

CONSTELLATIONS OF THE NIGHT SKY

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Introduction

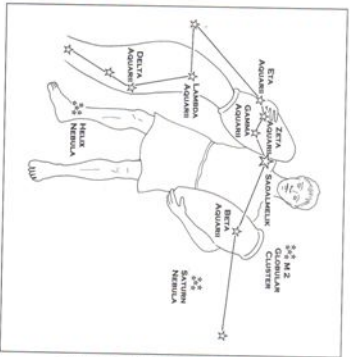
Away from the lights of the city, the dark night sky offers an amazing and wondrous sight: thousands of brilliant, glittering stars. In fact, the name of one type of star, a *Mira variable*, comes from the Latin word for "wonderful." Because the ancient civilizations of Babylon, Egypt, Arabia, Greece, and Rome did not possess the scientific knowledge to understand the true nature of stars, they constructed elaborate myths and legends about the star formations they observed. We now call these star groups *constellations*. Although most of the myths are from ancient Greek lore, the names of the constellations have come down to us in the Roman language of Latin. And because of the achievements of ancient Arab astronomers, many individual star names are in Arabic.

Stars come in a variety of colors, sizes, and types. Among them are *red dwarfs*—twenty times smaller than our own Sun, and *supergiants*—100 times more massive. Stars also burn at different temperatures, indicated by their colors. Yellow-white stars like the Sun have surface temperatures of 5500 degrees centigrade, while blue-white and blue stars burn the hottest—30,000 to 60,000 degrees centigrade. Astronomers also measure stars according to their brightness. The brightness of a star is determined by two types of *magnitude*. Absolute magnitude refers to the brightness of a star in relation to other stars. Apparent magnitude, the scale used in this book, describes a star's brilliance as seen from Earth (see p. 48 for a list of the twenty-five brightest stars).

In addition to individual stars, constellations include other celestial configurations: double stars orbiting in close proximity around a central gravitational point; binary eclipsing variables, i.e., twin stars in which a smaller companion orbits a larger main star; and groups of stars called *clusters*. Globular clusters are tightly packed together, while others with less density are called "open" clusters. *Nebulae*, clouds of brightly shining gas and dust, are interstellar nurseries where newborn stars come winking into existence. The largest elements of constellations are huge accumulations of stars called *galaxies*. Some, like our own Milky Way galaxy, are spiral-shaped and contain over 200 billion stars.

Observed from Earth, stars and constellations change constantly. Their positions vary as they rise and set with the Earth's daily rotation on its own axis. The location of constellations also varies with the seasons. As the Earth moves along its yearly orbital path around the Sun, the natural tilt of the planet causes an apparent monthly change of constellation positions in the night sky. Moreover, some constellations are visible only in the Southern Hemisphere, below the equator. However, since most of the constellations in this book are visible from the Northern Hemisphere, the sky charts at the front and back show the generalized positions of major constellations in the Northern Hemisphere during summer and winter.

Wherever you live, this book will help you understand and appreciate the wonders of the heavens. Simply step outside on a clear, dark evening and discover the magnificent display of mythical animals, objects, and characters glowing brightly in the constellations of the night sky.

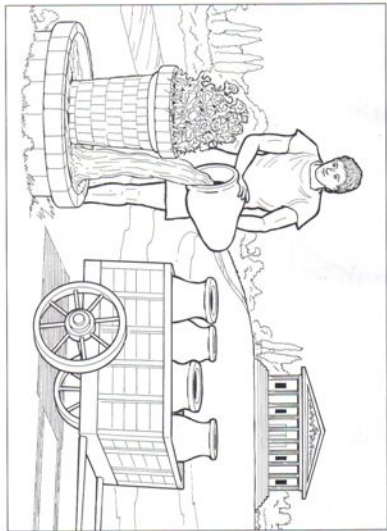


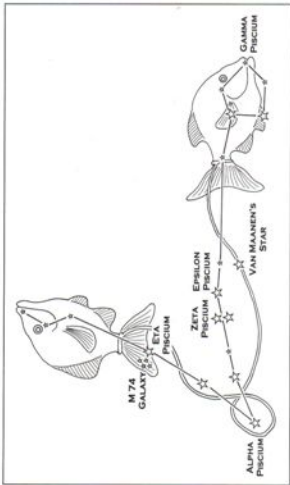
I. Aquarius

The Water Bearer

The constellation Aquarius is also known as "the water bearer." Aquarius is one of the oldest recognized groups of stars; observations have been recorded as far back as the Babylonians (ca. 1700 B.C.). The mythical Greek god, depicted as a young man pouring water from the open mouth of a jar, Aquarius is associated with Zeus, King of the Gods, pouring the waters of life down to Earth from Mt. Olympus. A variation of the legend states that Zeus chose Ganymede, son of the King of Troy, to serve as Aquarius; the cupbearer is represented by the monthly time period from January 20 to February 18.

Aquarius is located in a region of the sky known in Babylonian myth as "the sea." Also included in this region are the constellations of Orion (Sahab), Procyon (Idah), Hydrus (sea monster), and Capricorn (sea goat). The brightest star in Aquarius is Sadashab (Alpha Aquarii), with a magnitude of 1.0. It is 945 light-years (the distance light travels in a year) from Earth. Other prominent celestial objects within Aquarius are the globular star cluster M2, the Saturn Nebula, and the Helix Nebula.

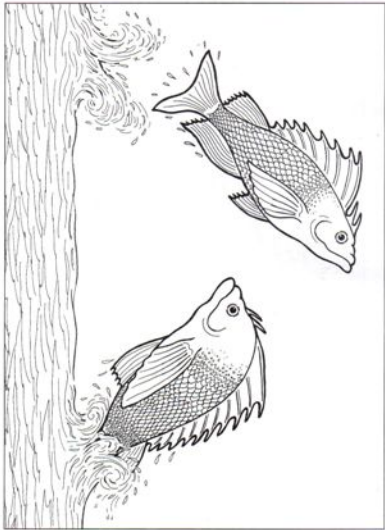


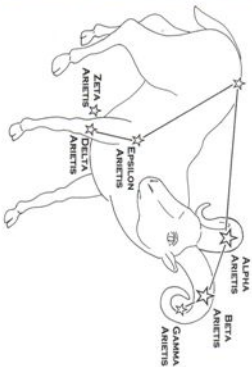


2. Pisces The Fish

The constellation Pisces is shown here as two fish hinged together by a cord. This depiction is drawn from a Greek myth recounting how the goddess Aphrodite and her son Eros were driven into the sea by the monster Typhoon. To rescue them, the sea god Poseidon sent two giant fish to carry them away. Zeus honored the fish by creating a new group of stars. The zodiac assigns Pisces the period from February 19 to March 20.

Although the constellation of Pisces is large, it contains no stars of great magnitude. Its brightest star, Alpha Piscium, is actually a binary star, two stars which orbit one another closely. They are located at the knot of the cord that binds the two fish and lie 140 light-years from Earth. The two stars have magnitudes of 4.2 and 5.2. Pisces also contains the spiral galaxy M74, and Van Maanen's Star, a rare white dwarf star.





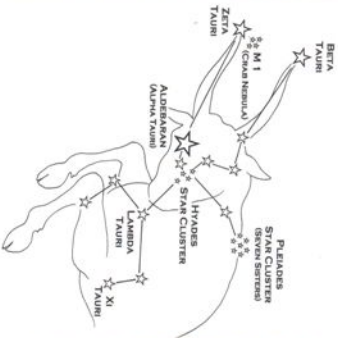
3. Aries

The Ram

The constellation of Aries is represented by the Ram. The original Greek legend concerns the steed of Phrixus and Helle, the son and daughter of the King of Thessaly, by a golden ram sent by the god Hermes (Mercury to the Romans). As the Ram was flying them to safety over the strait of water that separates Europe and Asia, Helle fell into the sea. In her honor, the Greeks named this body of water the Hellespont (Sea of Helles). Phrixus survived and was transported safely to the shores of the Black Sea. There, he sacrificed the golden ram to Hermes and placed its fleece under the protection of a dragon. This, in turn, gave rise to the legend of Jason and the Argonauts and their search for the Golden Fleece. Those with birthdays between March 21 and April 18 were born under the sign of Aries.

The constellation is usually identified by three low-magnitude stars that symbolize the horns of the Ram. These are Alpha, Beta, and Gamma Aries with magnitudes of 2.0, 2.6, and 4.6, respectively.





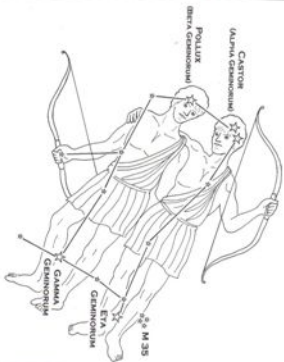
4. Taurus

The Bull

Containing a number of significant celestial objects, the constellation Taurus is one of the oldest star groups in association with the bull dating back to the Chaldeans (3000 B.C.). The Greek myth tells the story of how Zeus transformed himself into a powerful white bull to catch the attention of Europa, the beautiful daughter of the King of Phoenicia. Entranced by the bull, she climbed on his back. He then carried her into the sea and swam to the Isle of Crete, where Europa later bore him a son, Minos. The time period of April 20 to May 20 is assigned to the constellation Taurus.

The brightest object in Taurus is the star Aldebaran, an orange giant. With a magnitude of 0.85 it is located sixty-eight light-years from Earth. It also contains two bright open star clusters, the Pleiades and the Hyades. The Pleiades is popularly known as the "Seven Sisters" after its seven principal stars, named for the daughters of Atlas. The Hyades is located at a relatively nearby 150 light-years from Earth. Also within Taurus is the M1 Crab Nebula, visible through a moderately powered telescope as an oval patch of light.



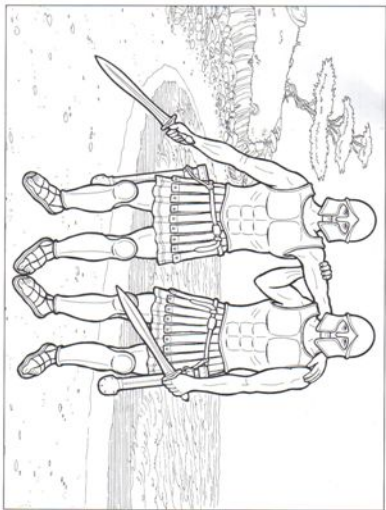


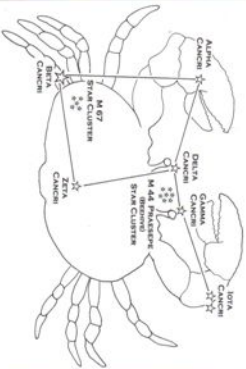
♊ Gemini

The Twins

The constellation Gemini is based on the Greek myth of the twin brothers, Castor and Pollux. They were athletes and warriors who sailed with the legendary hero Jason on the great ship Argo, fighting at his side during many adventures. When Castor was killed, Pollux asked Zeus to let him die also so that he might be with his brother. Zeus granted his request, transferring the two brothers into nearby stars set forever in the night sky. The zodiac period from to Castor is from May 21 to June 20.

The principal stars of Gemini are Alpha Geminorum (Castor), and Beta Geminorum (Pollux). Castor is a binary star with a combined magnitude of 1.5, while Pollux, the brightest star in Gemini, has a magnitude of 1.2. Also located within the constellation is the open star cluster M35.





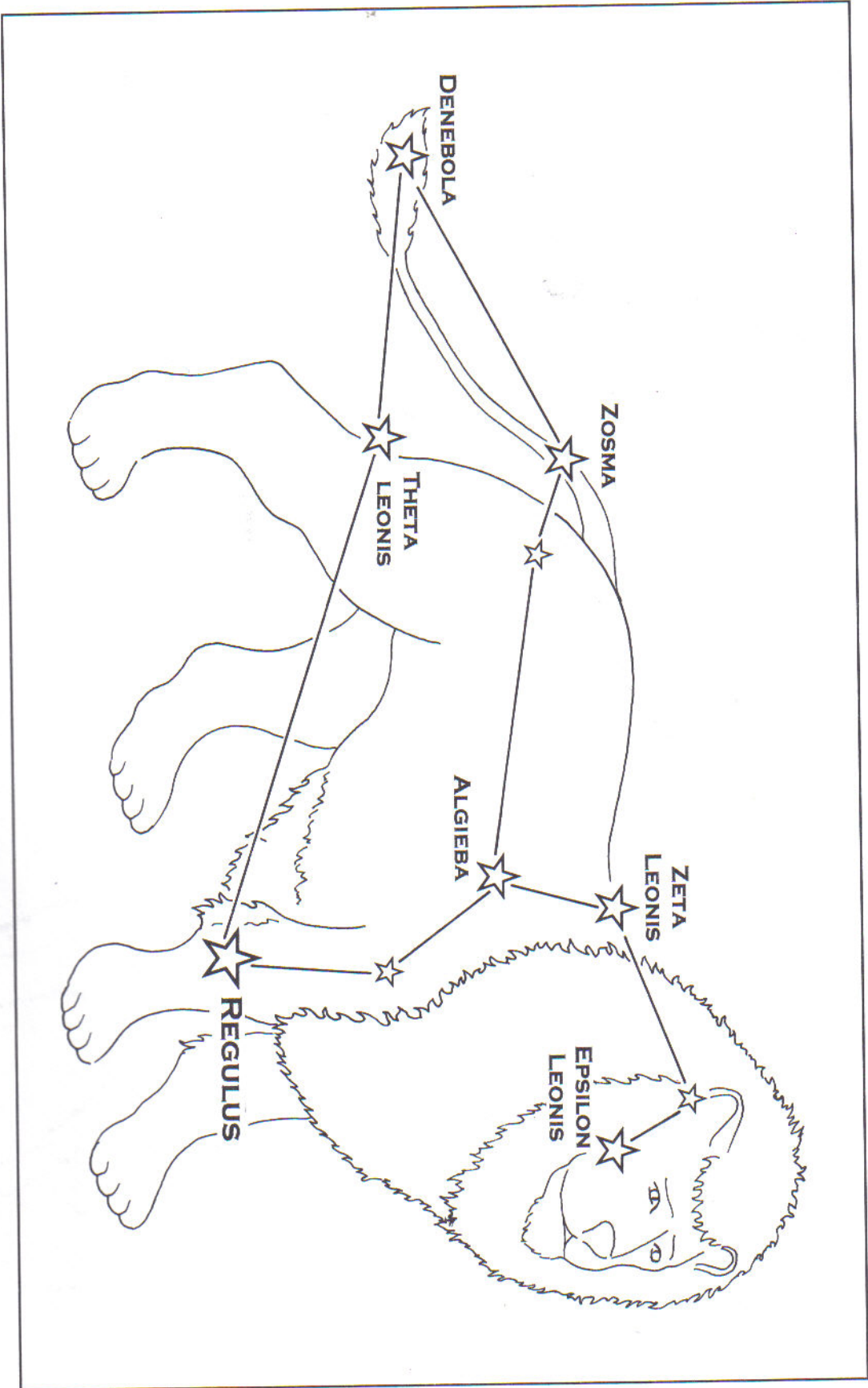
6. Cancer

The Crab

The crab is the image associated with the constellation Cancer. The Greek myth is based on the explosion of the great hero Hercules. One of the twelve labors the gods of Olympus forced Hercules to perform was to defeat the sea monster Hydra, a part of the goddess Hera. To help the Hydra in its battle with Hercules, Hera created a monstrous crab to seize the hero in its pincers. Using his enormous strength, Hercules crushed Cancer underfoot and killed the Hydra. The period from June 21 to July 23 is covered by Cancer.

The constellation contains the great star field known as M44, the Beehive Cluster (Praespe in Latin). It is visible to the naked eye as a cloudy patch of light, but through binoculars, a large field of individual stars can be seen. The brightest star in Cancer is Beta Cancri with a magnitude of 3.5. The constellation also contains the star cluster M47, located a distant 2,000 light-years from Earth.





7. Leo

The Lion

Leo is also associated with the twelve labors of Hercules. Leo was named for the Nemean lion, a fierce and powerful animal whose thick hide was impervious to arrows and spears. Hercules wrestled the lion in a great battle and finally killed the beast with his bare hands. Hercules was thereafter usually depicted wearing the pelt of a lion. Those with birthdays from July

23 to August 22 are born under the sign of Leo.

The brightest star in Leo is Regulus (*Alpha Leonis*), located near the elbow of the lion. It is a blue-white star located seventy-seven light-years from Earth, with a magnitude of 1.35. Other major stars in Leo are Denebola, magnitude 2.1, Algieba, magnitude 2, and Zosma, magnitude 2.6.



VIRGO GALAXY CLUSTER

