

Lift Up Your Eyes on High

UNDERSTANDING THE STARS



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James Nickel
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Written by James Nickel, B.A., B.Th., M.A.
Layout and editing by Edward J. Shewan
Copyediting by Diane C. Olson

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FORWARD

Stars have a divine purpose. They reveal the power and wonder of God and are signs which “declare the glory of God” (Psalm 19:1–4; Romans 10:17–18). Indeed, they have a “speech” which they pour forth to all men.

From the Scriptures we can see that God has used the stars in many ways: to give light (along with the Sun and Moon) upon Earth, to confirm His promises to Abraham, to prophecy through a dream the calling of Joseph, to direct magi to the birthplace of the Messiah, and to symbolize earthly and heavenly rulers in terms of their rise and fall.

For our dominion living on Earth, the stars help in the planning of seasonal activities, to find south and north, and to measure time and astronomical distances.

Surely, for the Christian, the stars are more than just balls of superheated gas thrown out into the void by some primeval explosion. How did they originate? What distances and magnitudes typify them? What about astrology? Do stars have a divine purpose?

In helping us to begin to answer these questions, James Nickel has shown that the stars do have significance beyond being physical matter. They bear witness of God’s plan of redemption, for He named the stars and even calls groups of them by constellational names (see Psalm 147:4 and Amos 5:8). This is not “astrology” as practiced in the modern sense, but points to God’s control over and plan for this part of His creation. There are no “accidental” arrangements in the heavens: God works “all things according to the counsel of His will” (Ephesians 1:11) and “all things” includes the stars!

In *Lift up Your Eyes on High: Understanding the Stars* the author has admirably expanded our vision concerning these heavenly bodies. In the pages of this book the reader will find many facts, parallels, interpretations, and questions that should help him or her to “consider the heavens.” For the teacher, this book should be a great source of material to inspire students, whether as a key reference, comprehensive text, or even as a workbook where students could fill in matching star names and meanings on diagrams. I have used this book in its first edition form, along with some of the references from the bibliography, in an astronomy course. This course has been the highlight of a secondary science program. Some students have even wanted to do it twice—surely a sign of a successful study!

For those of us in the Southern Hemisphere, the stars bear special witness to the redemptive love of God. The constellation, The Southern Cross, appears on several flags and is a clear redemptive image. Could it be one of the “constellations of the south” mentioned in Job 9:9? Similarly, the image of a mighty man (Ophiuchus) struggling with a serpent (Serpens) while a scorpion (Scorpio) looms threateningly below reminds us of Genesis 3:15 and the suffering Savior-seed from Eve. *Lift Up Your Eyes on High* offers these glimpses and more insights into the wonder and mystery of the night sky.

The reader will find much to ponder in *Lift Up Your Eyes on High*. May it encourage you to pursue further study of the heavens and reclaim the starry realm for Christian appreciation and education.

Lift your eyes on high, and see Who has created these things, Who brings out their host by number; He calls them all by name, by the greatness of His might and the strength of His power; not one is missing (Isaiah 40:26).

Peter Cain
Light Educational Ministries
Canberra, Australia

PREFACE

Young people are naturally fascinated with and curious about the stars. With more information available through new technology and the continuous expectation that “the stars will guide,” secondary students are surrounded with messages about the stars. On the whole, however, they are ill informed and “cheated” in their study of the stars. Study conducted in schools tends to reflect a dichotomous view and generally do not provide the opportunity for holistic studies where one can learn not only scientific “facts,” but also of the amazing message the stars declare.

This book provides parents and teachers with an excellent basis to turn the unknown into a tool that both inspires and strengthens one’s faith and can raise questions about the real nature of the universe and the amazing God of whom it speaks.

The development stage we call adolescence is characterized by a desire to find answers to the basic philosophical questions: Who am I? Why am I here? What is the reason for living? Is there life after death? Many turn to the Zodiac pages in the newspapers or magazines for input into their life—but do not find the truth there. How much better if they knew of the amazing Gospel truth the stars declare. In this most recent book from James Nickel, the reader will find strengthening of their faith and equipping in their ability to speak back into the society and culture around them.

In its first edition form, this book was an answer to prayer for me in the following situation. On a school excursion with secondary students from a Christian school, I was amazed to watch as these young people, almost without exception, turned first to the Zodiac pages of the free on-board magazine. I realized that they were confused and without knowledge. Knowing that such people are open to deception, we began a series of lessons based on the first edition to show them the richness and life which God has provided, the way in which the heavens indeed declare His love, purpose, and design. Instead of wondering what the answers to the key questions of life are, they could be sure. The culminating activity for this study was the development of their own tract to declare the message of the stars to young people like themselves.

I recommend this book to you if you are a parent or teacher who is committed to equipping young people to be effective in the world in which they live. This book provides you with a resource to equip them so that the next time they are asked about their star sign, they can confidently reply concerning the true message contained within the stars that speak. We are directed by Paul the Apostle in Philippians 2:14–16 (NIV) to “shine like stars in the universe ... as you hold out the word of life.”

How can we do this if we do not *understand the stars*?

Beverly Norsworthy
MASTERS Institute
Auckland, New Zealand

ABOUT THE AUTHOR

James Nickel holds B.A. (Mathematics), B.Th. (Theology and Missions), and M.A. (Education) degrees. He has been involved in the Christian school movement since 1978 serving as a teacher, home school parent, researcher, lecturer, and writer. He is the author of *Mathematics: Is God Silent?* (Ross House Books, 1990) and *The Heavens Declare: Understanding the Stars* (Light Educational Ministries, 1998). He is currently working on two new books, *Mathematics: Building on Foundations* (which explores the nature, structure, and purpose of mathematics starting from explicit biblical presuppositions) and *Mathematics: The Language of Science*.

He and his wife Lila make their home in Shreveport, Louisiana; they have three grown children—Daniel, Joy, and Margaret. He is currently the Dean of the School of Mathematics of Christian Heritage Academy International, a proposed biblical Christian distance learning school developed in association with Patria Ministries of Washington state and, while performing these duties, he is also writing some database applications as a consultant using the small business software package Alpha Five.

He endeavors to work for the cause of biblical Christian reformation heeding the injunction that “true reformation begins with biblical scholarship read and applied.”



Chapter Two

North Circumpolar Stars

This chapter deals with North Circumpolar⁴⁷ Stars—stars seen from Earth’s Northern Hemisphere as you look north. They are observed ideally from North America, Europe, North Africa, and most of Asia.

We will identify and comment on these stars as they appear in their appropriate constellations. A constellation is a group of stars that form pictures in the sky that speak of the Gospel of Christ. Among other sights, two beautiful constellations embellish the northern sky. They are the Big Dipper and the Little Dipper.

Big and Little Dippers

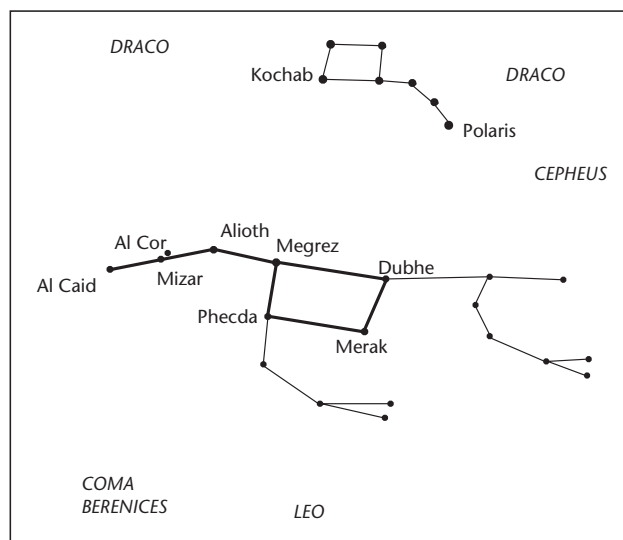
The Big and Little Dippers are popular names for Ursa Major and Ursa Minor. The brightest stars in these constellations form what looks like long-handled utensils. Ursa Major means “Great Bear” and Ursa Minor means “Little Bear.” The bear pictures are probably perversions, as the following analysis suggests.

Ursa Minor

The Hebrews called Ursa Minor *Dobher*, meaning “fold” like in sheepfold. *Dohver* is very similar to *Dobheh* (means “rest or security”) and *Dobh* (means “bear”). From this, it is clear how the bear picture could have come about. The most important, and brightest, star of Ursa Minor is Al Ruccaba (means “the turned or ridden on”) or Polaris, the North Star.

The brightest star in a constellation is scientifically identified by the prefix *alpha* (see Appendix One). So, Polaris is also known as Alpha Ursae Minoris.⁴⁸ Scientists use a measuring system called magnitude to express the apparent brightness of stars (See Appendices Three and Four). Two Greek astronomers, Hipparchus (190?–120 B.C.) and Ptolemy (ca. A.D. 90–168), inaugurated this system.

Figure 2–1: Ursa Major and Ursa Minor



47. *Circumpolar* refers to celestial bodies that never set and therefore are always seen from a given location on Earth.

48. *Ursae Minoris* is the genitive form of the constellation name.

They noted the twenty brightest stars in the sky and grouped them together as stars of the “first magnitude.” Stars about 2.5 times fainter were classified as stars of the “second magnitude.” Those 2.5 times fainter than second magnitude stars were classified as stars of the “third magnitude,” and so on. Stars of the sixth magnitude were at the limit of naked-eye visibility. This system, virtually unaltered, is still in use today. Astronomers have set 2.512 as the exact ratio between magnitudes. When the difference in magnitude between two stars is five, it means one star is one hundred times brighter than the other; i.e., a star of magnitude one is one hundred times brighter than a star of magnitude six. Mathematically, the magnitude scale is logarithmic (2.512 is the fifth root of one hundred). Polaris has a magnitude of 1.99 (forty-ninth brightest star in the sky⁴⁹) and is 782 light-years away.

The color of Polaris is yellow-white. Scientists can calculate the estimated temperature of a star by its color. Telescopes receive light from a star passing it through a special prism. This prism splits the light into the colors of the spectrum. By studying this spectrum, scientists can discover many things about the stars, one of which is their temperature (see Appendix Six). The spectral analysis of Polaris suggests it to be a “lukewarm” star with a temperature of approximately 7,500°K.⁵⁰

Polaris is also a double or binary star. This means that Polaris has a sister star (of pale bluish tint and magnitude of 9) quite close and both revolve about each other. It was first seen by Sir William Herschel (1738–1822), a German-born British astronomer who also discovered the planet Uranus, in 1780. This binary arrangement is quite common. Possibly half the stars are double or multiple system stars. In many cultures, this star has been seen as a symbol of faithfulness. For example, John Keats, in his *Last Sonnet*, writes, “Bright star! Would I were steadfast as thou art....” And William Shakespeare has Julius Caesar confess, moments before his assassination, “... but I am constant as the northern star....”

The Old Testament suggests a link between God’s holy mountain and the northern sky or possibly the northern stars. Note the following:

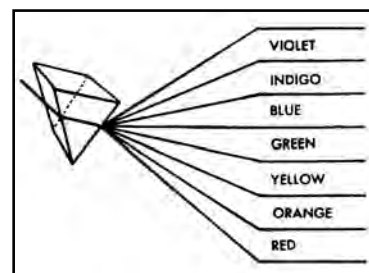
He comes from the north as golden *splendor*; with God is awesome majesty (Job 37:22).

Great is the Lord, and greatly to be praised in the city of our God, in His holy mountain, beautiful in elevation, the joy of the whole earth, is Mount Zion on the sides of the north, the city of the great King (Psalm 48:1–2).

The phrase “sides of the north” literally means “beyond Zaphon.” This same word is used in Isaiah’s oracle against the degenerate monarch of Babylon, comparing him with the fallen angel, Lucifer, “How you are fallen from heaven, O Lucifer, son of the morning! ... For you have said in your heart, ‘I will ascend into heaven, I will exalt my throne above the stars of God; I will also sit on the mount of the congregation on the farthest sides of the north’” (Isaiah 14:11–13). Zaphon is a mountain often described in Canaanite texts as the dwelling place of *their* gods. Sumerian inscriptions mention a great peak called “the mountain of the world” in the far north. In a great many ancient cultures, we find this concept symbolized on land by some sort of “temple mountain”—the ziggurat in Babylon and Sumer, the pyramid in Egypt, the teocalli in Mexico. Could it be that these “north” and “mountain” indicators reflect in these cultures the vestige of the God of gods, the God of the Bible?

The prophet Ezekiel sees a vision of God through “a whirlwind coming out of the north” (Ezekiel 1:4; compare with Revelation 4). One final passage from the Psalms associates God with the north:

Figure 2–2: The Spectrum



49. Its luminosity is 1,600. That means it shines with the brightness of 1,600 Suns.

50. *K* refers to an absolute scale of temperature based on kelvin (the base **SI unit*** of temperature, defined as 1/273.6 of the triple point of water); °K = °C + 273.

*Refers to the unit of measurement established by the *Système International*.

For exaltation *comes* neither from the east nor from the west nor from the south. But God is the Judge: He puts down on, and exalts another (Psalm 75:6–7).

Here we see that God, the Judge, brings exaltation or debasement from the north—where He alone is exalted in glorious splendor. What we can conclude from these Scriptures is that somehow the majesty of God is associated with *north*. Let us remember this as we lift our eyes on high toward the north.

Polaris has been an invaluable guide to seamen for centuries⁵¹ as a navigational guide for determining a ship's latitudinal position at sea (see Appendix Eight). Polaris now lies one degree⁵² off true north. In the year 2102 (when it will be at its closest), it will lie one-half degree away. Due to a phenomenon known as the precession of the axis, Thuban in Draco was the "North Star" during Abraham's time (see Appendix Eleven). As north stars slowly changed with the passing of millennia, we've never had one as bright *and* as close to true north as Polaris. There are 41,253 square degrees of sky, and only some 50 stars are as bright as or brighter than Polaris. The chances of such a noticeable star occupying this spot are nearly 1,000 to 1 against. This star is not there by chance, but by God's design and providence in order to further His eternal purposes.

In the early period of European exploration (fifteenth and sixteenth centuries), mariners considered Polaris as an indispensable navigational tool.⁵³ The need for better precision, i.e., determining one's longitude at sea, became a pressing problem that challenged the greatest scientific minds of the day.⁵⁴ In 1761, through the application of Hooke's law⁵⁵ and basic trigonometric functions, John Harrison (1693–1776), British horologist, invented the first practical marine chronometer.⁵⁶ This timepiece enabled navigators to compute accurately their longitude at sea to a fraction of a second. With this tool, the seas became much safer to navigate.

The Englishman John Hadley and the American Thomas Godfrey independently developed the sextant in 1731. With this instrument came increased precision in determining the altitude⁵⁷ of Polaris and other celestial bodies. Turned on its side, it could make precise angular measurements. In 1764, the British high command employed two Protestant refugees, Joseph Desbarres from France and Samuel Hollandt from Holland, to chart the eastern coast of America using a sextant turned on its side. In Canada, one of the pupils of Desbarres and Hollandt was a young naval officer named James Cook (1728–1779). He used this cartographic knowledge to map (and plant the British flag on) the coasts of New Zealand and Australia in the 1770s.

In 1792, William Carey (1761–1834) founded the first Protestant missionary society (Baptist Missionary Society) in 1792 and in the nineteenth century Christian missionaries spread the Gospel

Figure 2-3: The Sextant



51. Since the third century B.C., navigators have also called this star the *Lodestar* or *Steering Star*.
52. A convenient way to measure distances between celestial objects in the night sky is by degree measurement. One degree is about the width of the end of a person's little finger when the arm is held straight out. The degree measurement from horizon to zenith (the point on the Celestial Sphere that is directly above the observer) is 90°.
53. Why did this happen in Europe and why at this time? See James Nickel, *Mathematics: Is God Silent?* (Vallecito, CA: Ross House Books, 1990), pp. 31–48.
54. See Dava Sobel, *Longitude* (New York: Walker and Company, 1995).
55. Named for Robert Hooke (1635–1703), British scientist, who developed a formula that identified the quantitative relationship between the spring and the bob.
56. Harrison, whose singleness of purpose had made it possible for him to achieve what, to other scientists of his era (including Galileo and Sir Isaac Newton), was impossible, wrote, "I think I may make bold to say, that there is neither any other Mechanical or Mathematical thing in the World that is more beautiful or curious in texture than this my watch or Time-keeper for the Longitude ... and I heartily thank Almighty God that I have lived so long, as in some measure to complete it." Cited in Rupert T. Gould, *The Marine Chronometer: Its History and Development* (London, 1923), p. 63.
57. The angular distance of a celestial object above the horizon.

around the world traveling on ships using these navigational aids. After Carey noted these aids, he said, “providence seems in a manner to invite us to the trial.”⁵⁸

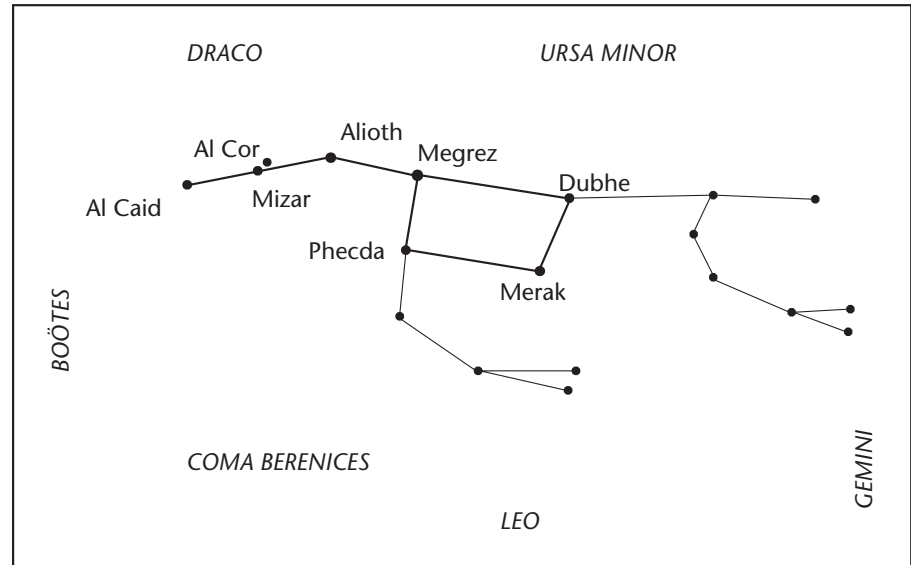
The second brightest star in Ursa Minor is Beta Ursae Minoris or Kochab. Kochab means “waiting for Him who cometh.” Its magnitude is 2.07 and is 104 light-years away. Gamma Ursae Minoris is also known as Al Pherkadain meaning “the redeemed assembly.” The magnitude of this star is 3.04 and it lies 270 light-years away.

Ursa Major

The Arabs identified Ursa Major as Al Naish, meaning “the assembled together.” Other cultures have called this constellation the Plough, Seven Wise Men, Seven Little Indians, the Heavenly Wain (wagon),⁵⁹ and Charles Wain.⁶⁰ Individual stars that form the “dipper” (called an *asterim*⁶¹) in this constellation, in rough order of brightness, are:

1. Dubhe, Dubh, or Dubb (Alpha Ursae Majoris) meaning “flock” (magnitude of 1.79 at 104 light-years).
2. Merak, Merach, or Mirak (Beta Ursae Majoris) meaning “purchased flock” (magnitude of 2.37 at 78 light-years). The two stars, Dubhe and Merak, point the viewer to Polaris. Extend the distance between Merak and Dubhe six times beyond Dubhe and you will find Polaris.
3. Phaeda, Phad, Phacda, or Phecda (Gamma Ursae Majoris) meaning “visited, guarded, numbered” (magnitude of 2.44 at 90 light-years).
4. Megrez (Delta Ursae Majoris) meaning “tail” (magnitude of 3.30 at 63 light-years).
5. Alioth (Epsilon Ursae Majoris) meaning “she goat” (somewhat variable⁶² magnitude of 1.78 at 82 light-years).
6. Mizar (Zeta Ursae Majoris) meaning “separate or small” (magnitude of 2.09 at 88 light-years). Mizar has a companion star of magnitude 4.02, Al Cor (80 Ursae Majoris), meaning “the lamb.” Resolving these two stars with the naked eye is proof of excellent eyesight.
7. Benet Naish of Al Kaid (Eta Ursae Majoris) meaning “the daughters of the assembly or the assembled” (magnitude of 1.86 at 150 light-years).

Figure 2-4: Ursa Major



58. William Carey, “An Enquiry into the Obligation of Christians to Use Means for the Conversion of the Heathens,” in *Perspectives on the World Christian Movement: A Reader*, ed. Ralph Winter and Steven Hawthorne (Pasadena, CA: William Carey Library, 1981), p. 233.

59. Some medieval Christians pictured it as the heavenly chariot in which Elijah was taken up to heaven. Actually, he was not taken up to heaven in a chariot; it was a whirlwind (II Kings 2:1).

60. Some older medieval English texts denote this constellation as Cherlemaynes Wayne and Charel-Wayne.

61. An *asterim* is a pattern of stars within a constellation but not itself a constellation.

62. A variable star varies in brightness with periods ranging from minutes to years.

The Big Dipper Clock

The Big Dipper rotates in a counterclockwise, circular motion around Polaris, which, as we have noted, is one degree away from the North Celestial Pole (N.C.P.). The N.C.P. is a point in the sky that is on a line that extends Earth's rotational axis. The South Circumpolar Stars rotate in a clockwise motion around an imaginary point in the night sky, called the South Celestial Pole (S.C.P.). Unfortunately, for those who live in the Southern Hemisphere, there is no star nearby the South Celestial Pole that suggests due south.

The motion of the Big Dipper during the night acts as a celestial time clock. As you face north, Figure 2–5 shows the relative positions of the Big Dipper as it would appear in mid-month throughout the year at 9 P.M. Each month is an hour indicator on our celestial clock. For example, May would be twelve o'clock, February would be three o'clock, November would be six o'clock, and August would be nine o'clock.

Every two hours, the Big Dipper moves the clock space of one hour. For example, if, during June, we look for the Big Dipper at 9 P.M., we will find it in the eleven o'clock position. Two hours later, at 11 P.M., the Big Dipper will be in the July, or ten o'clock, position. At 7 P.M. (two hours before the 9 P.M. position), the Big Dipper would be in the May, or twelve o'clock, position; that is, nearly upside down.

If we know the time of night, then we can find the month by reversing the above procedure. For example, the time is 11 P.M. and the Big Dipper is in the December, or five o'clock, position. What month is it? Two hours earlier, at 9 P.M., the Big Dipper would have been in the six o'clock position. The month is therefore November.

Figure 2–5: Big Dipper Clock

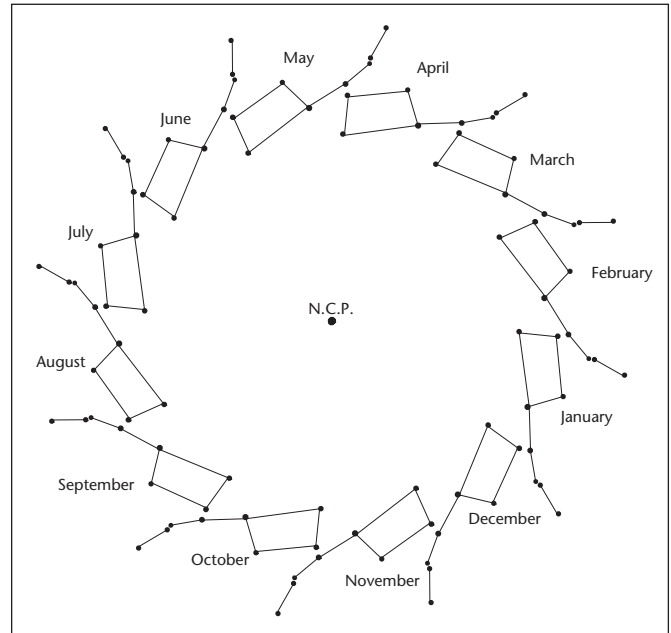
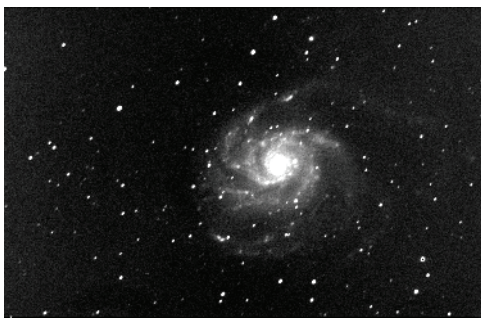
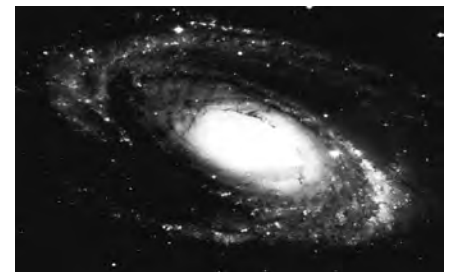


Figure 2–6: M101



You can see several beautiful spiral galaxies⁶³ by looking in the direction of Ursa Major. They are M81, M82, NGC⁶⁴ 2976, M101, and NGC 2841. The Owl Nebula,⁶⁵ M97, is a conspicuous deep sky object in this constellation. M81

Figure 2–7: M81



and M82 are estimated to be 6.5 million light-years distant. M101 is 14 million light-years away and M97's distance is estimated at 10,000 light-years. To sight these requires a good telescope.⁶⁶

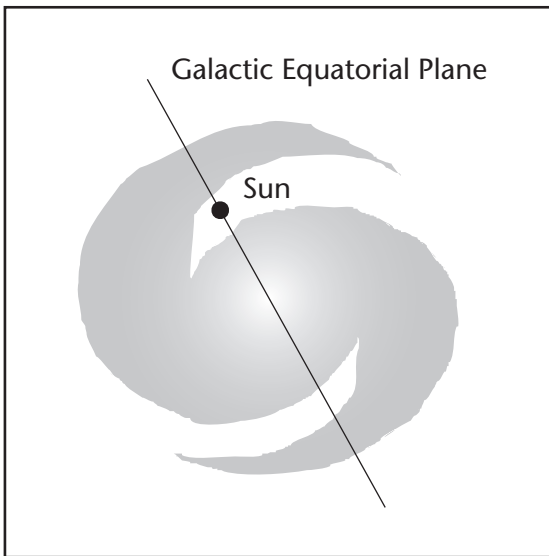
63. There are three different types (or classes) of galaxies: (1) Ellipticals, (2) Spirals, and (3) Irregulars. See Robert Burnham, Jr., *Burnham's Celestial Handbook*, vol. 1 (New York: Dover Publications, 1978), pp. 91–95.
64. Refers to the *New General Catalogue* (NGC) which was compiled by John L. E. Dreyer in 1888.
65. A *nebula* is a cloud of gas or dust in space.
66. Telescopes come in three types: (1) refractors (use lenses to gather light), (2) reflectors (use mirrors to gather light), and (3) catadioptrics (use lenses and mirrors in combination to gather light).

Two “Naked-eye” Galaxies

There are two companion galaxies of our own (called the Milky Way) that can be seen with the naked eye.⁶⁷ One is a large irregular elliptical galaxy called the Large Magellanic Cloud (L.M.C.). It is 160,000 light-years away with dimensions of 12° by 4° . Its major, or long, axis is 30,000 light-years in length and it contains about 5×10^9 stars. The other is the Small Magellanic Cloud (S.M.C.). It is about half the diameter of the Large Magellanic Cloud and has about 1.5×10^9 stars. Its estimated distance is 190,000 light-years.

Both of these galaxies are located in the south circumpolar region. Only residents living in the Southern Hemisphere (e.g., Australia, New Zealand, South Africa, or South America) can see them. Portuguese seamen discovered them in the fifteenth century and they named them after their fellow-explorer Ferdinand Magellan.

Figure 2–8: The Milky Way (Top View)



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The Milky Way

The white band of light stretching across the entire night sky is the concentrated light coming from the dense conglomeration of stars located around the central axis of our galaxy, the Milky Way.

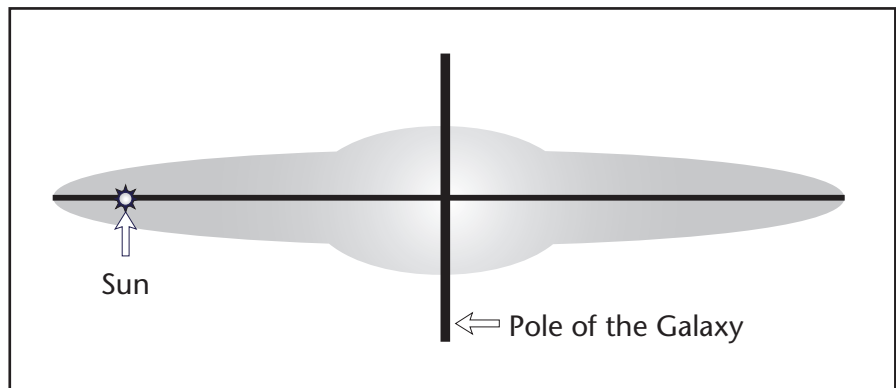
Viewed from above, the Milky Way’s outline would appear circular, the stars forming a spiral, or pinwheel, design. A side view would reveal its thinness. At the center of the galaxy is a concentration of stars. Two arms start at opposite sides of the center and spiral about it. The diameter is estimated to be 100,000 light-years and the maximum thickness to be between 10,000 and 15,000 light-years.

Our Sun with its system of planets occupies a position about 30,000 light-years from the center and close to the galactic equatorial plane.

Let us shrink the Milky Way down so that its size covers the continental United States. The billions of stars would appear on the map as specks averaging about 200 yards apart. Our Solar System, if we could locate it, would be about two inches in diameter. The Sun and Earth would be about three hundredths of an inch apart.

Looking at this multitude of stars from our own small planet, one gets two distinct views. In the direction parallel to the pole of the galaxy, due to thinness of the latter, individual stars are seen against a dark background. The view along the equatorial plane is different in that the closer stars are seen against a faint luminous band (Milky Way). This

Figure 2–9: The Milky way (Side View)



67. The only other galaxy that can be seen with the naked eye is the Andromeda galaxy (M31).

band owes its existence to the merging light of the billions of stars present in the thick part of our galaxy. This band of light suggests the direction of the equatorial plane of our galaxy.

The shape of our galaxy implies that it is rotating. Its axis of rotation is perpendicular to the equatorial plane of the galaxy. All stars in the Milky Way do not rotate uniformly around its hub. The stars near the center of our galaxy move at great orbital velocities. Stars far from the center rotate at smaller velocities. Our Sun has an orbital velocity of about 150 miles per second. Stars close to the center seem to outrun the Sun while stars closer to the edge seem to move at slower speeds. A “galactic year” is the time it takes for our Sun to make one revolution—about 225,000,000 Earth years given its current orbital velocity.

Facts and Faith

Is the position of our Solar System in the Milky Way just happenstance? Or, has God designed its location just perfectly? Is Earth in Space by chance or by design?

We must recognize that the *faith* of a man or a culture will determine the answers to the above questions. All thinking is founded upon faith. The true facts about God’s creation will be the same for the man of the Christian faith and any other faith. It is the frame of reference for understanding these facts that will be different.

Other words for *faith* are:

- **Presupposition:** *Pre* means “before” and *supposition* means “belief without full evidence.”
- **Premise:** a proposition antecedently supposed (e.g., the axioms or postulates of Euclidean geometry).
- **Pre-commitment:** a preliminary act or pledging of trust.
- **Paradigm:** a model that provides a basis for understanding the facts.

Faith conditions the way the facts before us are understood and interpreted. Consider a fish and a submarine. The facts about both are that they have tails and navigate underwater. Consider two *faith* scenarios. First, assume that similarity equals common ancestry. When interpreting the facts by this faith, we conclude that the fish is a highly advanced, miniaturized great-nephew of the submarine. Second, assume that similarity equals a common designer. When interpreting the facts by this faith, we conclude that both were designed to work underwater; one by man, the other by God. Note that with the right *facts* but a wrong *faith* you can come up with the *wrong* answer for all the *right* reasons!

Philosopher and mathematician Alfred North Whitehead (1861–1947) said, “Theories are built upon facts; and conversely the reports upon facts are shot through and through with theoretical interpretation.”⁶⁸ Paleontologist Stephen Jay Gould said, “Facts do not ‘speak for themselves’; they are read in the light of theory.”⁶⁹ In the context of discussing geocentricity and heliocentricity, astronomer Sir Fred Hoyle (1915–) said:

Writers on scientific method usually tell us that scientific discoveries are made “inferentially,” that is to say, from putting together many facts. But this is far from being correct. The facts by themselves are never sufficient to lead unequivocally to the really profound discoveries. Facts are always analyzed in terms of the prejudices of the investigator. The prejudices are of a deep kind, relating to our views on how the Universe “must” be constructed.⁷⁰

Ideas have consequences. Research metallurgist Ian T. Taylor said “... presuppositions can not only make us see what does not exist but can also prevent us from seeing what does.”⁷¹ In July of

68. Alfred North Whitehead, *Adventures of Ideas* (New York: The Free Press, 1967), p. 3.

69. Stephen J. Gould, *Ever Since Darwin* (New York: W. W. Norton, 1977), p. 161.

70. Fred Hoyle, *Highlights in Astronomy* (San Francisco: W. H. Freeman & Company, 1975), pp. 35–36.

1959, paleontologist Louis Leakey found a bit of a skull bone and two teeth in Nairobi, Kenya. He said, "We knelt together to examine this treasure ... and cried with sheer joy. For years people had been telling us that we'd better stop looking, but I felt deep down that it had to be there. You must be patient about these things."⁷² Note that Leakey knew what he found *before* he examined it; he was finding proof for a theory already accepted. The Piltdown man forgery is a classic case of how a few men, blinded by their presuppositions, deceived and duped an entire generation (from 1912 until the hoax was uncovered in 1953). Concerning this, John Reader said, "When preconception is so clearly defined, so easily reproduced, so enthusiastically welcomed and so long accommodated as in the case of the Piltdown man, science reveals a disturbing predisposition towards belief before investigation."⁷³

What are the roots of evolutionary *faith*? The basis is anthropological. Molecular biologist Michael Denton said, "The entire scientific ethos and philosophy of modern western man is based to a large extent upon the central claim of Darwin's theory that humanity was not born by the creative intentions of a Deity, but by a completely mindless, trial and error selection of random molecular patterns."⁷⁴ An outstanding British biologist, D. M. S. Watson, said, "... the theory of evolution ... a theory universally accepted, not because it can be proved by logically coherent evidence to be true, but because the only alternative—special creation—is clearly incredible."⁷⁵ According to Denton, Darwin's theory of evolution is "a highly speculative hypothesis entirely without direct factual support and very far from that self-evident axiom some of its more aggressive advocates would have us believe."⁷⁶ The building of modern evolutionary theory is founded, not upon evidence, but upon a paradigmical prejudice. To this, C. S. Lewis responded, "Was it devised not to get in facts but to keep out God?"⁷⁷ The evolutionary faith must be understood as *man's attempt to flee from God*. If God is Creator and is now sustaining every atom of His creation, then man is *faced with reminders of Him wherever he looks*. Rebellious man is suppressing the truth clearly seen in creation (Romans 1:18–20).

Since the roots of evolutionary faith are anthropological, then the touchstone of truth is man's reason. This culminates in the absolutization of the scientific method; that is, only what can be proved by man's reason is true. Revelation from a transcendent, Creator God is *not* a source of knowledge. But, by this very definition, evolution *cannot* be scientific! According to Denton:

... the theory of evolution deals with a series of unique events, the origin of life, the origin of intelligence and so on. Unique events are unrepeatable and cannot be subjected to any sort of experimental investigation. Such events ... may be the subject of much fascinating and controversial speculation, but their causation can, strictly speaking, never be subject to scientific validation. Furthermore, not only is the theory incapable of proof by normal scientific means, the evidence is ... far from compelling.⁷⁸

For the evolutionary faith, matter is ultimate. Dr. Corliss Lamont, one of the signers of *Humanist Manifesto II*, states that "... Nature itself constitutes the sum total of reality, that matter-energy and not mind is the foundation stuff of the universe ... our cosmos does not possess a supernatural and eternal God."⁷⁹ Man is therefore only a product of the cosmos and is conditioned by it. Life is defined chemically and physiologically.

71. Ian T. Taylor, *In the Minds of Men* (Toronto: TFE Publishing, 1984), p. 194.

72. John Pfeiffer, "Man—Through Time's Mists," *The Saturday Evening Post*, 239th year, no. 25, 3 Dec. 1966, p. 41.

73. John Reader, *Missing Links* (London: Collins, 1981), p. 81.

74. Michael Denton, *Evolution: A Theory in Crisis* (Bethesda, MD: Adler & Adler, 1985), p. 357.

75. D. M. S. Watson, "Adaptation," *Nature*, 1929, 24:233.

76. Denton, p. 76.

77. C. S. Lewis, *They Asked for a Paper* (London: Geoffrey Bles, 1962), p. 163.

78. Denton, pp. 75–76.

79. Corliss Lamont, *The Philosophy of Humanism* (New York: Frederick Unger Publishing, 1977), pp. 12–13, 16.

Finally, for the evolutionary faith, the physical laws of the universe stand before us as impersonal absolutes.

What are the consequences of this faith? Quoting the *Humanist Manifesto II*, “Happiness and the creative realization of human needs and desires, individually and in shared enjoyment, are continuous themes of humanism. We strive for the good life, here and now.”⁸⁰ Compare this the Apostle Paul’s observation of those who reject the basic tenets of the Christian faith, “Let us eat and drink, for tomorrow we die” (I Corinthians 15:32).

According to Denton,

The social and political currents [communism, fascism, socialism—J.N.] which have swept the world in the past eighty years would have been impossible without its [Darwinian Revolution—J.N.] intellectual sanction. It is ironic to recall, that it was the increasingly secular outlook in the nineteenth century which initially eased the way for the acceptance of evolution while today it is perhaps the Darwinian view of nature more than any other that is responsible for the agnostic and skeptical outlook of the twentieth century.⁸¹

Denton concludes his masterful treatise with these insightful comments:

Ultimately the Darwinian theory of evolution is no more nor less than the great cosmogenic myth of the twentieth century.... [I]t satisfies the same deep psychological need for an all-embracing explanation of the origin of the world which has motivated all the cosmogenic myth makers of the past.⁸²

C. S. Lewis shows us the heinous epistemological⁸³ ramifications that result from embracing this myth as truth:

I grew up believing in this [Evolution] Myth and I have felt its almost perfect grandeur. Let no one say we are an unimaginative age; neither the Greeks nor the Norsemen ever invented a better story.... But the Myth asks me to believe that reason is simply the unforeseen and unintended by-product of a mindless process at one state of its endless and aimless becoming. The content of the Myth thus knocks from under me the only ground on which I could possibly believe the Myth to be true. If my own mind is a product of the irrational ... how shall I trust my mind when it tells me about Evolution?⁸⁴

The Darwinian Revolution is nothing but a philosophy of despair. We are pieces of driftwood washed up on the shore of fate. Modern education has proclaimed this “evangel” for decades. The result is students who look at the stars and say, “Praise and honor to Big Bang, Chance, and Matter.”

In contrast, what are the roots of biblical *faith*? The basis is theological. Biblical faith looks at what God has said in His revealed Word. The Bible reveals God to be the Creator, Triune, Sovereign, Just, Good, Infinite, Eternal, and Personal. The universe is His handiwork. Biblical faith admits man’s rebellion and trusts in God’s redemption in Christ. Biblical faith sees man to be accountable to his Creator. Man faces his Creator everywhere for no fact exists apart from God.

Since the roots of biblical faith are theological, then the touchstone of truth is revelation. True knowledge is founded upon the fear or respect of the biblical God; apart from this, we have, not knowledge, but misinformation (Proverbs 1:7; Psalm 36:9; Colossians 2:1–3). The purpose of the Bible is to correct our faulty, sin-corrupted vision so that we might see the world in truth.

For the biblical faith, God is ultimate. Man is responsible before Him to obey His directive to take dominion over the creation (Genesis 1:26–28; see also Psalm 8:6–8). James Clerk Maxwell (1831–1879) was a pioneering scientist in the field of electromagnetism. A prayer was found in his own handwriting after his death in which he quoted from this Genesis passage and indicated that

80. Paul Kurtz, ed. *Humanist Manifestos I and II* (Amherst, NY: Prometheus Books, 1973), p. 17.

81. Denton, p. 358.

82. Denton, p. 358.

83. The branch of philosophy that studies the nature of knowledge, its presuppositions and foundations, and its extent and validity.

84. C. S. Lewis. *Christian Reflections*, ed. Walter Hooper (Grand Rapids: Eerdmans Publishing, 1975), p. 89.

God's command to man to subdue the earth was the motivation for his scientific studies.⁸⁵ He utilized his intense study of God's creation with one goal in mind—to benefit the inhabitants of Earth.

Finally, for the biblical faith, every physical “law of nature” is simply man's attempt to systematize the faithfulness of God in the performance of His omnipotent sustaining word of power (Hebrews 1:3). We may determine the “cause and effect” nature of the universe by observation, but we must always keep in mind that the *first cause* of these laws is the triune God.

What are the consequences of this faith? William Haller wrote, “Men who have assurance that they are to inherit heaven have a way of presently taking possession of the earth.”⁸⁶ Physicist and theologian Stanley L. Jaki observed that “the history of science with its several stillbirths and only one viable birth, clearly shows that the only cosmology, or view of the cosmos as a whole, that was capable of generating science was a view of which the principal disseminator was the Gospel itself.”⁸⁷ Biblical faith generated modern science. The scientific enterprise must now be subservient to biblical faith. Then, and only then, will its discoveries and products serve the “City of God” and thereby bring healing to the nations (Revelation 22:2).

Biblical faith will open our eyes to the awe and wonder of God's creation. We will amen the truth of the *Netherlands' Confession*, “Before our eyes as a beautiful book, in which all created things, large or small, are as letters showing the invisible things of God.” We will echo the sentiments of the Psalmist, “Great are the works of the Lord; they are studied by all who delight in them” (Psalm 111:2).

Earth in Space by Design

Our Sun is positioned just perfectly in the Milky Way galaxy. If it would be nearer the galactic center, stronger cosmic radiation from the hub would make life impossible on Earth. Also, the stars in any constellation are at varying distances, some stars hundreds of times more distant than others. If our Solar System were located in another place in the Milky Way, the whole constellation scheme would be radically different. God placed our Solar System where it is so that the constellation arrangements would declare a unique story of His glory.

Concerning the arrangement of the Solar System, the distance of the Sun from Earth and the mass and size of the Sun is just right to support life on Earth and no other planet. The planetary system is so finely tuned that if the mass of Jupiter were to be increased by *1 percent*, the planetary system would no longer have that stability that is the precondition of life on Earth.

On any other planet, we would have been barred, or at least greatly impeded, from acquiring knowledge about the Solar System. The Moon and Sun have the same apparent size as viewed from Earth. This is because the diameter of the Sun is four hundred times the diameter of the Moon and its distance from Earth is four hundred times that of the Moon. This precise arrangement makes possible total eclipses, a phenomenon crucial to the development of astronomy. It made possible those attainments that are the basis of Ptolemaic or geocentric (Earth is the center of the Solar System) astronomy. Without Ptolemy's astronomy there would be no Copernican astronomy and Newtonian physics. On any other planet, Newton would have no Moon to verify the universality of the law of gravitation. You cannot see the Moons of Mars from its surface. The Moons of Jupiter and Saturn would appear much bigger than our Moon. Our Sun would look like a very bright star, not that imposing though not overpowering fiery body that could prompt a Copernican belief in heliocentricity (Sun is the center of the Solar System). Without this unique positioning, Newtonian physics would not have developed, let alone modern physics.

85. Henry Morris. *Men of Science, Men of God* (San Diego: Master Book Publications, 1984), p. 91.

86. William Haller. *The Rise of Puritanism*, p. 162. Cited in Gary North, ed. “Symposium on Puritanism and Progress,” *The Journal of Christian Reconstruction*, VI:1, (Vallecito, CA: Chalcedon, 1979), p. 27.

87. Stanley L. Jaki, *The Origin of Science and the Science of its Origins* (Edinburgh: Scottish Academic Press, 1978), p. 99.

The inclination of the axis of Earth is exactly 23.5° . The axis points north toward a star (within historically recorded times) bright enough to make possible the observation of the precession of Earth's axis (see Appendix Eleven). This occurred before the invention of the telescope, a pivotal feat in astronomy. No such star reference point exists in the Southern Hemisphere. Without this tilt, the four seasons would be nonexistent. Without the four seasons, it would be impossible to grow food on large portions of the world. The four seasons reveal the covenant faithfulness of our God, the Creator and Sustainer of all things:

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

Our Earth is an amazing planet. Its crust and its composition are just right to support life. The quantity and composition of the ocean are just right to support life. Water is essential to life. The world has 4.1×10^{16} cubic feet of water. There is not one drop of water anywhere else in our Solar System! The composition of the atmosphere is just right to support life. 21% of our atmosphere is made up of life-giving oxygen (O_2). No other satellite or planet in our Solar System has free oxygen like this. The poisonous ozone (O_3) layer surrounds Earth at a safe distance of ten miles above the surface. It absorbs and filters out deadly ultraviolet light from the Sun.

Truly, God has carefully positioned Earth in space. This placement provides life for its inhabitants. Its position was also perfect for developing astronomy, a most crucial component in developing science as a tool to take dominion over God's creation.

More North Circumpolar Constellations

Cassiopeia

Cassiopeia makes a conspicuous "W" or "M" in the northern sky. In Arabic, it is El Seder meaning "the freed." The Egyptians called this constellation Set, meaning "set up as queen." In the Chaldee tongue, it was known as Dat al Cursa meaning "enthroned." Three stars of Cassiopeia are Schedir (magnitude 2.23 at 147 light-years) meaning "the freed," Ruchbah (magnitude 2.68 at 43 light-years) meaning "the enthroned or the seated," and Caph (magnitude 2.25 at 45 light-years) meaning "the branch."

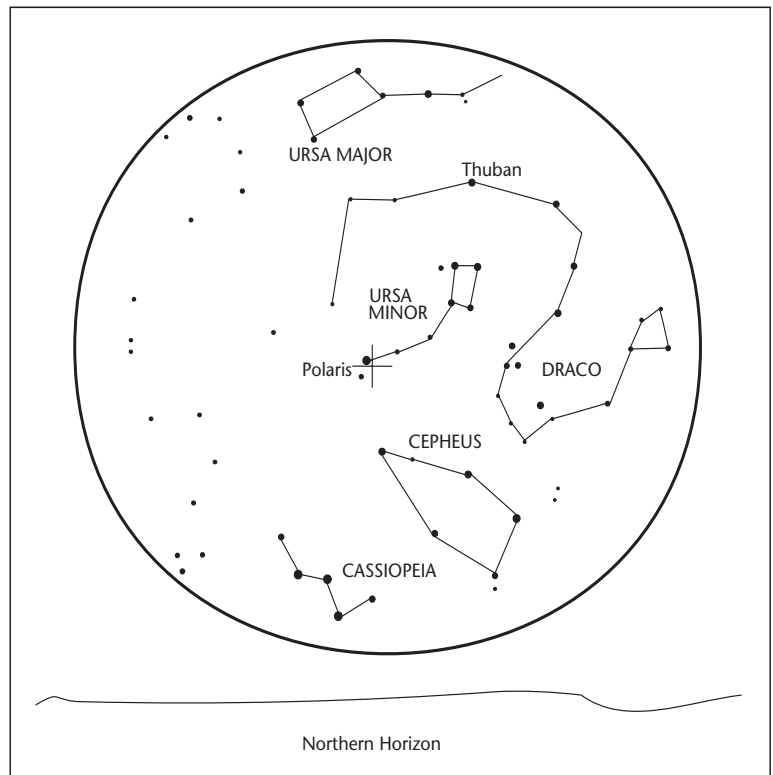
In 1572, a great supernova⁸⁸ (called Tycho's star) burst forth in this constellation. On November 11 of that year, the famous astronomer Tycho Brahe⁸⁹ (1546–1601) made these comments:

On the eleventh day of November in the evening after sunset ... I was contemplating the stars in a clear sky ... I noticed that a new and unusual star, surpassing the other stars in brilliancy,

88. A rare celestial phenomenon involving the explosion of most of the material in a star, resulting in an extremely bright, short-lived object that emits vast amounts of energy.

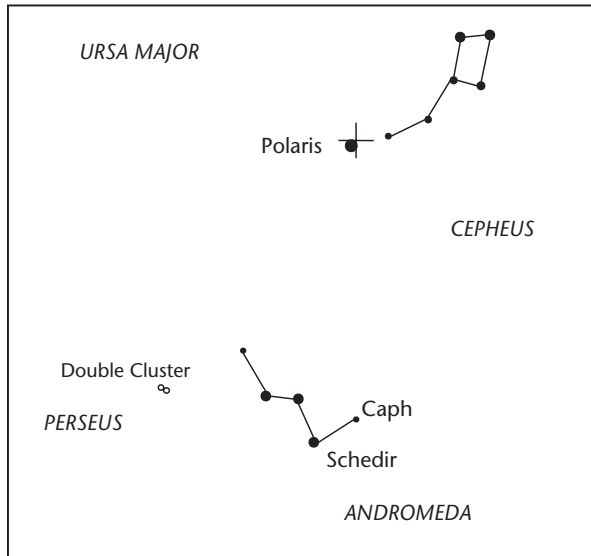
89. Pronounced *tee-ko bra-hee*.

Figure 2–10: North Circumpolar Stars



was shining almost directly above my head; and since I had, from boyhood, known all the stars of the heavens perfectly, it was quite evident to me that there had never been any star in that place in the sky, even the smallest, to say nothing of a star so conspicuous and bright as this. I was so astonished at this sight that I was not ashamed to doubt the trustworthiness of my own eyes. But when I observed that others, on having the place pointed out to them, could see that there was really a star there, I had no further doubts. A miracle indeed, one that has never been previously seen before out time, in any age since the beginning of the world.⁹⁰

Figure 2–11: Cassiopeia



For a period of two weeks, this celestial explosion outshone every star in the sky. You could even see it in the daytime. It began to fade at the end of November and finally vanished from naked-eye sight in March of 1574. It created a great commotion in its time and induced the Protestant Reformer Theodore Beza (1519–1605) to predict the Second Coming of Christ. Some even considered it as a re-appearance of the “Star of Bethlehem.”

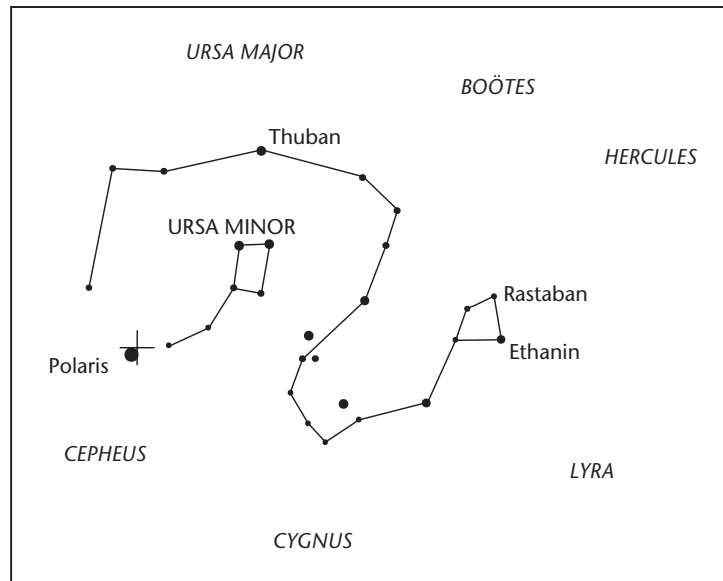
A beautiful celestial grouping called the Double Cluster lies between Cassiopeia and Perseus. On a really dark night, you can see this patch of light with the naked eye. A small telescope or binoculars will reveal that this cloudy spot consists of two open star clusters, both about 7,000 light-years distant. According to some astronomers, this pair forms one of the most impressive and spectacular objects in the night sky.

Draco

In the Greek, Draco means “trodden on.” Draco is possibly derived from the Hebrew, Dahrach, meaning “to tread.” The Egyptians named this constellation Herfent, meaning “the serpent accursed.” The Hebrews called it Rastaban, meaning “the head of the subtle who is to be destroyed.” Hercules, a mighty warrior, is pictured as treading under foot the head of Draco, the dragon.

The most famous and brightest star of this constellation is Thuban (magnitude 3.64 at 220 light-years) meaning “the subtle.” As already mentioned, about 4,000 years ago, Thuban was the “North (or Pole) Star” and worshipped as such by the ancient Egyptians. Much has been written about this star and its connection to the Great Pyramid of Khufu at Gizeh, the most mathematically perfect and puzzling structure in the world. In summary, it appears as though one of its descending passageways was constructed to point directly at Thuban as this star passed its lower culmination⁹¹

Figure 2–12: Draco



90. Cited in Robert Burnham Jr., vol. 1, p. 505.

91. *Lower culmination* is the lowest point in the sky that Thuban reaches as it makes its circular path around the North Pole.

point below the North Pole. In 1929, Charles Barns, author of *1001 Celestial Wonders*, described his reaction during a visit to this wonder of the world:

I myself, some years ago, crept down into the sepulchral chambers deep in the solid masonry of this most ancient of tomb observatories, and gazing obliquely up through the murky rift, beheld a rectangular patch of blue Egyptian sky where Thuban once reigned in solemn grandeur—a thrilling moment!⁹²

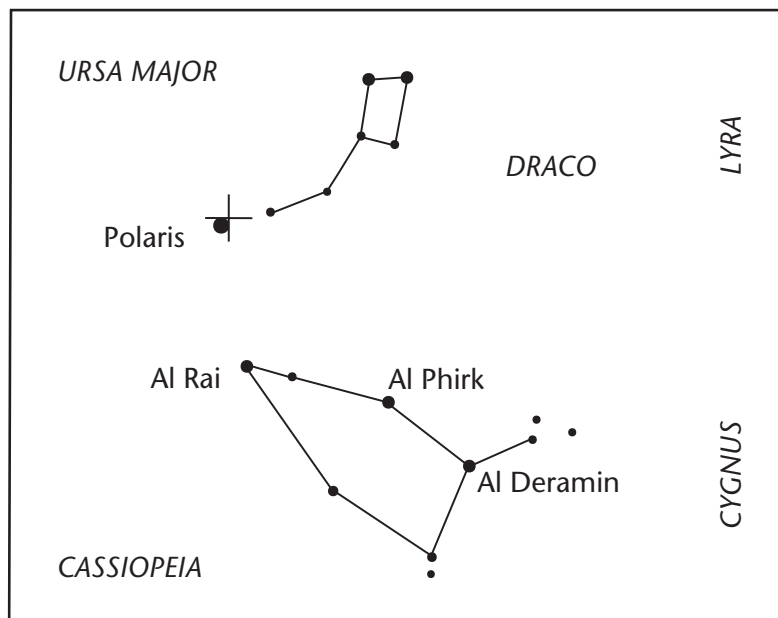
Cepheus

In Egypt, this constellation was known as Pe-ku-hor, meaning “this one cometh to rule.” In Greek, Cepheus means “the branch.” Individual stars of this constellation are Al Deramin (magnitude of 2.44 at 52 light-years) meaning “coming quickly,” Al Phirk (magnitude of 3.15 at 980 light-years) meaning “the redeemer,” and Al Rai (magnitude of 3.20 at 51 light-years) meaning “who bruises or breaks.”

Delta Cephei is a famous variable star. It pulsates (i.e., changes magnitude) not because it is eclipsed by a companion star, but because of internal energy change that affects its surface temperature—hence also its spectral type. There are many other

stars (approximately 500) that do this and they are called Cepheids in honor of this star. Astronomer John Goodricke first noticed this characteristic of Delta Cephei in 1784. The magnitude of Delta Cephei varies from a low of 3.51 to a high of 4.42 every 5.37 days. Delta is a supergiant star that is thirty times the size of our Sun. Astronomers use the periodicity of a Cepheid to determine its distance from Earth (see Appendix Twelve). Delta Cephei is 1,300 light-years away.

Figure 2–13: Cepheus



What is the message of these stars?

What can we learn from the ancient meanings of the star names of these North Circumpolar Stars? The meanings for the stars of Ursa Major and Ursa Minor suggest that these constellations symbolize the shelter and protection afforded to a flock of sheep. Cassiopeia speaks of a woman raised up as a queen after being released from bondage. Draco speaks of a cursed serpent being bruised or trodden on. In fact, the feet of Hercules, a victorious warrior (see Chapter Five), is crushing the head of Draco, the serpent. Cepheus speaks of a redeemer who comes quickly to bruise or to break an enemy.

Any astute Bible student can readily associate these signs with the Gospel of Christ. Christ is that victorious warrior, the redeemer of His people, His sheep, His bride (or queen). He released His people from the bondage of sin by crushing the head of the serpent, the Devil, on Calvary’s Cross (Genesis 3:15). After redeeming His people, God set His bride on His throne (Ephesians 2:6) and protects and guards them as their Great Shepherd who has risen from the dead (Hebrews 13:20; I Peter 1:5).

92. Cited in Robert Burhham Jr., vol. 2, pp. 862–863.

Questions for Review and Further Study

Short sentence answers:

Define the following words:

1. Circumpolar stars
2. Magnitude
3. Constellation
4. Binary star
5. North Celestial Pole
6. Galaxy
7. Ozone layer
8. Supernova
9. Cepheids

Short essay:

1. Explain how Greek letters relate to star names.
2. Study and explain the difference between apparent and absolute magnitude.
3. Describe the pictures that are associated with the constellations Ursa Major and Ursa Minor.

Long essay:

1. Explain God's providence in association with Polaris.
2. Define the size and structure of the Milky Way.
3. How would you respond to the following statement?

"The chance, impersonal forces of evolution put Earth where it is now in space."

Research:

1. Research and report on the different types (called classes) of galaxies.
2. Do a research project on the science of spectroscopy.

Figure 2-14: Simple Spectrograph

