THE ASSOCIATION FOR BIBLICAL ASTRONOMY

NOTES ON GEOCENTRICITY FOR HOMESCHOOLING PUPILS

GEOCENTRICITY (GRADE 4)

WHAT IS GEOCENTRICITY?

Geocentricity is a big word meaning "earth centered." The alternative is heliocentricity, which means "sun centered."

Until about 500 years ago, people believed that the earth was the centre of the whole universe. They got this idea from two sources:

1. As they observed the sun crossing the heavens each day, and the moon and stars moving across the heavens at night, they came to the conclusion that the earth was standing still while the sun, moon and stars moved around it.

2. Scripture indicates in various places that the earth stands still, while the sun, moon and stars move around it.

WHEN AND WHY DID THIS VIEW CHANGE?

Up till about the early 1500s, the scientific view of the universe was based on the ideas of the Greek astronomer, Ptolemy. He believed that the sun, moon and stars circled the earth, which itself moved backwards and forwards along a line. As the telescope was better developed, it became obvious from the observations that this was not what was happening. Two astronomers made their own observations and came up with their own explanation of how the heavens worked: Tycho Brahe and Nicolaus Copernicus.

Tycho Brahe made very careful observations over a long period of many years. He believed that his observations confirmed that the earth was stationary at the centre of the universe (i.e. that it stood still at the centre of everything). The sun and the moon moved round the earth. However, the planets (other than the earth) moved round the sun (not the earth) and were carried around the earth as the sun moved around the earth. Tycho Brahe died before he could publish his results, and his ideas are not well known today.

Nicolaus Copernicus did not make as many or as good observations as Brahe. However, he was interested in the Greek philosophers, and he agreed with the ancient Greek philosopher, Plato, "The sun is the most magnificent of all the gods." (Of course, Plato did not believe in the God of Scripture. He believed that there were a whole lot of gods, and he believed that the most important of these was the sun.) As Copernicus thought about it, he decided that the sun should be the centre, rather than the earth. In his system (which was much simpler than Brahe's) he had the sun at the centre with all the planets going around it. This is the view that eventually became popular and is still taught today.

Lately there are some astronomers that have wondered if Copernicus was right. In spite of the fact that many experiments have been done to prove that the earth moves, many of them have shown that it does not move. Those that seem to show that it moves are only showing that either the earth is moving or the universe is turning around the earth. Brahe, you remember, said that the universe turns around the earth, while Copernicus said that the earth was moving, while the sun and stars stood still.

Who was right?

We cannot tell, unless we could get right outside the universe and have a good look. However, this is not possible.

There is another source of truth, however: Scripture.

WHAT DOES SCRIPTURE SAY?

There are many references in the Scripture to the earth standing still while the sun moves. However, we will look at two important incidents: Joshua 10 and 2 Kings 20.

In Joshua 10 we read of the miracle that God did to help His people to defeat the five kings of the Amorites. That day Joshua prayed to the Lord to stop the sun until they had defeated the Amorites completely. In Joshua 10:13 we read,

"And the sun stood still, and the moon stayed, until the people had avenged themselves upon their enemies."

It is only possible to stop something that is moving. This indicates that the sun is moving, while the earth stands still.

The other incident is recorded in 2 Kings 20. In this case Hezekiah was very ill, and he had been told that he was going to die. In his distress he cried out to the Lord, and the Lord promised that He would give him another fifteen years of life on this earth. As a sign He offered to let the sun go forward 10° or backwards 10°. Hezekiah asked that it go back. The Scripture says in 2 Kings 20:11:

*"**And Isaiah the prophet cried unto the LORD: and he brought the shadow ten degrees backward, by which it had gone down in the dial of Ahaz**."*

Again, something can only go back if it is moving. This also indicates that the sun is moving, while the earth stands still.

NOTE TO PARENTS: Some may wonder why it is necessary to introduce the subject of Geocentricity to children as young as Grade Four. It is our belief that children should be taught from a young age not to accept current scientific beliefs blindly. They should be informed of the fact that there are other points of view, and that these points of view have Scriptural support (where they do, that is). We trust you will find these very brief notes

interesting and informative. For further information we refer you to Gerard Bouw, Ph.D., 4527 Wetzel Ave., Cleveland, Ohio 44109. In particular, his book, *Geocentricity: The Church in the Woodshed*, is the most comprehensive work available.

THE GEOCENTRIC VIEW OF THE UNIVERSE (GRADE 6)

For many years people believed that the earth was stationary at the centre of the universe and the sun and everything else went around it. There were various reasons for this view: first, this is how it looks as we look out into the universe around us. Secondly, the observations that astronomers made seemed to confirm this. Thirdly, and most importantly, this is what the Scripture seemed to teach. This view is called the geocentric view.

All this changed when Copernicus came on the scene. He proposed a different way of looking at things. Instead of the sun and everything else moving around the earth, he said, the earth moved around the sun. He said this because he thought the sun was bigger and therefore more important than the earth, and he thought everything should move around it. This view is called the heliocentric view.

There was another astronomer at the time of Copernicus called Tycho Brahe. This man made more accurate observations of the stars and planets than had ever been made before, and he is still considered one of the best observational astronomers who has ever lived. Brahe believed that the earth was the centre of the universe and that everything else moved around it. He did not find anything to conflict with this view in all his observations.

Up to this point there was no proof either way. Then Galileo Galilei invented an improved telescope which enabled him to see the heavenly bodies more clearly. When he observed the moons of Jupiter he thought he had proved that the earth goes around the sun, in the same way that the moons of Jupiter go around Jupiter. Of course, this did not prove anything—except that the moons of Jupiter do indeed go around Jupiter—but Galileo decided to teach the heliocentric view as fact anyway.

Since the time of Galileo many experiments have been done to try to prove that the earth moves, and if so, at what speed it moves. These experiments have all shown one of two things:

1. The earth does not move at all - it is stationary.

2. Either the earth rotates while the universe stands still or the universe rotates around the earth while the earth stands still.

All the observations that can be taken can be equally well explained by either the heliocentric or the geocentric view. We should take note of the following facts:

1. Whether the earth is stationary or not, it will always seem to someone on earth that the sun and stars are moving while the earth stands still.

2. No experiment has yet been done that proves that the earth is moving. In fact, many experiments have merely confirmed that it does not move.

3. Scripture has numerous references to the earth standing still and the sun moving. Two of the most spectacular of these are Joshua's long day (Joshua 10) and Hezekiah's miraculous sign (2 Kings 20). In both of these the Scripture clearly indicates that the earth is standing still while the sun moves. In Joshua 10 the sun is stopped, while in 2 Kings 20 it is actually moved back.

As we study the earth, we find that it makes quite a big difference what framework of reference we accept. The conclusions drawn by heliocentrists are going to be different from those held by geocentrists. We are going to look at the conclusions of both groups.

MOVEMENTS OF THE EARTH

HELIOCENTRISM	GEOCENTRICITY
There are two movements of the Earth: rotation and revolution.	The Earth is stationary at the centre of the Universe. It does not rotate or revolve.
Rotation: The Earth rotates on its own axis from west to east. It takes 24 hours for the earth to rotate once. The rotation of the Earth causes day and night.	The sun travels around the Earth once in 24 hours. This causes day and night. Scripture supports this view in Joshua 10:15 (where the sun stood still) and 2 Kings 20:8-11 (where the sun went back 10°).
Revolution: The Earth revolves around the sun once in 365 days. This, in conjunction with the tilt of the earth's axis, causes the seasons.	The sun travels around the Earth in a spiral-type orbit, so that it is closer to the northern hemisphere in June and closer to the southern hemisphere in December. This causes the seasons.

THE SEASONS

The seasons are first mentioned in Genesis 1:14, with the creation of the sun, moon and stars:

"And God said, Let there be lights in the firmament of the heaven to divide the day from the night; and let them be for signs, and for seasons, and for days, and years"

It seems, however, that there were no seasons as we know them until after the Flood, as there is evidence that before that time the Earth had a uniformly warm climate. After the Flood God says:

While the earth remaineth, seedtime and harvest, and cold and heat, and summer and winter, and day and night shall not cease. (Genesis 8:22.)

What causes the seasons? According to the Heliocentrists, they are caused by the earth's revolution around the sun, in conjunction with the tilt of the Earth's axis. The angle of inclination is 66.5^{o} to the plane of the Earth's orbit. Because the Earth is a sphere, only one half can receive the Sun's heat and light at a time. As the Earth travels round the Sun, the Sun's rays fall vertically over one part of the Earth at one time of the year, and over another part at another time. The result is an uneven distribution of heat over the surface of the earth, causing our Spring - Summer - Autumn - Winter cycle.

According to the Geocentrists, the Earth does not move at all. It is a sphere, and so only one half can receive heat and light at a time, and it is tilted at 66.5^{o} from the vertical. However, the Sun, besides travelling once around the Earth every 24 hours, also travels between the Tropic of Cancer and the Tropic of Capricorn and back every 365 days. The Sun's rays therefore fall vertically over one part of the Earth at one time of the year, and over another part at another time. The result is an uneven distribution of heat over the surface of the Earth, causing our Spring - Summer - Autumn - Winter cycle.

As you can see, both views seek to explain exactly the same effects. They just explain the same facts in different ways.

So what difference does it really make?

In Astronomy it makes a big difference. If we are going around the sun, we have an orbit with a diameter of about 300 million kilometers. This orbit can be used to calculate the distances to the nearest stars, which then turn out to be about four and a half light years away. On the basis of this, using various assumptions, we can extrapolate that the size of the universe is about twenty thousand million light years across.

If, however, the earth stands still, we do not have that base line of 300 million kilometers. Using other methods and some reasonable assumptions we can calculate that the furthest objects in the universe may only be sixty light days away. This means that the diameter of the universe would only be about 120 light days - about a third of one light year! If this should be so, it would completely revolutionize all current theories about the universe and space exploration.

Perhaps, however, the greatest problem is where the whole controversy began—philosophy. Burgess, writing in *Earth Chauvinism*, says: "The story of Christianity tells

about a plan of salvation centered upon a particular people and a particular man. As long as someone is thinking in terms of a geocentric universe the story has a certain plausibility. As soon as astronomy changes theories, however, the whole Christian history loses the only setting within which it would make sense. With the solar system no longer the centre of anything, imagining that what happens here forms the centre of a universal drama becomes simply silly." Burgess is an atheist. He does not believe the Scripture. But does he really have scientific proof for his ideas, as he apparently thinks he has?

Professor J. F. Henry pointed out in *Geocentricism and Heliocentricism*: "The possibility that we have a special place in the universe is depressing to the humanist and is to be absolutely avoided." Why? Only because it shows that there must be a God, and that we are responsible to Him for the way we live.

ACKNOWLEDGEMENTS: I am indebted for most of the above material to Mr. Philip Stott, of Kwasizabantu Mission, Kwazulu-Natal. I am especially grateful for his book, *Vital Questions*, copyright 1994, published by Valamin, printed by Khanya Press, Private Bag 250, Kranskop, 3550, and also *The Earth Our Home* copyright 1996.

EXERCISE 1

1. What is the difference between the geocentric view and the heliocentric view?
2. Name the following scientists:
   a) The man who is considered one of the best observational astronomers who has ever lived.
   b) He thought he had proved heliocentricity when he saw the moons of Jupiter.
   c) Proposed the idea that the earth moves around the sun.
3. Look up and read the accounts given in Joshua 10 and 2 Kings 20, and write a brief description in your own words of what happened on each occasion.
4. Has anyone ever been able to prove that the earth moves?

THE GEOCENTRIC VIEW OF THE UNIVERSE (GRADE 8)

As astronomers study the stars, they have noticed that everything appears to be moving around some central point. Two basic views emerged – one, that the earth is that central point (geocentricity) and the other, that the sun is that central point (heliocentricity). Up until 1543 everyone believed that the earth was the central point, stationary at the centre of the universe. This view was held by Ptolemy, an ancient Greek astronomer. Although his system was rather complicated, it fitted the observations quite well, and the predictions made on the basis of it were reasonably accurate.

In 1543 Nicolas Copernicus published his idea that the sun was the centre of the universe, and that everything, including the earth, goes around it.

Which of these two ideas is right? First, we must realize that it is impossible to decide on the basis of observation. The observations will be the same in both cases. Tycho Brahe, who came after Copernicus, did not agree with Copernicus that the sun was the centre.

He made more observations than any astronomer had done up to that time, and he believed that the earth was the central body in the universe.

An important question we should ask is, "Why did Copernicus come to the conclusion that the sun is the centre of the universe?" The answer is to be found, not in the realm of science, but in the realm of religion and philosophy. Copernicus was particularly interested in the pagan Greek philosophers, Plato and Pythagoras. Both these men considered that the sun, being, they considered, the embodiment of everything good and noble in the universe, should be the centre of all of life. Copernicus agreed with his ancient Greek counterparts, and devised a system in which the sun was the centre and the stars and planets, including the earth, revolved around it. To agree with the observations, Copernicus had to make the planets follow a rather more complex path than Ptolemy had previously suggested. Furthermore, the predictions made on the basis of the Copernican system were not as accurate as those made on the old Ptolemaic system. However, Copernicus took the position that at last the real truth had been found.

Galileo Galilei, a Renaissance scientist, enthusiastically took up Copernicus' position. He attracted the unwelcome attention of the Inquisition, who demanded that he produce proof for the new system. He had no proof, but simply stated that "he could not persuade himself" that the sun moved around the earth, as if it did, it would have to travel at a vast speed. This, however, was not scientific proof, and so Galileo was ordered to stop teaching the heliocentric view as fact. He agreed not to do this, but went out and continued to do it anyway until he was placed under house arrest in his comfortable Italian villa.

Galileo claimed that he had found proof for the Copernican system when he constructed a telescope through which he was able to observe four moons of Jupiter. Just as Jupiter's moons circled Jupiter, he said, so the earth and the other planets of the solar system circle the sun.

The observable facts are the same, but there can be different ways of interpreting those facts. Tycho Brahe (1546–1601), recognized as one of the greatest observational astronomers of all time, devised a different model to account for the observations. In his model, he had the earth at the centre of the universe for one reason only: the Bible indicates that that is where it is. Then he had the sun circling the earth, and the planets circling the sun, and being dragged around with the sun in their orbits, just as Jupiter carries its moons around with it as it orbits the sun. Brahe could satisfactorily account for his observations using this model.

Unfortunately, Brahe died before he could publish his findings. He asked his assistant, Johannes Kepler, to publish them for him in terms of his geocentric view. Kepler, however, only partially kept his promise. He described Brahe's model and showed that all the observations were consistent with it, but he personally preferred Copernicus's model and came out openly in support of it. In order to make it fit the observations better, he proposed the idea that the planets and the earth move around the sun in ellipses, rather than in circles.

Ernst Mach, a great scientist of the last century, was troubled by the fact that there is no sound reason, based on observation, to reject the idea that the earth could be stationary at the centre of the universe. He said, "Obviously it matters little if we think of the earth as turning about on its axis, or if we view it at rest while the fixed stars revolve around it. Geometrically these are exactly the same case of a relative rotation of the earth and the fixed stars with respect to one another." In other words, the two views were equally valid on the basis of observation.

Today heliocentricity is accepted by almost everybody, but there is still no proof that the earth moves. In fact, all the experiments that have been conducted so far indicate one of two things: either the earth is stationary, or that either the earth or the sun moves (i.e. the evidence is inconclusive). The Bible, on the other hand, indicates that the earth remains stationary and the sun moves. For example, examine the following passages of Scripture:

Genesis 1:1, 16: Sun, moon and stars created after the earth.
Judges 5:20: Speaks of the "stars in their courses."
Psalm 19: Speaks of the sun "running a race."
Joshua 10:13: The sun stood still.
2 Kings 20:8-11: The sun went backwards.

There are many more passages as well. Some can be explained on the basis of figurative language; however, many are contained in purely factual, narrative passages.

Many experiments have been done to demonstrate the earth's movements. One of the most interesting is known as "Boscovich's Experiment." In 1728 a British astronomer, James Bradley, believed that he had found proof that the earth moves. He noticed that a star seemed to trace out a tiny ellipse in the sky once a year. He explained this by saying that as the earth moved around the sun, the telescope moved, and so the star appeared to move from its average position. Actually, the star had not moved – it was the earth that must have moved. Other astronomers pointed out, however, that the same effect would be achieved if the earth were stationary and the stars were moving.

Roger Boscovich (1711–1787) suggested taking observations through a telescope filled with water. If the earth were moving, it would take the light from the star one-and-a-half times longer to move from the top of the telescope to the bottom (as light travels one-and-a-half times slower in water), and the ellipse would then show as one-and-a-half times larger. If the earth were stationary, however, it would make no difference to the ellipse, because the telescope would not be moving. The scientists agreed that this would prove that the earth moves (or doesn't), but felt that it was not worth doing the experiment, as everybody knew that the earth moved! Much later, after Boscovich's death, George Airy actually did the experiment. To his amazement, he found that the ellipse was the same size – whether he observed the star through a telescope filled with water or not. He had just proved that the earth does not move!

Towards the end of the 19th and beginning of the 20th centuries several famous experimenters tried to detect the movement of the earth using very sensitive optical and electrical apparatus. Michelson and Morley's experiment was the most famous of the optical experiments. By making use of a phenomenon known as "fringe-shifts," they proved, in spite of modifying their apparatus several times, that the earth did not move. They did not accept the results of their own experiments, and instead looked around, as Airy had done, for some other explanation.

The explanation that became generally accepted was Einstein's Theory of Relativity, which insists that it is impossible to tell whether the earth, the sun, or any other body is stationary or moving – all we can tell is that one is moving relative to the other. There are times when it is more convenient for us to consider the earth as stationary (e.g. when we want to aim a space-ship at the moon) and others when it is more convenient to consider the sun as stationary (e.g. when we want to explain the seasons to children). According to Einstein, however, the real truth cannot be known.

As we study the earth, we find that it makes quite a big difference what framework of reference we accept. The conclusions drawn by heliocentrists are going to be different from those held by geocentrists. We are going to look at the conclusions of both groups.

MOVEMENTS OF THE EARTH

HELIOCENTRICITY	GEOCENTRICITY
There are two movements of the Earth: rotation and revolution. Rotation: The Earth rotates on its own axis from west to east. It takes 24 hours for the earth to rotate once. The rotation of the Earth causes day and night. Revolution: The Earth revolves around the sun once in 365 days. This, in conjunction with the tilt of the earth's axis, causes the seasons.	The Earth is stationary at the centre of the Universe. It does not rotate or revolve. The sun travels around the Earth once in 24 hours. This causes day and night. The Bible supports this view in Joshua 10:15 (where the sun stood still) and 2 Kings 20:8-11 (where the sun went back 10°). The sun travels around the Earth in a spiral-type orbit, so that it is closer to the northern hemisphere in June and closer to the southern hemisphere in December. This causes the seasons.

THE SEASONS

The seasons are first mentioned in Genesis 1:14, with the creation of the sun, moon and stars:

"And God said, Let there be lights in the firmament of the heaven to divide the day from the night; and let them be for signs, and for seasons, and for days, and years:"

It seems, however, that there were no seasons as we know them until after the Flood, as there is evidence that before that time the Earth had a uniformly warm climate. After the Flood God says:

"While the earth remaineth, seedtime and harvest, and cold and heat, and summer and winter, and day and night shall not cease." (Genesis 8:22.)

What causes the seasons? According to the Heliocentrists, they are caused by the earth's revolution around the sun, in conjunction with the tilt of the Earth's axis. The angle of inclination is 66.5^{o} to the plane of the Earth's orbit. Because the Earth is a sphere, only one half can receive the Sun's heat and light at a time. As the Earth travels round the Sun, the Sun's rays fall vertically over one part of the Earth at one time of the year, and over another part at another time. The result is an uneven distribution of heat over the surface of the earth, causing our Spring - Summer - Autumn - Winter cycle.

According to the Geocentrists, the Earth does not move at all. It is a sphere, and so only one half can receive heat and light at a time, and it is tilted at 66.5^{o} from the vertical. However, the Sun, besides traveling once around the Earth every 24 hours, also travels between the Tropic of Cancer and the Tropic of Capricorn and back every 365 days. The Sun's rays therefore fall vertically over one part of the Earth at one time of the year, and over another part at another time. The result is an uneven distribution of heat over the surface of the Earth, causing our Spring - Summer - Autumn - Winter cycle.

As you can see, both views seek to explain exactly the same effects. They just explain the same facts in different ways.

So what difference does it really make?

In Astronomy it makes a big difference. If we are going around the sun, we have an orbit with a diameter of about 300 million kilometers. This orbit can be used to calculate the distances to the nearest stars, which then turn out to be about four and a half light years away. On the basis of this, using various assumptions, we can extrapolate that the size of the universe is about twenty thousand million light years across.

If, however, the earth stands still, we do not have that base-line of 300 million kilometers. Using other methods and some reasonable assumptions we can calculate that the furthest objects in the universe may only be sixty light days away. This means that the diameter of the universe would only be about 120 light days - about a third of one light year! If this should be so, it would completely revolutionize all current theories about the universe and space exploration.

Perhaps, however, the greatest problem is where the whole controversy began—philosophy. Burgess, writing in *Earth Chauvinism*, says: "The story of Christianity tells about a plan of salvation centered upon a particular people and a particular man. As long as someone is thinking in terms of a geocentric universe the story has a certain plausibility. As soon as astronomy changes theories, however, the whole Christian history loses the only setting within which it would make sense. With the solar system no longer the centre of anything, imagining that what happens here forms the centre of a universal drama becomes simply silly." Burgess is an atheist. He does not believe the Bible. But does he really have scientific proof for his ideas, as he apparently thinks he has?

Professor J.F. Henry pointed out in *Geocentricism and Heliocentricism*: "The possibility that we have a special place in the universe is depressing to the humanist and is to be absolutely avoided." Why? Only because it shows that there must be a God, and that we are responsible to Him for the way we live.

ACKNOWLEDGEMENTS: I am indebted for most of the above material to Mr. Philip Stott, of Kwasizabantu Mission, Kwazulu-Natal. I am especialIy grateful for his book, *Vital Questions*, copyright 1994, published by Valamin, printed by Khanya Press, Private Bag 250, Kranskop, 3550, and also for *The Earth Our Home*, copyright 1996.

EXERCISE 1

1. Define: a) Geocentricity.
   b) Heliocentricity.
2. Which modern astronomer (i.e. in the past 500 years) first proposed the idea that the sun, not the earth, was the centre of the universe?
3. Did he have any proof for his ideas?
4. Who popularized this idea?
5. Did he have any proof for his ideas? Discuss the "proof" he felt he had.
6. What scientific proof exists to show that the earth moves?
7. What difference does it make to
   a) Astronomy
   b) Philosophy
   whether the earth moves or not?
8. Draw diagrams explaining:
   a) The heliocentric view.
   b) The geocentric view.

GEOCENTRICITY VERSUS HELIOCENTRICITY (GRADE 9)

Although your textbook, "Matter and Motion in God's Universe" is excellent in most respects, the one area where it falls down (in our opinion) is its section on the so-called "Christian View" of astronomy (pages 33-38). We therefore offer these notes to bring a slightly different perspective to this very controversial subject!

It is first of all important to note that the geocentric view of the universe did not begin with Aristotle, nor was it popularized by him. It was perfectly obvious to anyone who had eyes that the earth was the centre of the universe and that the sun, moon, stars and planets all moved in various ways around it. This idea was believed from ancient times right up until the 1600's, when Copernicus came up with another idea: namely, that the sun, not the earth, was the centre of the universe. His reason for saying this was not because he had come across some hitherto undiscovered evidence, but because of his philosophical beliefs. He was a great admirer and student of Plato and Pythagoras, two pagan philosophers who believed that the sun was the embodiment of all that was good, and should therefore be at the centre of the universe as the most magnificent of the gods.

Copernicus' ideas, published shortly before his death in 1543, would probably have died a natural death had it not been for the work of Galileo Galilei. He firmly believed, like everybody else, that Scripture put the earth at the centre; but his reason told him that the sun should be at the centre. He followed the spirit of the Renaissance by deciding in favor of his reason - note, again, not as the result of new experimental evidence in favor of the new idea.

Galileo began to teach his students that the sun was at the centre of the universe and that the earth was merely a planet in orbit around it. For this reason he fell foul of the Church, who told him that he was welcome to teach the new idea as a theory, but not as a fact, unless he had definite evidence. Galileo promised to do this, but went away and broke his promise by teaching it as a fact, and was then placed under house arrest by the Inquisition until he recanted.

Galileo then sought to prove his theory. He developed a more powerful version of the telescope, and with its aid was able to observe four of Jupiter's moons circling the planet. This, he claimed, proved that the earth went round the sun in the same way that Jupiter's moons went around Jupiter. He also observed Venus and Mercury in their crescent phases, and was able to explain this by Copernicus' model but not by Ptolemy's.

The heliocentric view has been accepted, virtually without question, for four hundred years. But - is it true? There are a few facts we should know:

Although many experiments have been done to show that the earth moves, not one of them has succeeded in proving this conclusively. Most of them show the earth as stationary at the centre of the universe! Experiments done to find the earth's speed as it travels through space have shown it to be zero.

Galileo's "proof" was, of course, no proof at all, as any logical person can see straight away. The fact that Jupiter's moons go around Jupiter in no way proves that the earth goes round the sun. (Note that your textbook may claim that this was proof.) The crescent phases of Venus and Mercury were later accommodated by Tycho Brahe's geocentric theory (see below). They proved that the other planets went around the sun, but still did not prove anything about the earth's movements or lack thereof.

It is impossible to tell by observation which is moving: the earth or the rest of the universe. We are dealing here with relative motion, and cannot rely on our senses. If we are on the earth, everything else looks as if it is moving. If we are on the moon, it seems that the moon is stationary and the earth is moving. We would have to be right outside the solar system, or indeed, the universe itself, to be able to see exactly what is happening!

Scripture does, indeed, teach that the earth is stationary and that the sun, stars and other heavenly bodies move. Many times Scripture speaks of the sun as moving. Twice this normal pattern was interrupted: once in Joshua's day, when the sun stood still for "about a whole day," and once in Hezekiah's day, when it actually went back ten degrees. Whenever the sun is spoken of, it is assumed to be moving. According to Scripture, the sun was created only on the fourth day—was the earth in orbit around nothing for three days? On the other hand, the earth is spoken of as being stationary, "hangeth the earth upon nothing" (Job 26:7), "stablished that it cannot be moved" (Psalm 93:1), etc. Whenever movement is mentioned in connection with the earth, it is as a result of judgment: the earth "reels to and fro like a drunkard" in Isaiah 24:20, for example. In both the Old and the New Testaments, the earth is spoken of as being the Lord's "footstool" (Isaiah 66:1 and Matthew 5:35).

There is also no evidence from Scripture that the earth rotates. Note that your textbook quotes Job 38:12, 14 as "proof" of this (pg. 274), but a close examination of these two verses shows that this interpretation is unwarranted. The word "turn" used here does not mean "turn" in the sense of turning around, but rather "change" as in the sense of something changing into something. As clay is "turned" by a seal into a pattern, so the earth has been "turned" into something different from a smooth place.

Galileo was well aware of these passages, but he concluded, "In matters concerning the natural sciences, Holy Writ must occupy the last place." Your textbook claims that Galileo looked to Scripture for insight and understanding of nature. He may well have done so, but he certainly did not look to the Scriptures for confirmation of his heliocentric theory! Scripture clearly warns us that the fear of the Lord is the beginning of wisdom (Proverbs 9:10), but Galileo evidently felt that God's Word should be considered last in formulating scientific theories!

It is often assumed that Copernicus' heliocentric theory explained the observations far better than the old Ptolemaic theory did. This is simply not true. In fact, it was soon necessary to modify Copernicus' original theory by postulating elliptical orbits - the work of Johannes Kepler. Nowadays nobody believes that the sun is the centre of the universe.

The old Ptolemaic theory left much to be desired. However, a Danish astronomer, Tycho Brahe (1546-1601), spent a lifetime making observations, and finally came up with a geocentric view that explained the observations far better than either Ptolemy or Copernicus had done. He believed that the earth was stationary at the center of the universe, that the moon and the sun orbit the earth, and that all the planets orbit the sun. Unfortunately Brahe died before he could publish his findings, and his student, Johannes Kepler, used his observations to promote the heliocentric theory instead.

SOMETHING TO THINK ABOUT:

In Genesis chapter 1 we read:

And God said, Let there be lights in the firmament of the heaven to divide the day from the night; and let them be for signs, and for seasons, and for days, and years: And let them be for lights in the firmament of the heaven to give light upon the earth: and it was so. (Gen. 1:14-15.)

If God has ordained the motion of the heavenly bodies as seen from the earth to be the standard for time (days and years), then we should have doubts about Einstein's Theory of Relativity, which says that time depends on the motion of an observer. Relativity is used to explain away experiments which indicate that the earth does not move.

REWARD OFFERED!

Most scientists believe that the earth orbits the sun, but there is still no proof that it does so. An American engineer, R. G. Elmendorf, has offered to pay $1,000 to any scientist who can prove that the earth moves, and a further $1,000 for proof that the earth rotates. No one has yet been able to give a convincing proof and claim the prize! (This should give us serious food for thought. Why do we believe it if there is no proof?)

If anyone did put forward a valid proof it would be a disproof of Einstein's cherished Theory of Relativity, which claims that it is impossible to tell whether anything is actually moving or at rest - one can only show that one body is moving relative to another.

TO SUM UP:

1. There is no experimental proof that the earth moves.

2. The so-called "proofs" that have been proposed do not show conclusively that the earth moves.

3. It is not possible to tell which is moving by observation, as we are "caught in the system", as it were.

4. A close study of Scripture passages mentioning the sun and/or the earth indicates that the sun moves while the earth stands still.

5. Galileo felt that Scripture should be disregarded in scientific matters. He preferred to rely on his own powers of reasoning.

6. The Copernican theory did not explain all the observations as well as the Ptolemaic theory. It was soon necessary to modify it—this was done by Johannes Kepler.

7. The Ptolemaic theory also left much to be desired and was later modified by Tycho Brahe.

EXERCISE

1. Define:
   a) Geocentricity.
   b) Heliocentricity.

2. Who first proposed the idea that the sun, not the earth, was the centre of the universe?

3. What was his reason for proposing this idea?

4. Did he have any proof for his theory?

5. Who popularized this idea?

6. Did he have any proof for his idea?

7. Comment on the "proofs" he offered.

8. What scientific proof exists to show that the earth moves?

9. Draw diagrams explaining:
   a) The heliocentric view;
   b) The geocentric view.

ANSWERS TO EXERCISE ON GEOCENTRICITY

1. a) The Geocentric Theory teaches that the Earth is at the centre of the universe, and that the sun and all the planets, stars, etc. move around it.
   b) The Heliocentric Theory teaches that the Sun is at the centre of the universe, and that the Earth and all the other planets, as well as the stars and other heavenly bodies, move around it.

1. Copernicus.

2. He was influenced by the ideas of the pagan Greek philosophers, particularly Plato, who felt that the Sun should be the centre as it was "the most magnificent of all the gods."

3. No.

4. Galileo Galilei.

5. No.

6. He observed the moons going around Jupiter, and claimed that the Earth and other planets went around the Sun in the same way. The fact that Jupiter has moons in orbit around it does not mean that the Earth is in orbit around the Sun. It simply means that some planets have moons in orbit around them, for example, Jupiter.

7. There is no scientific proof that the earth moves.

8. a) The heliocentric view.
   Diagram can be found in most Geography textbooks or encyclopedias.
   b) The geocentric view.
   Diagram should show the earth at the centre, with the Sun, accompanied by its planets, moving around it.

ACKNOWLEDGEMENTS

I am indebted for most of the material on Geocentricity to Mr. Philip Stott, of Kwasizabantu Mission, Kwazulu-Natal. I am especially grateful for his book, "The Earth - Our Home", copyright 1996. If more information is desired, it can be obtained from Mr. Philip Stott himself, or from his book "Vital Questions", copyright 1994, printed by Khanya Press, Private Bag 250, Kranskop, 3550, or obtainable from Christian Liberty Books, Tel. (021) 689-7478. Mr. Stott has also made audio and video tapes on this subject – they are also obtainable from Christian Liberty Books.