NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

JANUARY 2024

WELCOME OUR NEW MEMBERS

Peter Byrd of Sierra Vista joined the club in December. Welcome, we are glad you joined!

2024 DUES

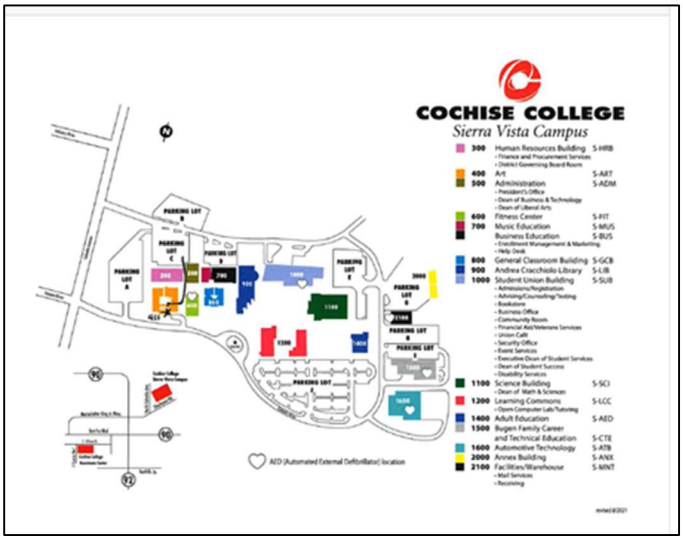
Most HAC memberships expire each December. If you have already paid your 2024 dues, thank you. If you still need to pay, there are several options.

1. You can pay your dues in person by cash or check made out to Huachuca Astronomy Club. See the treasurer, Ted Forte, at a meeting or event.
2. You can mail your dues check to the Huachuca Astronomy Club PO Box 922, Sierra Vista AZ 85636
3. You can pay online by visiting www.hacastronomy .org and pulling down the membership menu. You'll be directed to Pay Pal where you can use your Pay Pal account OR your credit card.
4. If you have a Pay Pal account, you can use PayPal Direct to send your payment to paypal@hacastronomy.org
5. If you have a Zelle account with your bank, you can make a dues payment by transferring funds to twforte@powerc.net

If you are unsure of your dues status, contact the treasurer, Ted Forte by email tedforte511 at gmail dot com.

JANUARY MEETING LOCATION CHANGE

Our usual meeting room is being refurbished as a computer lab. Our January 26 meeting will be held in room Art 411 on the main Cochise College campus 901 N Colombo Avenue.



We should be back in our regular room, A102, Downtown Campus, 2600 E Wilcox Drive for our February 23 meeting.

Our meetings have shifted to later in the month because our formula is to schedule meetings for the Friday closest to full moon.

SOLAR SATURDAY

Starting with January 13, 2024 we will be conducting a solar observing event at the Sierra Vista Library. from 10 am to noon every second Saturday of the month.

PATTERSON OBSERVATORY ACCESS

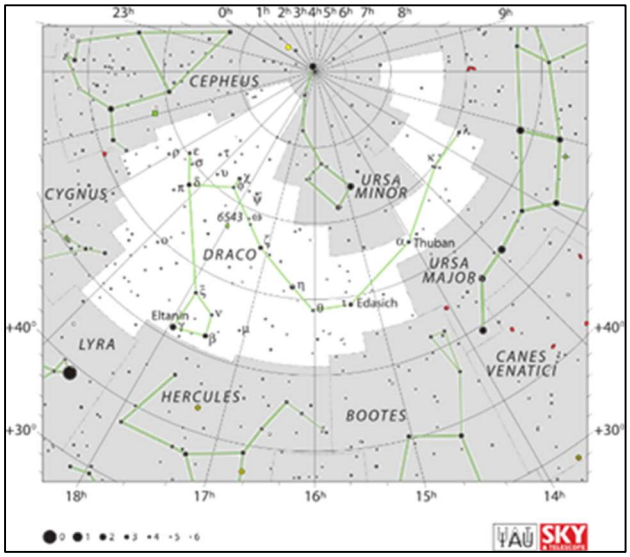
There is still no access to the back of the observatory. The only path is reserved for construction and emergency access. This will be the case for the foreseeable future apparently. The foundation will eventually build an access road, but that could be more than a year in the future.

We greatly appreciate the patience and cooperation of our volunteers participating at Patterson events. Please know that alleviating the inconvenience is very high on the list for the foundation leadership, but a number of business considerations are complicating the matter.

President's Constellation Exploration (Jan 2024)

Welcome to 2024. Since this is the year of the Dragon, I thought we would start the year looking at the Constellation Draco.

Draco is a constellation in the far northern sky. Its name is Latin for dragon. It was one of the 48 constellations listed by the 2nd century Greek astronomer Ptolemy, and remains one of the 88 modern constellations today. The north pole of the ecliptic is in Draco. Draco is a circumpolar constellation in the northern latitudes, meaning that it never sets and can be seen at any time of year by the naked eye.



Draco 'coils' around the north celestial pole, as depicted in Urania's Mirror, a set of constellation cards published in London c. 1825.

Thuban (α Draconis) was the northern pole star from 3942 BC, when it moved farther north than Theta Boötis, until 1793 BC. The Egyptian Pyramids were designed to have one side facing north, with an entrance passage geometrically aligned so that Thuban would be visible at night. Due to the effects of precession, it will again be the pole star around the year AD 21000. It is a blue-white giant star of magnitude 3.7, 309 light-years from Earth. The traditional name of Alpha Draconis, Thuban, means "head of the serpent". Nearby Beta Draconis, traditionally called Rastaban, is a yellow giant star of magnitude 2.8, 362 light-years from Earth. Its name shares a meaning with Thuban, "head of the serpent".

One of the deep-sky objects in Draco is the Cat's Eye Nebula (NGC 6543), a planetary nebula approximately 3,000 light-years away that was discovered by English astronomer William Herschel in 1786. It is 9th magnitude and was named for its appearance in the Hubble Space Telescope, though it appears as a fuzzy blue-green disk in an amateur telescope. NGC 6543 has a very complex shape due to gravitational interactions between the components of the multiple star at its center, the progenitor of the nebula approximately 1,000 years ago.

There are several faint galaxies in Draco and several interacting galaxies and galaxy clusters. One such massive cluster is Abell 2218, located at a distance of 3 billion light-years (redshift 0.171). It acts as a gravitational lens for even more distant background galaxies, allowing astronomers to study those galaxies as well as Abell 2218 itself; more specifically, the lensing effect allows astronomers to confirm the cluster's mass as determined by x-ray emissions. One of the most well-known interacting galaxies is Arp 188, also called the "Tadpole Galaxy". Named for its appearance, which features a "tail" of stars 280,000 light-years long, the Tadpole Galaxy is at a distance of 420 million light-years (redshift 0.0314). The tail of stars drawn off the Tadpole Galaxy appears blue because the gravitational interaction disturbed clouds of gas and sparked star formation.

For those with a bigger scope look for the 'Draco Trio or Triplet', a close grouping of three very different looking galaxies. These galaxies are probably not related. They reside at different distances so the triplet is purely a line-of-sight effect. NGC 5985 is a face on spiral galaxy about 120 million light years away, NGC 5982 is an elliptical galaxy about 130 million years and the small edge on galaxy NGC 5981 is about 100 million light years away. NGC 5981 is quite a small dwarf galaxy. NGC 5982 and 5985 were found by William Herschel in 1788 but NGC 5981 had to wait until 1850 when it was found by J Stoney at Birr castle, probably with the 72"

The Hercules–Corona Borealis Great Wall, possibly the largest known structure in the universe, covers a part of the southern region of Draco. There are two meteor showers that

radiate from Draco. The February Eta Draconids is a meteor shower that was discovered on February 4, 2011. The October Draconids, also called Giacobinids, is a meteor shower associated with the periodic comet 21P/Giacobini-Zinner. This shower peaks on 8 October.

Draco was identified with several different dragons in Greek mythology. Gaius Julius Hyginus in *De Astronomica* reports that it was one of the Gigantes, who battled the Olympian gods for ten years in the Gigantomachy, before the goddess Athena killed it and tossed him into the sky upon his defeat. As Athena threw the dragon, it became twisted on itself and froze at the cold north celestial pole before it could right itself.

Aelius Aristides names him Aster or Asterius ('star' or 'starry') and says that Athens' Great Panathenaea festival celebrated Athena's victory over him. The festival coincided with the culmination of the constellation's head as seen from the Athenian Acropolis.

Traditional Arabic astronomy does not depict a dragon in modern-day Draco, which is called the Mother Camels. Instead, two hyenas, represented by Eta Draconis and Zeta Draconis are seen attacking a baby camel (a dim star near Beta Draconis), which is protected by four female camels, represented by Beta Draconis, Gamma Draconis, Nu Draconis, and Xi Draconis. The nomads who own the camels are camped nearby, represented by a cooking tripod composed of Upsilon, Tau, and Sigma Draconis. However Arabic astronomers also knew of the Greek interpretation of the constellation, referring to it in Arabic as *At-Tinnin* (‘the dragon’) which is the source of the formal name of Gamma Draconis, Eltanin ('the head of the dragon')

In more recent times: *Draco* was a United States Navy Crater class cargo ship named after the constellation. The main character in the 1996 film *Dragonheart* gets his name from this constellation. The film also reveals that Draco is actually a dragon heaven, where dragons go when their time in this world is complete, if they have upheld the oath of an ancient dragon to guard mankind, with dragons otherwise fading into nothing upon their deaths. At the conclusion of the film, Draco, the last dragon, ascends into the constellation after he sacrifices himself to destroy an evil king.

The Dragon Variation of the Sicilian Defense chess opening was also named after the constellation by Russian chess master Fyodor Dus-Chotimirsky. And of course, Draco Malfoy, an antagonist in the Harry Potter series, is named after the constellation as well.

Whether you have a clear target or are just exploring the night sky, Draco with its winding path of stars is fun to find and explore. I hope your 2024 will be a year of explorations and enjoyment as you move your way across the night sky.

The Bucket List – January 2024

by Vince Sempronio

This column highlights interesting non-seasonal nighttime, and sometimes daytime sky events that the reader may not be aware of and may wish to observe. I’ll cover one-off events that are special, rare, or uncommon.

TERM OF THE MONTH

The First Point of Aries isn’t in Aries?

The term “The First Point of Aries” isn’t a reference to a famous speech given by a person named Aries, but rather it is a point in the sky. Also called the “Cusp of Aries”, it is the location in the sky of the “March Equinox”, formally called the “Vernal Equinox”, where the Sun’s path crosses the celestial equator on its path northward. On star charts, it is sometimes denoted by the character ♈. Are you confused yet? Named for the constellation Aries, it is one of two points in the sky where the path of the Sun crosses the celestial equator. The other point is called “The First Point of Libra”, or the “September Equinox”, previously called the “Autumnal Equinox”. I discussed in more detail the reason for the term changes in the March 2023 issue of Nightfall.

If you look at a sky map, or use your favorite planetarium software, you will see that the ecliptic (the Sun’s path in the sky) crosses the celestial equator in the spring in the constellation Pisces. So why don’t we call it the “First Point of Pisces”? The Sun was in the constellation Aries 2000 years ago, but because of the precession of the equinoxes the Sun is now in Pisces in March. Likewise, in September, the Sun is no longer in Libra, but is in Virgo. The “first point” terms are considered archaic now, considering they no longer are accurate, and who wants to repeat this lecture in 500 years when we’ll need to refer to them as the first points of Leo and Aquarius!

IN THE SKY

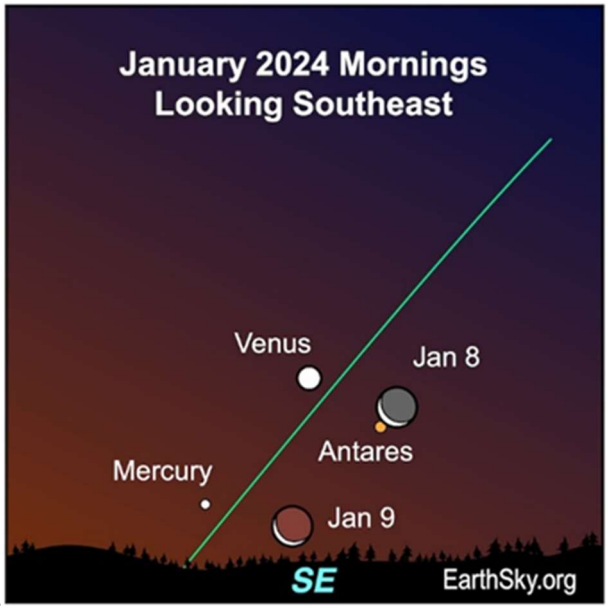
NOTE: All times are AZ MST unless otherwise noted.

What is happening in this, the first month of 2024?

Mercury is at its brightest in the dawn sky the first week of January.

This is the last month to see Saturn before it disappears into the evening twilight. It will once again be visible in the morning sky by mid-April.

Jupiter transits the meridian around 7:30pm at the beginning of the month making it an easy evening target



On the evening of January 6th at 9:40pm, Jupiter's moons Ganymede and Europa will both cast shadows on the face of Jupiter as shown in the simulation. North is up and West is to the right. The small shadow near the Great Red Spot (GRS) is cast by Europa, and the larger, elongated shadow is from Ganymede. I am not sure if the simulation is accurate regarding the GRS but give the event a try. This is a good opportunity to try and image Jupiter, but keep in mind that you must worry about motion if you don't image Jupiter quickly.

Credit: Stellarium

At 6:40am on January 8th, the Moon will occult Antares in the southeast sky. Antares will disappear on the bright limb towards the southern cusp. The reappearance will occur at after sunrise at 7:45am on the dark edge as shown in the diagram. With a suitable size scope and good tracking, the reappearance should also be visible. Antares is a double star and lunar occultations are used to measure the separation and position angle of the components very accurately.

Credit: Occult occultation prediction software

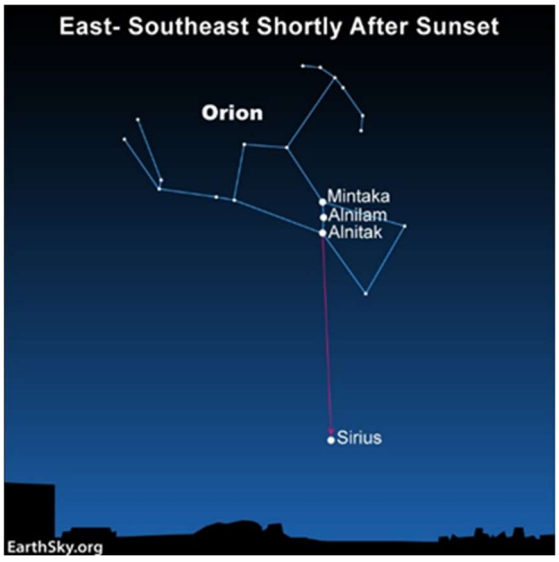
At 7:00pm on the evening of January 13, the two Jovian moons Ganymede and Europa will transit the face of Jupiter. This time it is the moon's themselves, not their shadows. Jupiter will be high in the sky but good optics and seeing will be necessary to identify the moons. North is up and West is to the right.

Credit: Stellarium

MONTHLY SPOTLIGHT

But "Siriusly"…

Which star is the brightest star in the sky? This question is always one of those "gotcha" questions that is fun to trick youngsters and adults alike, but most people who know anything about astronomy know the brightest star in the night sky is Sirius (Alpha Canes Majoris). Let's explore some additional information about this interesting star.



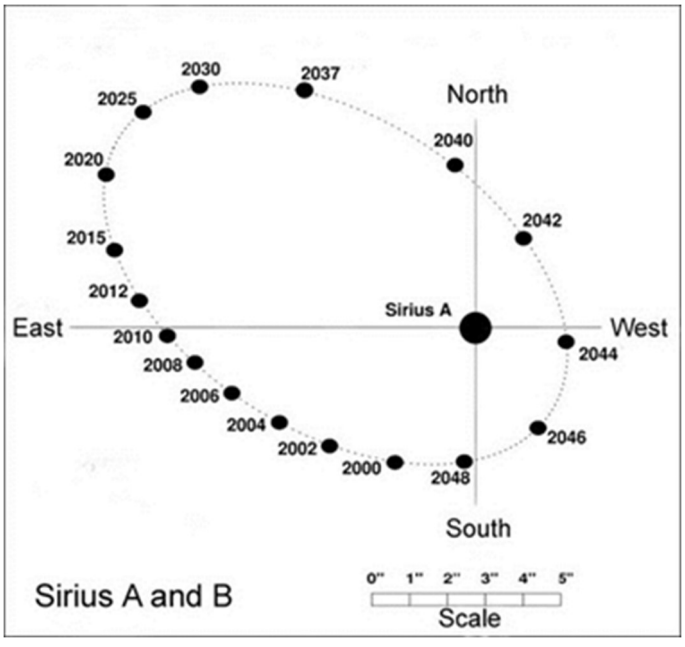
Sirius makes its appearance late in the year just after sunset in the southeast, culminating around midnight. Sirius is on the

meridian at midnight on January 8th, and on Valentine's Day, it is due south at 9:30pm, so impress your significant other and point out Sirius to show them how bright you are!

To find Sirius, first locate the three stars that make up the belt of Orion and using them as a pointer, follow them from right to left. The first bright star near the extended line is Sirius. NOTE: Sirius is slightly to the right of the line as shown in the figure.

From our 30° north latitudes, Sirius continues to dominate the night sky till mid-May when it becomes lost in twilight in the southwest. Sirius gets its name from the Latin word Seirios, meaning scorching, and its most common colloquial name is the "Dog Star". Sirius shines at apparent magnitude -1.4, almost a magnitude brighter than the second brightest star, Canopus. Canopus is located south of Sirius in the sky and can best be seen close to the southern horizon when Sirius is on the meridian. Sirius will continue to brighten over the next 60,000 years when it will shine at magnitude -1.7. Six thousand years after that, Sirius will also become the southern pole star, getting as close as 1.5° away.

Sirius is a binary star, and its companion is called the Pup. Sometimes mistakenly stated to be the closest star (excluding the Sun), to us, we now know that there are nine individual stars closer to us than Sirius. If you count the Pup as a separate star, then sometimes the count is ten since as the Pup orbits Sirius every 50 years, the Pup is sometimes slightly closer to us. The Pup is approaching (in 2025) its apastron, the furthest point in its orbit from Sirius and it is the best time to attempt to observe it. Here is a link to one author's attempt.



https://www.astronomy.com/science/see-the-pup/

Sirius and the Pup are 8.6 light years from us. The Pup is the closest white dwarf to us, which also adds to the distance confusion. The Pup was discovered on 31 January 1862 by the famous American telescope maker Alvan Clarke, who used the 470mm (18.5") refractor at the Dearborn Observatory, which, at the time was the largest telescope in the United States.

Sirius is a main sequence dwarf star which means, like our Sun it is still fusing Hydrogen as its main source of energy. Sirius is twice the mass of our Sun, 3 times the diameter, and is 25 times more luminous. Both Sirius and the Pup are A-type stars, with surface temperatures of 9,900K and 25,000K respectively. White dwarf stars are hot! As for comparison, our Sun's surface temperature is 5,800K. Sirius and the Pup formed 200-300 million years ago, and the Pup was then a lot more massive than Sirius. It burned through its Hydrogen a lot faster and evolved into a red giant before collapsing 120 million years ago to the white dwarf we see today.

Sirius will continue to amaze and will also keep its title of the night skies brightest star for the next 210 million years at which time Vega will become the sky's brightest star.

Newsletter Book Review

By Karen Peitsmeyer

The book by Astronaut Scott Kelly titled "Endurance" A Year in Space, A Lifetime of Discovery was informative and revealed his personal journey from his rough New Jersey childhood to inspirational triumphs did keep me turning the pages in this fast read.. Humor, learning about Dill in foods in Russia, the Soyuz Russian traditions he had to participate in, his thought of the future of space flight and how he navigates the effects on the human body will keep your interest to enjoy reading his book.

NASA Night Sky Notes January 2024

This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.org to find local clubs, events, and more!

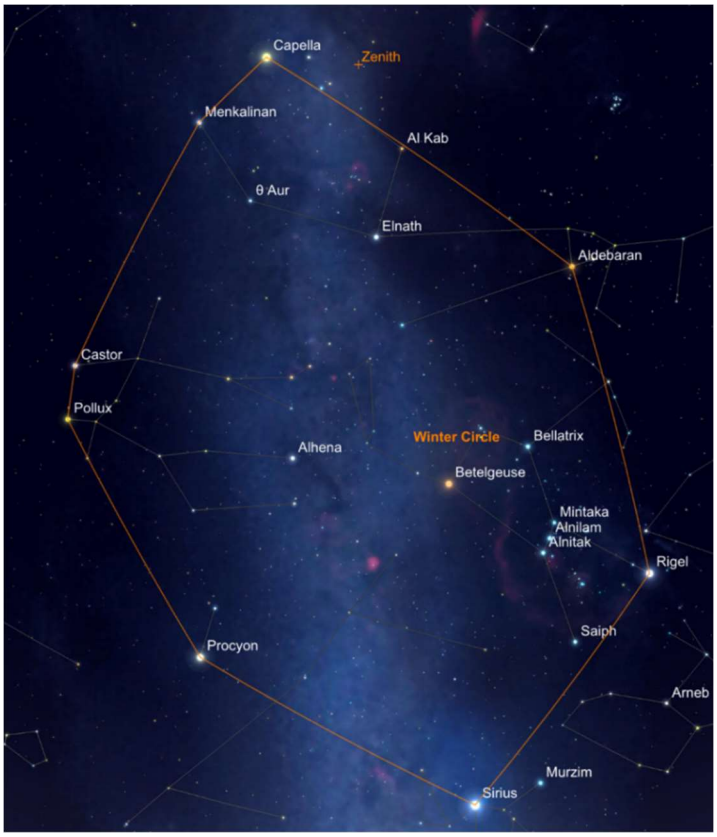
Connecting the 'Dots' with Asterisms

By Kat Troche

In our December Night Sky Notes, we mentioned that the Orion constellation has a distinct hourglass shape that makes it easy to spot in the night sky. But what if we told you that this is not the complete constellation, but rather, an *asterism*?

An asterism is a pattern of stars in the night sky, forming shapes that make picking out constellations easy. Cultures throughout history have created these patterns as part of storytelling, honoring ancestors, and timekeeping. Orion's hourglass is just one of many examples of this, but did you know Orion's brightest knee is part of another asterism that spans six constellations, weaving together the Winter night sky? Many asterisms feature bright stars that are easily visible to the naked eye. Identify these key stars, and then connect the dots to reveal the shape.

Asterisms Through the Seasons

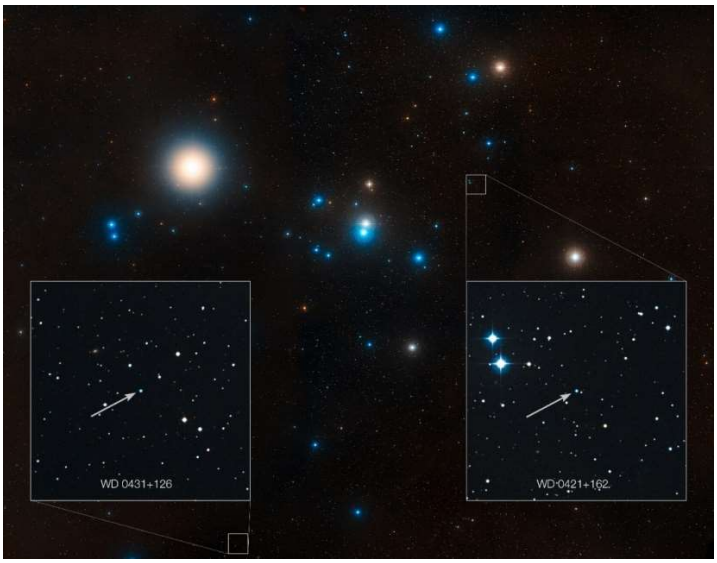


Stars that make up the Winter Circle, as seen on January 1, 2024

Sky Safari

Try looking for these asterisms this season and beyond:

- **Winter Circle** – this asterism, also known as the Winter Hexagon, makes up a large portion of the Winter sky using stars Rigel, Aldebaran, Capella, Pollux, Procyon, and Sirius as its points. Similarly, the **Winter Triangle** can be found using Procyon, Sirius, and Betelgeuse as points. **Orion's Belt** is also considered an asterism.
- **Diamond of Virgo** – this springtime asterism consists of the following stars: Arcturus, in the constellation Boötes; Cor Caroli, in Canes Venatici; Denebola in Leo, and Spica in Virgo. Sparkling at the center of this diamond is the bright cluster **Coma Berenices**, or Bernice's Hair – an ancient asterism turned constellation!
- **Summer Triangle** – as the nights warm up, the Summer Triangle dominates the heavens. Comprising the bright stars Vega in Lyra, Deneb in Cygnus, and Altair in Aquila, this prominent asterism is the inspiration behind the cultural festival Tanabata. Also found is Cygnus the Swan, which makes up the **Northern Cross** asterism.
- **Great Square of Pegasus** – by Autumn, the Great Square of Pegasus can be seen. This square-shaped asterism takes up a large portion of the sky, and consists of the stars: Scheat, Alpheratz, Markab and Algenib.



This image shows the region around the Hyades star cluster, the nearest open cluster to us. The Hyades cluster is very well-studied due to its location, but previous searches for planets have produced only one. A new study led by Jay Farihi of the University of Cambridge, UK, has now found the atmospheres of two burnt-out stars in this cluster — known as white dwarfs — to be "polluted" by rocky debris circling the star. Inset, the locations of these white dwarf stars are indicated — stars known as WD 0421+162, and WD 0431+126.

NASA, ESA, STScI, and Z. Levay (STScI)

Tracing these outlines can guide you to objects like galaxies and star clusters. The Hyades, for example, is an open star cluster in the Taurus constellation with evidence of rocky planetary debris. In 2013, Hubble Space Telescope's Cosmic Origins Spectrograph was responsible for breaking down light into individual components. This observation detected low levels of carbon and silicon – a major chemical for planetary bodies. The Hyades can be found just outside the Winter Circle and is a favorite of both amateur and professional astronomers alike.

How to Spot Asterisms

- **Use Star Maps and Star Apps** – Using star maps or stargazing apps can help familiarize yourself with the constellations and asterisms of the night sky.
- **Get Familiar with Constellations** – Learning the major constellations and their broader shapes

visible each season will make spotting asterisms easier.

- **Use Celestial Landmarks** – Orient yourself by using bright stars, or recognizable constellations. This will help you navigate the night sky and pinpoint specific asterisms. Vega in the Lyra constellation is a great example of this.

Learn more about how to stay warm while observing this Winter with our upcoming mid-month article on the Night Sky Network page through NASA's website!

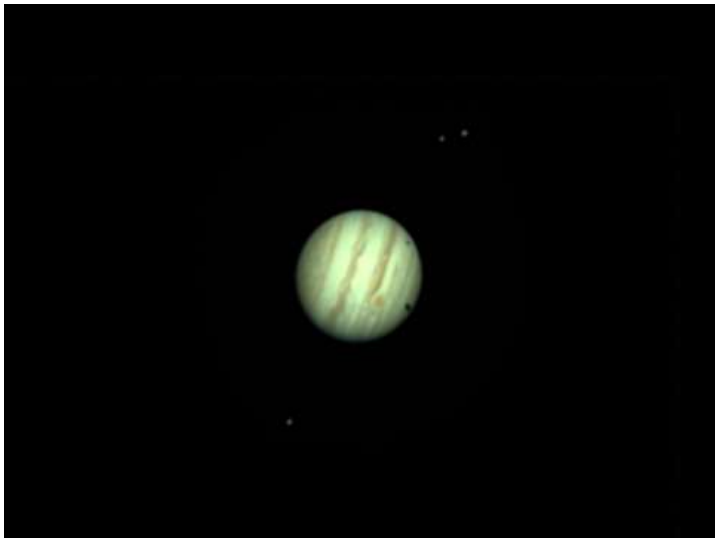
Pictures from HAC Astro

Moon's Occultation of Antares by Richard Lighthill

Christmas eve launch of a Falcon 9 from Vandenberg AFB by JD Maddy
Taken at second stage separation

Horsehead Nebula by Mark Orvek

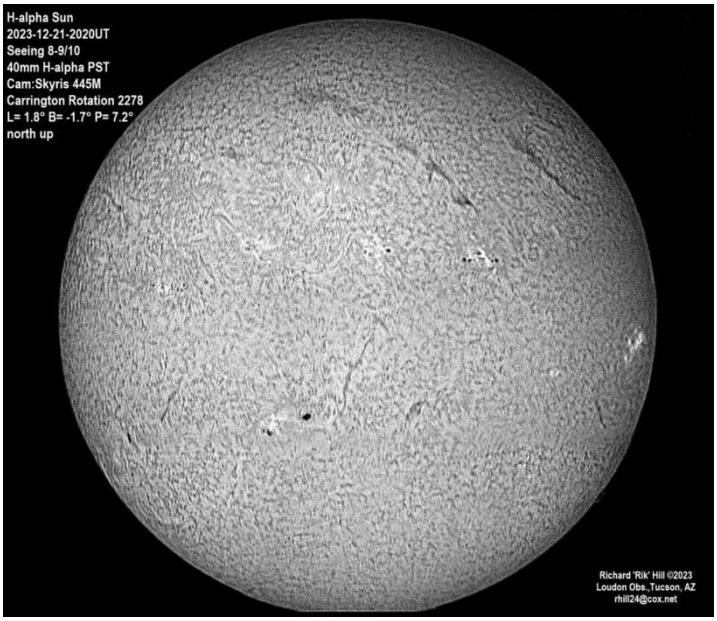
Full Moon by Michael Morrison



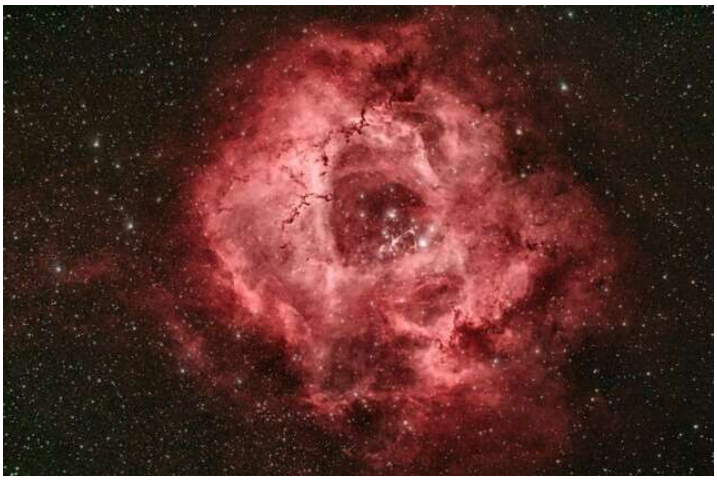
Jupiter with moon shadow by Michael Morrison

M45 (Pleiades) by Michael Morrison

Moonset by Richard Lighthill



Sun in H Alpha by Rik Hill



The Rosette Nebula by Richard Lighthill

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Email: info@hacastronomy.org

HAC Jan Feb 2024 Calendar of Events

SU	MO	TU	WE	TH	FR	SA
31 		Jan 2	3 8:30 PM Quadrantid Meteors	4 Quadrantid Meteors	5	6
7	8 Church Grp 6-8 PM Patterson Antares/Moon 0.8°	9	10	11 4:57AM	12	13 Solar SaturdayS.V. Library 10 AM
14 Saturn/Moon 2°	15	16 Church Grp 6:30 PM Patterson	17 8:53 PM	18 Public Night at Patterson 6 PM Jup/Moon 3°	19	20
21	22	23	24	25 10:54AM	26 HAC Meeting Room Art 411	27
28	29	30	31	Feb 1	2 4:18PM	3
4 Antares/Moon 0.6°	5	6	7 Venus/Moon 5°	8 Mars/Moon 4°	9 3:59PM	10 Solar SaturdayS.V. Library 10 AM
11	12	13	14	15 Public Night at Patterson 6:30 PM	16 8:01PM	17
18	19 	20	21	22	23 HAC Meeting Room A102 Downtown	

All times local MST
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