



ASTROFILES

Auburn Astronomical Society Newsletter

August 2022 *Newsletter Editor — John Wingard — jwin1048@gmail.com*

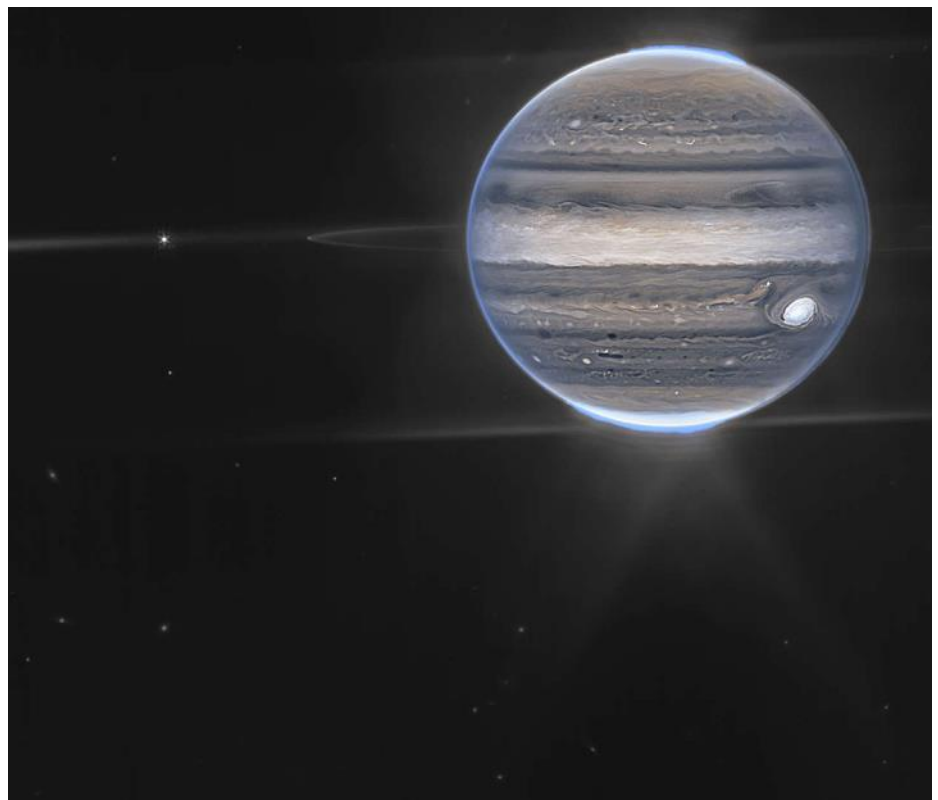
Moon Phases

August 19 — Last Quarter
August 27 — New Moon
September 3 — First Quarter
September 10 — Full Moon
September 17 — Last Quarter
September 25 — New Moon
October 2 — First Quarter
October 9 — Full Moon

News and events

As we have all slogged through the dog days of summer this year, I'm sure that many of us are looking forward to cooler weather as well as clearer and darker skies earlier in the evenings. This always makes for more enjoyable observing. It seems that we have been in a recent period of scattered, pop-up thunderstorms, often in the early evenings, that have dashed any plans to do any serious observing. However, if you do have any opportunities to get out under the stars, there are two of our major planets that are now in ideal positions for observing. Both Jupiter and Saturn are at or close to opposition and are in the Southeast sky at twilight. They will both be in the Southern sky most of the night.

Speaking of Jupiter, the James Webb Space Telescope (JWST) has recently taken some very interesting shots of Jupiter in the infrared. The photo below shows the giant planet with its polar auroras, the great red spot, a faint ring and one of its moons. In the lower portion of the image are quite a few distant galaxies, combining a view of our local space neighborhood with that of far distant deep space.



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10 THINGS YOU NEED TO KNOW ABOUT THE CONSTELLATIONS

You've probably heard a lot about the stars and constellations but may not know a lot about them. It can be a difficult and daunting prospect to learn the different facets of a new hobby, so with that in mind, we'd like to help you with our list of the top 10 fun things you need to know about constellations.

#1 - 48 CONSTELLATIONS HAVE BEEN KNOWN SINCE ANCIENT TIMES

In the 2nd century AD, the Greek astronomer Ptolemy listed 48 constellations in his *Almagest*. These constellations (now known as the classical constellations) typically depicted animals, creatures, and figures from Greek mythology, which, in turn, were sometimes based upon myths and legends from pre-existing cultures. For example, Hercules has been linked to the Sumerian hero Gilgamesh, while the constellation Taurus had been identified as a bull for thousands of years before Ptolemy's time.

#2 - 44 CONSTELLATIONS WERE CREATED IN THE PAST 500 YEARS

Thanks to the location of Greece on the Earth, most of the original classical constellations are best seen from the northern hemisphere. When 15th-century explorers started to venture into the southern hemisphere, they not only found strange lands, but also a sky full of unfamiliar stars invisible from more northerly latitudes.

As a result, these explorers created new constellations, but with no new myths and legends to base them on, they represent a wide range of birds, animals, and objects found in the modern world. This list of modern constellations, therefore, includes everything from a lizard, giraffe, and a toucan to an octant, painter's easel, and the almost obligatory telescope!

#3 - SOME CONSTELLATIONS NO LONGER EXIST

As you might expect, there have been a lot of new constellations over the years, but not all of them have survived. Astronomers, scientists, and cartographers would often create a constellation and include it in a star chart, but unless the constellation became popular and adopted by the astronomical community, they would often vanish into obscurity.

For example, there are three constellations that depict dogs, but *Felis*, the Cat, lost his nine lives some time ago. *Frederici Honores* ("Frederick's Glory") was named for Frederick the Great of Prussia, but apparently, others didn't rate the constellation so highly.

Similarly, the large constellation *Argo Navis*, which represented the ship that carried Jason and his Argonauts on their quest, was broken up into its component parts. The only surviving reference to *Quadrans Muralis*, the Mural Quadrant, is in the name of the *Quadrantid* meteors, as they appear to originate from where the now-defunct constellation once was.

#4 - DIFFERENT CULTURES HAVE DIFFERENT CONSTELLATIONS

With so many cultures and civilizations developing across the world, it only stands to reason that they would each have their own constellations. We know the constellation Orion as a hunter, but the ancient Babylonians knew him as a shepherd and the Egyptians identified him as the god Sah. Meanwhile, the Chippewa Native Americans called him The Winter Maker (due to his appearance at the start of that season) and in India, the stars of Orion represented a deer.

#5 - THERE ARE NOW 88 OFFICIALLY RECOGNIZED CONSTELLATIONS

With different constellations being known by different people, countries, and cultures around the world, it became apparent that the astronomical community needed to determine a standardized list of constellations that everyone could reference. Otherwise, it would be confusing if one astronomer referred to an object in a constellation that others weren't familiar with.

This didn't happen until 1922 when the International Astronomical Union formally ratified the 88 constellations we know today. However, it was another six years before the boundaries of those constellations were defined, providing astronomers with the criteria needed to clearly identify the home constellation of every object in the sky.

#6 - THERE ARE 12 CONSTELLATIONS IN THE ZODIAC - OFFICIALLY

Largely thanks to astrology, almost everyone is familiar with the 12 "signs" (aka, constellations) of the zodiac. The zodiac is loosely defined as being the constellations through which the Sun, Moon, and planets appear to move.

The path they follow is called the ecliptic, but this path also cuts through Ophiuchus, the Serpent Bearer. Located between Scorpius and Sagittarius, there's more of the ecliptic passing through Ophiuchus than Scorpius. While this has been the case for thousands of years, you'll still see some stories online that claim NASA has "discovered" a 13th sign

#7 - ORION HAS THE BRIGHTEST STARS

It's difficult to say which constellation (if any) is the brightest, as you'd have to assess the brightness (or, magnitude) of each star and then calculate the average. However, if you consider the 50 brightest stars in the sky, then Orion is home to five of them - more than any other constellation.

Unfortunately, not all constellations are so easily seen. There are 36 constellations with no stars brighter than magnitude 3, which means they're all but invisible from suburban skies. Of these, arguably the faintest is the modern constellation Mensa, the Table Mountain. Its brightest star is only magnitude 5.1, placing it at the edge of naked-eye visibility - but you'll need to be under dark skies to identify it!

#8 - THE LARGEST CONSTELLATION IS HYDRA

When the IAU defined the boundaries of the constellations in 1928, it also set in stone the amount of sky each constellation covered. When measured in degrees, the largest constellation is Hydra, the Female Water Snake, which covers 1,303 square degrees of sky.

The head of the snake can be found below Cancer, the Crab, a constellation best seen in late winter and early spring. Its body then stretches eastward, with its tail beneath Virgo, the Maiden, the second-largest constellation, best seen in late spring and early summer. In fact, the only time when you're not able to see anything of the snake at all is during the autumn!

#9 - THE SMALLEST CONSTELLATION IS CRUX

If there's a largest constellation, then it stands to reason that there must also be a smallest constellation. That honor belongs to Crux, the Southern Cross, and as its name implies, it can be found in the southern hemisphere.

Despite its size - just 68 square degrees, or roughly 20 times smaller than Hydra - Crux stands out due to the four stars that form the distinctive cross-shape that gives the constellation its name. All four rank among the 150 brightest stars in the sky, placing Crux itself within the Top 10 list of brightest constellations. It's also home to NGC 4755, the Jewel Box Cluster, a stunning collection of stars that any northern constellation would be proud to call its own!

#10 - THE BIG DIPPER IS NOT A CONSTELLATION

This last fun fact might come as something of a surprise... the Big Dipper is not a constellation! The seven stars that form the dipper are actually the seven brightest stars in the constellation Ursa Major, the Great Bear. The Big Dipper is actually an asterism, which is a group of stars that have a familiar shape.

Since constellations are also groups of stars that have a familiar shape, they are also asterisms. However, while all constellations are asterisms, not all asterisms are constellations! As we know, there are only 88 officially defined constellations, but the fun thing about asterisms is that anyone, anywhere can make up their own. Go outside tonight and take a look for yourself!

The above article on the constellations is by Richard Bartlett and is part of "Astronomy 101," courtesy of Highpoint Scientific.



ASTRONOMICAL LEAGUE



Binocular Buying Basics for Beginners

Introduction – An economical and inexpensive tool to help you get involved in astronomical observing is a pair of binoculars. There are hundreds of objects in the universe that are visible with a good pair of binoculars. In fact, there are some objects that need the low power and wide field of a good pair of binoculars. The ideal pair for you is dependent on your intended uses for the binoculars. These rules will help you begin your quest.

Rule #1: Buy quality optics – the best optics you can afford. A good pair of binoculars will give you a lifetime of enjoyment. Don't skimp. Then take very good care of them.

Rule #2: Porro Prisms or Roof Prisms? Binoculars with Porro Prisms have the traditional zig-zag shape. Those with Roof Prisms have straight barrels. Porro prisms give better light transmission than most roof prisms. If you buy very good Roof Prism binoculars this is not a problem. (See rule about coatings.) Roof Prism binoculars tend to be more compact.

Rule #3: Coatings? Yes! Coatings help improve the transmission of light through the binoculars. There are binoculars with uncoated optics, and you really do not want these. Some have coated optics, and this is better. You may even see multi-coated optics which is better still. What you really want is fully multi-coated optics. This assures you of the best possible light transmission.

Rule #4: What size to get. Bigger is not always better. If you only use them for astronomy, you can go larger, but if you use them for general bird watching, 10x50 is about the practical limit. Birds are not prone to staying in one place (unlike astronomical objects). The bigger they are the heavier they are too.

Rule #5: Size part 2. The first number is the magnification. The second number is the size of the objective lenses. If you divide the size of the objective by the magnification you get the exit pupil diameter. You want this to be close to the actual size of your pupil when you are using the binoculars. If it is too large, then you have to move your eyes around to see the entire field of view. If it is too small, then you get a tunnel-vision effect. In daylight pupils constrict. So, when you are birding, your pupils may be 2 mm in diameter. In the dark pupils dilate. For the young this may be as much as 7 mm. As you get older they dilate less. About 5 mm seems to be the right exit pupil size for general use for most people. This means 7x35, 10x50, or 15x75 are good ones.

Rule #6: Extras. Shock resistant, waterproof, and gas filled are all useful additions. Don't forget a comfortable strap, a carrying case, lens caps, warranties, etc.



This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

The Summer Triangle's Hidden Treasures

David Prosper

September skies bring the lovely **Summer Triangle** asterism into prime position after nightfall for observers in the Northern Hemisphere. Its position high in the sky may make it difficult for some to observe its member stars comfortably, since looking straight up while standing can be hard on one's neck! While that isn't much of a problem for those that just want to quickly spot its brightest stars and member constellations, this difficulty can prevent folks from seeing some of the lesser known and dimmer star patterns scattered around its informal borders. The solution? Lie down on the ground with a comfortable blanket or mat, or grab a lawn or gravity chair and sit luxuriously while facing up. You'll quickly spot the major constellations about the Summer Triangle's three corner stars: Lyra with bright star Vega, Cygnus with brilliant star Deneb, and Aquila with its blazing star, Altair. As you get comfortable and your eyes adjust, you'll soon find yourself able to spot a few constellations hidden in plain sight in the region around the Summer Triangle: **Vulpecula the Fox**, **Sagitta the Arrow**, and **Delphinus the Dolphin**! You could call these the Summer Triangle's "hidden treasures" – and they are hidden in plain sight for those that know where to look!

Vulpecula the Fox is located near the middle of the Summer Triangle, and is relatively small, like its namesake. Despite its size, it features the largest planetary nebula in our skies: M27, aka the Dumbbell Nebula! It's visible in binoculars as a fuzzy "star" and when seen through telescopes, its distinctive shape can be observed more readily - especially with larger telescopes. Planetary nebulae, named such because their round fuzzy appearances were initially thought to resemble the disc of a planet by early telescopic observers, form when stars similar to our Sun begin to die. The star will expand into a massive red giant, and its gasses drift off into space, forming a nebula. Eventually the star collapses into a white dwarf – as seen with M27 - and eventually the colorful shell of gasses will dissipate throughout the galaxy, leaving behind a solitary, tiny, dense, white dwarf star. You are getting a peek into our Sun's far-distant future when you observe this object!

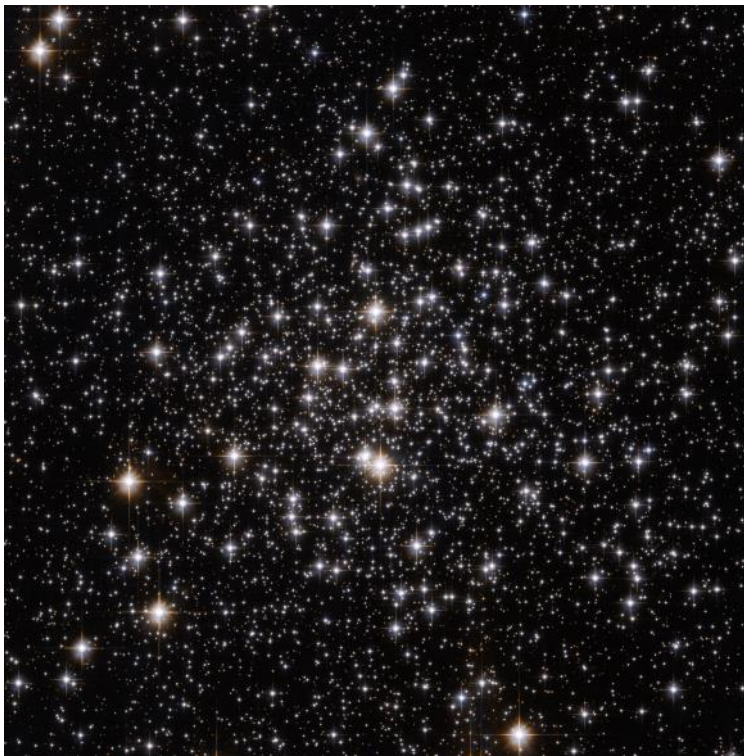
Sagitta the Arrow is even smaller than Vulpecula – it's the third smallest constellation in the sky! Located between the stars of Vulpecula and Aquila the Eagle, Sagitta's stars resemble its namesake arrow. It too contains an interesting deep-sky object: M71, an unusually small and young globular cluster whose lack of a strong central core has long confused and intrigued astronomers. It's visible in binoculars, and a larger telescope will enable you to separate its stars a bit more easily than most globulars; you'll certainly see why it was thought to be an open cluster!

Delicate **Delphinus the Dolphin** appears to dive in and out of the Milky Way near Aquilla and Sagitta! Many stargazers identify Delphinus as a herald of the fainter water constellations, rising in the east after sunset as fall approaches. The starry dolphin appears to leap out of the great celestial ocean, announcing the arrival of more wonderful sights later in the evening.

Want to hunt for more treasures? You'll need a treasure map, and the Night Sky Network's "Trip Around the Triangle" handout is the perfect guide for your quest! Download one before your observing session at bit.ly/TriangleTrip. And of course, while you wait for the Sun to set - or skies to clear - you can always find out more about the objects and science hidden inside these treasures by checking out NASA's latest at nasa.gov.



Search around the Summer Triangle to spot some of its hidden treasures! To improve readability, the lines for the constellations of Aquilla, Lyra, and Cygnus have been removed, but you can find a map which includes them in our previous article, Spot the Stars of the Summer Triangle, from August 2019. These aren't the only wonderful celestial sights found around its borders; since the Milky Way passes through this region, it's littered with many incredible deep-sky objects for those using binoculars or a telescope to scan the heavens. Image created with assistance from Stellarium: stellarium.org

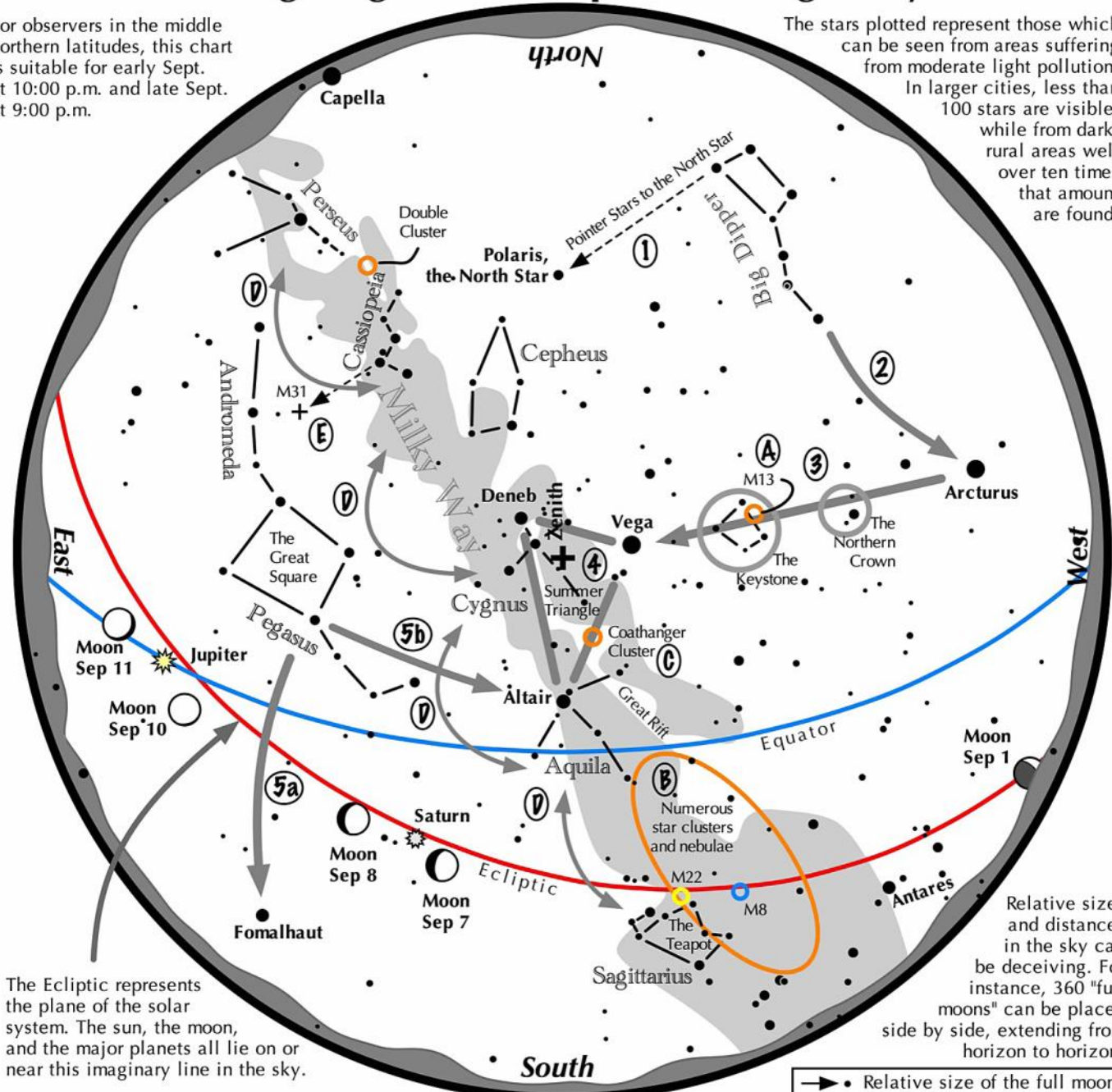


M71 as seen by Hubble. Your own views very likely won't be as sharp or close as this. However, this photo does show the cluster's lack of a bright, concentrated core, which led astronomers until fairly recently to classify this unusual cluster as an "open cluster" rather than as a "globular cluster." Studies in the 1970s proved it to be a globular cluster after all – though an unusually young and small one! Credit ESA/Hubble and NASA. Source: <https://www.nasa.gov/feature/goddard/2017/messier-71>

Navigating the mid September Night Sky

For observers in the middle northern latitudes, this chart is suitable for early Sept. at 10:00 p.m. and late Sept. at 9:00 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→ • Relative size of the full moon.

Navigating the mid September night sky: Simply start with what you know or with what you can easily find.

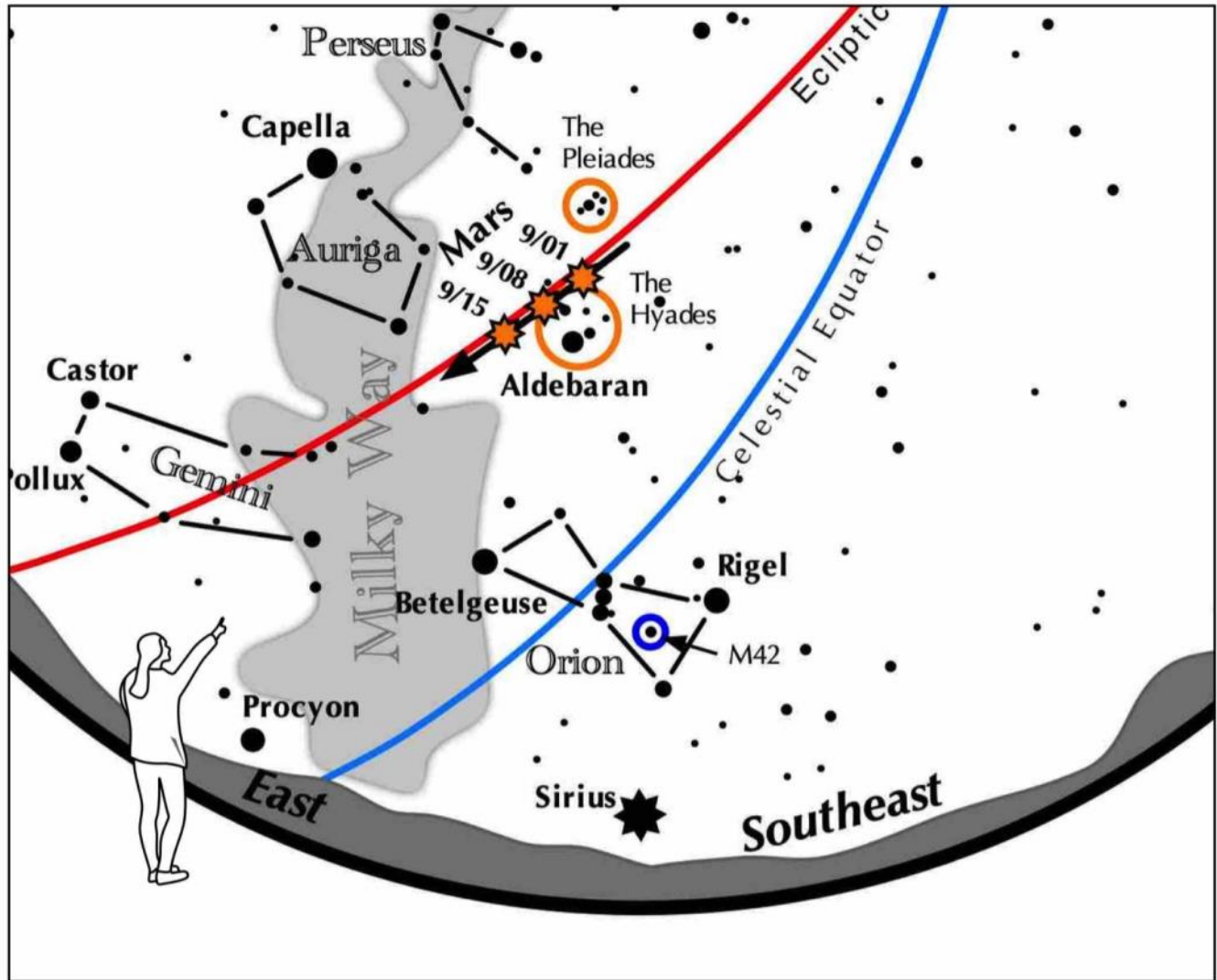
- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the September evening sky.
- 3 Nearly overhead shines a star of similar brightness as Arcturus, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
- 4 The stars of the summer triangle, Vega, Altair, and Deneb, shine overhead.
- 5 The westernmost two stars of the Great Square, which lies high in the east, point south to Fomalhaut. The southernmost two stars point west to Altair.

Binocular Highlights

- A: On the western side of the Keystone glows the Great Hercules Cluster.
- B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
- C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
- D: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.
- E: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.



If you can see only one celestial event in the morning this September, see this one.



Mars Slides Between the Pleiades and the Hyades

On the first few mornings of September, look high in the east–southeast 90 minutes before sunrise.

- Bright, red Mars brightly shines to the upper right of Orion.
- From September 1 through September 8, the Red Planet slides between the Pleiades and Hyades star clusters.
- Compare Mars' hue and brightness with those of nearby Aldebaran.





Auburn Astronomical Society Membership Application Form

Name:

Address:

City: _____ State: _____ Zip: _____

Phone: _____ Date of Application* ____/____/____

E-mail:

Telescope(s):

Area(s) of special interest:

Enclose: \$20.00 for regular membership, payable in January. *Full-Time* student membership is half the Regular rate.

* For ***NEW*** members joining after January, refer to the prorated Dues Table below:

Jan \$20.00	Feb \$18.33	Mar \$16.66	Apr \$14.99	May \$13.33	Jun \$11.66
Jul \$10.00	Aug \$8.33	Sep \$6.66	Oct \$4.99	Nov \$2.33	Dec \$1.66

Make checks payable to: Auburn Astronomical Society and return this application to:

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c/o John Wingard
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For questions about your dues or membership status, contact: jwin1048@gmail.com

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