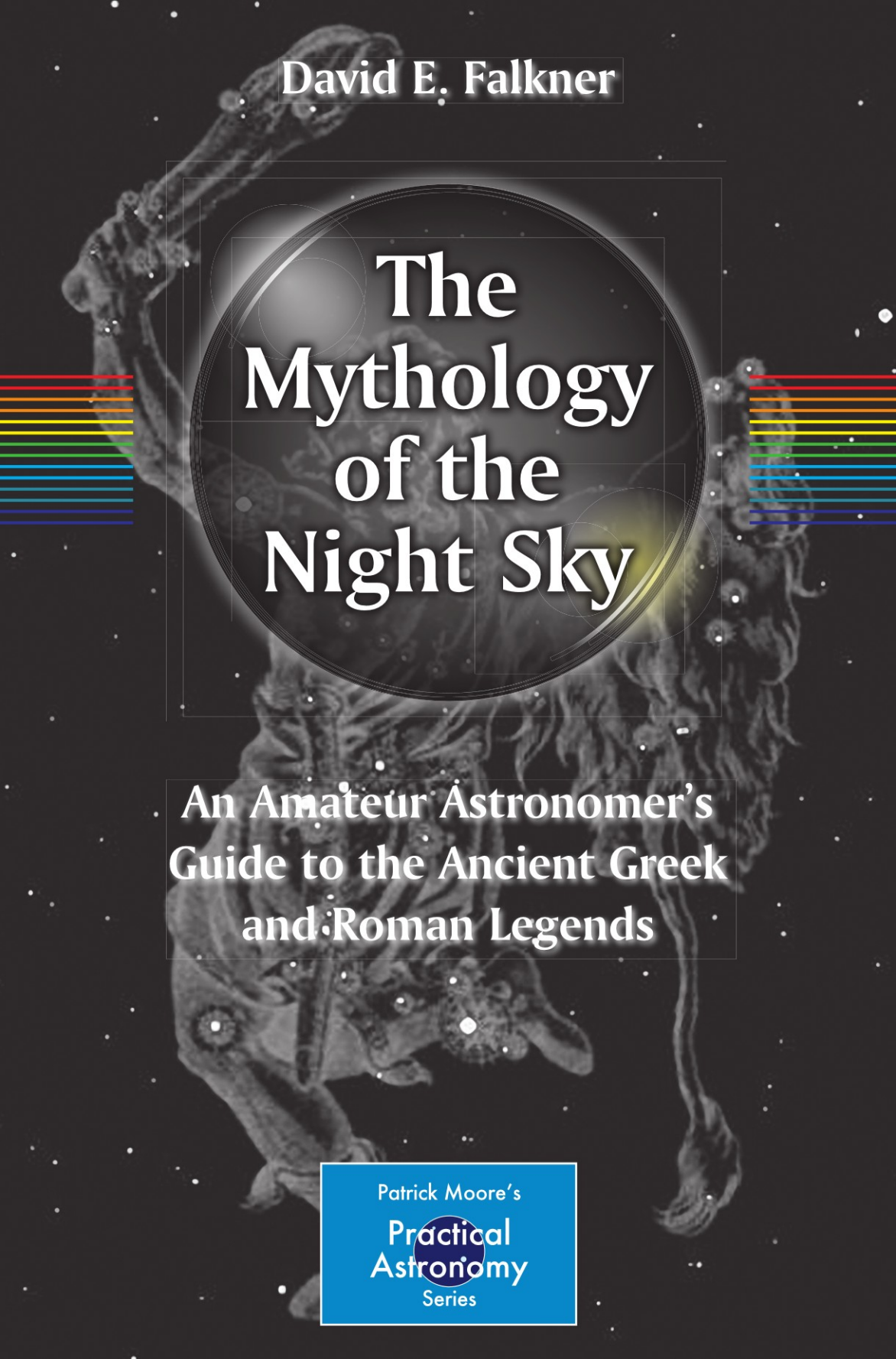
David E. Falkner



The Mythology of the Night Sky

An Amateur Astronomer's Guide to the Ancient Greek and Roman Legends

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Springer

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Blaine, MN, USA

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This book is dedicated to my wife, Kathy, who showed love, patience and support throughout this project. I also want to thank my children and my brothers and sister who were very encouraging. I would also like to dedicate this book to my daughter Julie and my brother Bob, who have passed before us but I'm sure are giving their support in ways I do not understand.

Preface

If you have ever found yourself in an area far away from the bright city lights you have experienced what it must have been like for the people of ancient cultures. It is a moving experience to go out on a clear, moonless night and look up at the stars. Ancient astronomers watched the stars and grouped them into the constellations and other patterns called asterisms that we know today. Many are familiar, such as the Big Dipper in the northern sky. In winter Orion the Hunter is easily identified by the four bright stars that form a box for his body and his distinctive three-star belt.

For as long as humans have roamed Earth, people have gazed at the heavens on clear nights and wondered at the bright points of light. Surely there was some reason for their being there? As humankind became more civilized and began to study and record their observations of the sky, people realized that there a was certain predictability to the starry sky.

This book is about the 48 constellations named by the first-century astronomer Ptolemy, as well as the Solar System planets and their moons. The constellations, planets, and most of the planetary satellites were named for characters and objects associated with Roman mythology, which was derived from ancient Greek mythology. Since we are talking about gazing at constellations in the sky it seemed like it might be fun to talk about how someone with a point-and-shoot digital camera can be introduced to the world of astrophotography by taking pictures of constellations. So this book begins with a chapter on astrophotography using a simple digital camera and processing software typically included with such a camera. Included are a few pictures at the end of the chapter I took with my camera.

Before delving into the details of the constellations and their mythology I thought it would be helpful to devote a chapter on the origins of Greek and Roman mythology. The dozens of characters and numerous stories depicted in the constellations and Solar System can be quite confusing. We will try to provide some context and order for you to reference while enjoying the characters and stories.

The next several chapters talk about the constellations by season. In discussing the constellations we first look at the placement of the constellation in the sky. If it happens that this constellation was chosen as an astrophotography opportunity I include the picture and talk about my experience with that. Next, the constellation is discussed in some detail, starting with a star chart that includes the names of major stars and deep sky objects that can be seen with amateur telescopes with apertures of 6″ or more in a reasonably dark sky location. Included is a table with any named stars in the constellation and their translation as well as a table of Messier objects in the constellation. A complete list of Messier objects is contained in Appendix C. Although New General Catalog/Index Catalog (NGC/IC) objects that are brighter than magnitude 10 are also shown on the star charts only a few of the brighter and better-known ones are discussed with the constellation. All of the NGC/IC objects on the charts are listed in Appendix D.

Finally, this book is about the Roman and Greek mythological stories that are the basis for ancient astronomers naming a pattern of stars after a person, animal, or object. This book is different from most in that instead of giving just a one or two sentence synopsis the entire story is told. In doing so the hope is that you will not only have an enjoyable read but gain a better understanding of why the person, animal, or object deserved a place of immortality in the heavens.

Most of the stories are told as part of the constellation description. However, there are three legends that have a number of constellations associated with them – Jason and the Argonauts, Hercules, and Perseus. These legends have separate chapters and are told in their entirety as one story identifying the constellations as they are found throughout the myth.

This book is not intended to be a study in Greco-Roman mythology although, out of necessity, we will delve into it at some length. As you are reading this mythology you should keep in mind that these stories were passed down by word of mouth for many generations. Additionally, there were over 30 Greek and Roman authors who recorded these stories. The result is that the same story may have several different versions. The main plot is usually consistent, but the details can vary quite a bit. Since the purpose of this book is to show how a character, animal, or object became immortalized in the heavens the story or combination of stories that best illustrates this is provided. You may have heard other versions that are just as valid as told by a different Greek or Roman author. Nevertheless, we hope this book will provide you with as much knowledge and entertainment as it has given the author. Even the non-astronomer should find the stories entertaining.

Blaine, MN David E. Falkner

About the Author

David Falkner first became interested in astronomy as a pre-teen when his father took him to a show at the Holcolm Planetarium in Indianapolis, IN. He became hooked and has loved astronomy ever since. When he was a teenager he inherited a homemade Newtonian telescope that needed the primary mirror. He ground a 6 mirror and completed his first telescope, which gave him years of pleasure observing the heavens. In 1973 he joined the US Navy and became an officer in 1980. In 1986 as a Naval Officer stationed in Monterey, California, he became involved with the Friends of MIRA (Monterey Institute for Research in Astronomy) where he conducted outreach to local schools associated with the return of Halley's Comet. He retired from the navy in 1993 and settled in Minnesota, where he continues his love of astronomy and serves as president of the Minnesota Astronomical Society.

Contents

Chapter 1

Astrophotography Using a Compact Digital Camera

Before we talk about taking pictures with a compact digital camera a little history on the evolution of astrophotography is in order.

Many people wonder when they look at a galaxy or a nebula through a telescope, even a sizable one, why they don't see the incredible color and detail that is shown in photographs. Before the camera was invented astronomers had to be content with looking through their eyepieces and drawing what they saw. Light from distant objects is captured by the telescope and focused through the eyepiece to the retina of the eye. But the image was processed immediately by our brain. Staring at an object might glean a little more detail, but the real challenge was gathering more light. The bigger the "light bucket" the more light could be focused on the retina of the eye. The use of filters to enhance certain wavelengths of light would also improve contrast and bring out more detail.

The advent of the camera and photographic film was the first revolution in capturing images. Now the astronomer could focus the image onto to the film and accumulate light over time instead of processing it immediately, like the human eye. This resulted in much more detail being brought out. Moreover, if the astronomer was careful the film didn't have to be exposed all at once. The film could be exposed several times over a period of nights if necessary to capture the image. This also provided the opportunity to expose the film using various filters to enhance certain features.

When color film was made available then any color given by the object could be captured as well, although even today many photographs of deep sky objects are artificially color-enhanced by filters to bring out the features.

For the amateur astronomer photographing the sky could be an expensive proposition. The equipment of choice was the SLR (Single Lens Reflex) camera because

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of its features. The "SLR" part of the camera meant you are aiming the camera by actually sighting through the main lens. Lenses are interchangeable, and higher power telephoto lenses were available. Telescope makers even made special adapters for attaching SLR camera bodies to the eyepiece focuser, making the telescope a huge "telephoto lens."

In addition to the expense of the equipment were the film and its processing. Astrophotography might take a number of attempts before the desired picture was obtained. There was additional expense is getting the film processed. Some amateurs could curb the expense of processing black and white photos by having their own dark rooms. Still, there was the expense of the chemicals and equipment to do processing. Only those amateurs with a serious interest in astrophotography would devote the time and money required for producing photographs.

Then came digital photography. Digital cameras have three distinct advantages over film photography:

1. Pictures can be viewed immediately and erased if not wanted.
2. Pictures can be printed one at a time instead of having to print the whole roll.
3. Memory cards can used over and over again.

Here's how a digital camera works. The film is replaced with four primary electronic devices: the imaging array, the analog to digital converter, the digital storage processor. and the storage device. The **imaging array** consists of areas, called "pixels" that record the intensity of light shining on it as an electronic charge. Pixels can be designed so that they are sensitive to red, green, or blue light. The imaging array is considered an analog device since the amount of charge will vary depending on the intensity of light it was exposed to.

After the picture is taken this array of charges is sent to an **analog to digital converter (ADC)**, which converts the analog charges into binary sequences, thus creating the digital image.

These binary sequences are sent to the **digital storage processor**, which formats the data and moves it into the **storage device**. From there it can be viewed on the camera's display, transferred to a computer, or the camera can in most cases be attached directly to a printer and the image printed out. Figure 1.1 shows a diagram of this system.

The size and sharpness of a picture is dependent on the number of pixels. The more pixels the larger the displayed or printed picture can be. Reducing the size of a picture will usually increase sharpness, also called resolution. As you enlarge pictures, though, the resolution degrades, and the picture can become "grainy." The resolution degradation is reduced as the number of pixels increases.

As a result cameras have evolved from the early 1 megapixel (one million pixels) variety up to the those that have a 10 megapixel array. Digital Single Lens Reflex (DSLR) cameras have all the features of their film counterparts, but they are still a little pricey. You can purchase a compact digital camera of the "point-and-shoot" variety and produce pictures of excellent quality for half the cost of the DSLR.

The Compact Digital Camera has a lot of capability even though it lacks the flexibility of the DSLR. You can't change lenses. You can't attach filters to it.

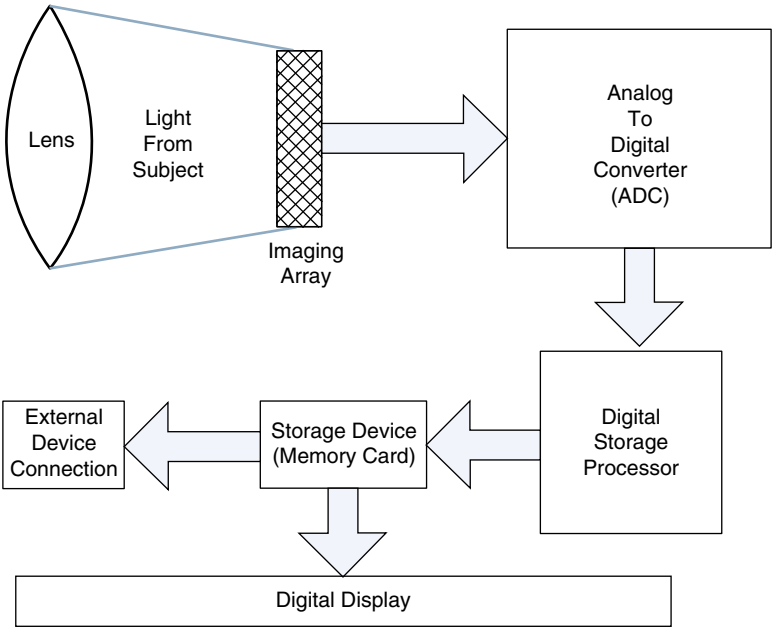

Fig. 1.1 Block diagram of a digital camera

Taking photographs through a telescope is difficult. Nevertheless, with the right features and knowledge of how to program it manually, as well as good picture processing computer software, some amount of astrophotography can be done. The night sky photographs in this book were taken by the author with a Canon PowerShot SD880 IS camera (Fig. 1.2). For successful night sky pictures it is essential that your compact digital camera is able to be programmed manually and have certain features.

The camera body needs to have the threaded fitting on the bottom to allow attachment to a tripod. Shop around and purchase a sturdy tripod. Vibrations will ruin your shot. Although new tripods can cost upwards of $60, try shopping at thrift stores or online to find them much cheaper. The camera MUST be able to take a timed exposure, meaning that the camera must allow the shutter to remain open continuously for a period of time. My camera allows me to have the shutter open for up to 15 s. Some cameras have the capability of being hooked up to a computer via a USB cable and the shutter can be controlled from the computer. Unless you are photographing star trails longer exposures will require some means of having the camera track the apparent movement of the sky to obtain sharp pictures. The sky doesn't move appreciably in 15 s so a stationary tripod worked well for me.

Next, the camera's ISO setting should go to at least ISO 1600. ISO is an international standard for a camera's sensitivity to light. The higher the ISO number the more sensitive the camera is to light. Almost all cameras will go to ISO 400, but for

Fig. 1.2 The Canon PowerShot SD880 IS

taking pictures of the night sky you need a camera with greater sensitivity. You can compensate for a lower ISO by keeping the shutter open longer, but if your camera doesn't have the capability of going to ISO 1600 it probably doesn't have the capability of allowing the shutter to remain open for long periods of time, either.

If your camera allows you to set your f-stop manually that's great, too. The f-stop determines how much light is allowed to pass through the lens and hit the image array. It also determines how much of the field is in focus. Lower f-stop figures mean more light is hitting the array. F-stops can generally go to about F2 (mine bottoms out at F2.8). The camera I have sets the F-stop automatically based on the ISO and the built-in light meter. Despite this limitation I have been able to get some great pictures.

There are other features that most cameras have in the Program or Manual mode. You should confirm that your camera has these and that they can be controlled manually:

- The flash can be turned off.
- Ability to zoom both optically and digitally (mine starts at 1× [5 mm], has a 4× [20 mm] optical zoom and up to 16× digital zoom).
- Setting the focus at infinity or at least distant objects.
- Setting the shutter release delay – most cameras allow up to 10 s. You need to set it to 3 or 4 s to allow the camera to stop vibrating after you release the shutter unless you are able to release the shutter remotely.
- Ability to set the time of review on the camera's display.

Using the display for framing your picture of the night sky can be problematic. When I was lining up the picture my display would only show objects that were magnitude 0 or brighter. I was literally shooting in the dark! Once the picture was taken and displayed I could see where the camera was centered. If the shot only showed for a couple of seconds that didn't afford me enough time to study the shot and re-aim the camera. I would need to press the button to review the picture and then press it again to go back to camera mode, re-aim the camera, and try again. Each time I press the button I risked moving the camera so it could be off before I could even re-aim. By setting the review at 10 s I was able to study the picture and adjust the tripod to re-aim the camera for the next shot without touching the camera until I released the shutter. This worked very well. One word of warning if you are planning a taking pictures at a star party. Make sure you tape red film over the display screen, as it is very bright, especially at a dark sky site.

If your camera only has a short exposure time then having software that will allow you to enhance your picture is a must. My camera came with software that allowed me to do just that. With night sky pictures one way to bring out the stars is to increase the contrast, especially if you plan to print out the picture. I found that my pictures looked fine on the computer screen but were difficult to see when printed out. Increasing the contrast helped immensely.

Technology moves quickly and as this book goes to print I learned of the Panasonic Lumix TZ7 mid-range digital camera, which has a "starry sky" setting. It allows the user to take an exposure up to 60 s then immediately takes a black frame exposure. Black frame exposures are used to detect "hot pixels," which are pixels that are illuminated by noise or have just gone bad. The camera can then subtract out the pixels to provide a better picture.

Another technique for enhancing pictures is called "stacking." Start by taking several identical pictures, preferably on a tracking mount to avoid star trails. Using special software the pictures can then be superimposed, or stacked, to get a combined shot that will bring out better details. Black frames should also be stacked and added to the original to enhance the photograph. Although image stacking is included with most retail image processing software there are a number of good "freeware" programs available over the Internet.

Shown are some pictures I took with my Canon PowerShot. The first one is the constellation Cassiopeia. I was at a dark sky site when I took this picture. I had the camera on a tripod and took a 15-s exposure with an ISO of 1600 and F/5.6. I took an initial picture with no zoom so I could adjust the camera and center the constellation. Then I zoomed in to 14 mm, which is about 3× on my camera (Fig. 1.3).

Zooming in on a constellation helps bring out its stars. But even pictures of larger star fields come out well. Note the picture of the Summer Triangle with Vega located near the top and right of center, Deneb a little lower and left of center, and Altair near the bottom and right of center. Looking closer you can see the parallelogram of Lyra below Vega, the Northern Cross extending to the right of Deneb, and the little constellation of Delphinus, which is visible at the bottom center of the picture. This picture was taken at a dark sky site with a 15 s exposure, ISO 1600, f/2.8, and no zoom (5 mm F.L.) (Fig. 1.4).

Fig. 1.3 Cassiopeia – 15 s exposure at f/5.6, ISO 1600, 14 mm F.L.

Fig. 1.4 Summer Triangle – 15 s exposure, f/2.6, ISO 1600, F.L. 5 mm

Fig. 1.5 Close-up of Lyra – 15 s, f/5.8, ISO 1600, and 16× digital zoom

Zooming to maximum on a star field creates some distortion. In the close-up picture of Lyra here the primary stars are clearly visible, but Vega is a disk when normally at this magnification stars would still be pinpoints (Fig. 1.5).

The last picture in this section is of Orion. This picture is significant because the southern sky had significant light pollution from a large metropolitan area. Nevertheless Orion is clearly visible in this picture as is the Winter Triangle with Sirius at the bottom center, Pollux near the lower left edge, and Betelgeuse in Orion. This was also a 15 s exposure at f/5.6, ISO 1600, and no zoom (5 mm).

It should be noted that while these pictures may not seem particularly spectacular on paper these same photos on a computer screen look a lot better, especially considering the camera that took them. For example, it's difficult to see the haziness around the stars in Orion's sword that mark the Great Orion Nebula. However, on a computer this is clearly visible (Fig. 1.6).

There are a few additional such pictures throughout this book and all were taken with this same camera. So grab your compact digital camera, go out to a dark sky, and take some shots. Your first attempt at astrophotography will be undoubtedly be fun and the pictures surprisingly good.

Fig. 1.6 Orion and the Winter Triangle – 15 s, f/5.6, ISO 1600, F.L. 5 mm

Chapter 2

An Introduction to Greco-Roman Mythology

The Night Sky and Ancient Cultures

The sky we see at night has changed very little since the time of the ancient Greeks and Romans. It was easy for them to see that the stars moved through the night from east to west just as the Sun did. If you went out at the same time every night you would notice that there was a larger movement that progressed slowly from east to west over days, weeks and months. Yet, if you went out at 9 o'clock on the evening of March 7 every year, the same pattern of stars would greet you. It is this regularity in the stars that allowed the ancients to use them for predicting when to plant crops, when to harvest, when to expect colder weather, and when the warmth of spring was close at hand.

Uniformity about the night sky led ancient cultures to create images from star patterns. The stars never changed their position with respect to each other. So by grouping certain stars together in a particular pattern they created "animals," "people," and "things" in the heavens. These constellations were a part of every great civilization. Records of constellations can be found in the writings of the Egyptians, Japanese, Chinese, Babylonians, Incas, Aztecs, native American tribes, and – of course – the ancient Greeks and Romans.

In addition to the stars there were other celestial bodies that often had significance. The Moon and the Sun were worshipped. Meteors were known as shooting stars but were seen more as an atmospheric phenomenon like lightning. Comets would appear in the heavens and would often be seen as bad omens. Then there were the "wanderers," the planets. They looked like stars but would change position in the star field. They would be named after the gods.

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Today we recognize the constellations founded by the ancient Greeks and Romans. The legends and stories of Greek and Roman mythology were passed by word of mouth for generations before they were written down. In order to help them remember the stories, the Greeks and Romans would identify star groups they felt looked like a person, animal, or object of a legend, and then tell the story that explained how they were immortalized in the heavens. Ptolemy, a Greek astronomer who lived around 130 A. D., finally recorded 48 constellations that represented characters, animals, and items associated with ancient Greek and Roman mythology. These constellations, as well as the stories about how they came to be in the heavens, are both interesting and entertaining. This book takes you through the skies of the four seasons and points out the constellations of mythology and the stories of their creation.

Greek or Roman?

The ancient Greeks originated the stories during the period of history lasting roughly from 1100 B. C. to the death of Alexander the Great in 323 B. C. Roman conquests were growing by this time, and by 146 B. C. Greece was part of the Roman Empire. Although the Romans embraced the stories of ancient Greece the gods and key characters took on Roman (Latin) names. The 48 constellations identified in this book were originally named by the Greek astronomer Ptolemy in the first century.

Although the constellations may have had Greek names originally, it was the Latin names of the constellations that were passed on to modern day. Likewise, the planets have retained their Latin names.

Most of us who have had literature and ancient history classes can remember studying some ancient mythology. We remember that most of the time those stories used the Greek names for gods and heroes such as Zeus, Hera, Poseidon, Heracles, and so on. However, when you move to the heavens these characters are referred to by their Roman counterparts – Jupiter, Juno, Neptune, Hercules, and so forth. So it was a bit of a dilemma to decide whether to relate stories using the more familiar Greek names or using names that are more familiar in an astronomical sense. Since the book is primarily an astronomy text we will use the Roman or Latin names when making mythological references. It's interesting to note that not all of the names in mythology were converted to Latin. Mortal characters, animals, and objects retained their original Greek names in Roman mythology.

The Creation of the World

Roman mythology is a soap opera with a myriad of characters and all the elements that make for great and lasting stories – love, hate, jealousy, deceit, corruption, lust, war, incest, murder, punishment, and reward to name a few attributes. Keeping track of who's who can be as confusing as modern day soap operas.

To assist the reader in sorting out these relationships we are going to review some Roman god genealogy. Part and parcel to that, however, is the story of the creation of the world, which involves the creatures that preceded the familiar Roman gods and goddesses of Olympus fame.

The Roman Olympian gods didn't just materialize out of thin air. They were the children of the Titans, whom the gods would later overthrow to gain control of the world. The Titans were the children of the deities that created the world and all that is around it. The story of creation is rather bizarre since it involves beings created from seeming nothingness, others born without sexual relations and incestuous relations, which perhaps is inevitable in the beginning.

First, there was Chaos. This Chaos did not represent random disorder; rather Chaos was a great, dark abyss, a black void that stretched to infinity. Today Chaos would be considered the universe before the Big Bang.

From this nothingness came black-winged Night and Erebus, where death dwells. Then something marvelous happens. Night plants an egg in Erebus and, after a period of time, from death and darkness gold-winged Love is born. With Love came Light with its companion, Day.

Next, again from nothingness, Terra (Earth) appears, and she creates for herself Uranus (the Heavens) to surround her, along with Mountains and Seas. The 12 children of Terra and Uranus were the race of divinities known at the Titans. The male Titans were Oceanus, Hyperion, Coeus, Saturn, Crius, and Iapetus. The female Titans were Moneta, Tethys, Thea, Phoebe, Ops, and Themis.

The Titans were huge monsters. Uranus attempted to hide them from Terra by throwing them into a deep cave presumably so he could continue to have uninterrupted intercourse with Terra. The Titans eventually found the courage to rebel. As Uranus was spreading himself onto Terra for yet another act of intercourse the Titan Saturn emerged from the cave and cut off Uranus's genitals. The drops of blood from this event sprang up to become yet another race of monsters known as the Giants, as well as the Furies and the Nymphs.

The separation of Terra and Uranus allowed the Titans to emerge from hiding and wield their power to rule the world. Saturn was their leader and lord of the universe. By his side was Ops, his sister-queen of the universe. The children of the Titans are the more familiar gods of mythology. They eventually banded together and overthrew the Titans to become the rulers of the universe.

These gods became known as the Olympians, for the Greeks believed that Mt. Olympus, the tallest mountain in Greece, had the gods' home atop it. In later writings, however, Olympus became this place even higher than the mountains, above the clouds. There were 12 major Olympians who succeeded the Titans. These were Jupiter, Juno, Mercury, Venus, Mars, Neptune, Apollo, Diana, Minerva, Ceres, Liber, and Vulcan. The children of these gods as well as the lesser gods of Olympus, along with the offspring from the unions of gods and mortals, produced most of the characters we find in the mythological stories, constellations, planets, and satellites.

Astronomical Family Trees

The stories associated with the constellations, planets, and satellites in this book will include a brief narrative on the genealogy of the character. However, a picture or diagram really helps to identify where the character fits in the overall scheme of Roman mythological genealogy. The next few pages will diagram the Roman mythology family tree as it relates to characters found in the night sky. The complete family tree of Roman mythology would be massive and confusing, which is why we have confined the family trees to those related to characters in the sky. Significant characters, such as names of constellations or planets, will be boldfaced and underlined for easier identification. In some cases the constellation depicting the character will be in parentheses under the name.

Figure 2.1 shows the genealogy of the gods of Creation and the Primeval gods. Since the Primeval gods begat the Titans, Fig. 2.2 has the genealogy of the Titans. The Titans begat the Olympian gods, so Fig. 2.3 shows the genealogy of the Olympian gods.

Jupiter was a very promiscuous and persuasive god, and it stands to reason that many of the characters were the direct result of his amorous adventures. Figure 2.4 shows those celestial characters that had Jupiter in their lineage. Finally, several of the characters were the result of unions between gods, mortals, and nymphs. These can be found in Fig. 2.5.

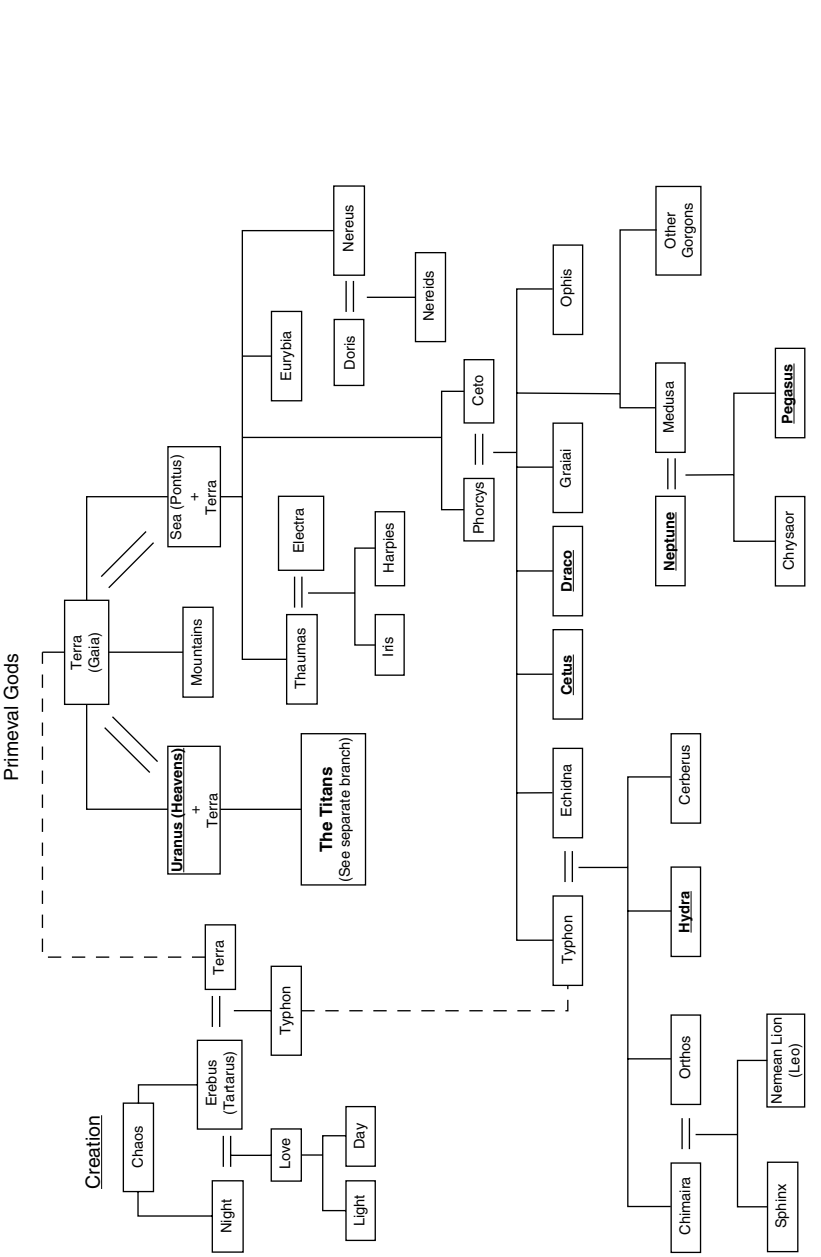

Fig. 2.1 Genealogy of the primeval gods

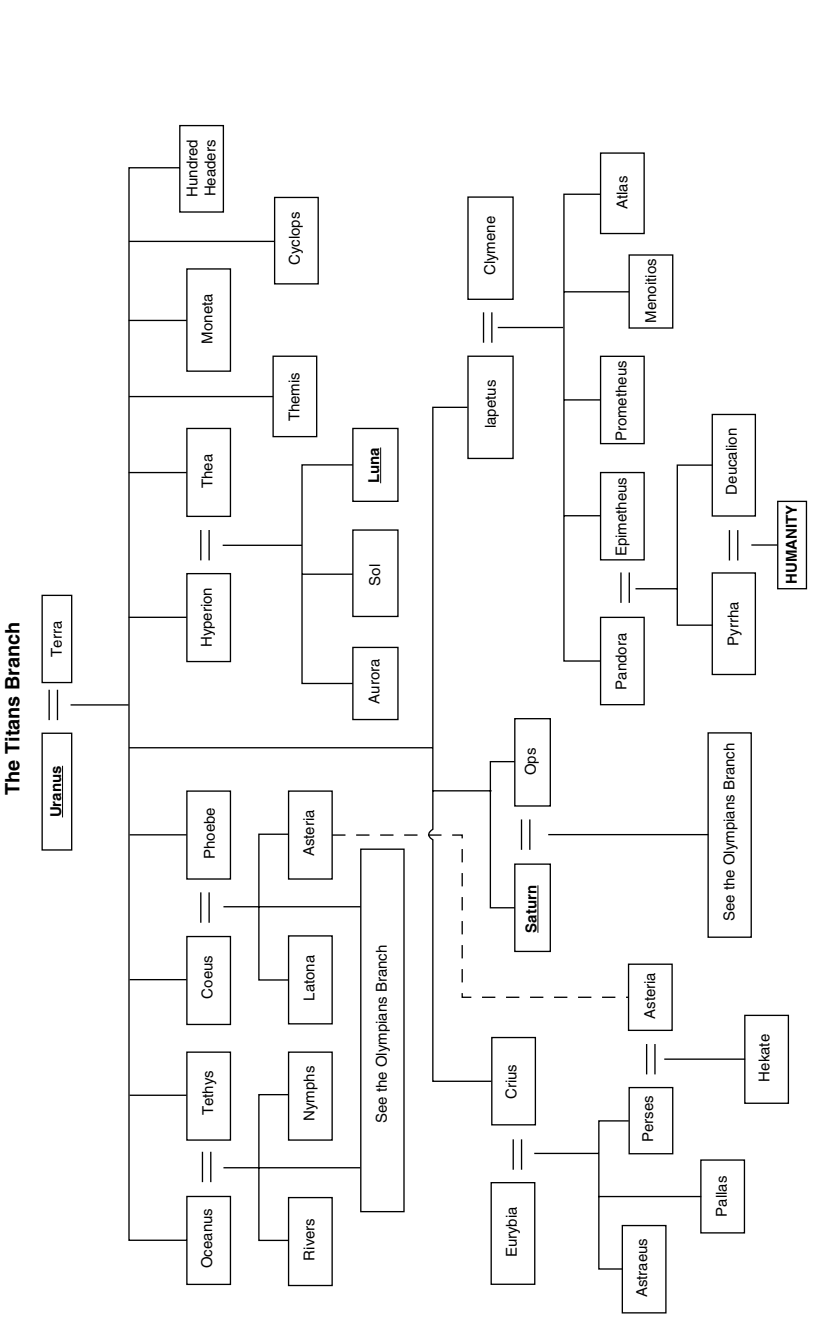

Fig. 2.2 Genealogy of the Titans

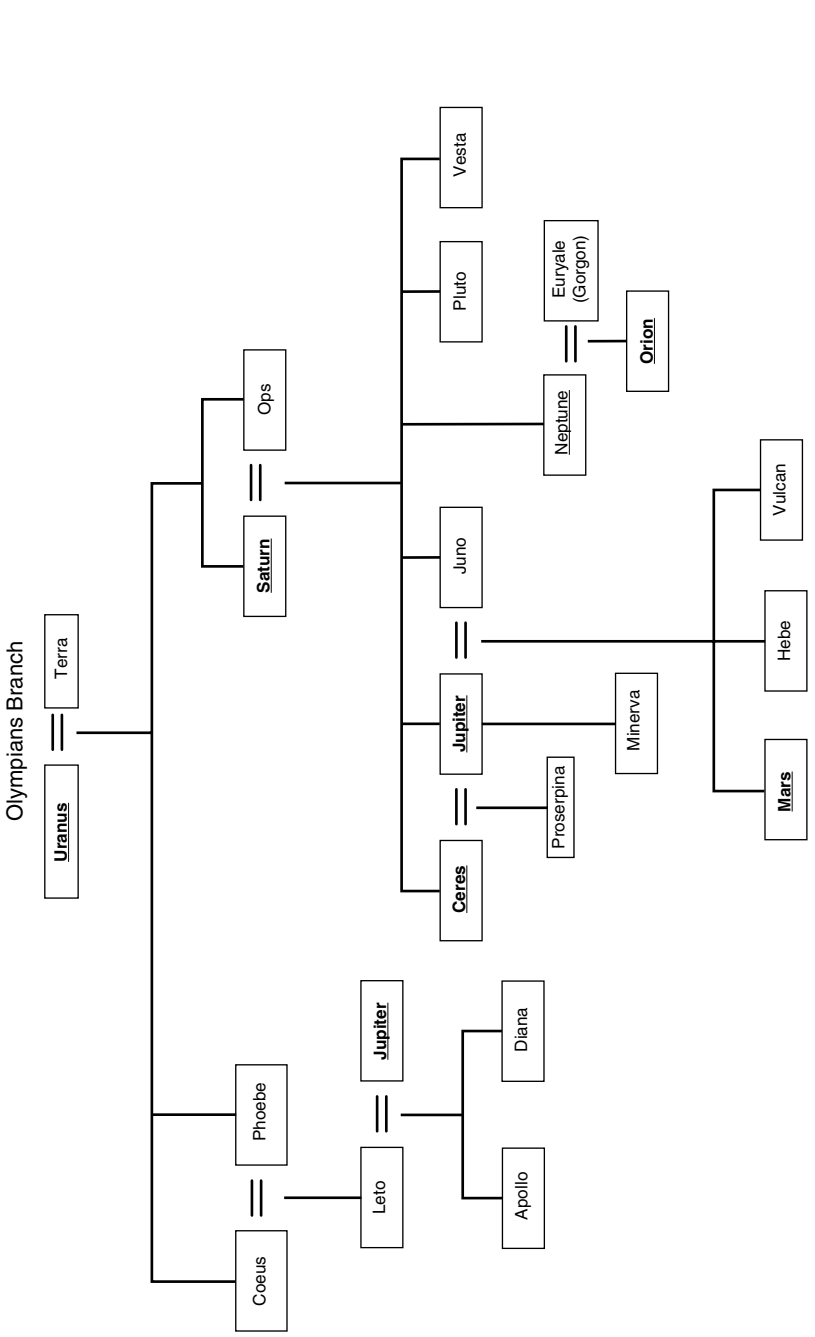

Fig. 2.3 Genealogy of the Olympian gods

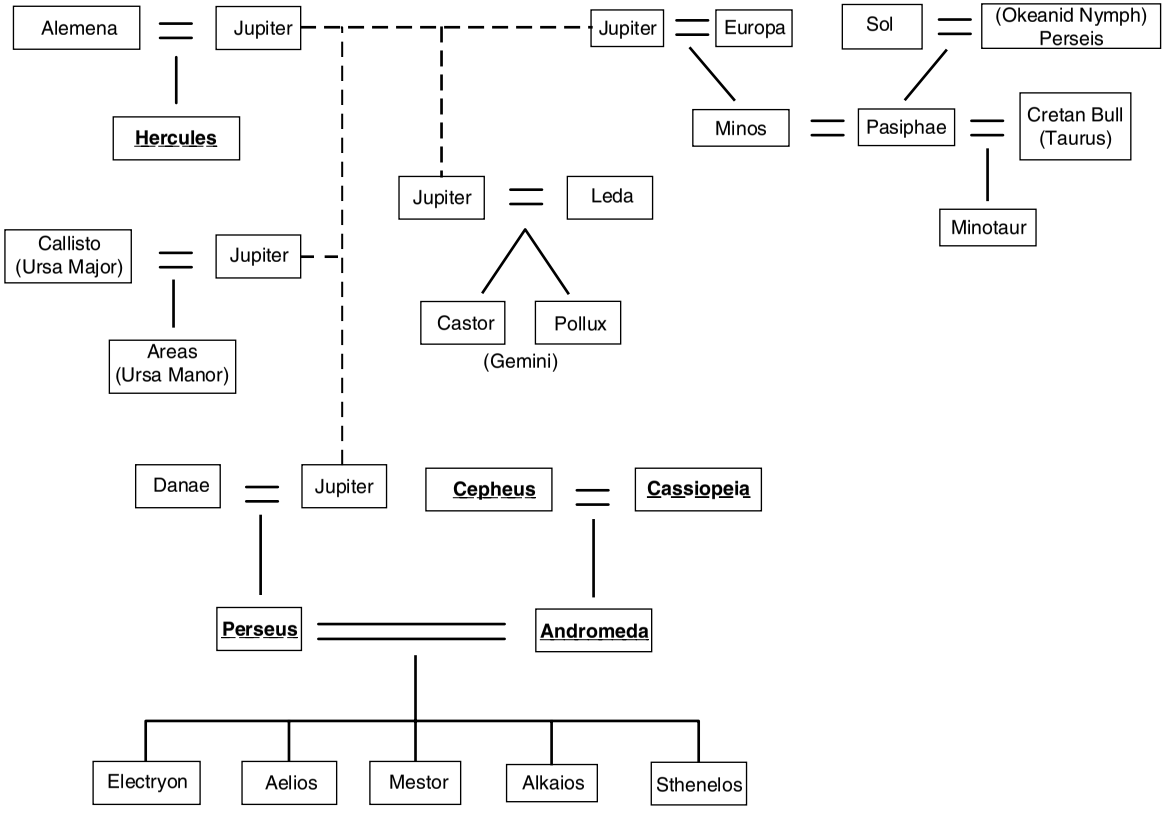

Fig. 2.4 Characters fathered by Jupiter

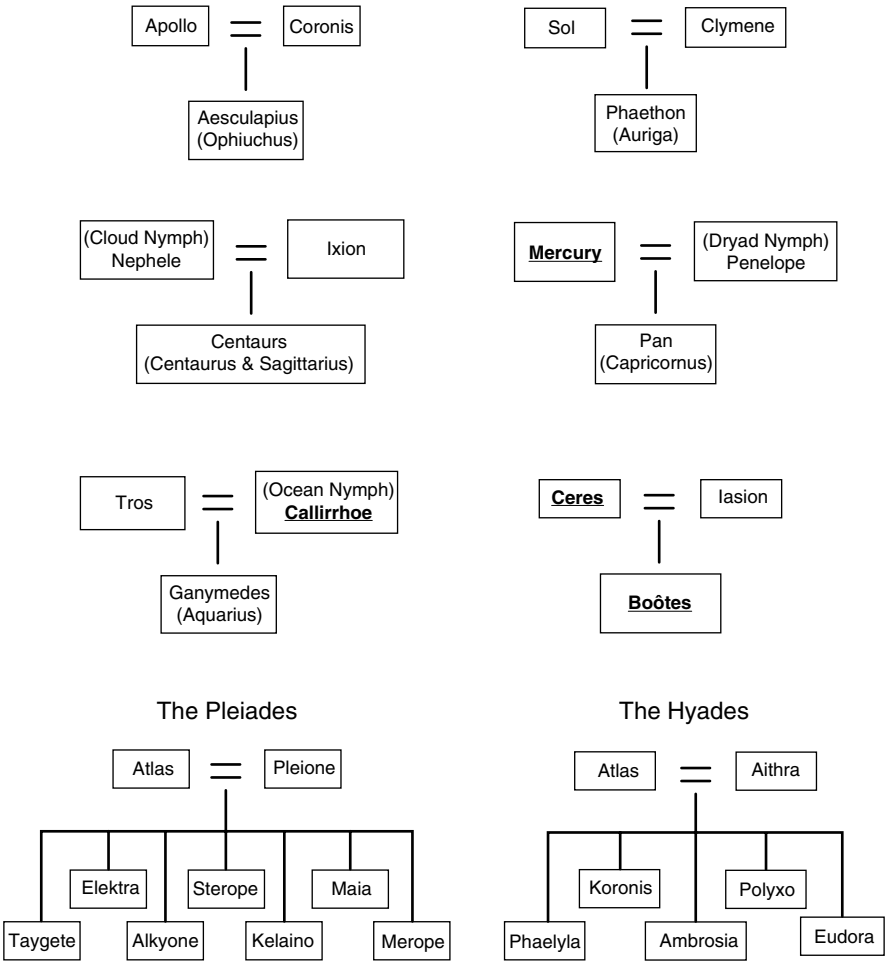

Fig. 2.5 Genealogy of other constellation characters

Chapter 3

The Winter Constellations

The clear, crisp evenings of winter often provide for excellent seeing conditions. The colder air doesn't have the capacity to hold water vapor, which means the atmosphere is more transparent on moonless nights and appears quite dark. Coupled with the dark skies are some of the brightest stars of any season, and the combination provides the star gazer with breathtaking views. Or maybe it's just the freezing cold temperatures! Be sure to dress in layers to keep warm. You will enjoy winter star gazing more if you participate with an organized star party that may have viewing areas with a warming house complete with red lights to preserve night vision. If you are using a telescope or binoculars you may need to invest in dew heaters for your eyepiece, finder scope, and secondary mirror to keep these items from frosting up. Of course, you could pack up your gear and head south to warmer climates to do star gazing!

The winter constellations provide some wonderful stories, so let's take a look at these constellations and the ancient Roman stories they depict.

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Orion – The Hunter

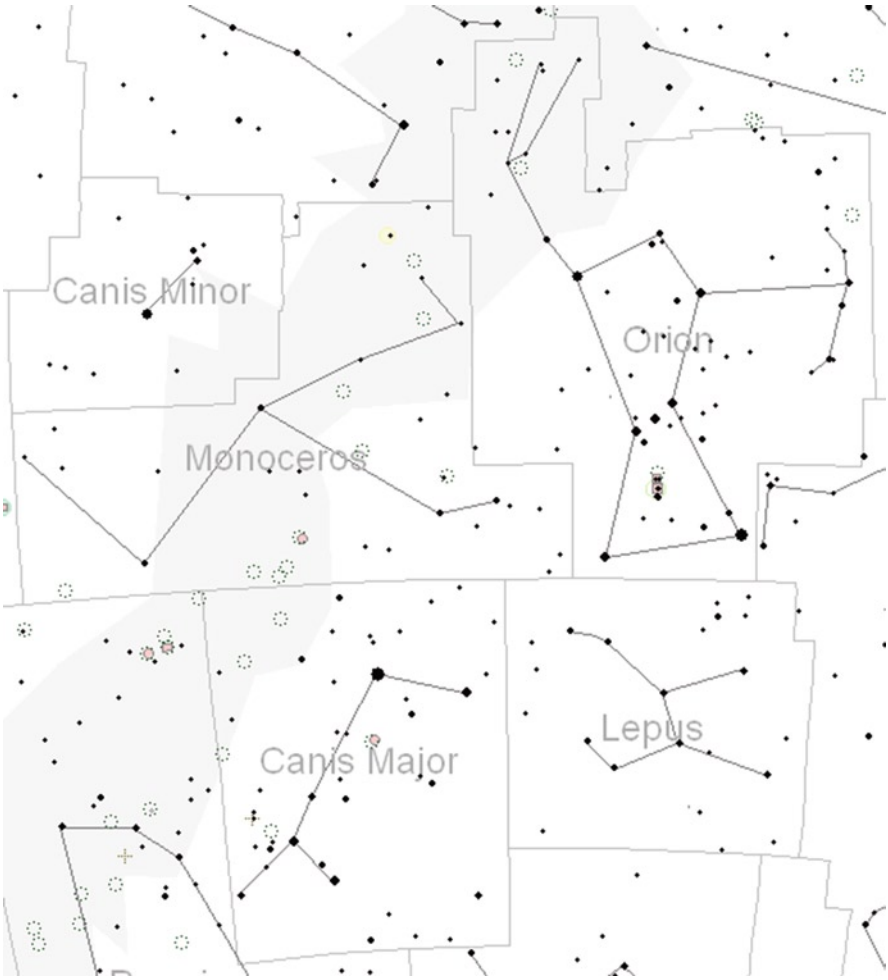

Fig. 3.1 Star chart of Orion (courtesy Starry Night Education)

The constellations associated with the legend include Orion (The Hunter), Canis Major (The Great Dog), Canis Minor (The Lesser Dog) and Lepus (The Hare). Monoceros, while included in the modern-day star chart in Fig. 3.1, was not a member of Ptolemy's original 48 constellations. Scorpius (The Scorpion) is also a

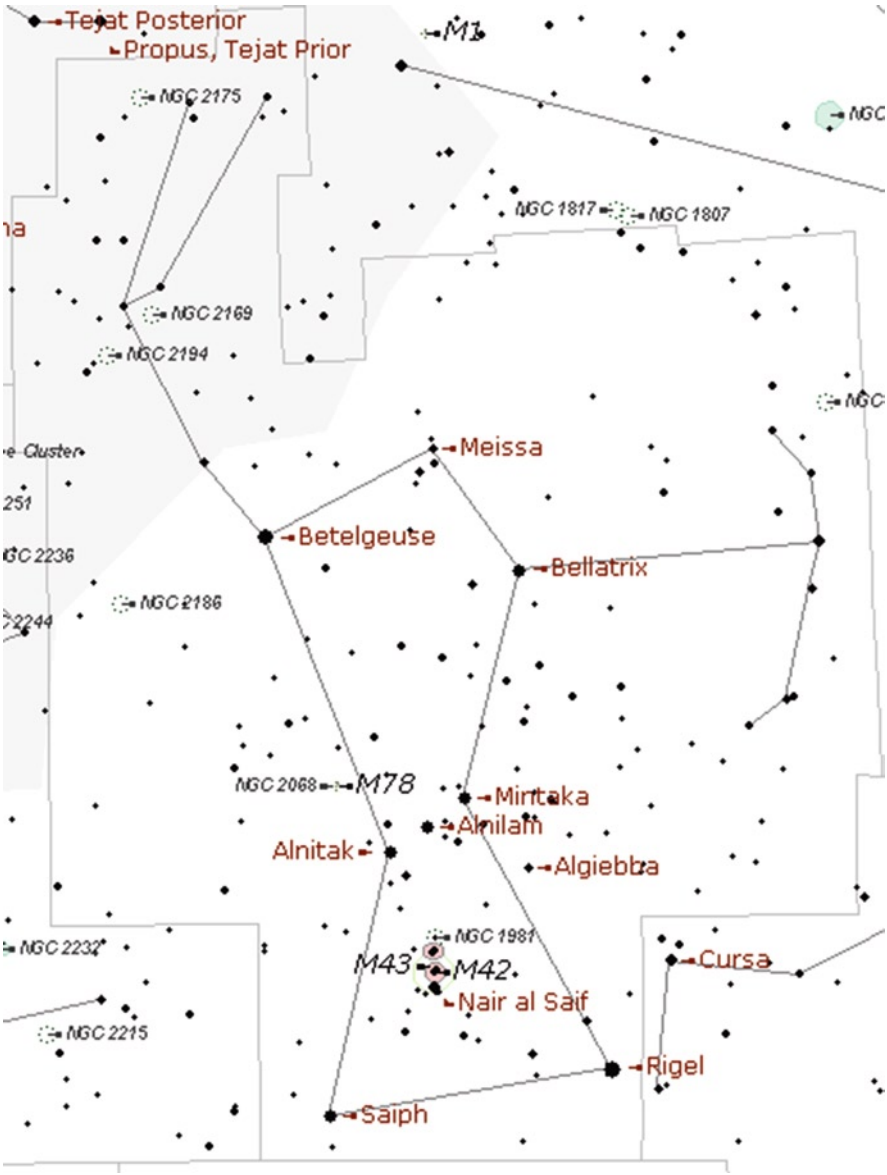

Fig. 3.2 The constellations of the legend of Orion (courtesy Starry Night Education)

part of the legend. That may seem odd, but its location in the summer sky will become apparent when you read the legend.

Named Stars of Orion

Bayer designation	Mag.	Common name	Translation
ALPHA	0.43	Betelgeuse	"Hand of Al-Jazwa"
BETA	0.15	Rigel	"Foot" (west)
GAMMA	1.62	Bellatrix	"Warrioress" (west shoulder)
DELTA	2.25	Mintaka	"Belt" (west end)
EPSILON	1.68	Alnilam	"Arrangement" (of pearls; middle of belt)
ZETA	1.71	Alnitak	"Belt" (east end)
IOTA	2.75	Na'ir al Saif	"Bright one of the sword" (tip)
KAPPA	2.06	Saiph	"Sword"
LAMBDA	3.37	Meissa	"Shining" (Orion's head)

Messier Objects in Orion

Messier	Mag.	Name	Type
42	4.0	The Great Orion Nebula	Bright nebula
43	9.0	de Mairan's Nebula – part of Orion Nebula	Bright nebula
78	8.3		Bright nebula

By far the most prominent constellation in the winter sky – and in fact the entire sky – is Orion, the mighty hunter shown in Fig. 3.2. The star pattern of this constellation has been depicted as a hunter or warrior by most ancient civilizations. The four stars that make up his shoulders and feet along with the three stars of his belt are conspicuous in the southern sky along the celestial equator. The red giant Betelgeuse marks Orion's right shoulder and also marks one of the points of the Winter Triangle asterism (along with Sirius and Procyon). Betelgeuse is an irregular variable star and is occasionally brighter than Rigel. Normally, however, it is the second brightest star in Orion despite its designation as Alpha Orionis.

A group of stars extending above Betelgeuse and forming a "V" at the top is Orion wielding his sword. Bellatrix marks Orion's left shoulder. Apparently this star was once part of a different constellation and hence its unmanly name. To the west of Bellatrix is an arc of stars that depicts Orion holding his shield. Some depictions of Orion actually show him shooting an arrow with this arc of stars being the bow. This is supported by the fact the Betelgeuse means "hand of Al-Jazwa" and is located where a hand would be when drawing back the bow. Between Betelgeuse and Bellatrix and slightly above them is Meissa, a much fainter star marking Orion's head.

At the lower end of Orion lies the blue giant Rigel, designated as Beta Orionis although it is normally the brightest star in the constellation. The blue giant Saiph

marks Orion's right foot. The distinctive three stars of Orion's belt from the viewer's left to right are Alnitak, Alnilam, and Mintaka. All are blue or blue-white giants and Mintaka is actually a multiple-star system. Below Alnitak lie several more stars that form a sword sheath. The end star of this line is Na'ir al Saif and marks the tip of his sword. It is an eclipsing binary of two blue stars.

Orion is a hotbed of star formation and has one of the largest and brightest nebulae in the sky. Not surprising, the three Messier objects in Orion are all nebulae. M78 is a diffuse reflection nebula that is part of the Orion nebula complex. It is located north of Alniatak about a sixth of the way to Betelgeuse. M42 is the "Great Orion Nebula" located among the stars of Orion's sword. At fourth magnitude the "haziness" of the stars can be seen by the naked eye, and the nebula is greatly enhanced by using binoculars or a telescope. Located next to M42 but divided by a dark dust lane is M43, which is also part of the Orion Nebula complex.

There are a number of NGC objects in Orion as well. More information on these objects can be found in Appendix D of this book.

Canis Major – The Great Dog

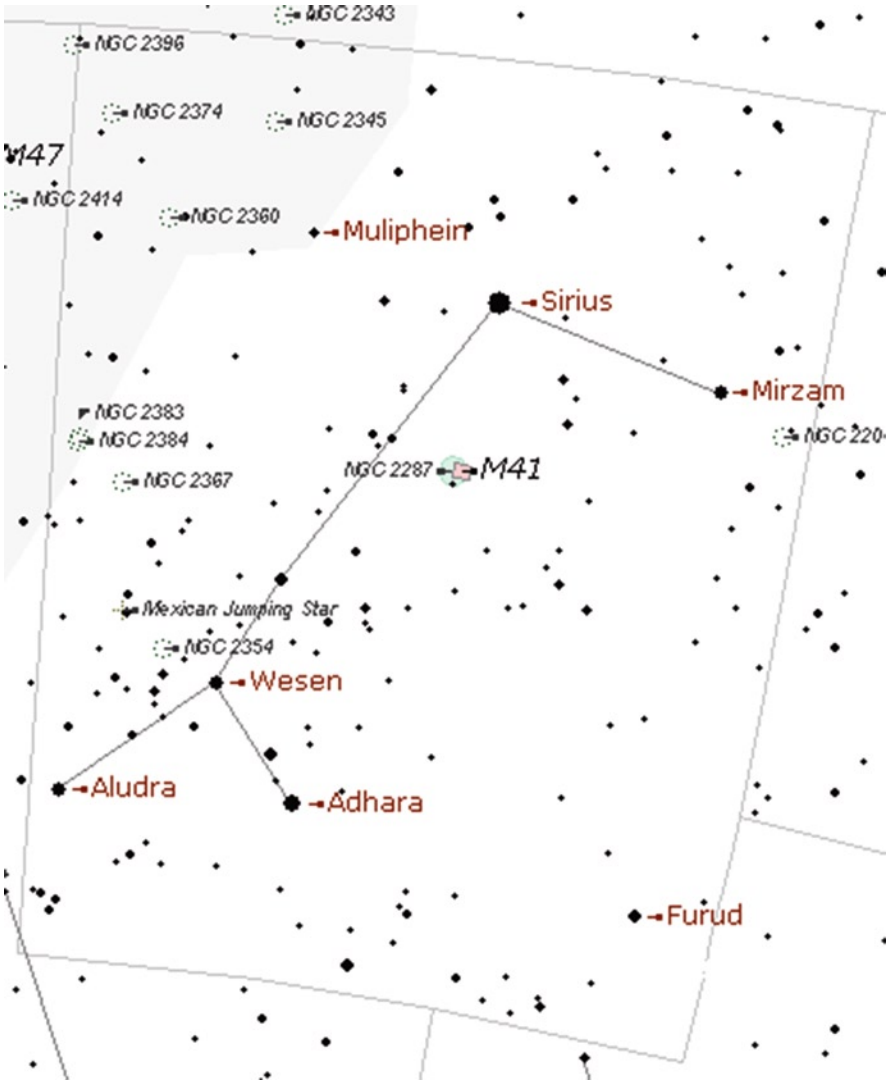

Fig. 3.3 Star chart of Canis Major (courtesy Starry Night Education)

Named Stars of Canis Major

Bayer designation	Mag.	Common name	Translation
ALPHA	−1.47	Sirius	"Scorching"
BETA	1.96	Mirzam	"The herald"
GAMMA	4.09	Muliphein	"The two causing dispute and the swearing of an oath"
DELTA	1.81	Wesen	"Weight"
EPSILON	1.50	Adhara	"Midens"
ZETA	3.00	Furud	"Solitary ones"
ETA	2.43	Aludra	"Maidenhood"

Messier Objects in Canis Major

Messier	Mag.	Name	Type
41	4.6		Open cluster

Canis Major, one of Orion's two hunting dogs, is located southeast of Orion. Canis Major, depicted in Fig. 3.3, appears to be standing on his tail with his feet pointing west. Its bright star, Sirius (magnitude –1.47) is about twice as luminous as our Sun and is located only 8.6 light-years away. As a result it is the brightest star in the night sky. Since it is located in Canis Major Sirius is often called "The Dog Star" although the actual translation is "scorching." This refers to the ancient Greeks' belief that the presence of Sirius in the sky with the Sun, which occurs during the summer months, heralded a hot dry summer, which would scorch crops. It also marks one of the three points of the Winter Triangle asterism, along with Procyon and Betelgeuse.

Since most of the names used for stars in the sky are Arabic in origin they often do not have translations that coincide with the constellation itself. Mirsam, a variable blue-white giant, likely received its name because it rises just before Sirius. Muliphein, another blue-white giant, gives no indication of how its name was derived. The remainder of the named stars appear to have some ancient significance regarding maidens. Adhara and Aludra are clearly related to maidens. Furud appears to be away from the others and hence its lonely name.

Finally, you will see a reference on the star chart to the Mexican Jumping Star. NGC 2362 is an open cluster with a bright foreground star, Tau CMa. Apparently under windy conditions when telescopic images can "jiggle" Tau CMa will appear to move in a different direction than the background stars of NGC 2362. Although the phenomenon is likely caused by the retinal persistence of the brighter star the perception is that it is "jumping" around!

There is only one Messier object in Canis Major, M41, an open cluster. The Milky Way runs through part of this constellation as indicated by the shaded area in the star chart. As a result there are a number of NGC objects listed under CMa in Appendix D of this book.

Canis Minor – The Little Dog

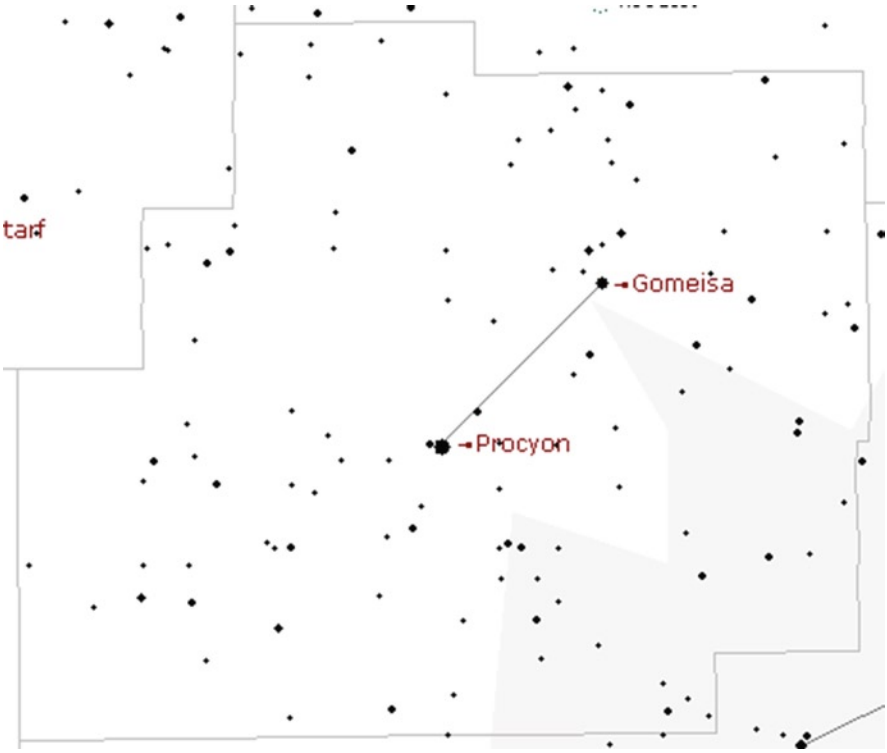

Fig. 3.4 Star chart of Canis Minor (courtesy Starry Night Education)

Named Stars of Canis Minor

Bayer designation	Mag.	Common name	Translation
ALPHA	0.34	Procyon	"Before the dog"
BETA	2.87	Gomeisa	"The bleary eyed"

Messier Objects in Canis Minor

Messier	Mag.	Name	Type
50	6.3		Open cluster

Figure 3.4 shows Canis Minor, a relatively small constellation east of Orion's right arm. Procyon marks the dog's head, while Gomeisa marks its hind quarters. Procyon's location in the sky farther to the north causes it to rise before Sirius in Canis Major, hence its Greek name meaning "before the dog." It is actually a double star consisting of a white main sequence star and a white dwarf. As noted earlier, it is also one of the vertices of the Winter Triangle asterism along with Sirius and Betelgeuse. Gomeisa comes from the Arabic and has no canine significance. It is a main sequence star about four times the size of our Sun.

Lepus – The Hare

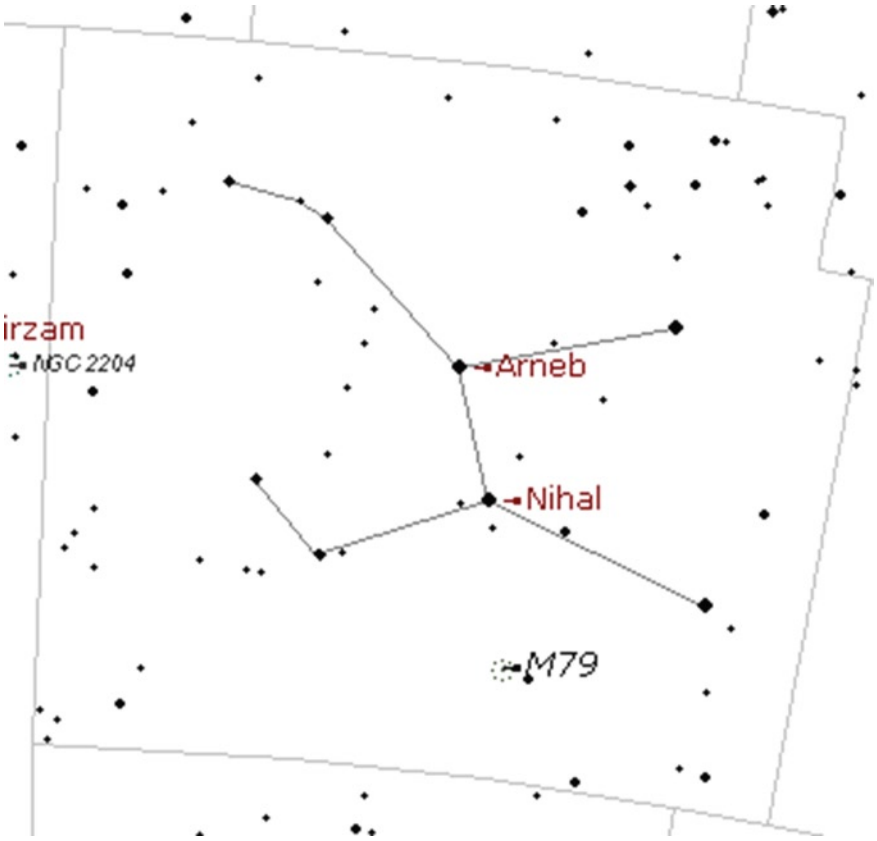

Fig. 3.5 Star chart of Lepus (courtesy Starry Night Education)

Named Stars of Lepus

Bayer designation	Mag.	Common name	Translation
ALPHA	2.56	Arneb	"Hare"
BETA	2.78	Nihal	"Camels quenching their thirst"

Messier Objects in Lepus

Messier	Mag.	Name	Type
79	7.7	None	Globular cluster

Directly below Orion is the rather insignificant constellation of Lepus, the Hare, being pursued by Orion and his dogs. The constellation, shown in Fig. 3.5, is without the hare's rear legs, with Arneb and Nihal marking the location where the ears join the head. The ears are extended to the west, and the head and upper body of the hare are toward the east.

Arneb, an older star in the latter stages of stellar evolution, is appropriately named. Nihal, on the other hand, shows its Arabic roots, but the name is clearly not related to the constellation. It is a G-type giant star.

Scorpius – The Scorpion

The Description

As mentioned in the introduction to this section this constellation is a part of the legend. It is a summer constellation, though, and the description of Scorpius can be found in the summer constellations chapter of this book.

The Legend

Orion was a giant of a man. The son of the sea god, Neptune, and the Gorgon, Euryane, he grew up having the ability to wade in the oceans without sinking. He became an accomplished and mighty hunter and walked about with his shield and sword prominently displayed.

One day during his travels Orion arrived on Chios, an island located in the eastern Aegean Sea and ruled by King Oenopion. Oenopion was a very proud and possessive man. He had a beautiful daughter, Merope, who the king loved dearly. When Orion met Merope he was taken with her beauty. Orion decided to remain on

Chios so he could get to know Merope better. Soon Merope was all Orion could think of, and he fell in love with her. He knew he had found the one he wanted to spend the rest of his life with.

He went to King Oenopion and asked for her hand in marriage. Oenopion was very upset about this request for he did not want to lose Merope. He had to devise some plan to discourage Orion without angering him, for Orion could easily kill the king with his bare hands. Oenopion devised a clever plan. He refused to give Merope's hand until Orion had completed a task to prove his sincerity. Orion was to rid the island of all the dangerous wild beasts. It was a worthy task for the great hunter. Oenopion thought the task could never be accomplished and Orion would never marry his daughter.

Day after day Orion would set out and every evening he would return with numerous pelts and skins. He finally rid the island of all the dangerous wild beasts and approached Oenopion again. Oenopion claimed all the beasts were not yet caught and refused Orion again. Orion finally realized Oenopion really didn't want to give up his daughter. He was angry and frustrated that Oenopion would come between him and the woman he loved. One night Orion drank too much wine and in his drunken, impaired state he decided that he would have Merope despite Oenopion. He burst into Merope's room, forced the love of his life down, and amid her pleas to stop Orion raped Merope.

Upon hearing of this, the king was furious. He wanted revenge for this brutal act against his daughter, but he knew he couldn't fight Orion outright. He devised a plan to get Orion drunk, and while he was in a drunken stupor, the king had Orion's eyes gouged out and had him dumped on the seashore.

Orion traveled out on the ocean and eventually found his way to Lemnos. Orion had heard in a prophecy that if he journeyed to the east and faced the sunrise he could regain his sight. He petitioned the god Vulcan to help him recover his sight. Vulcan lent his assistant Kedalion, who guided Orion to the eastern end of Earth where the Sun rose. Orion faced east and waited for the sunrise. There the goddess of the morning, Aurora, fell in love with Orion while the glowing rays of the sunrise from her brother Sol, the Sun, restored Orion's vision.

Orion stayed with Aurora for a while, but his desire to gain revenge on Oenopion raged within him. He left the east and Aurora and traveled back to Chios. The king, learning of Orion's return, hid from him. Orion could not find Oenopion. He thought the king might have traveled to Crete to seek refuge with his grandfather, King Minos. Orion set sail for Crete, and when he arrived he met Diana, the Moon goddess and patroness of the hunt. Diana was a beautiful deity and was just as keen a hunter as Orion. In him she found someone worthy of her love. Together Orion and Diana hunted and their time together was so delightful that Orion soon forgot about Merope and his vengeful quest for King Oenopion.

However, Diana was so smitten with Orion that soon she forgot her duties as goddess of the Moon. Diana let weeks pass without once carrying the Moon across the sky. It wasn't long before this got the attention of Apollo, chariot driver for the Sun and Diana's brother. Apollo tried to argue with her about her negligence. She wouldn't listen, so Apollo conceived a plan to get rid of Orion.

One day, while Diana was away, Apollo convinced the Earth goddess to send a giant scorpion to challenge Orion. Ordinarily Mother Earth would question why a god would want such a challenge for a mortal. But she had once heard Orion claim that there was no beast that he couldn't slay. She felt that was an arrogant claim for a mortal so she agreed to send the scorpion and Orion accepted the challenge. He was so vain about his abilities that he thought the scorpion would be easy prey, but the scorpion was created by the gods and Orion was half mortal. The battle between the scorpion and Orion raged on and on. Orion grew more and more tired and eventually had to run for his life. He ran to the shore, waded into the water, and wandered far out to sea. From shore he appeared as a mere speck and Apollo quickly took advantage of the situation.

Diana arrived on the scene and Apollo brought her attention to the speck far out on the sea. He told her that although she was a fine hunter, even her abilities were limited. He dared her to try to hit the speck on the sea with her arrow. Diana fitted the arrow and carefully aimed her silver bow. She drew the string back its full reach and let go of the arrow, which soared out to sea. Her aim was perfect and the arrow pierced Orion's head, killing him instantly. When Orion's body washed ashore the horrified Diana realized what she had done. Weeping bitterly, she took Orion's body to Aesculapius, the doctor, and begged him to bring Orion back to life. But Jupiter would not allow that to happen and sent a thunderbolt that destroyed Orion.

The distraught Diana finally accepted that Orion was gone, but pleaded with Jupiter to bring back her lover and allow him to rest among the stars. He agreed to this and placed Orion with his hunting dogs in the heavens, forever pursuing their prey, the hare. Jupiter also realized that it was Orion's vanity about battling with the scorpion which eventually led to his death, so – in spiteful tribute – Jupiter also placed the scorpion in the sky so that it would have equal place with Orion. Jupiter was considerate, however, and placed the scorpion in the summer sky, opposite Orion, so the two would never be seen at the same time.

Taurus – The Bull

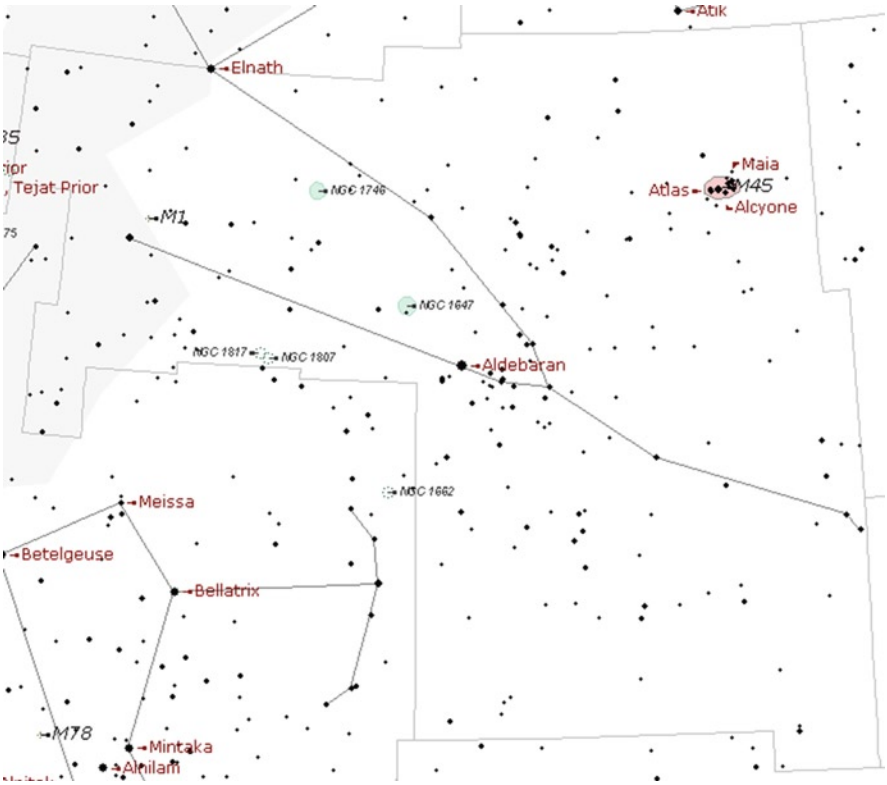

Fig. 3.6 Star chart of Taurus (courtesy Starry Night Education)

Named Stars of Taurus

Bayer designation	Mag.	Common name	Translation
ALPHA	0.85	Aldebaran	"Follower" (of the Pleiades), Bull's Eye
BETA	1.62	Elnath	"The butting" (horn)

Messier Objects in Taurus

Messier	Mag.	Name	Type
1	8.4	The Crab Nebula	Bright nebula
45	1.6	The Pleiades	Open cluster

The Description

Taurus lies above and to the right of Orion in Fig. 3.6. The large red star, Aldebaran, marks the eye of the bull. It is easily found by using the stars of Orion's belt from east to west and following that line to Aldebaran. Directly below Aldebaran lies an open star cluster known as the Hyades (which has its own legend). Extending from Aldebaran to the east is a V-shape of stars that form the horns. At the tip of the northern horn is El Nath, a main sequence star that shares a corner of the constellation Auriga. To the west of Aldebaran lies another open cluster of stars in a dipper shape known as the Pleiades (M45 and the source of another legend told later). The Pleiades form the shoulder of the bull. The rest of the bull is missing.

M1 is the well-known Crab Nebula. It is the remnant of a supernova that was observed and documented by Chinese astronomers. The supernova first appeared on July 4, 1054, and brightened to magnitude −6, four times brighter than Venus. It was actually visible in daylight for 23 days and remained visible to the naked eye for 653 days. It is now a magnitude 8 nebula, which makes it a bit challenging for smaller telescopes. Use of an Oxygen III filter improves the contrast, making it much easier to see.

The Legend of Europa and the White Bull

This story begins with Europa, daughter of Agenor and Telephassa who ruled Sidon. She was a beautiful woman, a virgin, who would go to a secluded meadow by the sea with other virgins to gather flowers. Jupiter was very taken with her beauty and used to watch her from his home in the heavens, but he dared not approach her. He was afraid that Juno, his queen, would inflict something terrible on Europa in a fit of jealously. One day, while Juno was away, Venus, the goddess of beauty and love, and her mischievous son Cupid, decided to intervene. Venus had Cupid shoot one of his arrows through Jupiter's heart, and he instantly became overwhelmed with love for the beautiful Europa. He had to have her.

Europa and the other girls were by the seashore gathering flowers and placing them in their hand baskets. Europa's basket was particularly ornate and rather ironically, made of gold with figures that showed the story of Io – how she was changed into a cow and doomed to wander Earth watched by the hundred-eyed Argus. Argus was eventually killed, and Jupiter touched her with his hand and changed her back into a woman.

In order to get close to Europa, Jupiter needed to be careful. If Juno were to find out Europa could suffer a similar fate to Io. He decided to take the form of a white bull and joined a herd of cattle that was grazing near the seashore where the girls were gathering their flowers. The herd gradually wandered closer to where the girls were picking their flowers. They noticed the particularly handsome white bull and were charmed by its gentle nature. They were petting and stroking him and noticed his fragrance was like that of the flowers they had just picked.

He gradually wandered over toward Europa. Despite his size she was not afraid. She stroked his head and played with him. Eventually he lay down as if inviting the girls to climb on his back. The other virgins coaxed Europa into climbing on his back, but she would only do it if the others would also climb on. Before the others could join her the bull jumped up and ran out to sea.

He didn't swim, but ran across the water. The sea nymphs and Neptune himself came up to join them. Europa was understandably frightened and amazed at the sights she was seeing. With one hand she hung on for dear life to the bull's horn while gathering up her dress with the other hand to keep it dry. Europa realized that this clearly was no ordinary bull but a god. She pleaded with the bull not to leave her in some desolate place. At that, Jupiter revealed who he was and assured her that all he had done was out of love for her. He took her to a secret hideaway on Crete where his mother had hidden him from Saturn when he was born. Here Jupiter and Europa would be lovers and she would bear him three sons: Sarpedon, Minos, and Rhadamanthus. Minos and Rhandamanthus would become famous in their own right as upholders of justice on Earth and were made judges of the dead.

The Legend of the Cretan Bull

Taurus also represents the Cretan Bull, a story that begins with Asterios, the king of Crete, who died without any children to carry on the throne. Minos, the son of Jupiter and Europa (who ironically was carried off to Crete by Jupiter disguised as a bull), said he would like assume the throne. No one believed him worthy nor did he have any royal parentage. (Recall that Europa and Jupiter had their affair secretly so Juno would not find out.)

To prove his worthiness Minos stated that he would pray to the gods and whatever he prayed for would come true. He set up a sacrifice and prayed to Neptune for a bull to appear from the sea and upon its appearance he would sacrifice it to the god of the sea. Neptune granted the request and a beautiful white bull appeared from the waves and foam. Minos had been vindicated and he received the rule of Crete.

The bull that Neptune had sent really was quite handsome. Minos did not want to slaughter such a fine beast for a sacrifice. So instead he had the bull placed in his herd and chose another bull for the sacrifice. This was not his agreement with Neptune, who became angered by the arrogance of Minos. As punishment Neptune turned the bull wild so that it would attack anyone who approached it. Then, out of vengeful spite, Neptune placed a spell on Minos' wife, Pasiphae, making her lust after the bull. Her crazy desire for the bull could not be satisfied, since the bull could not be approached without it attacking.

It was this driving lust for the bull that drove Pasiphae to seek out Daedalus, an accomplished architect and craftsman. She begged him to help her satisfy this lust she had for the beautiful bull. Daedalus thought Pasiphae was a bit mad to want such a thing, but she was the queen and he agreed to help her. He fashioned a wooden cow on wheels, which was hollow in the middle for Pasiphae. He then skinned real cows

and covered the contraption with the hides. Pasiphae and Daedalus wheeled the "cow" out to a meadow where the bull normally grazed and placed Pasiphae inside. Soon the white bull came into the meadow and started grazing. It wasn't long before the bull noticed the "cow" and began moving toward it. Pasiphae positioned herself in the wooden cow. The white bull mated with the wooden cow as it were real and inseminated Pasiphae.

When the pregnancy came to term and Pasiphae gave birth what came out was neither man nor bull but a hideous beast with the face of a bull, the hairy body of a man and hooves for feet. It was called the Minotaur and was as wild and dangerous as his bull father. Minos decided not to kill the beast, but he had to find a way to confine it. He called upon the Oracles, who advised him that the only way to contain the beast was to place him in a huge labyrinth, so large and complicated that the Minotaur could not find his way out. So Minos pressed Daedalus to build this containment. Daedalus built a huge maze known throughout the world as the Labyrinth, with tall, thick, impenetrable hedges for walls and innumerable passages and deadends with only one way out, which was nearly impossible to find. There was a large meadow in the center where the Minotaur lived. Eventually the beast was killed by Theseus, the prince of Athens. After killing the Minotaur Theseus returned to Athens. After the tragic death of his father, King Aegeus, Theseus assumed the throne and became the king of Athens.

Before all that happened, however, Theseus actually encountered the Cretan Bull in Marathon near the city of Athens. The reader must be wondering how the Cretan Bull found its way to Marathon, since Crete is an island and bulls are not great swimmers. Hercules actually brought the bull over from Crete after subduing it as the seventh of his 12 labors (see The Legend of Hercules chapter). After presenting the bull to Eurystheus Hercules released the bull. The Cretan Bull was still quite wild, and it roamed freely until it found its way to Marathon. There it destroyed crops and killed humans for many years until the arrival of Theseus, the same one who would eventually kill the Minotaur.

Theseus was the son of Aethra and King Aegeus of Athens. King Aegeus had a brother, Pallas, who was jealous of Aegeus for being king. Pallas had 50 sons who were fierce warriors and Pallas wanted one of them to one day be king of Athens.

Before Aethra had her baby Aegeus took her to live in her hometown, the port city of Troezen. He never saw his son, for Aegeus was called to fight for his throne. Before he left he placed a pair of sandals and a sword under a great rock. He then instructed Aethra that, should the baby be a boy, she wasn't to tell him who his father was until he found the sandals and sword. Then he must come to Athens to fight at Aegeus' side.

Theseus was born in Troezen and grew up with Aethra, who never revealed to him his royal heritage. Despite his small stature Theseus learned how to fight and use his opponent's size against him. He grew brave and strong and learned wisdom and skill by observing the exploits of his grandfather, King Pittheus, and his mother. He learned much from Hercules when he visited once. Hercules told Theseus that he was destined to spend his life ridding the world of monsters and evil-doers.

It was shortly after his eighteenth birthday that Theseus was strong enough to move the rock and discover the sandals and sword that had been placed there by his father. When Theseus showed the items to Aethra she told him his father was King Aegeus. Theseus at once donned his sandals, secured the sword about his waist and set off toward Athens.

Theseus had many adventures on his way to Athens that are not recounted here. Suffice it to say however that he destroyed several evil, vicious, and sadistic men along the way just as Hercules had predicted. Upon reaching Athens he went to the palace of King Aegeus. His mother had warned him about the political turmoil with Pallas and his 50 sons, so Theseus did not reveal who he was nor did he show the sandals and sword.

In the meantime King Aegeus had taken another wife, Medea. She was the witch who befriended Jason and the Argonauts and helped them to escape from King Aeetes with the Golden Fleece (see The Legend of Jason and the Argonauts chapter in this book). After Jason and Medea parted ways she found her way to Athens and learned of King Aegeus' problems with his brother. She convinced King Aegeus that her special powers could protect him. So the king took Medea as his wife to protect him from his 50 nephews. The king was so fearful of what dangers might be set him that Medea could control him completely.

When Theseus arrived she was leery of this stranger and through her witchcraft she learned who he really was. She knew Theseus would be a threat so she warned Aegeus that this stranger, who had professed to doing many mighty deeds for the glory of Athens, might be out to kill him.

The king decided to test Theseus. He told Theseus that if he did, indeed, perform the great feats as he had said, he should travel to Marathon and bring the Cretan Bull to Athens to prove his worthiness. Theseus set off confidently to Marathon. There he battled the great bull and eventually subdued it. He dragged it back to Athens by its horns and sacrificed it to Athena at the Acropolis.

The witch-wife knew Theseus was her greatest threat and warned King Aegeus again that he was planning to murder him. That evening she prepared a cup of deadly poison to be served to Theseus.

A great celebration was held to mark the slaying of the Cretan Bull. A fine steak from the bull was prepared for the feast. Theseus, now prepared to show King Aegeus who he really was, drew his sword and carved the steak. He placed the sword on the table in plain view and took the cup prepared by the witch-wife. Aegeus recognized the sword immediately. Crying out, he leapt from his seat, and with a swipe of his hand, knocked the cup from Theseus' hand just as he was about to take a sip. The cup fell to the ground and the vile brew hissed and foamed, eating through the solid stone floor.

At this, the witch-wife grew fearful and fled from Athens, never to be seen again. King Aegeus welcomed his son and declared to all that Theseus was heir to his throne.

The Hyades – The Daughters of Atlas

Named Stars of Hyades Star Cluster

Bayer designation	Mag.	Common name	Translation
Theta2	3.40	Phaesyle	"Shining"
Episilon	3.53	Coronis	"Arched, curved"
Gamma	3.65	Ambrosia	
Delta	3.77	Eudora	"Well-gifted"
Theta1	3.84	Phaeo	"Shining"
68 Tauri	4.30	Cleeia	"Famous, illustrious"
71 Tauri	4.48	Polyxo	

The Description

The Hyades are an open star cluster located around and just to the west of Aldebaran. Although Aldebaran appears to be part of the cluster it is only an optical alignment as it is only half as far away from us as the Hyades. The primary stars in the Hyades are arranged in a "V" shape and form part of the bull's face. Because of its size the Hyades are best viewed through binoculars, which provide a nice field of view and should reveal many more stars in this beautiful cluster.

The Legend

The Hyades were the daughters of Atlas and Aethra. In Greek poetry there were originally five but later two more were added. They, with their half-sisters, the Pleiades, were the 14 "Atlantides." Also known as the "Dodonides," they were the nymphs of Dodona who were given Dionysus as a baby and entrusted by Jupiter to raise him. They had a brother, Hyas, who was a great hunter. While hunting in Libya he was killed by a wild boar. When his sisters learned of his untimely death they grieved bitterly. For their undying grief and as a reward for raising Dionysus, Jupiter set them among the stars. Also known as "the Rainy Ones" it is said that their tears fall as rain when they are near Earth (the horizon) in early May and November.

The Pleiades (M45) – The Seven Sisters

The Star Cluster

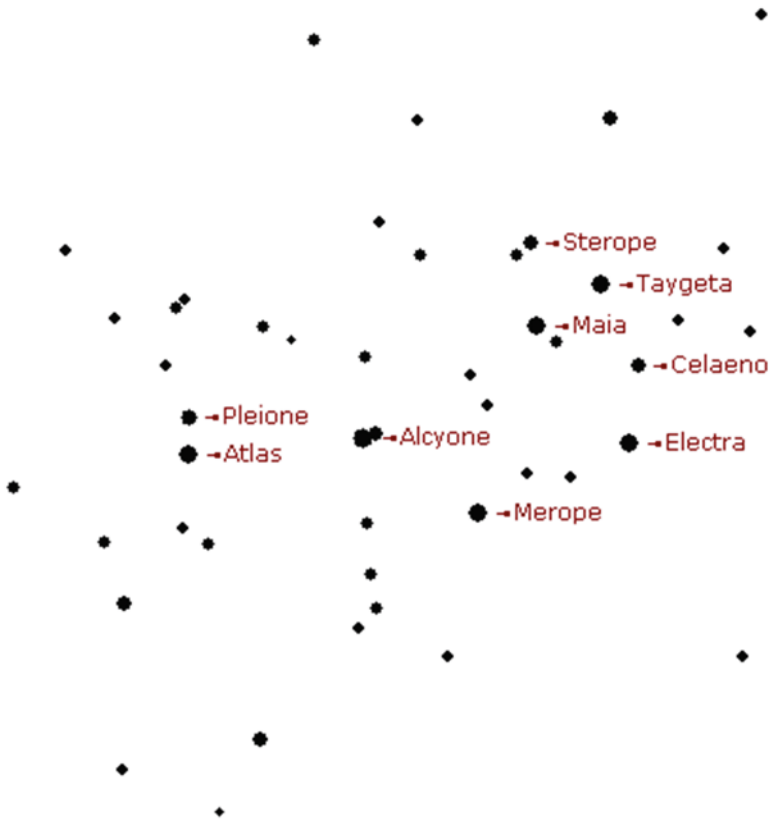

Fig. 3.7 Star chart of the Pleiades open cluster (M45) (courtesy Starry Night Education)

Named Stars of the Pleiades Star Cluster

Bayer designation	Mag.	Common name	Translation
ETA/25	2.85	Alcyone	"Queen who wards off evil [storms]"
27	3.62	Atlas	"He who dares/suffers" – Father of the Pleiades
17	3.72	Electra	"Amber/shining/bright"
20	3.87	Maia	"Grandmother/mother," "nurse," "great one"
23	4.14	Merope	"Eloquent," "bee-eater," "mortal"
PHI/19	4.30	Taygeta	"Long-necked"
28	5.05	Pleione	"Sailing queen" – Oceanid Mother of the Pleiades
16	5.45	Celaeno	"Swarthy"
21/22	5.76/6.43	Sterope (I & II)	"Lightning/twinkling/sun-face/stubborn-face"

The Description

While not strictly a constellation, the Pleiades, illustrated in Fig. 3.7, comprise a striking open star cluster visible to the naked eye. They are located at the shoulder of Taurus the Bull and appear to the naked eye as a miniature dipper. On a clear, dark night a person with good eyesight can easily see six stars, and with a little patience, seven and perhaps more. (The record is said to be 19.) The cluster takes on even greater beauty when viewed through binoculars.

The Legend

The beautiful Pleiades were the daughters of Atlas and Pleione. Their names were Merope, Alcyone, Celaeno, Electra, Taygete, Sterope, and Maia. Although there are seven sisters, only six are clearly visible in the star cluster. One story suggests that Electra is the Lost Pleiad. She hid her light in sorrow at witnessing the destruction of her father, Atlas, when he rebelled against Jupiter.

Atlas was one of the second-generation Titans. The Titans were upset about losing their power to the gods of Olympus, and Atlas led a rebellion against Jupiter and the gods. The rebellion failed, however, and Atlas was condemned to forever support the heavens on his shoulders as punishment for his deeds. The Pleiades were so distraught about this that Jupiter placed them in the heavens so that they could be close to their father for eternity.

Still another legend concerns Orion, the Hunter. Orion was smitten with the beauty of the Pleiades. He pursued the girls relentlessly but was never able to catch them. Jupiter grew tired of the pursuit and placed the Pleiades and Orion in the heavens where Orion continues to chase the Pleiades to this day. (The Pleiades are located west of Orion. As they move across the sky Orion is always following them or chasing them.)

Auriga – The Charioteer

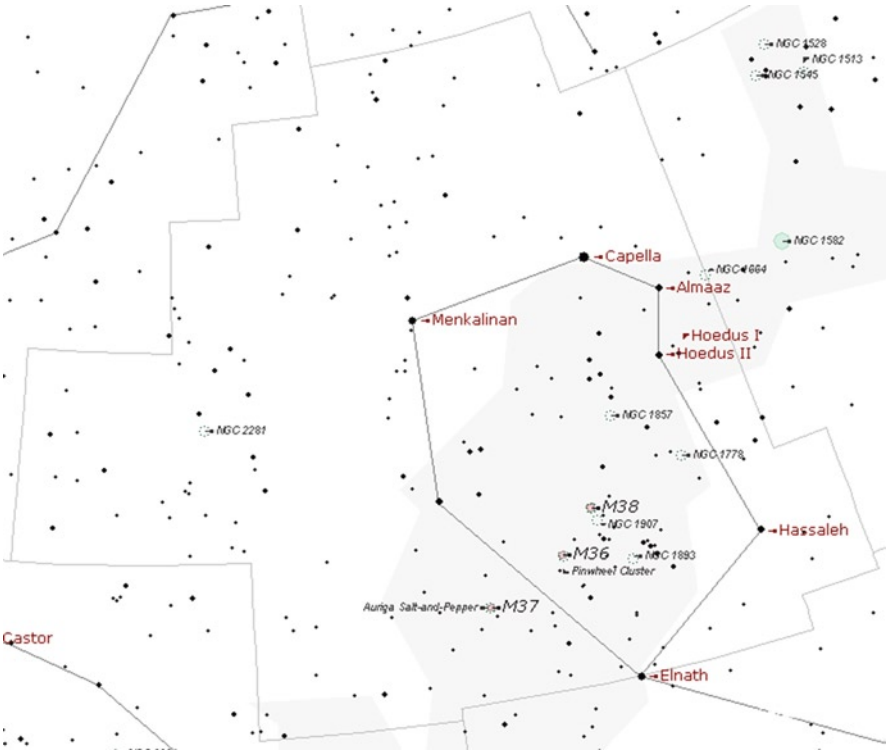

Fig. 3.8 Star chart of Auriga (courtesy Starry Night Education)

Named Stars of Auriga

Bayer designation	Mag.	Common name	Translation
ALPHA	0.08	Capella	"She-goat"
BETA	1.90	Menkalinan	"Shoulder of him of the reins" (Charioteer)
DELTA	3.72	Prijipati	"Lord of Creation" (Sanskrit/Pali)
ETA	3.18	Hoedus II	One of the "two young goats (kids)"
EPSILON	3.03	Almaaz	"He-goat"
ZETA	3.69	Hoedus I	Second of the "two young goats" (kids)
IOTA	2.69	Kabdhilinan or Hassaleh	"Anklebone of the rein-holder"

Messier Objects in Auriga

Messier	Mag.	Name	Type
36	6.3	Pinwheel Cluster	Open cluster
37	6.2	Auriga Salt & Pepper Cluster	Open cluster
38	7.4		Open cluster

The Description

This constellation shown in Fig. 3.8, although best seen in winter, can be seen much of the year from the northern latitudes. It resides high in the sky between Taurus and Gemini. In fact the tip of the right "horn" of Taurus is the star Elnath, which is shared with but not part of Auriga. The constellation is roughly pentagonal in shape with its major star, Capella, located at one of the northern points. Capella is a zero magnitude star and easy to spot even in the illuminated skies around cities.

The Charioteer is depicted as being dejected and without a chariot. He is holding broken reins in one hand. With his other hand he is holding a she-goat on his shoulder and her kids on his arm. Capella is a Roman name meaning "she-goat." Ptolemy described the star as being on the Charioteer's left shoulder and depicts the goat Amaltheia who suckled the baby Jupiter while on the isle of Crete. The goat was placed in the sky as mark of gratitude. Her two kids that she bore during this time are also with her, marked by the stars Eta and Zeta Aurigae, also known as Hoedus I and Hoedus II.

Just to the west of Capella is much fainter Almaaz, better known as Epsilon Aurigae. This is an eclipsing variable star with a period of about 27.1 years, dimming for about 1 year. Up until 2009 the mystery has been that the companion star has never been detected, either visually or spectroscopically. Only the spectrum of Epsilon Aurigae is present through the entire cycle. So what is eclipsing this star? Astronomers believe there is another star that has a disk-shaped dust cloud around it that we are observing roughly edge-on. The dust cloud masks the companion star from being seen visually or spectroscopically, but it obscures a portion of Epsilon Aurigae every 27 years. For the first time during the eclipse that started late in 2009 and ran until early 2011 astronomers had access to a host of orbiting observatories capable of observing this phenomenon across the electromagnetic spectrum from X-rays to the far infrared. Add to this the legion of amateur astronomers that participate in the American Association of Variable Star Observers (AAVSO) Citizen Sky program and there is no doubt that the mystery of Epsilon Aurigae will be solved during this cycle.

Although it's not unusual for a constellation to have three Messier objects Auriga happens to have consecutively numbered objects. M36, the Pinwheel Cluster, is located east of Hassaleh and north of Elnath (the tip of Taurus' right horn). It is fairly easy to see at magnitude 6. Its name comes from the arrangement

of the stars in the cluster, which appears like a pinwheel. However, in the same neighborhood is M38, NGC 1907, and NGC 1893, which are all open clusters. It can be challenging to distinguish these four objects. M37, Auriga Salt and Pepper Cluster, is located southwest of M36 and is the brightest of the three Messier clusters in Auriga at magnitude 5.6. There are several NCG objects in Auriga listed in Appendix D of this book. All are open clusters.

The Legend

As is often the case with constellations Auriga could represent a couple of characters from Roman mythology. According to one Greek myth, Auriga represents Vulcan (Hephaestus), the blacksmith god, who was lame and invented the chariot so as to easily travel wherever he wanted.

Auriga is also said to represent Phaethon, the son of Sol. Phaethon tricked Sol into allowing him to drive the Sun-chariot across the sky. When Phaethon lost control of the horses Jupiter was concerned about the damage a runaway Sun would do to crops and mortals. So he flung a lightning bolt at Phaethon, stiking him and ejecting him from the chariot and propelling his scorched body across the sky, eventually landing in the river Eridanus. The Milky Way marks the path that Phaethon's body took as it fell from the sky.

But the story that seems to best fit this constellation is that of Myrtilus, the charioteer of King Oenomaus of Pisa. King Oenomaus and his queen, Evarete, had a beautiful daughter named Hippodamia. Although many men asked for the hand of Hippodamia the king was hesitant. He had learned from an oracle that his death would come at the hand of the man who married his daughter. To prevent any man from winning his daughter's hand Oenomaus devised a contest to test each man who came calling.

King Oenomaus was the son of Mars. In his stables he had fine, swift horses given to him by the god of war. Controlling a four-horse chariot with these fine steeds required an experienced hand. Myrtilus was the son of Mercury and was the finest charioteer around. King Oenomaus ensured that only Myrtilus drove his chariot, which was the fastest in the land.

Myrtilus was enamored by the beauty of Hippodamia and secretly loved her. He never expressed this love for fear of the king, but he would have done anything to ensure her happiness.

The contest that King Oenomaus devised for the suitors of Hippodamia was a chariot race from his land to the Isthmus of Corinth. If the challenger won the race then he could have Hippodamia's hand in marriage. However, if King Oenomaus won he would slay the man. Each man would have their four-horse chariot and take Hippodamia with them. Oenomaus and Myrtilus would take the king's chariot.

One by one 13 men lost their lives in this contest and each of their heads was nailed to a house. Then a man by the name of Pelops arrived and asked for her hand. When King Oenomaus challenged him to the chariot race he accepted. When he saw the heads of those who came before him he began to regret his decision.

Pelops decided that the only way to win the contest would be to gain the confidence of Myrtilus and convince him to throw the race. He took Myrtilus aside and promised him half of the kingdom if he made sure the king didn't win. Myrtilus agreed, believing that if he had half the kingdom he could win over Hippodamia's love. Before the race he removed the lynchpin that secured the wheel to the king's chariot.

As the chariots went racing along the road the wheel on the king's chariot gradually loosened. Then the chariot hit a hole in the road and the wheel came off, causing the chariot to swerve wildly and throwing King Oenomaus out, whereupon he became entangled in the reins. The horses broke free of the chariot and ran off, dragging Oenomaus to his death.

Myrtilus made it through this horrific accident and joined Pelops and Hippodamia for the ride back. They took a road along the cliffs overlooking the sea. They stopped for a rest. Pelops realized that if it were ever found out how he had won the contest he would be disgraced. Pelops told Myrtilus he would not give him half of the kingdom as he had promised. The angered Myrtilus and the two fought. During the ensuing shuffle Pelops managed to throw Myrtilus over the cliff into the sea, where he drowned. Mercury was devastated to see his son die in this fashion, so he placed him in the heavens as the constellation Auriga. You will notice that he has no chariot, his reins are broken, and he is saddened by the treachery of Pelops who took Hippodamia from him.

Eridanus – The River

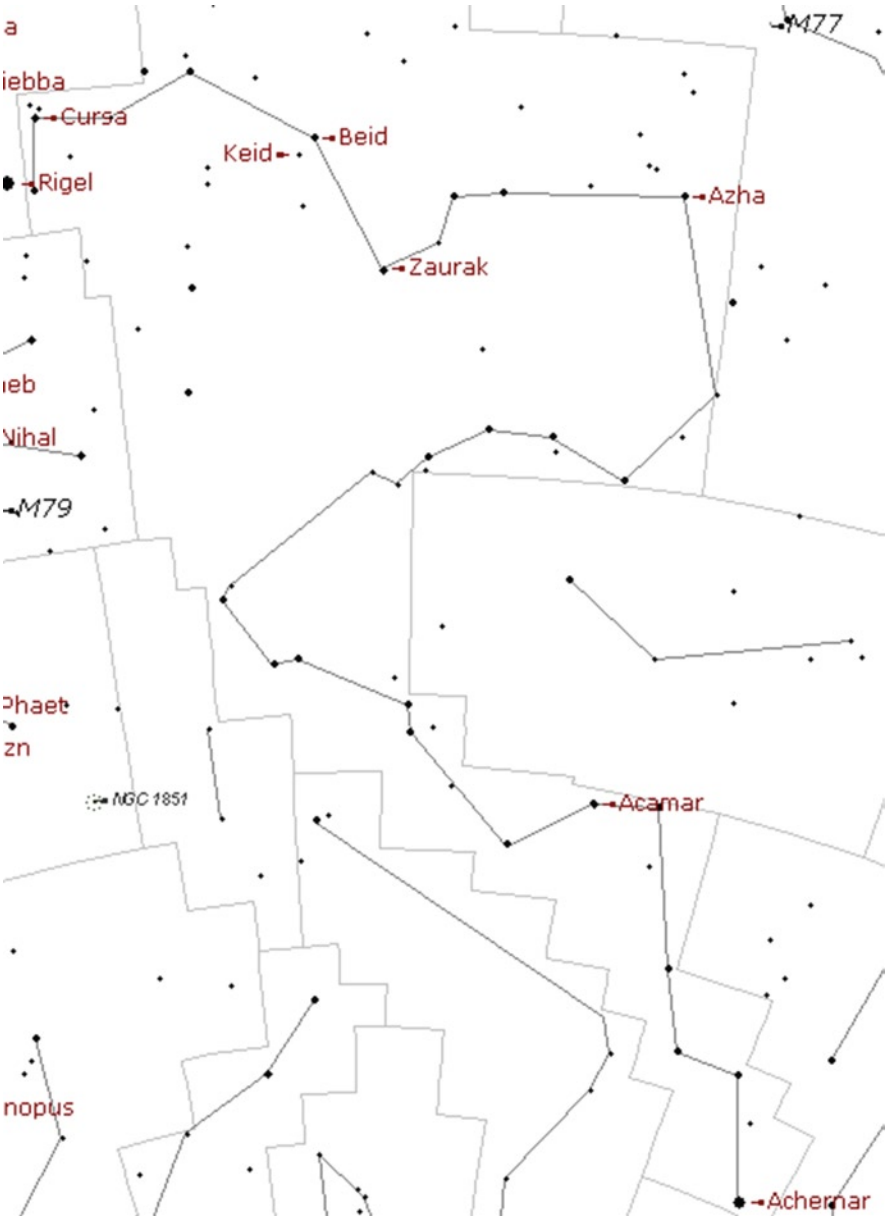

Fig. 3.9 Star chart of Eridanus (courtesy Starry Night Education)

Named Stars of Eridanus

Bayer designation	Mag.	Common name	Translation
ALPHA	0.50	Achernar	"End of the river"
BETA	2.78	Cursa	"Chair/footstool of Orion"
GAMMA	2.88	Zaurak	"Boat"
ETA	3.89	Azha	"Hatching place"
THETA	2.88	Acamar	"End of the river" (before Achernar was added)
OMICRON 1	4.04	Beid	"Eggs" (ostrich)
OMICRON 2	5.92	Keid	"Broken eggshell"

Messier Objects in Eridanus – None

The Description

Eridanus is a large but faint constellation that starts at the southwestern corner of Orion near Rigel as shown in Fig. 3.9. It runs briefly north to the star Cursa, the most northerly named star in this constellation at declination −5 degrees. The string of stars extends first toward the west, loops toward the east, and then southeast in an area to the west of Lepus. Eridanus then curves back in a generally southwestly direction, eventually ending at the bright star Achernar. Achernar is the 8th brightest star in the sky, but at declination −57 degrees it is not visible to most northern observers. It seems pretty evident that to include Eridanus as well as the constellations of the ship *Argo* Ptolemy must have traveled very near the equator at some point to include these in his list of 48 constellations.

Despite its large size there are no Messier objects in Eridanus and only NGC 1291 is listed in Appendix D of this book.

The Legend

Although Eridanus is the name of the river in the sky, it represents several important rivers in Greek and Roman mythology.

Eridanus is mentioned in The Legend of Auriga, the Charioteer, as the river in which Phaethon landed after being struck down by Jupiter. Eridanus could also represent the river Phasis, which flowed from where Russia is today to the Euxine Sea (now called the Black Sea) and emptied near where Jason and the Argonauts found the Golden Fleece. Since the Eridanus is the only river in the sky it is not hard to believe that at one time or another it could have represented any important river. Ancient Greeks said that Eridanus was also the heavenly extension of the little stream that flowed from the Acropolis. Later the Romans would identify it as a representation of the river Po, Italy's largest river, which flows through Rome. Eridanus has also been said to relate to other great rivers discovered by the ancient Greeks and Romans, such as Spain's river Ebro, the Nile in Egypt, and central Europe's Rhine and Rhone rivers.

Aries – The Ram

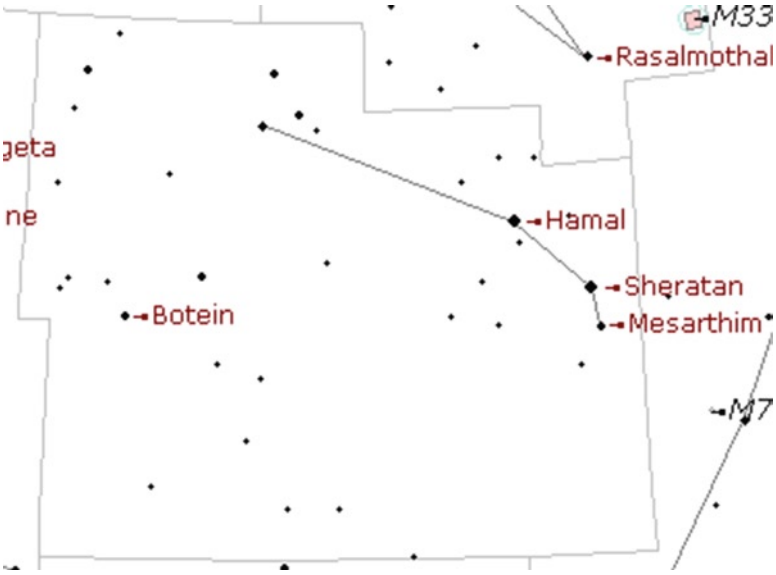

Fig. 3.10 Star chart of Aries (courtesy Starry Night Education)

Named Stars of Aries

Bayer designation	Mag.	Common name	Translation
ALPHA	2.01	Hamal	"Ram"
BETA	2.64	Sheratan	"The two signs" (Pisces & Aries)
GAMMA	3.88	Mesarthim	"Servants"
DELTA	4.35	Botein	"Little belly"

Messier Objects in Aries – None

The Description

Illustrated in Fig. 3.10, Aries is a relatively faint constellation with its brightest star, Hamal, at magnitude 2.0, Aries holds an important place in history. The point at which the ecliptic crosses the celestial equator marks the equinox, a word that literally means "equal night," meaning that day and night are of equal length. The vernal equinox marks the first day of spring, and from 2000 to 100 B.C. it was located in Aries. The precession of the equinoxes has since moved the vernal equinox into Pisces. Nevertheless, Aries gained special prominence to ancient cultures, for when

the Sun entered Aries it marked the beginning of spring and planting time. Aries' association with the vernal equinox has caused astrologers to consider it as the first constellation of the Zodiac. Mariners regarded Aries so highly that the start of the coordinate system in the sky is referenced at the "first point of Aries."

Its faint stars make it a little tricky to find, located west of Taurus, southeast of Andromeda, and directly east of Pisces. Four faint stars form a hockey stick shape marking the main body of the Ram, with Botein isolated southeast of the other stars marking the belly of the ram, as its name implies.

The Legend

In Greek mythology Aries is the ram in the story of Phryxus and Helle, the children of Athamas, king of Thebes. Their mother was Nephele, the Cloud Maiden. After the children were born, Nephele returned to heaven, and King Athamas never saw her again. He eventually married another woman, Ino, and they had children of their own.

Phryxus and Helle's stepmother hated them. Ino did not fancy the idea of Phryxus inheriting the throne from his father. She would rather one of her sons inherit the kingdom. Ino had every intention of killing Phryxus and Helle at the first opportunity. She had to be crafty, though, for if she were blamed for the killings she would incur the wrath of King Athamas. She decided instead to devise an evil plan so the children's death would be by the hand of their father.

Ino deliberately parched the seed corn used for sowing the fields. Naturally, when the corn was planted nothing grew. A famine soon came upon the land, and in desperation King Athamas sent a messenger to the oracle at Delphi and ask why the famine was visited upon their land. After the messenger left the king Ino stopped him. She paid him a handsome sum of money with instructions to go to the oracle at Delphi. However, when the messenger returned he was not to tell King Athamas what the oracle said; rather, he was to tell the king that the famine was caused by a curse that could only be removed by sacrificing Phryxus.

The messenger did as he was told. When Athamas heard the words of the messenger he was devastated. He believed the oracle to be Apollo and dared not disobey the message, lest further doom come upon his kingdom. On the appointed day he tied Phryxus to the altar of Jupiter and, before all his subjects, prepared to sacrifice his son.

Nephele, the Cloud-Maiden, had watched from above as these events unfolded. She would not allow her children to die in this manner. She sent Mercury, messenger of the gods, to ask Pan for help. Pan sent a flying ram with a fleece of pure gold. As Athamas raised his sword to deliver the fatal blow, the ram swooped down from heaven, gathered Phryxus and Helle upon its back, and carried them off. The ram flew over land and sea. As it crossed from Europe to Asia it suddenly swooped low over the sea. Helle lost her balance and fell to a watery grave. To this day the narrow sea is called Hellespont. Phryxus was able to stay on the ram, and it carried

him to the eastern edge of the world to the Land of Colchis, ruled by King Aeetes. There Phryxus lived in safety. In thanksgiving Phryxus sacrificed the ram to Jupiter. Jupiter honored the ram by having its bones placed in the heavens. Phyxrus then took the golden fleece and gave it to King Aeetes. Aeetes had the ram's fleece hung in a sacred grove guarded by a dragon.

As for Ino, the wicked stepmother, she revealed the evil plan to Juno, who in turn told Jupiter. Ino then incurred the wrath of Jupiter. He made her pay for all of her wicked deeds by causing her to go mad. She ran to the sea and jumped in with her son in her arms. They were saved by the sea-nymphs, but in doing so the sea-nymphs were obligated to atone for Ino's wicked deeds by helping storm-tossed sailors.

Later, the ram's golden fleece would be forcibly taken by Jason and his comrades, the Argonauts. This tale is contained The Legend of Jason and the Argonauts chapter of this book.

Gemini – The Twins

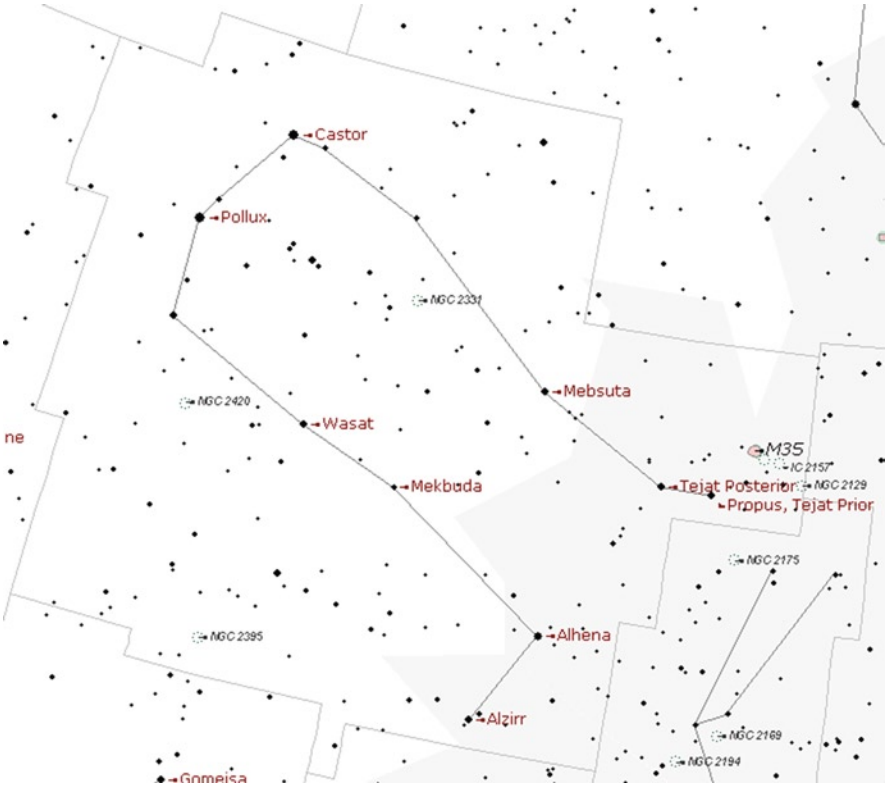

Fig. 3.11 Star chart of Gemini (courtesy Starry Night Education)

Named Stars of Gemini

Bayer designation	Mag.	Common name	Translation
ALPHA	1.58	Castor	"Beaver"
BETA	1.16	Pollux	"Much wine"
GAMMA	1.93	Almeisan or Alhena	"Shining" or "the mark" (on the neck of a camel)
DELTA	3.50	Wasat	"Middle of the sky"
EPSILON	3.06	Mebsuta	"Outstretched" (paw)
ZETA	4.01	Mekbuda	"Pulled in": (paw)
ETA	3.31	Propus (Tejatprior)	"Forward foot"
MU	2.87	Tejat (Tejat posterior)	"Back foot"
XI	3.35	Alzirr	Unknown

Messier Objects in Gemini

Messier	Mag.	Name	Type
35	5.3		Open cluster

The Description

Gemini is high in the sky in mid-winter. The constellation illustrated in Fig. 3.11 is located east of Auriga, northeast of Orion, and due north of Canis Minor. The constellation's two brightest stars bear the names of the twins Castor and Pollux. These two stars mark the heads of the twins, while a roughly rectangular configuration of stars, oriented northeast to southwest, has the twins standing side by side (although somewhat on their sides from our angle). Wasat is aptly named for it lies just below the ecliptic in the "middle of the sky."

M35 is the only Messier object in Gemini. It is a faint open cluster but easily resolvable in a telescope. It consists of several hundred stars and is about the size of a full Moon. In the star chart there are two NCG objects next to M35 but not labeled. The closest is NGC 2168, which is adjacent to M35 and is the same open cluster. Just 15′ southwest of M35/NGC 2168 is the unlabeled NGC 2158. A telescope larger than 12″ is required to satisfactorily resolve this open cluster.

The Legend

The story of Gemini is contained in The Legend of Jason and the Argonauts chapter of this book.

The Ship *Argo*

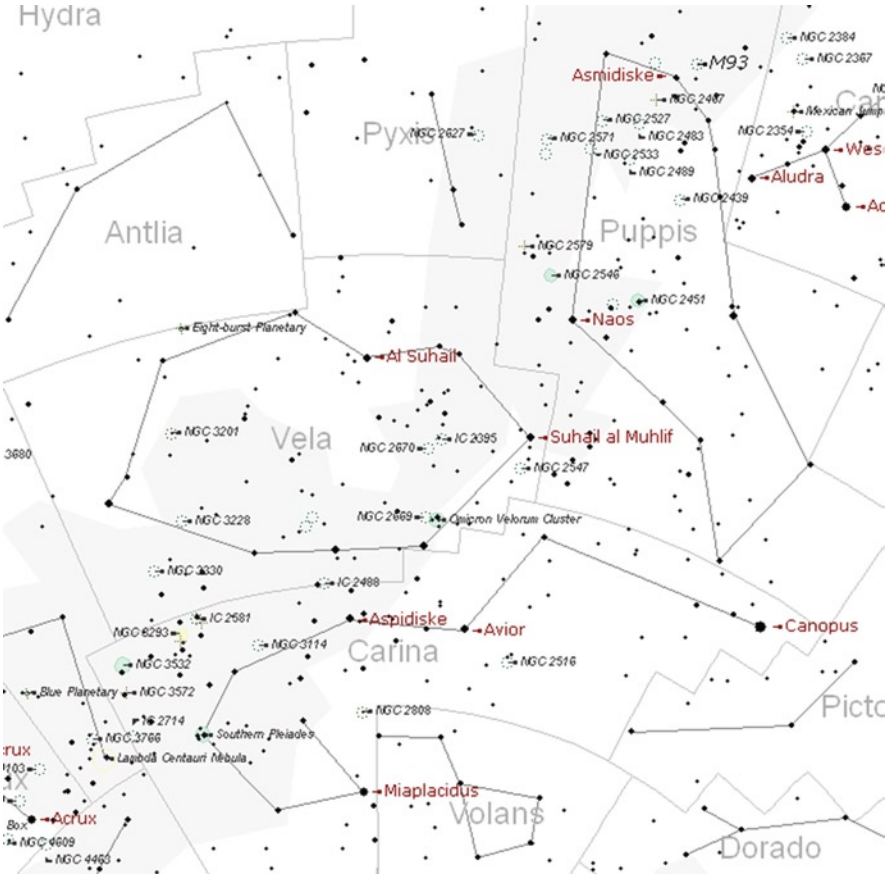

Fig. 3.12 Star chart of *Argo* (courtesy Starry Night Education)

Four constellations make up the good ship *Argo* – Puppis the Stern, Pyxis the Mariner's Compass, Vela the Sails, and Carina the Keel as shown in Fig. 3.12. All are rising in January and still lie well to the south near the horizon in mid-February. The northern extensions of Pyxis and Puppis lie at about −20 degrees of declination and extend southward. Vela lies between –40 and –55 degrees of declination, while Carina is farthest south, extending from –55 to –70 of declination. In some northern latitudes one or more of the constellations may remain below the horizon and are never seen. These four constellations are reviewed below along with their astronomical notes. The ship *Argo* is found in The Legend of Jason and The Argonauts.

Puppis – The Stern

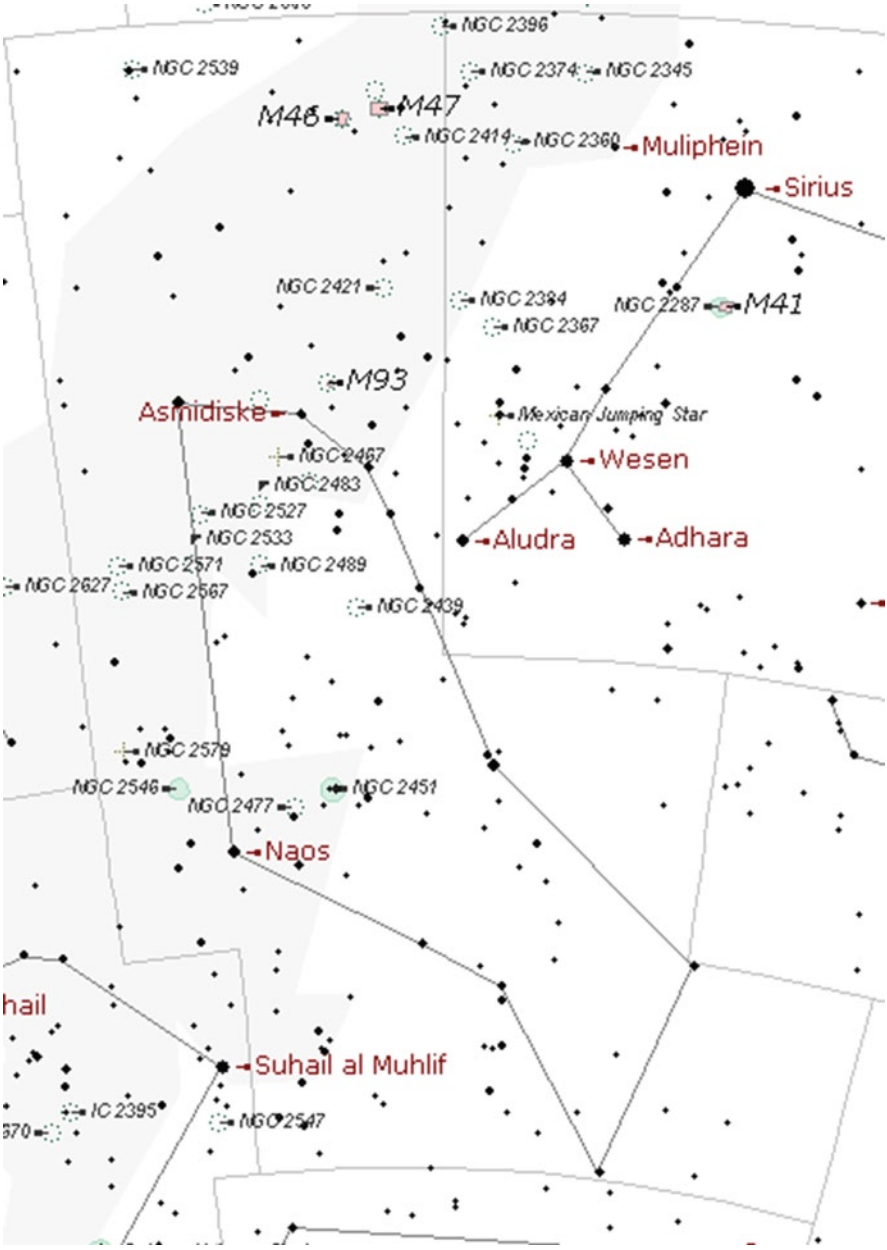

Fig. 3.13 Star chart of Puppis (courtesy Starry Night Education)

Named Stars of Puppis

Bayer designation	Mag.	Common name	Translation
ZETA	2.21	Naos	"Ship"
XI	3.34	Asmidiske	"Little shield"

Messier Objects in Puppis

Messier	Mag.	Name	Type
46	6.0		Open cluster
47	5.2		Open cluster
93	6.0		Open cluster

We can start looking for these constellations by going east from the back legs of Canis Major where we find a small crescent of stars as shown in Fig. 3.13. This is the northern end of Puppis, the stern of Argo. Extending below this are two triangular-shaped star groupings stacked atop one another. The remainder of the constellation extends to –50 degrees of declination, which means an observer will need to be at 25 degrees latitude (Miami, Florida) to have a good chance of seeing all of the constellation.

Despite its rather large expanse it is a faint constellation. The two named stars are fainter than magnitude 2, so a dark sky will be needed to see this constellation. The northern part of Puppis extends into the Milky Way, providing a plethora of deep sky objects.

M46 is a sixth-magnitude open cluster of over 500 stars with approximately 150 of them distinguishable and ranging from magnitude 10 to 13. M47 is another cluster, more open but brighter than M46. It has an overall magnitude of 5.2, with the brightest star at magnitude 5.7. M93 was one of the last objects found by Charles Messier. It is a magnitude 6 open cluster with a tight grouping of central stars that forms a triangle.

Puppis contains over a dozen NGC/IC objects, which are listed in Appendix D of this book.

Pyxis – The Mariner's Compass

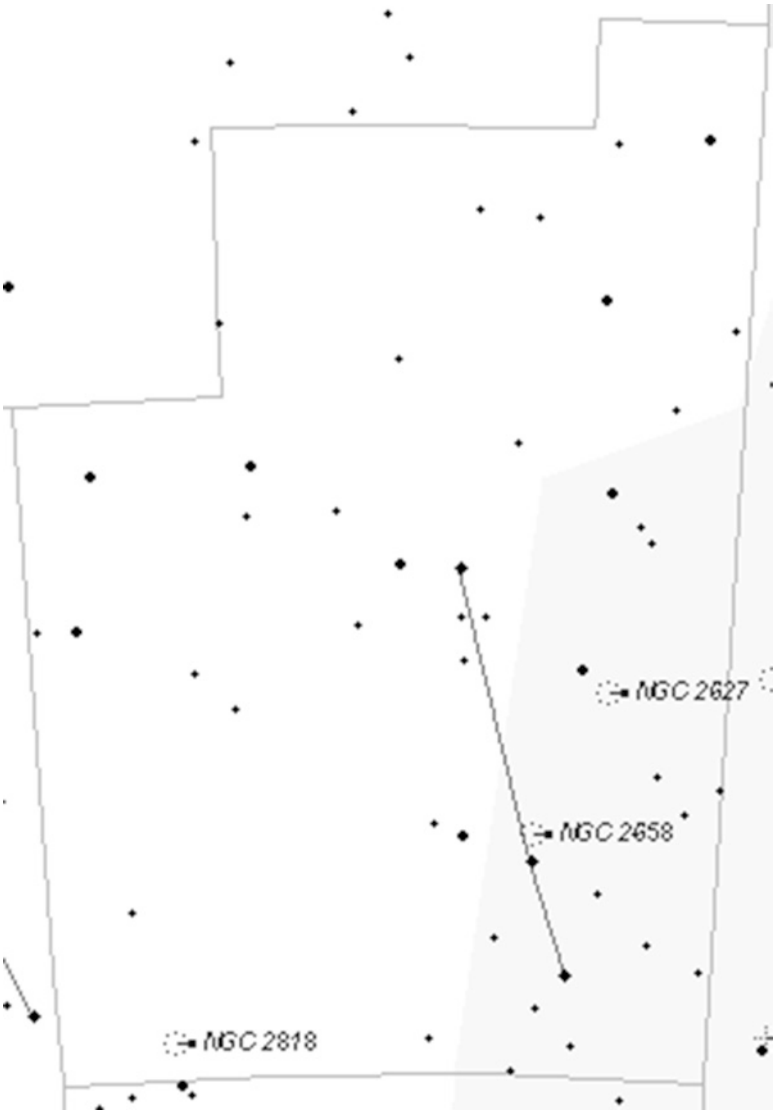

Fig. 3.14 Star chart of Pyxis (courtesy Starry Night Education)

Named Stars of Pyxis – None

Messier Objects in Pyxis – None

Proceeding farther east from the top of Puppis we find Pyxis, the mariner's compass, which is illustrated in Fig. 3.14. Three faint stars in a vertical line make up this constellation, which appears to be constantly pointing to the North Pole. When the constellations that made up the ship *Argo* were first broken up, this constellation was known as Malus, the Mast. Nicolas Louis de Lacaille invented the constellation Pyxis during his survey of the southern skies in the mid-eighteenth century. Despite its location along the eastern edge of the Milky Way the space it occupies is uncharacteristically devoid of objects. It has no named stars and no Messier objects and only three NGC objects.

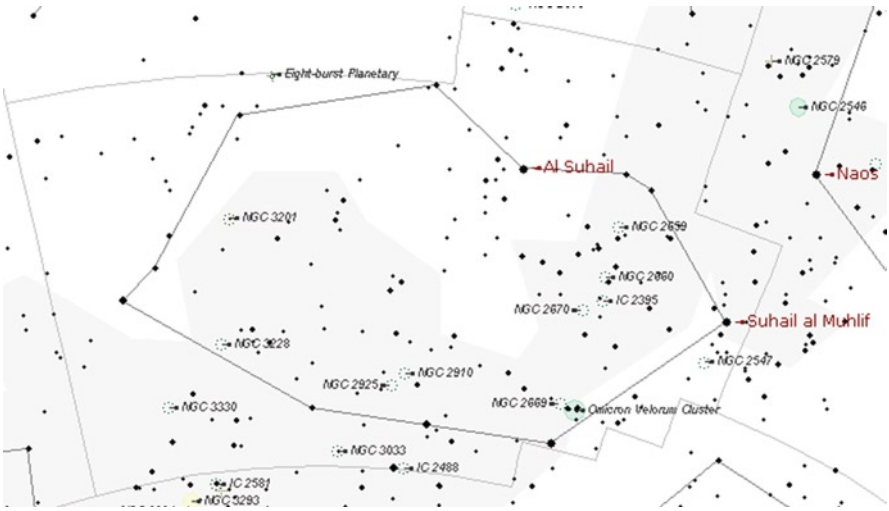

Fig. 3.15 Star chart of Vela (courtesy Starry Night Education)

Named Stars of Vela

Bayer designation	Mag.	Common name	Translation
GAMMA	1.75	Suhail al Muhlif or Regor	"Glorious star of the oath"; "Roger" backwards [Roger Chaffee, Apollo 1]
LAMBDA	2.23	Al Suhail	"Glorious star of the cycle"

Messier Objects in Vela – None

Vela – The Sails

Vela, the Sails, lies below Pyxis and to the east of Puppis. As shown in Fig. 3.15 it is roughly horseshoe-shaped with the open end toward the east. Its two major stars both have similar names that often confuse people. As is often the case with star names neither has a translation that is obviously ship-related.

Gamma Velorum has an interesting alternate name. Its modern popular name of "Regor" is "Roger" spelled backwards, referring to astronaut Roger Chaffee. It was invented as a practical joke by Apollo 1 astronaut Gus Grissom.

While it contains no Messier objects Vela does have the Milky Way occupying at least half of the constellation and is rich in NCG/IC objects, a list of which can be found in Appendix D of this book. NGC/IC objects are very numerous, but IC 2391 – the Omicron Velorum Cluster – is worth noting. At magnitude 2.5 this open cluster is visible to the unaided eye. It can be found on the star chart near the southern tip of Vela. You will need to head south to see it, however, as it is found at a declination of –53 degrees.

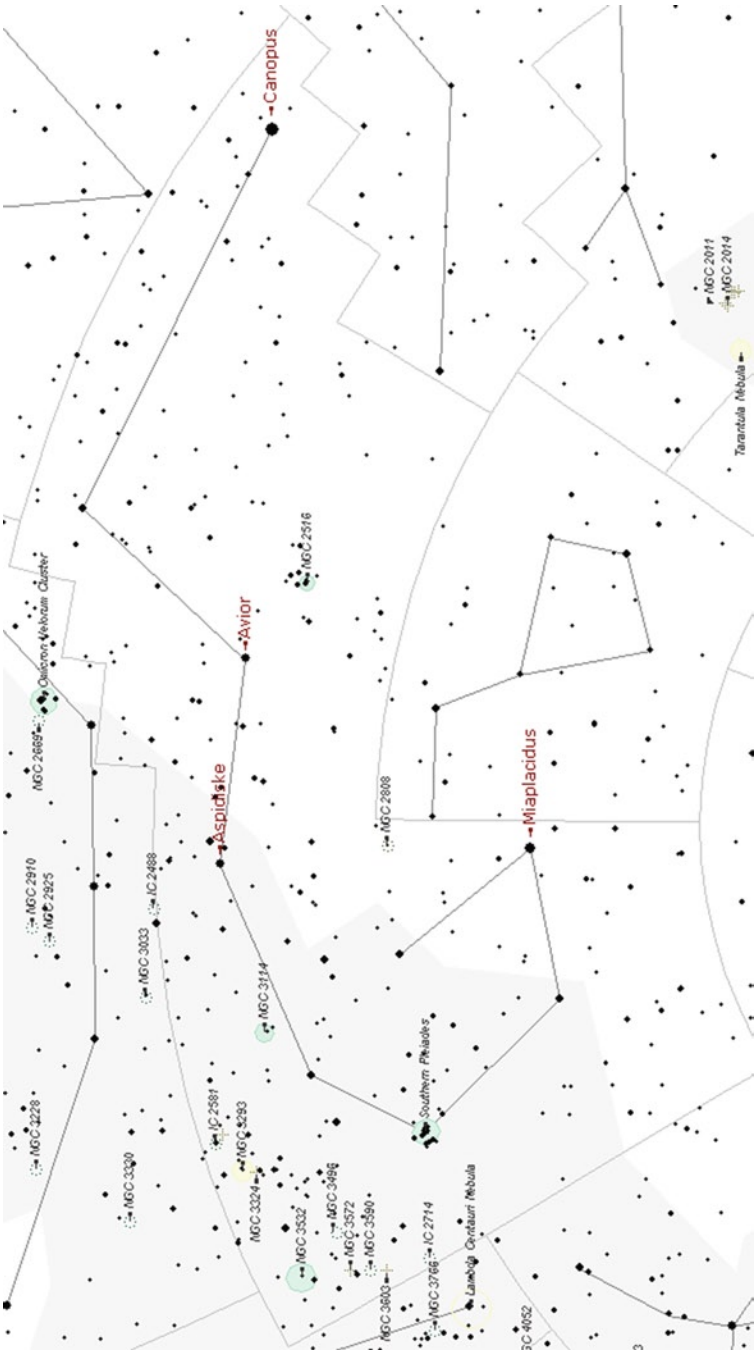

Fig. 3.16 Star chart of Carina (courtesy Starry Night Education)

Named Stars of Carina

Bayer designation	Mag.	Common name	Translation
ALPHA	−0.62	Canopus	(Menelaus's helmsman; also Egyptian seaport)
BETA	1.67	Miaplacidus	"Placid waters"
EPSILON	1.86	Avior	Modern name assigned by RAF
IOTA	2.21	Scutulum or Aspidiske	"Little shield"

Messier Objects in Carina – None

Carina – The Keel

Last, but not least, we find Carina, the keel of Argo illustrated in Fig. 3.16. Extending from east to west below Vela and Puppis, this constellation would only be visible to sky watchers south of 20 degrees north latitude.

The star Canopus is quite bright and can be seen even when low to the horizon. All the stars have nautical names except Episilon Carinae. In the late 1930s the Royal Air Force published a navigational almanac. It had chosen 57 stars and insisted that all of the stars have names. Only two of the chosen stars did not already have classical names; Alpha Pavonis was named Peacock and Episilon Carinae received the name Avior.

No Messier objects are visible in Carina but there are a number of NGC/IC objects listed in Appendix D of this book. One worth noting, IC 2602, is an open cluster known as the Southern Pleiades. Like its northern hemisphere counterpart it is a naked eye object at magnitude 1.9 and is a fairly bright cluster of 60 stars resembling its northern cousins.

For observers below 25 degrees north latitude midway between NGC 3324 and NGC 3496 you will find 6th magnitude Eta Carinae amid NGC 3372, the Great Carina Nebula. Although this object is not shown on the star chart it is a bright star-forming region like the Orion nebula and is easily captured in most telescopes.

Chapter 4

The Legend of Jason and the Argonauts

The story of Jason and the men of the ship *Argo* is one of the most famous legends in Greek literature. Ironically, Jason has never been immortalized in the heavens, although three of the Argonauts have. His ship was also given a place in the sky and was a single constellation in Ptolemy's list of 48 groupings, though the *Argo* has since been broken into four separate constellations.

The Constellations

The Ship Argo

PUPPIS – The Stern
PYXIS – The Mariner's Compass
VELA – The Sails
CARINA – The Keel

The description of these constellations can be found in the chapter on the winter constellations.

Aries – The Ram (with the Golden Fleece)
The description of Aries can be found in the winter constellations chapter.
Gemini – The Twins (Castor and Pollux)
The description of Gemini can be found in the winter constellations chapter.
Hercules – The Strongman
The description of Hercules can be found in the summer constellations chapter.

D.E. Falkner, *The Mythology of the Night Sky: An Amateur Astronomer's Guide to the Ancient Greek and Roman Legends*, Patrick Moore's Practical Astronomy Series,
DOI 10.1007/978-1-4614-0137-7_4, © Springer Science+Business Media, LLC 2011

Lyra – The Lyre (played by Orpheus)
The description of Lyra can be found in the summer constellations chapter.
Eridanus – The River (representing the river Phasis and Po along with others)
The description of Eridanus can be found in the winter constellations chapter.
Draco – The Dragon (guarding the Golden Fleece)
The description of Draco can be found in the summer constellations chapter.

The Legend

Jason was born to Aietes, the king of Iolcus. Although Jason was the rightful heir to the throne Aietes had a half-brother, Pelias, who was vengeful and domineering. He planned to kill the rightful heir, but Jason was smuggled away by the centaur, Chiron, who raised him in a mountain cave and taught him all things befitting a prince.

While Jason was growing up Pelias overthrew the king and declared himself ruler. He was constantly on guard, though, for an oracle told him to beware of a man with one sandal who would cause his death. Pelias took note of this and watched all carefully.

Jason grew to be strong and intelligent. When he was of age he set off for Iolcus to find his fortune. On his way he came across the river Anaurus, where the water was high and swift from a flood. He noticed an old woman sitting on the bank. She cried out to him and pleaded with him to carry her across. She was old and feeble, but he was young and strong and could ford the stream. He agreed and took the old woman on his shoulders and started across the stream. The current was fast and Jason had difficulty maintaining his balance. At one point his sandal got stuck in the mud and came loose, but he forged on and made it to the other side, where he gently laid the old woman down before collapsing from exhaustion. He looked up at the old woman, but saw instead a shining immortal. She told him not to be afraid, as she was Juno, queen of the gods, and his friend. She told him she would be with him and he would become one of the most famous heroes in all Greece. Then she vanished from sight. Jason was elated at these words and continued on his journey, arriving in Iolcus by evening.

Pelias was holding a great feast that day. When he saw Jason approaching he noticed that Jason wore only one sandal. The words of the oracle came back to him and he trembled in fear. When he learned it was Jason, his nephew and heir to the throne, he feared for his life even more. He knew drastic action was needed.

Pelias summoned Jason and asked him who he was. Jason stood there in his fine attire, minus one sandal, and announced that he was Pelias' nephew and he had come home to claim the throne that was rightfully his. Jason went on to say that he had no quarrels with Pelias. He would gladly allow Pelias to keep his wealth and herds. Jason only wanted Pelias to relinquish the scepter and throne to him.

Clearly harming such a generous man would not bode well for Pelias. The kingdom was at peace with no enemies or monsters to slay. Still, Pelias needed something that would require Jason to leave and hopefully never return. He knew of Phryxus and Helle and the Golden Fleece (see the legend of Aries the Ram) that hung in a

garden in Colchis guarded by a dragon. So Pelias devised a story. He told Jason he received a message from an oracle. Phryxus, who had since passed away, wished that the Golden Fleece be brought back to Greece, where it rightfully belonged. Pelias was too old for such a voyage but thought that the quest was one more befitting a fine young man such as Jason. Pelias then said that as soon as Jason returned with the Golden Fleece he would hand over the throne. Jason agreed to the quest to retrieve the Golden Fleece from Colchis. He immediately set off to find a suitable boat and crew for such a quest. Little did he know that Pelias lied about readily giving up the throne for Jason.

The journey to Colchis would require a fine ship and the bravest crew. Jason sought out Argus, a noted shipbuilder, who fashioned a craft with the help of Minerva. The vessel, the largest ever made, was fitted with 50 oars, and on the prow Argus used a timber from the sacred oak tree of Jupiter's oracle at Dodona. This gave the timber a special power – the ability to speak and prophesy the future or give advice.

Meanwhile Jason sent a proclamation that he was preparing to go on a long and perilous journey to retrieve the Golden Fleece. He was inviting any and all strong, brave men to join the finest crew in all of Greece. His petition went out to all the kingdoms and brought in the finest of the Greek heroes, men such as Hercules with his esquire, Hylas; Castor and Pollux; Theseus from Athens; Idas and Lyccus; and Telamon and Pelous. Admetus also came, as well as Oileus, Laertes, Meleager, and Nestor. Orpheus, the son of Apollo, also came and played the lyre so sweetly that plants and beasts would bow to its enchanting music.

When the ship was completed it was christened the *Argo* after its builder. The crew became known as the Argonauts, and they gathered to embark on their long journey. They hung their shields on the rails and set sail, rowing to the music of Orpheus while the wind aided their travel and Tiphys, the helmsman, steered a true course.

The Argonauts had many adventures along the way, but only a few notable ones are told here. The first stop on their adventure was the island of Lemnos, the home of the god Vulcan. The island was unusual in that all its inhabitants were women and children. Venus also had an altar there, but when Vulcan arrived the men all paid homage to him. Venus became jealous and vengeful. She called upon the dark gods; Rumor, Treachery, Fear, Anger, and Frenzy. Towering above them all was Death. Venus set them all upon the women, who in terror turned against their beloved men; fathers, brothers, husbands, and lovers were all killed in a wave of horror. All the men were killed, save one. The old king was spared. He was placed into a trunk, set out to sea, and eventually was saved. All this was in the past when the Argonauts arrived and the women treated them well, giving the crew a place to rest and sending them on their way with food, wine, and clothing.

It was not long after that when the crew lost Hercules. Hercules had a young servant who accompanied him named Hylas. He was a handsome youth who helped Hercules with his armor and tended to any other needs. When the ship made landfall in the country of the Mysians Hylas grabbed an empty jar and went in search of fresh water. He soon found a spring and began to fill his jar. Greek springs are sacred places and often occupied by water nymphs. One lived in this spring and when she saw handsome Hylas she became enamored of him. She came up out of the water to embrace him, but as they embraced she drew him down into the water.

Hercules noticed that Hylas had been gone for some time. He began searching for Hylas and came to the spring. When he saw the water jar on the shore he knew what had happened. He began searching for Hylas, first in the surrounding forest, then diving deep into the water but always coming up with nothing. The Argonauts needed to get underway, but Hercules would not abandon his faithful servant, so they were forced to sail away without him.

In another adventure, the ship *Argo* stopped along the northern coast of Asia Minor in the land of Bebrycei. The ruler of this land was a huge brute of a man, King Amycus, who was notorious for not allowing travelers to pass without challenging them to a boxing match. As Pollux was an accomplished boxer, he stepped forth to meet the challenge. He donned the sharp-edged strips of leather (which were used for boxing gloves at the time), and he and King Amycus squared off. It was a brutal fight, with the advantage shifting back and forth. Then, as King Amycus was moving in for a final blow, he let his guard down momentarily. Pollux saw his opportunity and struck a blow to the temple of King Amycus, breaking his skull and killing him instantly.

One fortuitous stop was somewhat questionable at first. The Argonauts had come ashore for the night when they encountered an emaciated, old blind man named Phineus, who had become quite bitter about his lot in life. It seems that Apollo had given Phineus the gift of prophesy, which he used to tell mortals what Jupiter and the gods had planned for them. This soon angered Jupiter. First he took away Phineus' sight. Then when visitors came with food to hear their prophesy Jupiter would send the Harpies. Harpies were winged creatures with sharp beaks and claws, scaly bodies, and long tails. Known as "the hounds of Jupiter" they would swoop down and snatch the food, sometimes from Phineus' hand as he was about to eat it. Before they finished the Harpies would leave a horrible stench over the remaining food so powerful that no one would go near it. Soon no one would come to see Phineus, and he was close to starvation when the Argonauts discovered him, for every time he would try to eat the Harpies would swoop down and steal his food, leaving only their vile stench behind.

When the Argonauts arrived Phineus began to have hope. He knew from a prophesy that two of the Argonauts, Kalais and Zetes, the sons of Aquilo, would defend him from the Harpies. He welcomed the Argonauts and sat them down and began to relate the story of the gift of prophesy he had received, the anger of Jupiter, and his constant battles with the Harpies. Finally he revealed the prophesy that the sons of Aquilo would defend him from the Harpies. If the prophesy was fulfilled he would give the Argonauts some valuable advice for their trip.

Kalais and Zetes were eager to help out Phineus. They kept watch while the Argonauts set the table and placed out food for Phineus and them to eat. Soon the Harpies appeared and started swooping down on the food, grabbing it out of Phineus' hand and defiling it. Kalais and Zetes began thrashing at the creatures with their swords slicing off wings and feet and heads. Though some got through many were killed and maimed and the sons of Aquilo probably would have killed them all had not Iris intervened. She had come to check on the Harpies and witnessed the slaughter. She stopped Kalais and Zetes from killing all of the hounds of Jupiter and

swore by the river Styx, the sacred oath that no god can break, that the Harpies would never bother Phineus again.

With their victory intact the Argonauts set up another feast, and Phineus ate and drank for hours. Finally he paused and, recounting his promise, gave the Argonauts some important advice. Before reaching Colchis where the Golden Fleece is kept, the Argonauts would need to sail between the Clashing Rocks. Phineus told them to release a bird and have it fly between the rocks to cause them to smash together. When the rocks begin to separate sail the Argo between them. But the *Argo* must be quick, for if the ship is between the rocks after they open they will come together again, smashing the *Argo* to splinters as they had done to so many other ships.

The next day the Argonauts set sail again heading for the entrance to the Black Sea. The Clashing Rocks guarded that entrance. A ship must pass through these rocks to enter the Black Sea. As soon as the ship was between the Clashing Rocks the huge floating masses would come together smashing the ship between them. As the rocks slowly withdrew, the ship would sink to the depths of the ocean.

Following the advice of King Phineus, the Argonauts drew near the Clashing Rocks, which were veiled in fog and mist. As they approached the rocks Jason let loose a heron, which flew ahead of them. As the heron flew between the rocks they came together in a huge crash, nipping the tail feather of the bird. As the rocks slowly drew apart the Argonauts strained at the oars while Tiphys carefully steered between the rocks. As soon as the Clashing Rocks drew completely back, they came together again. The Argo barely escaped destruction as the rocks clipped the stern ornament of the ship. From that time the Clashing Rocks stood silent, never to come together again – for once a ship successfully passed between them, the rocks could move no more.

The *Argo* sailed into the Black Sea, along its southern coast, and then up the River Phasis, which runs red from the Caucus Mountains (in memory of Phaethon, who was struck down by Jupiter after losing control of the Sun Chariot). Presently they came to the land of Colchis, ruled by King Aeetes, the son of Sol. His sister, Circe, and his daughter, Medea, were skilled in the art of witchcraft. This was the Argonauts destination, the land of the Golden Fleece. But the trip had been long and the men were weary. They decided to stay near their ship that night and rest before going into the city the next day.

Juno had been watching the progress of the Argonauts and was very impressed by the way they were able to overcome serious obstacles. She knew that while they may be welcome in Colchis when they arrived, when they revealed their mission Aeetes would become incensed and turn on them. They were in grave danger, and she wanted to give them an edge. Juno summoned Venus, who was surprised at the audience, for she and Juno were not friends. Juno asked Venus for her help in aiding the Argonauts. If the daughter of King Aeetes were to fall in love with Jason, the leader of the Argonauts, then he would have a powerful ally who would help the Argonauts defeat the king. Venus was honored that the queen of the gods came to her for help, so she graciously agreed to help and immediately went to her playful son, Cupid. She promised to give him a beautiful plaything if he shot Medea with his arrow. He eagerly agreed and took his bow and arrow and flew down to Colchis.

When dawn broke the heroes broke camp and started walking toward Colchis. A dense fog had settled over the land so no one saw them approaching the city. As the group neared the city of Colchis the fog lifted. No one recognized them. They were handsome and friendly, though, so the guards led them to the palace to meet with King Aeetes. The king welcomed them and, as was the custom, invited them to eat and drink before he asked why they had come to his city. The king's servants waited on them, and they ate and drank with the king while talking about their extraordinary journey. During this time the king's daughter, Medea, stole in to get a look at these strangers who had the whole city talking. Cupid was there, too, hiding in the shadows and waiting for the right moment. As Medea studied each of the strangers her gaze fell upon Jason. He was young but was extremely handsome, and she stared at him, taking in his beauty. Cupid saw his opportunity and let go an arrow that pierced Medea's heart. Her breath was taken away and her heart was pounding. She had never felt this way about a man. She blushed and turned away. Embarrassed she quickly left the room. But she could not stop thinking about Jason.

When they finished the meal King Aeetes turned to Jason and asked why this valiant group had come to his city. At that Jason stood up and announced that all of his crew came from noble families. All were the sons or grandsons of Olympians. All of them had accepted to join the crew of the *Argo* on a splendid quest to come to the great city of Colchis and request of King Aeetes the Golden Fleece. In return they would provide whatever service the king would like. They would kill a monster, defeat an enemy, or anything else the king desired.

As expected, King Aeetes' rage grew within him. If they had not just eaten at his table and drank his wine he would have had them killed where they stood. These foreigners from Greece had come to take the sacred Golden Fleece! He brooded over Jason's proposal and finally came up with a scheme that would defeat Jason and his crew. King Aeetes told the Argonauts that he admired their courage and valor. While he held nothing against them he felt that the Golden Fleece could only be given to those with the greatest of courage. Colchis had no enemies and no monsters threatened them. Nevertheless, there was a test of courage that would prove their worthiness to have the Golden Fleece. One of them would need to yoke his brazen-footed bulls that breathed fire, plow a field with them, and sow it with dragon teeth! If the man who took this challenge completed it successfully without dying he would earn the Golden Fleece. What King Aeetes failed to reveal was that the sown dragon teeth would spring up as armed men and attack the sower. He was satisfied that the Golden Fleece would remain in Colchis.

The Argonauts looked at each other. Who among them would be strong enough to meet this challenge? Feeling the weight of his leadership Jason volunteered. It was getting late so all agreed to meet the king the next day at the fateful field and the Argonauts returned to their ship for the night.

Jason pondered this feat during the evening. Even Hercules could not perform such a task. How could he? Medea, the witch-maiden, had heard about the challenge as well. How could she allow the man she was now madly in love with, thanks to Cupid, rush into harm's way without help. She slipped out of the palace and left the city to find Jason. She found him at the shore and when she approached

him Jason could see she was quite beautiful. She told Jason that she was Princess Medea and she had heard about the trial he was to take the next day. She said that she wanted to help him and could tell him how to accomplish the formidable task and retrieve the Golden Fleece. For these secrets, though, Jason must promise to take her with him back to Greece and make her his wife. Jason was taken with her beauty and her inner strength. He agreed, though he didn't much care for witches or their craft.

Before venturing out to meet Jason Medea had prepared a magic ointment and placed it in a small jar. She pulled the jar from her bosom and gave it to Jason. She told him that the ointment was magical and made him invulnerable and unable to be burned for a day. Next, she told him the dragon teeth would yield men who would attack the sower. When they started to attack, Jason should throw the remaining teeth amongst the dragon-teeth men. They will turn on each other to get to the teeth and destroy one another.

Then she looked into his eyes. Her heart melted and she had butterflies in her stomach. She reminded him that he was to take her with him. Then wrapping her arms around his broad shoulders she pressed her lips to his and they enjoyed a long passionate kiss. She left him then and returned to the palace.

The next morning Jason applied the ointment over his entire body. Then he got dressed in his armor and he and the Argonauts traveled to the field that was designated by King Aeetes. The king was there, along with a large crowd, including Medea. Near the field were the two fire-breathing bulls and the yoke. Next to the yoke was a helmet filled with the teeth of the dragon slain by Kadmos.

The dumb-founded King Aeetes watched as Jason put the yoke on the oxen and then plow the field unharmed. Jason began to sow the dragon teeth, but as soon as the teeth were sown they began to grow. The teeth did not yield plants; they sprouted fully armed warriors just as Medea had prophesied, each ready to slay Jason. Jason remembered the instructions from Medea and threw the helmet that contained the dragon teeth into the middle of the warriors. They immediately fought so fiercely among themselves for possession of the helmet that they killed each other, and soon all the warriors lay dead.

King Aeetes was amazed at Jason's feat and vowed to deliver the Golden Fleece the following day. But secretly he plotted to kill the Argonauts and burn the *Argo* that night. Medea learned of his plot and went to warn Jason and lead him to the Golden Fleece. Together with Orpheus and his lyre, Medea and Jason slipped into the night and went to the magic garden where the Golden Fleece hung on the Tree at the World's End. It was guarded by a fierce dragon, as were the Golden Apples of Hesperides that hung in a garden at the other end of the world.

As the trio approached the garden they could see the huge dragon coiled in a tree at the entrance. It was the fiercest dragon they had ever seen. Medea whispered to Orpheus to play and sing. As Orpheus began to play the lyre and sing everything in and around the garden seemed to go to sleep. The wind died, the leaves fell limp, and even the terrible dragon fell asleep going limp and slipping off the branch, coiling on the ground, one coil inside the other, until it was stacked with its head resting in a bed of red poppies. Were it not for a spell cast by Medea, Jason would have fallen

asleep, too. When everything was still, Medea told Jason to climb up the dragon's coils and retrieve the fleece. Medea sprinkled a magic sleeping powder on the dragon as Jason nervously scaled the ladder of dragon coils. He quickly lifted the Golden Fleece off its branch and climbed down. Then Medea cast a spell which invoked Hecate, the goddess of the witches, and the night grew incredibly dark. Even the moon grew dark. Medea led Orpheus and Jason, with the Fleece, through the dark back to the *Argo.* On the way she also gathered up her brother, Prince Absyrtus, whom they took with them. Jason roused the Argonauts and they set sail immediately and rowed so hard that the oars bent under the strain.

Presently, the dragon awoke from the spell. Realizing that the Golden Fleece had been stolen, the dragon let out a terrible groaning cry, hissing in anger at the loss of the fleece. Women gathered up children and shuddered in fear at the sound of the beast. King Aeetes awoke to the terrible sound and realized immediately what had happened. He summoned his soldiers and set sail in his swiftest ship.

When Medea heard the dragon she knew her father would soon be in pursuit. She urged Jason and the Argonauts to row as hard as they could, for Aeetes' ships were fast. If Aeetes reached them, there would be no mercy for any of them. So the Argonauts bent the oars and the wind filled the sail; they raced down the Phasis and into the Black Sea with such speed that the water churned behind them.

King Aeetes' ships were as fast as Medea had claimed. Despite their efforts to speed away, by noon the Argonauts spied Aeetes' fleet closing in on them. Orpheus played on his lyre as the Argonauts labored at their oars, but despite their best efforts the Colchis fleet, led by King Aeetes' ship, drew ever nearer. It was clear they would be overtaken before long. Medea realized that only one thing would slow the Colchis fleet.

Medea did a dreadful thing. The Argonauts dared not stop this witch, for it was she who had saved them, and Jason had vowed to marry her when they reached Greece. As the Argonauts looked on in horror Medea killed her brother, Prince Absyrtus, in plain view of her father. Then she chopped the body into pieces and threw them into the water. She knew the king would stop to pick up the pieces so that he could give the prince an honorable burial (and allow his spirit to find rest in the Realm of Hades). As expected, the fleet slowed to gather up the pieces while King Aeetes wept. He uttered a terrible curse upon Medea and the Argonauts for this horrible tragedy. With the Colchis fleet stopped, the Argo sailed out of sight, never to be found by King Aeetes again.

Jason felt ashamed and miserable for the terrible, unforgivable deed Medea had done. But he was bound to her in marriage.

On the return voyage the *Argo* encountered a violent storm. The ship was spun around and around and the Argonauts lost their way. They passed islands and rocks that were not familiar to them until they reached what seemed to be a great river's mouth. At that moment the Magic Branch of Dodona – the timber that was made into the bow of the ship at its building – cried out to the Argonauts that the murder of Prince Absyrtus had caused them to incur the wrath of Jupiter. They were banished from their native land until they were cleansed of their sin. They were to proceed to the Island of Aeaea and seek out Circe, the Enchantress. Only she could purify them. The way was dark and forbidding, never before sailed by man.

At that, the Magic Branch fell silent. The Argonauts were terrified at its words. The wind caught the sails and took them up the great river. The darkness closed around the Argonauts, and none of them knew where they were going. They continued up the river, sometimes rowing and sometimes being blown by the wind. Eventually the river became too shallow for the *Argo.* They steered the ship to shore, hoisted it upon their shoulders and carried it overland. They had many adventures in this strange and savage land, encountering wild men and beasts.

Eventually they reached the shore of a great sea. Although it was the Adriatic Sea they did not recognize it. They sailed across it and encountered another river that flowed toward the northwest. Though they did not realize it they had found the river Eridanus, now known as the Po. They proceeded up that river. The weather got colder as they sailed on. When the river became too shallow they once again hoisted the *Argo* on their shoulders and carried it overland. They encountered another river, the Rhodanos (Rhone) and proceeded south. This river emptied into the Mediterranean Sea, and as they proceeded east they began to recognize landmarks. They passed the islands of Corsica and Sardinia and eventually came ashore at Aeaea. It was there that the enchantress Circe lived. Medea, the witch-wife of Jason, was Circe's niece. Had Medea not been with the Argonauts, Circe would have worked some evil enchantment on them. Instead, she welcomed them and gave them every comfort. Medea related to Circe the account of her crime and the warning words of the magic Branch of Dodona. She begged Circe to cleanse them that they might not suffer the wrath of Jupiter forever. Circe could not refuse such a request from her niece and purified them all from the blood of Absyrtus. The Argonauts left there feeling renewed and relieved of a tremendous burden. But their adventures were not yet over.

As they continued to sail easterly, they passed near the island of Capri. On the island lived the Sirens, maidens who had once played with Proserpina, now queen of the dead. The Sirens wished to search for Proserpina and were granted wings by Ceres to speed their travel. But they had grown evil and now lived on this island. They grew sharp claws and tails like birds to accompany their wings. The Sirens' sweet singing lured sailors off their ships. The men would swim to shore, where the Sirens would capture them and tear them apart. Legend had it that if any man could resist their singing and sail away unharmed; the Sirens would meet their end.

It was the Argonauts the Sirens spied this day, and they began their enchanting singing. Medea, the witch-wife, knew what lay ahead if she did not do something to prevent it. She pleaded with Orpheus to sing as sweetly as he could, for only the son of Apollo could overcome the luring song of the Sirens. As he played and sang, the Argonauts stopped listening to the Sirens and heard only the music of Orpheus. They steered safely past the island of the Sirens and continued on their journey. The Sirens, having been resisted by mortal men, met their fate. They flung themselves from the rocks where they had been singing and died.

The Argonauts continued eastward, stopping only briefly in Phaeacia to celebrate the ill-fated wedding of Medea and Jason. Soon after the wedding, the *Argo* sailed again. As the Argonauts rounded Cape Malea at the south of Greece, a tremendous storm overtook them. At the height of the storm the ship was threatening to sink. Orpheus then took his lyre and played beautiful songs to calm the seas. When the

seas subsided and the ship was moving gently on the oceans, two bright stars shone in the heavens over the heads of Castor and Pollux.

The demise of Castor and Pollux happened long after the voyage of the *Argo.* Castor and Pollux were involved in a cattle raid with two other ex-Argonauts. However, they were discovered during the raid and in the ensuing fight Castor and Pollux were killed. Jupiter immediately offered immortality to Pollux since he was his son. Pollux refused, since his brother could not share it with him. Jupiter then offered a compromise. If Pollux was willing to endure Castor's lot in Hades half of the time, he would offer them both immortality the other half of the time. Pollux agreed, and as a reward for their loyalty to one another Jupiter gave them both a place in the heavens during the time when they were not in Hades. He placed them where the two stars had shown above the *Argo.*

Eventually the *Argo* approached the shores of Crete. On the island there lived a giant named Talos. He had been fashioned out of brass by Vulcan, the metal smith of the immortals, for the first King Minos of Crete. The monster would run around the island three times each day smashing any ship that drew near by hurling stones at it. At other times he would make himself red hot by sitting in fire and would then burn everything he touched. Every succeeding King Minos knew how to control the monster, but when the last King Minos sailed away in pursuit of Daedalus, Deucalion became king of Crete. The monster had gotten out of control, and Deucalion had barely escaped to join Jason and sail with the Argonauts.

Now that Deucalion had returned to his land, he begged the Argonauts to help him rid the land of this terrible giant. None of the Argonauts had a clue how to kill the monster. Medea spoke up and said that the monster could be defeated with magic. The Argonauts agreed to follow her instructions exactly. As the ship approached the shore, Talos appeared; he was glowing red hot and had a huge rock in his hand and was ready to hurl it at the *Argo.* At that, Medea ordered Orpheus to play his lyre and sing. The lyrical music caused Talos to stop short and he appeared confused. Then Medea talked to him.

She told Talos that she was Medea, the witch. She assured him that she could make him king of the world and ruler over the immortals if he would make her his queen. Talos asked her how she could do that. Medea asked him if it were not true that he had but a single vein that runs from his head to his heel, and that this vein was filled with ichor, the sacred fluid which flows in the veins of Immortals. Talos affirmed this. Medea went on to say that even so, Talos was not immortal. Medea assured him that if she could come ashore with one follower, she could produce a magical brew that would make him immortal. Talos agreed.

The Argonauts decided that Poeas should accompany Medea. Poeas was the smallest of the Argonauts and would not seem the threat against Talos that one of the other large Argonauts would. Poeas was also a superb archer, and he took his bow and arrows, which he concealed as he and Medea set foot on Crete. Talos thought nothing of Poeas, who went and hid out of sight among the rocks.

When Medea reached the shore she immediately built a fire, gathered grasses, roots, and herbs, and placed them in a cauldron on the fire. Talos watched with interest and continued to draw closer to watch. He was cautious, ever mindful that

in the heel of his foot was the brass nail that plugged the end of the vein containing the ichor. He always kept his heel well away from the witch.

As the brew began to boil, Medea removed her clothes, drew her hair up onto her head, and bent over the magical liquid. Talos grew ever nearer to see what it was she was doing. Eventually, Medea took a cup and filled it with the brew, gave it to Talos and told him it was the wine of Immortality. He drank all of the liquid, began to grow drowsy, and started stumbling about. But he did not fall asleep lest someone should remove the brass nail in his heel.

At this point, Poeas emerged from his hiding place. He took an arrow and fitted it to the bow. Taking careful aim at the brass nail in the heel of Talos, he let loose the arrow. The arrow hit its target perfectly and the nail fell out. Talos let go a cry as the ichor flowed onto the ground. He groped about the ground in an attempt to find the nail. The magic brew was too much for him, though, and soon he lay silent and still, nothing more than a lump of brass.

The Argonauts rejoiced and landed on Crete. There Deucalion reclaimed his kingdom and treated the Argonauts to a wonderful stay, giving them anything they wanted.

After a short stay, the Argonauts – less Deucalion, who stayed on to rule Crete – left and sailed uneventfully to Iolcus, where Jason found his father had died and Pelias still ruled. The Argonauts parted company there, having completed the quest for the Golden Fleece.

Although Jason was the rightful heir, he allowed Pelias to remain king.

Medea wished to be queen and would not stand for this. One day, while Jason was away, she said to the daughters of Pelias that she could show them how to make their father young again and thus rule Iolcus for a very long time. The daughters did not trust her, however, so she made a magic brew in a large pot. She then took an old ram, cut it into small pieces, and threw the pieces into the pot. Almost immediately, a young lamb jumped out of the pot. The daughters were amazed. They believed Medea and besieged their father, cut him into pieces, which they then tossed into the pot. Pelias remained dead, however, for Medea did not teach them the magic spell to make him young. Through Medea this fulfilled the oracle's earlier prediction that a man with one sandal would cause Pelias's death.

The people of Iolcus banished Jason and Medea forever for this terrible deed. Jason and Medea eventually parted, as Jason could no longer live with her wicked deeds. He became an outcast and wandered for years before finally returning to the spot where the *Argo* had been pulled ashore. It still lay there, his only friend in the world. He lay down in its shade and fell asleep. The ship was old and weathered, however, and as he lay there, a large piece of the hull, rotted with age, broke off, fell on Jason, and killed him.

Chapter 5

The Spring Constellations

These constellations begin to show a theme of fruitful fields. It is the time for spring flowers and new birth. Farmers are sowing seeds and watching crops sprout in the fields. The night sky shows some familiar asterisms. The Big Dipper is rising and the Sickle of Leo is high in the southern sky.

For those hearty souls willing to brave chilly nights the time around the vernal equinox affords an interesting observing opportunity. With some careful planning and a dark sky location a person can observe nearly all of the 110 Messier objects in the sky in one night. Many astronomy clubs hold a Messier Marathon to celebrate the beginning of observing on warmer nights, although the night of the Messier Marathon can be pretty chilly in some locales. Dress warmly!!

Ursa Major and Ursa Minor – The Greater Bear and the Lesser Bear

These two constellations contain the best known asterisms in the night sky – the Big Dipper and the Little Dipper. Being circumpolar constellations both are visible the entire year from northern latitudes. But in the spring the Big Dipper is marching toward the zenith, making it particularly prominent and making the rest of the Great Bear constellation easier to find, as it is quite large and most of the remaining stars are much fainter, requiring a darker locale to see it best.

D.E. Falkner, *The Mythology of the Night Sky: An Amateur Astronomer's Guide to the Ancient Greek and Roman Legends*, Patrick Moore's Practical Astronomy Series,
DOI 10.1007/978-1-4614-0137-7_5, © Springer Science+Business Media, LLC 2011

Ursa Major – The Great Bear and the Big Dipper

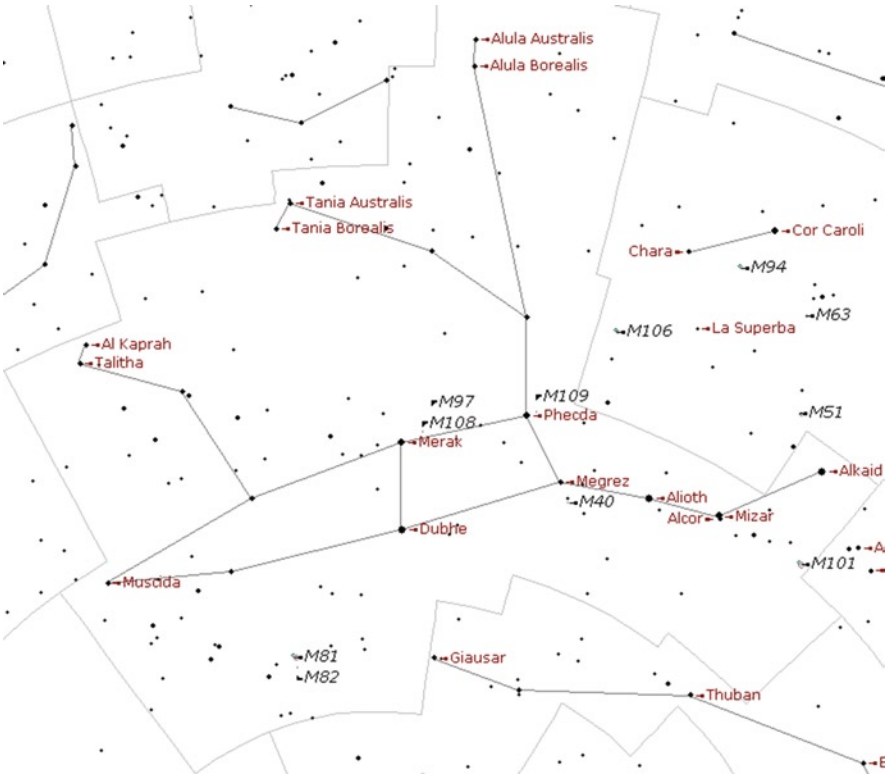

Fig. 5.1 Star chart of Ursa Major (courtesy Starry Night Education)

Named Stars of Ursa Major

Bayer designation	Mag.	Common name	Translation
ALPHA	1.78	Dubhe	"Bear"
BETA	2.31	Merak or Mirak	"Loins"
GAMMA	2.40	Phad or Phecda	"Thigh"
DELTA	3.31	Megrez	"Insertion-point" (of the bear's tail)
EPSILON	1.75	Alioth	"Black horse/bull"
ZETA	2.21	Mizar	(From a corrupt reading of "loins"; see Beta UMa)
80	3.96	Alcor	(Derivation similar to Epsilon UMa)
ETA	1.84	Alkaid	"The leader" (of the mourning women?); "daughters of the bier"
THETA	3.17	Al Haud	"The pond"
IOTA	3.12	Talitha Borealis or Dnoces	"Third [leap of the gazelle], north"; "Second" backwards [Ed White II, Apollo 1]
KAPPA	3.57	Talitha Australis	"Third [leap of the gazelle], south"
LAMBDA	3.43	Tania Borealis	"Second [leap of the gazelle], north"
MU	3.03	Tania Australis	"Second [leap of the gazelle], south"
NU	3.46	Alula Borealis	"First [leap of the gazelle], north"
XI	3.78	Alula Australis	"First [leap of the gazelle], south"
OMICRON	3.34	Muscida	"Muzzle"

Messier Objects in Ursa Major

Messier	Mag.	Name	Type
40	8.4	Wineke 4 (asterism)	Double star
81	6.9	Bode's Galaxy (Bode's Nebula)	Spiral galaxy
82	8.4	The Cigar Galaxy	Irregular galaxy
97	9.9	The Owl Nebula	Planetary nebula
101	7.9	The Pinwheel Galaxy	Spiral galaxy
108	10.0		Spiral galaxy

The table of named stars is quite large for Ursa Major. Every star of the Big Dipper is named undoubtedly due to its prominence in the sky throughout the year. The star chart (Fig. 5.1) depicts Ursa Major upside down in the sky although with the constellation near the zenith it's not hard to position yourself to see it right side up. The Big Dipper forms the rear end of the bear. The front of the Bear and the Bear's front legs extend northwest from the bowl of the Dipper. The handle of the Dipper is the tail of the Bear and the back legs are formed by a "V" of stars extending south from the bottom of the Dipper.

The Big Dipper is a prominent and well-known asterism easily identified even by those with no astronomical background. For thousands of years navigators have

used the Big Dipper to locate the north celestial pole by taking the end stars of the bowl (known at the "Pointer Stars") and moving along an imaginary line from the open end of the dipper five times the distance between the stars to find Polaris, the pole star.

The center star of the dipper's handle actually consists of two stars, Mizar and Alcor. On a clear, calm night those with good eyesight can see the separate stars with the unaided eye. As a result, ancient cultures would use these stars as an eye test, particularly for their hunters.

Because it is visible in the sky much of the year astronomers use the stars of the Big Dipper in various combinations as pointers to other constellations. Cassiopeia, for example, can be found by continuing to follow the line from the Pointer Stars through Polaris to a point the same distance from Polaris opposite the Big Dipper. Using the pointer stars and moving in the opposite direction will take you to Leo. By following the curve, or arc, of the dipper's handle you will find first the bright star Arcturus in Boötes, and continuing on you will come to a second bright star, Spica in Virgo. As the mnemonic goes, you "arc to Arcturus and speed to Spica."

Of the six Messier objects in Ursa Major three are good candidates for small to medium telescopes. Bode's Galaxy and the Cigar Galaxy (M81 & M82) can be found by following a line from the star Phecda to Dubhe and continuing the same distance beyond Dubhe. The two objects are quite close together and can both be seen in the eyepiece field of view at lower powers of about 40×. The Pinwheel Galaxy (M101) is also fairly bright and can be found as the third point of an equilateral triangle with Mizar and Alcaid in the Big Dipper's handle.

Ursa Minor

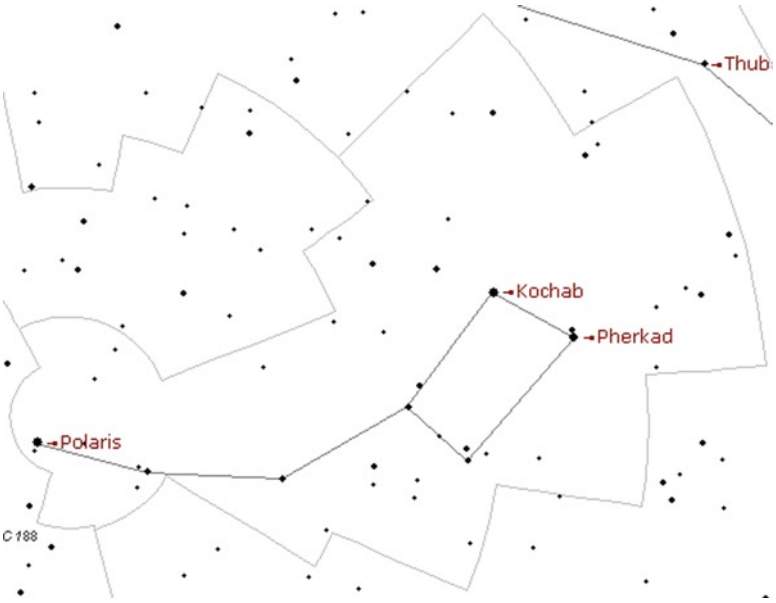

Fig. 5.2 Star chart of Ursa Minor (courtesy Starry Night Education)

Named Stars of Ursa Minor

Bayer designation	Mag.	Common name	Translation
ALPHA	1.96	Polaris	"Pole star"
BETA	2.06	Kochab or Kokab	"Star"
GAMMA	3.00	Pherkab	"Calf"

Messier Objects in Ursa Minor – None

The Description

This constellation is easily found by following the two stars (called The Pointers) at the end of the Big Dipper's bowl toward its open end. Follow this line to the Pole Star, Polaris, which marks the end of the tail of Ursa Minor and the end of the handle of the Little Dipper. This constellation, illustrated in Fig. 5.2, extends in direction opposite the Big Dipper and looks similar, but smaller.

Polaris is actually an optical double star, meaning that the stars appear next to each other because of their alignment to our observing point. They are actually very far apart, unlike binary double stars that actually orbit around each other. Polaris B can be seen even in modest telescopes. Although Polaris is currently the pole star Earth's precession, which is caused by small perturbations to Earth's axis of rotation, will cause the sky to shift over time. The precession actually has a cycle of 25,800 years during which time other stars will serve as the pole star, including Thuban in Draco and Vega in Lyra.

The Legend

Callisto was the beautiful daughter of King Lycaon of Arcadia. She had a great love of hunting and became an attendant to Diana, goddess of hunting. As with so many beautiful women she attracted the attention of Jupiter. He would disguise himself as Diana and go with Callisto to guide her with her hunting. But when they were out of sight of the others he would embrace her. Callisto became pregnant and together they had a son named Arcas. This brought out the jealousy and rage in Juno, and she changed Callisto and Arcas into the form of bears and sent them wandering the forests of Arcadia.

Later Diana was hunting in those same woods and came upon Callisto. Not realizing who it was Diana drew her bow and shot Callisto turned bear and killed her. Jupiter, distraught over this turn of events, decided to correct the wrong by placing Callisto among the stars. He grasped her by the tail and flung her into the heavens, where she became Ursa Major. In order that she might have company, Jupiter also changed her son, Arcas, into a bear and flung him into the heavens as well. He became Ursa Minor. To this day stargazers like to say that both bears have extremely long tails because they were stretched when Jupiter hurled them into the sky.

Juno was enraged when she discovered what Jupiter had done. She did not want them honored by placement among the stars. She asked Poseidon, god of the sea, never to allow the bears to descend into the ocean to rest as the other stars were allowed to do. Even today, these two constellations rotate around the northern sky, never passing below the horizon.

Boötes – The Herdsman (or the Plowman)

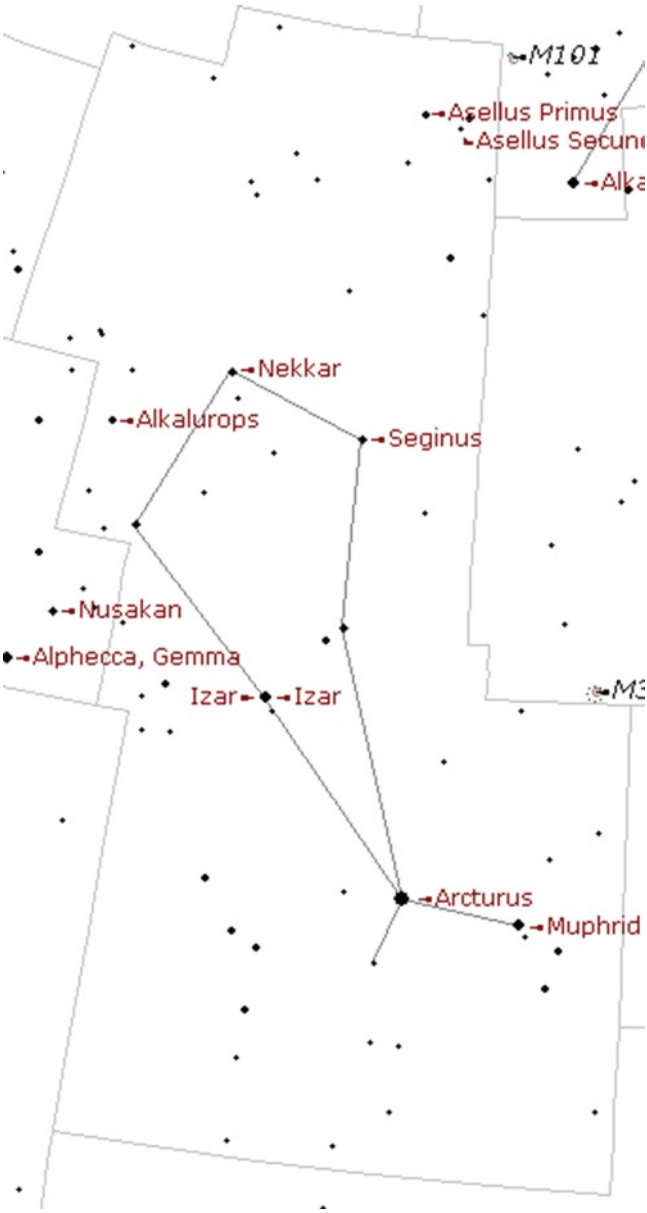

Fig. 5.3 Star chart of Boötes (courtesy Starry Night Education)

Named Stars of Boötes

Bayer designation	Mag.	Common name	Translation
ALPHA	–0.04	Arcturus	"Bear-guard"
BETA	3.46	Nekkar or Nakkar	"Cattleman"
GAMMA	3.03	Seginus	From Theguius; medieval Latin translit. of Arabic tlt. of Greek "Bootes"
EPSILON	2.34	Mirak, Izar, or Pulcherrima	"Loins" or "loincloth"
ETA	2.65	Muphrid	"Isolated, single one (of the lance-bearer)"
MU	4.31	Alkalurops	"Shepherd's crook"
THETA	4.04	Asellus Primus	"First donkey colt"
IOTA	4.75	Asellus Secondus	"Second donkey colt"

Messier Objects in Boötes – None

The Description

Once you have the Big Dipper in sight, Boötes (See Fig. 5.3) is not difficult to find. Its major star, Arcturus, is easily found by taking the three stars in the handle of the Big Dipper and, using the natural arc they form, "arc to Arcturus." Its translation, "Bear-watcher" comes from its proximity to Ursa Major. Two stars flank Arcturus and a narrow "V" shape of four stars extends toward the north with one star at the top (which would complete the kite-shaped circuit of stars).

The stars "Nusakan" and "Alphecca, Gemma" identified on the star chart are actually associated with neighboring constellation Corona Borealis. There are no Messier objects in Boötes.

The Legend

Boötes has been known by several names. In *The Odyssey* he is mentioned as a wagon driver. In the eighth century B.C. Hesiod called the same constellation Arctophylax (similar to Boötes' major star Arcturus), which means "Bear-keeper." In fact, he appears to be chasing the Great Bear (Ursa Major) through the heavens.

Given his position in the heavens, the most appropriate legend starts with his brother Erectheus, who was an Athenian leader. Erectheus tricked Boötes and robbed him of his inheritance, leaving him penniless. Completely destitute, Boötes wandered Earth hunting food and hiring himself out to tend herds or gather crops. One day while planting seeds by hand Boötes stood up with a marvelous idea. He took a sword and hammered it into the shape of a plow (the Big Dipper), hooked it

up to an ox, and simplified the work of planting crops while increasing the yield of the soil significantly. Delighted with Boötes' invention, Ceres (Virgo), the goddess of grain and plenty, beseeched Jupiter to honor Boötes by placing him among the stars, which he did.

Finally, there is the legend which depicts Boötes as Icarius of Athens. The story revolves around Liber (better known by his Greek counterpart, Dionysus), son of Jupiter and the mortal Semele. Juno, queen of the immortals, was angry and jealous of Jupiter's and Semele's marriage. She tricked Semele into making Jupiter reveal his brilliant immortality, which overwhelmed Semele and caused her death.

Juno did not know of their son until Liber grew to boyhood. It was then that his identity was discovered by Ino and revealed to Juno. Jupiter protected the boy by disguising him as a goat and carrying him to Mount Nysa in Thrace where Liber was raised by water-nymphs.

When Liber matured into manhood he discovered how to raise grapes and make them into wine. He decided to give mankind the gift of wine for comfort and joy. He eventually traveled to Athens where he met Icarius. Icarius welcomed Liber and his gift. To show his gratitude Icarius had a celebration and served the wine to his friends. They had never had wine before and, when they felt its strange effects, they thought that Icarius had poisoned them. In fear and confusion they attacked and killed Icarius and threw his body into a well.

Icarius' daughter, Erigone, grew worried when her father did not return. She took his faithful dog and together they searched for her father. When they found his body, Erigone was so saddened with grief that she hung herself.

Jupiter saw all that had happened and was so moved that he placed the three of them among the stars and marked each with a prominent star. Icarius became Boötes with its bright star Arcturus. Erigone became Virgo with the star Spica, and Icarius' faithful dog became Canis Minor with its bright star, Procyon.

Virgo – The Virgin

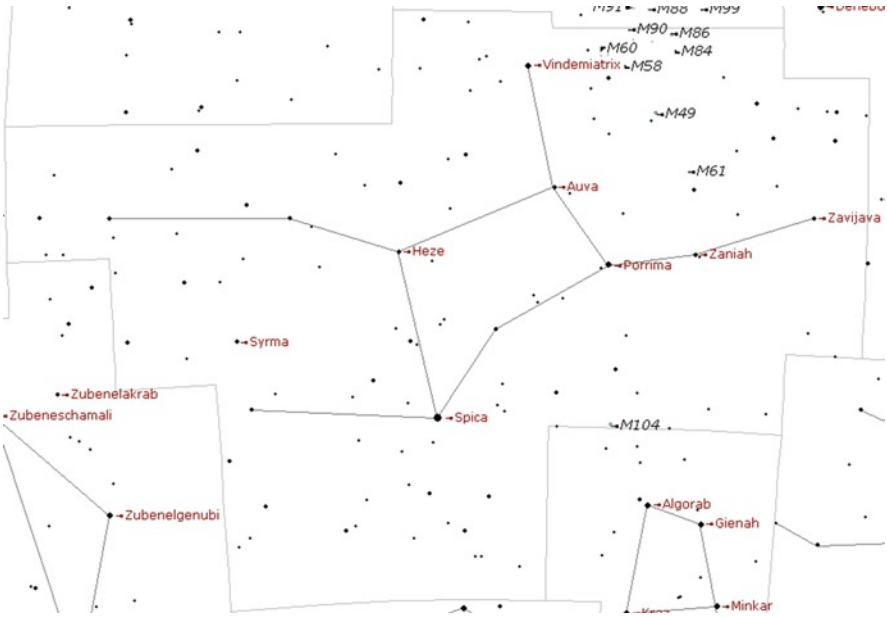

Fig. 5.4 Star chart of Virgo (courtesy Starry Night Education)

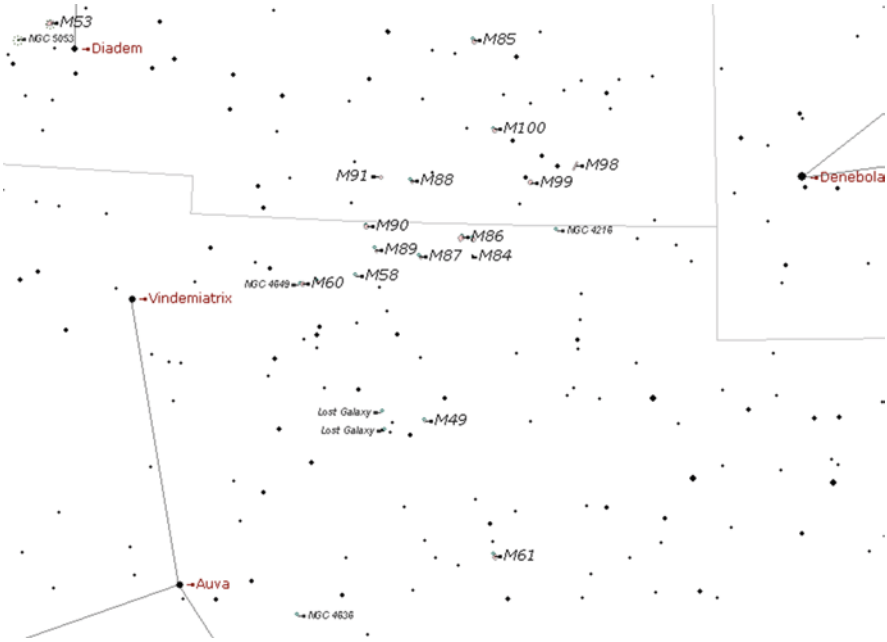

Fig. 5.5 Star chart of the Virgo Cluster of galaxies (courtesy Starry Night Education)

Named Stars of Virgo

Bayer designation	Mag.	Common name	Translation
ALPHA	0.96	Spica	"Ear of wheat" (held by Virgo)
BETA	3.59	Zavijava or Alaraph	"Corner of the barker"; "grape gatherer"
GAMMA	2.74	Porrima	Roman goddess of childbirth
DELTA	3.39	Auva	"The barker"
EPSILON	2.85	Vindemiatrix	"Vine-harvestress"
ZETA	3.38	Heze	Origin of name is unclear
ETA	3.89	Zaniah	"Corner"
IOTA	4.07	Syrma	"Train" (of a garment)

Messier Objects in Virgo

Messier	Mag.	Name	Type
49	8.4		Elliptical galaxy
58	9.7		Spiral galaxy
59	9.6		Elliptical galaxy
60	8.8		Elliptical galaxy
61	9.7		Spiral galaxy
64	8.5	The Blackeye Galaxy	Spiral galaxy
84	9.1		Elliptical galaxy
85	9.1		Elliptical galaxy
86	8.9		Elliptical galaxy
87	8.6	Virgo A	Elliptical galaxy
88	9.6		Spiral galaxy
89	9.8		Elliptical galaxy
90	9.5		Spiral galaxy
91	10.2		Spiral galaxy
98	10.1		Spiral galaxy
99	9.9		Spiral galaxy
100	9.3		Spiral galaxy
104	8.0	The Sombrero Galaxy	Spiral galaxy

The Description

There are a number of Messier objects northwest of the star Vindemiatrix too numerous to be labeled in the star chart of Virgo found in Fig. 5.4. These objects are all galaxies and are known collectively as "The Virgo Cluster." The cluster actually extends into the neighboring constellation of Coma Berenices, which is not one of Ptolemy's 48 constellations. Figure 5.5 is a star chart that magnifies this area of the sky. The accompanying Messier table includes objects in both Virgo and Coma Berenices.

Returning to the three stars that make up the handle of the Big Dipper you can follow the stars' curving motion past Arcturus to complete the mneumonic "Arc to Arcturus and speed to Spica" locating the major star Spica in the constellation Virgo, the Virgin. Virgo is standing sideways in the heavens with two lines of stars extending to the east of Spica while her body, formed by a "U" shape of stars, extends northwest. They look like her arms; she is holding a bundle of grain in her right arm.

The Legend

Virgo has already been mentioned as representing Erigone, Icarius' daughter in the legend of Boötes.

Another legend concerns Jupiter's sister, Ceres, and her daughter Proserpina, who was fathered by Jupiter. One day Proserpina was gathering flowers when Pluto, god of the underworld, came by in a chariot pulled by four midnight black horses. Pluto was quite taken with Proserpina's beauty and decided she should be his wife. Pluto lured Proserpina aboard his chariot and drove off. Pluto took his trident and struck the earth, whereupon it opened, allowing Pluto to return to his dark kingdom with Proserpina, whom he made his queen.

Ceres did not know what happened to her daughter. In her anxiety to find out what had become of her daughter she did not allow anything to grow until Proserpina was returned. All over the world crops began to fail, and mankind began to face the worst famine in history. Ceres finally learned of Pluto's theft and pleaded with Jupiter for Proserpina's return. Jupiter, however, said that Pluto deserved Proserpina's hand. Still, to satisfy Ceres' demands Jupiter agreed to allow Proserpina's return – provided she had not eaten pomegranate seeds, the fruit of the underworld. Unfortunately, at Pluto's urging, Proserpina had eaten six pomegranate seeds. Jupiter could see the ruin that Ceres was doing to the earth, so he agreed to allow Proserpina to return and spend half of the year with her mother Ceres; the remaining 6 months of the year she must spend with Pluto.

And so, as the constellation Virgo, Proserpina rises in the spring and is with her mother. Ceres is joyful and crops flourish. But when Proserpina returns to the underworld with the setting of Virgo in the autumn Ceres is unhappy and allows crops to die and winter to settle in.

Virgo is also associated with the Roman goddess Astraea, whose story is found under the constellation Libra.

Corvus – The Crow

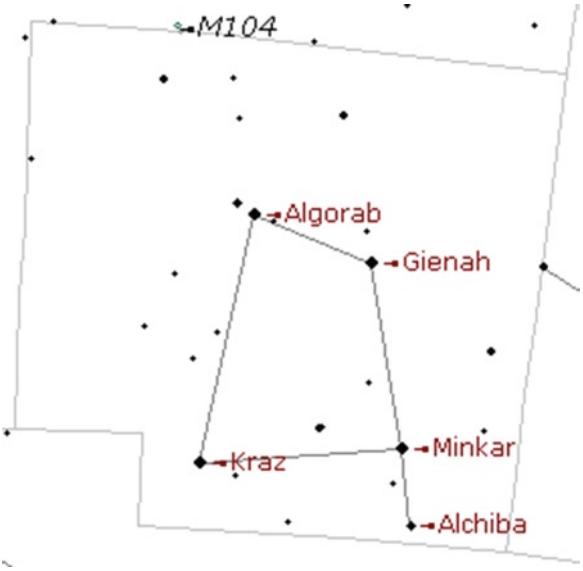

Fig. 5.6 Star chart of Corvus (courtesy Starry Night Education)

Named Stars of Corvus

Bayer designation	Mag.	Common name	Translation
ALPHA	4.02	Alchibah	"Tent"
BETA	2.65	Kraz; also Tso	Meaning unknown; "left-handed lynch-pin" (from Chinese carriage constellation)
GAMMA	2.58	Gienah	"Wing"
DELTA	2.94	Algorab	"Raven"
EPSILON	3.02	Minkar	"Beak"

Messier Objects in Crater – None

The Description

Moving east from Spica in Virgo, you will see four stars forming a four-sided figure with an additional star by the upper left and lower right stars. Corvus, illustrated in Fig. 5.6, is depicted as flying to the south.

The Legend

The story of Corvus is contained in the Legend of Hercules chapter of this book.

Crater – The Cup

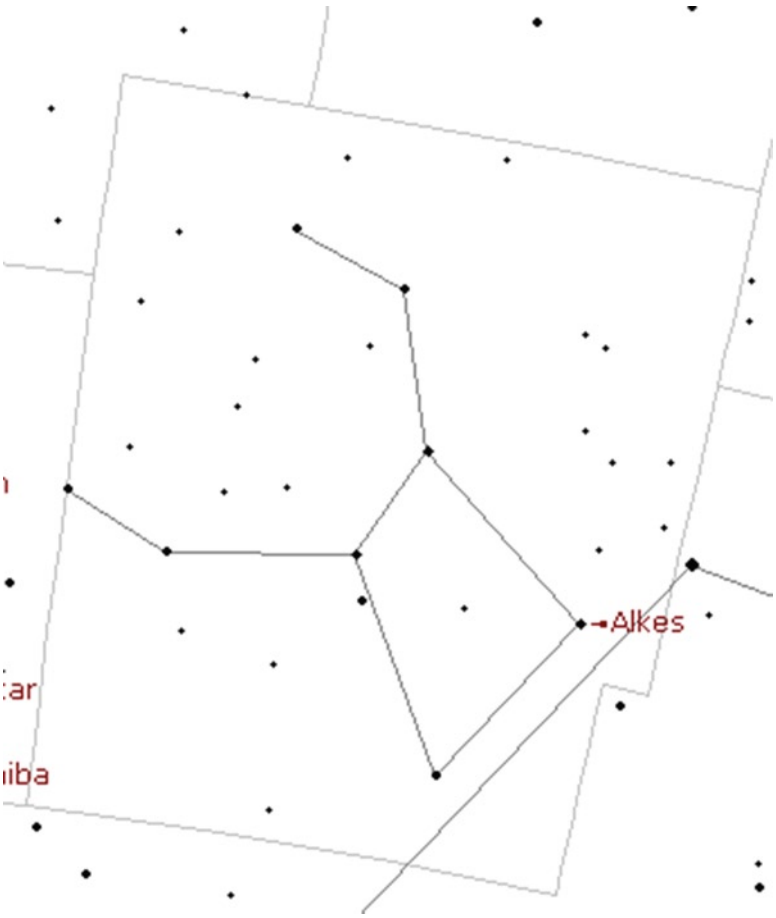

Fig. 5.7 Star chart of Crater (courtesy Starry Night Education)

Named Stars of Crater

Bayer designation	Mag.	Common name	Translation
ALPHA	4.08	Alkes	"Cup"

Messier Objects in Crater – None

The Description

Just east of Corvus you will find six faint stars forming a semicircle with its opening to the east. The center two stars of the semicircle join with two additional stars just to the southwest, which form a base for the cup. The cup appears to be pouring its contents into the heavens as seen in Fig. 5.7.

The Legend

The story of Crater is contained in The Legend of Hercules chapter of this book.

Centaurus – The Centaur

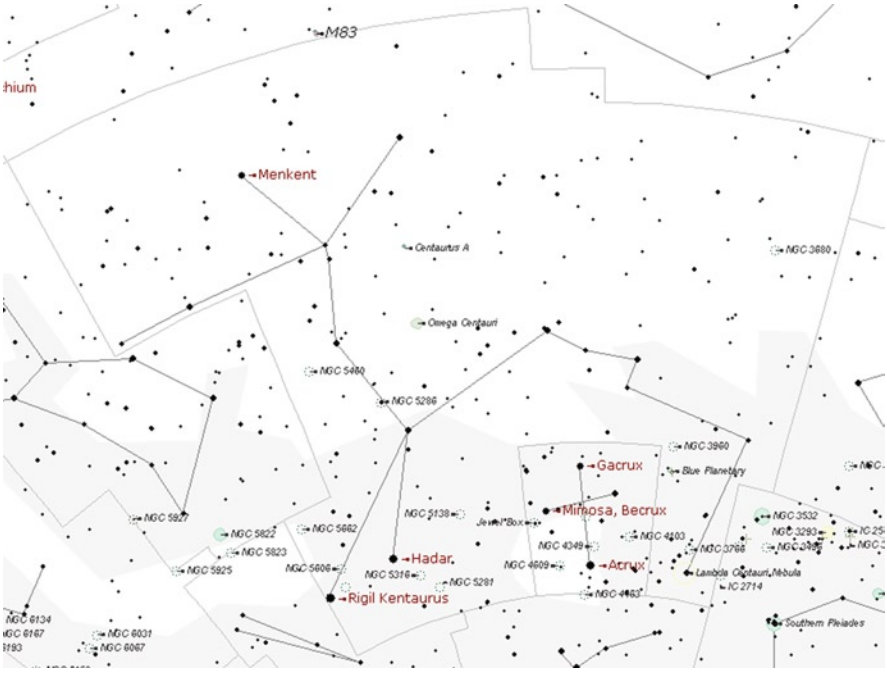

Fig. 5.8 Star chart of Centaurus (courtesy Starry Night Education)

Named Stars of Centaurus

Bayer designation	Mag.	Common name	Translation
ALPHA	−0.01	Rigel Kentaurus or Rigilkent	"Foot of the centaur"
BETA	0.60	Hadar or Agena	(No known translation) ; from A = alpha (wrong) and genu = "knee"
GAMMA	2.20	Muhlifain	(Similar to Gamma CMa)
THETA	2.06	Menkent	"Shoulder of the centaur"

Messier Objects in Centaurus – None

The Description

This constellation, illustrated in Fig. 5.8, is very low on the southern horizon and is best seen in mid-May. It lies directly below Virgo and the tail of Hydra, where there are two moderately bright stars marking the head and the left arm of the Centaur. Below and between these stars are three faint stars marking the center of the stick figure. From this point, another arm stretches toward the west and the body extends to the horizon.

Alpha Centauri or Rigil Kentaurus is the closest star system to the Sun at just over 4 light years. It is actually a triple star system with Alpha Centauri being a double star at magnitude zero. Proxima Centauri is actually the closest star to the Sun at 4.2 light years but is only magnitude 11 and so requires a medium-size telescope to see.

There are no Messier objects in Centaurus, but there are a large number of NGC objects, the most spectacular of which is Centaurus A (NGC 5128), a galaxy located about 11 million light years away with a prominent dust lane. At magnitude 6.84 it is the fifth brightest galaxy in the sky and an easy object for amateur telescopes at latitudes of less than 30 degrees. The remainder of the NGC objects can be found in Appendix D of this book.

The Legend

This story begins with Jupiter's invitation to Ixion of Thessaly to join him for a meal. While at table, Ixion is enchanted by Juno and looks passionately at her. Jupiter can see what is happening and fashions a false Juno from a cloud. Ixion is delighted when he takes this "Juno" and finds her willing to go to bed with him, but when Jupiter catches him in the act he punishes Ixion by sending him to Hades where he is bound to a flaming wheel.

Somehow, in the heat of the moment, Jupiter completely forgets about the cloud woman known as Nebulae. She gives birth to Centaurus, who eventually mates with the mares of Thessaly in Greece. From this union come the beasts or monsters know as *centaurs,* strange creatures which have the anatomy of a man above the waist and the body of a horse below the waist. They usually take on the names of mountains or trees. The centaurs are wild creatures, lustful and very fond of wine, which unfortunately makes them drunk and uncontrollable.

There seemed to have been two kinds of centaurs – wise and friendly ones, such as Chiron and Pholus, who became companions of some of the Greek heroes, and wild and violent beasts (represented by the constellation Sagittarius) who fought with and were eventually conquered by the Lapiths and Hercules.

Lupus – The Wolf

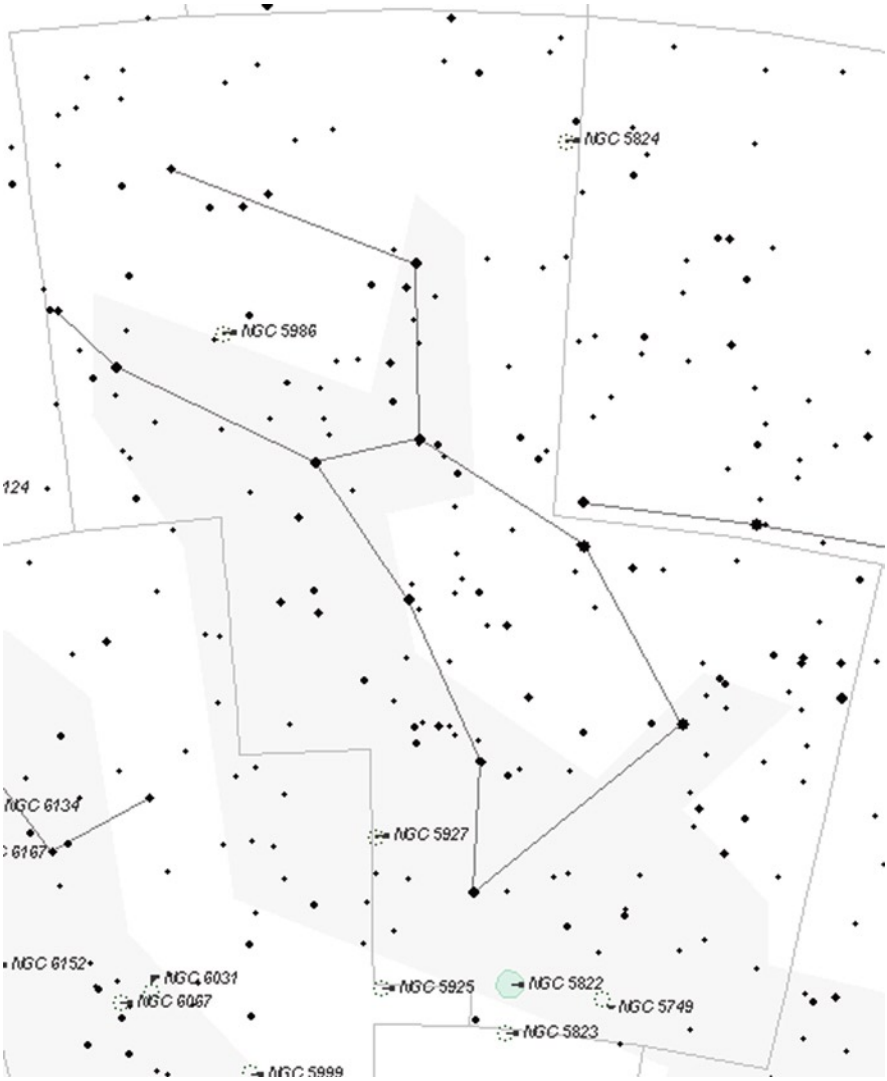

Fig. 5.9 Star chart of Lupus (courtesy Starry Night Education)

Named Stars of Lupus – None

Messier Objects in Lupus – None

The Description

This trans-seasonal, faint constellation illustrated in Fig. 5.9 has no named stars and no stars brighter than magnitude 2.3. Best seen in June Lupus is found below Libra, east of Centaurus and west of Scorpius. The wolf appears to be on its hind feet. Off the right claw of Scorpius find a faint star marking the ear of the wolf. Proceed southwest to a double star and south to a roughly triangular shape of stars. Lupus' hind feet are on the horizon for most observers in the northern hemisphere and his front feet are below his ear.

The Legend

The wolf plays a prominent role in the story of Romulus and Remus. These two lads were the twin sons of Rhea Silvia and Mars, the god of war. Rhea Silvia was appointed by King Amulius to be a Vestal Virgin (priestess for the goddess Vesta). But Mars found her incredibly beautiful and seduced her, resulting in her pregnancy. Obviously, Rhea Silvia's motherhood was a tremendous disgrace for the ruthless King Amulius. She was certain that her sons were fathered by Mars, but Amulius had been disgraced, so he condemned her and her sons to death by drowning in the Tiber River. Rhea was thrown into the raging water of the Tiber, which was in full flood. She did not drown, however, as she was saved by the river god Tiberinius, made immortal, and became his wife.

Meanwhile, the twins were placed in a basket and sent down the raging Tiber. Mars was indeed the father of the twins and he would not allow them to die. The basket pitched and rolled as it careened down the river. The twins lay helpless as the basket was nearly swamped on several occasions. Eventually it came to a calmer area and the basket became entangled in exposed roots, where it remained safe until the flood subsided. Mars, having saved his abandoned babies from the flood, now had to find some way to take care of them. The wolf was a creature sacred to Mars, and it so happened that a great she-wolf lived in a cave near the river with her two cubs. One day as she was getting a drink at the river she heard the cries of the twins. She went to the basket, worked open the lid, and found the two babies. Instead of eating them (as you might expect), she removed the babies and carried them back to her cave, where she cleaned them up and nursed them with her milk. Nestled with the warm wolf and her cubs, the abandoned babies lived happily.

The boys continued to grow and eventually required solid food, but the food of the wolves was not sufficient for them. Realizing this, Mars sent birds into the

countryside to get bread and wild fruit and take it to the cave. Mars also realized that, as the boys grew, food and shelter would not be enough. Nearby there lived a herdsman, Faustulus, and his wife, Laurentia. They had no children, and Mars knew they would make wonderful foster parents. One day Faustulus was near the river when he found the basket. He looked around and saw the birds entering and leaving the cave. Thinking this was strange, he waited until the wolf had left with her cubs before he entered the cave. As he became accustomed to the darkness, he heard strange whimpers and then made out the form of the two babies lying in bed of dry grass. He gathered them up and ran back to his hut, where he gave them to his astonished wife. He realized that these were no ordinary children. They must have been children of gods given to his care to love and to cherish, so he and Laurentia raised them as their own. They named the boys Romulus and Remus, who grew to be brave, strong young men.

Together they had many adventures, including avenging the evil King Amulius who had tried to kill them. Eventually the twins fought each other for the leadership of the Palatine Hill. Romulus became king after killing his brother, and a new city – Rome – was built in his name.

Leo – The Lion

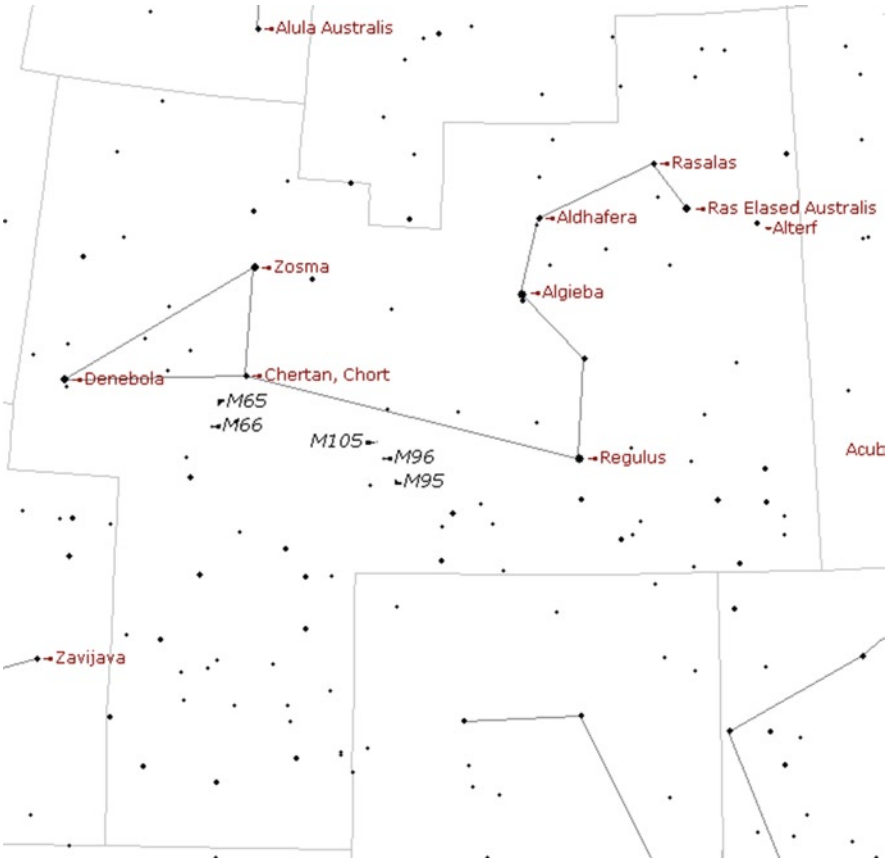

Fig. 5.10 Star chart of Leo (courtesy Starry Night Education)

Named Stars of Leo

Bayer designation	Mag.	Common name	Translation
ALPHA	1.35	Regulus	"Prince", "heart of the lion"
BETA	1.92	Denebola	"Tail of the lion"
GAMMA	2.01	Algieba	"Forehead"
DELTA	1.32	Zosma	"Enzonement" or "loincloth"
EPSILON	2.97	Ras Elased Australis	"Head of the lion"
ZETA	3.43	Adhafera	"Curl" (of hair)
THETA	3.33	Coxa or Chort or Chertan	"Hip" or "small rib" or "two small ribs"
IOTA	4.00	Tsze Tseang	"Second general"
LAMBDA	4.32	Alterf	"Glance"
MU	3.88	Rasalas	"Head of the lion"

Messier Objects in Leo

Messier	Mag.	Name	Type
65	9.3		Spiral galaxy
66	8.9		Spiral galaxy
95	9.7		Spiral galaxy
96	9.2		Spiral galaxy
105	9.3		Elliptical galaxy

The Description

Leo, illustrated in Fig. 5.10, can be found high in the mid-April sky. You can locate it by following the Pointer Stars of the Big Dipper south instead of north along their line. As you traverse just south from the point overhead (the zenith), the line will pass between what appears to be a backward question mark to the west, and a right triangle to the east. These mark, respectively, the head and haunches of Leo as he lies in the heavens.

The backwards question mark is an asterism called the "Sickle" of Leo. At its base is the bright star Regulus. Of the brightest stars in the sky Regulus lies closest to the ecliptic and is often occulted by the Moon. Regulus is actually a quadruple star system, though amateur telescopes are only able to resolve it as a binary system.

The five Messier objects are all galaxies. M65, M66, and a companion galaxy NGC 3628 (mag. 9.5) are known at the Leo Triplett of galaxies, while M95, M96, and M105 along with two fainter galaxies, NGC 3384 (mag. 10) and NGC 3389 (mag. 11.8) form the Leo I galactic group. The NGC objects are not shown in the star chart above but can be found on more detailed charts.

The Legend

The story of Leo is contained in The Legend of Hercules chapter of this book.

Hydra – The Watersnake

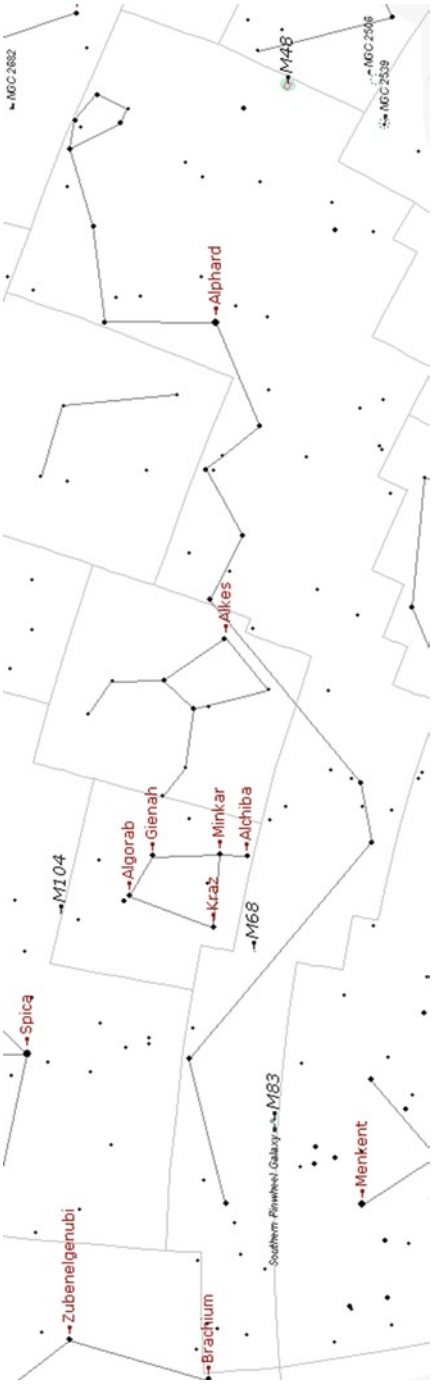

Fig. 5.11 Star chart of Hydra (courtesy Starry Night Education)

Named Stars of Hydra

Bayer designation	Mag.	Common name	Translation
ALPHA	1.99	Alphard	"The solitary" or "heart of the hydra"

Messier Objects in Hydra

Messier	Mag.	Name	Type
48	5.5		Open cluster
68	7.8		Globular cluster
83	7.6		Spiral galaxy

The Description

This long, meandering, but faint constellation illustrated in Fig. 5.11 stretches across the southern sky in springtime. Starting with a small group of stars midway between Canis Minor and Leo (high in the southwestern sky) follow the string of stars directly below Crater and Corvus to a point low in the southeastern sky just above the horizon. The entire constellation can only seen by those at lower latitudes.

Three Messier objects are found in Hydra. M48 is a rather bright open cluster located at the head of the serpent. At magnitude 5.8 it would be visible at a dark sky sight to the unaided eye and should be a spectacular view even in binoculars and small telescopes. Globular cluster M68 and spiral galaxy M83 are fainter but should be attainable in modest telescopes.

The Legend

The story of Hydra is contained in The Legend of Hercules chapter of this book.

Cancer – The Crab

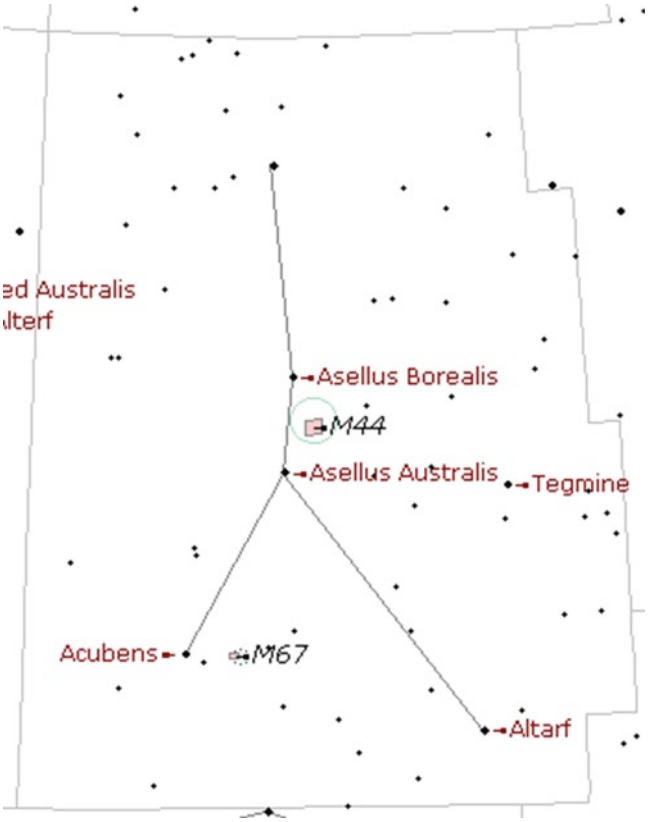

Fig. 5.12 Star chart of Cancer (courtesy Starry Night Education)

Named Stars of Cancer

Bayer designation	Mag.	Common nme	Translation
ALPHA	4.25	Acubens	"Claw"
BETA	3.50	Altarf	"Glance" or "eye"
GAMMA	4.65	Asellus Borealis	"Northern donkey"
DELTA	3.93	Asellus Australis	"Southern donkey"
ZETA	4.65	Tegmine	"Cover"

Messier Objects in Cancer

Messier	Mag.	Name	Type
44	3.7	The Beehive Cluster – Praesepe	Open cluster
67	6.1		Open cluster

The Description

This obscure early spring constellation illustrated in Fig. 5.12 is located between Gemini and Leo. It consists of seven faint stars; unless one has access to a dark night, it will be difficult to spot this one.

At the heart of the Crab is the Beehive Cluster, M44. At magnitude 3.7 it is brighter than most of the stars that make up the constellation. At a dark sky site this cluster should be easily visible to the naked eye. It is a spectacular object in binoculars and in low power in telescopes.

To the south of the Beehive and just west of Acubens is the open cluster M67. Although much fainter than the Beehive it is still fairly bright at magnitude 6.1 and should be easy object for binoculars and small telescopes.

The Legend

The story of Cancer is contained in The Legend of Hercules chapter of this book.

Chapter 6

The Summer Constellations

The summer nights provide a more comfortable temperature for stargazing, but other challenges await the astronomer. In some localities bugs, especially mosquitoes, can become very bothersome. Be sure to have plenty of repellent ready. The warm air usually results in lower transparency from the higher humidity, dispersing light very efficiently and filtering starlight. This could present a challenge for finding the fainter constellations near light domes or if the Moon is out. Finding a dark sky could be a challenge. It is especially important to make good use of that first clear night after the passage of a cool front, especially if it falls between a last quarter and new Moon. Use the star charts provided to navigate among the stars while enjoying the wonderful legends.

D.E. Falkner, *The Mythology of the Night Sky: An Amateur Astronomer's Guide to the Ancient Greek and Roman Legends*, Patrick Moore's Practical Astronomy Series,
DOI 10.1007/978-1-4614-0137-7_6, © Springer Science+Business Media, LLC 2011

Ophiuchus – The Serpent-Bearer

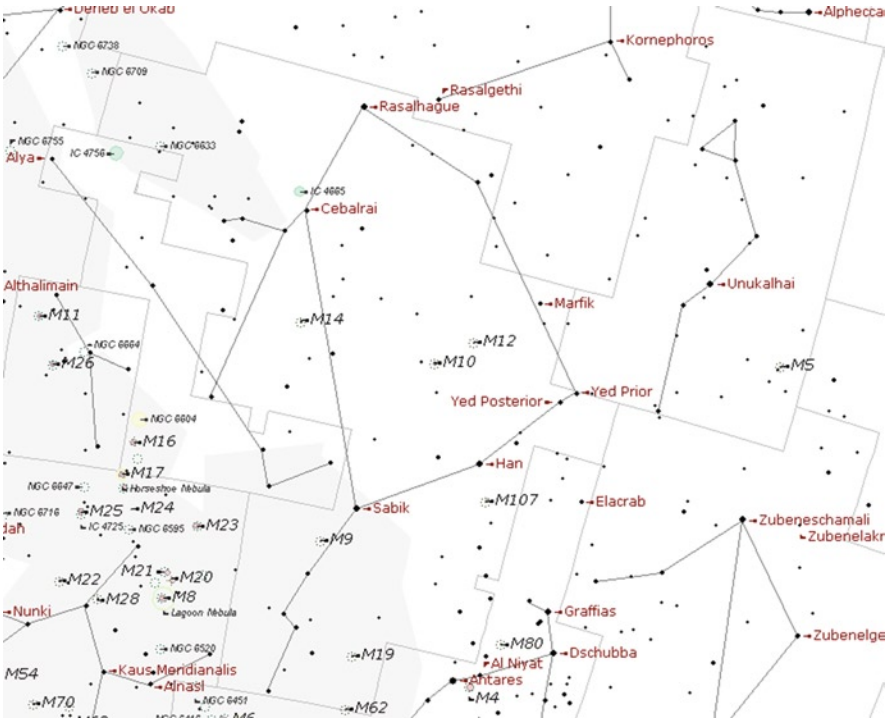

Fig. 6.1 Star chart of Ophiuchus and Serpens (courtesy Starry Night Education)

Named Stars of Ophiuchus

Bayer designation	Mag.	Common name	Translation
ALPHA	2.08	Rasalhague	"Head of the snake"
BETA	2.76	Cheleb or Celbalrai	"Dog of the shepherd"
DELTA	2.73	Yed Prior	"Hand" (before; western)
EPSILON	3.23	Yed Posterior	"Hand" (after; eastern)
ETA	2.43	Sabik	"The preceding"
LAMBDA	3.81	Marfik	"Elbow"
ZETA	2.54	Han	Chinese – no translation

Messier Objects in Ophiuchus

Messier	Mag.	Name	Type
9	7.7		Globular cluster
10	6.6		Globular cluster
12	6.7		Globular cluster
14	7.6		Globular cluster
19	6.8		Globular cluster
62	6.5		Globular cluster
107	7.9		Globular cluster

This constellation, depicted in Fig. 6.1, is large and is devoid of bright stars to help you locate it. It is situated between Hercules and Scorpius. Ophiuchus' brightest star Rasalhague is just over magnitude 2 and is located east of Hercules, left foot. The constellation's basic shape is that of a house, and Rasalhague marks the top of the roof. The house tips slightly to the right as you face south, and the four major stars of the base (Sabik, Han, Yed Posterior, and Yed Prior) lie just above Scorpius. He is wearing his robes and standing majestically in the heavens.

With Ophiuchus so close to the Milky Way there a number of Messier objects, all globular clusters. All of them are fairly bright and can be seen with a small to medium telescope.

Serpens (Cauda and Caput) – The Serpents

Named Stars of Serpens

Bayer designation	Mag.	Common name	Translation
ALPHA	2.63	Unukalhai	"Neck of the snake"
THETA	4.62	Alya	"The fatty tail" (of a breed of Oriental sheep)

Messier Objects in Serpens

Messier	Mag.	Name	Type
5	5.6		Globular cluster
16	6.4	Part of Eagle Nebula	Open cluster

Messier Objects in Scutum

Messier	Mag.	Name	Type
11	6.3	Wild Duck Cluster	Open cluster
26	8.0		Open cluster

The Description

As you will find out in the legend below Ophiuchus represents a medical healer. The serpent has been the historical symbol of the healing arts and remains today as part of the logo for doctors (the winged rod entwined with a snake). It seems appropriate, then, that this healer is flanked by serpents. Going along the base of Ophiuchus, Serpens Caput extends to the west, ending with a triangle of stars forming the serpent's head near Corona Borealis. Serpens Cauda is a line of stars extending east toward Aquila, the Eagle, ending with the star Alya.

Two more Messier objects can be found in Serpens. Globular cluster M5 is west of the base of Serpens Caput, while open cluster M16 can be found east of the base of Serpens Cauda.

The Legend

The constellation depicts Aesculapius, the Roman god of medicine. Aesculapius became a very skilled healer. He became so good, in fact, that he began to revive the dead. This disturbed Pluto, god of the underworld, and he complained to Jupiter about it. Jupiter favored the subordinate gods in their respective realms. He responded to Pluto's demand by striking down Aesculapius with a lightning bolt. In recognition for his superb abilities, however, Jupiter gave the physician a place in the sky holding Serpens, the traditional symbol of his profession.

Corona Borealis – The Northern Crown

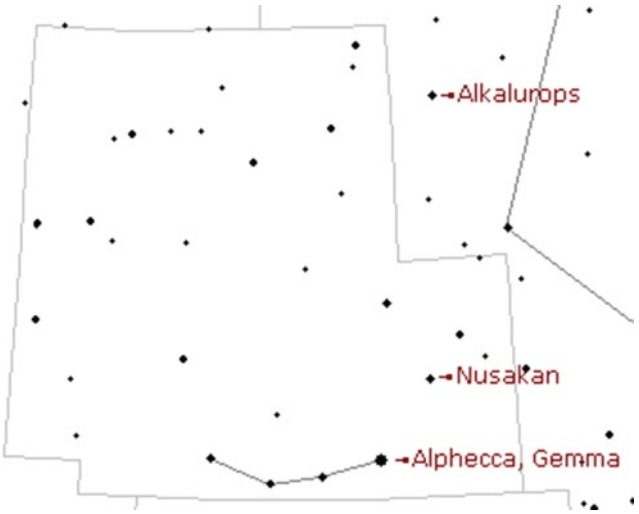

Fig. 6.2 Star chart of Corona Borealis (courtesy Starry Night Education)

Named Stars of Corona Borealis

Bayer designation	Mag.	Common name	Translation
ALPHA	2.22	Gemma or Alphecca	"Gem" or "the broken" (ring of stars)
BETA	3.66	Nusakan	"The two series"

Messier Objects in Corona Borealis – None

The Description

This faint constellation illustrated in Fig. 6.2 is nearly overhead at 9:00 p.m. in early July. Seven stars form a horseshoe shape between the constellations of Hercules and Boötes.

The Legend

According to Greek legend, Corona Borealis was the beautiful golden crown of Princess Adriane of Crete. She received the crown from the gods as a wedding gift for her marriage to Bacchus. Upon her death the crown was set among the stars.

Corona Australis – The Southern Crown

Fig. 6.3 Star chart of Corona Australis (courtesy Starry Night Education)

Named Stars of Corona Australis – None

Messier Objects in Corona Australis – None

The Description

Another faint constellation of summer, this horseshoe-shaped grouping of stars is located directly below the "teapot" of Sagittarius. Illustrated in Fig. 6.3, Corona Australis is generally low to the southern horizon. As such, this constellation may be difficult to spot, especially in the hazy skies of summer.

The Legend

There is no well-defined story associated with this constellation, although there is some reference to Bacchus. As he did with Corona Borealis, Bacchus gave this crown away, this time to his deceased mother, Semele, upon retrieving her from the Underworld.

Another source suggests that the constellation could refer to a wreath worn by the centaur, since it is adjacent to the constellation Sagittarius.

Draco – The Dragon

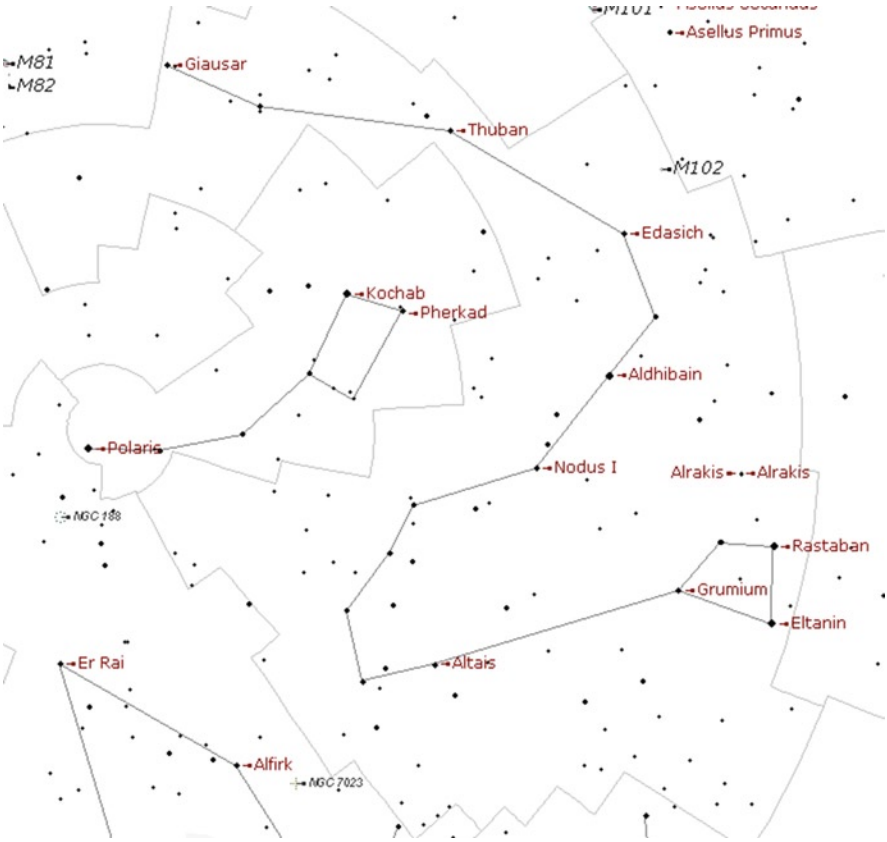

Fig. 6.4 Star chart of Draco (courtesy Starry Night Education)

Named Stars of Draco

Bayer designation	Mag.	Common name	Translation
ALPHA	3.67	Thuban	"Snake"
BETA	2.79	Rastaban	"Head of the snake"
GAMMA	2.24	Eltanin	"Snake" (alternate word; Arabic name for Draco)
DELTA	3.07	Nodus II or Altais	"Second knot" – the second loop in the dragon
ZETA	3.17	Kaou Pih or Nodus I	"First knot" – the first loop in the dragon
IOTA	3.29	Edasich	"Hyena"
LAMBDA	3.82	Giausar	"Dragon" (mythical Persian name designating nodes of lunar orbit)
MU	4.91	Alrakis or Arrakis	"Dancer"
XI	3.73	Grumium	"Jaw"
ETA	2.73	Aldhibain	"The two wolves"

Messier Objects in Draco

Messier	Mag.	Name	Type
102	9.9	Spindle Galaxy	Elliptical galaxy

The Description

This circumpolar constellation, illustrated in Fig. 6.4, is visible throughout the year, but its position in summer is most favorable for viewing. To find the dragon it's easiest to start with the tail and work toward its head. The tail can be found between the Big Dipper and the Little Dipper. The end of his tail is nearly in line with the Pointer Stars and Polaris. Follow the line of stars between the dippers and wrap around the Little Dipper. The stars turn back toward the south again and end with four stars, making the head of the dragon near the star Vega (in Lyra).

The stars in Draco are faint and its position high in the spring and summer skies that make it relatively easy to see. One star in Draco, Thuban, is notable even though it is not the brightest star. About 4,500 years ago Thuban was the pole star. Over the millennia Thuban has gradually drifted away from that position due to Earth's precession. Like a spinning top Earth tends to wobble a little as it rotates on its axis. The cumulative effect of this wobble (about one degree every 72 years) is that the sky has an apparent shift over time. Like the top this wobble is cyclical and repeats itself about every 26,000 years. So, in the year 20,346, if Earth is still around, Thuban will once again be the pole star. This notoriety is undoubtedly the reason why Thuban has earned the designation at Alpha Draconis even though there are seven stars in the constellation that are brighter.

There is one Messier object in Draco, the rather faint elliptical galaxy M102. It is seen edge on, and at higher magnifications a dust lane is visible. Also known as NGC 5866 this object has a rather sordid history. In some references M102 is listed as a duplicate of M101. It was probably first discovered by Peirre Méchain or Charles Messier in 1781. Although referenced by Charles Messier as M102 he never recorded its position and so there was no verification. In 1788 it was independently discovered by William Herchel and placed in his catalog as H I.215.

The Legend

There are two myths about Draco. The first concerns an early fight that occurred between the gods of Olympus and a race of super humans, the *Gigantes,* or Giants, who were huge men with terrible faces and legs like serpents. They were fierce fighters and hated the gods of Olympus. When Jupiter locked up their brothers, the Titans in Tartarus, the Gigantes became outraged and attacked Olympus with boulders and flaming trees. The Olympians were nearly overwhelmed until the prophesied "man in a lion skin" – Hercules – arrived and turned the tide of the battle. He was helped by an herb that made him invulnerable. As the battle raged the gods began to overcome the Gigantes. At one point one of the Gigantes threw a huge serpent at Athena. She snatched the serpent from the air and flung it into the sky. That serpent became Draco, and it continues to writhe in the northern sky to this day!

The second myth depicts Draco as the hundred-headed guardian of the Golden Apples of Hesperides and is found in The Legend of Hercules chapter of this book.

Aquila – The Eagle

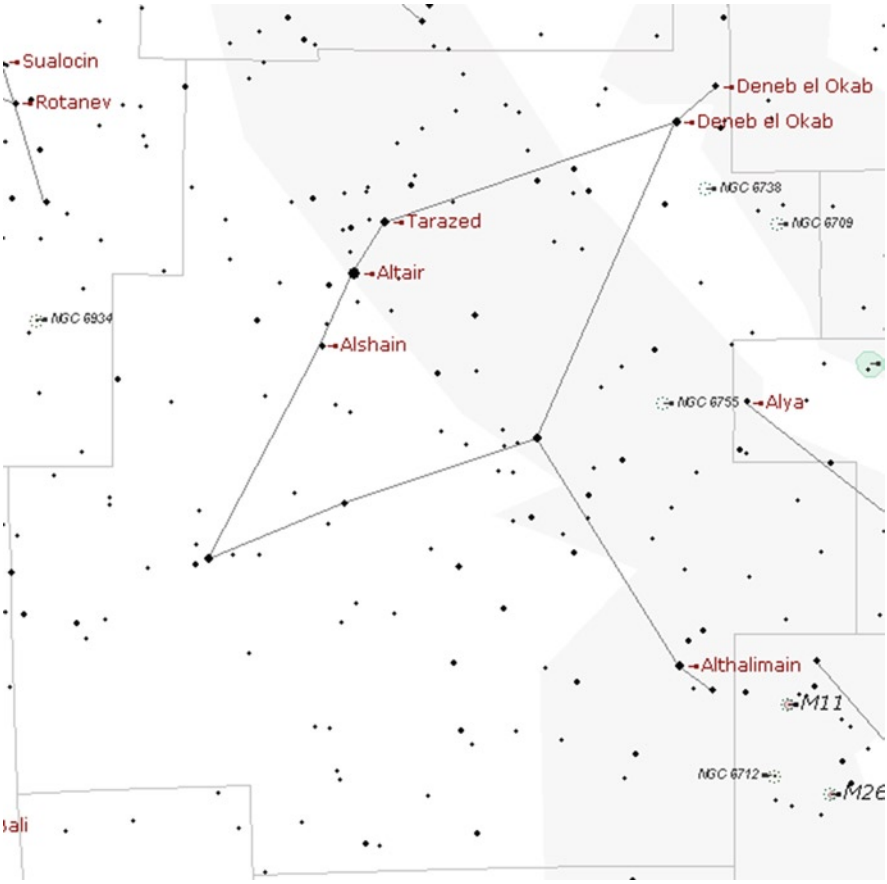

Fig. 6.5 Star chart of Aquila (courtesy Starry Night Education)

Named Stars of Aquila

Bayer designation	Mag.	Common name	Translation
ALPHA	0.76	Altair	"Flying one"
BETA	3.71	Alshain	"Falcon"
GAMMA	2.72	Tarazed	"Plundering falcon"
LAMBDA	3.40	Al Thalimain	"The two ostriches" (with Lamda)
ZETA	2.99	Deneb el Okab	"Tail of the falcon"

Messier Objects in Aquila – None

The Description

This constellation lies between Delphinus, the dolphin, and Serpens Cauda (near Ophiuchus). The tail of the eagle is the bright star, Altair, which is the tip of the Summer Triangle (formed by the stars Deneb – at the tail of Cygnus, Vega – in Lyra, and Altair). From Altair a small line of stars extends to the southeast and northwest to the tips of his wings, and then returns to the center and to the southwest to a small group of stars that forms the head. The eagle appears to be flying to the south-southwest. The star chart of Aquila is found in Fig. 6.5.

The Legend

Aquila represents Jupiter's magnificent golden eagle. Jupiter was very impressed by Ganymede, a handsome, young Trojan prince. One day Jupiter sent the eagle to retrieve Ganymede and transport him to Olympus, where he replaced Juventas as the cupbearer of the gods.

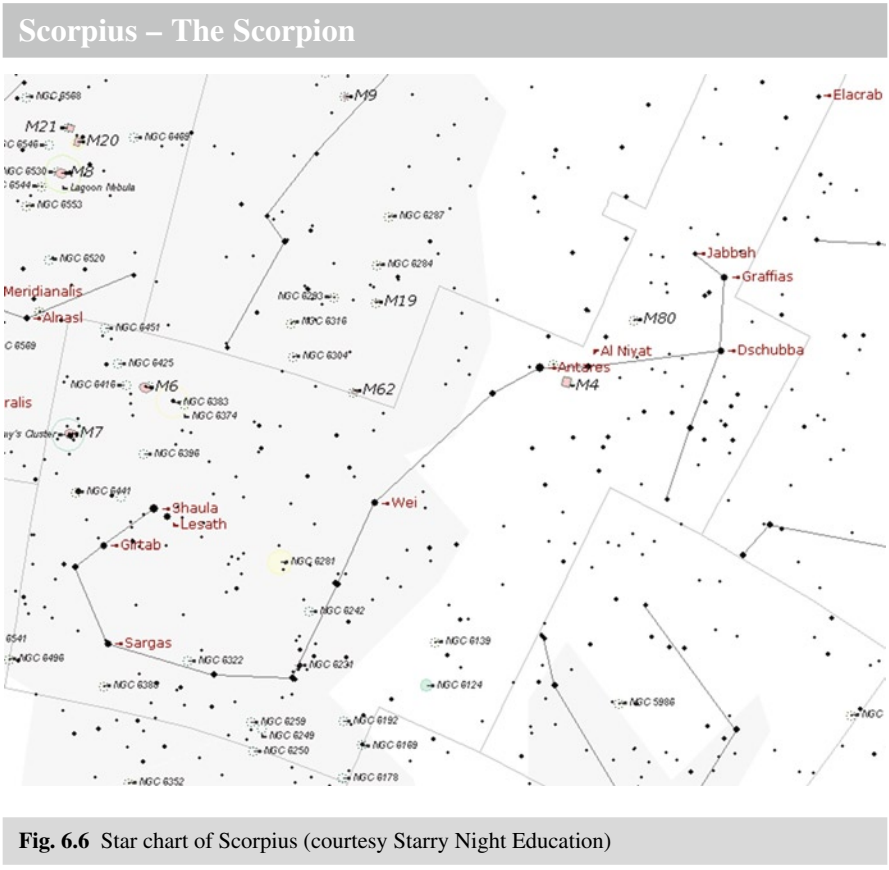

Fig. 6.6 Star chart of Scorpius (courtesy Starry Night Education)

Named Stars of Scorpius

Bayer designation	Mag.	Common name	Translation
ALPHA	1.06	Antares	"Anti-Ares," rival of Mars
BETA	2.56	Graffias or Elacrab	"Claws" (Latin) or "scorpion" (Arabic)
DELTA	2.29	Dschubba	"Forehead"
EPSILON	2.29	Wei	'The tail" (Chinese)
KAPPA	2.29	Girtab	Title of an asterism formed by itself, Lesath, Shaula and Iota Scorpii
THETA	1.86	Sargas	"Seizer/smiter" (Babylonian title; name of a weapon of the God of War)
LAMBDA	1.62	Shaula	"Raised tail"
NU	4.00	Jabbah	"Forehead"
SIGMA	2.82	Al Niyat	"The arteries"
UPSILON	2.70	Lesath or Lesuth	"Sting" or "bite" (of a poisonous animal)

Messier Objects in Scorpius

Messier	Mag.	Name	Type
4	5.6		Globular cluster
6	4.2	The Butterfly Cluster	Open cluster
7	4.1	Ptolemy's Cluster	Open cluster
80	7.3		Globular cluster

The Description

Scorpius, illustrated in Fig. 6.6, is one of the most beautiful and easily recognizable constellations of the summer sky. One of the constellations of the Zodiac it is located south of Ophiuchus, east of Libra, and north of Lupus. At magnitude 1.06 the bright red star Antares is easily spotted in the southern sky. This star forms the "heart" of the Scorpion. Moving up and to the right along a line of stars, you will quickly come to three stars situated in a nearly vertical line. This is the head of the Scorpion, whose claws extend from here toward Libra. Going the other direction from Antares, follow a line of stars that curves toward the horizon before hooking back above the horizon to form the scorpion's stinger.

Antares is the 16th brightest star in the sky and the fourth brightest among the stars near the ecliptic. It is a red supergiant star so large that its surface would be about where the Asteroid Belt is in our Solar System between Mars and Jupiter. It is a binary star having a blue companion star, which is also quite bright. Antares' brightness makes resolving this binary system challenging and will require apertures of 8 inches or larger with high magnification.

Three of the four Messier objects in Scorpius are quite bright and can be seen readily by binoculars or a telescope. M4 is a globular cluster just west of Antares and is an easy target for small telescopes. M6 and M7 are both open clusters found to the northeast of the scorpion's tail. Despite their brightness, at –32 degrees and –34.5 degrees declination, respectively, these clusters will be near or below the horizon for observers north of latitude 45 degrees, making them a challenge to find. Although a little fainter the globular cluster M80 should be fairly easy to find, located northwest of Antares halfway to the scorpion's head.

The Legend

The story of the Scorpion can be found in The Legend of Orion in the winter constellations chapter.

Libra – The Scales

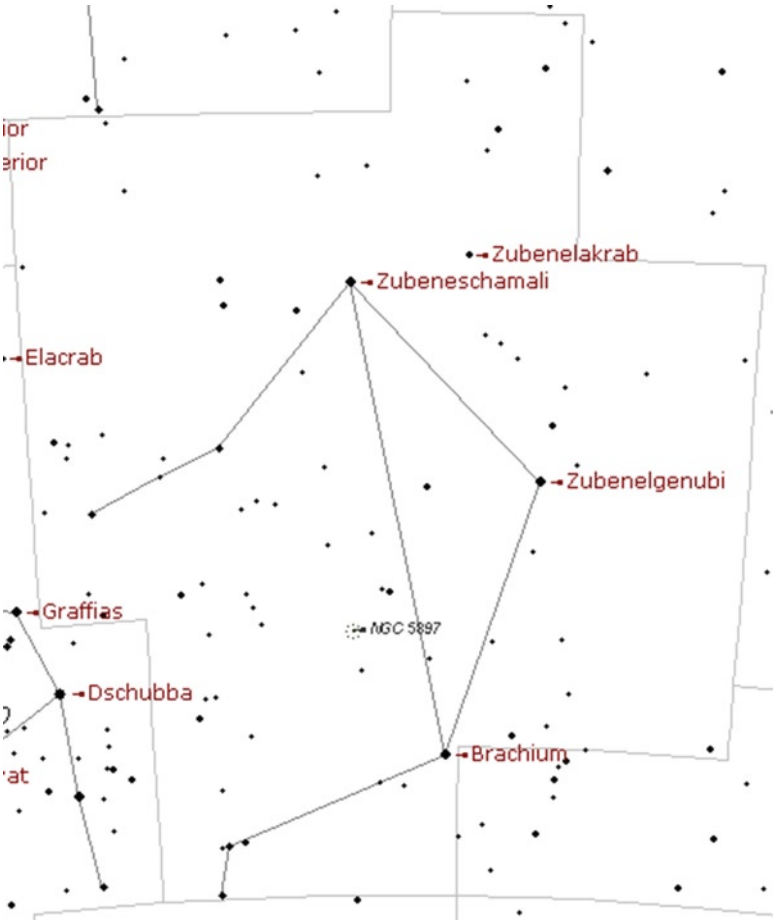

Fig. 6.7 Star chart of Libra (courtesy Starry Night Education)

Named Stars of Libra

Bayer designation	Mag.	Common name	Translation
ALPHA	2.75	Zubenelgenubi	"Southern claw" (of the scorpion)
BETA	2.61	Zubeneschamali	"Northern claw" (of the scorpion)
ETA	5.41	Zubanalakrab	"Scorpion's claw"
SIGMA	3.25	Brachium	"Arm"

Messier Objects in Libra – None

The Description

The four stars that make up this constellation form a kite shape just to the east of the head of Scorpius. Although they are a set of balance scales today, in Ptolemy's time this constellation was sometimes called 'The Claws' and was depicted as the claws of Scorpius. This accounts for the fact that the major stars of Libra have names relating to a scorpion. Its star chart is shown in Fig. 6.7.

The Legend

The Scales are legendary in both Greek and Roman mythology. One of the more famous stories involved Venus' love for the mortal Adonis. The story begins with the mortal Smyrna. She would not honor Venus and because of that Venus caused her to lust after her father. For 12 nights she would sneak in and sleep with him without his knowing it. When he found out he was enraged and started chasing her with his sword drawn. She could see that he was overtaking her so she prayed to the gods to make her invisible. The gods took pity on her and transformed her into a tree and thus she escaped the rage of her father. Nine months later the tree split open and the baby Adonis was born. He was a beautiful baby so Venus took him and hid him from the gods. She carried him to Proserpina in the Underworld and told her to take care of the child until she returned. But Proserpina fell in love with him and would not return him to Venus even when she came to the Underworld for him. The two goddesses quarreled fiercely over Adonis but neither would yield. The matter was taken to Jupiter and he decided to allow Adonis to spend half of the year with each goddess; consequently, Adonis spends fall and winter with Proserpina, queen of the dead, and spring and summer with Venus, goddess of love and beauty. To commemorate the balance of these loves Jupiter placed the Scales in the heavens. For Adonis this story has an even more tragic ending. While on a hunting trip Adonis was attacked by a boar and died.

The Romans also associated Libra with the Scales of Astraea, the goddess of justice. She was the daughter of Jupiter and Themis (which means justice). The Romans pictured the constellation Virgo as Astraea, and the constellation Libra formed her scales of justice. Her scales weighed the evidence of each person's case presented to her. Although there does not seem to be any specific stories, the legend of Astraea carries on to this day. The symbol of the judicial system in the United States is that of the blind-folded Astraea holding the scales of justice.

Sagittarius – The Archer

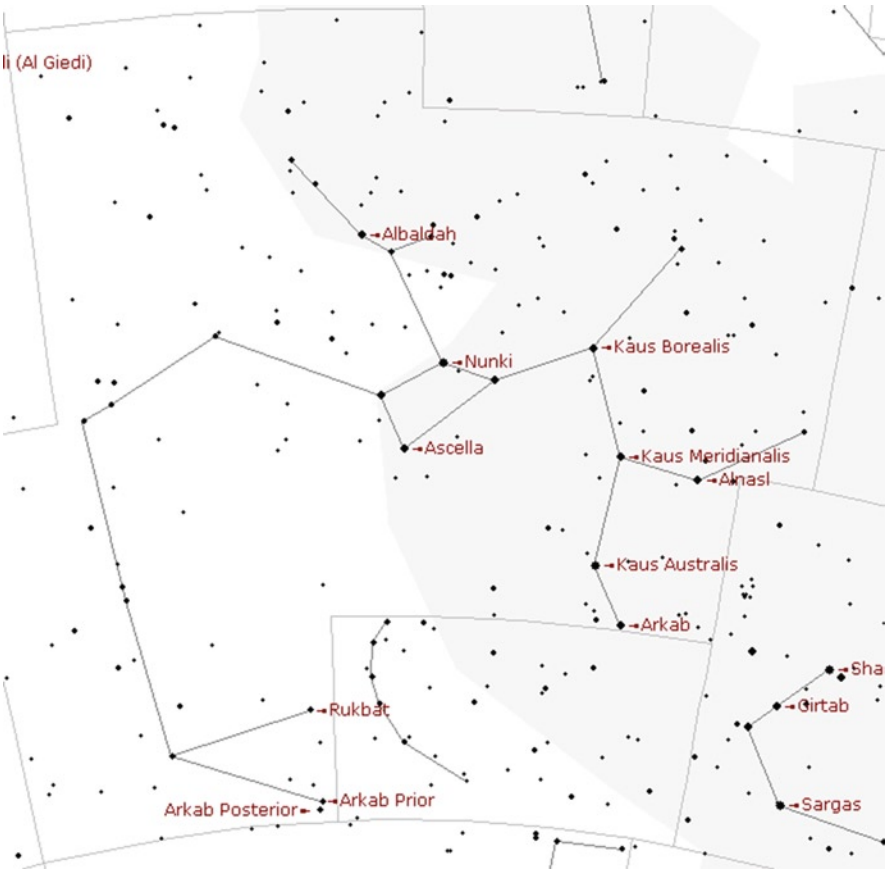

Fig. 6.8 Star chart of Sagittarius (courtesy Starry Night Education)

Named Stars of Sagittarius

Bayer designation	Mag.	Common name	Translation
ALPHA	3.96	Rukbat	"Knee"
BETA-1	3.96	Arkab Prior	"Hamstring"
GAMMA	2.98	Alnasi	"Arrowhead"
DELTA	2.72	Kaus Meridianalis	"Bow" (middle)
EPSILON	1.79	Kaus Australis	"Bow" (southern)
ZETA	2.60	Ascella	"Armpit"
LAMBDA	2.82	Kaus Borealis	"Bow" (northern)
SIGMA	2.05	Nunki	"Of Enki" (Sumerian god of waters & of most ancient city of Eridu)
PI	2.88	Albaldah	"The axe"
BETA-2	4.27	Arkab Posterior	"Hamstring"
ETA	3.09	Sephdar (Arkab)	"Violent warrior" (Note: Arkab label on star chart is incorrect)

Messier Objects in Sagittarius

Messier	Mag.	Name	Type
8	6.0	The Lagoon Nebula	Bright nebula
17	7.0	The Omega, Swan or Horseshoe Nebula	Bright nebula
18	7.5		Open cluster
20	9.0	The Trifid Nebula	Bright nebula
21	6.5		Open cluster
22	5.1		Globular cluster
23	6.9		Open cluster
24	4.6	Milky Way Patch	Milky way cloud
25	4.6		Open cluster
28	6.8		Globular cluster
54	7.6		Globular cluster
55	6.3		Globular cluster
69	7.6		Globular cluster
70	7.9		Globular cluster
75	8.5		Globular cluster

The Description

This constellation, shown in Fig. 6.8, lies east of Scorpius with the most familiar part, the asterism known as "the Teapot," situated north of Corona Australis. See more on the Teapot below. In Roman mythology the centaur was a creature with the torso and upper body of a man and the body of a horse below the waist. The way the constellation is depicted above imagine the upper torso of the centaur archer with the western stars (the trio starting with "Kaus") forming a drawn bow

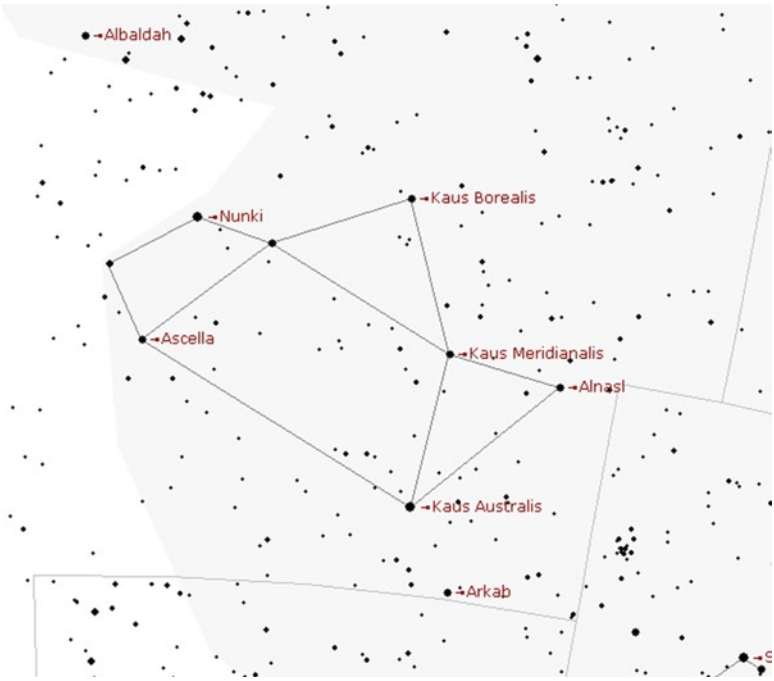

Fig. 6.9 Star chart of the Tea Pot asterism (courtesy Starry Night Education)

and arrow aimed at the heart of Scorpius. The stars around Nunki and Ascella form his arm and elbow pulling back the string. Extending off his "elbow" is a curving line of stars toward the horizon (around Corona Australis) that make up the remainder of his body. A fair amount of imagination is required, but it's not a far stretch to see the centaur with his bow and arrow. The table above lists the stars of Sagittarius.

The brightest stars of Sagittarius form a very distinct teapot with the handle toward the east and the spout toward the west and a peaked lid to the north. It appears to be "pouring" toward the southwest. A star chart of this asterism is shown in Fig. 6.9. I also had the opportunity to take a picture of the teapot with my Canon PowerShot SD 880 IS set at an ISO1600 and an exposure of 15 s. I enhanced the contrast a little with the software provided but the Teapot is clearly visible as shown in Fig. 6.10.

Not only does the Milky Way pass through Sagittarius but the center of our galaxy lies in the direction of Sagittarius. So it shouldn't surprise you that this constellation is a hotbed of Messier and NGC objects. With a large number of named stars and deep sky objects occupying the same sky the star chart in Fig. 6.11 has the star names omitted to better show the large number of objects. Even so, the chart remains quite crowded.

Fig. 6.10 Image of Teapot – 15 s exp, ISO 1600, F2.8, 5mm

Several of the Messier objects can be seen with the naked eye at dark sky sites. Although all of these are great telescopic objects a few are notable. The Lagoon Nebula (M8) is located northwest of the Teapot. At magnitude 6.0 is an easy object for binoculars, but a telescope will be needed to bring out details. Like the Orion Nebula this is a stellar nursery with a number of bright stars embedded in it.

Just northwest of the Lagoon Nebula is M20, the Trifid Nebula. At magnitude 9.0 this is a more challenging object but certainly attainable. Its three-lobed appearance consists of both emission and reflection nebulae.

Above Sagittarius' bow near the northern border lies 6th magnitude M17, an open cluster with nebulosity that goes by several names, including Omega, Swan, Horseshoe, or Lobster Nebula. Another star-forming region this is a beautiful telescopic object spanning 11 arc minutes.

Lying to the south of M17 are two starry patches of the Milky Way designated M24 and M25. Also known as the Sagittarius Star Cloud M24 is a dense star field with nebulosity woven through it. At magnitude 4.6 it is easily seen without any aids, but binoculars really bring it out. Open cluster M25 lies just to the east and is another great object for binoculars at magnitude 4.6.

With well over 30 Messier and NGC objects at magnitudes that are easily seen through small to mid-range telescopes the amateur astronomer could spend an entire night exploring this part of the night sky. The list of Messier objects is in the table below. The NGC objects are listed in Appendix D of this book.

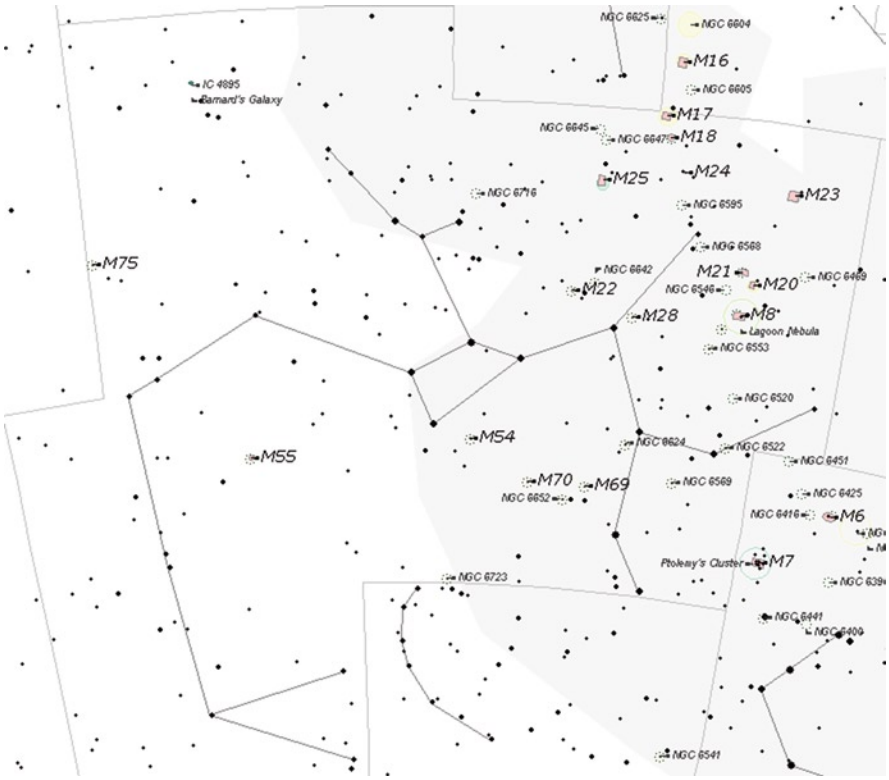

Fig. 6.11 Deep sky objects in Sagittarius (courtesy Starry Night Education)

The Legend

Sagittarius represented one of the wild centaurs of Roman mythology. The centaurs came into being as the offspring of Melia, a Naiad nymph who was loved by the old satyr-god Silenus, the god of the wine press. Their offspring were known as the southern centaurs. They had a love of wine and were much more violent than their northern counterparts. One of these centaurs, Pholos, offered Hercules some wine. But when he uncorked the flask the aroma attracted the other centaurs, who lusted for the intoxicating beverage. They fought Hercules for the wine and were all but wiped out in the ensuing battle. The ancient Romans placed this centaur in the sky as Sagittarius to show that there were two types of centaurs – good ones represented by Centaurus and violent ones represented by Sagittarius.

According to legend, the good centaur, Chiron, described the constellation Sagittarius to the Argonauts, who then used it to help them navigate to where the Golden Fleece was being held.

Lyra – The Lyre

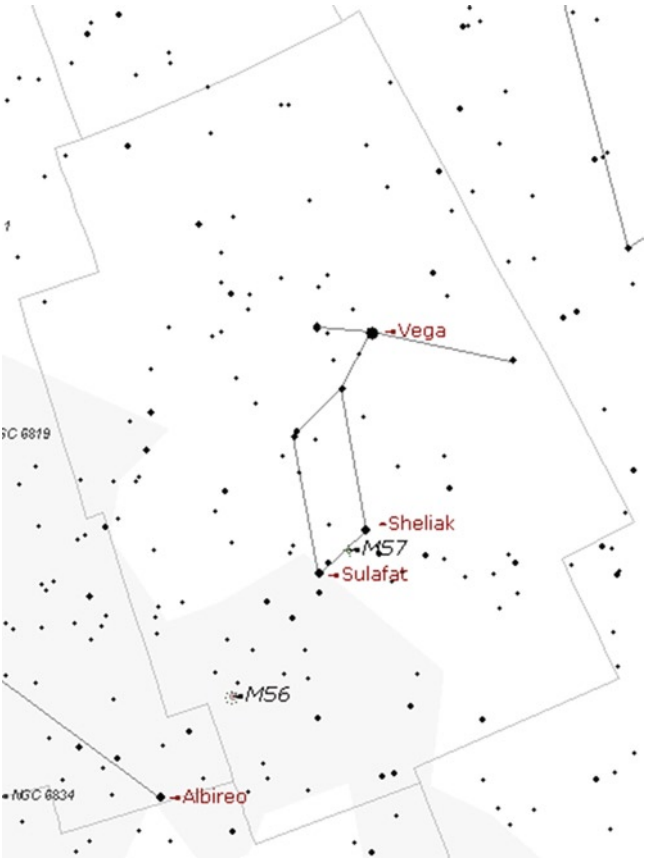

Fig. 6.12 Star chart of Lyra (courtesy Starry Night Education)

Named Stars of Lyra

Bayer designation	Mag.	Common name	Translation
ALPHA	0.03	Vega	"The swooping" (eagle)
BETA	3.52	Sheliak or Shelyak	"Harp" (from Greek Sambyke, a kind of harp)
GAMMA	3.25	Sulafat	"Tortoise"

Messier Objects in Lyra

Messier	Mag.	Name	Type
56	8.3		Globular cluster
57	8.8	The Ring Nebula	Planetary nebula

The Description

In mid-July this constellation is easy to find by starting with its very bright star, Vega, located near the zenith. Immediately to the southeast of Vega is a small parallelogram of stars that makes up the frame of this harp-like instrument (See Fig. 6.12).

Vega is the 5th brightest star in the sky. In fact, north of the celestial equator it is the second brightest behind Arcturus. Vega is relatively close, located only 25 light-years from Earth. Astronomers have cataloged it as a blue-white main sequence star not unlike the Sun. It appears to have a debris disc surrounding it and may have a planetary system.

Vega is one of the points of the Summer Triangle asterism with Deneb and Altair completing the triangle. Earth's precession caused Vega to move within 4 degrees of the north celestial pole about 14,000 years ago, making it the pole star, and it will make a return to that position around the year 13,700.

The other named stars are not well known but are aptly named. Sheliak translates from the Greek as "harp," which the lyre is a type of. Sulafat means "tortoise," which is also appropriate. Lyres were often made using a tortoise shell for the body of the instrument.

Lyra contains two Messier objects. Globular cluster M56 is located about halfway between Sulafat and Albireo in Cygnus. It is relatively faint for a globular cluster but at magnitude 8.3 is still fairly easy to find. The other Messier object in Lyra, M57, has much more notoriety. The Ring Nebula is a favorite telescopic object in the summer and is easily located halfway between Sheliak and Sulafat. Its position high in the sky allows it to be resolved as a planetary nebula even by small telescopes despite being fairly faint at magnitude 8.8. The term "planetary nebula" is a misnomer, of course, since the ring of gas is caused by the ejection of the outer layer of a collapsing star, which then continues to expand. The early telescopes of Messier and his contemporaries could not resolve the object clearly, and so to them it looked like a "fading" planet, hence the term "planetary nebula."

The Legend

The lyre was an ancient stringed musical instrument. There were many different versions of the lyre, but typically it was a lightweight instrument having a tortoise shell body, 'arms' of animal horns, and a stretched skin for a sound board. Strings of sheep gut or hemp completed the instrument. There are several stories in which the lyre plays a part.

Mercury is supposed to have fashioned the lyre. He was born at dawn and by noon he had found a turtle shell, fashioned a lyre out of it, and began playing heavenly music. Mercury gave up his lyre, though, when he surrendered it as a peace offering to Apollo after they had a quarrel. Apollo then became the musician of Olympus, playing his lyre for the entertainment of the gods.

Apollo played his lyre so wonderfully that he was often challenged by musicians with other instruments, sometimes with grisly outcomes. Marsyas, for example, challenged Apollo with a flute he had retrieved from Minerva. He was defeated, however, and as a result his skin was removed and hung in a cave.

Pan played a set of pipes and also challenged Apollo. Midas was the judge of the contest. He declared Pan the winner, although Apollo clearly was the better player. As a display of his poor judgment Midas grew the ears of an ass.

The music of the lyre was said to have magical powers and could command the forces of nature and the supernatural. In one story, while Poseidon was building Troy, Apollo sat by and played the lyre. While he played, the stones danced to the music and set themselves down in their proper places.

The city of Thebes was also built thanks, in part, to the melody of the lyre. This time the instrument was played by Amphion, son of Jupiter and Antiope and husband of Niobe. Mercury gave the instrument to Amphion and taught him how to play. Again the masonry danced to the music and assembled themselves into walls.

However, the story that eventually endeared the instrument to the skies was that of Orpheus, son of Apollo and Calliope. He had lost his wife, Eurydice, when a snake bit her and she died. Orpheus went to Hades, charming Charon, the ferryman, and other demons by playing the lyre, and begged Hades to allow Eurydice to return. Proserpina, the unwilling consort of Hades, was taken with Orpheus's music and grief. She asked Hades to grant Orpheus's wish. Hades agreed on the condition that upon their return to Earth Eurydice would follow Orpheus, and Orpheus must believe she was following him and never look back. But Orpheus grew troubled that Eurydice wasn't behind him, and he turned to look back. He caught a glimpse of his wife being drawn back into the nether world. Although he failed to retrieve his love, the gods rewarded his lyrical playing by placing his instrument, the lyre, in the sky for posterity.

Cygnus – The Swan

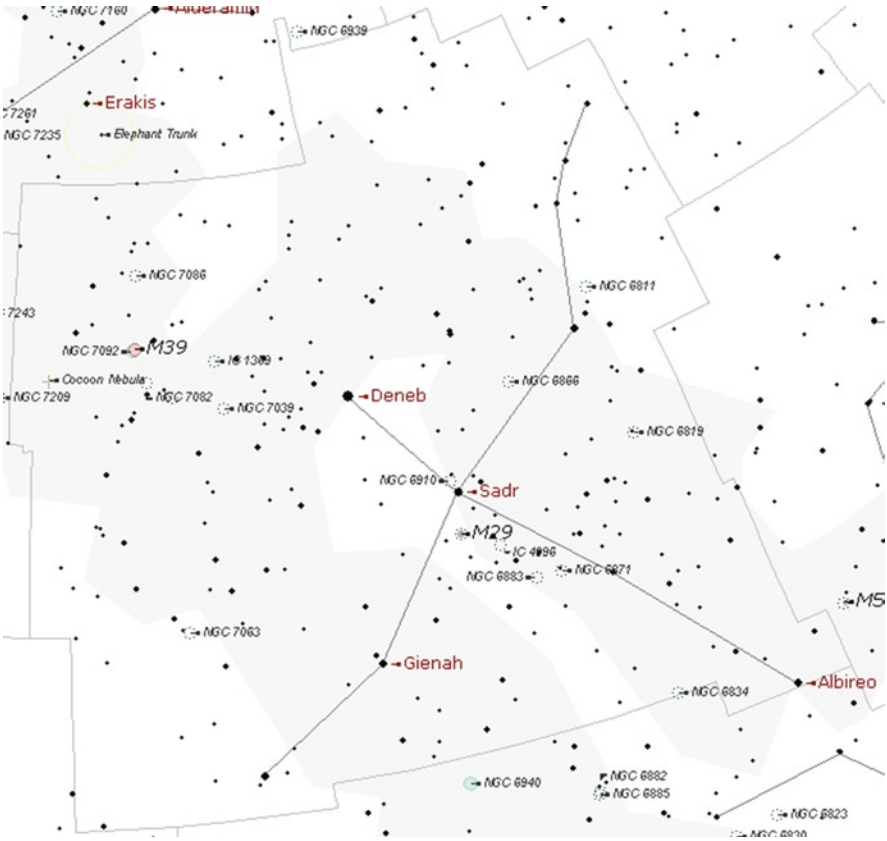

Fig. 6.13 Star chart of Cygnus (courtesy Starry Night Education)

Named Stars of Cygnus

Bayer designation	Mag.	Common name	Translation
ALPHA	1.25	Deneb	"Tail of the hen"
BETA	3.03	Albireo	(From Ireus, a fragrant flower)
GAMMA	2.21	Sadr	"Breast"
EPSILON	2.46	Gienah	"Wing"

Messier Objects in Cygnus

Messier	Mag.	Name	Type
29	7.1		Open cluster
39	4.6		Open cluster

The Description

Just east of Lyra is the first magnitude star, Deneb. This star marks the swan's tail and a line of four stars extends south to Albireo to form the swan's body. Two stars extend from either side of Sadr to form the wings. Cygnus, shown in Fig. 6.13, appears to be flying south a little early for winter. Viewed a different way this constellation is also known as the Northern Cross. Deneb marks the top of the cross and Albireo the base.

Deneb is aptly named, as it does mark the tail of the swan, but it is also one of the vertices of the Summer Triangle asterism. Albireo is a beautiful telescopic object, resolving into a gold and blue double star.

The Milky Way runs through the body of the swan, which provides a large number of deep sky objects though only two Messier objects. M29 is a rather unimpressive open cluster located in the star-crowded Milky Way and may be rather difficult to distinguish from the surrounding sea of stars. Open cluster M39 is a large, open cluster that, although significantly brighter than M29, will still be a challenge to separate from the surrounding star field of the Milky Way. A number of NGC objects can be found in Cygnus, including the Cocoon Nebula (IC 5146). The Cocoon is a reflection/emission nebula located near M39 and NGC 7209 northwest of Deneb.

The Legend

This constellation relates to the Greek myth concerning Cycnus who was a friend of Phaethon, the wayward son of Sol who attempted to drive the Sun chariot and lost control. To save the world Jupiter struck down Phaethon, who fell from the sky into the river Eridanus. Cycnus tried to save his friend by diving time after time into the river in an attempt to retrieve the remnants of Phaethon. For his valiant and devoted effort, the gods transformed him into a celestial swan known today as Cygnus.

Some astronomers also suggest that Cygnus represents the swan in the story of Leda. She was the daughter of King Thestius of Aetolia and the wife of Tyndareus, king of Sparta. Jupiter found Leda very desirable. To approach her without being obvious, he transformed himself into a swan. Although it is not clear how in the story, he somehow made love to Leda while in the form of a swan. Later that night, Leda also made love with her lawful husband.

When the time came to give birth, Leda laid an egg and gave birth as well. The hatching and the live birth both produced twins: the egg contained Helen and Polydeuces (Pollux), while Castor and Clytemnestra were delivered normally.

Finally there is the story of how Jupiter seduced the goddess Nemesis. In order to get close to her Jupiter enlisted the help of Venus. Jupiter transformed himself into a swan while Venus transformed herself into an eagle. The eagle pursued the swan, which flew into the lap of Nemesis to gain refuge and, of course, make love. As a memorial of his successful deception Jupiter placed the swan (Cygnus) and the eagle (Aquila) in the sky.

Ara – The Altar

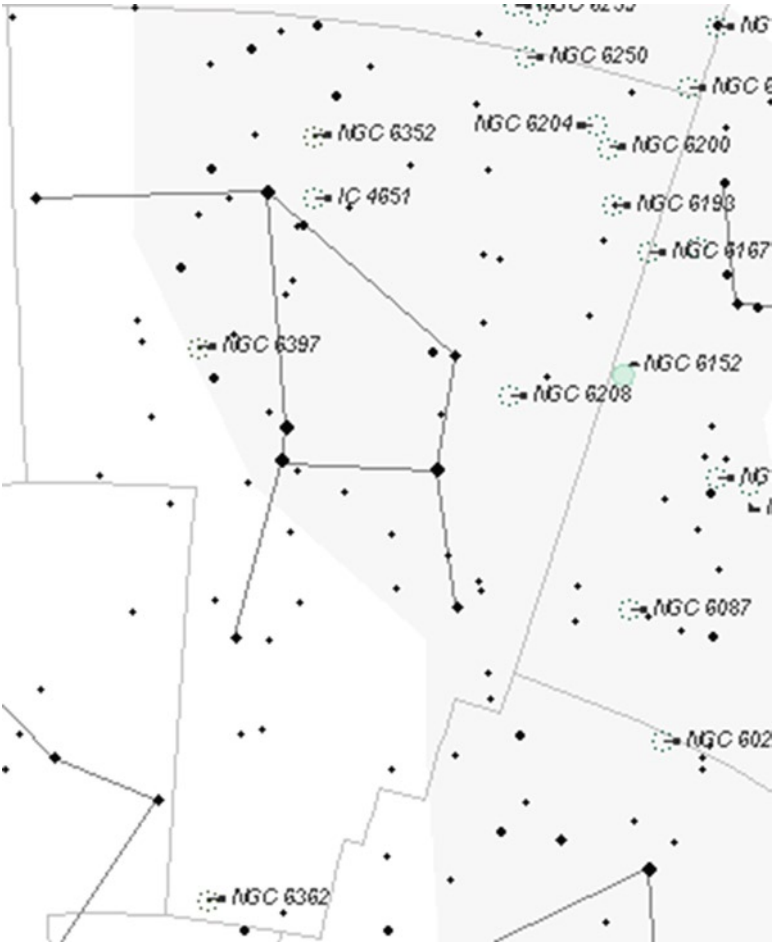

Fig. 6.14 Star chart of Ara (courtesy Starry Night Education)

Named Stars of Ara – None

Messier Objects in Ara – None

The Description

This obscure constellation, shown in Fig. 6.14, is extremely low on the southern horizon below the tail of Scorpius. The brightest stars in Ara are only second magnitude. Adding to this challenge is the fact that it lies for the most part in the Milky Way. Although best seen at latitudes below 25 degrees north with good seeing conditions near the horizon one could see most of this constellation from as far north as 35 degrees. Although no Messier objects lie in Ara its proximity to the Milky Way affords a good environment for a number of NGC/IC objects, which are listed in Appendix D of this book.

The Legend

As is often the case this constellation could represent a few myths. In one story Jupiter had gathered his allies to fight the Titans. They made sacrifices on the altar constructed by the Cyclopes as a pledge of their allegiance. After they defeated the Titans Jupiter memorialized the altar by placing it among the stars.

In another story Ara represents the altar of Pholus, a kind centaur who was particularly adept at augury. Jupiter honored his ability by placing him among the stars in the form of three constellations: Ara the Altar, Crater the Cup, and Centaurus the Centaur, where he is depicted pouring libations at his altar.

Lastly Ara relates to a story in which Hercules sets out to defeat the giant Cacus, the son of Vulcan, which is part of the Tenth Labor in The Legend of Hercules. To honor Hercules' victory an altar was erected over the spot where Hercules defeated Cacus. Today Hercules' altar, Ara Pacis, still stands in Rome in the Forum Boarium, between the Palatine Hill and the Tiber.

Hercules – The Hero

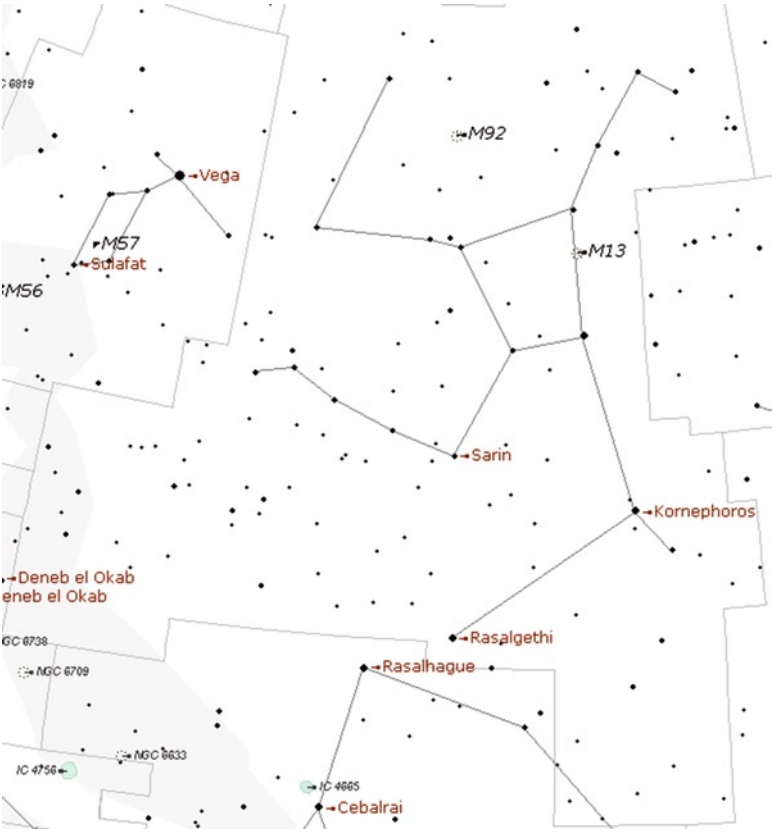

Fig. 6.15 Star chart of Hercules (courtesy Starry Night Education)

Named Stars of Hercules

Bayer designation	Mag.	Common name	Translation
ALPHA	3.31	Rasalgethi	"Head of the kneeling one"
BETA	2.78	Kornephoros	"Club-bearer"
DELTA	3.12	Sarin	No translation

Messier Objects in Hercules

Messier	Mag.	Name	Type
13	5.8	The Great Hercules Globular Cluster	Globular cluster
92	6.4		Globular cluster

The Description

This constellation illustrated in Fig. 6.15 is about the same size and shape as Orion (See the Winter Constellations chapter of this book) but not nearly as prominent. Nevertheless it is fairly easy to locate, being situated high in the sky throughout the summer with Corona Borealis to the west, Lyra to the east, Draco to the north, and Ophiuchus to the south. Hercules' torso lies north-south with one arm extended toward Lyra, the other arm bent toward the west, one leg toward Ophiuchus and the other toward Serpens Caput. He is depicted as being in a fighting stance holding a lion's mane with his right hand, while holding a mighty sword with his left hand.

Although the stars of Hercules are fairly insignificant the two Messier objects are well worth looking at. Both are globular clusters at magnitudes on the edge of visibility with the unaided eye. They can be seen easily in binoculars and are spectacular in telescopes. The Great Hercules Globular Cluster (M13) is a favorite at star parties and provides an easy target and a magnificent view at low power.

The Legend

For the story about this great mythological character, see The Legend of Hercules chapter of this book.

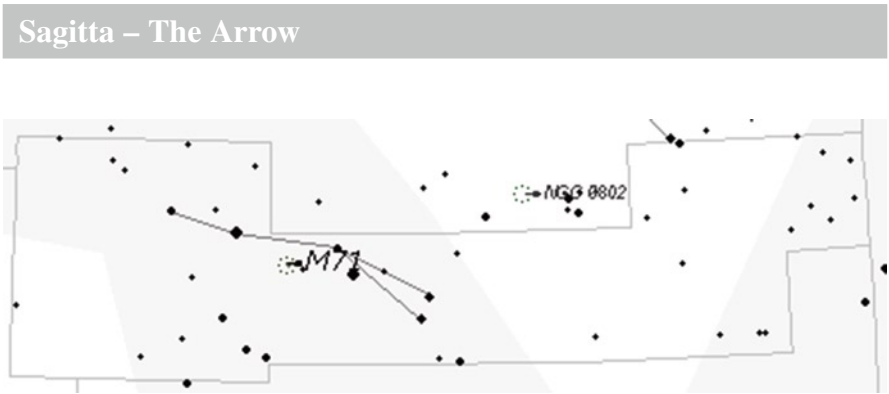

Fig. 6.16 Star chart of Sagitta (courtesy Starry Night Education)

Named Stars of Sagitta – None

Messier Objects in Sagitta

Messier	Mag.	Name	Type
71	8.2		Globular cluster

The Description

This tiny summer constellation shown in Fig. 6.16 lies just to the north of the tail of Aquila, the eagle. The six small stars do seem to look like an arrow extending with its tail toward the southwest, and its head pointing toward the northeast.

Although it has no named stars M71 is a loosely packed globular cluster that is quite beautiful through a telescope.

The Legend

The story of Sagitta is contained in The Legend of Hercules chapter of this book.

Equuleus – The Foal

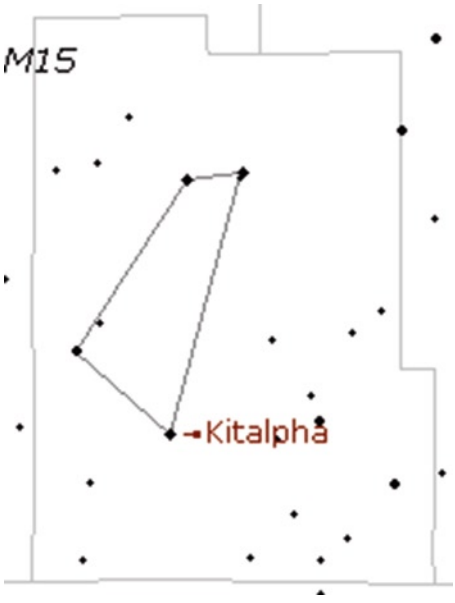

Fig. 6.17 Star chart of Equuleus (courtesy Starry Night Education)

Named Stars of Equuleus

Bayer designation	Mag.	Common name	Translation
ALPHA	3.92	Kitalpha	"Part of the horse"

Messier Objects in Equuleus – None

The Description

This diminutive constellation shown in Fig. 6.17 is visible in the latter part of summer and consists of four stars between Delphinus and Aquarius. The foal, said to be the offspring of Pegasus, is 'running' ahead of the great winged horse, which rises closer to autumn. Equuleus is a very faint constellation with its brightest star, Kitalpha, only at magnitude 3.92 and no deep sky objects.

The Legend

The story of Equuleus is contained in The Legend of Hercules chapter of this book.

Chapter 7

The Legend of Hercules

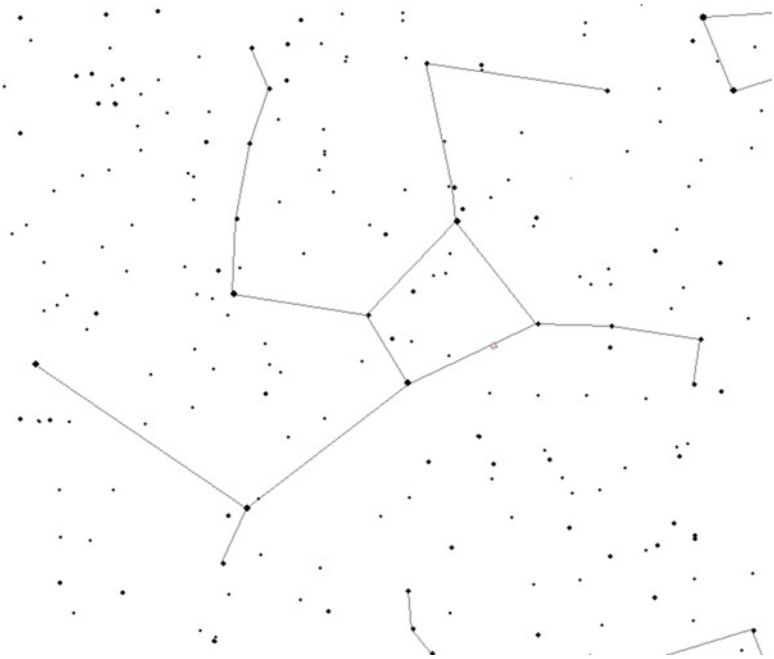

Fig. 7.1 Star chart of Hercules (courtesy Starry Night Education)

D.E. Falkner, *The Mythology of the Night Sky: An Amateur Astronomer's Guide to the Ancient Greek and Roman Legends*, Patrick Moore's Practical Astronomy Series,
DOI 10.1007/978-1-4614-0137-7_7, © Springer Science+Business Media, LLC 2011

Fig. 7.2 Hercules – 15 s, ISO 1600, F 3.5, 8.1 mm

The story of Hercules is one of the greatest in Greek and Roman mythology. The star chart of Hercules is shown in Fig. 7.1 while a photograph of the star field in the same orientation is shown in Fig. 7.2. Although born a mortal, Hercules was the strongest man in the world and he demonstrated tremendous courage and cunning. There are no less than 11 constellations depicting Hercules and the performance of his labors. Since most of these constellations can be seen in spring and summer, this chapter provides a nice transition between them and autumn.

The Constellations

This story encompasses a host of spring and summer constellations with one winter constellation thrown in. Below are the constellations and the chapter in this book where you can find details about the constellation.

Hercules – The Strongman
The description of Hercules is found in the summer constellations chapter.
Ara – The Altar (The altar erected after his tenth labor)
The description of Ara is found in the summer constellations chapter.
Leo – The Lion (The Nemean Lion)
The description of Leo is found in the spring constellations chapter.

Hydra – The Watersnake (Found in the Second Labor)
The description of Hydra is found in the spring constellations chapter.
Cancer – The Crab (Also part of the Second Labor)
The description of Cancer is found in the spring constellations chapter.
Sagitta – The Arrow (The arrows used by Hercules)
The description of Sagitta is found in the summer constellations chapter.
Taurus – The Bull (The Cretan Bull)
The description of Taurus is found in the winter constellations chapter.
Equuleus – The Foal (The Horses of Diomedes)
The description of Equuleus is found in the summer constellations chapter.
Draco – The Dragon (Found in the Eleventh Labor)
The description of Draco is found in the summer constellations chapter.
Corvus – The Crow (The Stymphalian Birds)
The description of Corvus is found in the spring constellations chapter.
Crater – The Cup (The "boat" in the Tenth Labor)
The description of Crater is found in the spring constellations chapter.

The Legend

Hercules was the son of Jupiter and the mortal Alcmena, a princess. Jupiter's wife, Juno, was insanely jealous of Alcmena. She decided to punish Alcmena by killing Hercules in his crib. Juno sent two huge snakes to do the boy in, but Hercules awoke to find the two snakes poised over his crib ready to strike him dead. He reached up and grabbed them and held them so tight that he strangled them. This was such an unusual deed for such a young boy that it was prophesied he would be a great hero. This enraged Juno and she vowed to defeat Hercules and immediately began to scheme against him.

Hercules continued to grow and became a tremendous athlete. He had little interest in the fine arts and, at one point, he accidentally killed his music teacher, Linus. As punishment for this deed he was sent to guard the cattle at Amphitryon on Mount Cithaeron. At age 18, having grown strong and powerful, he killed his first lion.

Hercules went on to marry Megara, the daughter of Creon, king of Thebes. The two lived quite happily and were prosperous until Juno, jealous of Hercules' strength, made Hercules go mad and kill his wife and their three sons. When the deed was done Hercules regained his sanity. When he saw what he had done he slipped into deep remorse. How could he murder his wife and children and deserve to live? He was about to go and take his own life when his friend Theseus arrived. He told Hercules that he should not feel responsible for their deaths, as he was not in his right mind. Theseus convinced Hercules to return to Athens with him. Reluctantly Hercules agreed.

In Athens Theseus spoke to his people and explained what had happened. The Athenians accepted that Hercules did not intend to harm his family and welcomed him. But Hercules continued to feel the guilt and sorrow. He had defiled others and was defiled himself. He went to Delphi to seek the counsel of the oracle there.

The oracle felt as Hercules did about his deed and for such a horrible act he must do a severe penance to cleanse himself. He was to seek out his cousin Eurystheus, king of Mycenae and do whatever he asked.

Hercules did as he was instructed – he found Eurystheus and worked for him for 12 years. Hercules was told that, if he performed the ten tasks given him by Eurystheus, his murderous deed would be forgiven. Juno, still jealous that Hercules was the offspring of Jupiter, conspired with Eurystheus in developing the now famous 12 Labors of Hercules. How the number of tasks grew from the original 10 to a total of 12 will come to light as you read through the story.

There are many constellations in the sky that relate to the labors. Although not every labor is represented in the heavens, all of them are told here for your enjoyment.

The First Labor – The Nemean Lion

Leo is associated with this lion, which was the offspring of Selene, goddess of the Moon. She was horrified when she saw the lion and dropped it to Earth, where it terrorized the Valley of Nemea. Its impenetrable hide prevented the lion from being slain by ordinary weapons. Eurystheus made the slaying of this beast the first labor of the strongman Hercules.

Hercules set out to Nemea with his bow, a quiver of arrows, a sword, and a club. He searched the countryside and discovered the lion's lair, a cave with two openings strewn with the bones of men and animals. After blocking one of the openings Hercules waited for the beast to return.

Presently the huge lion appeared, his fur matted with the blood of his latest kill. Hercules took an arrow from the quiver and, taking careful aim, fired the arrow straight at the lion's heart. It bounced off the lion's impenetrable hide. Enraged, Hercules drew his sword and lunged at the lion. The lion reared his massive body up on his hind legs to attack. As Hercules' sword struck, it bent, failing to pierce the lion's skin but knocking the beast on its back. The lion regained his balance and crouched to attack Hercules. Hercules drew his club just as the cat sprang and dealt a crushing blow to the head. The lion was knocked off balance and landed a little dazed.

Hercules tried every weapon to slay the lion, but to no avail. He rushed the animal before it could recover and wrestled the animal with his bare hands, finally managing to strangle the beast. Using the lion's claws he skinned the beast, wore the creature's hide as a trophy, and returned to the surprised Eurystheus.

The Second Labor – The Hydra of Lerna

Eurystheus was amazed that Hercules had returned from the first task. He gave Hercules a second, more difficult task – to slay the Lernean Hydra.

This nine-headed serpentine monster was the offspring of Typhon and Echidne. Juno had nurtured the beast in hope that it would defeat Hercules. He traveled to Lerna, a city near the sea not far from Argos. The serpent lived in a nearby swamp. Hercules asked his nephew, Iolaus, to assist him in his task.

As the two approached the swamp the goddess Minerva appeared before them. Minerva was the goddess of war and defense and she favored helping the great heroes. Despite the deed that put Hercules in this position Minerva wanted to help him. She told Hercules and Iolaus that the only way to draw the serpent out of its lair was to shoot fiery arrows into the cave. She warned Hercules to beware the breath of Hydra for it was deadly, and the center head of the nine was immortal.

Hercules thanked Minerva for the valuable information and continued to the serpent's lair. After building a fire, Hercules shot arrows tipped with burning grass into the monster's cave. As the serpent emerged from the cave, Hercules took in a deep breath and held it as he began to strike at the serpent with his sword. As he lopped off one head, another would grow in its place. Iolaus was quick to realize what was happening. He grabbed a lighted torch and went to assist Hercules. As Hercules struck off the serpent's heads with his sword, Iolaus would place the torch on the bleeding stump, cauterizing the end and preventing any new heads from growing.

As Hercules fought the serpent, Juno became angry at his ability to battle the Hydra. To foil his attempts she sent a giant crab to attack his legs. Hercules quickly drew his club and gave the crab a tremendous blow, crushing it. He and Iolaus continued battling Hydra, chopping off eight heads until only the ninth and central, immortal head was left. Hercules chopped off this head, which was still hissing as Hercules grabbed it and buried it deep in the ground.

Before returning to Eurystheus, Hercules took his arrows and dipped them in the blood of the Hydra, making them deadly poisonous.

The Third Labor – The Erymanthian Boar

When Hercules returned Eurystheus was amazed. When he found out that Hercules had been assisted by Iolaus he became angry. He claimed that the task didn't count since Hercules had help. Furthermore, Eurystheus declared that from then on all the labors were to be performed alone. He then told Hercules that he wanted to see the Erymanthian Boar brought in alive.

This great boar was the very same that had killed Adonis, the son of Venus. She had forgiven the boar, but now it ran loose, terrorizing the wooded slopes of Mount Erymanthus in Arcadia. Hercules managed to drive the beast high up onto the mountain where the snow was deep. When the boar grew tired running in the deep snow, Hercules jumped on its back, wrestled it down, and chained its legs together.

Hercules then returned to Eurystheus with the boar. When Eurystheus saw the frightening beast he grew fearful. He jumped into a bronze jar and hid until Hercules released the beast into the ocean, where it swam away safely.

The Fourth Labor – The Hind of Ceryneia

When the coast was clear, Eurystheus emerged from the bronze jar to give Hercules his next task: bring back the Hind of Ceryneia alive and unharmed. The Hind of Ceryneia was one of five beautiful reindeer that Diana, the goddess of hunting, had herded from the far north. She had harnessed four of them for use on her chariot, but the fifth had escaped and lived wild on a hill near Ceryneia. This hind was particularly beautiful, as it had a set of antlers (unusual for a hind) that shone like gold.

When Hercules set after the reindeer he knew he could not harm it. He chased the beast for an entire year, eventually running it down until it was exhausted. Then he picked it up and placed it across his shoulders and set off for Argos. Along the way he encountered an angry Diana. She asked him why she shouldn't slay him on the spot for taming her beautiful hind. Hercules explained that he was performing a task for his master, Eurystheus, and told her of the other tasks that had been given him. She was amused by the labors he had been given and allowed him to show the hind to his master as long as he returned the beast. Hercules agreed and took the beast to Argos.

When he arrived and showed the hind with the golden antlers, Eurystheus was delighted. But his glee soon turned to terror as Hercules related the story of his encounter with Diana. Eurystheus told Hercules to take the beast back to Diana immediately and lived in fear of his life until the hind was returned.

The Fifth Labor – The Stymphalian Birds

When Hercules returned, Eurystheus said he would have no more to do with dangerous beasts. For his next labor Eurystheus told Hercules to chase away the birds of Stymphalus.

The birds of Stymphalus were the property of Mars. They were vicious creatures with brazen wings, beaks, claws, and feathers that could be flung like arrows. The birds were known to eat human flesh. They attacked the cultivated fields, destroying crops, and were unceasingly noisy.

On his way to Stymphalus Hercules encountered Minerva, who warned him not to confront the birds directly. Their beaks were so sharp that when they flew directly at a human they would pierce the skin, even through armor. Minerva gave Hercules a pair of bronze castanets fashioned by Vulcan that could be used against the birds.

Hercules went to the top of a mountain that overlooked the pool of Stymphalus, which was surrounded by the dense forest where the birds lived. He began to clash the castanets, making a terrible noise that echoed through the valley and startled the birds. Hercules continued to clash the castanets. The birds had never heard such a sound and flew out of the trees in confusion. Soon a great cloud of birds was flying around, squawking and bumping into each other, and Hercules killed a few with his

poison arrows. Finally, the birds flew to the east and were never seen again. Hercules gathered up the birds he shot and returned to Eurystheus.

The Sixth Labor – The Augean Stables

Eurystheus thought the birds were such easy prey that the labor was hardly worth it, so he charged Hercules with the task of cleaning the Augean Stables.

The stables were the property of Augeas, king of Elis, who had more cattle and flocks than any other man on Earth. As a result of divine involvement, King Augeas' cattle and sheep were granted immunity from disease; consequently, he felt it was a waste of time to clean the stables. When Hercules arrived, the stables had not been cleaned for 30 years. The flies, filth, and stench were overwhelming and seemed to affect everyone but King Augeas.

Before starting his task, Hercules approached the king and told him that he would clean the stables in one day for payment amounting to one-tenth of the herd. King Augeas agreed. Hercules punched holes in either end of the stables, now knee-deep in filth, and quickly dug a channel from the river Alpheus to the stables. He diverted the water to rush through the stables, washing out the filth and sending it back to the river where it flowed to the sea. Hercules then moved the river back to its original course and rebuilt the stable where the holes were. He did all this in a single day.

When he went to the king to receive his payment, Augeas denied the agreement. Hercules would later take revenge against the king for failing to make proper payment. By the time Hercules returned to report his completion of the task Eurystheus had learned that Hercules had been hired by King Augeas, and claimed that labor could not be counted.

The Seventh Labor – The Cretan Bull

Eurystheus quickly sent Hercules to bring back the Cretan Bull alive. This creature had been the gift of Poseidon to King Minos of Crete to be offered as sacrifice. But Minos, in his greed, offered a less desirable bull instead. Afterward, the bull that had been given him went mad and had terrorized the people of Crete ever since.

Hercules took a ship from Argos to Crete, where he was met by King Minos. When he learned of Hercules' task, the king was delighted and offered any assistance he could. But the bull was easily overcome by Hercules, who returned with it to Argos.

When Hercules returned to Argos with the bull, Eurystheus was terrified and jumped into his bronze jar again, where he stayed for several days. Hercules allowed the bull to go free, and it made its way to Marathon. There it found green pastures and lived for 26 years, killing any human who approached until Theseus

arrived and captured the bull again (see The Legend of the Cretan Bull in Taurus). Meanwhile, Hercules waited for Eurystheus to recover from his fear and assign the next task.

The Eighth Labor – The Horses of Diomedes

Eurystheus next told Hercules to bring back the Horses of Diomedes. Diomedes was the son of the god Mars and the nymph Cyrene, and was the king of the Bistones in Thrace. He had a stable of four fierce warhorses guarded by several grooms. The horses were fed human flesh, usually from unwitting passersby who were invited as "guests" by Diomedes.

When Hercules arrived he was immediately invited in by Diomedes. But Hercules was cautious for he knew of the horses. When he was alone Hercules sneaked out to the stable and overpowered the grooms. He made a special harness so he could tie all four horses together. Then he dragged them kicking and rearing out of the stables.

As one could imagine, this made a tremendous noise that alerted Diomedes and his guards. When they came out to see what the disturbance was all about, they saw Hercules taking the horses. Diomedes led the attack on Hercules, who released the horses in order to defend himself. He dealt a crushing blow to Diomedes, then turned to fight the guards. While Hercules was fighting the guards, the horses devoured Diomedes, whereupon they immediately became tame. After defeating the guards, Hercules harnessed the horses to a chariot and rode back to Argos. When Hercules returned, Eurystheus saw that the horses were tame and he dedicated them to Juno. The horses remained the fiercest and most courageous horses in Greece.

The Ninth Labor – The Girdle of the Amazon

Eurystheus had a daughter who greatly wanted the huge belt, or girdle, of Hippolyta, the queen of the Amazons. The Amazons were a race of warrior women who lived on the south shore of the Black Sea. They were adept at throwing the javelin and shooting the arrow. Their land had no men, and they kept their husbands in a different country, visiting them one month out of the year. The girdle had been the gift of Mars, god of war, to the bravest of the Amazons. Eurystheus gave Hercules the task of retrieving the girdle.

Hercules sailed from Argos with a crew of nine to the land of the Amazons. Although he fully expected to do battle with them, Hercules was admired by Hippolyta, and she would gladly have given him the girdle. But Juno was appalled at the ease at which Hercules was completing this task, so she disguised herself as an Amazon warrior and ran to their fort, where she announced that a ship of male pirates was in the harbor. She alleged the men were kidnapping their queen, Hippolyta, to sell her as a slave in Athens.

The Amazon warriors swarmed the shore and engaged the men in battle. The fighting was fierce, but Hercules was able to kill the Amazon leaders with his poison arrows. Then he captured Melanippe, the queen's sister. As ransom for her life he received the girdle, whereupon he sailed away. He returned to Eurystheus where he presented the girdle of the Amazon, which Eurystheus then gave to his daughter.

The Tenth Labor – The Cattle of Geryon

This time Eurystheus sent Hercules out to steal the Cattle of Geryon. Geryon claimed to be the strongest man in the world, having three heads, six arms and hands, and one body from the chest down. He lived on the island of Erythia, west of the Straits of Gibraltar. He had a handsome herd of red cattle that were the envy of everyone – including Eurystheus.

Hercules traveled overland until he reached the straits (Straits of Gibraltar) that separate Europe from Africa. There he raised a pillar of stones at Gibraltar and another across the straits in Africa at Ceuta. While building the pillar at Ceuta, Hercules became crazed by the searing heat of the Sun, and in a fit of rage he loosed one of his poison arrows at the Sun chariot of Sol. Sol was so amused by the audacity of this mortal that he not only shielded him from the rays of the Sun but allowed Hercules to use his great golden goblet or cup as a boat to sail to Erythia.

Hercules used his lion's skin as a sail and soon landed on Erythia. After concealing his strange boat in an inlet, he climbed a mountain to view the countryside. He was attacked by Geryon's huge two-headed dog, Orthrus. Hercules drew his club and crushed the beast with a single blow. He finally found a spot overlooking the valley, where he beheld the marvelous herd of red cattle. As he went into the valley to gather the herd, he encountered the vicious herdsman, Eurytion. They fought a tremendous battle, but in the end Hercules killed him.

As he began to herd the cattle toward the golden cup-turned-ship, Hercules was discovered by Geryon. The monster came rushing at Hercules, wielding weapons in each of his six massive hands. Hercules realized that Geryon would be too much to handle in direct combat, so he loosed three poison arrows into Geryon's three necks, killing the hideous monster. Hercules loaded the cattle into the golden cup and sailed back to Spain, where he unloaded the cattle and gratefully returned the cup to Sol. Hercules herded the cattle overland to Argos, encountering the giant Cacus along the way.

Cacus was a shepherd who lived in a cave on the Aventine River and was notorious for his robberies. As Hercules was driving the cattle of Geryon to present them to Eurystheus Cacus stole some of the cattle. This enraged Hercules, who set out to find the giant. When he learned that Hercules was looking for him Cacus attempted to lay a diversion by dragging Hercules' cattle backwards into his cave. When the rest of the herd passed by the cave opening the hidden cattle heard them and bellowed out to them, revealing the hiding place. Hercules entered the cave, which was

incredibly dark. One side of the cave was a wall of flint from floor to ceiling. Hercules thrust himself against this wall, shaking the entire cave and wrenching the wall loose, opening a crack through which light flowed, illuminating the cavern below and revealing Cacus' hiding place. Hercules began attacking him with arrows, boulders, large branches, just about anything he could get his immense hands on. Cacus in desperation over his situation belched out a great cloud of smoke and flames. Smoke filled the cave, obscuring him from Hercules' view. Hercules became infuriated and jumped into the smoke and flames to the point where the smoke was thickest. His hands found the hideous creature, knotted him in double, and strangled him so violently that Cacus eyes bulged out and his throat hemorrhaged. With the giant dead the smoke cleared and the light revealed the location of the cattle. To honor this victory an altar was erected over the spot where Hercules defeated Cacus.

Hercules brought the stolen cattle out of the cave and rejoined the rest of the herd. He continued on his journey, finally reaching Argos, where he presented them to Eurystheus. At this, Hercules claimed that his ten labors were completed. Eurystheus was quick to retort that two of his labors did not count – one because he was assisted, and the other because he was hired. Juno demanded that Hercules complete two more deeds.

The Eleventh Labor – The Apples of Hesperides

Juno had given Jupiter three golden apples as a wedding present, which Jupiter placed in the Garden of Hesperides for safekeeping. This paradise was located at the end of the world and was guarded by a dragon. Atlas, the Titan who carried the heavens on his shoulders, also occupied this garden, and he was the only creature the dragon allowed to pass unharmed. In this labor, Hercules was required to retrieve the three golden apples.

Now Atlas was not particularly bright, but he was quite friendly, so when Hercules asked Atlas to help him steal the apples, Atlas agreed. The plan started with Hercules taking over the formidable job of holding up the sky while Atlas passed by the dragon and retrieved the apples.

Atlas decided that he was going to double-cross Hercules, leaving him to hold up the sky while Atlas would keep the apples for himself. The crafty Hercules told Atlas he really didn't mind holding up the sky, but he needed to get a shoulder pad to rest it on. Atlas fell into the trap and took over the burden of the heavens. Hercules then took the golden apples and left.

Juno became enraged at the loss of the golden apples. In her rage she took the dragon – which was supposed to be guarding the apples – and flung the creature into the northern sky, where it never sets and is, therefore, forever on guard.

Hercules took the apples back to Eurystheus and presented them to him. Eurystheus knew better than to keep the apples, so he gave them back to Hercules. Hercules gave them to Minerva, who returned them to the garden.

The Twelfth Labor – The Stealing of Cerberus

Eurystheus knew that he had only one more chance to dispose of Hercules as Juno wanted. He presented Hercules with the most difficult and dangerous labor of all – to descend into the depths of Hades and return with Cerberus, the three-headed watchdog of the underworld. Hercules began the journey in a dejected state, for he realized this deed would be the most trying of all.

Fortunately, Hercules had two friends in the immortals Mercury and Minerva. Mercury was in charge of conducting souls to Hades, so he was able to lead the way. Minerva came along for encouragement. After entering a hidden cave, the trio descended into the gloomy depths of Earth. Eventually they came to the river Styx. The ferryman, Charon, who took the souls of the deceased across the river, was there. He refused to take Hercules at first, but when Mercury scowled at him he became afraid and allowed them to pass. Minerva waited for them on the opposite shore.

Once on the other side, Hercules witnessed the eerie twilight of the dead. He beheld such sights as the head of the gorgon, Medusa, slain by Perseus. He saw Ixion lashed to his flaming wheel for breaking faith with Jupiter, and Sisyphus, a thief and murderer who was sent to Hades with the task of forever rolling a stone to the top of a hill. The stone always rolled down just as he got to the top, and he would have to start over again.

Eventually Hercules reached Pluto and Proserpina. There he asked if he could take the watchdog, Cerberus, to present him as his final task. Pluto agreed, provided Hercules could overpower the dog without the use of weapons.

Hercules returned to the river Styx, where he found Cerberus. He put down his weapons. Then, using his impenetrable Nemean lion skin to guard himself, he approached the three-headed dog. The dog snarled viciously, and the manes of his three necks bristled with snakes. In place of his tail was a serpent that hissed and writhed. As the dog attacked the lion's skin, Hercules grabbed the beast and pinned it to the ground. Although he was attacked by the serpent-tail, he kept hold of Cerberus until the beast lost consciousness.

Hercules then picked up Cerberus and went to the river Styx, where he was taken across by Minerva. Mercury and Minerva then led Hercules up to the surface by a different route, and returned to Eurystheus, who was in his castle. Hercules called to Eurystheus, and when he arrived, Hercules stated that his final deed was complete and dropped Cerberus to the ground. The three-headed dog immediately ran, snarling and barking, after Eurystheus. Eurystheus screamed in terror and scrambled into his large bronze pot. He was still screaming when Hercules left with Cerberus, returning to the nether world. After leaving the dog on the shore of the river Styx he returned to Earth, elated that he had finally finished his 12 labors.

Hercules had completed all his penance and felt like a new man. But Jupiter knew that Juno would never relent from trying to kill Hercules. So, for his bravery in the face of danger and the completion of 12 very difficult tasks Jupiter granted Hercules immortality and a place among the stars.

Chapter 8

The Autumn Constellations

Autumn brings with it the transition from hot, sultry nights to cool, crisp evenings. 'Seeing' conditions generally improve during this season. Good seeing conditions will be needed if you are to locate the rather faint constellations of autumn. Several of the constellations are found in an area of the sky called "The Water" because of the number of water-related constellations. Delphinus (the Dolphin), Pisces (the Fishes), Aquarius (the Water-Bearer), Cetus (the Sea-Monster), Capricornus (the Sea-Goat), and Pisces Austrinus (the Southern Fish) are all found in this area of the sky. Although there is no lack of constellations the number of bright stars is decidedly lacking, as are the number of deep sky objects. These constellations are formed by 3rd to 5th magnitude stars so a dark, Moonless night and a star chart will help a lot when navigating the sky. Some wonderful stories accompany these constellations.

D.E. Falkner, *The Mythology of the Night Sky: An Amateur Astronomer's Guide to the Ancient Greek and Roman Legends*, Patrick Moore's Practical Astronomy Series,
DOI 10.1007/978-1-4614-0137-7_8, © Springer Science+Business Media, LLC 2011

Delphinus – The Dolphin

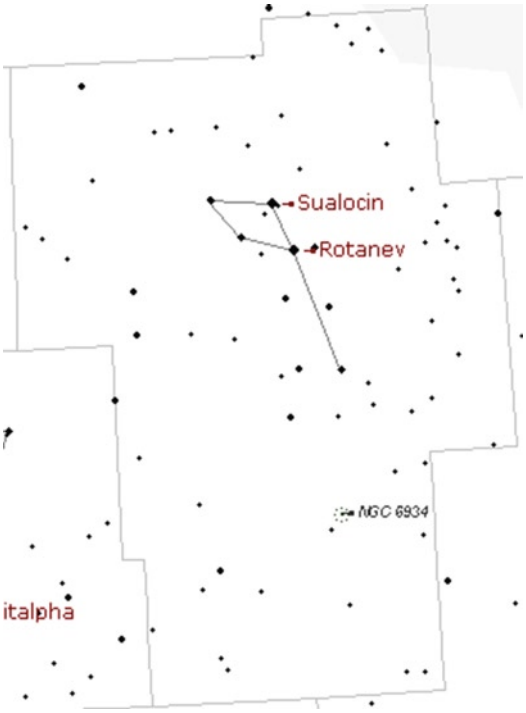

Fig. 8.1 Photograph and star chart of Delphinus. Photo taken for 15 s, ISO 1600, F5.6 and 20 mm with digital zoom (courtesy Starry Night Education)

Photographing Delphinus

Since Delphinus is a small, faint constellation I started with a wide field and centered the constellation in the viewer. I zoomed in incrementally, re-centering with each shot until I had the constellation centered. I wound up with the image in Fig. 8.1 using a focal length of 20 mm, ISO 1600 and f5.6 with a 15 s exposure. I used the computer tools provided with the camera to brighten the stars a bit for this picture.

Named Stars of Delphinus

Bayer designation	Mag.	Common name	Translation
ALPHA	3.77	Sualocin	"Nicolaus" backwards
BETA	3.63	Rotanev	"Venator" backwards
EPSILON	4.03	Deneb Dulfim	Tail of the dolphin

Messier Objects in Delphinus – None

The Description

This small constellation lies just east of first magnitude Altair in Aquila. Look for a small parallelogram that forms the body of the dolphin as shown in the star chart in Fig. 8.1. Two additional stars below and to the west complete its tail. The four stars of the dolphin's body form an asterism called "Job's Coffin." There are three named stars.

Sualocin (Alpha Delphinus) and Rotanev (Beta Dolphinus) are somewhat unusual since the first reference to these names came from a star catalog published in 1814. The two stars were named by Niccolò Cacciatore, a nineteenth-century Italian astronomer. As an astronomical joke Niccolò took the English version of his name, Nicolas Hunter, and taking the Latin form (Nicolaus Venator) spelled them backwards to name the stars. Deneb Dulfim (ε Del) is not shown in the star chart but marks the tail of the dolphin, as the name would imply. Delphinus also has three faint NGC objects.

The Legend

The story of Delphinus begins with Neptune, the god of the sea. Neptune was interested in taking a wife. He looked to the sea-nymphs, known as the Nereids, as they were the 50 daughters of Nereus and Doris. Nereus was an old sea god who was wise in prophesies and also had the unusual ability to change his shape as he wished. Neptune was interested in taking the Nereid Thetis, but changed his mind

when he learned that if they had a son, the son would be greater than Neptune. Neptune was too proud for that, so he sought another Nereid. He decided to choose Salacia as his mate. But Salacia had taken a vow of chastity and rejected all of Neptune's advances. He was so persistent that Salacia finally had to flee to a hiding place near the Pillars of Hercules. Then Neptune had a marvelous idea how to lure the lovely Salacia.

The dolphin, Delphinus, was known to be exceptionally charming. Neptune sent Delphinus to find Salacia and convince her to marry him. Delphinus searched far and wide and eventually found Salacia's hiding spot near the Pillars of Hercules. No details are available concerning what Delphinus said to Salacia, what promises of riches and power she would have as the wife of Neptune, but she finally yielded and became Neptune's wife. As his reward, Neptune immortalized Delphinus by placing him in the heavens.

Neptune and Salacia had three children. It is interesting to note that the largest moon around the planet Neptune was named after one of the children, Triton. Additionally, the other moon is named Nereid, honoring the 50 daughters of Nereus.

Delphinus was involved in another legend involving the famed poet and singer, Arion. It seems Arion was in a music festival in Sicily and won a prize. During his return by ship to Corinth, the ship's crew decided to kill Arion and seize his prize money. Arion learned of this, and when he was taken he pleaded for the opportunity to sing one last song. The crew was not unreasonable, so they granted this last request. Arion took his lyre and sung a song so beautiful that he attracted the attention of the dolphin. All dolphins in mythology were music lovers. When the crew threw Arion overboard to a certain death, Delphinus found him and carried him to Corinth ahead of the ship. Upon his arrival, Arion told the king of this terrible act. The ship and its crew were seized upon its arrival, and the sailors were questioned about the attempted murder. The crew, thinking Arion dead, swore that Arion had such great success in Sicily that he decided to stay behind. Arion then confronted them face-to-face and described the murder attempt. Caught in their lie, the crew was immediately executed for their treachery. As a memorial to the kindly dolphin that saved Arion he was placed among the stars.

Aquarius – The Water-Bearer

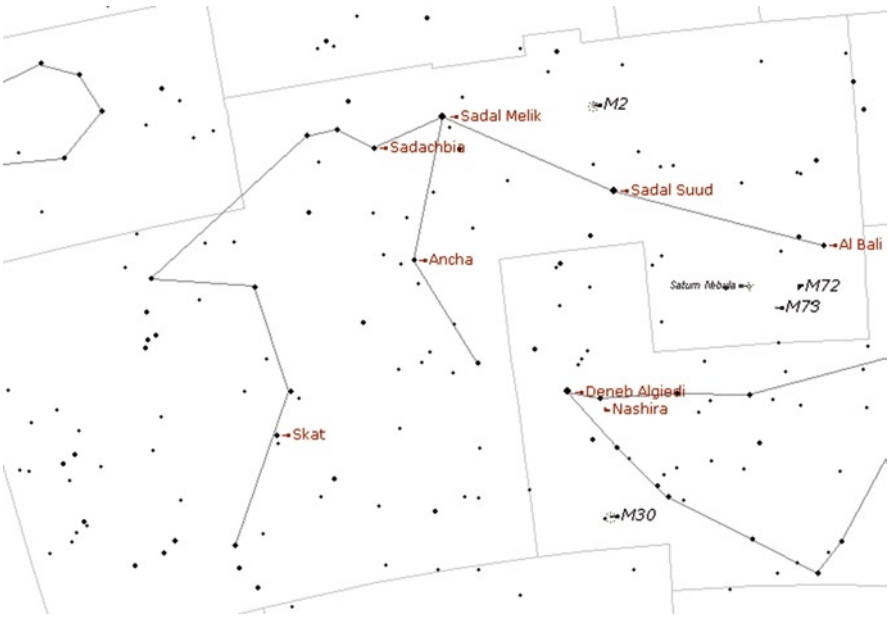

Fig. 8.2 Star chart of Aquarius (courtesy Starry Night Education)

Named Stars of Aquarius

Bayer designation	Mag.	Common name	Translation
ALPHA	2.95	Sadal Melik	"Lucky star of the king"
BETA	2.90	Sadal Suud	"Luck of lucks"
GAMMA	3.86	Sadachbia	"Lucky star of the tents"
DELTA	3.27	Skat or Scheat or Seat	"Shin" (lower leg)
EPSILON	3.78	Al Bali	"The swallower"
THETA	4.17	Ancha	"Hip-bone"

Messier Objects in Aquarius

Messier	Mag.	Name	Type
2	6.5		Globular cluster
72	9.3		Globular cluster
73	9.0	Four star asterism	Open cluster

The Description

This constellation depicted in Fig. 8.2 is quite faint, and you will require a dark night away from lights in order to see it. To find Aquarius, start with a rectangular shape of stars above Fomalhaut, the bright star in Pisces Australis. This is one of the two water jugs the water-bearer is carrying. The constellation then extends to the west to a group of stars below the front leg of Pegasus, and then to a roughly pentagonal shape of stars that form the other water jug. Try to imagine the water-bearer carrying the jugs of water suspended from a large rod resting on his shoulders.

Aquarius is associated with the Sun's rising in the spring. The "lucky" stars seem related to the coming of spring with its gentle rains and promise of new life. The faintness of the stars make this a challenging constellation to see.

Messier 2 is a prominent globular cluster. It is tightly packed with over 150,000 stars and is an easy object for small telescopes or binoculars. It is located about 37,500 light-years from us. At magnitude 9.3 and 9.0 Messiers 72 and 73 are far more challenging objects. M72 is a faint globular cluster located at the western edge of the constellation about 3 degrees southeast of the star Al Bali. Located at 55,400 light-years it is one of the most distant globular clusters in the Messier catalog. Continue on that same line from Al Bali and you will come to M73, also labeled NGC 6994 on the chart. It is a faint open cluster with four rather conspicuous stars of 10th to 11th magnitude. The Saturn Nebula (NGC 7009) is labeled on the star chart and is located east of M72. This unusual planetary nebula gets its name from its resemblance to the planet Saturn with its rings nearly on edge. Located about 2,700 light years from Earth it was first discovered by William Herchel in 1782.

The Legend

As we have seen with many of the constellations thus far, this one is associated with a number of myths. Originally Aquarius represented Jupiter, the Roman symbol of creation and the life-giving power of water. Later the water-bearer was associated with Ganymede, the lad who was saved by Jupiter and flown on a great bird to Mount Olympus, where he became the cup-bearer of the gods.

Another Greek myth equates Aquarius with Deucalion, who, with his wife Pyrrha, became the Greek Noah by surviving the great flood Jupiter sent to destroy the men of bronze. After the flood Deucalion and Pyrrha populated Earth by throwing over their shoulders the "bones of their mother," which were really just stones. As they threw them over their shoulders the stones turned into men or women, depending upon whether Deucalion or Pyrrha threw the stone. Because he survived when all that water covered Earth Deucalion is depicted as Aquarius

Aquarius is also associated with Aristaeus, who was the child of Apollo and Cyrene. When he was grown he traveled to the island of Cos off the southwestern coast of Turkey. There he found that Sirius, the Dog Star (See Canis Major), had combined its heat with that of the Sun to cause a terrible drought in the land.

Aristaeus discovered that the Dog Star was angry because the islanders were hiding murderers. Aristaeus convinced the islanders to execute the murderers. Then he prayed to the Dog Star for forgiveness. The Dog Star seemed appeased and the rains came. Since Aristaeus was responsible for bringing the rain he is depicted as Aquarius pouring the water. Ever since, the Etesian winds have helped cool Greece during the hot summers.

Capricornus – The Sea-Goat

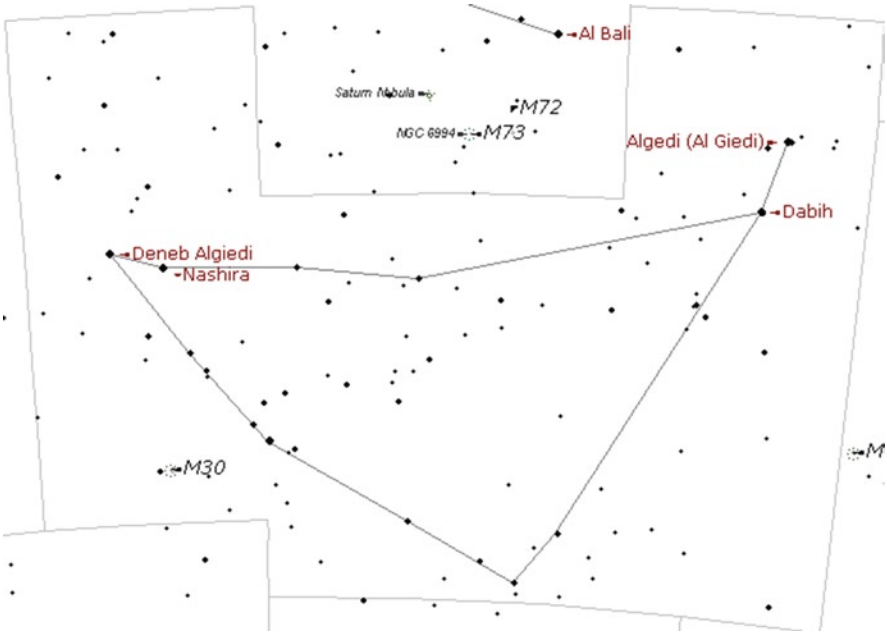

Fig. 8.3 Star chart of Capricornus (courtesy Starry Night Education)

Named Stars of Capricornus

Bayer designation	Mag.	Common name	Translation
ALPHA	3.58	Al Giedi	"Goat"
BETA	3.05	Dabih	"Slaughterer"
GAMMA	3.69	Nashira	"She who brings good news"
DELTA	2.85	Deneb Algiedi	"Tail of the goat"

Messier Objects in Capricornus

Messier	Mag.	Name	Type
30	7.2		Globular cluster

The Description

This is another constellation where a dark, Moonless night will greatly facilitate its location. To find this faint constellation, look for the boomerang shape of stars directly below the right water jug of Aquarius as shown in Fig. 8.3. The brightest star, Deneb Algiedi is at the eastern tip of the "boomerang." As we have learned from other constellations the name "Deneb" usually marks the rear or tail of the animal. That continues to hold true here with the goat clearly facing westward.

As you have probably begun to realize the autumn sky is markedly void of bright stars and deep sky objects. In such an environment M30 is a fairly easy object to locate. Situated due south of the star Nashira this magnitude 7.2 globular cluster should be easy to find with moderate telescopes despite its location low in the southern sky at declination −23 degrees.

The Legend

As obscure as this constellation is in the sky, so is any reference to a sea-goat in Greek or Roman mythology. However, it seems that this constellation refers to the demigod (half god, half human) Pan, who was the son of Hermes and Dryope. Pan became the god of shepherds, farmers, and the country life. He had the monstrous appearance of a man-goat with two small horns on his head, hairy legs and thighs, and a tail. He could usually be found in the forests and rugged mountains. He enjoyed pursuing nymphs but was usually unsuccessful in gaining their love. In one case he sought Syrinx, daughter of the Ladon River god. She was so opposed to his advances that she turned herself into a reed rather than accept his embraces. In another episode Pan pursued the nymph Pithys, who was said to have been loved by both Pan and the North Wind, Aquilo. She loved Pan but scorned Aquilo and for that Aquilo dashed her against a rock, whereupon she turned into a pine tree. Pan did seem to be well liked by the mortals, though, as they celebrated the Festival of Pan each year.

During the War of the Titans when they unleashed the monster Typhon the gods and demigods fled to Egypt, where they transformed themselves into creatures to hide from the monster. Pan transformed himself into a goat-fish and dived into a river, where he hid until Jupiter had defeated Typhon. For escaping Typhon and his service to the gods Pan was awarded a place in the heavens as Capricornus.

Pisces – The Fishes

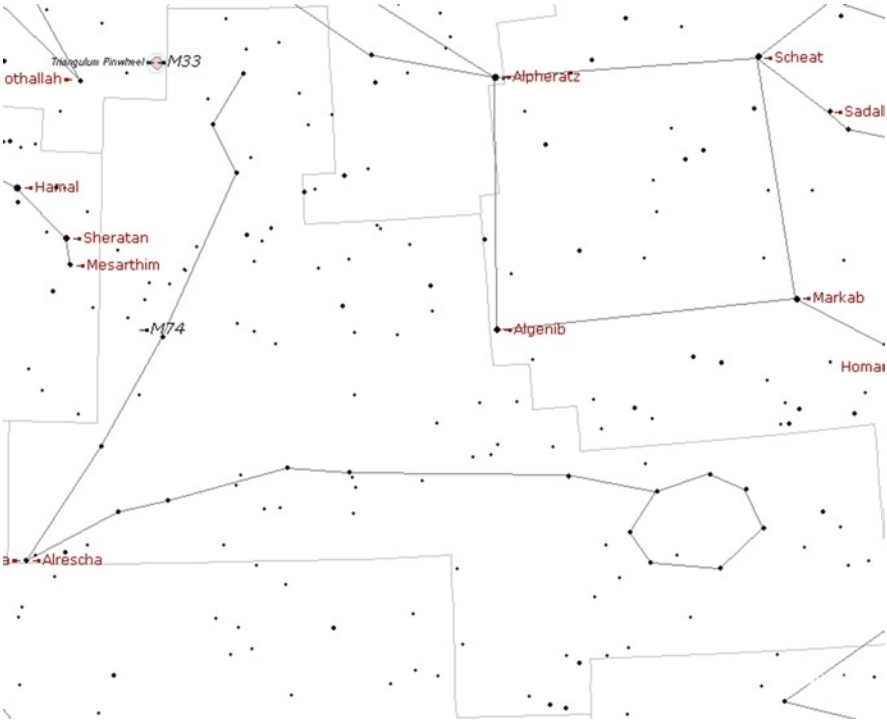

Fig. 8.4 Star chart of Pisces (courtesy Starry Night Education)

Named Stars of Pisces

Bayer designation	Mag.	Common name	Translation
ALPHA	3.82	Alrescha	"Rope"

Messier Objects in Pisces

Messier	Mag.	Name	Type
74	9.4		Spiral galaxy

The Description

This late autumn constellation illustrated in Fig. 8.4 is the last in the Zodiac. As with many of the fall constellations, the stars of Pisces do not stand out, and it takes a dark night away from the city lights to get a good view. The easiest place to start is with the asterism "The Circlet," a ring of stars located directly south of Pegasus. From there follow the string of stars east to form a point between Aries and Cetus. The line of stars then extends north to Andromeda.

The lone Messier object, M74, is a spiral galaxy that is open toward us. Widely considered one of the best examples of a Milky Way-like "grand design" galaxy at magnitude 9.4 it is a challenging object to find even in this dark part of the sky.

The Legend

The story associated with this constellation starts with the terrible monster, Typhon, who was the last of the Giants born of Mother Earth. This gargantuan superhuman was so large that his head scraped the clouds when he stood erect. His lower legs were serpents. At the end of his arms – which could reach hundreds of miles – were serpent heads instead of hands. His eyes glowed red and his breath belched molten rocks and smoke. The gods of Olympus were truly overwhelmed by this creature and instead of fighting him they scattered. They eventually landed in Egypt, where they transformed themselves into animals and could wander undetected.

When the monster, Typhon, approached Cupid and Venus, the god and goddess of love, they escaped by changing into fish. They jumped into the Nile River and assumed the form of Pisces (fish tied with string) so as not to lose track of each other in the murky waters. The monster was fooled by this trick and Cupid and Venus escaped.

Eventually, Diana – the goddess of hunting – proclaimed that Jupiter was a coward for not fighting. Embarrassed and outraged Jupiter confronted Typhon and wounded him with a lightning bolt. Jupiter then mounted his chariot and pursued the monster, heaving lightning bolts at him. The chase continued all the way to Sicily where Jupiter finally pinned the monster by dropping Mount Etna on him. Even today one can see a plume of smoke coming from the summit of Mt. Etna. Perhaps Typhon has yet to have his last word.

Pisces Austrinus – The Southern Fish

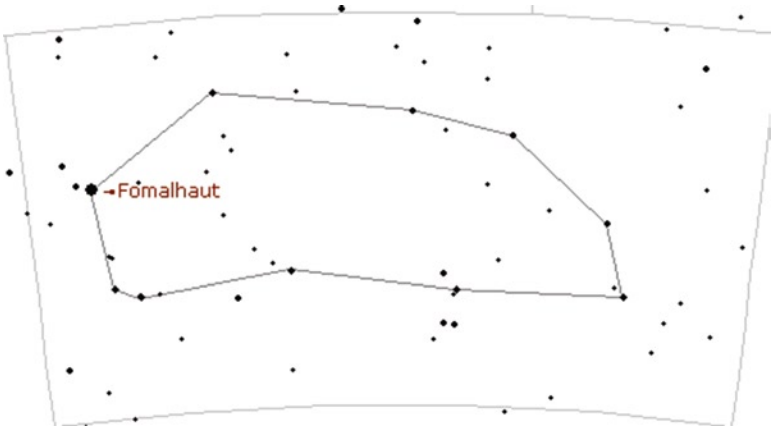

Fig. 8.5 Star chart of Pisces Austrinus (courtesy Starry Night Education)

Named Stars of Pisces Austrinus

Bayer designation	Mag.	Common name	Translation
ALPHA	1.17	Fomalhaut	"Mouth of the fish"

Messier Objects in Pisces Austrinus – None

The Description

This constellation is quite faint and near the horizon. As shown in Fig. 8.5 most of the stars in Pisces Austrinus are fainter than magnitude 4.0 with one notable exception. Fomalhaut, which means "fish's mouth," shines at magnitude 1.17 and is the 18th brightest star in the sky. It can be seen near the horizon looking almost due south. The remainder of this constellation extends toward the west in an oval shape. There are no deep sky objects to note in Pisces Austrinus.

The Legend

Little is known about the origin of this constellation, and it does not appear in mythology. Lying just south of Capricorn and Aquarius, it is located in an area of the sky known as "The Water," which also includes Pisces, Cetus, and Delphinus.

Pisces Australis is sometimes considered to be the parent of the more northern Pisces. Other sources say that the constellation represents any water monster in mythology not already found in the night sky.

Pegasus – The Flying Horse

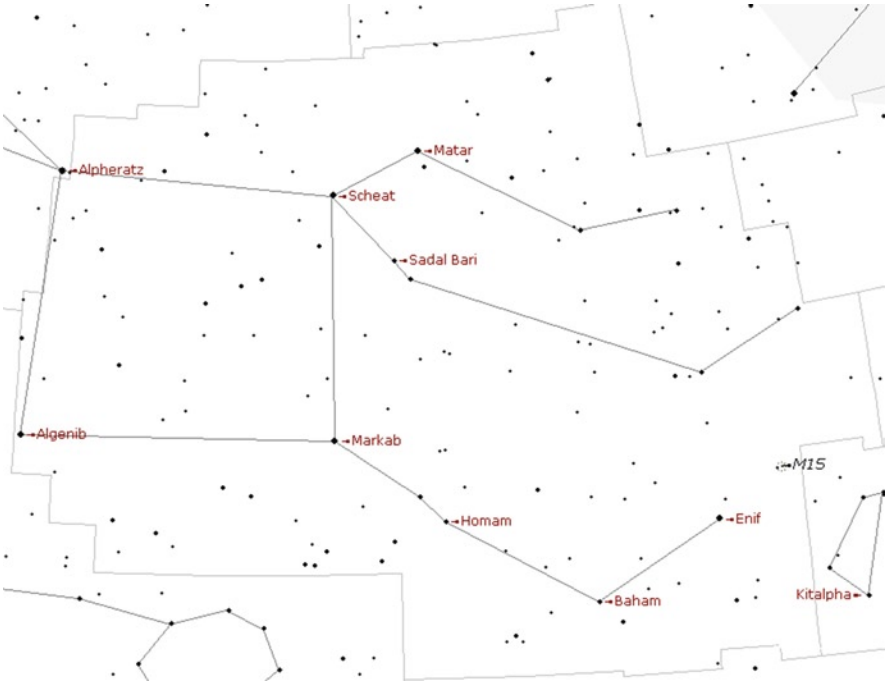

Fig. 8.6 Star chart of Pegasus (courtesy Starry Night Education)

Named Stars of Pegasus

Bayer designation	Mag.	Common name	Translation
ALPHA	2.49	Markab or Marchab	"Shoulder" (from Mankib)
BETA	2.44	Scheat	"Leg"
GAMMA	2.83	Algenib	"Flank"
EPSILON	2.38	Enif	"Nose"
ZETA	3.41	Homam	"The high-minded man"
ETA	2.93	Matar	"Rain"
THETA	3.52	Baham	"Livestock"
MU	3.51	Sadal Bari	"Lucky star of the excellent one"

Messier Objects in Pegasus

Messier	Mag.	Name	Type
15	6.2		Globular cluster

The Description

Although none of the fall constellations is striking, the most prominent is Pegasus shown in Fig. 8.6. Its well-known asterism, the Great Square of Pegasus, is formed by the stars Algnib, Markab, Scheat, and Alpheratz, which is actually the western star of Andromeda. Pegasus is located nearly overhead when looking south in October. The flying horse is traveling through the stars from east to west. With Alpheratz shared by both constellations and the "V" shape of stars that form Andromeda trailing eastward it is easy to look at Andromeda as the tail of the stallion.

Following the line from Baham to Enif and continuing onward half that distance you come to Messier 15. This prominent globular cluster is an easy find at magnitude 6.2. Its placement high in the sky in autumn makes it a candidate for the unaided eye in a dark sky location.

The Legend

The story of Pegasus is contained in The Legend of Perseus chapter of this book.

Andromeda – The Princess

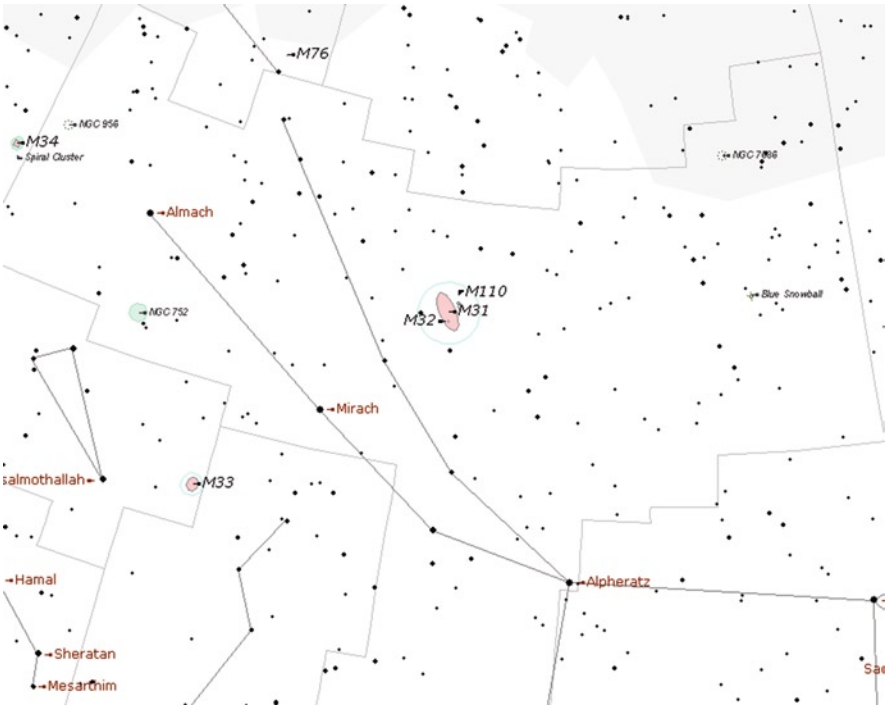

Fig. 8.7 Star chart of Andromeda (courtesy Starry Night Education)

Named Stars of Andromeda

Bayer designation	Mag.	Common name	Translation
ALPHA	2.07	Alpheratz	"The horse" or "navel"
BETA	2.07	Mirach	"The loins"
GAMMA	2.10	Almach	"Earthkid" (Arabian weasel-like mammal)

Messier Objects in Andromeda

Messier	Mag.	Name	Type
31	3.4	The Andromeda Galaxy	Spiral galaxy
32	8.1	Satellite Galaxy of Andromeda	Elliptical galaxy
110	8.5	Satellite Galaxy of Andromeda	Elliptical galaxy

The Description

The tail of Pegasus is actually the constellation Andromeda. Starting at Alperatz located at the northeastern corner of the Great Square follow the slightly curving "V" of stars to the east and north. The princess Andromeda is depicted in Fig. 8.7 as lying on the rocks of the seashore awaiting her fate with Cetus.

Located above the middle set of stars marking the "V" is M31, the Andromeda Galaxy. This magnitude 3.4 spiral galaxy can be seen with the unaided eye at dark sky sites and is often one of the first deep sky objects that novice astronomers locate. At 178 arc minutes in diameter Andromeda overflows most eyepieces. Although the core is quite bright and one can see the expanse of this galaxy in the glow of its arms, the delicate structure of the spiral arms requires imaging.

Directly below and about 50′ above Andromeda are its satellite galaxies M32 and M110, respectively. At magnitude 8.1 and 8.5 both are easy telescopic objects and at low powers the trio can be seen together.

The Legend

The story of Andromeda is contained in The Legend of Perseus chapter of this book.

Cetus – The Sea-Monster (Whale)

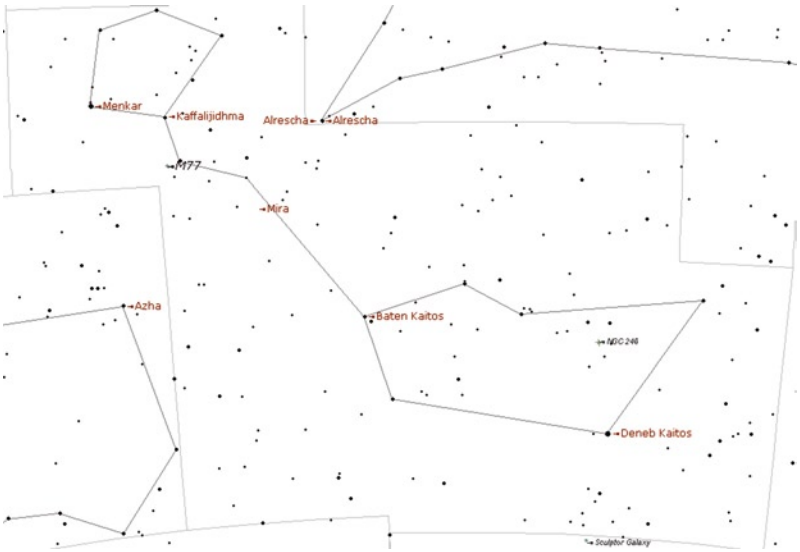

Fig. 8.8 Star chart of Cetus (courtesy Starry Night Education)

Named Stars of Cetus

Bayer designation	Mag.	Common name	Translation
ALPHA	2.54	Menkar or Menkab	"Nostril"
BETA	2.04	Diphda or Deneb Kaitos	"Frog" or "tail of Cetus"
GAMMA	3.47	Kaffaljidhmah	"Cut-short hand" (reaching from the Pleiades)
ZETA	3.74	Baten Kaitos	"Belly of Cetus"
IOTA	3.56	Schemali	"Northern" (branch of the tail)
OMICRON	3.04	Mira	"Wonderful"

Messier Objects in Cetus

Messier	Mag.	Name	Type
77	8.9		Spiral galaxy

The Description

Cetus, the sea-monster (now relegated to a whale), is located south and east of Pisces. Although a fairly large constellation shown in Fig. 8.8 its composition of no stars brighter than second magnitude makes it a challenge to find. The 'body' of this whale is formed by a box-shape of seven faint stars, with Baten Kaitos marking the eastern edge of the box and Deneb Kaitos, the brightest star in the constellation, located at the southwestern corner. From Baten Kaitos at the eastern edge of the box, follow the trail of three stars toward the northeast to Kaffaljidhmah, just east of the point of Pisces, marking the southwest point in a circlet of six stars. This circlet marks the "tail" of the whale.

Modern depictions of this constellation show Deneb Kaitos at the head of the sea-monster, probably about where its mouth would be. However, as we have learned from other constellations, such as Cygnus and Delphinus, the name "Deneb" means "tail." In fact the translation is "tail of Cetus," leading one to believe that this constellation is shown in the wrong orientation.

The lone Messier object, spiral galaxy M77, is located south of Kaffaljidhmah. Although fairly faint at magnitude 8.9, its location in a dark part of the sky devoid of bright stars makes it relatively easy to find, particularly in medium to large telescopes.

The Legend

The story of Cetus is contained in The Legend of Perseus chapter of this book.

Cassiopeia – The Queen

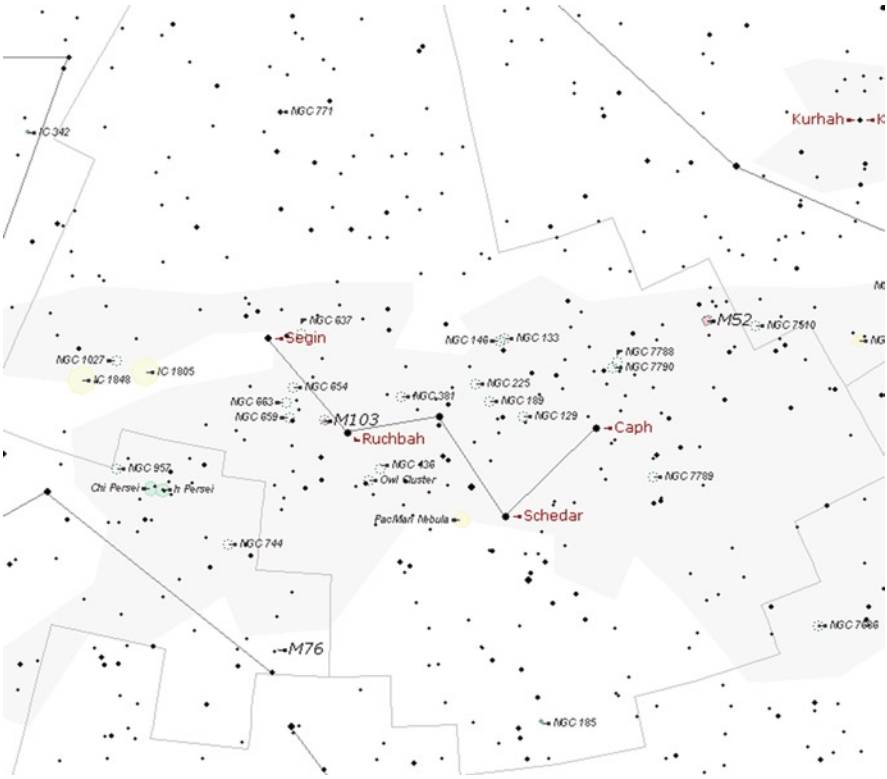

Fig. 8.9 Star chart of Cassiopeia (courtesy Starry Night Education)

Named Stars of Cassiopeia

Bayer designation	Mag.	Common name	Translation
ALPHA	2.24	Schedar or Shedir	"Breast"
BETA	2.28	Caph	"Palm" (reaching from the pleiades)
GAMMA	2.15	Tsih or Cih (not labeled on chart)	"Whip"? (Chinese)
DELTA	2.66	Ruchbah or Rukbah	"Knee"
EPSILON	3.35	Segin	Unknown

Messier Objects in Cassiopeia

Messier	Mag.	Name	Type
52	7.3		Open cluster
103	7.4		Open cluster

The Description

On the opposite side of the north celestial pole from the Big Dipper you will find the familiar "M" (or "W") asterism of stars marking Cassiopeia, the queen, and mother of Andromeda. Illustrated in Fig. 8.9 she is best seen by facing north and looking nearly overhead. It is not hard to envision the queen sitting on her throne with her head near Caph and her feet at Segin. For some reason the center star of the "M" and the brightest star in Cassiopeia is not labeled in the chart as its designated name Tsih or Cih. Nevertheless, it is listed here in the major star table.

In recent years Segin is said to have been designated "Navi" by the U. S. National Aeronautics and Space Administration (NASA). The unsubstantiated account claims that NASA named the star Navi, which is "Ivan" spelled backwards, in honor of Virgil Ivan "Gus" Grissom, one of the three astronauts who died in the *Apollo 1* accident.

Cassiopeia has two Messier objects, both open clusters. M52 is located by moving from Schedar to Caph and extending that line the same distance again. M103 is near Ruchbah. Both are fairly bright at magnitude 7+.

The Milky Way runs through Cassiopeia, resulting in a plethora of NGC/IC objects. These objects can be found in Appendix D of this book, but two are worth noting here. The Owl Cluster (NGC 457) is an open cluster of about 150 stars with two notably bright stars, magnitude 5 Phi-1 Cassiopeia and magnitude 7 Phi-2 Cassiopeia. The two stars look like eyes, with the remainder of the cluster's oval shape forming the body of the owl.

NGC 281 consists of a diffuse nebula surrounding the open cluster IC 1590. The nebula has the shape of the famous video game character Pacman™ so this deep sky object has become known as the Pacman Nebula.

The Legend

The story of Cassiopeia is contained in The Legend of Perseus chapter of this book.

Cepheus – The King

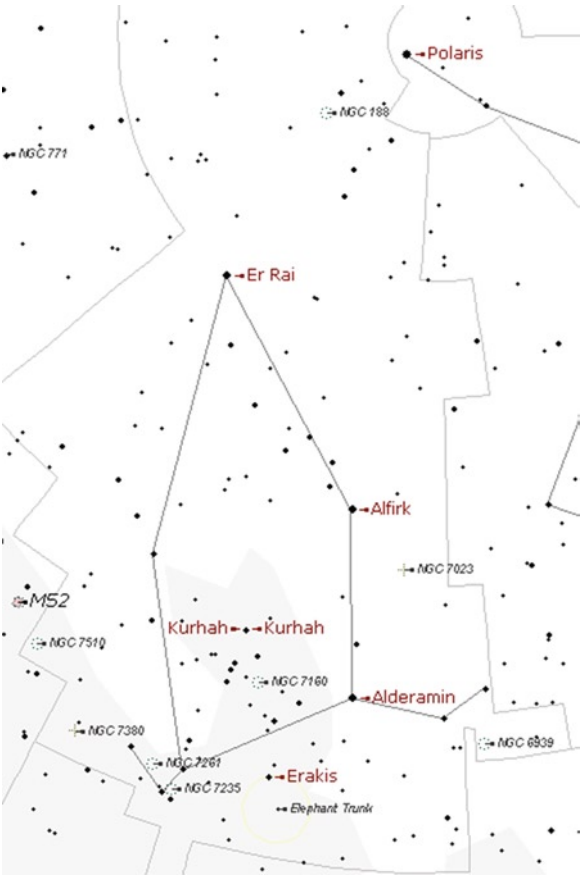

Fig. 8.10 Star chart of Cepheus (courtesy Starry Night Education)

Named Stars of Cepheus

Bayer designation	Mag.	Common name	Translation
ALPHA	2.45	Alderamin	"Right forearm"
BETA	3.23	Alfirk	"Flock"
GAMMA	3.21	Er Rai	"Shepherd"
XI	4.26	Kurhah	"Blaze" (horse's brow)
MU	4.23	Erakis	Also known as "The Garnet Star"

Messier Objects in Cepheus – None

The Description

To the north of Cygnus and west of Cassiopeia lies Cassiopeia's husband Cepheus, the king shown in Fig. 8.10. This constellation looks like a house with Er Rai at the peak of the roof, Alfirk and Alderamin marking the west side, and two unnamed stars the east side. Kurhah is in the center of the house and Erakis is the doorstep. You can imagine the king sitting in his throne facing us.

Most of the stars in Cepheus seem unremarkable, but two are worth noting. As indicated in the table the star Erakis is also known as "The Garnet Star." This red supergiant star was described by William Herschel as having a deep garnet color and subsequently became known as "The Garnet Star."

The outermost star at the southeastern corner of Cepheus is Delta Cephei. This variable star gained notoriety when it was determined that the variation in luminosity between magnitudes 3.6 and 4.3 was caused by the pulsation of the star itself. The star became the first of a class of pulsating variable stars collectively known as Cepheid variable stars.

Cepheus is devoid of Messier objects, but it does have a few NGC objects. One notable object is IC 1396, which is a star cluster with nebulosity. A long, stringy dust lane extending about 45 arc minutes is imbedded within the faint nebulosity. The appearance of this dust lane against the backdrop of the emission nebula resembles an elephant's trunk, and so IC1396 is known as the Elephant Trunk Nebula.

The Legend

The story of Cepheus is contained in The Legend of Perseus chapter of this book.

Perseus – The Hero

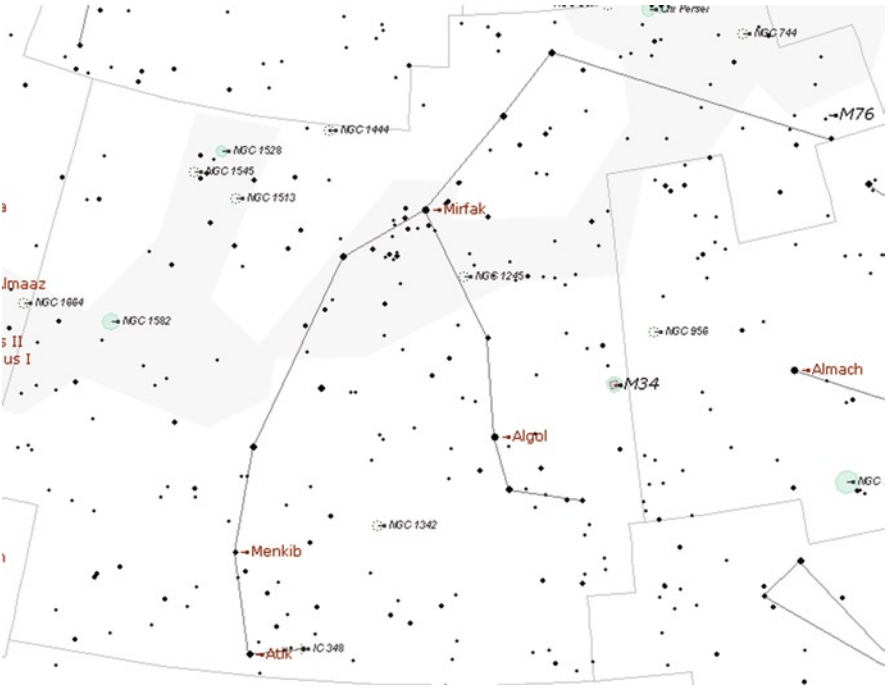

Fig. 8.11 Star chart of Perseus (courtesy Starry Night Education)

Named Stars of Perseus

Bayer designation	Mag.	Common name	Translation
ALPHA	1.79	Mirfak or Marfak	"Elbow"
BETA	2.09	Algol	"The ghoul"
XI	3.98	Menkib	"Shoulder"
OMICRON	2.84	Atik	"Shoulder" (of the Pleiades)

Messier Objects in Perseus

Messier	Mag.	Name	Type
34	5.5		Open cluster
76	10.1	The Butterfly Nebula – Little Dumbell, Cork	Planetary nebula

The Description

Perseus, the hero, can be found east of Andromeda and Triangulum and west of Auriga as shown in Fig. 8.11. Given the names of the stars he appears to be sideways or even inverted when facing north. Mirfak is the fairly bright star in the middle of the constellation and from there lies a branch of stars extending to the southeast. This is the left arm of Perseus, which is still holding the head of Medusa, the Gorgon. The variable star Algol is the blinking eye of Medusa. Also known as "The Demon Star" Algol is an eclipsing binary with about a 3-day period where it dims from magnitude 2.09 to 3.4. It is the best known of the variable stars and is the namesake for the class of eclipsing binary stars called "Algol variables."

There are two Messier objects in Perseus. M34 is a fairly bright open cluster located northwest of Algol. The more noted object is the planetary nebula M76. Its unusual shape has earned it names such as the "Little Dumbbell Nebula" or "The Butterfly Nebula." It is located at the northwestern edge of Perseus near Phi Persei, and at magnitude 10.1 will require a dark sky site to see.

The Milky Way runs through part of Perseus and so it has a number of NGC objects listed in Appendix D of this book. The Double Cluster is located near the border between Perseus and Casseopeia, consisting of NGC 869 ("h Persei") and NGC 884 ("Chi Persei"). Not only are these magnitude 4.0 open clusters naked eye objects, but they are close enough to be captured together in a low power eyepiece to make a spectacular object to view!

The Legend

The story of Perseus is contained in The Legend of Perseus chapter of this book.

Triangulum – The Triangle

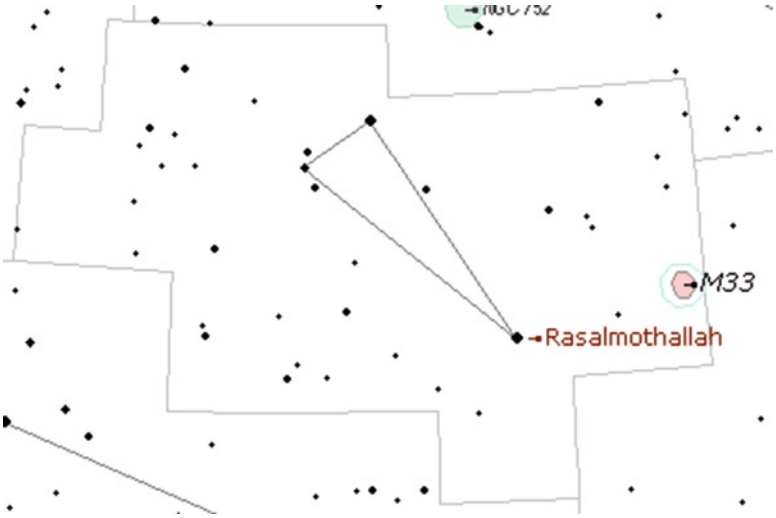

Fig. 8.12 Star chart of Triangulum (courtesy Starry Night Education)

Named Stars of Triangulum

Bayer designation	Mag.	Common name	Translation
ALPHA	3.42	Rasalmothallah	"Triangle", "head of the triangle"

Messier Objects in Triangulum

Messier	Mag.	Name	Type
33	5.7	The Triangulum Galaxy	Spiral galaxy

The Description

This faint constellation can be found best by facing due east and looking up about two-thirds of the way to the point overhead. Between Andromeda and Aries you will find three stars in a triangle shape as shown in Fig. 8.12. If you imagine it as a hand of a clock, it points to about five o'clock.

Located east of the star Rasalmothallah is M33 – the Triangulum Galaxy. This galaxy is part of our local group, and although small compared to the Andromeda

Galaxy it is relatively bright and easy to find. Its actual size is more indicative of spiral galaxies, while Andromeda and the Milky Way are quite large for spiral galaxies.

The Legend

Triangulum is said to represent the Trinacria on the island of Sicily. These three large points of land were called Lilybaeum, Pelouis, and Pachynus. They roughly define the triangular shape of Sicily. Legend has it that Ceres was so enchanted with the island that she begged Jupiter to reproduce it in the heavens and Jupiter finally capitulated.

The Trinacria has also been identified with the Thrinakia of *The Odyssey,* land that was the pasture-ground of the Oxen of the Sun.

Triangulum could also represent any number of trios found in mythology. Known as the "Triads" these include the three Fates, the Gorgon sisters (of which Medusa is the best known), and the Gray Sisters of the North (who passed one eye between them) to name just a few. Usually these Triads had unique characteristics. Examples include the Sirens' enchanting singing, which would lead men to their death; the Graces (Aglaia meaning "splendor," Euphrosyne meaning "mirth," and Thalia meaning "good cheer"), who were the incarnation of grace and beauty; and the Erinyes or Furies (named Sleep, Death, and Dreams), who were the servants of Pluto and Proserpina and oversaw the torture of criminals in the Dungeons of the Damned.

Chapter 9

The Legend of Perseus

This is a wonderful story about an underdog who overcomes incredible odds to become victorious. Even the gods recognize this man's courage and perseverance and provide a little help for him along the way. We'll identify the constellations in this story then relate the famous myth.

The Constellations

When fall arrives the constellations of this great story are dominating the eastern sky. Cepheus and Cassiopeia are circumpolar constellations in the northeast, while Pegasus rises with Andromeda literally on his tail. Cetus rises in the southern sky with Andromeda. Finally, just like in the mythological story, Perseus arrives just in time in the northeast after all the other constellations have risen.

Pegasus – The Flying Horse
The description of Pegasus is found in the autumn constellations chapter of this book.
Andromeda – The Princess
The description of Andromeda is found in the autumn constellations chapter of this book.
Cetus – The Sea-Monster
The description of Cetus is found in the autumn constellations chapter of this book.
Cassiopeia – The Queen
The description of Cassiopeia is found in the autumn constellations chapter of this book.

D.E. Falkner, *The Mythology of the Night Sky: An Amateur Astronomer's Guide to the Ancient Greek and Roman Legends*, Patrick Moore's Practical Astronomy Series,
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Cephus – The King
The description of Cephus is found in the autumn constellations chapter of this book.
Perseus – The Hero
The description of Perseus is found in the autumn constellations chapter of this book.

The Legend

The story of these constellations begins with Danae, the daughter of King Acrisius of Tiryns, a city not far from Argos. Danae was quite beautiful, but she was King Acrisius' only child. He really wanted a son to continue the royal name. He was so concerned about this that he sent a messenger to Delphi to ask an oracle of Apollo why he was denied a son. The messenger returned with the answer but not the answer he was looking for. The oracle said that, not only would King Acrisius not have a son but his daughter would have a son who would kill him. This enraged Acrisius, who immediately had the messenger's head cut off. Then, in a futile attempt to change his fate, for the oracle was never wrong, he vowed that this prophesy would never happen. The king forbade his daughter to marry, and as insurance he built a massive tower made of bronze with no doors and only narrow slits as windows and locked her inside before the final plate of bronze was put in place. Then he posted guards who watched the tower around the clock.

Jupiter, always on the lookout for beautiful women, was quite taken with Danae's beauty. The formidable bronze tower was not much of an obstacle for the god. He disguised himself as golden rain and came through slits in the tower to be with Danae. Through their union Danae became pregnant and bore a son. She tried to keep him a secret, but one day when her father was visiting he saw the boy. Danae told him that the boy, whom she named Perseus, was fathered by Jupiter. The king was beside himself. He removed Danae and Perseus from the tower. The oracle's prophesy still gnawed at him, and he had to devise some way to get rid of Perseus. But his task was even more complicated now that Perseus was the son of a god, and Jupiter no less! He didn't want to anger him!

After many sleepless nights King Acrisius came up with a plan. He took Danae and Perseus, placed them in a box, and set them out to sea. By doing this he didn't kill them outright, but their chances of surviving out at sea were remote at best. The king felt relieved and went back to his life, never giving it another thought.

The box floated out to sea where the waves tossed it about. Danae was terrified and feared that she and the baby she clutched were doomed to a watery grave. Then she noticed that the baby Perseus was not fearful at all. His calm and confident face was a comfort to her. Surely Jupiter would not allow their child to perish. Throughout the night, while the waves rocked the box, baby Perseus slept and Danae prayed to Jupiter.

When morning came her prayers were answered. The box washed up on the shores of the island of Seriphos, ruled by King Polydectes. The king's brother, Dictys, discovered the box with Danae and Perseus, and he welcomed them into his home. There Perseus grew in wisdom and strength, learning about many things from fishing successfully to wielding a mighty sword.

King Polydectes was a vengeful, tyrannical ruler. He and Dictys were estranged, so it was many years before he found out about Danae and Perseus. Polydectes found Danae very beautiful and wanted to take her as his wife. She refused, however, because he was so cruel and wicked. The king would have taken her forcibly but Perseus was always present to protect her. The king realized if he was going to have Danae he must first eliminate Perseus. He put together a plan to do away with him.

The king held a great feast and invited all the young men of Seriphos, including Perseus, to attend. All the young men, except Perseus, brought wonderful gifts for the king. When he was mocked and scorned by the others, Perseus declared that he would bring the most wonderful gift of all. King Polydectes seized this opportunity by stating that there was only one such gift that would do. Perseus must bring him the head of the Gorgon Medusa. Perseus accepted the challenge and, amid laughs and jeers, he left the palace to begin his quest.

Once away from the palace, Perseus strolled down to the sea. He was dejected and sat down on a rock to consider his situation. He had made a bold claim. Despite his great strength, defeating the Gorgon would be very difficult. As he sat there deep in thought, two of the Immortals, Minerva and Mercury, visited him. They told him not to be distraught for, by orders of Jupiter himself, they had come to help him.

First Mercury presented Perseus with the Sickle of Adamant. It was the sharpest weapon on Earth and the very one Jupiter used to defeat Typhon in the Battle of the Titans. No other weapon could shear off the head of Medusa, the Gorgon. Then Minerva stepped forth with her shining armor and polished shield. She had a personal interest in the quest, as we will learn later in the story. She hated Medusa and was all too happy to assist Perseus with this quest. Minerva removed her shield and, handing it over to Perseus, told him that she would lend him her shield with its mirror-like surface. Those who gazed directly at Medusa were instantly turned to stone from the terror of the sight, but Perseus would be able to view her in the mirror surface of the shield without fear. Then the Immortals assured him that his mother would be protected by Dictys while he was away, for the journey would be long.

First, he must travel north to the land of the twilight, a cold and dark place that was the home of the Gray Sisters. Perseus needed to coerce the Gray Sisters to direct him to the Nymphs of the north. The nymphs would provide all the assistance he required as well as directions on where to find the Gorgons. They would also tell Perseus the secret of defeating the two immortal Gorgons after killing Medusa. At that, Minerva and Mercury left, and Perseus set out to find the Gray Sisters.

The Gray Sisters and the Gorgon Sisters were the offspring of the incestuous union between Phorkys, the god of the dangers of the sea, and Ceto, goddess of sea monsters. The Gray Sisters had been born already old with gray hair, leathery skin, and had but one eye and one tooth that they passed among themselves. As you can imagine there was much quarreling between them as to who would have the eye and who would have the tooth. Perseus found the three huddled around a fire to keep warm in the cold and dark land. As they sat there, Perseus crept up slowly and silently from behind them. As the eye was passed from one sister to another Perseus snatched it up. He did likewise with the tooth. As the three women argued about who had the eye and tooth he spoke up. He cried aloud that he had their eye and tooth and he would keep them forever if they did not tell him what he wanted to know.

They pleaded with him to return their eye and tooth and not to leave them in the darkness, cold and starving. They promised on the River Styx to tell him what he wanted. Perseus asked for directions to the land at the back of the North Wind where the Nymphs lived and from there the way to the Gorgons. They told him everything he asked for. Then he returned the eye and tooth to the sisters and left immediately to continue his journey.

The northern Nymphs lived in a beautiful garden where one could remain forever young. Perseus was welcomed by the Nymphs and dwelt for a long time with them. It was a happy time, but eventually Perseus realized he must continue his journey. He told the Nymphs of his quest for the head of the Gorgon Medusa, and how he must return to King Polydectes with it. He begged the fair nymphs to tell him where he might find Medusa and defeat her along with her two immortal sisters. The Nymphs were eager to help him. First they lent him the Shoes of Swiftness. These were winged silver sandals that would allow him to escape from the two terrible sisters of Medusa. Next they loaned him a kibisis, a magic bag that grows larger or smaller depending on what is put into it.

The Nymphs told him there was yet one more item he would need – the Cap of Hades, which would render Perseus invisible and give him an advantage. Fortunately, one of the Nymphs was a close friend of Proserpina, the queen of the dead. This Nymph was able to go to the underworld to visit Proserpina at any time and return at will. She did so and returned with the Cap of Hades, which was made from dog skin. Perseus was then ready to continue his journey and meet the Gorgons.

The Gorgons were three sisters. Medusa was mortal, while her two sisters, Stheno and Euryale, were immortal. Medusa had been beautiful once, with fair skin and gorgeous hair. Neptune was taken with her beauty, but she resisted his advances. He grew impatient and raped her in the temple of Minerva. Minerva was outraged that this would happen in her temple. She could not punish Neptune, since he was a god himself, so she punished Medusa and her sisters. Instead of hair, terrible snakes grew from Medusa's head. Her sisters had their heads covered with dragon scales. They all had white tusks, like pigs, hands made of brass, large golden wings on their shoulders, and were hideous to look at. Minerva made them so hideous that any person or beast that gazed directly upon their faces would be so terrified he or she would instantly turn to stone.

It was this terrible trio that awaited Perseus. He traveled the route given him by the Gray Sisters. Perseus was soon in the land of the Temple of Minerva. While still a good distance from the temple, Perseus began to see stone statues of men and beasts, victims of Medusa's hideous sight. They grew in number as Perseus approached the temple until they were scattered everywhere. From a distance Perseus sighted the temple. Using the mirrored surface of Minerva's shield he could see the three sisters sleeping on the temple steps with Medusa's snakes writhing in the sun. Perseus donned the Cap of Hades and the Shoes of Swiftness. Then, looking only at the reflection in Minerva's shield, he carefully and quietly approached the Gorgons.

He was terrified by the reflection but, remembering his mother, continued to draw closer. When he was next to Medusa he carefully raised the Adamantine Sickle given to him by Mercury. Minerva and Mercury were with him now and guided his trembling hand. In one great stroke he sliced through the neck of

Medusa, and her head fell next to her body. He kept looking at the reflection, for though she was dead her image was still deadly. Perseus quickly picked up the head with its hissing snakes and placed it in the kibisis.

The hissing of Medusa's snakes awakened the two sisters. Seeing what had happened to Medusa, they were enraged. Perseus could not kill them, for they were immortal. They could not see him, though, for he still wore the Cap of Hades. Perseus leapt into the air and was carried away to the shore by the Shoes of Swiftness. As he hovered there with his winged shoes drops of blood from Medusa's severed head fell onto the beach and foam from the waves. Neptune took this mixture and fashioned Pegasus, the flying horse.

Pegasus flew wild for some time until he was tamed, with the help of Minerva, by the warrior Bellerophon. Bellerophon had many successful conquests with Pegasus but eventually grew out of favor with the gods when he attempted to fly to heaven on Pegasus. Jupiter sent a gadfly to sting Pegasus, who reared, throwing Bellerophon to his death. Pegasus flew on to Olympus where he stayed in the stables of Jupiter and was eventually placed among the stars.

Meanwhile, on his return to Sephiros Perseus stopped at the island of Hesperides in the land of Atlas to find food and rest. Atlas, ever paranoid of someone stealing the Golden Apples of Hesperides, which he guarded for Juno, refused Perseus hospitality. Perseus was angered by the distrust of Atlas. Closing his eyes he uncovered the head of Medusa from the kibisis and turned Atlas into a huge mountain upon which rests the sky and all its stars. Today we know this as the Atlas mountain range in Morocco.

Perseus continued his journey and soon found himself over the kingdom of Ethiopia. It was ruled by King Cepheus and Queen Cassiopeia. They had a beautiful daughter named Andromeda. Now, Queen Cassiopeia was very proud of her daughter and boasted that she was more beautiful than the sea nymphs. The sea nymphs, hearing of this boast, were jealous and protested to Neptune, god of the sea. Being protective of his sea nymphs, Neptune agreed to punish Cassiopeia by sending the sea-monster, Cetus, to ravage the coast of Ethiopia. King Cepheus was horrified at the devastation the monster wrought and consulted an oracle for advice about how to stop the terrible destruction. The oracle said that the only way to appease the gods was for Cepheus to sacrifice his daughter by chaining her to the coastline for Cetus to devour. Cepheus was torn between the love of his daughter and the welfare of his subjects. In the end, he reluctantly had Andromeda chained to a sea rock. As the king and queen watched the horrible sea-monster appeared.

As luck would have it Perseus was flying overhead on his Shoes of Swiftness as Cetus approached Andromeda. Perseus looked at Andromeda and was smitten by her beauty. Perseus flew down to Cepheus and Cassiopeia and offered to slay the monster and save their daughter if she could be his wife. They promised him their daughter and offered a kingdom as a dowry. Perseus sped into the air and attacked Cetus. He approached the monster from the back and stabbed him in the neck with his sword. The monster reeled with pain and anger snapping at Perseus. But with his Shoes of Swiftness Perseus was able to dodge the monster's lunges. One more time he was able to thrust his sword into the scaly neck. Then when the monster was thrashing about he landed on its back and taking the sword by both hands drove the blade through its shoulders. Cetus was spewing water and blood from his nostrils and the Shoes of

Swiftness were soaked in the bloodbath. Perseus landed on the rock near Andromeda and waited for the monster. Cetus was now exhausted from the fight and weak from the wounds. As Cetus approached Andromeda chained to the rock Perseus dealt one more mighty blow to the neck, slicing it open and killing the monster.

Perseus then took the sword and broke the chains that bound Andromeda. He then claimed the hand of Andromeda. The happy couple were married immediately and set sail for Greece to claim their kingdom.

On their way to Greece they stopped at Seriphos to see Perseus' mother. There Perseus learned that Dictys and Danae were hiding in fear of Polydectes. He had grown hostile and violent at Danae's continued refusal to become his wife. Angered by this turn of events in his absence Perseus went alone to the palace of King Polydectes. He entered and found Polydectes feasting with his unseemly friends. Polydectes was surprised to see Perseus and, along with the others, jeered and mocked Perseus. Polydectes asked Perseus if he had brought the present he promised. Perseus told him that he carried with him the Gorgon's head. Polydectes called him a liar and boaster and demanded that Perseus show him the head. Perseus remained silent, closed his eyes, and drew out the head of Medusa. The room became deathly quiet. After replacing the head in the kibisis, Perseus opened his eyes to see only stone statues where men once were. Perseus then had the stone lumps dumped on the hillside.

That evening Perseus strolled down by the sea and Minerva and Mercury appeared once again. Perseus returned the Adamantine Sickle and Minerva's shield, along with the Shoes of Swiftness, the Cap of Hades, and the magical bag containing the head of Medusa. Minerva later took the head and placed it in the center of her shield so that it might strike terror into the hearts of her enemies.

Dictys became the king of Seriphos and married Danae. Perseus and Andromeda continued their journey to their kingdom, called Argonis. During their trip Perseus learned of a great contest of games being held by the king of Larissa, and they decided to sail there to join in the games. Perseus was doing well in the games when it came time to throw the iron discus. Perseus concentrated very hard, grasped the disc, and, in a tremendous thrust, hurled it into the air. As it flew through the air a gust of wind caused it to veer into the crowd, where it struck an old man who was watching and killed him. This unfortunate man turned out to be Acrisius, Perseus's grandfather. He had left Tiryns fearing that Perseus would return to kill him. The oracle's prophesy was fulfilled after all.

In great sorrow, Perseus left Larissa and sailed to Argonis, where he and Andromeda ruled. They had many children and a wonderful life. Eventually Perseus perished after his battle with Liber. Jupiter so admired Perseus and Andromeda that he placed them in the sky along with those involved with their story – King Cepheus, Queen Cassiopeia, and Cetus, the sea-monster. In addition Jupiter has Perseus holding the head of Medusa with the winking eye of Algol so that all may see his most famous feat for all posterity.

However, the gods felt that the vain queen, Cassiopeia, got off easy, so they condemned her by tying her to her throne and setting her in the sky circling the Pole Star forever, alternating between an upright position and dangling upside down.

It is interesting to note that Hercules, one of the greatest warriors and heroes of Greco-Roman mythology, is the great grandson of Perseus.

Chapter 10

Planets and Satellites

The word "planet" comes from the Latin word *planeta* and the Greek word *planes,* which means "wanderer." When the ancient Greeks studied the night sky they noticed that most of the stars remained in the same position relative to all the other stars, but a few stars seem to move in the sky from day to day, week to week, and month to month. The Greeks called these rogue stars "wanderers" because they wandered through the starry background.

The names of the planets, in most cases, reflect some characteristic that caused the ancients to link them with a particular god or goddess. Like the constellations the planets were given the names of the Roman gods. At first the moons of planets were given Roman names. As the discovery of moons proliferated, some moons were given Greek names and, more recently, the names of mythological characters from other cultures.

Defining what a planet is has become somewhat controversial. When Pluto was discovered in 1930 it was declared the ninth planet in our Solar System. In recent years astronomers have discovered a large number of icy rocks just beyond the orbit of Pluto in a region of the Solar System called the Kuiper Belt. One of these objects identified as UB313 (later named Eris) is actually larger than Pluto. With the potential of a number of these Kuiper Belt Objects (KBOs) being "planet sized" many astronomers began to question whether Pluto should be considered a planet or rather a large KBO.

Deciding the classification of these KBOs prompted the International Astronomical Union (IAU) to define what a planet is, as well as other types of Solar System objects such as a comets, asteroids, and dwarf planets. More details on this can be found in this chapter's section on dwarf planets, which is included because these are significant objects and at least two of them can be seen by large aperture amateur telescopes. More information on this can also be found at www.iau.org.

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In this chapter we discuss the observational highlights of the planets and moons along with other interesting details. You will find the 152 named natural satellites orbiting planets and dwarf planets as of the date of this writing. Since this book is also about mythology we also tell stories about each, though some of these are quite brief.

Just as the advent of robotic space probes has increased our knowledge of the gas giant planets of Jupiter, Saturn, Uranus, Neptune, and KBOs it is likely more dwarf planets and satellites will become known after this book is published. Interested readers are encouraged to seek out periodicals and literature that provide details about each planet or moon from scientific evidence gathered by the army of specialized telescopes and from robotic space probes that have visited the planets.

Mercury

The Description

Although Mercury is bright enough to be seen with the naked eye its proximity to the Sun makes it challenging to find. It is always in the glow of twilight, and a favorable elongation (the apparent distance a viewer observes between the Sun and a planet) is needed to get a good view of this planet. Its small size (about 38% the size of Earth) prevents most amateur telescopes from seeing any kind of surface feature. Because its orbit is inside that of Earth's it does exhibit phases similar to our Moon, which are visible at higher powers in amateur telescopes. With its orbital period of 88 days this planet changes from a morning object to an evening object every month and a half or so. Because of its elusive nature and swift movement the Romans named it after Mercury, the messenger of the gods.

The Legend

Mercury is usually depicted wearing winged sandals, a winged hat, and carrying his winged wand, the Caduceus. Though he was Jupiter's messenger, Mercury was also quite shrewd and cunning. He represented eloquence and skill. He was known as the Master Thief and was the god of thieves. He acquired this reputation at a very early age. The son of Jupiter and Maia, daughter of Atlas, Mercury was reportedly born at the break of day; by evening he had stolen Apollo's herds. Jupiter made Mercury give the herds back. Mercury won Apollo's forgiveness by presenting him with a lyre made from a tortoise shell (See Lyra in the summer constellations chapter). Perhaps it was this act that also made him the god of commerce, marketing, and protector of traders. Mercury also plays a prominent role in the legend of Perseus. Some myths maintain that Mercury escorted souls to the underworld.

Venus

The Description

Venus has been called "Earth's twin." This similarity relates to the fact that it is a terrestrial planet about 95% the size of Earth. However, the similarities end there. Venus is shrouded in clouds of carbon dioxide (CO_2) with some sulfuric acid mixed in. It has a surface temperature of 470 °C (878 °F). The homogenous CO_2 clouds do not provide the observer with any discernable features. The planet also rotates in the opposite direction from Earth and has a very long "day," about 243 Earth days.

Like Mercury, Venus also occupies the evening and morning sky, but its distance from the Sun and larger size allows it to be viewed well after dusk or before dawn. It is in the darkened sky that this planet shows its true beauty. The shroud of clouds provides an excellent reflector of sunlight, making Venus the third brightest object in the sky (after the Sun and Moon), and this wanderer is not unlike a diamond in the background of stars. Its brilliance captures the eye and the beauty of it makes it easy to see why the Romans named it Venus after the goddess of beauty and love.

Venus is so bright, in fact, that it can be a telescopic object in the daytime. Like Mercury and the Moon it exhibits phases as it comes from the far side of the Sun. The disk starts nearly full but small as it appears in the evening sky. As time passes each evening Venus is higher in the sky and the disk attains a "first quarter" appearance as it becomes steadily larger. As Venus approaches inferior conjunction the disk will be fairly large and exhibit a crescent shape as it moves closer to the horizon at sunset and eventually moves into the solar glare. After inferior conjunction Venus will begin to appear in the morning sky, and the reverse will happen from its evening appearance. As it moves away from the solar glare at dawn and into the morning sky it will go from an appearance as a large crescent shape, through "last quarter," and then gradually sink into the morning glare as it becomes a small disk again before moving to superior conjunction. It takes about 225 days for Venus to complete an orbit but because the Earth travels in the same direction as Venus in its orbit this whole sequence takes well over a year. Consecutive inferior conjunctions run about 19 months apart.

The Legend

Venus was named as the daughter of Jupiter and Dione in Homer's epic, *The Iliad*. However, Venus is known as Aphrodite to the Greeks, and the Greek word *aphros* means "foam." The story has a grizzly side in the details, for she was created when the genitals of Ouranus (Uranus), the Sky God, were castrated by Kronos (Saturn) and cast into the sea where, with the foam, Aphrodite was created.

Venus is the goddess of love and also was associated with sex, procreation, prostitution, beauty, and pleasure. In her presence the skies were blue and the

breezes warm and light. Beauty was all around her. In an interesting course of events Venus eventually married Vulcan, the god of fire, who was the lame and ugly god of the forge. Cupid was her son.

Venus is involved in a number of stories. In the story of Pisces, the Fishes, Venus and Cupid escaped the monster Typhos. She is often involved in causing gods and mortals to fall in love. But her curse can cause just the opposite, as happened to the men of Lemnos in the legend of Jason and the Argonauts. Her love of Adonis led to a quarrel with Proserpina, as told in Libra (The Scales).

On a lighter note there is the story of the Race of Atalanta. Atalanta was a woman who was beautiful, incredibly fit, and could run like the wind. She would race men and always win. Her beauty attracted many suitors, whom she would immediately turn away, saying that she would only marry a man that could race her and win. Hippomenes often sat and watched these races, not paying much attention. One day he caught a glimpse of Atalanta's face and saw how beautiful she was. When she disrobed and he saw the beauty of her body he found himself wishing that no man would race faster than her. He wanted Atalanta for himself and decided to try and win her. He prayed to Venus to assist him with this deed, for it was Atalanta's beauty and grace that ignited this flame of love. On the day of the race Venus appeared only to Hippomenes. She was holding three golden apples, and she taught Hippomenes how he should use them.

The racers crouched, took their mark, and were off. Hippomenes took the early lead but soon Atalanta caught up. She looked into his eyes as she passed and sighed. Then she ran ahead of him. Hippomenes took one of the golden apples and tossed off the side of the track, catching Atalanta's attention. She had never seen such a sight and veered off the track to retrieve the apple. This gave the lead back to Hippomenes and the crowd cheered. But soon Atalanta had caught up and passed him once again. Hippomenes took the second apple and tossed it. Once again Atalanta left the course to retrieve the apple. Although Hippomenes had once again gained the lead he was becoming quite winded and knew if he didn't delay this woman enough with the third apple all would be in vain. As she passed him for the third time he took the last apple and thrust as far as he could across the field. As it was nearing the end of the race Atalanta was undecided on what to do. So Venus caused her to desire the apple and she left the course to retrieve it. Hippomenes conjured up all his strength and pushed as hard as he could toward the finish. Atalanta, having retrieved the third apple, was now weighed down with the three apples. Venus also intervened to lessen her speed, and in the end Hippomenes won the race – and Atalanta.

Earth

The Description

Earth-type planets, while probably not unique in our galaxy, may be relatively rare. The unique combination of the Sun's size and composition, our distance from it, and the rotational period of Earth has produced an evolutionary cycle that has

resulted in the complex life forms of plants and animals. We have not yet found anything even close in the over 400 planets discovered as of this writing. To be fair, the technology to discover such a planet around a star thousands of light years away is in its infancy, and within a few years we will undoubtedly have the necessary technology to find such a planet.

Note also that the habitable zone for simpler life forms is much larger and holds a much greater chance of existing. Within our own Solar System some of the moons of the gas giants have the necessary ingredients to support some basic life forms, even in their bitter temperatures. The possibility of discovering life, whether in our own Solar System or around other stars, holds a fascination that will stay with us for the foreseeable future.

The Legend

Earth was known to the Romans as *Terra Mater,* or "Mother Earth," and to the Greeks as *Gaea.* From her and Father Heaven (Uranus) came all life as we know it. First they bore the Monsters, the Cyclops, the Titans, and finally the Giants. The gods of Olympus came from the Titans and humankind was fashioned by the gods. The story of all this is included in the chapter of this book called "An Introduction to Greco-Roman Mythology."

Earth's Satellite – The Moon

The Description

The Moon is not the largest satellite in the Solar System. That award goes to Ganymede, a moon of Jupiter. However, the Moon does win two other prizes. First, it is the largest moon as compared to the size of its host planet. Second, it is the only moon visited by humans.

The Moon has no atmosphere but was recently discovered to have some crystallized water. It was most likely formed early during the creation of the Solar System, when Earth was in its infancy. A sizable object hit Earth, and a large amount of material separated and went in orbit around Earth, becoming the Moon.

The Legend

The most prominent object in the night sky is named after the Roman goddess Luna (*Selene* in Greek mythology). Here is one notable story in which she plays a role.

There was a Greek youth named Endymion. Although he may have been a king or a hunter, most accounts refer to him as a shepherd. He was incredibly handsome

and caught the eye of Luna. She fell in love with him instantly and decided she must have him for herself. While he was asleep she came down from her heavenly abode, kissed him, and lay with him. He never awoke to see this beautiful, silvery goddess. She allegedly placed him in a peaceful slumber that never ends. He sleeps for all eternity so that Luna can visit him every night and lavish him with her kisses. While his fate may seem cruel, Luna also is in pain and misery, for her passion for him will never be fulfilled.

Mars

The Description

Even to the naked eye, this planet has a reddish hue about it. Over the years Mars has held a fascination for humans. Even modest telescopes can make out some surface color differences and the polar ice caps, which grow and shrink with the seasons. As telescopes grew larger and were able to see more detail the surface appeared to have canal-like features, prompting the rumor that Mars was inhabited by intelligent life. Further study with Earth-based telescopes, as well as robotic probes and landers, have determined that Mars is a barren planet with a thin carbon dioxide atmosphere and small amounts of water vapor. Frozen water and carbon dioxide form a frost-like coating at the poles, causing the polar ice caps.

Mars is about half the size of Earth and may have had a more substantial atmosphere along with liquid water sometime in its past. Gullies and canyons that appear to have been carved out by water are visible on the surface. There is also evidence of volcanic activity. However, the gravitational pull of this smallish planet was unable to retain an atmosphere that would sustain life as we know it. Despite the barren surface of Mars astronomers and scientists have not ruled out the potential for some sort of life that might exist under the surface of Mars.

The Legend

The color red historically has been associated with anger and fighting. It is appropriate that the Romans would name this planet Mars, after the god of war. He was the son of Jupiter and Juno. He was not well liked, for he was often accompanied by a morbid group while on the battlefield. First there was the goddess of war, Bellona. With her traveled Terror, Trembling, and Panic. Then there was Mars' sister, Discordia, whose name means "discord." Walking with her is Strife, her son. Finally the sons of Mars, Phobos (Fear) and his twin brother Deimos (Dread), always accompanied Mars on the battlefield.

The Romans revered Mars. He was a strong deity, dressed in shining armor. He represented victory on the battlefield and the notion of death with dignity. With Mars at their side, the Romans felt invincible in battle.

Mars' Satellites

It's interesting to note that the two moons of Mars were given the Greek names of Phobos and Deimos, instead of the Roman names, Pavor and Metus, respectively.

Deimos

Deimos is the smaller of Mars' two satellites. It is very irregular in shape, roughly $15 \times 12.2 \times 10.4$ km. Its orbit is about two and one-half times farther out than Phobos and has an orbital period of about 30 h.

This satellite's name means "dread," and, like Phobos, he was a son of Mars. The two sons of Mars attended him and drove his war chariot into battle.

Phobos

Phobos is the larger of the two moons of Mars. Its name means "fear," and Phobos was a son of Mars who drove his chariot into battles. It is oblong in shape, being roughly 27 km long and 20 km wide. It has one large impact crater called Stickney Crater. Calculations of Phobos' orbit and composition suggests that at least part of the moon is hollow. Future robotic missions to Mars will make close passes to this moon to try and determine if this is so. Phobos is also the closer of the two moons and orbits Mars in less than one Martian day. To an observer on the surface Phobos would appear to rise in the west and set in the east. Phobos' orbit is deteriorating, so it is slowly spiraling toward the surface of Mars. However, it will be over 7 million years before it impacts the surface.

Mars and his two sons are mentioned in many of the battles of the ancient Greeks and Romans. One of the most famous was the battle between the Greeks and Trojans. Since this battle took place during the rule of the ancient Greeks we will refer to the Greek characters of mythology. Aphrodite (Venus), whom Ares (Mars) had relations with, favored the Trojans. Ares joined her and had his morbid band, including Phobos and Deimos, on the battlefield aiding the Trojans. Hera (Juno) favored the Greeks and went to Zeus (Jupiter) requesting that he intervene. Despite the fact that Ares was their son he disliked him as well. He allowed Hera to persuade Diomedes to fight the dreaded god. Diomedes, with renewed joy in his heart, hurled a spear at Ares, and Athena (Minerva) drove it home. Ares went to Zeus and complained of Athena's violence. Zeus told Ares to quit whining and Ares left never to enter that war again. Eventually the Greeks won the long war, but probably not solely due to Ares leaving the fight.

Jupiter

The Description

Jupiter was the Roman king of the gods. Jupiter is the largest planet and the second brightest in the sky, surpassed only by Venus. Jupiter's prominence and slow movement suggests royalty. It was named, therefore, after the king of the gods and rightly so, since it is the king of the planets. It is over 1,400 times larger than Earth. Even modest telescopes are able to resolve the banding caused by the strong east-west winds and stormy weather. One feature, the Great Red Spot, is a storm that has been observed for over 300 years. Jupiter's composition is mostly hydrogen with some helium. If it were 80 times more massive it would likely have become a star. In 1979 NASA's *Voyager 1* spacecraft made the incredible discovery of rings around Jupiter. They are so thin and transparent that they are only visible when backlit by the Sun.

The Legend

As king of the gods Jupiter can be found in any number of stories, many of which can be found in this book. He achieved his place among the gods because of his courageous leadership in defeating the Titans, as told in the chapter called An Introduction to Greco-Roman Mythology. But it is his desire for the female form that is the source of many stories as well as the identification of 50 of the over 63 named satellites encircling this planet. The remainder of the satellites retained their discovery names, i.e., S/2003 J 19.

Jupiter's Satellites

The Description

Galileo discovered the four largest satellites of Jupiter: Io, Europa, Callisto, and Ganymede. They are very different, and their development is related to how they react with Jupiter's magnetic and gravitational forces.

Io is the innermost of the Galilean moons and has a large number of volcanoes. It is very active geologically, due to the gravitational tidal forces caused by Jupiter and the other moons. Europa is the smallest of the Galilean moons and is roughly the size of Earth's Moon. It has a solid core with a surface covered in ice containing stresses and cracks. Scientists have hypothesized that this unusual surface may be the result of an ocean somewhere beneath the surface. If tidal forces have heated this moon such that the subsurface water has remained liquid then scientists believe that we may eventually discover life on this moon.

Callisto is the second largest Galilean moon. It is about the size of the planet Mercury. Its orbit is well outside the other major moons, resulting in a rocky surface that hasn't been affected by tidal forces. Finally Ganymede is the largest moon, not only of Jupiter but in the entire Solar System. It is about 8% larger than Mercury and is composed of silicate rock and water ice. The seventh moon in orbit around Jupiter, scientists believe that a saltwater ocean may exist about 200 km below the surface, captured between layers of ice and kept liquid by the heat of tidal forces. The physical characteristics of the remaining satellites are not discussed here.

The Legend

Jupiter was attracted to many mortal women and had love affairs with quite a few. Unfortunately, Juno, his queen, would discover these affairs and become insanely jealous. Many of the lovers suffered horrible fates as a result. The satellites of Jupiter are named after these mortal women and others who were associated with Jupiter in mythology.

One interesting note is that, aside from the five largest satellites, the remainder of the satellites are named such that those with "normal" (counterclockwise) orbits have names ending in -a, while those with "retrograde" (clockwise) orbits have names ending in -e.

Adrastea

She is the nymph to whom Ops entrusted Jove (Jupiter). She raised Jupiter in secrecy so Saturn would not devour him.

Aitne

She is the divine personification of Mt. Etna. In one story she and Jupiter bore the Palici, the twin Sicilian gods of geysers.

Amalthea

Amalthea is said to be the goat on whose milk the infant Jupiter was fed. She had a horn that contained whatever food or drink anyone could want. It was called the Horn of Plenty, "Cornucopia" in Roman mythology.

Ananke

Ananke was the mother of the Moirae, the three fates who were fathered by Zeus (Jupiter).

Aoede

Aoede (Song) is the Latin spelling for this Titan goddess of music. Along with Mneme (Memory), Melete (Practice), and Arche (Beginning) they were known to the ancient Greeks as Mousai Titanides (Titan Muses). They were the daughters of Uranus, who is often referred to as the "second Jupiter" and were considered elder Muses.

Arche

Arche, which means "beginning," was another of the Titan Muses.

Autonoe

A Nereid Nymph was she who, along with Ino and Agaue, nursed Bacchus, who was said to be born from the thigh of Jupiter.

Callirrhoe

Callirrhoe was a nymph, the daughter of Achelous, the river god. She was first the wife of Alcmaeon and bore him two sons. Alcmaeon was killed by the sons of a rival, Phegeus, and when Jupiter courted Callirrhoe she requested of him that her sons be instantly grown so they could avenge their father's death. Her wish was granted, and the two sons did indeed kill the sons of Phegeus, and then went on to kill Phegeus and his wife as well.

Callisto

Another conquest of Jupiter, the story of this beauty is found in the chapter relating the legends of URSA MAJOR – THE GREAT BEAR, and URSA MINOR – THE LESSER BEAR.

Carme

Carme was the daughter of Phoinix and Kassiepeia and sister to Europa. She was the mother of Britomartis, who was born out of wedlock with Jupiter. Britomartis became the Cretan goddess of hunting small game and fowl, and of fishing with nets.

Carpo

Carpo was a Hora (Season) and sometimes referred to as a Grace by the Athenians. The Graces were daughters of Jupiter by Themis. Carpo was the goddess of the

fruits of Earth and was worshiped alongside Hegemone (Queen) and Auxo (Growth). Carpo was probably the original name for the goddess Ceres.

Chaldene

Chaldene is the mother of Solymos by Jupiter.

Cyllene

The Greek spelling was Kyllene and she was the Naiad nymph of Mount Kyllene in Greece where Jupiter and the nymph Maia gave birth to Mercury in a cave.

Elara

Another of Jupiter's romances, Elara was hidden in Earth when Juno learned of the affair. Elara later bore Tityus, one of the Giants, who was slain by Apollo during the Battle of the Giants.

Erinome

A daughter of Celes, she was compelled by Venus to fall in love with Jupiter.

Euanthe

As is often the case in the soap opera that is Greco-Roman mythology, other authors have credited Euanthe and Apollo as the parents of the Charities.

Eukelade

One of the nine Muses born from the union of Jupiter and Moneta.

Euporie

Euporie or Euporia was one of the Horae and the goddess of abundance. The Horae were the goddesses of the hours of the day and the seasons. They were the offspring of Jupiter and Themis.

Europa

Europa was another beautiful maiden who attracted the attention of Jupiter. Her story can be found in the chapter of this book containing the legend of Taurus (The Bull).

Eurydome

Also spelled "Eurynome," she was the Titan goddess of broad pastures and the third bride of Jupiter. Together they bore the Graces or Charities – Aglaia, Euphrosyne, and Thaleia.

Ganymede

He was known as the cup-bearer to the gods. The story of this handsome Trojan prince can be found in the chapter of this book containing the legend of Aquila (The Eagle) and Aquarius (The Water-Bearer).

Harpalyke

The daughter of Kymenos, though some accounts also say that she was a love of Jupiter.

Hegemone

Hegemone was one of the Charities or Graces of ancient Greece worshipped by the Athenians. Her name means "Leader" or "Queen" and she was worshipped alongside Auxo (Growth). Hegemone was likely an early title for the goddess Diana. The Charities or Graces were considered daughters of Jupiter.

Helike

When Jupiter was a young child Helike and Kynosoura were two Nymphai who nursed him on the island of Crete. They kept him in a cave out of sight of Saturn (Cronos) to keep Jupiter from being devoured by him.

Hermippe

She was one of the many lovers of Jupiter, though little else is known about her.

Herse

The daughter of Jupiter and Luna, the goddess of the Moon, Herse was the goddess of plant-nurturing dew.

Himalia

Himalia was a Nymph of the island of Rhodes. Jupiter seduced her after his victory over the Titans.

Io

The daughter of Inachus, Io was a happy girl and a beautiful princess. She caught the eye of Jupiter, who burned with desire and conspired to possess her. He knew, however, if he were discovered, Juno would do something terrible to Io. In order to hide his intentions from Juno, Jupiter wrapped Earth in a dark, thick cloud that seemed to turn day into night.

Jupiter went to Io's chamber. She experienced visions in the night and heard a voice tell her that she had been a maiden for too long. The arrow of desire had pierced Jupiter's heart, and he wished to make love with her. These same visions returned every night.

Juno was not fooled. She realized the dark cloud was an odd occurrence. She suspected Jupiter was once again unfaithful. When she could not find him around Olympus she floated gently down to Earth. Jupiter, ever mindful of Juno's jealously, acted quickly when he saw her coming, and when she arrived she found Jupiter standing next to a beautiful white heifer. It was Io, of course, whom Jupiter had transformed to disguise her from Juno. But Juno wasn't the least bit fooled. Jupiter claimed he never saw the heifer until just then when it sprang from the ground. Juno seized the moment and said that the heifer was so lovely Jupiter should give it to her as a present. Jupiter did not want to reveal his infidelity, so he reluctantly handed over the heifer to Juno.

Juno knew that Jupiter would transform the heifer back into a woman at his first opportunity. To prevent this from happening she charged Argus with guarding it. Argus had a hundred eyes; while some eyes slept, others would remain awake to maintain a constant guard. Io was miserable. Jupiter's heart went out to her, but he dared not help her. Then one day he got an idea. Mercury was an excellent warrior and very clever. If anyone could discover a way to slay Argus, Mercury could. Mercury donned his winged shoes and hat and flew to Earth. When he arrived he removed anything that would mark him as a god and only took with him a musical pipe made from reeds.

Mercury looked like a shepherd and played on his pipe of reeds as he approached Argus. Argus was pleased by the sound of the pipes and beckoned Mercury to come sit on a rock next to him. Argus thus played right into Mercury's plan.

Mercury told monotonous stories and played soothing music. Finally Mercury told the story of the pipe of reeds. Pan was in love with a Nymph named Syrinx. He would chase after her relentlessly. One day he was chasing her and she came upon the shore of a river. Pan was close behind and she only had a moment to call out to her sister nymphs to help her. Pan arrived, but when he reached out to hold her in his arms all he had was a tuft of reeds. Syrinx had been turned into the reeds

by her sister nymphs. But Pan was determined to have her one way or the other. He cut the reeds and bound them together with bees' wax, making a small reed pipe, which was then called a syrinx after the Nymph pursued.

The story was too much for Argus. It took a long time, but finally all of Argus' eyes fell asleep, and Mercury killed him immediately. Juno was dismayed when she learned of Argus' death. To honor him she took the eyes and placed them in the tail of her favorite bird, the peacock.

It seemed that Io was finally free, though she was still a heifer. Juno, however, was not to be so easily defeated. She sent a gadfly, which continued to plague Io by constantly stinging her. It drove her along the seashore night and day, not allowing her to eat or drink or sleep.

She was still fleeing the gadfly when she came upon Prometheus, who was bound to a rock. When the heifer spoke in a woman's voice, Prometheus knew immediately who the infamous heifer was. When he told her Jupiter bound him to the rocks as punishment for giving mankind fire, Io realized who he was, too. Prometheus tried to comfort her, but he knew her relief would only come in the distant future. First she would have to continue to wander, stumbling over rocks and eating on the run. The body of water she was running along would be called the Ionean Sea after her. She would later cross another body of water, the Bosphorus, which means "ford of the cow" after her. Eventually, however, she would reach the Nile, where Jupiter would be able to restore her to human form, and together they would have a son named Epaphus and she would live happily forever. One of her descendants would be the greatest of heroes, Hercules, who would find Prometheus and free him.

Iocaste

Also known as Jocasta, Iocaste she was the daughter of Menocenes. She does not appear to have any direct ties to Jupiter, nor do any of the characters in the famous myth involving her. She married Laius, king of Thebes, and together they gave birth to Oedipus. But an oracle had come to King Laius and told him that he would have a son and that son would kill him. So when Oedipus was born King Laius had his servant bind up the baby's legs and take him into the woods to die. But the servant could not do that and instead gave Oedipus to a passing shepherd from Corinth. Oedipus eventually was adopted by Polybus and Merope, the king and queen of Corinth.

Oedipus grew up thinking Polybus was his father. One night he encounters a drunk who tells him otherwise, but does not reveal who his real father is. Oedipus decides to seek the counsel of an oracle, the same oracle of Delphi that had given his real father that fateful prediction years earlier. The oracle does not tell Oedipus who his real father is, only that he would kill his father and marry his mother. Distressed by this news he dares not return to Corinth, for he loves Polybus. Instead he decides to go to Thebes.

While on his way to Thebes he comes to the intersection of three roads in Davlia, where he encounters a chariot driven by his real father, Laius. Of course, Oedipus does not realize who the driver is. An argument ensues and escalates into a fight. During the fight Oedipus unwittingly kills his father, fulfilling the oracle's prediction.

Still not realizing the gravity of that encounter he continues toward Thebes. Outside of Thebes he encounters a Sphinx, which has been tormenting Thebes. The Sphinx asks travelers a riddle, and if they answer the riddle correctly they are able to travel on their way. However, if they answer incorrectly they are immediately devoured by the Sphinx. Oedipus approached the Sphinx, who poses this riddle to him: "What walks on four feet in the morning, two feet in the afternoon, and three feet at night?" Oedipus correctly answers, "Man; as an infant he crawls on all fours, as an adult on two legs, and when he gets old he needs a cane to help him walk." The Sphinx is so amazed that someone finally answered his question correctly that he inexplicably devours himself, thus freeing the city of Thebes.

The people of Thebes are so grateful for what Oedipus has done that they welcome him and make him king. Their queen was recently widowed (by Oedipus' hand, but they thought he had been killed by the Sphinx), and so they give her hand to Oedipus. He marries Jocasta, thus fulfilling the other part of the oracle's prediction. Together they have two sons, Polynices and Eteocles, and two daughters, Antigone and Ismene.

Later, through a series of events, it comes to light that Oedipus was in fact adopted by Polybus and Merope. In an effort to find out the truth about his parents the shepherd who accepted the infant Oedipus from the servant is found, and he reveals that Oedipus is actually the son of Jocasta and Laius. Jocasta, upon realizing who Oedipus is, hangs herself. When Oedipus finds her he gouges his own eyes out. Then he blindly wanders the countryside and eventually dies at Colonus.

Isonoe

One of the Danaides, the 50 daughters of Danaus who, with the help of Minerva, escaped Egypt and fled to Argos. Isonoe became a lover of Jupiter.

Kale

Kale is also known as Cale. Another author identifies Cale, Pasithea, and Euphrosyne as the Charities or Graces, who are considered the daughters of Jupiter. One story relates how the Charities were in a dispute with Venus about who was the most beautiful. A man named Teiresias was asked to judge the winner. He selected Cale, whereupon Venus changed him into an old woman. But Cale intervened, gave him a beautiful head of hair, and then took him to Crete.

Kallichore

The spelling of this moon does not appear in mythological references. References citing it as a moon of Jupiter state that Kallichore was another one of the muses and a daughter of Jupiter. The closest reference along these lines that could be found was to the muse Terpsichore, goddess of the dance.

Kalyke

Also known as Calyce, she and Jupiter were lovers, producing Endymion, who became king of Elis.

Kore

Better known by her underworld name of Proserpina, she was the daughter of Jupiter and Ceres. She was the goddess of spring growth until her abduction by Pluto. Pluto took her to the Underworld to become his bride. Ceres was so disturbed by her disappearance that she went with Hecate in search of her daughter. She discovered that Jupiter had conspired with Pluto in this abduction and became furious. As Ceres was the goddess of agriculture and grain she refused to allow Earth to bear any fruit until her daughter was returned from the Underworld. Unfortunately, Proserpina had already tasted pomegranate seeds, the food of Hades, and was therefore forced to spend part of the year with her husband in Hades. In the spring she returns to the world and the crops flourish. But in the fall she returns to Hades and her husband Pluto, bringing winter to the world. Crops die and the trees go dormant until her return in the spring.

Leda

Another lover by a disguised Jupiter, Leda and her story are found in the chapter containing the legend of Cygnus (The Swan).

Lysithea

Little is written about Lysithea in classical mythology texts. According to one account, however, she was mentioned as the mother of the "first Dionysus." The Dionysus of mythology (known as Liber to the Romans) was the son of Jupiter and Proserpina.

Megaclite

By some authors of Greco-Roman mythology Megaclite was loved by Jupiter and became the mother of Thebe and Locrus.

Metis

Metis was a Titan goddess and the first wife of Jupiter. Jupiter learned through a prophesy that she would bear a son who would grow to be greater than his father. So when Metis became pregnant Jupiter swallowed her whole. While inside Jupiter Metis gave birth to Minerva, who later emerged fully grown from the skull of Jupiter.

Mneme

Mneme (Memory) was one of the Titan goddesses of music along with Melete (Practice) and Aiode (Song). They were the children of Uranus (Heaven) and Terra (Earth). However, Mneme has also been identified with Mnemosyne (also Memory), who was the mother by Jupiter of the nine Olympian Muses. The two sets of muses were most likely the same, with the number of muses differing based on the interpretation of the author.

Orthosie

She is the goddess of prosperity and another of the Horae born of Jupiter and Themis.

Pasiphae

There are two separate characters in mythology who are called Pasiphae. Pasiphae of Thalamai was a Titan sky and sea goddess. She was tied closely to Luna and was said to send prophetic dreams.

The more famous Pasiphae, the queen of Crete, has only a loose tie to Jupiter. The detailed story can be found as part of the constellation Taurus (The Bull), but a brief synopsis is given here. Pasiphae's husband was Minos, ruler of Crete and son of Europa and Jupiter. Minos was given a magnificent bull by Neptune, who ordered that it should be sacrificed. Minos could not bear to slay such a magnificent beast, so he kept it for himself instead. Neptune punished Minos for not obeying his command by making Pasiphae fall madly in love with the bull. The offspring of this match was a hideous monster, half human and half bull, known as the minotaur. Minos did not kill the beast but placed it in a huge, complicated maze, known as the Labyrinth, which had been built by Daedalus. The minotaur spent the rest of its days wandering in it until Theseus came and slew it.

Pasithee

Pasithee, or Pasithea, was the youngest of the Charities and caught the eye of Somnus, the god of sleep. Juno came to Somnus and begged him to put sleep in

Jupiter's eyes that she might lay with him and make love to him. Somnus was reluctant to do this to Jupiter without his knowledge for fear of retribution. But Juno insisted and promised Somnus the hand of the Pasithea in marriage. Somnus longed for this Charity and so he agreed, but only if Juno would swear to this agreement on the river Styx. Juno swore as he asked and the pact was sealed.

Praxidike

She is the Greek goddess of exacting justice. Her Roman name is Praxidice, and she is believed to be a daughter of Jupiter.

Sinope

The daughter of Asopus, Sinope was yet another conquest of Jupiter, but with an interesting twist: she never lost her virginity! When Jupiter approached her, Sinope realized he could have his way with her and that she would be powerless to do anything. She was a crafty vixen, though, and told Jupiter she would welcome his advances if he would grant her one wish. Jupiter was hot with desire but preferred a willing woman over rape, so he solemnly swore he would grant her the wish. Sinope quickly made her wish – to remain a virgin! Trapped by his own promise, Jupiter was forced to retreat and Sinope was spared. She did the same to Apollo when he made advances, and to mortal men as well. Sinope was never possessed by a lover.

Sponde

Another one of the Horae born to Jupiter and Themis, she presided over the seventh hour symbolized by beverages enjoyed after lunch.

Taygete

Taygete has already been introduced as one of the stars comprising the Pleiades star cluster (M45) found in the constellation Taurus the Bull. She was also a lover of Jupiter and their union begat Lacedaemon.

Thebe

Thebe was a Naiad Nymph to a fountain or spring in the town of Thebes. She was also known as Antiope. She and Jupiter were lovers and from that union she bore Zethos and Amphion.

Thelxinoe

This Olympian Muse was a child of Jupiter and Mnemosyne. Her name means "Charming the Mind."

Themisto

Themisto was one of the 50 nymphs known as the Neriads. As strange as it seems, she is said to be the daughter of Jupiter and the river god Inachus.

Thyone

She was born "Semele," a Theban princess and loved by Jupiter. When Juno discovered the affair she tricked Thyone into having Jupiter swear he would reveal himself to her in all his glory. Jupiter kept his word, but Thyone was consumed by the lightning bolts. Her son, Bacchus, was recovered from her womb. When he reached adulthood he descended into the Underworld to retrieve his mother and bring her to Olympus to live with the gods.

Saturn

The Description

The second largest planet in our Solar System, Saturn is best known for its magnificent rings, which can be seen even in a small telescope. Like Jupiter it is a gas giant 95 times larger than Earth and composed mostly of hydrogen and helium. The ring system is extensive, with nine bands and extending hundreds of thousands of kilometers from Saturn. They are composed mostly of ice crystals and dust with some rocks tens of meters in diameter. Two of Saturn's over 60 moons actually orbit in a gap in the rings.

Although the rings are visible even in small telescopes, larger telescopes over 10" in diameter will pick up some coloration in the clouds and allow the viewer to see four of Saturn's moons. Titan, Hyperion, and Iapetus are fairly easy to detect, while Rhea is more challenging, having an orbit much closer to Saturn.

The Legends

This magnificently Ringed Planet was named after the youngest of the Titans and father of the Olympian gods. It, too, moves slowly across the backdrop of stars, suggesting a regal bearing. It is dimmer than Jupiter, though, implying that it might be older; thus, it was given the name of Jupiter's father, Saturn (Cronus in Greek mythology).

The Titans were the offspring of Heaven and Earth. Saturn was the most terrible of Earth's children. Saturn despised his father, for Uranus would not accept the offspring of Earth and hid them from the light. Saturn heard his mother's plea to free her children and sought an opportunity to get revenge on Uranus. That opportunity came when Uranus lay with Earth; Saturn seized the moment. Using a sickle, Saturn castrated Uranus and scattered the bits of flesh. From Uranus, blood, Earth conceived the Furies, Giants, and Nymphs of the Ash-Trees. When Uranus' gonads were washed into the sea, the foam produced Venus.

Saturn and his sister-queen, Ops, bore many of the gods. However, Saturn had learned from Uranus and Earth that he was to be dethroned by his own son. To prevent this, he swallowed each of the gods as they were born, but when Ops was to give birth again, Uranus and Earth sent her to Lyctus in Crete and hid her in a cave. There she bore Jupiter. When Saturn learned of the birth, he demanded she hand over the child. Ops had wrapped a rock in a blanket, however, and it was this that Saturn devoured, mistaking it for the infant.

Jupiter was raised in secrecy and later did, indeed, kill Saturn. When Saturn died he spewed up the rock and all the god-children. Jupiter also freed all of Saturn's brothers from the earth.

Satellites

The names of the satellites of Saturn follow the pattern of early mythology. Most of the early moons were named after the Titans, the brothers and sisters of Saturn. Others were named after the Giants who sprang up from the blood of Uranus when he was castrated by Saturn. Finally, there are some satellites discovered in more recent years that do not appear to be connected directly with Saturn or Greek mythology, but rather are characters from Norse, Gallic, and Inuit mythology. They are mentioned here for completeness, but their stories will not be told.

Aegaeon

Aegeaeon was the son of Uranus and Terra and was the one of the three storm god brothers known as the Hecatoncheires. They each had a hundred hands and fifty heads. He lived in the body of water that is now named after him, the Aegean Sea. At the beginning of the Titan wars he and his brothers were locked underground. Later Jupiter released them to utilize their power and become master of the skies, harnessing thunder and lightning. In gratitude they helped Jupiter by throwing 300 rocks at once at the Titans, driving them back to Tartarus, where they were held captive and guarded by the Hecatoncheires.

Aegir

Aegir is a Norse giant and the god of tranquil seas. He is the son of Fornjot and brother to Lode.

Albiorix

Albiorix is a giant in Gallic mythology. He was considered the king of the world and is sometimes identified with the Roman god Mars.

Anthe

Anthe is one of the seven nymph daughters of Alkyoneus, the king of the Giants. When Hercules slew him the daughters cast themselves into the sea where the goddess Salacia transformed them into kingfishers.

Atlas

Like Saturn, Atlas was a Titan, the son of the Titan Iapetus and the ocean nymph Clymene. He had a number of daughters by two different women (See the story of the Hyades and the Pleiades in the Taurus The Bull section.) Although Atlas can be found in other legends (See the Eleventh Labor in The Legend of Hercules chapter), it is his fate of holding up the heavens, for which he is best known.

According to the legend, after Saturn had spit up the gods and goddesses, they rebelled against the Titans. Saturn was past his prime; in fact, some accounts maintain that he was killed by Jupiter, and Atlas was chosen to lead the Titans. The War of the Titans raged for ten long years, but ultimately the Titans were defeated by the gods. All but Atlas were bound in chains and banished to Tartarus, a place that was as far under Earth as heaven was above it. Atlas, for his role as leader of the Titans, was given the excruciating punishment of holding the sky on his shoulders and keeping the heavens and Earth separated for all eternity.

Atlas seemed doomed to hold up the heavens forever when he learned of a young hero, named Perseus, who reportedly slew the Gorgon Medusa and carried her severed head in a sack. As luck would have it, one day Atlas spied Perseus astride Pegasus, the flying horse. As they flew over him, Atlas cried out, pleading with Perseus to reveal the head of Medusa that he might be turned to stone and no longer feel the burden of the sky on his shoulders. Perseus gazed on Atlas and saw his great pain as his muscles strained to hold up the heavens. Taking pity on this sight, Perseus uncovered the head of the Gorgon and watched Atlas. There was no horror in Atlas' eyes, yet in seconds his eyes became cold and vacant as his huge form turned to stone. Perseus replaced the head in the sack and turned to take one last look at Atlas. He thought the gray hairs on the Titan's head resembled snow on a mountain top and his arms and legs looked like the ridges and valleys on a rough mountainside. In fact, the Gorgon's face had changed Atlas into the rugged mountains that bear his name today.

Babhionn

This moon was named after Bébinn, the Irish goddess of birth who was also known for her beauty.

Bergelmir

He was a giant in Norse mythology and the grandson of Ymir.

Bestla

Bestla was the frost giantess in Norse mythology.

Calypso

Another daughter of Thetis and Oceanus, Calypso is also known as the nymph of darkness. She lived on the island of Ogygia and is a character in one of the adventures of Ulysses ("Odysseus" to the Greeks). Ulysses and his men had been at sea for some time when they happened on the island where Apollo, the god of the Sun, grazed his cattle. The men were so hungry that they slaughtered the cattle and ate the flesh, caring not about the consequences of their action. Only Ulysses did not eat the meat. He was respectful of the power of the gods and hastened the men to set sail as soon as possible.

When Apollo learned of the slaughter he was furious. He went straight to Jupiter and proclaimed that he would darken Earth unless he was avenged. Jupiter bade Neptune to set a storm upon the ship (which he did gladly since he did not like Ulysses). All aboard the ship drowned in the storm except Ulysses, who was spared because he had not eaten the cattle's flesh. He drifted for 9 days holding on to a piece of the rudder before he finally washed ashore at Ogygia.

Calypso found Ulysses and took him in. She treated him kindly and took care of him, entertaining him and sharing her bed. Ulysses stayed with her for 10 years, for he had no way to leave the island. Despite Calypso's care and devotion, Ulysses longed to return to Ithaca, his home. At some point Minerva took pity on him. She approached Jupiter and stated that Ulysses had suffered enough and it was time to allow him to return to Ithaca. Jupiter agreed and sent Mercury to Calypso. He instructed her to help Ulysses build a raft and equip it with whatever he needed to ensure his return to Ithaca. Calypso was saddened at the request as she didn't want to let Ulysses go. However, she did as the gods requested.

Ulysses was overjoyed to hear the news. Calypso helped as Ulysses felled 20 large trees and fashioned them into a raft. Then she gave Ulysses the food and provisions that would sustain him for the long journey back to Ithaca. Finally a day arrived when the seas were calm and the winds were gentle. Ulysses departed Ogygia, leaving a teary-eyed Calypso behind. Ulysses would have several more adventures not told here before getting back to Ithaca.

Daphnis

Daphnis is one of the two moons that orbit within the rings of Saturn. Scientists believe that these "shepherd satellites" help to maintain the rings. Daphnis orbits in the Keeler Gap within the A ring.

It is appropriate then that Daphnis was the name of a shepherd in Greek mythology. He was a descendent of the Titans, the son of Mercury and the brother of Pan. He fell in love with a Naiad nymph who made him swear that he would never love another or she would blind him. He did well for a while and even invented the poetic form known as bucolic poetry, which pleased the goddess Diana.

Eventually, though, despite his valiant efforts to thwart off temptation, Daphnis allowed himself to drink too much and made love to a princess. The Naiad found out, of course, and as promised made him blind. He called upon his father, Mercury, who came and took him up to Olympus.

Dione

Dione was a Titan sister of Saturn. She was the goddess of the oracle of Dodona and the mother of Venus by Jupiter. Her sisters were also goddesses of oracles. Phoebe was the goddess of the oracle at Delphi, Moneta was the goddess of the oracle at Lebadeia, and Themis was a goddess of the oracles at Delphi and Dodona.

Enceladus

Enceladus was another Giant who was slain by Minerva, goddess of wisdom and bravery, during the Battle of the Giants. Enceladus was crushed by having the island of Sicily piled on top of him.

Epimetheus

Epimetheus was the Titan god of afterthought. He was co-creator of the beasts of the world along with his Titan brother, Prometheus.

Erriapus

This moon was named after Erriapo, a giant from Gallic mythology.

Farbauti

Farbauti was a storm giant from Norse mythology and the father of Loki.

Fenrir

This character from Norse mythology was a giant wolf, the father of Hati and Skoll.

Fornjot

Fornjot is a giant in Norse mythology and father to Lodi and Aegir.

Greip

Greip was a giantess from Norse mythology.

Hati

Hati is a giant wolf from Norse mythology. He is the son of Fenrir and twin brother of Skoll.

Helene

This satellite was named for the Greek Helen of Troy, who was considered the fairest woman in the world. Conceived during the joining of Leda and Jupiter (See Cygnus – The Swan), she was the sister of Castor and Pollux. King Tyndareus, Leda's husband, raised Helen as his own. She grew to be very beautiful and attracted many suitors from some of the most powerful families in the land. There were so many men asking for her hand in marriage that King Tyndareus was afraid to choose one for fear that the others would unite against him. Then he got an idea. He made all those who sought Helen's hand take a solemn oath to defend whoever married Helen from any wrong that might come upon him as a result of the marriage. Each man took the oath, of course, since they all wanted to marry Helen. In the end, once every man seeking Helen's hand had taken the oath, King Tyndareus chose King Menelaus from the House of Atreus in Sparta to wed Helen.

It was about this time that a great controversy arose among the gods. At the wedding of King Peleus and Thetis, Eris – the evil goddess of discord, who was not included in the festivities – threw into the banquet hall a golden apple bearing the inscription "For the Fairest." Immediately all the goddesses wanted it. In the end, however, there were three chosen as the most beautiful: Venus, Juno, and Minerva. No one could decide on one winner, and Jupiter wisely would have no part in it. It was said that a man named Paris, the son of King Priam of Troy, was an excellent judge of beauty.

The three goddesses confronted a startled Paris and asked him to choose. Each offered fantastic gifts in an effort to sway his decision, but it was Venus' offer of giving him the most beautiful woman in all the land that won her the golden apple.

Venus knew who the fairest woman was, of course, and soon Paris was the house guest of King Menelaus and Helen of Sparta. Remember that each man had taken the vow to support the husband of Helen. When Menelaus went on a trip to Crete,

he felt confident he could entrust Helen to Paris. Paris, however, broke the solemn oath, and when Menelaus returned to Sparta Helen was gone. Menelaus summoned all the military leaders of Greece, who were already sworn to protect his marriage, and with their armies they boarded ships and sailed to Troy.

And so the great Trojan War had begun. The battle raged for years, with each side gaining the advantage only to be thrown back by some defeat (often due to the intervention of the gods). At one point the fighting stopped, and the combatants decided that only the two men for whom the war meant the most, Menelaus and Paris, should fight to determine the outcome. They engaged one another first with spears, but neither was hurt. Next, they were to fight with swords, but when Menelaus found his sword had broken, he leaped on Paris, dragged him by his helmet, and would have taken him to the Greeks, but Venus intervened and broke the strap on the helmet. She took Paris back to Troy. The war might have ended there, but Minerva caused a soldier to break the peace by shooting an arrow at Menelaus and wounding him slightly. The war was back in full swing.

The ingenious Greeks finally came up with the winning plan. They constructed a huge hollow horse, in which they hid their military leaders. Then they hid their ships and soldiers, to make it appear they had left. A small group of Greeks took the horse to the gates of Troy and proclaimed that the Greeks admitted defeat and were presenting this horse as an offering to Athena. The Trojans were skeptical, though, and sent troops to search for the Greeks; however, finding no ships or soldiers, they began rejoicing and accepted the gracious Greek gift, dragging it inside the city gates to the temple of Minerva.

That night, all of Troy slept peacefully for the first time in 10 years. During the night a trap door in the huge wooden horse opened, and the Greek military leaders stole out and opened the gates of the city. The Greek army rushed in and positioned itself throughout Troy. When everyone was in place, the Greeks began burning the city. The Trojans were caught completely by surprise. Soldiers hastily donned their armor only to be slain as they left their homes. By morning Troy had fallen, and the once great city was burning to the ground.

Helen was helped by Venus, who took her to Menelaus. He received her with open arms and together they sailed back to Greece.

Hyperion

Hyperion was a Titan brother of Saturn and the father of the Sol (the Sun), Luna (the Moon) and Aurora (the dawn). Not much is said about him.

Hyrrokkin

Hyrrokkin was a giantess from Norse mythology.

Iapetus

Iapetus was a Titan brother of Saturn. He is notable for being the father of Atlas, who was forced to hold the heavens on his shoulders, and Prometheus who is the savior of mankind.

Ijiraq

Ijiraq is a creature of Inuit mythology.

Janus

This god was important to the Romans but was not found in Greek mythology. Janus was the god of the past, present, and future, of gates and entrances, war and peace, and patron of all beginnings. He had two heads, which faced in opposite directions (representing the past and the future). Of course, he existed in the present. Prayers to the gods were made through him and his name was invoked at events marking the beginning of the day and month. At the beginning of each year a festival was (and still is) held in his name. The first month of the year is named for him.

As legend has it, Janus was born in Thessaly, Greece, the son of Apollo. He came to Italy early in life and founded the city of Janiculum. His association with Saturn began when Saturn was driven from Greece by his son, Jupiter. Janus befriended Saturn and they ruled together. There was great prosperity during their reign; consequently it is often referred to as the Age of Gold.

Jarnsaxa

Jarnsaxa is another giantess of Norse mythology.

Kari

Kari is the personification of wind in Norse mythology. He is the son of Fornjot.

Kiviuq

Kiviuq is a significant character of Inuit mythology, having lived a long life and experienced many adventures.

Loge

Loge is a fire Giant in Norse mythology. He is the son of Fornjot and brother of Aegir.

Methone

Methone was another of the Alkyonides who were transformed into kingfishers when they cast themselves into the sea after Hercules killed their father, Alkyoneus.

Mimas

Mimas was a Giant slain in the great battle between the gods and the Giants called the "Gigantomachy." Mythological accounts are not clear concerning who was responsible for his slaying, but the likely candidates are Jupiter, Mars, or Vulcan.

Mundilfari

A character of Norse mythology, Mundilfari is the father of the goddess Sol and the god Mani.

Narvi

Narvi was the son of Loki in Norse mythology.

Paaliaq

Paaliaq is a fictional shaman in the book *The Curse of the Shaman*, written by Michael Kusugak, who supplied the names of giants from Inuit mythology that were used as names for some of the moons of Saturn.

Pallene

She was a princess in a kingdom by the same name. She was very beautiful, but she was also an excellent wrestler. He beauty was known throughout the kingdom, and many men sought her hand. Her father demanded that any man who wanted her hand in marriage must first wrestle her and win. Defeat meant death to the challenger. Many men wrestled Pallene but lost and were slain. Then Liber (Dionysus in the Greek) came along. He wrestled Pallene and won, taking her as his wife.

Pan

Pan was the son of Mercury and a strange creature. He was a satyr, a creature that was mostly a man but with goat horns, goat legs and hooves, and a goat tail. He was the god of shepherds and flocks and was a lover of the woodland nymphs. In his pursuit of Syrinx (see the story of Io in the moons of Jupiter), he used the reeds she

was transformed into for making his famous pan-pipes, which he played as he wandered the mountains and forests.

Pandora

She was the creation of Jupiter, who had revenge in mind when he made her. Prometheus gave fire to man; he also arranged it so that when man sacrificed an animal to the gods, man would get the good meat to eat while the fat and bones would be burned for the gods. He did this by slaughtering a bull and dividing the body parts into two piles. In one pile he placed the meat wrapped in the hide, then covered it with the bull's entrails. He then took the bones and wrapped them in the glistening white fat. He asked Jupiter to choose which pile was to be sacrificed to the gods. Thinking the meat still had the fat on it Jupiter chose the pile of fat. Jupiter was irate when he found out that he had chosen the fat and bones, and vowed revenge.

Jupiter decided to make a mate for man, and he made Pandora, who was incredibly beautiful but was destined to be the bane of humankind. The gods gave Pandora a box in which each of the gods had placed something harmful. She was told never to open it. Jupiter then presented Pandora to Epimetheus as a "gift." Despite warnings from his brother, Prometheus, not to accept anything from Jupiter, Epimetheus gladly took her.

As the story goes, Pandora was extremely curious and had to know what was in the box. Though she had been warned, curiosity won out one day, and she lifted the lid of the box. Immediately all the plagues and miseries of the world were released before Pandora had a chance to slam the lid closed.

Pandora's Box contained one other thing: hope. It was the one good thing in the box, and it is sometimes the only thing that sustains humankind.

Phoebe

Phoebe was a Titan sister of Saturn. Hecate was her grand-daughter by Coeus, another Titan. Jupiter supposedly loved Hecate most of all.

Polydeuces

Also known as Pollux, he is the immortal brother of Castor and together they had many adventures. They joined Jason in his pursuit of the Golden Fleece. (See The Legend of Jason and the Argonauts chapter of this book.) They were inseparable. Castor was eventually killed by Idas over a dispute. Polydeuces was so distraught over his brother's death that he asked to die. Jupiter was so moved by his brotherly love that he allowed Polydeuces to share his immorality with his brother. However, half of the year they would live beneath the earth while the other half they would

live in Olympus. They were immortalized as the Gemini Twins (See Gemini – The Twins in the winter constellations chapter of this book.)

Prometheus

Prometheus was a Titan brother of Saturn and considered the savior of humankind. In some accounts it was Prometheus who, with his brother Epimetheus, actually started the human race. Prometheus was very wise. Epimetheus, on the other hand, was a scatter-brain who acted impulsively and then frequently changed his mind. Before forming humans, Epimetheus made all the animals. He gave them all wonderful gifts – swiftness, strength, courage, cunning, fur, feathers, wings, and shells. However, he was at a loss for some wonderful quality with which to endow humans to make them a match for the beasts. Realizing his predicament, he sought out Prometheus for help.

Prometheus took over the task of creation. In order to make humans superior to animals, Prometheus fashioned people in a nobler shape and in an upright position to make them like the gods. Then he went to the Sun and lit a torch in order to give humankind the gift of fire, a better protection than fur or feathers and useful for creating other things.

Rhea

Rhea was a sister of Saturn, but she also became his queen. She bore many of the gods and was the mother of Jupiter.

Siarnaq

Siarnaq was a giant in Inuit mythology.

Skathi

Skathi is an alternate spelling for Skadi, a giantess of Norse mythology and the wife of Niord.

Skoll

Skoll is a giant wolf in Norse mythology, the son of Fenrir and twin brother of Hati.

Surtur

Surtur was a leader of the fire giants in Norse mythology.

Suttungr

Suttungr is a giant in Norse mythology. He is said to have once owned the mead of poetry. (Mead is a honey-based alcoholic drink. The Mead of Poetry comes from Norse mythology. Also known as Mead of Suttungr it is a mythical beverage and, whoever drank it became a scholar with unlimited knowledge and could answer any question. It became a metaphor for poetic inspiration.)

Tarqeq

Tarqeq is the Moon god in Inuit mythology.

Tarvos

Tarvos is the abbreviated name for Tarvos Trigaranus in Gaelic mythology. *Tarvo*s means "bull," *garanus* means "crane," and the prefix *tri* means "three." As such, this deity is depicted as a bull with three cranes on his back.

Telesto

Telesto was one of the sea nymph daughters of Tethys and Oceanus known as the Oceanides. Telesto was the personification of the divine blessing of success.

Tethys

Tethys was a Titan goddess of the sources of fresh water. She was the wife of Oceanus and bore a race of daughters who ruled over the sources of fresh water. They were known as the Flumen (Rivers), Oceanides (Springs, Streams, and Fountains), and Nebula (Clouds).

Thrymr

Thrymr is a frost giant in Norse mythology.

Titan

Titan is Saturn's largest satellite and is the namesake of the offspring of Uranus and Terra, of which Saturn was their leader. You can read about Saturn and the Titans in the first chapter of this book.

Titan has some interesting characteristics as discovered by the recent flybys by the Cassini-Huygens space probe. It is about 50% larger than Earth's Moon and is

about 80% denser. It is the only satellite in the Solar System to have an atmosphere and stable bodies of liquid on its surface. The moon is composed of water ice and rock, while its atmosphere is mostly nitrogen with a nitrogen-rich organic smog and small amounts of methane and ethane. The bodies of liquid are probably methane. Despite its incredibly cold surface temperature (−179°C, or −290°F) this moon contains the building blocks of simple organic life as we know it.

Ymir

Ymir is the ancestor to all the Jotuns or frost giants in Norse mythology.

Uranus

The Description

Uranus (Heaven in Greek mythology) is the father of the Titans. Finding a name for this planet was quite easy at the time of its discovery. Since Saturn was the father of Jupiter, it seemed only logical to name the next planet after the father of Saturn – namely, Uranus.

Uranus was discovered in 1781 by William Hershel and is the first planet discovered using only a telescope. At magnitude 6 it can be seen in small and large telescopes, though the small disk is easier to see at higher magnifications. Its bluish color is the result of methane gas found in small amounts in its atmosphere. Methane gas absorbs light in the red end of the spectrum while allowing the blue part of the spectrum to be reflected. Most of the mass of Uranus is contained in its liquid core, which contains ice, ammonia, and methane.

Roughly half the size of Saturn, Uranus is still considered a gas giant planet and has the characteristic atmosphere consisting of mostly hydrogen and helium. Uranus has a rotational period of 17½h and an orbital period of 84 years. It's unique among the planets in that its rotational axis is almost parallel to the plane of its orbit. This gives the appearance that Uranus is rotating on its side. In 1977 a set of rings was discovered around Uranus, much like its neighbors Jupiter and Saturn. With the aid of information sent back from the *Voyager 2* flyby in 1986 and Hubble Space Telescope pictures we now know there are 13 separate rings circling Uranus. Uranus also has 27 moons.

The Legends

In mythology Uranus was born from Mother Earth while she slept. Uranus later slept with her and fathered the Monsters, each of which had a hundred heads. Next, Uranus fathered the Cyclops, huge human forms with but a single eye in the middle

of their foreheads. Finally, he fathered the Titans. One of the Titans, Saturn, overthrew Uranus and killed him. (Saturn later fathered Jupiter, who eventually came to overthrow Saturn and ruled the gods of Olympus. There is more detail about this story in the section of this chapter on the planet Saturn).

Satellites

The names of the natural satellites of Uranus are markedly different from the names of the other bodies of the Solar System. When the first satellites were discovered by an English astronomer, William Hershel, he convinced the astronomical community to name them after Shakespearean characters, and – later – after characters from Alexander Pope's poem *The Rape of the Lock.* Since they are not characters from Greek or Roman mythology they are simply listed here along with the work they are identified with.

Ariel – the leading sylph (air spirit) in Pope's *Rape of the Lock*
Belinda – owner of the lock in Pope's *Rape of the Lock*
Bianca – character in Shakespeare's *The Taming of the Shrew*
Caliban – the monster in Shakespeare's *The Tempest*
Cordelia – the youngest daughter in Shakespeare's *King Lear*
Cressida – the heroine in Shakespeare's play *Troilus and Cressida*
Cupid – a character in Shakespeare's play *Timon of Athens*
Desdemona – the wife of Othello in Shakespeare's *Othello*
Ferdinand – the son of the kng of Naples in Shakespeare's *The Tempest*
Francisco – one of the lords in Shakespeare's *The Tempest*
Juliet – the famous heroine in Shakespeare's *Romeo and Juliet*
Mab – named for the fairy queen in Shakespeare's *Romeo and Juliet*
Margaret – the servant of Hero in Shakespeare's *Much Ado About Nothing*
Miranda – a character in Shakespeare's *The Tempest*
Oberon – a character in Shakespeare's *A Midsummer Night's Dream*
Ophelia – the daughter of Polonius in Shakespeare's *Hamlet*
Perdita – the daughter of Hermione and Leontes in Shakespeare's play *The Winter's Tale*
Portia – the heroine in Shakespeare's *The Merchant of Venice*
Prospero – the sorcerer in Shakespeare's *The Tempest*
Puck – the mischievous sprite in Shakespeare's *A Midsummer Night's Dream*
Rosalind – the daughter of the banished duke in Shakespeare's *As You Like It*
Setebos – a god worshiped by Caliban and Sycorax in Shakespeare's *The Tempest*
Stephano – the drunk butler in Shakespeare's *The Tempest*
Sycorax – Caliban's mother in Shakespeare's *The Tempest*
Titania – Queen of the Fairies in Shakespeare's *A Midsummer Night's Dream*
Trinculo – the drunken jester in Shakespeare's *The Tempest*
Umbriel – a sprite in Pope's *Rape of the Lock*

Neptune

Neptune maintains the pattern of naming the gaseous giant planets after early mythological characters. It is appropriate that the planet was named after the god of the sea, since the planet has a sea-green coloration, the result of a methane component in its atmosphere.

The Description

At 2.7 billion miles from the Sun eighth magnitude Neptune is a challenge to find. Although it can be seen in small telescopes, medium to large telescopes are needed to gather the light needed to resolve the greenish disk. Neptune was the first planet discovered through the use of mathematics. After the discovery of Uranus subsequent observations showed that its orbit varied slightly from what was expected. A French mathematician, Urbain Joseph Le Verrier, proposed that the variations could be caused by another as yet undiscovered planet and made calculations predicting where this planet would be located. French astronomers ignored him, but he sent his predictions to Johann Gottfried Galle at the Berlin Observatory. On September 23, 1846, during his first night of searching Galle discovered Neptune in the area where Le Verrier had predicted it would be.

Neptune is roughly the same size and composition of Uranus. Its atmosphere consists of mostly hydrogen and helium with some methane. The Earth-sized liquid core contains ices of water, methane, and ammonia. It rotates on its axis once (a Neptunian day) every 16 h. At 4.5 billion kilometers (2.8 billion miles) from the Sun it takes 165 years to orbit. The year 2011 marks the completion of Neptune's first orbit since its discovery in 1846.

The *Voyager 2* flyby of Neptune in 1989 discovered a delicate ring system consisting of six rings. *Voyager 2* also discovered six of the thirteen moons known to orbit Neptune.

The Legends

The name also preserves the focus on the Jupiter ancestry line, since Neptune is Jupiter's brother. Neptune married one of the sea nymphs, Amphitrite, and they had three children: Triton, Herophile, and Rhode. Like most of the major Olympian gods Neptune also had an number of love affairs with other goddesses and mortals.

Satellites

Because of its great distance the discovery of Neptune's moons was slow in coming. Triton's size allowed for its discovery in 1846 immediately after the discovery of Neptune. The next moon, Nereid, wasn't discovered until 1949. Of the remaining 11 satellites 6 were discovered during the *Voyager 2* flyby in 1989, and the remaining 5 were discovered by a study of irregular satellites conducted by Matthew Holman and others in 2003 using modern 4 meter and 3.6 meter telescopes in Chile and Hawaii respectively.

The names of the moons are either related directly to the god Neptune or extend the nautical theme of the planet by being named after freshwater nymphs or sea-nymphs.

Despina

Named after Despoena she is the goddess of fertility and is worshiped along with Ceres, the goddess of agriculture. She is the daughter of Neptune and Ceres.

Galatea

Galatea was one of the Nereid nymphs and was the goddess of calm seas. The Nereids were the 50 daughters of Nereus and Doris and were goddesses of the sea. Galatea would visit the coasts of Sicily and caught the eye of the Cyclops Polyphemus. He pursued her and tried to woo her with songs he would play on his pipes. He would offer her food such as fruit, cheese, and milk. But Galatea spurned his advances and instead became enamored with a handsome Sicilian youth named Akis. When Polyphemus learned of her love for Akis he became insanely jealous and crushed Akis beneath a rock, killing him. Galatea was grief-stricken by this act and turned Akis into a stream to preserve his memory.

Halimede

Another of the Nereid nymphs, Halimede is known as the Brine Queen. Little else is said about her.

Laomedeia

This Nereid nymph has a double meaning in her name. The ending *medeia* means "queen." However, *lao* could come from either *laos* meaning "people" or *laas* meaning "stone." As a result, in some texts she is known as "leader of the folk," while in others she is called "Queen of the Stone."

Larissa

Although Larissa is a town in northern Greece, this reference is probably to a princess of Argos who was one of Neptune's loves. She bore him three children – Akhaios, Pelasgos, and Pythios.

Naiad

Naiad is the singular form of Naiads, the freshwater nymphs in mythology. They were special deities in mythology. The Naiads along with Diana were often divine nurses of infants. They are also protectors of girls and maidens as they grow to adulthood. Many of the Naiads married local kings and had significant offspring in mythology.

The Naiads are divided into smaller groups named according to their domain:

Pegaiai – Naiads of the springs
Krinaiai – Naiads of fountains
Potameides – Naiads of rivers and streams
Limnades and *Limnatides* – Naiads of lakes
Eleionomai – Naiads of swamps, marshes, and wetlands

Nereid

This satellite honors the 50 daughters of Nereus and Doris. The daughters, known as the Nereids, were Haliad nymphs or goddesses of the sea and patrons to sailors and fishermen. Thetis was considered their unofficial leader, while Amphitrite married Neptune and became the goddess of the sea.

Neso

Neso is another of the Nereid nymphs and is considered a Nereid of islands.

Proteus

Proteus was a prophetic sea-god and the herder of the seals of Neptune. Legend had it that one would have to catch him to compel him to prophesy. He would always tell the truth. He did not like to prophesy, so during the day he would hide in the shadows of crags along the seashore and had the ability to take on any possible shape to avoid capture. One story tells how the Trojan War hero Menelaus came upon Proteus during his travels. He caught Proteus and then compelled the god to prophesy about the future. Proteus told Menelaus that he would not die in Argos but rather live a life of leisure and comfort in the Elysian Fields.

Psamathe

Psamathe was the Nereid nymph known as the sand-goddess. She was the wife of Proteus and bore him a mortal son and a sea-nymph daughter. It was her seduction by King Aiakos of Aiginetan that led to a more contentious tale. She was on the beach when Aiakos saw her and decided to pursue her. She tried to get away by transforming herself into a seal, but she could not escape his grasps. Finally she yielded to him and their union resulted in a son named Phokos, which means "the Seal."

Phokos became the favorite son of Aiakos, which did not sit well with his wife, Endeis, nor with the half-brothers, Peleus and Telamon. Endeis' jealousy of the bastard son compelled her to convince Peleus and Telamon to murder Phokos. During the pentathlon athletic event Peleus prepared to throw a quoit made from a flattened stone. Instead of aiming at the target that everyone was watching he hurled the quoit at Phokos, which struck him, killing him instantly. King Aiakos was enraged by the act and exiled the brothers, who boarded a ship and fled to another land.

Psamathe was devastated by the death of her son and vowed revenge on Peleus. When he settled in another land she sent a giant wolf to harass his flocks. Peleus married Thetis, the sister of Psamanthe. Thetis advised Peleus that he needed to atone for his act and offer sacrifices to Psamanthe. Peleus took the advice of his wife and did as she suggested. Eventually Psamanthe was appeased and ceased the wolf's harassment of his flocks.

Sao

Sao is the Nereid nymph of safe passage for seafarers and for the rescue of sailors.

Thalassa

Thalassa was the primeval spirit of the sea. Born from Hemera (Daylight) and Ether (Air) she was more of an elemental being than a personification. Her male counterpart was Pontos, and together they spawned all the fish of the sea. Neptune and Amphitrite became the anthropomorphic gods that equate to Pontos and Thalassa.

One story of Thalassa begins with a shipwrecked man who, after resting at length on the beach, gains his strength back. He looks toward the sea and curses it. He tells how the calm and glistening sea entices men to take boats and sail upon it, only to encounter storms and waves that eventually destroy the boats. Thalassa, assuming the form of a woman, replies to the man, telling him that she, by her nature, is calm and inviting, but the wind comes along creating the waves and lashing her into a fury.

Triton

The largest moon around Neptune, Triton is named for the Greek god of men and mermen. Triton is the seventh largest moon in the Solar System. Roughly the size

of Pluto it is 2,700 km in diameter and may be visible in large amateur telescopes under excellent seeing conditions. Its orbit is retrograde to Neptune's orbit, making it the only large moon in the Solar System with a retrograde orbit. It has a composition similar to Pluto, which along with its retrograde orbit and proximity to the Kuiper Belt lead astronomers to believe that Triton was likely a KBO that was captured by Neptune's gravity. It has a thin nitrogen atmosphere and is still geologically active, having geysers that probably spew liquid nitrogen, given its surface temperature of −237°C. The fact that Triton is still geologically active leads scientists to believe that Triton's surface is relatively young, probably less than 50 million years old.

In mythology Triton was the son and herald of Neptune. He had a giant conch shell that he would blow like a horn to still the waves of the sea or to announce the arrival of Neptune. When Jason and the Argonauts were on their return trip from capturing the Golden Fleece they had to portage the *Argos* across a Libyan desert. They found themselves in the vicinity of the large salt lake Tritonis, which was one of the abodes of Triton. When the sea-god saw them he went and greeted them. Then he assisted them in finding a route back to the sea, where they continued their journey.

The Dwarf Planets

Since its discovery in 1930 there has been some controversy over whether Pluto should be considered a planet. In more recent years the improved optics of larger telescopes and the advent of space-based telescopes that escape the distorting effects of Earth's atmosphere have resulted in the discovery of three more objects roughly the size of Pluto in the same area of our Solar System, known as the Kuiper Belt. This region extends from the orbit of Neptune, which is about 30 astronomical units (AU) from the Sun, to about 55 AU and contains a large number of Kuiper Belt Objects (KBO) that rival the size of Pluto, perhaps as many as 200.

The International Astronomical Union (IAU) is the official body of astronomers and scientists that has the last word for naming celestial bodies. Prior to their meeting in 2005 objects that orbited the Sun were defined as planets, minor planets (asteroids) and comets. With the discovery of KBOs the IAU redefined objects orbiting the Sun as planets, dwarf planets, and small Solar System bodies, which includes comets.

A dwarf planet is defined as a celestial object that is in direct orbit around the Sun and is massive enough to be rounded by its own gravity but has not cleared its neighboring region of small planetesimals. In addition, it must have sufficient mass to overcome its compressive strength and achieve hydrostatic equilibrium.

This definition demoted Pluto to a dwarf planet, since it has not cleared the neighboring region of small planetesimals. However, it also promoted Ceres from an asteroid to a dwarf planet. To date the IAU has named five dwarf planets, although not all are named after Roman mythological characters. All five are included here.

Ceres

Ceres is the smallest of the dwarf planets and the only one found in the Asteroid Belt, which lies between Mars and Jupiter. It has a rocky surface with some ice and there may be some liquid water well below its surface. Although it is by far the largest object in the Asteroid Belt, with a diameter of 950 km (590 mi) it is considerably smaller than Earth's Moon. Its relatively close distance compared to the other dwarf planets gives it an apparent magnitude that ranges from 6.7 to 9.3 as it rotates on its axis. This makes it well within reach of amateur telescopes, and most astronomy magazines provide star charts for locating it.

Ceres was the Roman goddess of agriculture, growing plants and fertility. She was the daughter of Saturn and Ops and, along with Bacchus, god of wine, they were the great gods of Earth. Unlike most of the gods who lived in Olympus in luxury Ceres and Bacchus saw the struggles of humanity as they rushed to plant their crops in the spring, tend to them all summer, and harvest them in the fall before the frost and winter killed the plants.

Ceres is best known in the story about her daughter, Proserpina. It can be found in the constellation Virgo (The Virgin) section in the spring constellations chapter of this book.

Eris

Eris is the largest dwarf planet known at 2,500 km in diameter and 27% more massive than Pluto. It orbits the Sun in an area of space just beyond the Kuiper Belt at a distance that is three times that of Pluto. With the exception of comets, its distance makes Eris the farthest object we know of orbiting the Sun. It has one moon, Dysnomia (see below).

In mythology Eris is the Greek goddess of strife and discord. She delighted in human bloodshed and was mentioned under the planet Mars, her Roman counterpart, Discordia would often be found on the battlefield.

Her morbid nature did not endear her to the other gods. She was the only goddess not invited to the wedding of Peleus and Thetis. When she showed up anyway she was barred from joining the celebration. In a rage she threw a golden apple in among the goddesses attending the wedding. The apple was inscribed "To the Fairest" and three goddesses claimed it. As mentioned in the story of Saturn's moon Helene the resulting rivalry brought about the events that led to the Trojan War, which no doubt pleased Eris immensely.

Dysnomia (Moon of Eris)

At roughly 175 km in diameter this moon is the largest orbiting a dwarf planet. It is appropriately named after the daughter of Eris and is the goddess or spirit of

lawlessness. She was often accompanied by Adikia (Injustice), Ate (Ruin) and Hybris (Violence).

Haumea

Haumea is a dwarf planet KBO about one-third the mass of Pluto. It is a highly elongated ellipsoid, being twice as long as it is wide. However, it does maintain hydrostatic equilibrium and so has the status of dwarf planet. Haumea is named after the Hawaiian goddess of childbirth. It has two natural satellites, *Hi'iaka* and *Namaka.*

Hi'iaka

This the larger of the two satellites, at about 310 km in diameter. Hi'iaka is the patron goddess of Hawaii and of hula dancers.

Namaka

Only 170 km in diameter this satellite is named for the daughter of Haumea and is a sea goddess or water spirit.

Makemake

This KBO is the third largest dwarf planet known and is roughly three-quarters the size of Pluto. Makemake was the creator of humanity in the Rapanui mythology of Easter Island.

Pluto

From a practical astronomy point of view Pluto is a very difficult object to find, even in the largest amateur telescopes. However, with the "Go To" technology available on amateur telescopes today one can certainly point the telescope to the star field that contains Pluto. Even then identifying the planet will require studying the star field and comparing the stars to a chart (probably with stars to 12th magnitude) to identify which point of light is Pluto.

In fact, the discovery of Pluto was done by comparing photographs of star fields. After the discovery of Neptune subsequent calculations determined that yet another

planet was disturbing Uranus' orbit. In 1906 Percival Lowell set out to find this undiscovered planet, which was dubbed "Planet X." After Lowell's death in 1916 the search was suspended for about 10 years during a battle over his estate. In 1929 the search resumed when Clyde Tombaugh was handed the task of searching for Planet X. Clyde used a machine called a blink comparator to shift rapidly between the two photographs of the same starfield taken about a week apart, to see if any of the objects changed position. On February 18, 1930, after a year of searching Clyde found an object that appeared to move. Subsequent photographs confirmed that a new planet had been found. After much deliberation, Pluto, a name proposed by an 11-year-old schoolgirl in Oxford, England, was given to the new discovery.

Like most of the Kuiper Belt Objects Pluto is composed of mostly rock and ice. It is roughly one-third the size of Earth's Moon and about one-fifth its mass. It has an elongated orbit that has it periodically closer to the Sun than Neptune. The orbit is also highly inclined to the plane of the ecliptic by some 17 degrees. Although the orbits of Neptune and Pluto pass within 8 AU to each other the two planets never really approach each other. This is due primarily by the fact that the period of the orbits of the planets have a 3:2 relationship. This means that if you take the two planets and note their position in their orbits and to each other it will take Neptune three orbits and Pluto two orbits to return to that same position. This is a very stable pattern, and the closest that the two planets get is 15 AU, making it highly unlikely that the two planets will interact.

Pluto lies in the deepest, darkest reaches of the Solar System. What could be more fitting than to name it after the god of the Underworld? Pluto is the son of Saturn and Terra and the brother of Jupiter and Neptune. After the defeat of the Titans the three of them drew lots for dividing up the cosmos. Jupiter won the sky, the air, and the clouds. Neptune ruled over the oceans, seas, and all thing water. Pluto drew the lot of mists and darkness and the netherworld. Earth and high Olympus were common to all three.

Pluto married Proserpina, as told in the story of Virgo (The Virgin) in the chapter on the spring constellations. He would ride a golden chariot pulled by four jet-black immortal horses and had the three-headed dog Cerberus, which guarded the gates of Hades. Pluto granted Hercules permission to take the hound to Eurystheus, provided he could overpower the dog without the use of weapons, which Hercules did. This was Hercules' twelfth labor, as recounted in The Legend of Hercules chapter in this book.

Pluto's small size and great distance from Earth made its discovery more than challenging. Discovering its satellites would prove to be even more challenging. Charon was discovered in 1978 while studying highly magnified photographic plates taken using the telescope at the U. S. Naval Observatory in Flagstaff. However, it took using the Hubble Space Telescope, clear of the distorting effects of Earth's atmosphere, to discover the much smaller satellites of Nix and Hydra in 2005.

Charon

The largest satellite around Pluto, Charon is named after the mythical ferryman who transported souls across the river Styx to Hades and the kingdom of the dead.

Nix

Nix is the Greek goddess of darkness and night and the mother of Charon.

Hydra

Hydra is the nine-headed serpent that lived in the mists and swamps near the city of Lerna. Hercules was sent to face the serpent and destroy it as his second labor in The Legend of Hercules chapter of this book.

Author's Final Word

The skies of Ptolemy were rich with the stories of ancient Greek and Roman mythology. I hope you have enjoyed reading this book as much as I have had writing it. Perhaps the next time you go out to look at the stars or peer through a telescope you won't just see star patterns, planets, or moons. Rather, you will recall the colorful stories of the Greeks and Romans that helped make sense of the sky for them and have entertained many generations after.

Appendices

Appendix A Names of the Greek and Roman Gods

Greek	Roman (Latin)	Title or significance
Aether	Ether	God of the Atmosphere
Amphitrite	Salacia	Goddess of the Sea (Neptune's Queen)
Ananke	Necessitas	Goddess of Necessity
Aphrodite	Venus	Goddess of Beauty & Love
Apollo	Apollo	God of Prophesy & Healing
Ares	Mars	God of War
Aristaeus	Aristaeus	God of Bee-keeping & the Etesian Winds
Artemis	Diana	Goddess of Hunting
Asclepius	Aesculapius	God of Healing
Astraeus	Astraeus	Titan God of the Stars, Astronomy & Astrology
Athena	Minerva	Goddess of Wisdom & Bravery
Atlas	Atlas	Titan God – Bearer of the Heavens
Boreas	Aquilo	God of the North Wind
Britomartis	Britomartis	Goddess of Hunting & Nets
Keto	Ceto	Sea-goddess of Monsters
Chaos	Chaos	First Primeval God at the Creation of the Universe
Charities	Gratiae	Goddesses of Pleasure and Joy
Charon	Charon	Ferryman God of the Dead
Chiron	Chiron	Centaur God
Chronos (Kronos)	Saturn	Titan God of Time & Father of the Gods

(continued)

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Appendix A (continued)

Greek	Roman (Latin)	Title or significance
Clymene	Clymene	Titan Goddess of Fame
Koios	Coeus	Titan God of Intellect
Kreios	Crius	Titan God of the Constellations
Demeter	Ceres	Goddess of Agriculture
Dione	Dione	Titan Goddess of the Oracle of Dodona
Enyo	Bellona	Goddess of War
Eos	Aurora	Goddess of the Dawn
Epimetheus	Epimetheus	Titan God of Afterthought
Erebus	Erebus	Primeval God of Darkness
Erinyes	Furiae	Goddesses of Retribution
Eros	Cupid	God of Love
Eurynome	Eurynome	Titan Goddess of Meadows & Pastures
Gaia	Terra	Primeval Goddess of Earth (Mother Earth)
Galatea	Galatea	Goddess of Calm Seas
Hades	Pluto	God of the Underworld
Hebe	Juventas	Goddess of Youth & Cup-bearer of the Gods
Hecate	Hecate	Goddess of Fertility
Helios	Sol	God of the Sun
Hemera	Dies	Primeval Goddess of the Day
Hephaestus	Vulcan	God of Fire
Hera	Juno	Goddess of Marriage, Queen of Gods & Women
Heracles	Hercules	Great Hero
Hermes	Mercury	God of Herds, Trade & Athletics Messenger of the Gods
Hesperides	Hesperides	Goddess of the Evening & Sunsets
Hestia	Vesta	Goddess of the Household
Horae	Horae	Goddesses of Seasons & Natural Order
Hyperion	Hyperion	Titan God of Light
Hypnos	Somnus	God of Sleep
Iapetus	Iapetus	Titan God of Mortality
Iris	Iris	Goddess of the Rainbow
Mnemosyne	Moneta	Titan Goddess of Memory
Moirae	Parcae	Goddesses of Fate & Destiny
Muses	Musae	Titan Goddesses of Music
Naiads	Naiads	Fresh Water Nymphs
Nephele	Nebulae	Cloud Nymph
Nereides	Nereids	Goddesses & Nymphs of the Sea
Nereus	Nereus	God of the Sea's Rich Bounty of Fish
Nymphs	Nymphs	Goddesses or Spirits of Nature
Nyx	Nox	Primeval Goddess of Night
Okeanus	Oceanus	Primeval God of the Ocean and Fresh Water
Oneiri	Somnia	Gods of Dreams
Ouranos	Uranus	Primeval God of the Sky
Pallas	Pallas	Titan God of Warcraft
Pan	Faunus	God of the Herdsman

(continued)

Appendix A (continued)

Greek	Roman (Latin)	Title or significance
Persephone	Proserpina	Queen of the Underworld
Phoebe	Phoebe	Titan Goddess of the Oracle of Delphi
Poseidon	Neptune	God of the Sea and Water
Prometheus	Prometheus	Titan God of Forethought & Creator of Mankind
Proteus	Proteus	Sea-god Herder of Seals
Rhea	Ops	Titan Queen of Heaven & Mother of the Gods
Satyrs	Satyrs	Fertility Spirits of the Wilderness & Countryside
Selene	Luna	Goddess of the Moon
Silenus	Silenus	God of Drunkenness & Wine-Making
Styx	Styx	Goddess of the Underworld River of hate
Tartarus	Tartarus	Primeval God of the Great Tartarean Storm Pit
Tethys	Tethys	Titan Goddess of Fresh Water & Nursing
Thalassa	Mare	Primeval Goddess of the Sea
Theia	Thea	Titan Goddess of Heavenly Light
Themis	Themis	Titan Goddess of Divine Law, Custom & Prophesy
Thetis	Thetis	Nereid Goddess of the Sea
Triton	Triton	Sea-god of Mermen
Zeus	Jupiter	God of Sky & Weather, King of Gods & Men

Appendix B Ptolemy's Constellations

Constellation	Description
Andromeda	Andromeda the Princess
Aquarius	The Water-bearer
Aquila	The Eagle
Ara	The Altar
Aries	The Ram
Argo Navis	The Ship *Argo*
Auriga	The Charioteer
Boötes	The Herdsman
Cancer	The Crab
Canis Major	The Great Dog
Canis Minor	The Lesser Dog
Capricornus	The Sea Goat
Cassiopeia	Cassiopeia the Queen
Centaurus	The Centaur
Cepheus	Cepheus the King
Cetus	The Whale or Sea-Monster
Corona Australis	The Southern Crown

(continued)

Appendix B (continued)

Constellation	Description
Corona Borealis	The Northern Crown
Corvus	The Crow
Crater	The Cup
Cygnus	The Swan
Delphinus	The Dolphin
Draco	The Dragon
Equuleus	The Foal
Eridanus	The River
Gemini	The Twins
Hercules	Hercules the Strong Man
Hydra	The Watersnake
Leo	The Lion
Lepus	The Hare
Libra	The Balance
Lupus	The Wolf
Lyra	The Lyre
Ophiuchus	The Serpent-bearer
Orion	Orion the Hunter
Pegasus	The Flying Horse
Perseus	Perseus the Hero
Pisces	The Fishes
Pisces Australis	The Southern Fish
Sagitta	The Arrow
Sagittarius	The Archer
Scorpius	The Scorpion
Serpens	The Serpent
Taurus	The Bull
Triangulum	The Triangle
Ursa Major	The Great Bear
Ursa Minor	The Lesser Bear
Virgo	The Virgin

Appendix C The Messier Objects

Messier number	NGC number	Mag.	Name	Type	Size (arc min)	Con
1	1952	8.4	The Crab Nebula	Bright nebula	6×4	Tau
2	7089	6.5		Globular cluster	13	Aqr
3	5272	6.2		Globular cluster	16	CVn
4	6121	5.6		Globular cluster	26	Sco

(continued)

Appendix C (continued)

Messier number	NGC number	Mag.	Name	Type	Size (arc min)	Con
5	5904	5.6		Globular cluster	17	Ser
6	6405	4.2	The Butterfly Cluster	Open cluster	15	Sco
7	6475	4.1	Ptolemy's Cluster	Open cluster	80	Sco
8	6523	6.0	The Lagoon Nebula	Bright nebula	60×35	Sgr
9	6333	7.7		Globular cluster	9	Oph
10	6254	6.6		Globular cluster	15	Oph
11	6705	6.3	Wild Duck Cluster	Open cluster	14	Sct
12	6218	6.7		Globular cluster	15	Oph
13	6205	5.8	The Great Hercules Globular Cluster	Globular cluster	17	Her
14	6402	7.6		Globular cluster	12	Oph
15	7078	6.2		Globular cluster	12	Peg
16	6611	6.4	Part of Eagle Nebula	Open cluster	7	Ser
17	6618	7.0	The Omega, Swan or Horseshoe Nebula	Bright nebula	11	Sgr
18	6613	7.5		Open cluster	9	Sgr
19	6273	6.8		Globular cluster	14	Oph
20	6514	9.0	The Trifid Nebula	Bright nebula	28	Sgr
21	6531	6.5		Open cluster	13	Sgr
22	6656	5.1		Globular cluster	24	Sgr
23	6494	6.9		Open cluster	27	Sgr
24	6603	4.6	Milky Way Patch	Milky Way Cloud	5	Sgr
25	IC 4725	4.6		Open cluster	40	Sgr
26	6694	8.0		Open cluster	15	Sct
27	6853	7.4	The Dumbbell Nebula	Planetary nebula	480″×340″	Vul
28	6626	6.8		Globular cluster	11	Sgr
29	6913	7.1		Open cluster	7	Cyg
30	7099	7.2		Globular cluster	11	Cap
31	224	3.4	The Andromeda Galaxy	Spiral galaxy	178×63	And
32	221	8.1	Satellite Galaxy of Andromeda	Elliptical galaxy	8×6	And
33	598	5.7	The Triangulum Galaxy	Spiral galaxy	73×45	Tri
34	1039	5.5		Open cluster	35	Per
35	2168	5.3		Open cluster	28	Gem
36	1960	6.3		Open cluster	12	Aur
37	2099	6.2		Open cluster	24	Aur
38	1912	7.4		Open cluster	21	Aur
39	7092	4.6		Open cluster	32	Cyg
40	Win4	8.4	Wineke 4 (asterism)	Double star	49″	UMa
41	2287	4.6		Open cluster	38	CMa
42	1976	4.0	The Great Orion Nebula	Bright nebula	85×60	Ori

(continued)

Appendix C (continued)

Messier number	NGC number	Mag.	Name	Type	Size (arc min)	Con
43	1982	9.0	de Mairan s Nebula – part of Orion Nebula	Bright nebula	20×15	Ori
44	2632	3.7	The Beehive Cluster – Praesepe	Open cluster	95	Cnc
45	–	1.6	The Pleiades	Open cluster	110	Tau
46	2437	6.0		Open cluster	27	Pup
47	2422	5.2		Open cluster	30	Pup
48	2548	5.5		Open cluster	54	Hya
49	4472	8.4		Elliptical galaxy	9×7.5	Vir
50	2323	6.3		Open cluster	16	Mon
51	5194	8.4	The Whirlpool Galaxy	Spiral galaxy	11×7	CVn
52	7654	7.3		Open cluster	13	Cas
53	5024	7.6		Globular cluster	13	Com
54	6715	7.6		Globular cluster	9	Sgr
55	6809	6.3		Globular cluster	19	Sgr
56	6779	8.3		Globular cluster	7	Lyr
57	6720	8.8	The Ring Nebula	Planetary nebula	85.6″×61.6″	Lyr
58	4579	9.7		Spiral galaxy	5.5×4.5	Vir
59	4621	9.6		Elliptical galaxy	5×3.5	Vir
60	4649	8.8		Elliptical galaxy	7×6	Vir
61	4303	9.7		Spiral galaxy	6×5.5	Vir
62	6266	6.5		Globular cluster	14	Oph
63	5055	8.6	The Sunflower Galaxy	Spiral galaxy	10×6	CVn
64	4826	8.5	The Blackeye Galaxy	Spiral galaxy	9.3×5.4	Com
65	3623	9.3		Spiral galaxy	8×1.5	Leo
66	3627	8.9		Spiral galaxy	8×2.5	Leo
67	2682	6.1		Open cluster	30	Cnc
68	4590	7.8		Globular cluster	12	Hya
69	6637	7.6		Globular cluster	7	Sgr
70	6681	7.9		Globular cluster	8	Sgr
71	6838	8.2		Globular cluster	7	Sge
72	6981	9.3		Globular cluster	6	Aqr
73	6994	9.0	Four star asterism	Open cluster	3	Aqr
74	628	9.4		Spiral galaxy	10.2×9.5	Psc
75	6864	8.5		Globular cluster	6	Sgr
76	650	10.1	The Butterfly Nebula – Little Dumbbell, Cork	Planetary nebula	163″×107″	Per
77	1068	8.9		Spiral galaxy	7×6	Cet
78	2068	8.3		Bright nebula	8×6	Ori
79	1904	7.7		Globular cluster	9	Lep

(continued)

Appendix C (continued)

Messier number	NGC number	Mag.	Name	Type	Size (arc min)	Con
80	6093	7.3		Globular cluster	9	Sco
81	3031	6.9	Bode's Galaxy (Bode's Nebula)	Spiral galaxy	21×10	UMa
82	3034	8.4	The Cigar Galaxy	Irregular galaxy	9×4	UMa
83	5236	7.6		Spiral galaxy	11×10	Hya
84	4374	9.1		Elliptical galaxy	5	Vir
85	4382	9.1		Elliptical galaxy	7.1×5.2	Com
86	4406	8.9		Elliptical galaxy	7.5×5.5	Vir
87	4486	8.6	Virgo A	Elliptical galaxy	7	Vir
88	4501	9.6		Spiral galaxy	7×4	Com
89	4552	9.8		Elliptical galaxy	4	Vir
90	4569	9.5		Spiral galaxy	9.5×4.5	Vir
91	4548	10.2		Spiral galaxy	5.4×4.4	Com
92	6341	6.4		Globular cluster	11	Her
93	2447	6.0		Open cluster	22	Pup
94	4736	8.2		Spiral galaxy	7×3	CVn
95	3351	9.7		Spiral galaxy	4.4×3.3	Leo
96	3368	9.2		Spiral galaxy	6×4	Leo
97	3587	9.9	The Owl Nebula	Planetary nebula	202″×196″	UMa
98	4192	10.1		Spiral galaxy	9.5×3.2	Com
99	4254	9.9		Spiral galaxy	5.4×4.8	Com
100	4321	9.3		Spiral galaxy	7×6	Com
101	5457	7.9	The Pinwheel Galaxy	Spiral galaxy	22	UMa
102	5866	9.9	The Spindle Galaxy	Elliptical galaxy	5.2×2.3	Dra
103	581	7.4		Open cluster	6	Cas
104	4594	8.0	The Sombrero Galaxy	Spiral galaxy	9×4	Vir
105	3379	9.3		Elliptical galaxy	2	Leo
106	4258	8.4		Spiral galaxy	19×8	CVn
107	6171	7.9		Globular cluster	10	Oph
108	3556	10.0		Spiral galaxy	8×1	UMa
109	3992	9.8		Spiral galaxy	7×4	UMa
110	205	8.5	Satellite Galaxy of Andromeda	Elliptical galaxy	17×10	And

Appendix D NGC/IC Objects by Constellation

NGC #	Con	Mag.	Type	Size (arc min)	Comments
205	And	8.5	Elliptical Galaxy	17×10	M110 – Satellite Galaxy of Andromeda
221	And	8.1	Elliptical Galaxy	8×6	M32 – Satellite Galaxy of Andromeda

(continued)

Appendix D (continued)

NGC #	Con	Mag.	Type	Size (arc min)	Comments
224	And	3.4	Spiral Galaxy	178×63	M31 – The Andromeda Galaxy
752	And	5.7	Open cluster	50	
956	And	9.0	Open cluster	8	
7686	And	5.6	Open cluster	15	
6709	Aql	6.7	Open cluster	13	
6738	Aql	8.0	Open cluster	15	
6755	Aql	7.5	Open cluster	15	
6981	Aqr	9.3	Globular Cluster	6	M72
6994	Aqr	9.0	Open Cluster	3	M73 – Four star asterism
7009	Aqr	8.0	Planetary Nebula	1.7	Saturn Nebula
7089	Aqr	6.5	Globular Cluster	13	M2
6193	Ara	5.2	Open cluster	15	
6200	Ara	7.4	Open cluster	12	
6204	Ara	8.2	Open cluster	5	
6208	Ara	7.2	Open cluster	16	
6250	Ara	5.9	Open cluster	8	
6352	Ara	8.2	Globular cluster	7.1	
6362	Ara	8.3	Globular cluster	10.7	
6397	Ara	5.7	Globular cluster	25.7	
IC 4651	Ara	6.9	Open cluster	12	
1664	Aur	7.6	Open cluster	18	
1778	Aur	7.7	Open cluster	7	
1857	Aur	7.0	Open cluster	6	
1893	Aur	7.5	Open cluster	11	
1907	Aur	8.2	Open cluster	7	
1912	Aur	7.4	Open cluster	21	M38
1960	Aur	6.3	Open cluster	12	M36
2099	Aur	6.2	Open cluster	24	M37
2281	Aur	5.4	Open cluster	15	
7099	Cap	7.2	Globular cluster	11	M30
2516	Car	3.8	Open cluster	30	
2808	Car	6.3	Globular cluster	13.8	
3114	Car	4.2	Open cluster	35	
3293	Car	4.7	Open cluster	40	
3324	Car	6.7	Cluster-nebulosity	16	
3372	Car	1.0	Bright nebula	120	The Great Carina Nebula
3496	Car	8.2	Open cluster	9	
3532	Car	3.0	Open cluster	55	
3572	Car	6.6	Cluster-nebulosity	20	
3590	Car	8.2	Open cluster	4	
3603	Car	9.1	Cluster-nebulosity	12	
IC 2581	Car	4.3	Open cluster	8	
IC 2602	Car	1.9	Open cluster	50	The Southern Pleiades

(continued)

Appendix D (continued)

NGC #	Con	Mag.	Type	Size (arc min)	Comments
IC 2714	Car	8.0	Open cluster	12	
129	Cas	6.5	Open cluster	21	
133	Cas	9.0	Open cluster	7	
146	Cas	9.1	Open cluster	7	
185	Cas	9.2	Elliptical galaxy	11.5	
189	Cas	8.8	Open cluster	4	
225	Cas	7.0	Open cluster	12	
281	Cas	7.0	Cluster-nebulosity	35	PacMan Nebula
381	Cas	9.0	Open cluster	6	
436	Cas	8.8	Open cluster	6	
457	Cas	6.4	Open cluster	13	Owl Cluster
581	Cas	7.4	Open cluster	6	M103
637	Cas	8.2	Open cluster	4	
654	Cas	6.5	Open cluster	5	
659	Cas	7.9	Open cluster	5	Not labeled on chart
663	Cas	7.1	Open cluster	16	
771	Cas	4.0	Star-nebulosity	–	
1027	Cas	6.7	Open cluster	20	
7654	Cas	7.3	Open cluster	13	M52
7788	Cas	9.0	Open cluster	9	
7789	Cas	6.7	Open cluster	16	
7790	Cas	8.5	Open cluster	17	
IC 1805	Cas	6.5	Cluster-nebulosity	60	
IC 1848	Cas	6.5	Cluster-nebulosity	60	Soul Nebula
3680	Cen	7.6	Open cluster	12	
3766	Cen	5.3	Open cluster	12	
3918	Cen	8.0	Planetary nebula	0.2	Blue Planetary
3960	Cen	8.3	Open cluster	7	
5128	Cen	7.0	Elliptical galaxy	18.2	Centaurus A
5138	Cen	7.6	Open cluster	8	
5139	Cen	3.7	Globular cluster	36.3	Omega Centauri
5281	Cen	5.9	Open cluster	5	
5286	Cen	7.6	Globular cluster	9.1	
5316	Cen	6.0	Open cluster	14	
5460	Cen	5.6	Open cluster	25	
5606	Cen	7.7	Open cluster	3	
5617	Cen	6.3	Open cluster	10	
5662	Cen	5.5	Open cluster	12	
IC 2944	Cen	4.5	Cluster-nebulosity	75	Lambda Centauri Nebula
188	Cep	8.1	Open cluster	14	
1396	Cep	3.5	Cluster-nebulosity	170	Elephant Trunk Nebula
6939	Cep	7.8	Open cluster	8	
7023	Cep	7.0	Cluster-nebulosity	18	
7160	Cep	6.1	Open cluster	7	
7235	Cep	7.7	Open cluster	4	

(continued)

Appendix D (continued)

NGC #	Con	Mag.	Type	Size (arc min)	Comments
7261	Cep	8.4	Open cluster	6	
7380	Cep	7.2	Cluster-nebulosity	25	
7510	Cep	7.9	Open cluster	4	
246	Cet	8.0	Planetary nebula	3.8	
1068	Cet	8.9	Spiral galaxy	7×6	M77
2204	CMa	8.6	Open cluster	13	
2287	CMa	4.6	Open cluster	38	M41
2345	CMa	7.7	Open cluster	12	
2354	CMa	6.5	Open cluster	20	
2360	CMa	7.2	Open cluster	13	Caroline's Cluster
2367	CMa	7.9	Open cluster	4	
2374	CMa	8.0	Open cluster	19	
2383	CMa	8.4	Open cluster	6	
2384	CMa	7.4	Open cluster	3	
2632	Cnc	3.7	Open cluster	95	M44 – The Beehive Cluster – Praesepe
2682	Cnc	6.1	Open cluster	30	M67
4192	Com	10.1	Spiral galaxy	9.5×3.2	M98
4254	Com	9.9	Spiral galaxy	5.4×4.8	M99
4321	Com	9.3	Spiral galaxy	7×6	M100
4382	Com	9.1	Elliptical galaxy	7.1×5.2	M85
4501	Com	9.6	Spiral galaxy	7×4	M88
4548	Com	10.2	Spiral galaxy	5.4×4.4	M91
4826	Com	8.5	Spiral galaxy	9.3×5.4	M64 – The Blackeye Galaxy
5024	Com	7.6	Globular cluster	13	M53
6541	CrA	6.6	Globular cluster	6.6	
4258	CVn	8.4	Spiral galaxy	19×8	M106
4736	CVn	8.2	Spiral galaxy	7×3	M94
5055	CVn	8.6	Spiral galaxy	10×6	M63 – The Sunflower Galaxy
5194	CVn	8.4	Spiral galaxy	11×7	M51 – The Whirlpool Galaxy
5272	CVn	6.2	Globular cluster	16	M3
1369	Cyg	6.8	Open cluster	4	
6811	Cyg	6.8	Open cluster	15	
6819	Cyg	7.3	Open cluster	5	
6834	Cyg	7.8	Open cluster	5	
6866	Cyg	7.6	Open cluster	7	
6871	Cyg	5.2	Open cluster	20	
6883	Cyg	8.0	Open cluster	15	
6910	Cyg	7.4	Open cluster	8	
6913	Cyg	7.1	Open cluster	7	M29
7039	Cyg	7.6	Open cluster	25	

(continued)

Appendix D (continued)

NGC #	Con	Mag.	Type	Size (arc min)	Comments
7063	Cyg	7.0	Open cluster	8	
7082	Cyg	7.2	Open cluster	25	
7086	Cyg	8.4	Open cluster	9	
7092	Cyg	4.6	Open cluster	32	
7092	Cyg	4.6	Open cluster	32	M39
IC 4996	Cyg	7.3	Open cluster	6	
IC 5146	Cyg	7.2	Cluster-nebulosity	12	Cocoon Nebula
6934	Del	8.9	Globular cluster	5.9	
5866	Dra	9.9	Elliptical galaxy	5.2×2.3	M102 – The Spindle Galaxy
1291	Eri	8.5	Spiral galaxy	10.5	
2129	Gem	6.7	Open cluster	7	
2158	Gem	8.6	Open cluster	5	Not labeled – near M35
2168	Gem	5.3	Open cluster	28	M35
2331	Gem	9.0	Open cluster	18	
2395	Gem	8.0	Open cluster	12	
2420	Gem	8.3	Open cluster	10	
IC 2157	Gem	8.4	Open cluster	7	
6205	Her	5.8	Globular cluster	17	M13 – The Great Hercules Globular Cluster
6341	Her	6.4	Globular cluster	11	M92
2548	Hya	5.5	Open cluster	54	M48
4590	Hya	7.8	Globular cluster	12	M68
5236	Hya	7.6	Spiral galaxy	11×10	M83
3351	Leo	9.7	Spiral galaxy	4.4×3.3	M95
3368	Leo	9.2	Spiral galaxy	6×4	M96
3379	Leo	9.3	Elliptical galaxy	2	M105
3623	Leo	9.3	Spiral galaxy	8×1.5	M65
3627	Leo	8.9	Spiral galaxy	8×2.5	M66
1904	Lep	7.7	Globular cluster	9	M79
5897	Lib	8.6	Globular cluster	12.6	
5749	Lup	9.0	Open cluster	8	
5822	Lup	7.0	Open cluster	40	
5824	Lup	9.0	Globular cluster	6.2	
5927	Lup	8.3	Globular cluster	12	
5986	Lup	7.0	Globular cluster	9.8	
6720	Lyr	8.8	Planetary nebula	85.6″×61.6″	M57 –The Ring Nebula
6779	Lyr	8.3	Globular cluster	7	M56
2323	Mon	6.3	Open cluster	16	M50
6171	Oph	7.9	Globular cluster	10	M107
6218	Oph	6.7	Globular cluster	15	M12
6254	Oph	6.6	Globular cluster	15	M10
6266	Oph	6.5	Globular cluster	14	M62

(continued)

Appendix D (continued)

NGC #	Con	Mag.	Type	Size (arc min)	Comments
6273	Oph	6.8	Globular cluster	14	M19
6333	Oph	7.7	Globular cluster	9	M9
6402	Oph	7.6	Globular cluster	12	M14
6633	Oph	4.6	Open cluster	27	
IC 4665	Oph	4.2	Open cluster	41	
1662	Ori	6.4	Open cluster	20	
1976	Ori	4.0	Bright nebula	85×60	M42 – The Great Orion Nebula
1981	Ori	4.6	Open cluster	25	
1982	Ori	9.0	Bright nebula	20×15	M43 – de Mairan's Nebula – part of Orion Nebula
2068	Ori	8.3	Bright nebula	8×6	M78
2169	Ori	5.9	Open cluster	7	
2174	Ori	6.8	Diffuse nebula	40	Not on Orion star chart
2175	Ori	6.8	Open cluster	18	Located in NGC 2174
2186	Ori	8.7	Open cluster	4	
2194	Ori	8.5	Open cluster	10	
7078	Peg	6.2	Globular cluster	12	M15
650	Per	10.1	Planetary nebula	163″×107″	M76 – The Butterfly Nebula – Little Dumbbell, Cork Nebula
744	Per	7.9	Open cluster	11	
869	Per	4.0	Open cluster	30	h Persei – Pt of Double Cluster
884	Per	4.0	Open cluster	30	Chi Persei – Pt of Double Cluster
957	Per	7.6	Open cluster	11	
1039	Per	5.5	Open cluster	35	M34
1245	Per	8.4	Open cluster	10	
1342	Per	6.7	Open cluster	14	
1444	Per	6.6	Open cluster	4	
1513	Per	8.4	Open cluster	9	
1528	Per	6.4	Open cluster	24	
1545	Per	6.2	Open cluster	18	
1582	Per	7.0	Open cluster	37	
IC 348	Per	7.3	Cluster-nebulosity	10	
628	Psc	9.4	Spiral galaxy	10.2×9.5	M74
2414	Pup	7.9	Open cluster	4	
2421	Pup	8.3	Open cluster	10	
2422	Pup	5.2	Open cluster	30	M47
2437	Pup	6.0	Open cluster	27	M46
2439	Pup	6.9	Open cluster	10	
2447	Pup	6.0	Open cluster	22	M93
2451	Pup	2.8	Open cluster	45	

(continued)

Appendix D (continued)

NGC #	Con	Mag.	Type	Size (arc min)	Comments
2467	Pup	7.0	Emission nebula	16	Cluster with nebulosity
2477	Pup	5.8	Open cluster	27	
2483	Pup	7.6	Open cluster	10	
2489	Pup	7.9	Open cluster	8	
2527	Pup	6.5	Open cluster	22	
2533	Pup	7.6	Open cluster	4	
2539	Pup	6.5	Open cluster	22	
2546	Pup	6.3	Open cluster	41	
2567	Pup	7.4	Open cluster	10	
2571	Pup	7.0	Open cluster	13	
2579	Pup	7.5	Cluster-nebulosity	10	
2627	Pyx	8.0	Open cluster	11	
2658	Pyx	9.0	Open cluster	12	
2818	Pyx	8.2	Planetary nebula	9	
6093	Sco	7.3	Globular cluster	9	M80
6121	Sco	5.6	Globular cluster	26	M4
6124	Sco	5.8	Open cluster	29	
6139	Sco	9.2	Globular cluster	5.5	
6144	Sco	9.1	Globular cluster	9.3	Not labeled – near M4
6178	Sco	7.2	Open cluster	4	
6192	Sco	9.0	Open cluster	8	
6231	Sco	2.6	Cluster-nebulosity	15	Table of Scorpius Cluster
6242	Sco	6.4	Open cluster	9	
6249	Sco	8.2	Open cluster	6	
6259	Sco	8.0	Open cluster	10	
6281	Sco	5.4	Cluster-nebulosity	60	
6322	Sco	6.0	Open cluster	10	
6374	Sco	9.0	Open cluster	3	
6383	Sco	5.5	Cluster-nebulosity	80	
6388	Sco	6.9	Globular cluster	8.7	
6396	Sco	8.5	Open cluster	3	
6405	Sco	4.2	Open cluster	15	M6 – The Butterfly Cluster
6416	Sco	5.7	Open cluster	18	
6441	Sco	7.4	Globular cluster	7.8	
6451	Sco	8.0	Open cluster	8	
6475	Sco	4.1	Open cluster	80	M7 – Ptolemy's Cluster
6496	Sco	9.2	Globular cluster	6.9	
6694	Sct	8.0	Open cluster	15	M26
6705	Sct	6.3	Open cluster	14	M11 – The Wild Duck Cluster
5904	Ser	5.6	Globular cluster	17	M5
6604	Ser	6.5	Cluster-nebulosity	60	
6605	Ser	6.0	Open cluster		Not labeled – S of M16

(continued)

Appendix D (continued)

NGC #	Con	Mag.	Type	Size (arc min)	Comments
6611	Ser	6.4	Open cluster	7	M16 – Part of Eagle Nebula
IC 4756	Ser	5.0	Open cluster	52	
6838	Sge	8.2	Globular cluster	7	M71
6469	Sgr	8.0	Open cluster	12	
6494	Sgr	6.9	Open cluster	27	M23
6514	Sgr	9.0	Bright nebula	28	M20 – The Trifid Nebula
6520	Sgr	8.0	Open cluster	6	
6522	Sgr	8.6	Globular cluster	5.6	
6523	Sgr	6.0	Bright nebula	60×35	M8 – The Lagoon Nebula
6531	Sgr	6.5	Open cluster	13	M21
6546	Sgr	8.0	Open cluster	13	
6553	Sgr	8.3	Globular cluster	8.1	
6568	Sgr	9.0	Open cluster	13	
6569	Sgr	8.7	Globular cluster	5.8	
6595	Sgr	7.0	Open cluster	11	
6603	Sgr	4.6	Milky Way Cloud	5	M24 – Milky Way Patch
6613	Sgr	7.5	Open cluster	9	M18
6618	Sgr	7.0	Bright nebula	11	M17 – The Omega, Swan or Horseshoe Nebula
6624	Sgr	8.3	Globular cluster	5.9	
6626	Sgr	6.8	Globular cluster	11	M28
6637	Sgr	7.6	Globular cluster	7	M69
6642	Sgr	8.8	Globular cluster	4.5	
6645	Sgr	9.0	Open cluster	10	
6647	Sgr	8.0	Open cluster		
6652	Sgr	8.9	Globular cluster	3.5	
6656	Sgr	5.1	Globular cluster	24	M22
6681	Sgr	7.9	Globular cluster	8	M70
6715	Sgr	7.6	Globular cluster	9	M54
6716	Sgr	6.9	Open cluster	7	
6723	Sgr	7.3	Globular cluster	11	
6809	Sgr	6.3	Globular cluster	19	M55
6864	Sgr	8.5	Globular cluster	6	M75
IC 4725	Sgr	4.6	Open cluster	40	M25
IC 4895	Sgr	8.0	Galactic cloud	10	Barnard's Galaxy (NGC 6822)
1647	Tau	6.4	Open cluster	45	
1746	Tau	6.0	Open cluster	42	
1807	Tau	7.0	Open cluster	17	
1817	Tau	7.7	Open cluster	16	
1952	Tau	8.4	Bright nebula	6×4	M1 – The Crab Nebula
–	Tau	1.6	Open cluster	110	M45 – The Pleiades

(continued)

Appendix D (continued)

NGC #	Con	Mag.	Type	Size (arc min)	Comments
598	Tri	5.7	Spiral galaxy	73×45	M33 – The Triangulum Galaxy
3031	UMa	6.9	Spiral galaxy	21×10	M81 – Bode's Galaxy (Bode's Nebula)
3034	UMa	8.4	Irregular galaxy	9×4	M82 – The Cigar Galaxy
3556	UMa	10.0	Spiral galaxy	8×1	M108
3587	UMa	9.9	Planetary nebula	202″×196″	M97 – The Owl Nebula
3992	UMa	9.8	Spiral galaxy	7×4	M109
5457	UMa	7.9	Spiral galaxy	22	M101 – The Pinwheel Galaxy
Win4	UMa	8.4	Double star	49″	M40 – Wineke 4 (asterism)
2547	Vel	4.7	Open cluster	20	
2659	Vel	8.6	Open cluster	3	
2669	Vel	6.1	Open cluster	12	
2670	Vel	7.8	Open cluster	9	
2910	Vel	7.2	Open cluster	5	
2925	Vel	8.0	Open cluster	12	
3132	Vel	8.0	Planetary nebula	0.8	Eight-burst Nebula
3201	Vel	6.8	Globular cluster	18.2	
3228	Vel	6.0	Open cluster	18	
3330	Vel	7.4	Open cluster	7	
IC 2391	Vel	2.5	Open cluster	50	Omicron Velorum Cluster
IC 2395	Vel	4.6	Open cluster	8	
IC 2488	Vel	7.0	Open cluster	15	
4216	Vir	10.0	Spiral galaxy	10	
4303	Vir	9.7	Spiral galaxy	6×5.5	M61
4374	Vir	9.1	Elliptical galaxy	5	M84
4406	Vir	8.9	Elliptical galaxy	7.5×5.5	M86
4472	Vir	8.4	Elliptical galaxy	9×7.5	M49
4486	Vir	8.6	Elliptical galaxy	7	M87 – Virgo A
4552	Vir	9.8	Elliptical galaxy	4	M89
4569	Vir	9.5	Spiral galaxy	9.5×4.5	M90
4579	Vir	9.7	Spiral galaxy	5.5×4.5	M58
4594	Vir	8.0	Spiral galaxy	9×4	M104 – The Sombrero Galaxy
4621	Vir	9.6	Elliptical galaxy	5×3.5	M59
4636	Vir	9.6	Elliptical galaxy	9.6	
4649	Vir	8.8	Elliptical galaxy	7×6	M60
5053	Vir	9.8	Globular cluster	10.5	Listed in Coma Berenices
6853	Vul	7.4	Planetary nebula	480″×340″	M27 – The Dumbbell Nebula

Appendix E The Greek Alphabet

Star charts typically use only the small Greek letters for designations.

α	Alpha
β	Beta
γ	Gamma
δ	Delta
ε	Epsilon
ζ	Zeta
η	Eta
θ	Theta
ι	Iota
κ	Kappa
λ	Lambda
μ	Mu
ν	Nu
ξ	Xi
ο	Omicron
π	Pi
ρ	Rho
σ	Sigma
τ	Tau
υ	Upsilon
ϕ	Phi
χ	Chi
ψ	Psi
ω	Omega

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