

Astronomy

What is the biblical perspective?



Second Edition

Copyright © 2010, 2021 Answers in Genesis–US. All rights reserved. No part of this book may be used or reproduced in any manner whatsoever without written permission from the publisher. For more information write: Answers in Genesis, PO Box 510, Hebron, KY 41048

Print ISBN: 978-1-9844-0923-2

ebook ISBN: 978-1-9844-1057-3

All Scripture quotations are taken from the English Standard Version. ESV® Text Edition: 2016. Copyright © 2001 by Crossway Bibles, a publishing ministry of Good News Publishers. Used by permission. All rights reserved.

Cover Design: Jenn Reed
Interior Design: Michaela Duncan
Editing: Evonne Krell

answersingenesis.org

Table of Contents

Does the Bible Say Anything About Astronomy?	5
What Was the Star of Bethlehem?	15
Is the Gospel Message Found in the Stars?	21
How Old Is the Universe?	31
How Can We See Distant Starlight?	41
What About the Big Bang?	49
Do Stars Form Today and Do They Evolve?	57
What About Black Holes, Dark Matter, and Dark Energy? .67	
Do Planets Orbit Other Stars?	77
Is There Life Elsewhere in the Universe?	87
Author Biography	95



Photo Courtesy of Jim Bonser

Does the Bible Say Anything About Astronomy?

In a word, yes. The first mention of astronomical bodies is found in the creation account of Genesis 1. Genesis 1:14–19 tells us that God made lights in the sky on day four of creation week. God made the greater light (the sun) to rule the day and the lesser light (the moon) to rule the night. The end of verse 16 says that God made the stars.

But what about other astronomical bodies, such as asteroids, comets, planets, and galaxies? We must keep in mind that the terms we have for those other astronomical bodies are of relatively recent origin. Until the invention of the telescope four centuries ago, a star was any luminous body in the sky, other than the sun and moon. The five naked-eye planets (Mercury, Venus, Mars, Jupiter, and Saturn) appear as bright stars. But unlike the stars, which remain relatively fixed with respect to one another, the planets move among the stars. Therefore, ancient people called the planets “wandering stars.” Our word *planet* derives from the Greek term for “wandering star.”

Since the invention of the telescope and the rise of the heliocentric theory (the belief that the earth is one of several planets orbiting the sun), we have made a distinction between the stars and planets. But before that time, few people thought planets were fundamentally different from stars. Therefore, the meaning of stars in Genesis 1:16 includes the planets.

What about comets? Comets appear to the naked eye as fuzzy stars, so that is what the ancients called them. The

English word *comet* reflects this meaning for it derives from a Latin root for hair (our word *comb* comes from this root too). As with planets, ancient people did not make the distinction between comets and stars that we make today, so we know that the day four account includes comets.

There are a few other fuzzy patches of light in the sky that don't move like comets do. The ancients called these "cloudy stars." Today, we use the term *nebula* (the plural is *nebulae*) for one of these. This word comes from Latin, meaning small cloud or mist. After the invention of the telescope, astronomers were able to resolve some nebulae into star clusters, which is what we call those today. It wasn't until 1924 that Edwin Hubble resolved some of these nebulae into vast, distant collections of stars similar to the Milky Way. Today, we call these objects "galaxies." Still, some nebulae are indeed what they appear to be, clouds of gas and dust. Thus, comets, nebulae, star clusters, and galaxies were all included in the day four creation. By extension, God made all astronomical bodies on day four.



Photocourtesy of Glen Fountain

Purposes of Astronomical Bodies

The day four account gives several purposes for astronomical bodies. Aside from ruling over the day and night, those purposes are to separate day from night, provide light on the earth, and to be for signs, seasons, days, and years. Some of those purposes are clear enough, but what about being for seasons, days, and years?

There are three natural units of time, the day, the month, and the year. The day is the rotation period of the earth, and it governs the light/dark cycle that all living things depend upon. The year is the orbital period of the earth. The tropical year, which is the year our calendars are based on, is the cycle over which the seasons repeat. This annual cycle is very important, particularly in agrarian societies. The month, which is intermediate between the day and year, is the orbital period of the moon. The moon repeats its phases over the synodic month, about 29.5 days. For people who watch the skies, the waxing and waning of the moon is a very visible manifestation of the month, so lunar phases are useful in measuring time.

Besides the natural units of time, God also ordained the week as a memorial to creation (Exodus 20:11; Exodus 31:17). Any other divisions of time are those defined by man. Examples of this would be the division of the day into hours, minutes, and seconds, an innovation usually attributed to the Babylonians. This convention was spread by Greek culture and later by the Roman Empire. Consequently, these man-made divisions of time are used in the New Testament. For instance, Jesus used the Roman convention of time measurement when he told the parable of the laborers in Matthew 20:1–16.

It is easy to think that seasons mentioned in the day four account refers to the climatic seasons, such as spring, summer, autumn, and winter. However, our word *season*



Photo courtesy of Ben Wilt

can also include another meaning. It can refer to a time dedicated to some purpose. For instance, we have athletic seasons, such as baseball season. We also have hunting seasons, such as deer season. This is the sort of meaning intended in the day four account.

The Hebrew word used here, *moed*, is the same word used to refer to the Hebrew festivals instituted at Sinai: Passover, Pentecost, and Sukkot. The dates of these festivals are defined on a calendar based on lunar months. For instance, Passover always commences on a full moon. But our Gregorian calendar is not based on lunar months, so the phases of the moon slip progressively earlier each month on our calendar. That is why Passover seems to bounce around on our calendar. When Moses gave the Hebrews the Pentateuch at Sinai, they understood what the seasons mentioned in Genesis 1:14 meant.

What about the heavenly bodies being for signs? Prophetic passages have statements about apocalyptic things in the heavens, such as the sun, moon, and stars dimming. Many Christians think these will have literal fulfillment near the

end of the age. The wise men were prompted to seek out a newborn king because of a sign in the heavens (possibly based on Numbers 24:17, for instance). I will discuss this more in the next chapter. In the chapter “Is the Gospel Message Found in the Stars?” I will briefly discuss suggested signs in the heavens that are not actually signs in the heavens.

Cosmology of the Bible

Cosmology is the study of the structure of the universe. When did God create the space of the universe? Note that *space* is a modern term, so the ancient Hebrews had no word for space. The best match is the Hebrew word for heaven. But in the Bible, *heaven* can have three meanings: where birds, clouds, and weather are; where the astronomical bodies are; and the abode of God. We would use the word *atmosphere* to describe the first and the word *space* to describe the second.

There are two schools of thought on when God created the astronomical heaven. One belief is that God made the universe on day one. This is based on the statement of Genesis 1:1: “In the beginning, God created the heavens and the earth.” The other school of thought is that God made space on day two (Genesis 1:6–8) when he made an expanse around the earth. In verse 8, God called the expanse “heaven.” Christians who believe that God made space on day one think that the heaven of day two is the earth’s atmosphere. The main problem with that belief is that the day four account states three times that God placed the astronomical bodies in the “expanse of heavens.” The combination of the terms *expanse* and *heavens* seems to be a reference to the thing God made on day two.

In 1929, Edwin Hubble discovered that galaxies appear to be moving farther apart. This is interpreted as evidence

that the universe is expanding. The expansion of the universe has become the foundation of modern cosmology.

Some Christians believe that the Bible provided this information all along. At least 11 times the Old Testament speaks of God stretching out the heavens (Job 9:8; Psalm 104:2; Isaiah 40:22; 42:5; 44:24; 45:12; 48:13; 51:13; Jeremiah 10:12, 51:15; and Zechariah 12:1). But is this the proper understanding of these passages? The expansion of the universe is an ongoing process, but some of the biblical passages referring to the stretching of the heavens appear to be in the past tense.

Was there a time in the past when God stretched out space? On day two, God made an expanse around the earth. An expanse is something that has been expanded. Perhaps the statements about the stretching of the heavens refer to the process on day two whereby God made the expanse. These passages generally are in the context of creation, which reinforces this understanding.

The Earth's Shape

How long have people known that the earth is a globe? Contrary to popular misconception, people did not learn the earth's shape at the time of Christopher Columbus five centuries ago. In the West, people have known for 2,500 years that the earth is a globe.

In the late sixth century BC, Pythagoras argued that the earth is spherical, though we don't know his reasons. Around 350 BC, Aristotle wrote on the earth being spherical and gave several reasons for that belief. Around 200 BC, Eratosthenes accurately measured the size of the earth. In the first century, Pliny the Elder gave good reasons for the earth being a globe, as did Claudius Ptolemy in the early second century. This understanding was prevalent in ancient Greek thought, which in turn influenced Western

thought. So, for two millennia before Columbus, people in the West generally knew that the earth is a globe.

Many Christians point out that the earth being spherical is in the Bible. Isaiah 40:22 reads,

It is he who sits above the circle of the earth,
and its inhabitants are like grasshoppers;
who stretches out the heavens like a curtain,
and spreads them like a tent to dwell in.

The argument is the Hebrew word translated *circle* here is better rendered as *ball*. Since Isaiah prophesied two centuries before Pythagoras lived, this would seem to give Isaiah precedence over Pythagoras. Or does it? The Hebrew word usually translated here as *circle* has the meaning of something round. Is a circle round? Yes. Is a sphere round? Certainly. Which is meant here? We don't know. So, this verse may indicate that the earth is a sphere, or it may not.

Amazingly, around 2015 there rapidly arose a movement of people believing the earth is flat. Social media and YouTube largely have been responsible for the spread of the flat-earth movement. Unfortunately, some Christians have fallen prey to this silly notion. They claim that the Bible teaches the earth is flat. Almost no one in the history of the church thought that. In the nineteenth century, skeptics began to make this false claim about Scripture (a straw man fallacy), and some Christians foolishly embraced this lie. Incidentally, this is how and when the misconception that Columbus proved the earth was a globe got started. The flat-earth movement was born in the late nineteenth century, but it largely faded in the early twentieth century. While the flat-earth movement never entirely disappeared, it was very small until revived around 2015.

Isaiah 40:22 is a verse that Christian flat-earthers like to use (along with another 200 or more passages they claim

teach the earth is flat). They insist that a circle can only mean a round shape in two dimensions, and thus this verse cannot be referring to a sphere. This argument only works if they impose their understanding of a modern English word onto the meaning of an ancient Hebrew word. This is the wrong approach. What we observe about the earth is that it is spherical, and this is consistent with the plain meaning of Scripture. To arrive at a flat, 2D earth, requires mental gymnastics to reinterpret verses and words throughout Scripture. Flat-earthers insist upon their own peculiar meaning to many biblical passages. That is eisegesis at its worst.

Conclusion

One other thing is worth noting. Job 26:7 says that God “hangs the earth on nothing.” Many ancient cosmologies had the earth resting upon something, but the Bible says otherwise. Other than this, the cosmology of the Bible is a bit ambiguous. The Bible does not directly address many cosmological questions, such as the earth’s shape, if the earth orbits the sun, or if the universe is expanding. This demonstrates God’s wisdom.

Many ideas about cosmology have changed tremendously over the years, but God’s Word remains the same. If the Bible endorsed any particular cosmology, it would have been ridiculed as wrong throughout the ages even if the Bible was right all along. However, the cosmogony (the study of the origin and history of the universe) of the Bible is clear enough. God created everything in six normal days. God made the heavenly bodies on day four. Within this framework, creation scientists are free to pursue all sorts of cosmological ideas. However, with all things in life, we must make sure that our scientific models conform to what Scripture teaches.

If you would like to learn more about the flat-earth movement, see the book *Falling Flat: A Refutation of Flat Earth Claims*, available from Answers in Genesis.



What Was the Star of Bethlehem?

This question has perplexed people for generations. There have been many hypotheses put forth. One popular view is that there was a series of planetary conjunctions that the wise men interpreted as a sign of the birth of the king of the Jews. There are at least two different planetary conjunction theories. Other suggested identities include a bright comet or a nova or supernova. Obviously, these proposals exclude one another, so they all can't be correct. But they all could be wrong.

What Does the Bible Tell Us About the Christmas Star?

Surprisingly, the Bible tells us very little about the Christmas star. The only information that we have comes from Matthew 2:1–12. And in that passage, the star is mentioned only four times, in verses 2, 7, 9, and 10. Many of our beliefs about the star (and other details about the birth of Jesus) come not from the Bible but from depictions found on Christmas cards, in Christmas pageants, and in Christmas songs. For instance, the wise men were not kings. We don't know if there were three wise men. Nor do we know if they rode camels (they probably didn't). It is important to strip away all these misconceptions and read what the Bible truly says.

Matthew's account says that the wise men arrived in Jerusalem from the east *after* Jesus was born (v.1). When the wise men arrived in Jerusalem, they asked where the king of the Jews was (v.2). They explained the reason for their trek: they had seen his star when it rose (in the east). What does this phrase mean? Already we have uncertainty. The

phrase could mean that the wise men saw the star when they were yet in the east, prior to their journey. Or it could mean that they saw the star in the eastern part of the sky. Or it could mean that they saw the star as it rose—not only does the sun rise in the east but other astronomical bodies also rise in the east.

Matthew's account continues with the statement that the current king, Herod, was troubled by this news, as were all the people in Jerusalem (v. 3). Herod's paranoia was legendary, so he probably was troubled by a possible usurper being born. Herod's paranoia caused him to carry out brutal acts on the people, which explains why everyone else was troubled too. When Herod wasn't safe and happy, no one in Judea was safe and happy. Herod called the religious authorities together to enquire where the Christ was to be born (v. 4). They reported that according to Micah 5:2, he was to be born in Bethlehem (vv. 5–6). Herod had a private meeting with the wise men in which he enquired the details of when they had seen the star (v. 7). Herod informed the wise men where the Christ was to be born and asked them to go to Bethlehem, find this new king, and bring word back to him so that he too could worship the new king (v. 8). Of course, later details revealed that this was a lie (vv. 16–18).

Once the wise men departed Jerusalem for Bethlehem just six miles south of Jerusalem, they were delighted to see the star once again (v. 9). One other detail here is that the star went before the wise men as they traveled and came to rest over the place where Jesus was. The wise men were very glad to see the star (v. 10). The wise men entered the house where Jesus was, worshipped him, and presented their gifts (v. 11). Being warned of Herod's true intent in a dream, the wise men went home by a different route to avoid Jerusalem (v. 12).

Several important details stand out. The wise men arrived after the birth of Jesus, so they weren't there the night Jesus was born, along with the shepherds (so much for all those nativity scenes). Contrary to popular misconception, the star probably did not lead the wise men all the way. The only leading by the star mentioned in the Bible was on the relatively short trip between Jerusalem and Bethlehem. Judging by their reaction upon seeing the star in verse 9, the wise men must not have seen the star for some time. This is also suggested by their description of the star in verse 2 as well. The star stood over the place Jesus was. This suggests that the star had been moving as they journeyed south from Jerusalem, but it no longer was.

Analysis

Most attempts to identify the star of Bethlehem focus on natural explanations, such as planetary conjunctions, comets, and novae. These phenomena may have been remarkably timed for Jesus' birth, but they were still natural events, events that in some cases could be calculated today from known motions of celestial bodies or pieced together from historical records. How well do they fare?

Many of these are problematic in the sense that they would not appear, disappear and not be visible for some time, and then briefly reappear as Matthew's account describes. Another problem is that the earth's rotation causes celestial bodies to move east to west across the sky. As the wise men traveled south from Jerusalem to Bethlehem, the star moved before them. This is in a different direction from how the earth's rotation would have carried the star (left to right). Then the star stood over the place where Jesus was. The implication is that the star stood over the *house* where Jesus was. Some insist that the star stood over Bethlehem rather than the house, but that doesn't matter because Bethlehem was a very small town.

The important thing was the star moved but then stopped moving. We don't know any celestial object that does this.

Some people explain this by arguing that the star only appeared to be over the house, much as one might see a bright star over a particular house today. But this overlooks the fact that the wise men were veteran watchers of the sky. They would have been quite familiar with the illusion that a celestial object could appear over a location on the ground. They also would have known that merely stepping to one side a short distance would destroy the illusion. The conclusion is no known celestial object behaves the way that Matthew describes.

If the star of Bethlehem was not a normal celestial object, then what was it? Keep in mind that until the past four centuries, a star was any lit object in the night sky. By that definition, an airplane flying at night is a star. A satellite passing over is a star. God could have created a light that was not very high that would have appeared as a star. The LORD himself appeared as a pillar of fire to lead the Hebrews in the wilderness (Exodus 13:21). Sometimes in the Bible stars are identified with angels (e.g., Job 38:7; Revelation 1:20), so perhaps the star was a manifestation of an angel.

Such a created light would have moved independently of how celestial bodies normally move. To astute watchers of the sky, such as the wise men, this would have stood out as unique among the stars of heaven. If the star was not very high above the earth, then its visibility would have been local, meaning that very few people other than the wise men ever saw it. Consequently, there would be no record of this star other than in Matthew's account, nor could modern astronomers calculate its behavior two millennia ago as one might compute planetary positions.

Conclusion

Those who wish to identify the star of Bethlehem with natural phenomena mean well. They try to give concrete evidence that the Bible really is true. But this can only be done either by reading much more into Matthew's account or by disregarding some of the details that he provided. Some Christians may find comfort in this, but it is not likely to convince a skeptic. The skeptic will believe that the star was just a natural phenomenon that Matthew folded into his contrived account of the birth of Jesus. The only explanation that survives close scrutiny and is honoring to the scriptural text is the miraculous one.

