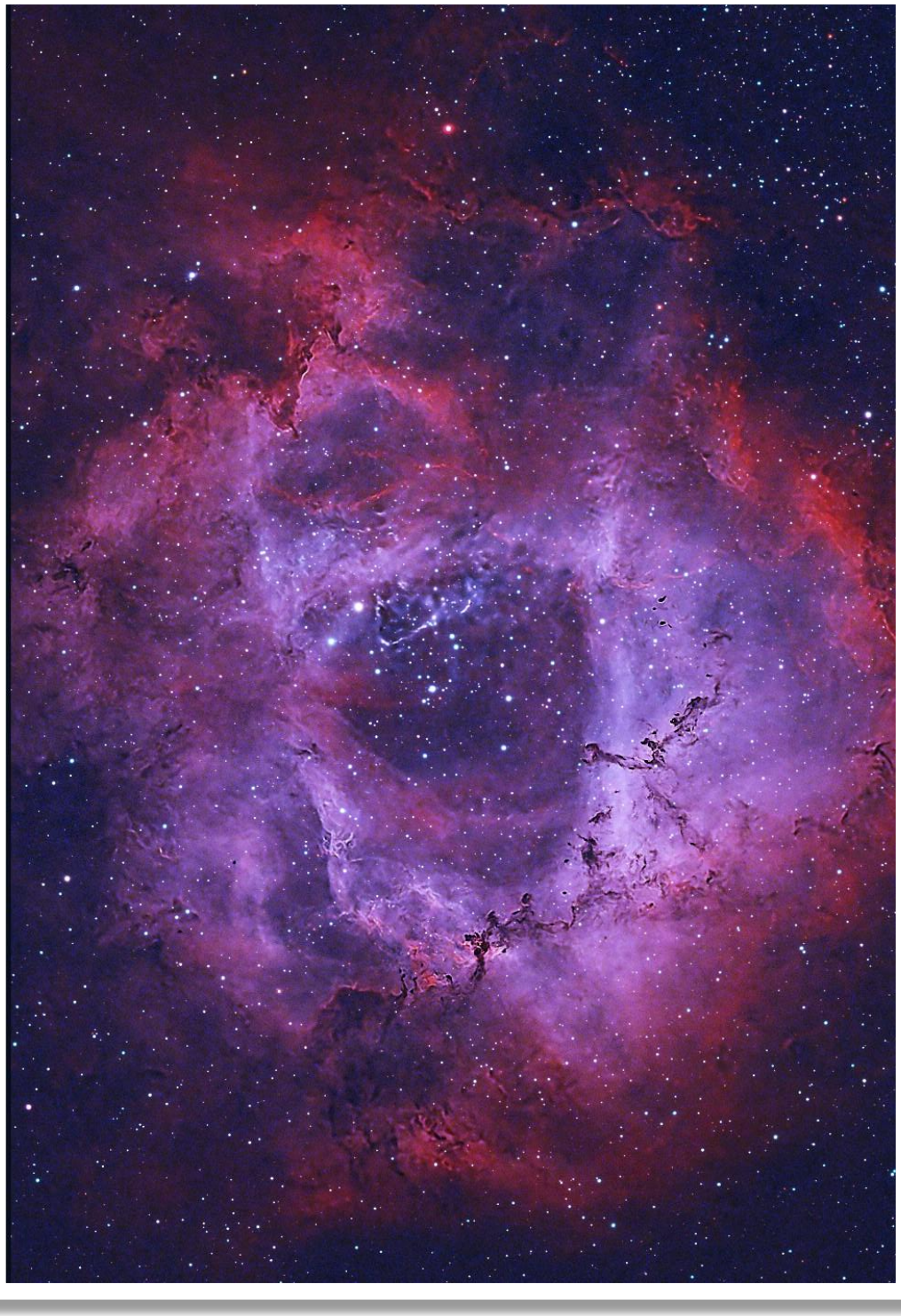
Nightfall

A Publication of the Huachuca Astronomy Club

May, 2025



Club Meeting Speaker

The speaker at the May 2025 club meeting is David Lee Summers. The topic of his talk is "*A exoplanet presentation based on the work he does at the WIYN telescope on Kitt Peak."*

David is an author, editor and astronomer living somewhere between the western and final frontiers in Southern New Mexico. He is the author of thirteen novels including Owl Dance, Vampires of the Scarlet Order, and The Astronomer's Crypt. His short fiction has appeared in such magazines and anthologies as Realms of Fantasy, Cemetery Dance and Straight Outta Tombstone. He has edited the anthologies A Kepler's Dozen, Kepler's Cowboys, and Maximum Velocity: The Best of the Full-Throttle Space Tales. In addition to his work in the written word, David has also worked at numerous observatories around the southwestern United States. Currently he works for Kitt Peak National Observatory, outside of Tucson, Arizona.

He lives in Southern New Mexico with his wife Kumie

Welcome our new members

The Kyle Pierce family of Hereford joined in March. Welcome, we are glad you joined.

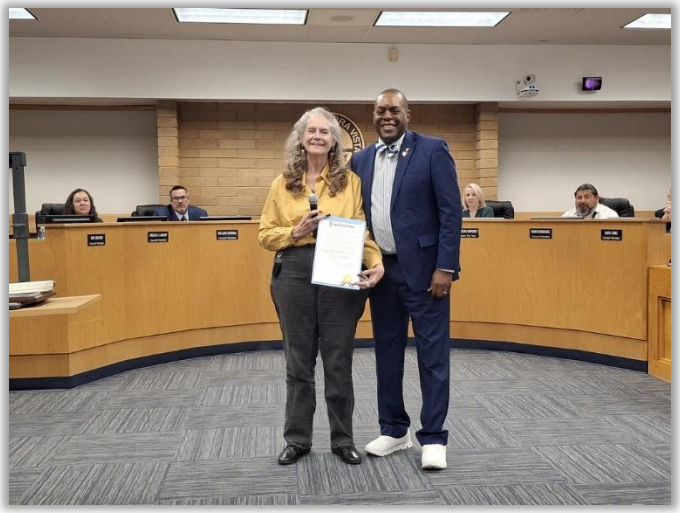
HAC Dues Reminder

Thank you to everyone who has paid their 2025 dues. There are still several memberships that expired in December. If you're unclear about your due's status, please contact the treasurer, Ted Forte at tedforte511@gmail.com Dues are $35 Family and $25 Regular ($25 and $20 for active-duty military). Full time students pay $10. Here are the options to pay your dues:

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

Astronomy Day, May 3, 2025

HAC will be collaborating with the Sierra Vista Library to conduct an Astronomy Day gala at Tomkins Park on Saturday May 3. The event runs from 3 p.m. until 9 p.m. with set up starting at 2 p.m.



Sierra Vista Mayor McCaa proclaimed May 3 as "Astronomy Day" in Sierra Vista at the April 24 city council meeting. HAC President Penny Brondum received the proclamation on behalf of the club.

Besides volunteers to attend, we need ideas and activities to enrich the event. We are calling on all HAC members to participate, but we also need you to give the event some thought and propose activities. Time is short, so please don't delay and don't be shy about suggestions.

School Field Trips to Patterson

School field trips to Patterson have ramped up and we have three of them scheduled in May. We'll host students from Ft Huachuca's Colonel Johnston elementary on May 5 and again on May 6. 9 a.m. to 11 a.m. Students from the Echoing Hope Ranch will visit on May 12, 10:30 a.m. to 12:30 p.m.

Editors Corner

Thanks to all for the positive feedback regarding the new layout of our Nightfall newsletter. We still require imaging submissions for consideration for the front cover, so please send something that you have taken, recently or in the past.

President's Constellation Exploration – Coma Bernices

by Penny Brondum

Coma Berenices, or Berenice's Hair, is a constellation in the northern sky. The constellation is home to the North Galactic Pole (NGP). Coma Berenices is associated with the story of a historical figure, Queen Berenice II of Egypt. Berenice was married to Ptolemy III Euergetes (fl. 246 BC-221 BC). During the Third Syrian War (246–241 BC), King Ptolemy III embarked on a hazardous mission of revenge against Seleucus II, the ruler of the Seleucid Empire who had murdered Ptolemy III's sister and her son.

Gerard Mercator (1512-1594) - The Mercator Globes at Harvard Map Collection. (Coma Bernices in upper left above Virgo)

Worried for her husband's life, the queen swore to Aphrodite that she would cut off her beautiful long, blonde hair if the goddess brought Ptolemy back home safely.

Once her husband returned, Berenice fulfilled her promise to the goddess. She cut off her hair and placed it in Aphrodite's temple. The hair disappeared the next day. This made the king furious. To appease him, the court astronomer Conon said that Aphrodite was so pleased with Berenice's offering that she had placed it in the sky, pointing to the group of stars that have since been known as Berenice's Hair.

In the 2nd century AD, the Greek astronomer Ptolemy considered Coma Berenices not a constellation, but an asterism representing the lion's tail in the constellation of Leo. In fact, it wasn't until 1536 that German cartographer Caspar Vopel officially promoted it to a constellation, while in 1602, one year after Danish astronomer Tycho Brahe's death, it was published posthumously in his star catalogue. Before the 18th century Coma Berenices was known in English by several names, including "Berenice's Bush" and "Berenice's periwig". The earliest-known English name, "Berenices haire", dates to 1601. By 1702 the constellation was known as Coma Berenices, and appears as such in the 1731 *Universal Etymological English Dictionary*.

Coma Berenices belongs to the Ursa Major family of constellations, along with Boötes, Camelopardalis, Canes Venatici, Corona Borealis, Draco, Leo Minor, Lynx, Ursa Major and Ursa Minor.

Although it is not large, Coma Berenices has two stars with known planets and contains eight Messier objects: the globular cluster M53 (NGC 5024), the Black Eye Galaxy (M64, NGC 4826), M85 (NGC 4382), M88 (NGC 4501), M91 (NGC 4548), M98 (NGC 4192), M99 (NGC 4254), and M100 (NGC 4321) and other galaxies in the Coma Cluster. It also contains the northern part of the Virgo cluster of galaxies. There is one meteor shower associated with the constellation; the Coma Berenicids, which begin mid-December and peak in Mid-January.

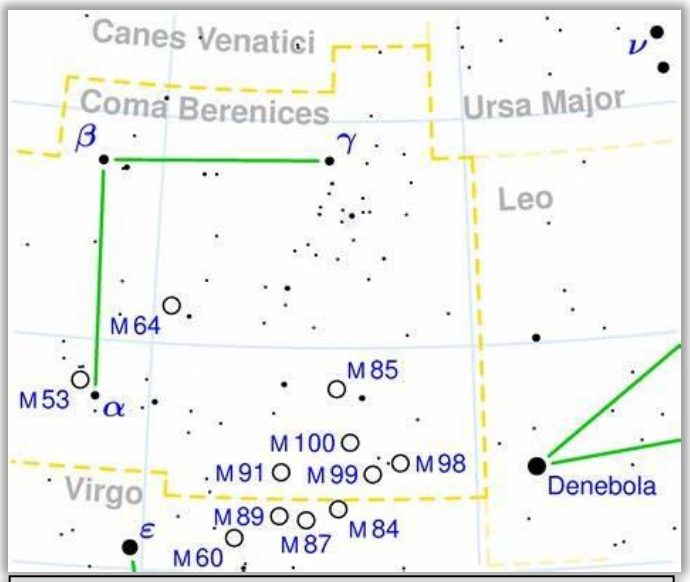
The star systems of Coma Berenices include binary, optical double and triple stars. Over 200 variable stars are also known in Coma Berenices, although many are obscure. As recently as 2019 scientists at Aryabhatta Research Institute of Observational Sciences announced the discovery of 28 new variable stars in Coma Berenices' globular cluster NGC 4147. Also, a number of supernovae have been discovered in Coma Berenices.

The Coma Star Cluster, a naked eye object, has been known since antiquity, appearing in Ptolemy's *Almagest*. It doesn't have a Messier or NGC designation, but is in the Melotte catalogue of open clusters (designated Melotte 111). It is a large, diffuse open cluster of about 50 stars including several of Coma Berenices' stars which are visible to the naked eye. The cluster is spread over a huge region (more than five degrees across).

The Black Eye Galaxy (Messier 64) is a spiral galaxy with an apparent magnitude of 9.36, lying approximately 24 million light years from Earth. It is sometimes also called the Sleeping Beauty Galaxy or Evil Eye Galaxy. It is a popular object among amateur astronomers, as it can be easily observed in small telescopes. The Black Eye Galaxy has a bright nucleus and a dark band of dust in front of it, which earned it the nickname the Evil Eye. M64 was independently discovered by Edward Pigott and Johann Elert Bode in 1779, and then by Charles Messier, who included the galaxy in his catalogue in 1780.

Black-Eyed Galaxy (M 64) By NASA and The Hubble Heritage Team (AURA/STScI)

The Needle Galaxy (NGC 4565) is one of the most famous edge-on spiral galaxies in the sky. It was discovered by Sir William Herschel in 1785. The galaxy can be seen in a small telescope. It lies exactly above the North Galactic Pole, a degree east of the star 17 Comae.



ar.inspiredpencil.com

The Coma Supercluster, itself part of the Coma Filament, contains the Coma and Leo Cluster of galaxies. The Coma Cluster (Abell 1656) is 230 to 300 million light-years away. It is one of the largest-known clusters, with at least 10,000 galaxies (mainly elliptical, with a few spiral galaxies). Due to its distance from Earth, most of the galaxies are visible only through large telescopes.

Coma Berenices contains the northern portion of the Virgo Cluster (also known as the Coma–Virgo Cluster), about 60 million light-years away. This portion includes six Messier galaxies.M85 (NGC 4382), M88 (NGC 4501), M91(NGC 4548), M98 (NGC 4192), M99(NGC 4254) and M100(NGC 4321).

A trivia note: Only one other constellation's name is *derived* from a reference to a historical person: the constellation Scutum is a shortening of the former name *Scutum Sobiescianum* ("shield of Sobieski"), named after King John III Sobieski of Poland. It is called the equivalent of "Shield of Sobieski" in some other languages, such as French.

Beyond looking up and seeing the wonders in our night sky, is the opportunity to discover the stories and tales behind the images which define the spaces above us. So, look up and enjoy Coma Berenices.

The Bucket List

by Vince Sempronio

The column is taking the month off while the author deals with real estate matters. The column will return with the June issue.

Astronomical Leage Observing Programs

by Ted Forte

If you are a member of HAC, you are also a member of the Astronomical League and you are eligible to earn awards for completing any of the approximately 80 programs found at the AL Observing Clubs.

There really is something for every interest and the programs vary greatly in their requirements. Some are entry level programs that can be done with modest equipment and very little experience. Some are intermediate in difficulty and some are quite advanced, even specialized.

The Observing Program Selector Grid will help you pick a program based on your experience level.

A couple of the programs require that you use traditional star hopping methodology to locate the objects you observe. The point of these programs, such as the Messier Program, is to encourage you to learn the sky. But the vast majority of the programs allow the use of all the latest technology for finding objects effortlessly.

So why do a program? Have you ever set up your telescope only to ask yourself, what should I observe tonight?' Or worse, do you find yourself observing the same dozen objects each time you're out?

The Astronomical League programs will introduce you to new objects, even new types of objects. You'll learn new techniques and develop new skills. You'll be forced to write good logs and often be encouraged to look at objects in a very different way than you are used to.

Observing programs can help motivate you, keeping your observing sessions challenging and fresh. Recording aspects of objects that you wouldn't normally think about will help you become a better observer and a more conscientious note taker.

The programs offer goals to strive for and rewards to reap. Once you complete a program, your accomplishment will be reported in the *Reflector* magazine and your award will be recorded on the A.L. website. You'll also receive a certificate and in most cases a lapel pin.

All you need to get started is to visit one of the links above and pick a program that interests you. Read the instructions carefully and start observing. A few program administrators require that you submit your work directly to them, but the majority allow our own awards coordinator (me) to review your logs and report accomplishment. All of the programs seem to have some common requirements – date, time, aperture, magnification, object description, etc., but many have some quite specific requirements as well so be sure to comply with all of the particulars. But do not be intimidated by the requirements. The programs are supposed to be, and are, fun.

You can start anywhere although it is traditional to begin with the Messier program. Personally, I would encourage starting with the Planetary Nebula Program as the coordinator of that program, dedicated to the most fascinating objects in the sky, is exceptionally accommodating to HAC members. Just sayin'

NASA Night Sky Notes

This article is distributed by NASA's Night Sky Network (NSN)

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!

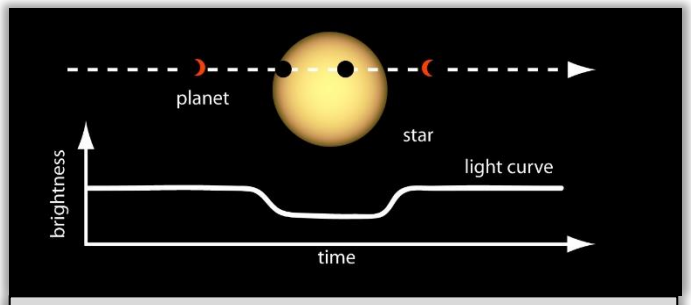
How Do We Find Exoplanets?

By Dave Prosper

Update by Kat Troche

Astronomers have been trying to discover evidence that worlds exist around stars other than our Sun since the 19th century. By the mid-1990s, technology finally caught up with the desire for discovery and led to the first discovery of a planet orbiting another sun-like star, Pegasi 51b. Why did it take so long to discover these distant worlds, and what techniques do astronomers use to find them?

The Transit Method



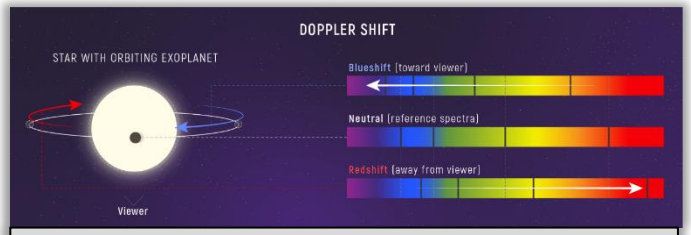
A planet passing in front of its parent star creates a drop in the star's apparent brightness, called a transit. Exoplanet Watch participants can look for transits in data from ground-based telescopes, helping scientists refine measurements of the length of a planet's orbit around its star. Credit: NASA's Ames Research Center

One of the most famous exoplanet detection methods is the **transit method**, used by Kepler and other observatories. When a planet crosses in front of its host star, the light from the star dips slightly in brightness. Scientists can confirm a planet orbits its host star by repeatedly detecting these incredibly tiny dips in brightness using sensitive instruments. If you can imagine trying to detect the dip in light from a massive searchlight when an ant crosses in front of it, at a distance of tens of miles away, you can begin to see how difficult it can be to spot a planet from light years away! Another drawback to the transit method is that the distant solar system must be at a favorable angle to our point of view here on Earth – if the distant system's angle is just slightly askew, there will be no transits. Even in our solar system, a transit is very rare. For example, there were two transits of Venus visible across our Sun from Earth in this century. But the next time Venus transits the Sun as seen from Earth will be in the year 2117 – more than a century from now, even though Venus will have completed nearly 150 orbits around the Sun by then!

The Wobble Method

Spotting the Doppler shift of a star's spectra was used to find Pegasi 51b, the first planet detected around a Sun-like star. This technique is called the **radial velocity or "wobble" method.** Astronomers split up the visible light emitted by a star into a rainbow. These spectra, and gaps

between the normally smooth bands of light, help determine the elements that make up the star. However, if there is a planet orbiting the star, it causes the star to wobble ever so slightly back and forth.



As a planet orbits a star, the star wobbles. This causes a change in the appearance of the star's spectrum called Doppler shift. Because the change in wavelength is directly related to relative speed, astronomers can use Doppler shift to calculate exactly how fast an object is moving toward or away from us. Astronomers can also track the Doppler shift of a star over time to estimate the mass of the planet orbiting it.
Credit: NASA, ESA, CSA, Leah Hustak (STScI)

This will, in turn, cause the lines within the spectra to shift ever so slightly towards the blue and red ends of the spectrum as the star wobbles slightly away and towards us. This is caused by the blue and red shifts of the planet's light. By carefully measuring the amount of shift in the star's spectra, astronomers can determine the size of the object pulling on the host star and if the companion is indeed a planet. By tracking the variation in this periodic shift of the spectra, they can also determine the time it takes the planet to orbit its parent star.

Direct Imaging

Finally, exoplanets can be revealed by **directly imaging** them, such as this image of four planets found orbiting the star HR 8799! Space telescopes use instruments called **coronagraphs** to block the bright light from the host star and capture the dim light from planets. The Hubble Space Telescope has captured images of giant planets orbiting a few nearby systems, and the James Webb Space Telescope has only improved on these observations by uncovering more details, such as the colors and spectra of exoplanet atmospheres, temperatures, detecting potential exomoons, and even scanning atmospheres for potential biosignatures!

You can find more information and activities on NASA's Exoplanets page, such as the Eyes on Exoplanets browser-based program, The Exoplaneteers, and some of the latest exoplanet news. Lastly, you can find more resources in our News & Resources section, including a clever demo on how astronomers use the wobble method to detect planets!

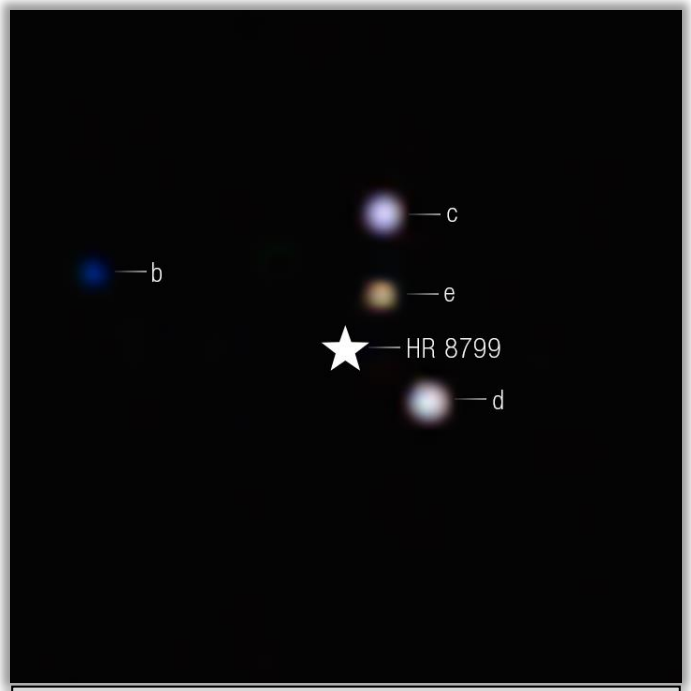


Image taken by the James Webb Space Telescope of four exoplanets orbiting HR 8799.
Credit: NASA, ESA, CSA, STScI, Laurent Pueyo (STScI), William Balmer (JHU), Marshall Perrin (STScI)

The future of exoplanet discovery is only just beginning, promising rich rewards in humanity's understanding of our place in the Universe, where we are from, and if there is life elsewhere in our cosmos.

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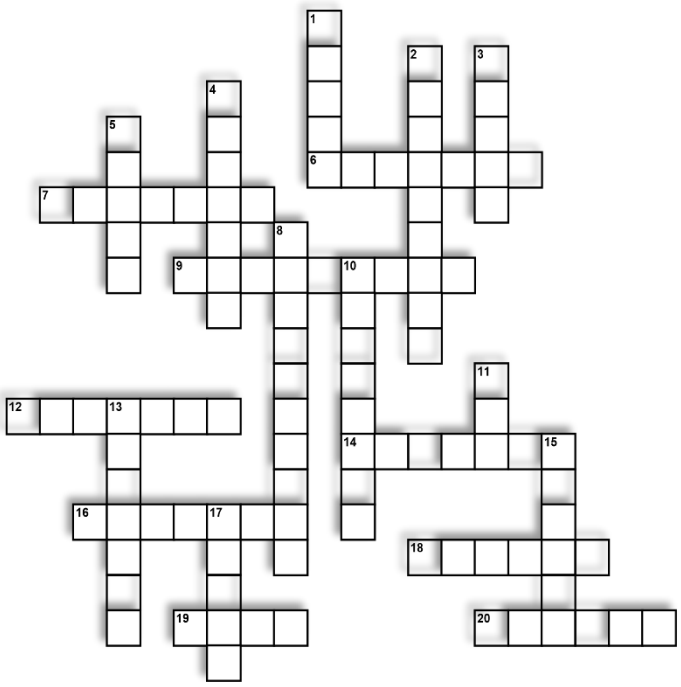
About the Cover

Leonard Amburgey describes his image. The Rosette Nebula, also known as Caldwell 49, is a large circular region of nebulosity located in the constellation Monoceros. It is approximately 5,000 light-years away from Earth and spans around 130 light-years in diameter. This emission nebula is a stellar nursery where intense radiation from young, hot stars excites the surrounding gas, causing it to glow brightly. The Rosette Nebula is part of a larger molecular cloud complex, which includes the open star cluster NGC 2244 at its center. This cluster is composed of stars formed from the nebula's material. This exposure was taken 4/9/25 under a moon illuminated 92.83% (waxing).

RASA (Schmidt) telescope 203 mm (8") @ F 2.1 FL 425 mm. One hour of exposure = 2.3 hours compared to an F 4.5 telescope ratio. Camera ZWO ASI 2600 OSC camera. Field of view of the combination: 2.99 degrees X 1.99 degrees. Area: 6 degrees. Resolution 3.2^seconds Filter: Optolong L-eXtreme 7 nm HaOiii exposure: 2.3 hours under a moon: 92.83% (waxing).

Fun and Games
Bright Star Crossword



Clues Across

[6] The heart of the Scorpion
[7] Famous colorful double star
[9] In line, but not part of the Hyades
[12] Member of the Winter Triangle
[14] Brightest star closest to the Ecliptic
[16] Stellar compass
[18] Fast rotating "eagle"
[19] Featured in the movie "Contact"
[20] The dimmer of the twins

Clues Down

[1] The virgin's ear
[2] The mouth of the whale
[3] The tail of the swan
[4] The Goat
[5] One of the pointers
[8] Inspired a movie title
[10] Brightest in northern hemisphere
[11] Our star
[13] 2nd brightest
[15] It's the brightest
[17] Orion's foot

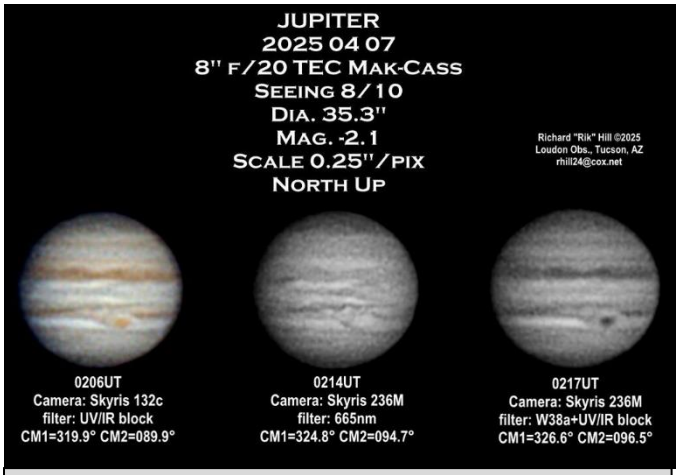
The clues going down are slightly more difficult. Try to do as many as possible without searching the internet and report the number of correct answers (out of 20) to the editor at nightfall@hacastronomy.org

A solution is not available, so you are on your own.

Trivia Question

106 years ago, in the month of May in 1919, scientific expeditions were used to confirm a key prediction of general relativity, the results of which made Albert Einstein famous and showed that Newton's theory of gravity was incomplete. The question is, what was observed, and what outcome did the expeditions expect to achieve?

Astro Images



As we say goodbye to an old friend (Jupiter) as the Earth outpaces it around the Sun, enjoy Rik Hill's composition from early April. The red spot is alive and well!

Club Officers & Contacts

President: *Penny Brondum* ***Vice President:*** *Mark Orvek*
Secretary: *Del Gordon* ***Treasurer:*** *Ted Forte*
Past President: *David Roemer*

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Gary Grue, Richard Lighthill, Mike Morrison, Vince Sempronio

Nightfall Editor: *Vince Sempronio* nightfall@hacastronomy.org
Webmaster: *Ken Kirchner*
Facebook Editor: *Richard Lighthill*

Website: http://www.hacastronomy.org
Facebook: http://www.facebook.com/HuachucaAstronomyClub
Email: info@hacastronomy.org

Club Meetings: Monthly at 7pm at the Cochise College Downtown Center at 2600 E Wilcox Drive, Sierra Vista, AZ in Room A102. Refer to the calendar for specific dates.

HAC Calendar of Events
(May & June, 2025)

SU	MO	TU	WE	TH	FR	SA
27 12:31PM	28	29	30	May 1 Public Night @ Patterson Obs 7:30 PM	2 Vesta Opposition	3 Astronomy Day @ Tompkins Park 2PM-9PM
4 6:52AM	5 Eta Aquariid meteors	6 Eta Aquariid meteors	7 Eta Aquariid meteors	8	9 HAC Meeting Room A102 7PM	10 Solar Saturday @ SV Public Library 10AM-12PM
11	12 9:56AM	13	14 Juno at opposition	15	16	17
18	19	20 4:59AM	21	22	23	24
25	26 8:02 PM Memorial Day	27	28	29	30	31 Venus @ Western Elongation
June 1	2 8:41 PM	3	4	5 Patterson Public Night 7:30 PM	6	7
8	9	10	11 12:44 AM	12	13 HAC Meeting Room A102 7PM	14 Solar Saturday @ SV Public Library 10AM-12PM Flag Day
15	16	17	18 12:19PM	19	20	

All dates and times are local MST
Astronomy events listed are those visible in the Southwestern, USA

Join the HAC Astro forum to keep up to date with all the Huachuca Astronomy Club events.
To join, send an email to: HACAstro+subscribe@groups.io

Answer to the trivia question: During a total solar eclipse, observations showed that starlight was bent due to the curvature of spacetime.