One-Minute Astronomer

Stargazing 101:

A Whirlwind Tour of The Night Sky

(Southern Hemisphere)

A Guide by One-Minute Astronomer

www.oneminuteastronomer.com

Please email, tweet, blog, and pass this e-book around to your friends, family, students, or astronomy club to help as many people as possible discover and enjoy the night sky.

For email updates on what to see in the night sky, or to learn more about stargazing, visit:

www.OneMinuteAstronomer.com

Table of Contents

What You Will Discover in this Guide

"Dwell on the beauty of life. Watch the stars and see yourself running with them." – Marcus Aurelius

Nearly everyone loves to look at the stars. For some, a clear night sky brings a sense of peace. For others it brings a sense wonder about our place in the universe. But when it comes to learning the stars, peace and wonder can change to apprehension or confusion. There are so many stars, how is it possible to tell one from the other? And many would-be stargazers believe stargazing is full of complicated terms and math and physics.

Basic stargazing isn't that hard. If you can follow a map to find your way around a new city, you can find your way around the night sky. As you read through this guide, you will discover how to easily find some of the brightest stars and constellations visible from the southern hemisphere. You will find it tremendously rewarding to point to the sky and show your friends or your children the brilliant star Canopus on a summer night, or the winding constellation Scorpius far overhead on a crisp winter evening. The basic ideas you discover in this short guide will set the stage for a lifetime of discovery of the stars, planets, and thousands of star clusters, nebulae, and galaxies.

To use this guide, first read over the section called "The Layout of the Night Sky". You don't have to understand everything here the first time through. (I sure didn't when I first learned the night sky). But get a feel for the main features of the sky including the celestial poles and celestial equator, as well as the basic motion of the night sky from day to day and month to month. This will help you understand why the stars appear to move slowly during the night and why they change from season to season.

Then start into the "Short Tours of the Night Sky" which are organized more or less by season: autumn, winter, spring, and summer. Start with your current season and go from there. Each has a one-page circular map you can print and take with you for your stargazing sessions, as well as a few tips about how to read the maps. Then move onto the other seasons of the year as your schedule allows. As you get more acquainted with the stars, you may wish to find more celestial sights using binoculars or a small telescope. The last section lists a few resources to get you started.

Take it slowly as you find your way around the night sky. You only need learn the stars once and they will follow you from season to season and from year to year for the rest of your life.

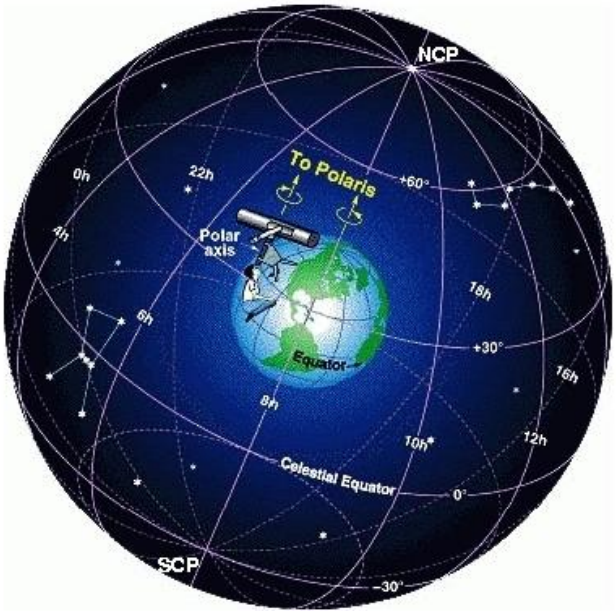
Wishing you clear skies,

Brian Ventrudo, Ph.D.
Publisher, One-Minute Astronomer
oneminuteastronomer.com

The Layout of the Night Sky

The Celestial Sphere

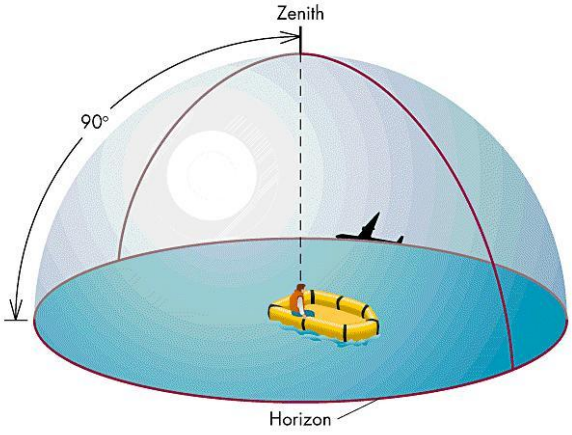
On the next clear night, leave the burdens of the day behind, dress warmly, and wander outside. Find a place with a clear view of most of the sky and, if possible, away from direct light. Look up. You will notice the sky takes on the appearance of a vast hemispherical dome with stars fixed to its inner surface. If the Earth were transparent, you would see the stars on the other half of this starry dome, below your feet, and you'd get the impression you were standing at the center of a velvety-black sphere speckled with stars. Astronomers call this the *celestial sphere*.



The celestial sphere showing the position of the north celestial pole (NCP), south celestial pole (SCP) and celestial equator

While it appears that stars are fixed to this celestial sphere, they are in fact at very different distances, but you cannot directly see this simply by looking into the sky. Ancient stargazers mused the stars may be tens or hundreds of miles away, and thought the stars were holes in the sky to let through the light of heaven. Now we know more. The stars are tens of trillions of miles away, and they are balls of burning gas sustaining themselves from the energy of nuclear reactions in the cores.

But let's get back to the sky. Surrounding you is the full circle at which the earth's surface and the sky appear to meet. This is called the *horizon*. If you're surrounded by structures, trees, and hills, it may be hard to see down to the horizon. If you're on flat grassland or desert or the ocean, you should have little trouble seeing the sky down to the horizon.



The horizon, where the sky appears to meet the Earth, and the zenith, directly overhead

The imaginary point on the celestial sphere that is directly overhead, and therefore 90 degrees above the horizon, is called the *zenith*. The point that is 90 degrees below the horizon, which of course you cannot see, is called the nadir.

The imaginary points on the horizon which indicate the main directions, north, south, east, and west are known as *cardinal points*. When you can, find out which way lies north. This will come in useful later. Use a compass, a smartphone with GPS, or ask a friend.

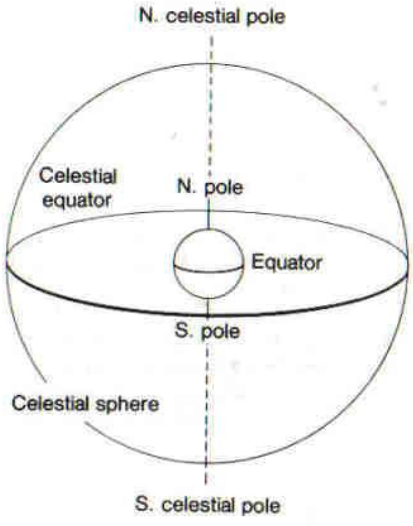
The Celestial Poles and the Celestial Equator

Recall how a spherical globe of the Earth has a north pole and a south pole. The celestial sphere also has poles. Directly above the Earth's north pole on the celestial sphere lies the north celestial pole (NCP). Directly above the Earth's south pole lies the south celestial pole (SCP).

If you were standing at the Earth's north pole, the north celestial pole would lie at the zenith, the imaginary point directly over your head. The star Polaris would lie almost directly at this point. It's the same story for the south... the *south celestial pole* (SCP) is directly above the Earth's south pole.

In the northern hemisphere, a moderately bright star—the North Star, also called Polaris— lies almost exactly at the position of the *north celestial pole* (NCP). There is, however, no bright star near the SCP, that is, there is no southern counterpart to Polaris. But a fainter star called Sigma Octanis,

which is just barely visible to the unaided eye, lies a little more than one degree away from the SCP.



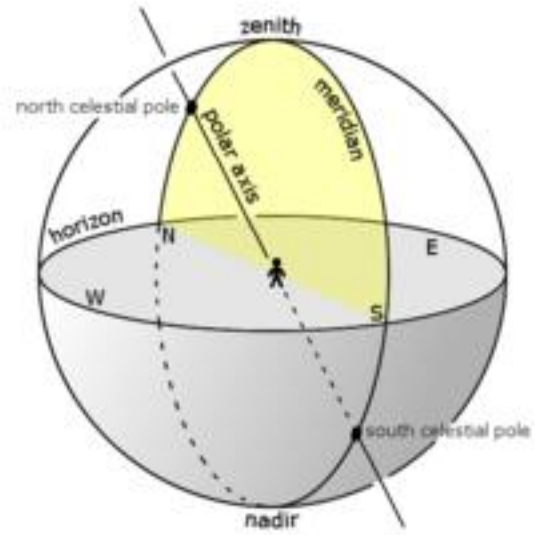
The celestial poles and equator lie above their terrestrial counterparts

As it is with the poles, so it is with the equator. Directly above the Earth's equator lies the *celestial equator*, a circle which goes all the way around the sky and which divides the northern half of the celestial sphere from the southern half (see image above).

If you were standing at the south pole, the celestial equator would coincide with the horizon. And if you were standing on the Earth's equator, the celestial equator would stretch from the east to the west directly overhead. As seen from the equator, the north and south celestial poles would lie on the northern and southern horizon, respectively.

But how about if you're standing at some intermediate latitude, between a pole and the equator?

In that case, the north or south celestial pole (NCP) would lie at some angle above the horizon. This angle is equal to your latitude. If you are at the equator, for example, which is 0 degrees latitude, then the SCP and NCP (and Polaris) would lie zero degrees above the horizon, that is, on the horizon. At 10 degrees south latitude, the SCP would lie 10 degrees above the horizon. And in Sydney, Australia, which has a latitude 34 degrees south, the SCP would lie 34 degrees above the horizon. This is how navigators have determined their latitude for thousands of years... by measuring the angle of the celestial poles above the horizon.

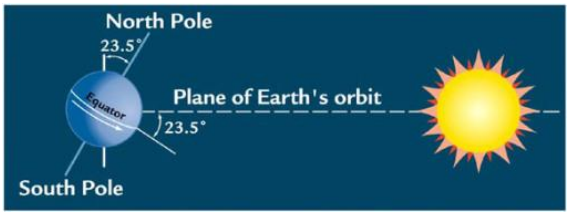


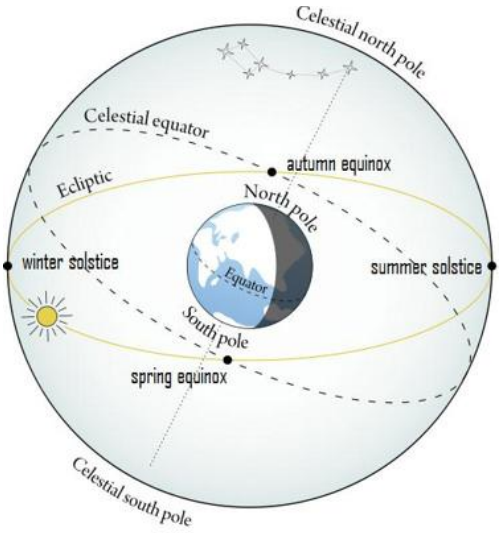
The horizon, meridian, and cardinal points

One more circle… the imaginary great circle that runs from the northern horizon, up through the celestial pole, through the zenith, then down to the southern horizon is called the *meridian* (again, see image above).

The Ecliptic

The celestial equator goes all the way around the celestial sphere above the Earth's equator. There is another circle that goes all the way around the sky. It is called the *ecliptic*, and it is tilted with respect to the equator by 23.5 degrees.





The tilt of the Earth's axis, showing the plane of the ecliptic inclined to the celestial equator and the position of the equinoxes and solstices.

The ecliptic is the imaginary circle on the sky that marks the annual path of the Sun. It's tilted because the Earth itself is tilted relative to its orbit around the Sun by 23.5 degrees (see above). If the Earth was not tilted in its orbit around the Sun, the celestial equator and ecliptic would be the same circle.

Because of the Earth's tilt, the Sun appears highest in the sky relative to the celestial equator when the Earth is at one position in its orbit. This happens on or about June 21, and we call this the *winter solstice* (in the southern hemisphere) because the Sun is at its most northerly point. When the Earth is at the opposition side of its orbit in December the Sun is at its lowest point in the sky relative to the celestial equator. This is the *summer solstice* in the southern hemisphere. Between the two, the Sun is right on the celestial equator. These are *spring and autumnal equinoxes* when spring and autumn begin. The equinoxes and solstices are four points on the ecliptic.

What's more, since all the planets lie near the same flat plane around the Sun, the ecliptic also marks the path of the planets around the sky as they revolve around the Sun. So every planet, the Sun, and even the Moon, are always found on or very close to the ecliptic during the year.

As it turns out, the great circle of the ecliptic passes through 12 formal groups of stars called *constellations*. This group of constellations is called the *zodiac*, and it includes Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpius, Sagittarius, Capricornus, Aquarius, and Pisces. (The ecliptic ac-

tually passes through a 13th constellation, Ophiuchus, but it is not included in the zodiac because ancient astrologers regarded the number 13 as unlucky).

You've covered a lot here. Who would have thought the sky has so many points and great circles? It may all seem a little confusing at first. But don't worry. You just need to review this material, think about it on your own, and find these points and circles in the heavens as you examine the sky in the coming weeks and months.

How the Sky Moves

Because the north and south celestial poles are the points about which the celestial sphere appears to rotate, these poles do not move during the day or year. The North Star, Polaris, for example, since it's almost right on the north celestial pole, appears to stay nearly fixed in the sky all night and all year. Any other star on the celestial sphere south of Polaris rotates in circles of increasing diameter about the rotation axis of the celestial sphere. It's the same with the south celestial pole. Stars above the Earth's equator trace out the largest circles around the sky during their daily motion across the celestial sphere. And south of the equator, stars trace out circles with smaller apparent diameters as they lie closer to the south celestial pole. The image below gives you a better idea of how the stars appear to rotate during the day because of the apparent rotation of the celestial sphere.

Star trails caused by the apparent rotation of the celestial sphere around a celestial pole

Like the stars and planets, the Sun also appears to move on the celestial sphere. If you measure the time when the sun is highest in the sky, you will find it takes exactly 24 hours for the Sun to move all the way around the celestial sphere and return to its highest point. In fact, that's how we define a "day", or what astronomers formally call a *solar day*.

It's a little different with stars. If you go out at night and select a star to observe, and measure its position on the celestial sphere, you will find it takes 24 hours to move all the way around the sky and get back to the same spot.

Well, almost 24 hours.

If you measure accurately, you'll find it takes only 23 hours and 56 minutes for a star to get back to the same position in the sky as it was the night before. That's because, during the day, the Earth revolved around the Sun by 1/365 of its orbit. So each day, you look in a slightly different direction in space, and this causes every star to appear to rise 4 minutes earlier each night. In two weeks, the star rises about an hour earlier; in one month the star rises 2 hours earlier, and in 12 months, it appears to move all the way around the sky back to the position at which you first saw it the previous year.

This apparent motion where the stars rise a little earlier each night, which is caused by the Earth's revolution around the Sun, explains why the stars you see in the in the night sky in one season are different than the stars you saw during the last season.

Now that you have some idea of the layout of the sky and how it appears to move each day and during the year, let's have a look at what you can actually see in the night sky each season.

As mentioned in the introduction to this guide, your first pass through this section may not be completely clear. It takes time and a little thought and experience to figure this out. Be patient. As you learn the sky, these concepts will become clearer to you.

Short Tours of the Night Sky

How to Read a Star Chart

Learning the sky is really no different than learning the streets of a new city or town. A simple map is the best way to get oriented. Of course, as you start out finding your way around town, you don't need a detailed map with elevations and minute detail of every house and tree down to the square meter. You just need a basic map showing the major streets and landmarks, and how to get from place to place.

So it is with star charts. Many advanced amateur astronomers use highly detailed star atlases that have thousands of stars and deep-sky objects, along with markings of celestial coordinates down to the degree. When you're just starting out, you don't need that. You just need a good, basic star chart that shows you where to find the bright stars and main constellations at a particular time and place.

In this guide, that's what you'll get… four star charts, one for each season, to show you the highlights of the sky.

But first, a word about how to read these charts…

The four charts below show you what you can see from the southern hemisphere at 35 degrees south latitude at 9 p.m. on May 15, August 15, November 15, and February 15.

As mentioned above, because of the revolution of the Earth around the Sun, the stars appear to change slowly each week and month. It turns out the **stars rise about an hour earlier every two weeks**. So these star maps are just as valid if you use them at 8 p.m. two weeks later on June 1, September 1, December 1, and March 1. Or at 10 p.m. two weeks earlier on May 1, August 1, November 1, and February 1, and so on.

As another example, the star chart for August 15 at 9 p.m. will also give you the correct star positions for May 15 at 3 a.m. Or at midnight on April 1, the stars you see will be the same as shown in the chart for May 15 at 9 p.m. because the stars rise 3 hours earlier on May 15 than on April 1. So for most nights of the year, you can use one of these maps early in the evening, and another map a few hours after midnight to get a fairly accurate representation of the sky. This takes a little thought and may be confusing at first, but it will all become clear to you as you gain experience observing.

The charts below try to represent a hemispherical sky on a flat surface. The edge of the chart represents the horizon, and the center of the chart is supposed to represent the zenith (the point directly overhead) at 35 degrees south. East and west are reversed compared to a map of the Earth, but they will point in the right directions when you raise the map over your head. Remember… we are looking at the celestial sphere from the inside, whereas maps of the Earth are drawn as if we look at its surface from above.

If you live south of 35 degrees south latitude, the stars over the northern horizon will appear slightly lower and the stars over the southern horizon will appear slightly higher than shown on the maps. The opposite is true if you live north of 35 degrees south latitude, and some stars over the southern horizon in these maps may not be visible because they are below the horizon.

Print each of the four circular maps and take them outside with you. To read these circular star charts, here's what to do…

• Find a location that's isolated from street and house lights. Stray light will make it harder for you to see fainter stars. Also, for the same reason, try to avoid nights with a full moon or too much haze when you go star-gazing.

• Once you go outside, give your eyes at least 5 or 10 minutes to become adapted to the dark. To best see the star charts, use a red flashlight or a white flashlight covered with red plastic. The red light will preserve the sensitivity of your eye for night viewing.

• Pick a direction to face, say, south, and rotate the chart so south is at the bottom. Now raise the chart overhead. The directions on the chart will now correspond to the directions in the sky.

• Don't try to take in the whole sky at once. Choose a quarter of the map, preferably one with several bright stars or a well-known constellation like Orion or Crux (the Southern Cross). Now, look up at the quarter of the

sky that corresponds to the quarter of the map. Make a connection with what you see in the sky with what you see on the map. Take your time… it's a little strange and overwhelming at first.

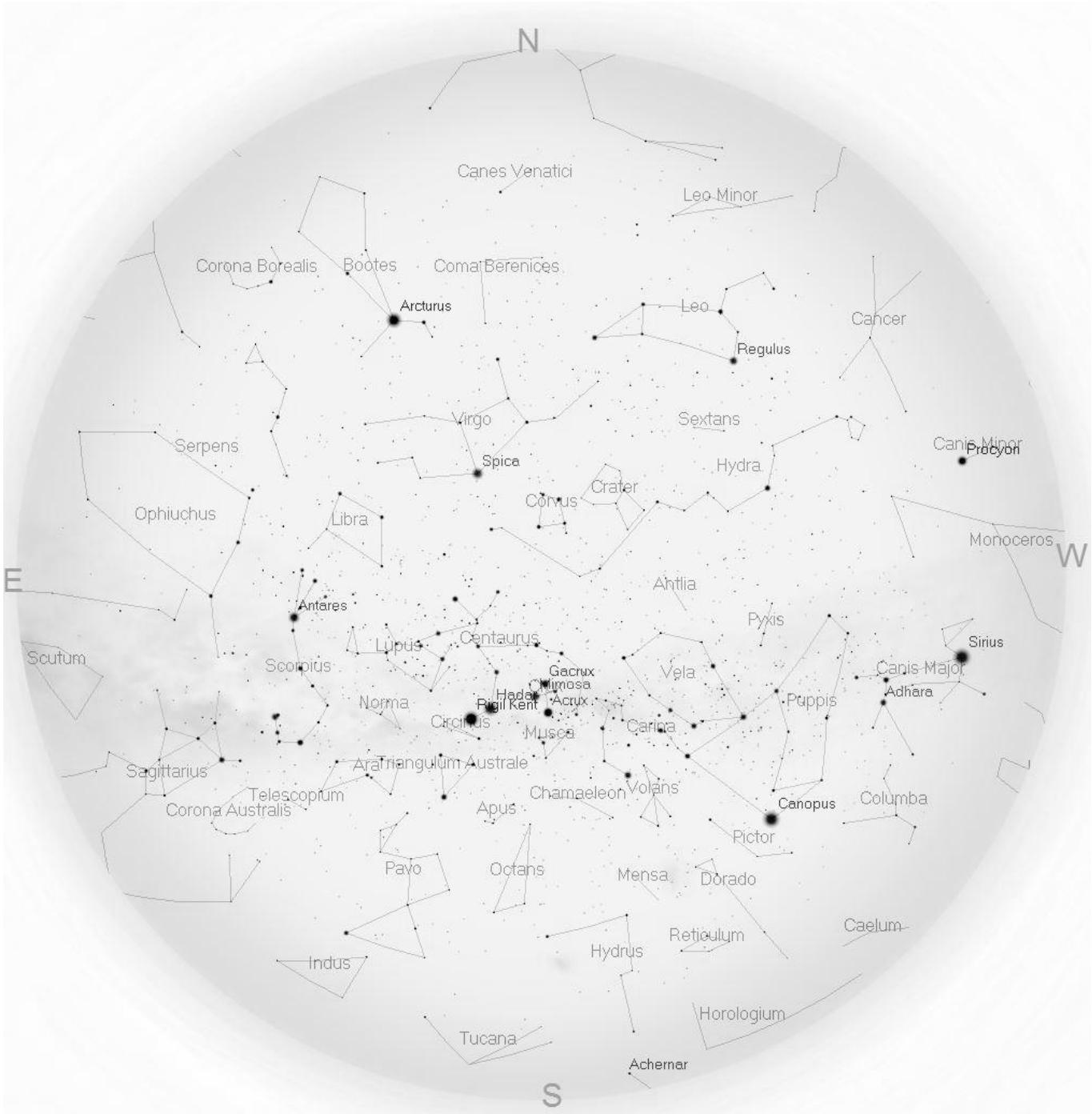
• Learn a few more stars at a time… don't rush. Once you've identified a few bright stars and constellations, move from what you know to what you don't know. Once you've learned most of a quarter of the sky, move to another quarter.

• Remember… while the charts are set for 9 p.m. local time, they are still useful for an hour or two on either side. The stars will appear in about the same position, except for the stars near the horizons. After 3 hours, the stars will have turned 1/8 of the way around the sky. And after 6 hours, they will have turned 1/4 of the way around the sky. The stars in the west will have set; new stars in the east will have risen.

• If you see an out-of-place star near the ecliptic (and in one of the constellations of the zodiac), it's almost certainly a planet. Since the planets move around in the sky from month to month, you will need to consult an almanac or website to figure out which planet you are seeing. *Sky and Telescope* is an especially good place to check. The positions of the planets are also reviewed each month at *One-Minute Astronomer*.

That's all there is to it. Well, that and a whole lot of practice. Be patient, and savor your personal discovery of each new star and constellation.

The Autumn Sky



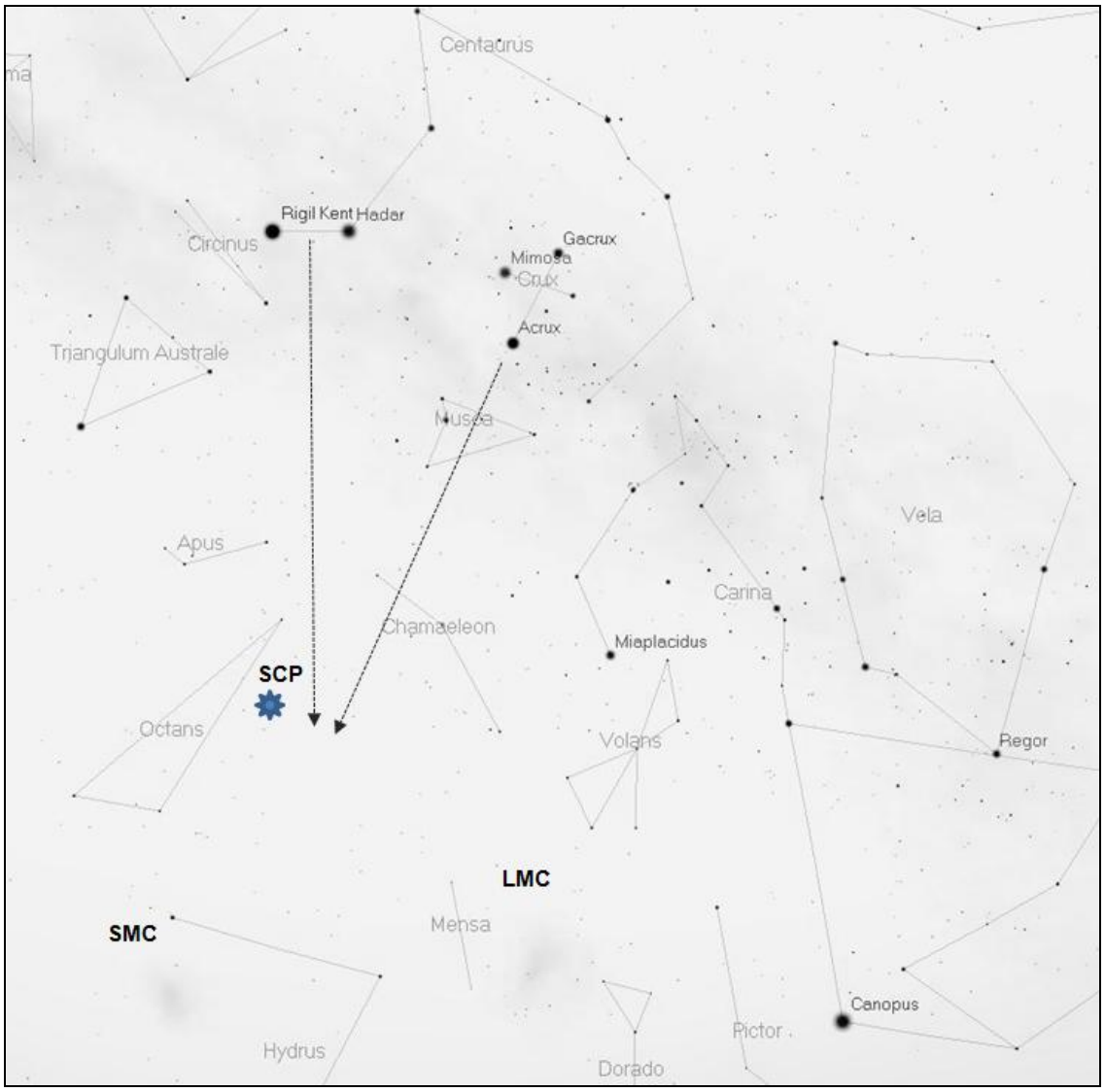
The sky at 9 p.m. on May 15 from 35^{o}S latitude

The Sky from April to June

In the early autumn sky of the southern hemisphere, a dazzling band of bright stars runs from the southeast to the west. Look directly at the western end of this band in the mid-evening hours to see the blue-white star Sirius, the brightest star in the night sky. Turn a little to the south-west to see the bright white star Canopus, the second-brightest star in the sky. Both stars are much higher during the summer months, and you will visit their home constellations of Canis Major and Carina during that season.

Overhead, just a little south of the zenith, look for a small group of bright stars. Four of these stars form the distinctive shape of the Southern Cross, a group that's part of the small constellation Crux. The image below shows the shape of this small constellation. It's a small group, just about 5 degrees from tip to tip… that's about as large as your middle three fingers held together at arm's length. The star at the "top" of the cross is called Gacrux, the star at the bottom is Acrux. The star at the eastern tip of the cross is called Mimosa.

Just to the east of Crux, look for two more bright stars. The slightly fainter blue-white star is Hadar. The brighter yellow star is called Rigel Kent, and it is also known as Alpha Centauri because it is the brightest star in the constellation Centaurus. It's also the closest bright star to Earth and the third-brightest star in the night sky after Sirius and Canopus.



Crux and the "Southern Pointers" show the direction to the SCP

Crux and the stars Hadar and Rigil Kent also point the way to the south celestial pole. These two stars are sometimes called the "Southern Pointers". Follow a line south from Crux, and another line south from the mid-

point between Hadar and Rigil Kent. These imaginary lines cross just 5 degrees northwest of the south celestial pole (SCP).

Look just west of Crux along the thick band of stars to see the large irregular outline of the constellation Vela. South of Vela lies Carina, another sprawling constellation of which Canopus is the brightest star. If you look at these constellations under dark sky, you will notice many faint misty patches. These are small clusters of new stars as well as glowing clouds of gas in which new stars are forming. Many of these patches are quite stunning in a telescope or pair of binoculars.

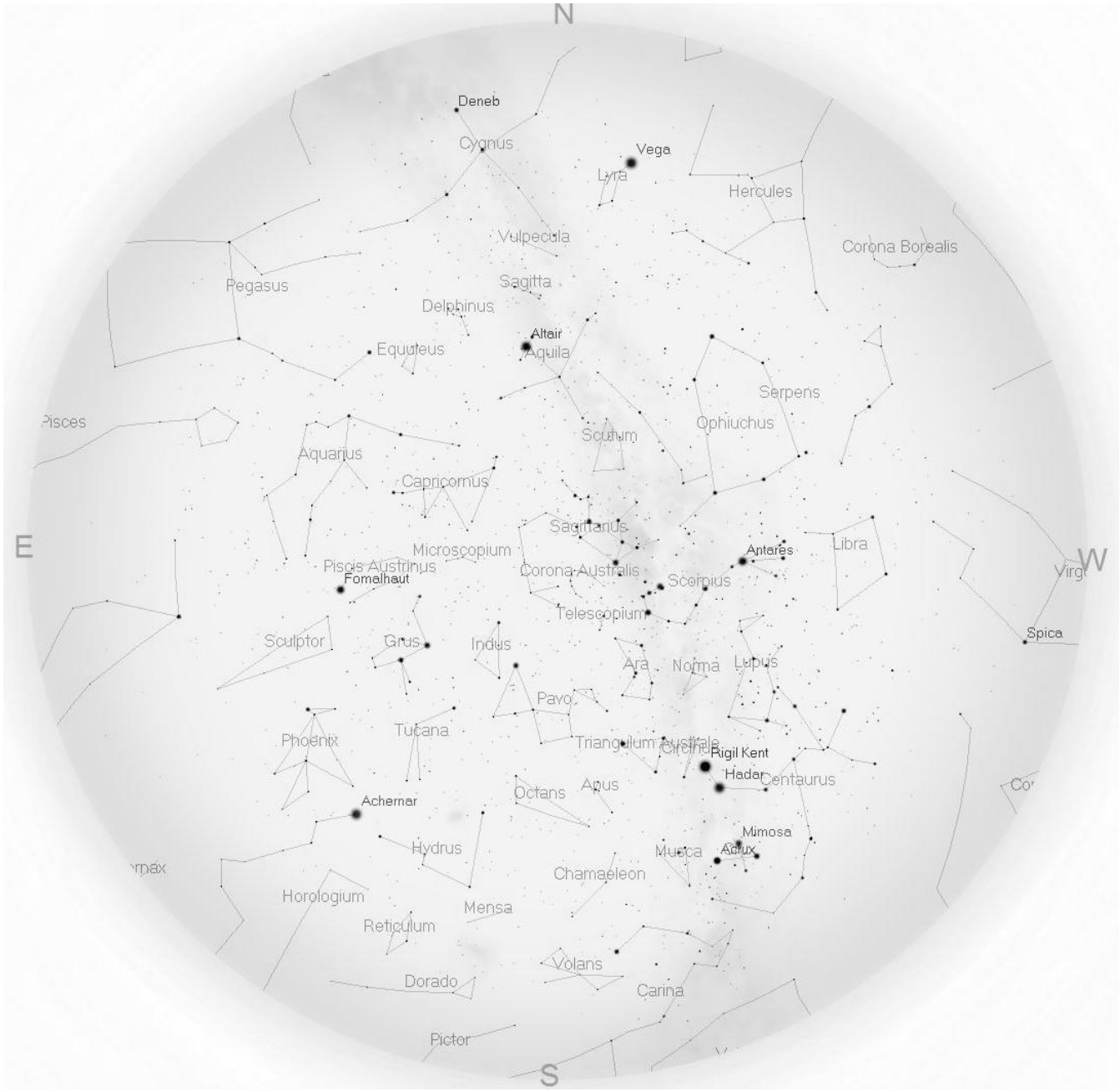
South of the starry band that includes Crux and the Pointers lie the Magellanic Clouds. These are small unresolved "dwarf" galaxies of a few million stars well outside of our own Milky Way galaxy. They are visible only from the deep southern hemisphere.

The sky towards the north contains only three bright stars: Arcturus, Spica, and Regulus in the constellations Bootes, Virgo, and Leo, respectively. In this direction, you are looking out of the starry plane of the Milky Way, which is why you see few bright foregrounds stars in this part of the sky. But a telescope will reveal hundreds of distant galaxies in this region of the sky, especially the galaxies of the Virgo galaxy cluster, which lies just southeast of the star Denebola in Leo. The star Arcturus, just over the northern horizon, is the 4th brightest star in the night sky. So at this time of year you can see the four brightest stars in the night sky.

Look now to the southeast. Here you will find the striking sight of the rising constellation Scorpius, its claws pointing northeast and its menacing stinger, rich with clouds of stars and star clusters, hanging in the southeast. The bright red-orange star at the "heart" of the Scorpion is called Antares.

Key Sights in April-June: Sirius and Canopus; Crux (the Southern Cross); Centaurus and the stars Hadar and Rigil Kent; how to find the SCP; the Magellanic Clouds; Arcturus, Regulus, and Spica; Scorpius and the star Antares

The Winter Sky



The sky at 9 p.m. on August 15 from 35°S latitude

The Sky from July to September

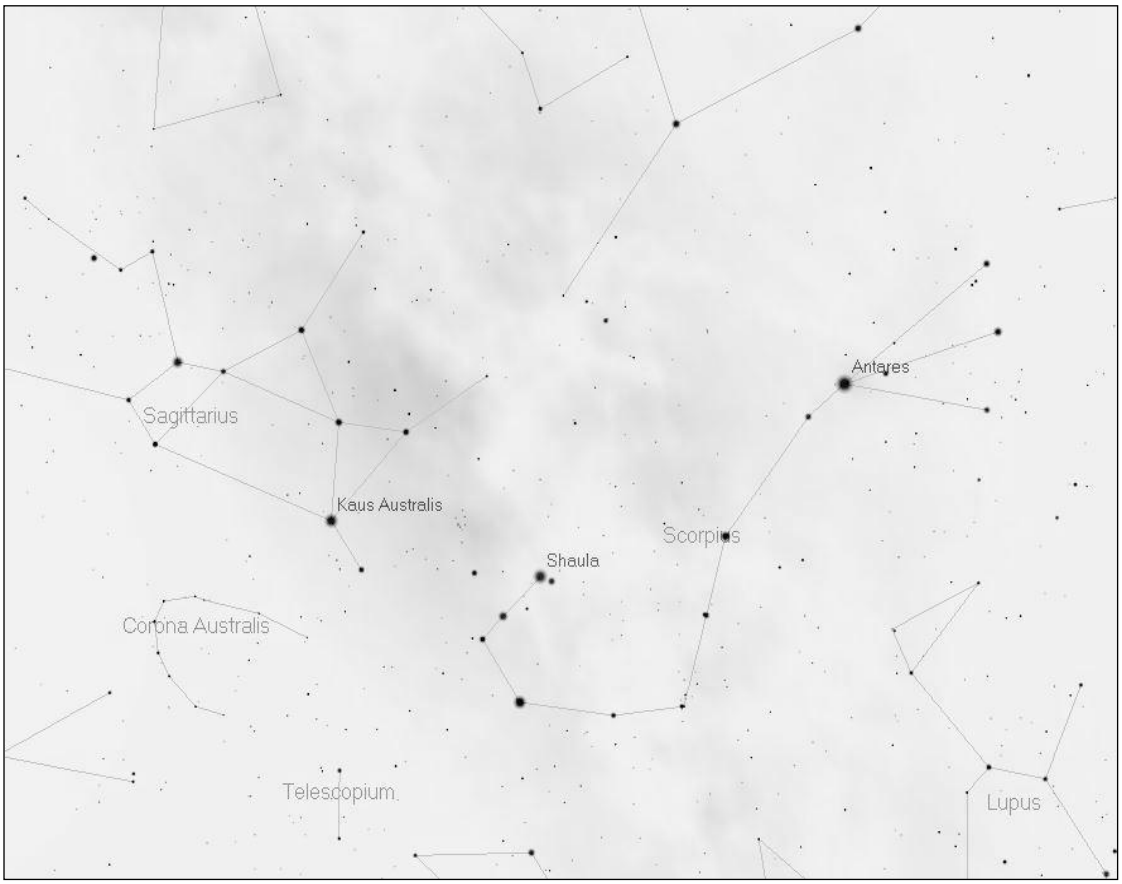
Since autumn, the sky has appeared to make a quarter turn as a consequence of Earth's revolution around the Sun. Crux and the Southern Pointers, the stars Rigil Kent and Hadar, have now migrated to the west but still remain well above the southwestern horizon. Antares in the constellation Scorpius lies just west of the zenith.

The bright star Achernar ("ACK-er-nar") now rises in the southeast. This star marks the end of the long and otherwise dim constellation Eridanus, the River. High in the east, look for the star Fomalhaut ("FOAM-a-lot"), the brightest star in Piscis Austrinus, the Southern Fishes. The misty patches of the Magellanic Clouds lie over the south-southeastern horizon.

Low in the northern sky, look for the dazzling blue-white star Vega in the small parallelogram-shaped constellation Lyra. And slightly lower still, the star Deneb shines in the constellation Cygnus, the Swan. Cygnus is a large cross-shaped constellation, so these stars are sometimes called the "Northern Cross". Further towards the zenith, well above the northern horizon, look for the white light of the star Altair in the constellation Aquila, the Eagle. The three bright stars Altair, Vega, and Deneb form what is sometimes called the "Northern Triangle".

Perhaps the finest celestial sight of the southern winter sky is the long arc of the star clouds of the Milky Way running from north to south. There are millions of unresolved stars in the clouds, along with foreground clumps of dark gas and dust that obscure the light from more distant stars. The

stars are thickest directly overhead, in the constellation Scorpius and the "teapot"-shaped constellation Sagittarius. Towards the tip of the teapot of Sagittarius lies the center of our galaxy, which is why the star clouds of the Milky Way appear so thick in this part of the sky. In the northern hemisphere, this region lies low on the southern horizon, but in the south the full grandeur of the richest part of the Milky Way is right overhead.

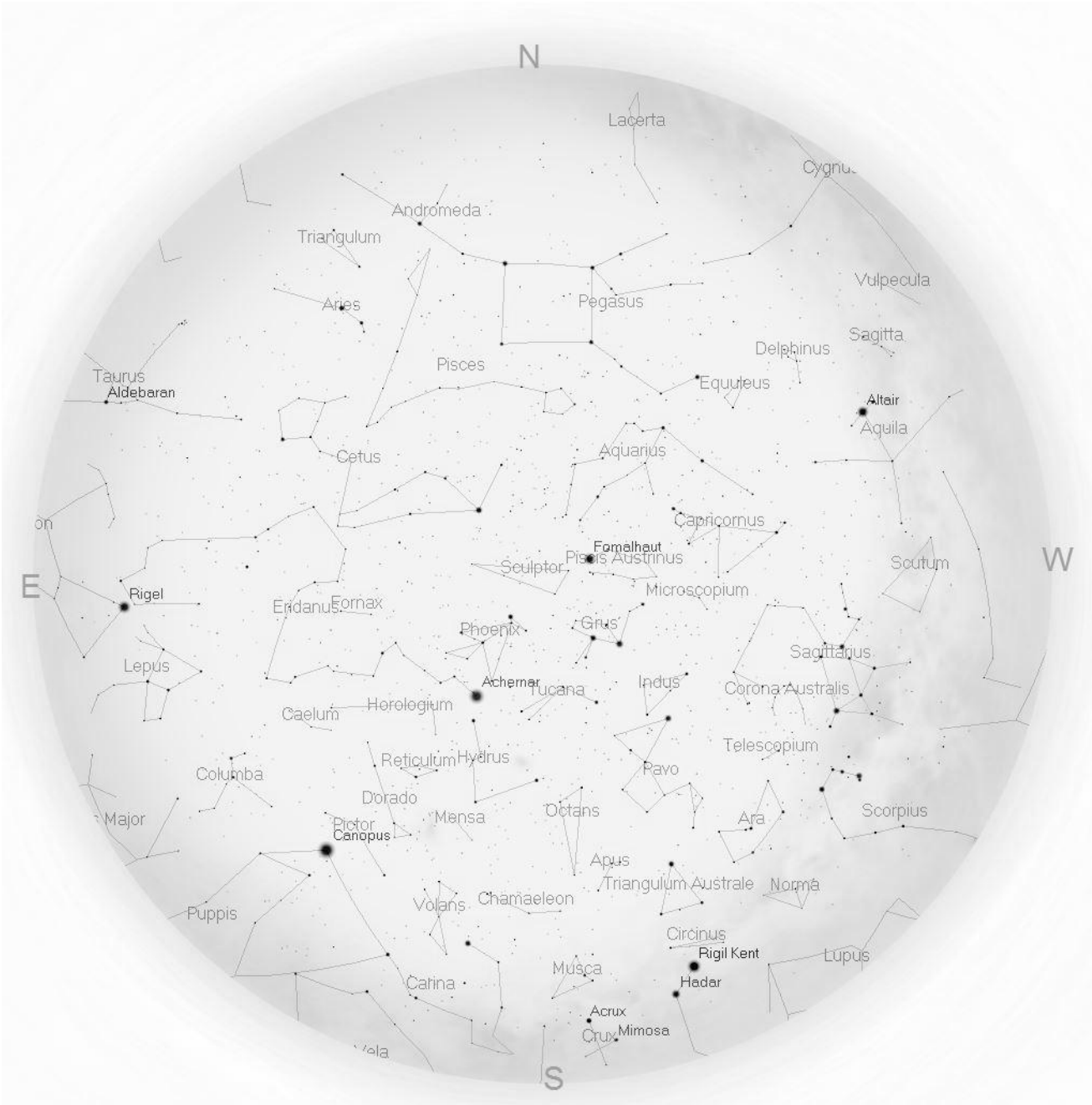


The constellations Sagittarius and Scorpius and the thick star clouds of the Milky Way are nearly directly overhead in the evening hours in in mid-August

The star clouds of the Milky Way are very difficult to see from urban areas where bright city lights wash them out, but they are very obvious in clear sky far away from city lights. If you have dark sky, look for small, misty, unresolved patches in Sagittarius and Scorpius. These are yet more groups of distant star clusters and nebulae where new stars are in the process of forming. They are dazzling sights in binoculars or a small telescope.

Key Sights in July-September: The star Achernar in Eridanus; Fomalhaut in the constellation Piscis Austrinus; Vega, Deneb, and Altair, the "Northern Triangle"; the constellations Lyra and Cygnus; the constellation Sagittarius; the Milky Way

The Spring Sky



The sky at 9 p.m. on November 15 from 35°S latitude

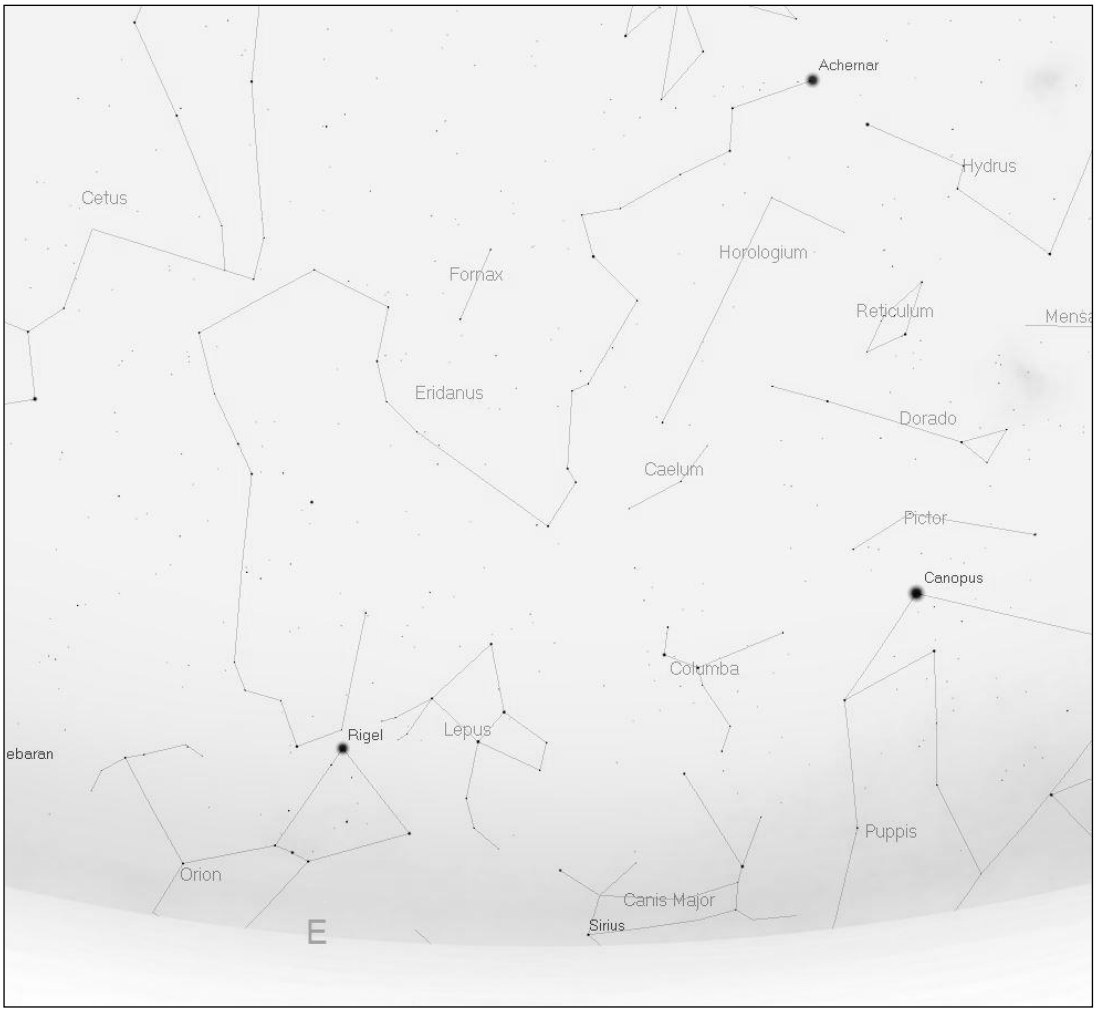
The Sky from October to December

The sky has made another quarter turn in the three months since August as the Earth moves around the Sun. The Southern Cross is just barely above the southern horizon now, and the splendid band of the Milky Way, along with the teapot-shaped constellation Sagittarius has moved towards the western horizon. Scorpius has already set by mid-evening.

Because you're looking out of the flat, starry plane of the Milky Way into deep intergalactic space at this time of year, the sky of the southern hemisphere has relatively few bright foreground stars. The eastern and northeastern sky is nearly deserted of bright stars. The bright star Fomalhaut sits almost at the zenith, with Achernar just southeast. And the bright star Canopus in the constellation Carina returns to the sky in the southeast. The Magellanic Clouds linger also well above the southeastern horizon.

In the east, look for the star Achernar at the tip of the long constellation Eridanus, the River. If you can, follow the winding trail of this long constellation from Achernar to the east, then to the north, and back towards the eastern horizon where it leads to the bright blue-white star Rigel rising low. Rigel marks one of the feet of the constellation Orion which will rise much later in the evening. More about Orion in the next short tour.

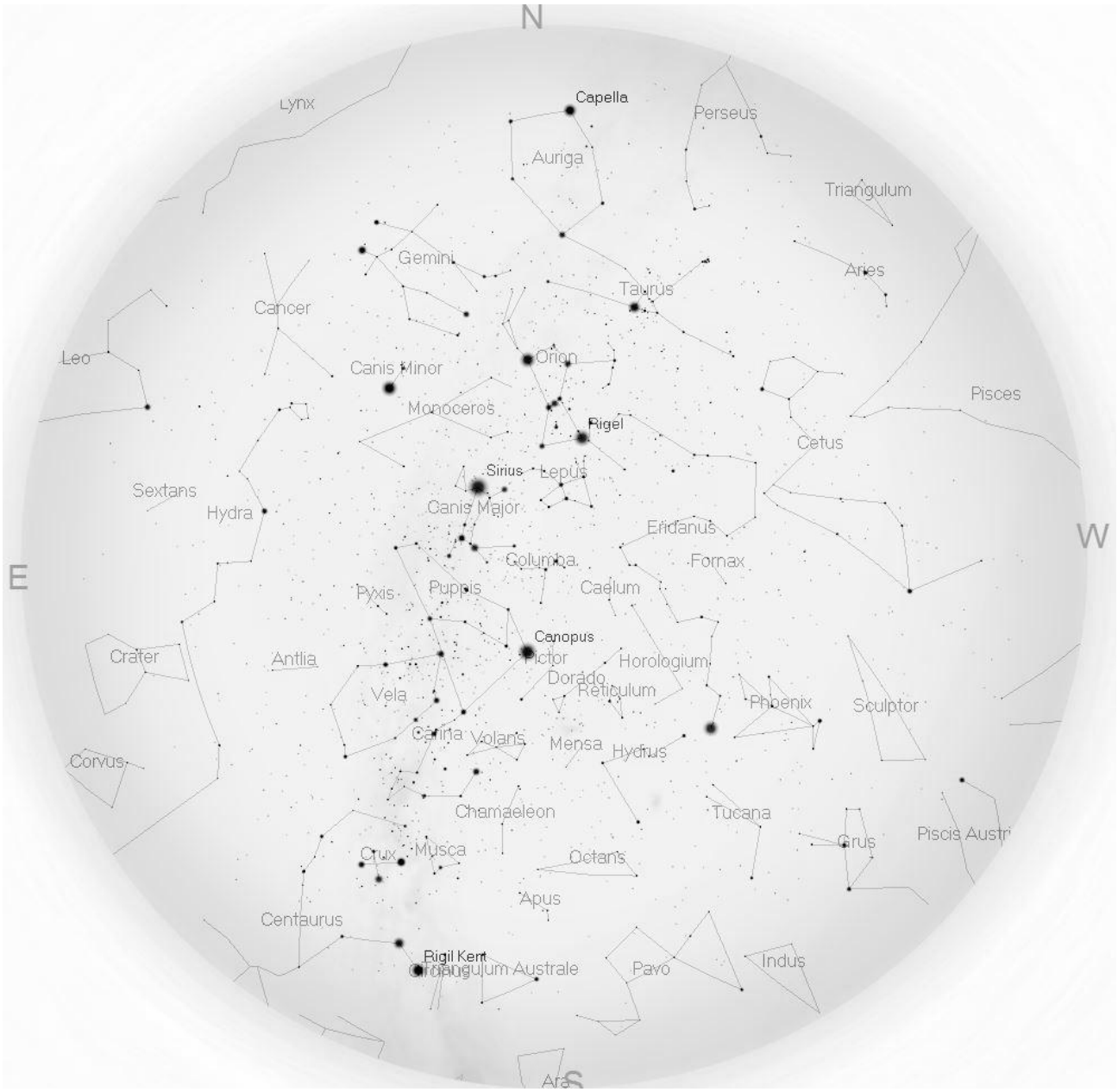
In the north, you'll see the Great Square of Pegasus and the attached constellation Andromeda. Cygnus and little Delphinus and Sagitta lie off to the northwest. Pisces and its pentagonal head lies just above Pegasus. Cetus, the sea monster, looms in the east between Pisces and Eridanus.



Start at the star Achernar and follow the star Eridanus east, north, and east again down to the horizon where it meets the bright rising star Rigel.

Key Sights in October-December: The stars Fomalhaut and Achernar; the return of Canopus; the Great Square of Pegasus; the head of the constellation Pisces; the long constellation Eridanus; the star Rigel

The Summer Sky



The sky at 9 p.m. on February 15 from 35°S latitude

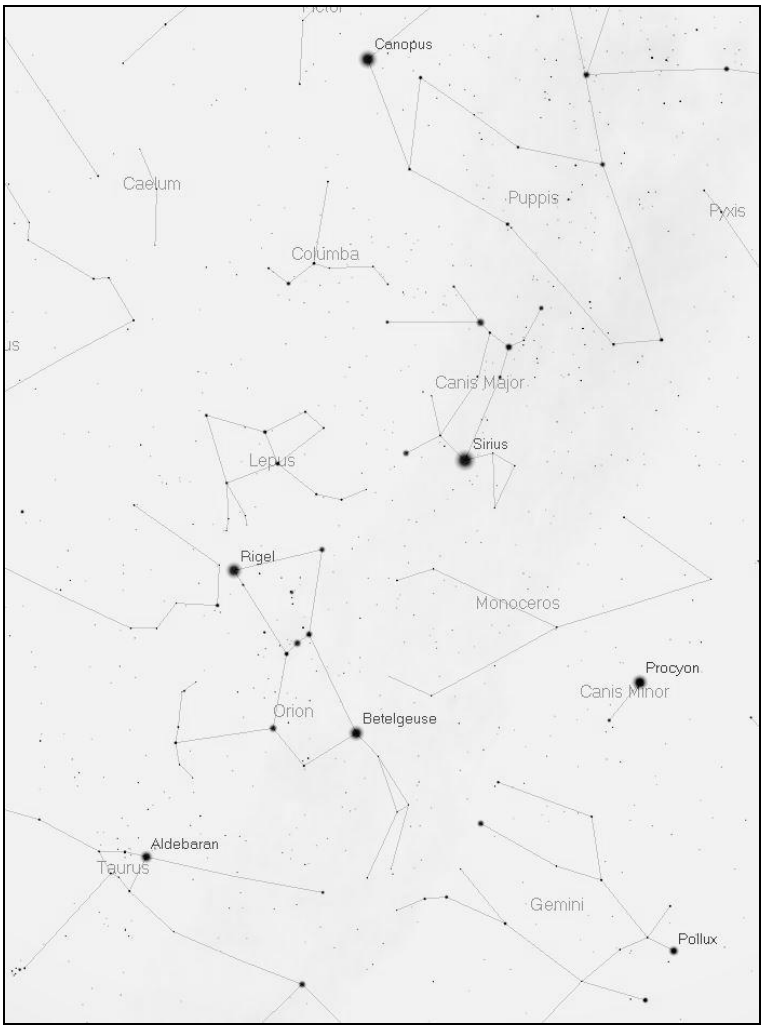
The Sky from January to March

The bright stars return to the southern skies in summer. From the northern horizon, overhead, and down to the southern horizon you can follow a bright string of stars from Rigil Kent to Capella. This string of bright stars follows a fairly thick band of fainter stars along the same north-south path as the Milky Way followed in the winter months. This summer band of stars is also part of the Milky Way, but here we look in the other direction along the flat plane of our galaxy away from the center. While the star clouds here are not as thick, there are many bright foreground stars that render the sky this season as beautiful as any visible from Earth.

At the southern end of this band, Crux and the Southern Pointers are getting higher again in the southeast sky. The two brightest stars in the night sky, Canopus and Sirius, lie almost directly overhead, as do many slightly fainter stars in the constellation Vela and Puppis. Orion, the Hunter, is doing a handstand just north of the zenith. It is marked by nearly a dozen bright stars, especially Rigel and Betelgeuse.

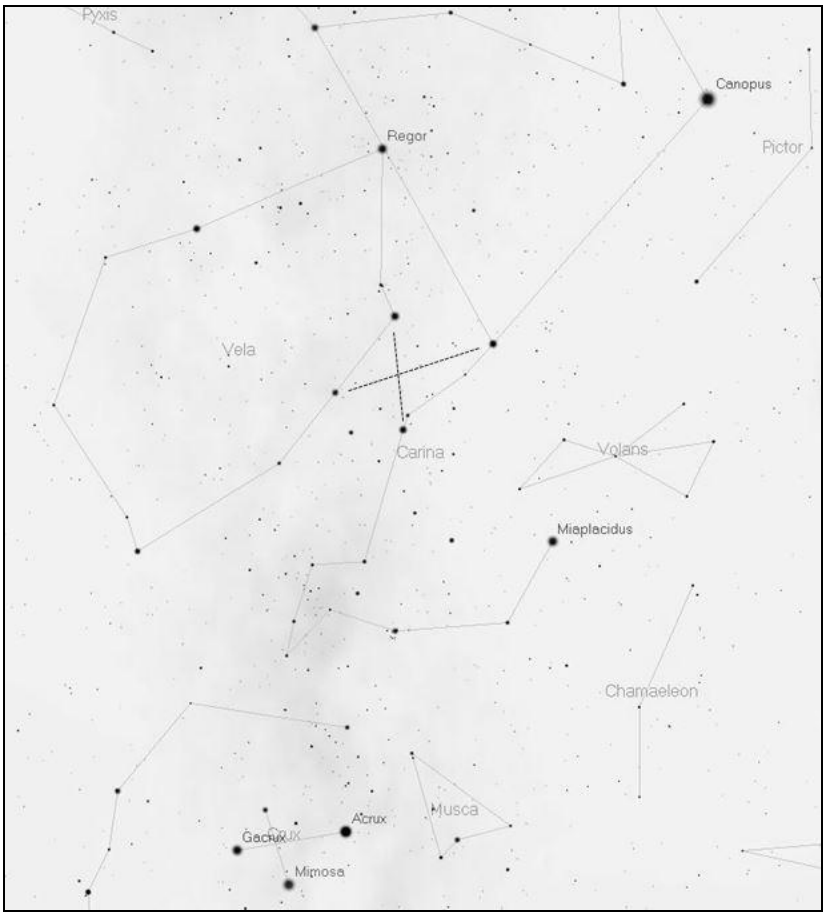
Orion, the Hunter, is the feature constellation this time of year in both hemispheres, and it makes a good base of operations to find other constellations. It takes little imagination to see a hunter outlined in these stars, though from the southern hemisphere he is upside down. Below the little line of three stars in the belt are two stars marking his shoulders, one of which is the bright orange-red star Betelgeuse. Above his belt are two feet, one of which is marked by the bright blue star Rigel. Hanging off his

belt are three fainter stars. This is the "Sword of Orion". Look carefully at the middle star in the Sword. You will see it is slightly fuzzy. In fact this middle star is not a star at all. It is a nebula, a misty patch of glowing hydrogen gas where new stars are forming.



A view looking north in mid-February. Orion's Belt points the way upward to Sirius and downward to the star Aldebaran in the constellation Taurus

Follow a line from Orion's Belt to the south and east to see find blue-white Sirius, the brightest star in the heavens. The star is part of the constellation Canis Major, the Big Dog. North and slightly east of Sirius lies the star Procyon ("pro-SY-on") in Canis Minor, the Little Dog.



The "False Cross", which is larger and somewhat tilted compared to Crux. It lies between Crux and Canopus and consists of two stars from the constellation Vela and two from the constellation Carina.

Many stargazers first exploring the southern sky are confused by the so-called "False Cross" that resembles Crux, the Southern Cross (see image above). The real Southern Cross lies further to the south and very close to the two bright stars Rigil Kent and Hadar in the constellation Centaurus. The False Cross is closer to Canopus. It's slightly larger and more oblique than Crux and consists of two stars in Carina and two stars in Vela.

Finally, follow the Belt of Orion to the north and west to arrive at a bright orange star over the northern horizon. This is the star Aldebaran in the constellation Taurus, which forms a small "V"-shape that marks the head of the bull which this constellation represents. Further north, just over the horizon, look for the bright yellow-white star Capella in the northern constellation Auriga. Follow a line northeast from Rigel in Orion's foot through Betelgeuse in his shoulder to arrive at the two bright stars Castor and Pollux in Gemini, the northernmost of the constellations of the zodiac.

Key Sights in January-March: The bright stars Capella, Castor and Pollux, Procyon, Sirius, Rigel, Aldebaran, and Betelgeuse. The constellations Orion, Gemini, Canis Major, Taurus, and Auriga.

What to Do Next

"Do not be afraid to become a stargazer. The human mind can find no higher exercise." – Garrett P. Serviss

The short tours in the guide have taken you on a whirlwind tour of the night sky through the year. You've discovered the basic layout of the sky and how it appears to move from day to day and season to season. You've toured the brightest stars and constellations visible each season in the southern hemisphere.

And perhaps you've discovered an amazing thing… that knowing something about the night sky makes it more interesting, not less.

If you are ready to learn many more stars and constellations as well as star clusters and nebulae, look for the detailed tour of the night sky with a pair of binoculars in the course called *"Stargazing for Beginners: A Binocular Tour of the Southern Night Sky"*. It's a great "next step". You can learn more about the course at this link.

Also, you can get regular e-mail updates from *One-Minute Astronomer* about astronomy and stargazing along with a series of free e-books (including this one) to help you understand more about what to look for in the night sky and about how to select equipment such as binoculars or a

small telescope. You can get a free subscription to *One-Minute Astronomer* at this webpage…