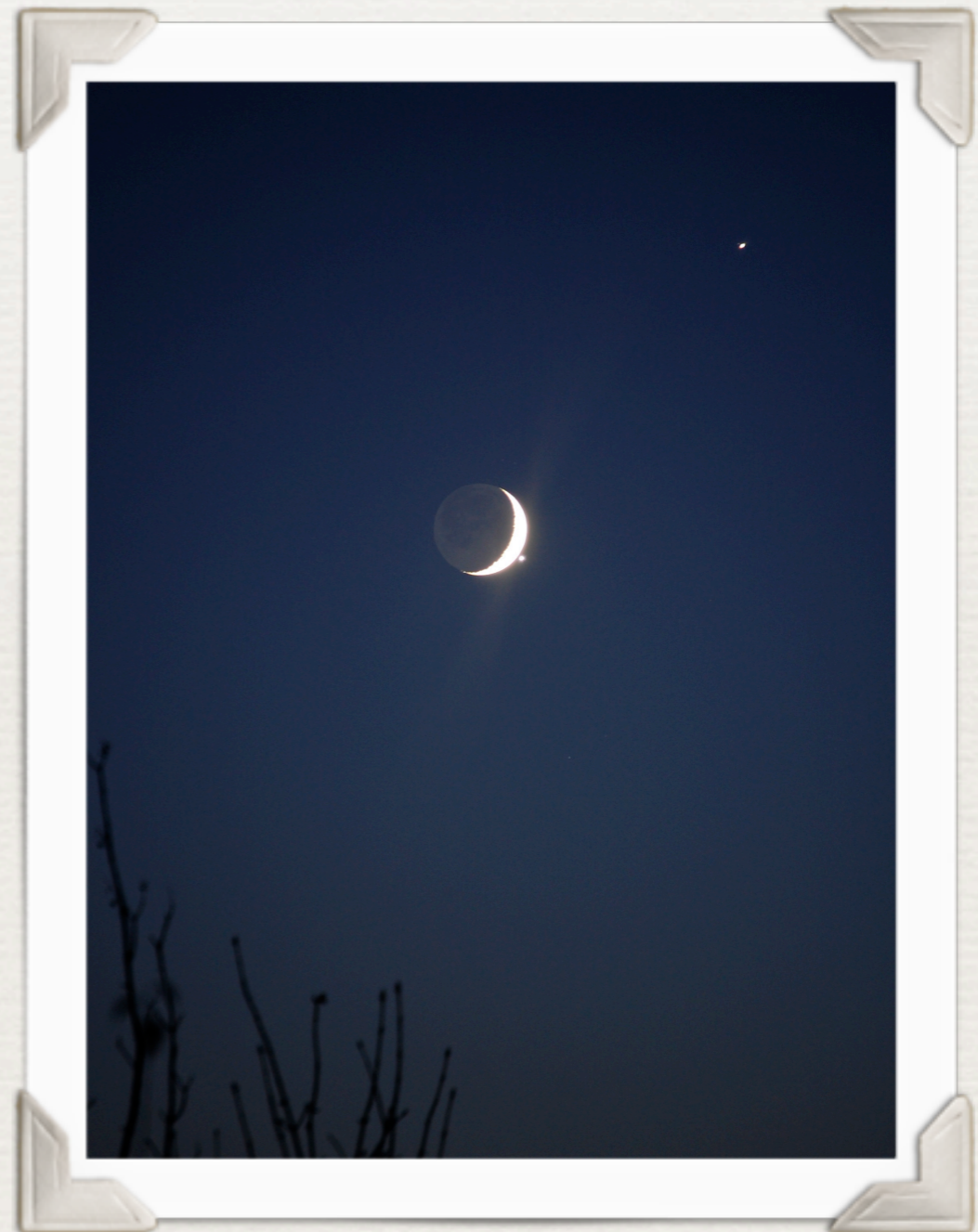
- ♦ Planets further out from the sun appear to move 'backwards' for a short period each year
- ♦ The points when the planet goes from moving one direction to another are called "Stationary Points"





# Aside - What is an Occultation?

- ◆ An occultation occurs when  
When one Astronomical object  
passes in front of another
- ◆ The nearer object is said to  
Occult the further object
- ◆ The further object is said to be  
occulted by the nearer object
- ◆ The most commonly happens with  
the Moon





# 6.1 – Jupiter's Retrograde Motion

- It has been suggested that the Retrograde motion of Jupiter in the Constellation of Aries in 6BC may be the Christmas Star.
- The three required Sightings are given as follows:
  - Jupiter was occulted by the Moon on April 17
  - August 23 it reached its first stationary point and reversed direction
  - December 19 it reached its second stationary point and reversed direction again
- The planet Jupiter was associated with Judea



# Roman Depiction?

*Jupiter in Aries  
During 6 B.C.*



*"Stood Over"*

*Dec 19*

*"Went Before"*

*Aug 23  
Reversed  
Direction*

*April 17  
"In the East"  
& Lunar  
Occultation*



# Jupiter Retrograde - Analysis

- We have three sightings a realistic time apart
- Some astrological significance (Jupiter)
- "stood over" could be interpreted to refer to a stationary point
- Would not have been obvious to Herod
- Within our preferred 8-6BC time period
- **Conclusion: Possible**



# Aside - What is a Heliacal Rising?

- ♦ From Wikipedia: *“The heliacal rising of a star (or other body such as the moon, a planet or a constellation) occurs when it first becomes visible above the eastern horizon at dawn, after a period when it was hidden below the horizon or when it was just above the horizon but hidden by the brightness of the sun.”*



# Aside - What is a Conjunction?

- ♦ Basically: when two astronomical objects appear close to each other in the sky they are said to be in Conjunction
- ♦ A Triple Conjunction is when this happens three times in a succession - caused by over-lapping retrograde loops (bear in mind for later)





# 6.2 – The Events of 3–2BC

- A large number of Astrological events happened in 3 and 2 BC:
  - The Heliacal Risings of Jupiter Venus and Mercury
    - 1 August 3BC Jupiter's Heliacal Rising
    - 13 August Jupiter and Venus in Conjunction in Dawn Sky
    - 18 August Mercury appears out of the Solar Glare
    - September 1st Mercury and Venus in Conjunction in Leo.
  - Jupiter in Conjunction with Regulus ( $\alpha$  Leo) on three occasions
  - June 17th 2BC Venus and Jupiter in a VERY close conjunction (**NOTE: recent press-release refers to this conjunction**)
  - 27th august 2BC Jupiter Mars Mercury and Venus all close together in Virgo
  - Then Jupiter Moved Westwards away from the other planets.
  - 25 December 2BC Jupiter Stationary in Virgo



# What does all that Mean?

- The first set of events that the Magi would have observed were the events around the Helical Rising of Jupiter
- These could have been interpreted by the astrologers as follows:

“Jupiter, the King planet, had left the Sun, the Father of the Gods, to be conjoined with Venus, the Virgin Mother in the constellation of Leo, which is the symbol for the tribe of Judah in Israel. Furthermore, Mercury, the Messenger of the Gods, had come from the Sun's presence to stand with Venus the virgin mother in the rays of the dawn”



# Still More Symbolism

- The star Regulus is known as the 'Royal Star' so the fact that the King planet passed the Royal Star in the Constellation representing Judea three times in the 2-3BC period would have been very significant
- The conjunction of Jupiter and Venus on June 17 was so close that the two planets would have fused into one single ball of light
- This would have been shortly followed by the close gathering of all the planets and Jupiter's "running away" westward
- Jupiter's "exit" would have been the trigger to tell the Magi to follow it west to Herod's Palace



# Still More!

- The Magi would have set out in Mid-November, hence arriving in Jerusalem to see Herod in late December. Jupiter literally “went before them”
- From Jerusalem Jupiter would have appeared to hover Directly over Bethlehem in the Morning Skies
- Then on December 25th Jupiter “stopped” (reached it’s stationary point). This would have been when the Magi arrived in Bethlehem



# Analysis

- This sequence of events fits perfectly with the time line we are expecting
- The sequence has HUGE astrological significance
- The Sequence would have meant nothing to Herod
- The language of the bible fits perfectly:
  - “we observed his star at its rising” – Jupiter’s Helical Rising
  - “ahead of them, went the star that they had seen at its rising, until it stopped over the place where the child was” – Jupiter’s Movements
- This time-line only works if Herod died in 1BC – very unlikely
- **Conclusion: Astrologically perfect – but still unlikely**



# 6.3 – Triple Conjunction of Jupiter & Saturn

- A Triple conjunction is a rare occurrence which happens when the retrograde motion of two planets overlap in such a way that the planets appear to cross three times
- A triple conjunction took place in 7BC
- The conjunction took place in Pisces which is associated with the Jews and involved Jupiter which is associated with Judea



# Triple Conjunction – Analysis

- The duration is long enough (a few months)
- The shortness of the gap between the last two conjunctions fits well with what you would expect.
- There is astrological Significance
- Herod would not have noticed the “star”
- The dates fit perfectly within our time-window of 8-6BC
- **Conclusion: Possible**



# Conclusions

- The Least convincing of the possible options is Jupiter's Retrograde
- The most Astrologically convincing possibility are the events around 3-2BC
- The only event that seems astrologically reasonable and falls within our time-line is the Triple Conjunction of Jupiter & Saturn
- No run-away winner so does not help date the nativity
- **PERSONALLY** - not convinced by any option - think the star was an embellishment added by Matthew to emphasise the importance of Jesus



# Aside - Why Christmas on December 25<sup>th</sup>?

- ♦ The Jewish festival of Lights (Hanukkah) falls around then and Christians saw Christ as “the Light of the World”
- ♦ The Roman festival of Saturnalia (‘new sun’) which celebrated the Solstice was around then.
- ♦ December 25<sup>th</sup> was first documented as Christmas Day in 354AD and became an official holiday under Emperor Justinian around 550AD.



# Credits

- Images

- Aurorae, John O'Brien & Gordon Nason
- Conjunctions & Occultations, Bart Busschots
- (rest from Google)

- Maps

- Cartes du Ciel



The End

Merry Christmas!

Questions?