



Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers Jan 2020

Events:

General Meeting :

Monday, January 6, 2020 at the Ronald H. Roberts Temecula Library, Room B, 30600 Pauba Rd, at 7:00 PM. On the agenda this month is “What’s Up” by Clark Williams followed by a presentation topic : “Making Mirrors” by Steve Miller.

Please consider helping out at one of the many Star Parties coming up over the next few months. For the latest schedule, check the Calendar on the [web page](#).



With a perfectly symmetrical ring circling a red sphere of stars, [Hoag's Object](#) is one of the prettiest mysteries in the universe. (Image Credit : [NASA/ESA/Hubble](#))

General information:

Subscription to the TVA is included in the annual \$25 membership (regular members) donation (\$9 student; \$35 family).

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WHAT'S INSIDE THIS MONTH:

Cosmic Comments

by President Mark Baker

Looking Up Redux

compiled by Clark Williams

Spot the Young Stars of the Hyades and Pleiades

by David Prosper

Send newsletter submissions to Mark DiVecchio [<markd@silogic.com>](mailto:markd@silogic.com) by the 20th of the month for the next month's issue.

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Cosmic Comments by President Mark Baker

2019 was a banner year for Astronomy in general and for the TVA as well...and 2020 is looking to continue that trend. Come along for the ride...

For me, the key word this year will be MISSIONS...!!! Although it may not seem so, every Mission in Space is driven by astronomical discovery. And there are a lot of them...!!! NASA alone has over 40 active missions, meaning they are either already operational or soon will be...by the time you add in all the other agencies and corporations throughout the world, that number is over 100!!! And that doesn't include the military applications...so no, Space Research and Science is not dead, but in fact is burgeoning, if anything. And yes, Astronomy leads the way, whether Atmospheric, Low Earth Orbit, Lunar, Planetary, and/or Deep Space... whether provided by professionals and/or amateurs. It's a team effort across ALL demographics...

Every meeting we hold, every Star Party we conduct, every school Club we support is part of the much bigger picture and WE get to inspire many to jump in and get involved...for me, that's the fun part!!!

So here's to an awesome 2020, where TVA will get to partake and enjoy the fruits of our labors, even if vicariously... "The Stars Are Calling, So We Must Go"!!!

Clear, Dark Skies my Friends...





Looking Up Redux compiled by Clark Williams

from these sources:

SeaSky.org

Wikipedia.com

in-the-sky.org

The American Meteor Society, Ltd.

cometwatch.co.uk

NASA.gov

TVA App (2.0.1296)

FullAndNewMoon App (2.0)

Starry Night Pro Plus 7 (7.6.3.1373)

SkySafari 6 Pro (6.1.1)

Stellarium (0.18.2)

timeanddate.com/astronomy



ALL TIMES ARE LOCAL PACIFIC TIME (PDT / PST) UNLESS NOTED OTHERWISE

Times are given in 24-hour time as: (hh is hours, mm minutes, ss seconds)

hh:mm:ss or hhmmss

hhmm+ (time of the next day)

hhmm- (time of the previous day)

hhmm (seconds not shown)

yyymmddThhmmss (Full date as: year month day Time separator hours minutes seconds)

Moon Phases for the month by date:

Thursday the 2nd @ 2046 **FIRST QTR** in Cetus
Friday the 10th @ 1122 **FULL** in Gemini
Friday the 17th @ 0459 **THIRD QTR** in LIBRA
Friday the 24th @ 1343 **NEW** in Capricornus

Apogee comes on 2020-01-02 @ 0131 - 404,578 km (251,393 mi)

Apogee comes on 2020-01-29 @ 2129 - 405,389 km (251,897 mi)

Perigee comes on 2020-01-18 @ 2022 - 365,963 km (227,399 mi)

2020 has: (12) new moons, (13) 1st Qtr moons, (13) Full moons, (12) 3rd Qtr moons

(1) Blue moon and (0) Black moons

Daylight Savings: Starts: 2020-Mar-08 : Ends: 2020-Nov-01

Luna: Luna is just ten days past NEW on the 1st of the month setting by **2307**. Luna by mid-month is 84% illuminated. Luna is rising late at **2245** and setting in late morning ay **1111**. By the end-of-the-month Luna is once again a waxing crescent moon, 41% illuminated setting by **2340**.



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Highlights: (distilled from: **SeaSky.org** and **Clark's planetary Orrey** program[s])

January 3, 4 - Quadrantids Meteor Shower. The Quadrantids is an above average shower, with up to 40 meteors per hour at its peak. It is thought to be produced by dust grains left behind by an extinct comet known as 2003 EH1, which was discovered in 2003. The shower runs annually from January 1-5. It peaks this year on the night of the 3rd and morning of the 4th. The first quarter moon will set shortly after midnight, leaving fairly dark skies for what could be a good show. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Bootes, but can appear anywhere in the sky.

January 10 - Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be fully illuminated. This phase occurs at 19:23 UTC. This full moon was known by early Native American tribes as the Full Wolf Moon because this was the time of year when hungry wolf packs howled outside their camps. This moon has also been known as the Old Moon and the Moon After Yule.

January 10 - Penumbral Lunar Eclipse. A penumbral lunar eclipse occurs when the Moon passes through the Earth's partial shadow, or penumbra. During this type of eclipse the Moon will darken slightly but not completely. The eclipse will be visible throughout most of Europe, Africa, Asia, the Indian Ocean, and Western Australia. (NASA Map and Eclipse Information)

January 24 - New Moon. The Moon will be located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 21:44 UTC. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.



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Algol minima: (All times Pacific)

01/02/20	1229
01/05/20	0918
01/08/20	0608
01/11/20	0257
01/13/20	2346
01/16/20	2035
01/19/20	1725
01/22/20	1414
01/25/20	1103
01/28/20	0753
01/31/20	0442

Sun and Moom Rise/Transit/Set Times (All times Pacific local time)

		Rise	Transit	Set
01/01/20	Sun	065153	115234	165313
	Moon	111354	170948	230715
01/15/20	Sun	065153	115829	170504
	Moon	224531	045944+	111101+
01/31/20	Sun	064445	120236	172028
	Moon	103813	170724	234014

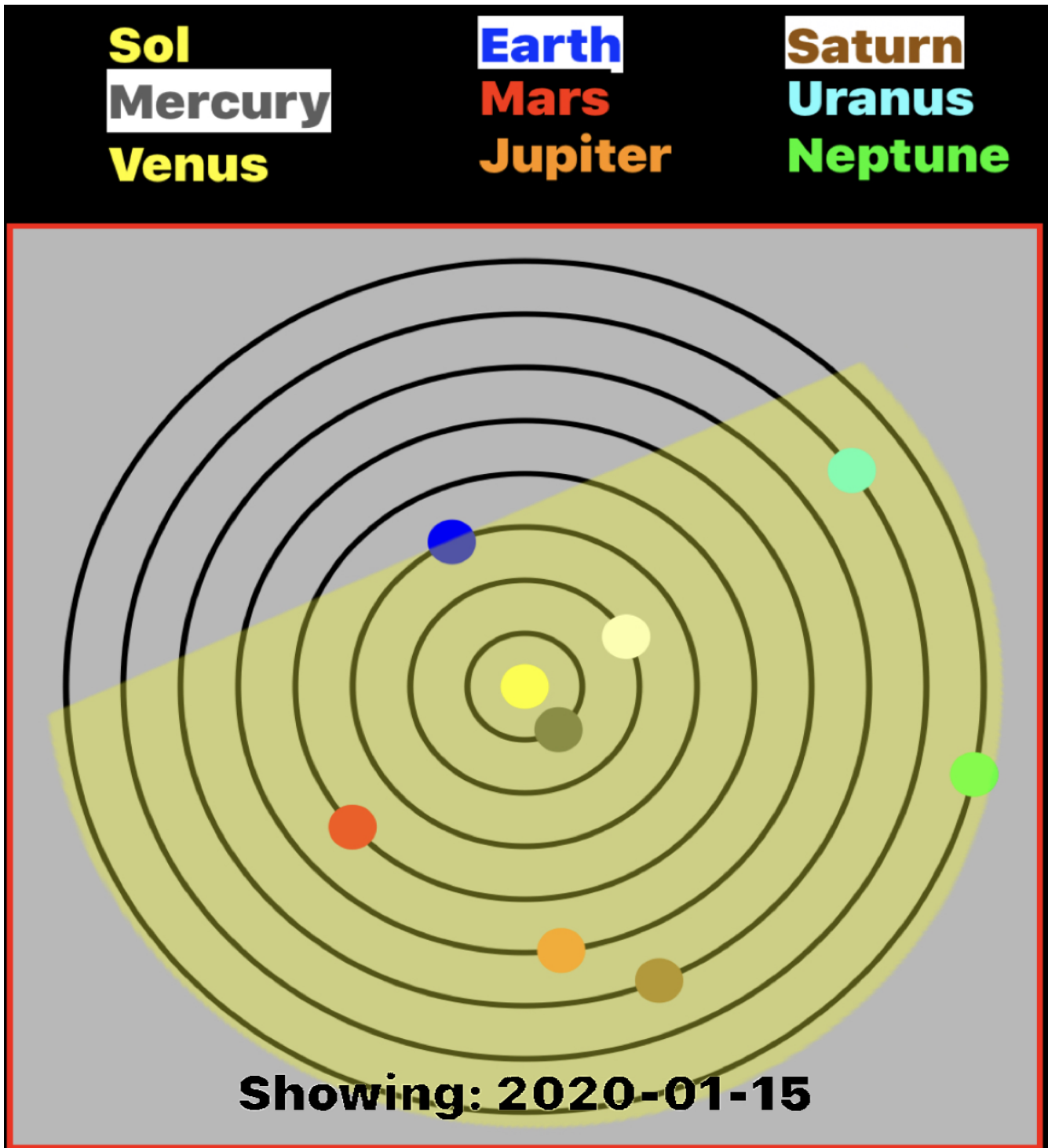


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Planets:

Planetary Positions January 2020: (from TVA App iOS version)



- **Mercury:** Mercury is a morning object in the beginning of the month. It is well illuminated at 99% and -0.92 apparent magnitude and rises at **0636** with the sun following at **0651**. Mercury



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by mid-month is just too close to the sun. By the 31st sunset is at **1720** with Mercury following at **1827**.

- **Venus:** Is the Evening Star. Venus sets about **1934** following sunset at **1653** on the first. By mid-month Venus is setting at **2002** following Sol which set at **1705**. By the 31st Venus is setting at **2031** long after the **1720** sunset.
- **Mars:** Mars is a morning object. Leading the Sun, Mars rises at **0342** on the first. By mid-month Mars is rising at **0333**. End-of-month finds the Warrior rising at **0321**. So if you're a night-owl or an extremely early riser the Red Planet is coming back into view.
- **Jupiter:** Jupiter is just too close to the sun on the first of the month. By mid-month Jove is rising at **0555** the sun follows at **0651**. Come the end of month Jupiter is peaking above the horizon by **0507** with sunrise at **0644**.
- **Saturn:** Saturn is trailing the sun setting about **1740** on the 1st while sunset is at **1653**. Saturn by mid month is lost to the sun. By the end-of-the-month Saturn has become a morning object rising at **0550** followed by the sun at **0644**.
- **Uranus:** On the first Uranus transits at **1910** and doesn't set until **0146+**. The apparent magnitude is 5.74 so we're right on the ragged edge of being naked-eye visible. By the ides Uranus is transiting at **1815** however, there is a waning gibbous moon looming toward the west at 74% illumination but it doesn't rise until **2138**. End-of-month finds Uranus transiting just before sunset at **1709** and setting at **2345**.
- **Neptune:** Neptune is leading Uranus, transiting at **1615** in the Eastern sky at the beginning of the month; setting about **2202**. Unfortunately there is a waxing crescent moon with **39%** illumination sitting just **12°** to the east along the Ecliptic. By the 15th Neptune is encroaching on the sun. Sunset is at **1705**. Neptune sets at **2108**. There is an 67% illuminated moon that night but it doesn't rise until **2245**. By the end of the month Neptune is setting at **2007** and a waxing moon is about **42°** away with 40% illumination.
- **Pluto:** Pluto is lost to the glow of the sun all month.

Asteroids:

- Still a dearth of asteroids. I searched for asteroids in 2020 with a reasonable magnitude; say less than or equal to +10 in January there is nothing except the regulars: Juno, Vesta, Hebe, Eros and Herculina. So consult your local planetarium software or try <https://www.asteroidsnear.com/year?year=2020>.

Meteors:

- Quadrantids

Next period of activity: December 27th, 2019 to January 10th, 2020

- The Quadrantids have the potential to be the strongest shower of the year but usually fall short due to the short length of maximum activity (6 hours) and the poor weather experienced during early January. The average hourly rates one can expect under dark skies is 25. These meteors usually lack persistent trains but often produce bright fireballs. Due to the high northerly declination (celestial latitude) these meteors are not well seen from the southern hemisphere. Shower details: Radiant: 15:18 +49.5° - ZHR: 120
Velocity: 26 miles/sec (medium - 42.2km/sec) - Parent Object: 2003 EH (Asteroid)
Next Peak: The Quadrantids will next peak on the Jan 3-4, 2020 night. On this night, the moon will be 58% full.



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- The Ursids is a minor meteor shower running annually from January 17 - 25. It peaks this year on the the night of the 21st and morning of the 22nd. See Highlights above for more details. (SeaSky.org) (American Meteor Society)

Comets: come in various classifications:

- 1) Short Period comets – further broken down into:
 - Halley Type: The Halley Types are believe to come from the Kuiper Belt and have periods in excess of 20-years.
 - Jupiter Type: The Jupiter types have a period less than or equal to 20-years.
 - Short period comets January have a near circular orbit or an elliptical orbit. The latter being far more common.
- 2) Long Period comets – thought to originate from the Oort cloud these comets have periods of over 200 years and have random inclinations around the celestial sphere.

Nothing really available this month in comets.

Deep Sky:

Notes:

L/Z abbreviation for ALT/AZ

R/D abbreviation for Right Ascension/Declination

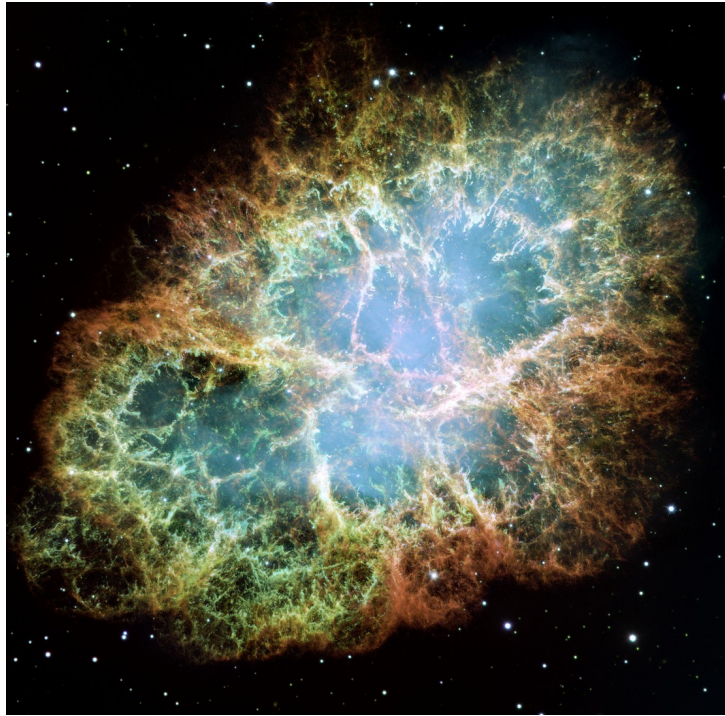
α is right ascension

δ is declination

In each case, unless otherwise noted, you should look for the following on or about the 15th Day of January 2020 at 2100 PDT and you will have about 20 minutes of viewing time total.

Lets look for some familiar objects:

- **M1: Crab Nebula**



By
NASA, ESA, J. Hester and A. Loll (Arizona State University)
– Hubble Site: gallery, release., [Public Domain](#)

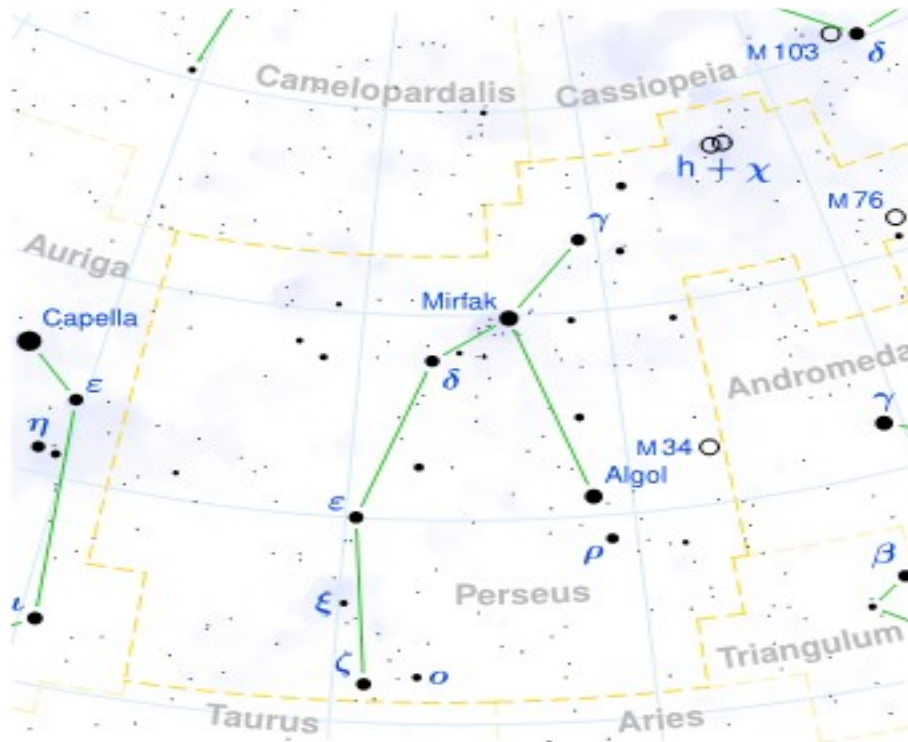
The Crab Nebula (M1, NGC 1952, Taurus A) is a supernova remnant in the constellation of Taurus. The current name is due to William Parsons, 3rd Earl of Rosse, who observed the object in 1840 using a 36-inch telescope and produced a drawing that looked somewhat like a crab. Corresponding to a bright supernova recorded by Chinese astronomers in 1054, the nebula was observed later by English astronomer John Bevis in 1731. The nebula was the first astronomical object identified with a historical supernova explosion.

At an apparent magnitude of 8.4, comparable to that of Saturn's moon Titan, it is not visible to the naked eye but can be made out using binoculars under favorable conditions. The nebula lies in the Perseus Arm of the Milky Way galaxy, at a distance of about 2.0 kiloparsecs (6,500 ly) from Earth. It has a diameter of 3.4 parsecs (11 ly), corresponding to an apparent diameter of some 7 arcminutes, and is expanding at a rate of about 1,500 kilometers per second (930 mi/s), or 0.5% of the speed of light.

At the center of the nebula lies the Crab Pulsar, a neutron star 28–30 kilometers (17–19 mi) across with a spin rate of 30.2 times per second, which emits pulses of radiation from gamma rays to radio waves. At X-ray and gamma ray energies above 30 keV, the Crab Nebula is generally the brightest persistent source in the sky, with measured flux extending to above 10 TeV. The nebula's radiation allows detailed study of celestial bodies

that occult it. In the 1950s and 1960s, the Sun's corona was mapped from observations of the Crab Nebula's radio waves passing through it, and in 2003, the thickness of the atmosphere of Saturn's moon Titan was measured as it blocked out X-rays from the nebula. (Wikipedia)

- o **Algol:**



Perseus_constell

ation_map.png: Torsten Bronger derivative work: Kxx (talk) - Perseus_constellation_map.png, CC BY-SA 3.0, [Wikipedia](https://en.wikipedia.org/wiki/File:Perseus_constellation_map.png).

- o **Algol** /'ælgol/, designated Beta Persei (β Persei, abbreviated Beta Per, β Per), known colloquially as the Demon Star, is a bright multiple star in the constellation of Perseus and one of the first non-nova variable stars to be discovered.

Algol is a three-star system, consisting of Beta Persei Aa1, Aa2, and Ab – in which the hot luminous primary β Persei Aa1 and the larger, but cooler and fainter, β Persei Aa2 regularly pass in front of each other, causing eclipses. Thus Algol's magnitude is usually near-constant at 2.1, but regularly dips to 3.4 every 2.86 days during the roughly 10-hour-long partial eclipses. The secondary eclipse when the brighter primary star occults the fainter secondary is very shallow and can only be detected photoelectrically.[10]

Algol gives its name to its class of eclipsing variable, known as Algol variables.

January is great for both viewing and imaging. Spend some time outside with your scope. Winter is here.

For now – Keep looking up.



Spot the Young Stars of the Hyades and Pleiades by David Prosper

Orion is the last of a trio of striking star patterns to rise during the late fall and early winter months, preceded by the diminutive Pleiades and larger Hyades in Taurus. All three are easily spotted rising in the east in early January evenings, and are textbook examples of stars in different stages of development.

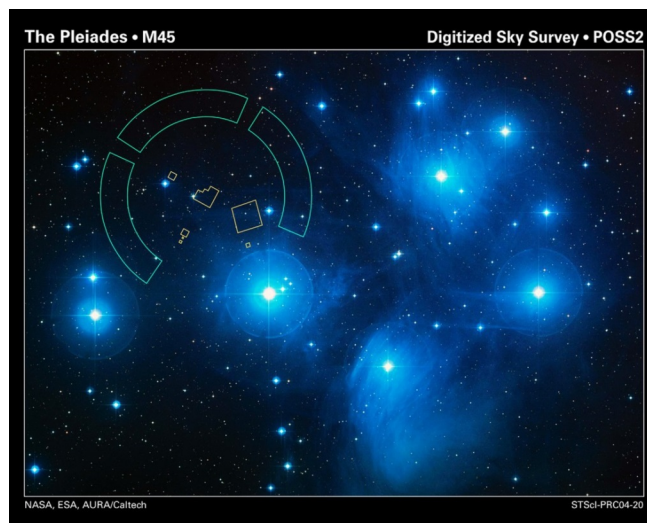
As discussed in last month's Notes, the famous Orion Nebula (M42), found in Orion's "Sword," is a celestial nursery full of newly-born "baby stars" and still-incubating "protostars," surrounded by the gas from which they were born. Next to Orion we find the Hyades, in Taurus, with their distinctive "V" shape. The Hyades are young but mature stars, hundreds of millions of years old and widely dispersed. Imagine them as "young adult" stars venturing out from their hometown into their new galactic apartments. Bright orange Aldebaran stands out in this group, but is not actually a member; it just happens to be in between us and the Hyades. Traveling from Orion to the Hyades we then find the small, almost dipper-shaped Pleiades star cluster (M45). These are "teenage stars," younger than the Hyades, but older than the newborn stars of the Orion Nebula. These bright young stars are still relatively close together, but have dispersed their birth cocoon of stellar gas, like teenagers venturing around the neighborhood with friends and wearing their own clothes, but still remaining close to home - for now. Astronomers have studied this trio in great detail in order to learn more about stellar evolution.

Figuring the exact distance of the Pleiades from Earth is an interesting problem in astrometry, the study of the exact positions of stars in space. Knowing their exact distance away is a necessary step in determining many other facts about the Pleiades. The European Space Agency's Hipparcos satellite determined their distance to about 392 light years away, around 43 light years closer than previous estimates. However, subsequent measurements by NASA's Hubble Space Telescope indicated a distance of 440 light years, much closer to pre-Hipparcos estimates. Then, using a powerful technique called [Very Long Baseline Interferometry](#) (VLBI), which combines the power of radio telescopes from around the world, the distance of the Pleiades was calculated to 443 light years. The ESA's Gaia satellite, a successor to Hipparcos, recently released its first two sets of data, which among other findings show the distance close to the values found by Hubble and VLBI, possibly settling the long-running "Pleiades Controversy" and helping firm up the foundation for follow-up studies about the nature of the stars of the Pleiades.

You can learn more about the Pleiades in the Universe Discovery Guide at bit.ly/UDGMarch , and find out about missions helping to measure our universe at nasa.gov.



Locate Orion rising in the east after sunset to find the Orion Nebula in the “Sword,” below the famous “Belt” of three bright stars. Then, look above Orion to find both the Hyades and the Pleiades. Binoculars will bring out lots of extra stars and details in all three objects, but you can even spot them with your unaided eye!



Close-up of the Pleiades, with the field of view of Hubble’s Fine Guidance Sensors overlaid in the top left, which helped refine the distance to the cluster. The circumference of the field of view of these sensors is roughly the size of the full Moon. (Credit: [NASA](#), [ESA](#) and AURA/Caltech)



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This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach.

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The TVA is a member club of [The Astronomical League](#).
