



# Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers Dec 2019

## Events:

### General Meeting :

No meeting in December but watch your email for the announcement of the Sirius [Soirée](#) – bid a fond farewell to Saturn and welcome in the Winter Sky.

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](#).



[NASA APOD](#): Venus and Jupiter on the Horizon – Image Credit & Copyright: [Juan Carlos Casado \(TVA\)](#)

### General information:

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

President: Mark Baker 951-691-010

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Past President: John Garrett <[garjohn@gmail.com](mailto:garjohn@gmail.com)>

Treasurer: Curtis Croulet <[calypte@verizon.net](mailto:calypte@verizon.net)>

Secretary: Deborah Baker <[geedeb@gmail.com](mailto:geedeb@gmail.com)>

Club Librarian: Vacant

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## WHAT'S INSIDE THIS MONTH:

### Cosmic Comments

by President Mark Baker

### 2020 Board of Directors Election

### Looking Up Redux

compiled by Clark Williams

### The Orion Nebula: Window Into a

### Stellar Nursery

by David Prosper

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

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## Cosmic Comments by President Mark Baker

These are truly exciting times in the study of the Cosmos...we glean new insights daily, and are even doing what was once the impossible on a daily basis. And the best part is that there is plenty of room for amateurs and hobbyists to be involved and make hard contributions...from corroborative observing to validating data, amateurs like us are an important cog in the wheel of understanding!!!

Not to beat a worn out drum, but the expanding indications of prevalent water throughout the solar system is especially gratifying. As one who took on the established notion back in the seventies that water compounds were predominantly a Terran asset, it's nice to see my numbers were NOT wrong...there IS water EVERYWHERE!!! And humankind is on the verge of utilizing this most important asset both to benefit this rock we call home, and to support the expansion of the species into our local cosmic neighborhoods...much is ballyhooed about the Moon and Mars, but other bodies are now catching our imagination and interest too!!! Enceladus, Europa, Triton, and especially Titan are planetary satellites that just might harbor a home for humanity in the next century as well...how cool is that??!!!

The point to all this for us non-professionals, is the need for more "eyes" on the skies grows exponentially...I encourage any and all that might have a spare hour or two, now and then, to jump into Zooniverse, google NASA and commercial agencies, or even international organizations to see where your particular interests might best fit and best be utilized. There is so much to be done and the work can be gratifying...you might even find your name attached to one or more of the plethora of papers being produced constantly. For example, an easy contribution would be to the Silent Earth project...if you take and submit only 100 readings on your smart phone, you become part of that research team!!! Fun stuff...

But coming back down to Earth, the TVA will continue to inspire and encourage young and old alike to Look Up, wonder in awe, and ask important questions...that part of our Mission never changes. Thanks to all those that actively support this effort, as well as those that tacitly do just by being a part of TVA...On to 2020!!!

Clear, Dark Skies my Friends...





## 2020 Board of Directors Election

At the November meeting of the TVA, we elected the following members to the Temecula Valley Astronomers' 2020 Board of Directors:

President: Mark Baker

Vice President: Sam Pitts

Treasurer: Curtis Croulet

Secretary: Deborah Baker





## 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 TIME WILDOMAR/MURRIETA/TEMECULA

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:

<b>Tuesday</b>	<b>the 3<sup>rd</sup></b>	<b>@ 2259 FIRST QTR in Aqurius</b>
<b>Wednesday</b>	<b>the 11<sup>th</sup></b>	<b>@ 2113 FULL in Taurus</b>
<b>Wednesday</b>	<b>the 18<sup>th</sup></b>	<b>@ 2058 THIRD QTR in Virgo</b>
<b>Wednesday</b>	<b>the 25<sup>th</sup></b>	<b>@ 2114 NEW in Sagittarius</b>

Apogee comes on 2019-12-05 @ **0410 – 404,445 km (251,311 mi)**

Perigee comes on 2019-12-18 @ **2031 – 370,258 km (230,068 mi)**

2019 has: (13) new moons, (12) 1<sup>st</sup> Qtr moons, (12) Full moons, (12) 3<sup>rd</sup> Qtr moons  
(0) Blue moons and (1) Black moon

**Daylight Savings:** Pacific time is Timezone Uniform -8 GMT (-7 GMT PDT)

**Luna:** Luna is just five days past NEW on the 1<sup>st</sup> of the month setting by **2137**, so you should have some dark nights for a few days of the month. Luna by mid-month is 80% illuminated. Luna is rising by **2026** and glowing without mercy while insisting on staying up all night. This is a perfect time for some lunar exploring with binoculars, a small scope or just your peepers. All of the Apollo landing sites will be visible; not the detritus of course. By the-end-of-the-month Luna is once again a waxing crescent moon, 32% illuminated setting by 2213.



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

December 12 - 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 05:14 UTC. This full moon was known by early Native American tribes as the Full Cold Moon because this is the time of year when the cold winter air settles in and the nights become long and dark. This moon has also been known as the Full Long Nights Moon and the Moon Before Yule.

December 13, 14 - Geminids Meteor Shower. The Geminids is the king of the meteor showers. It is considered by many to be the best shower in the heavens, producing up to 120 multicolored meteors per hour at its peak. It is produced by debris left behind by an asteroid known as 3200 Phaethon, which was discovered in 1982. The shower runs annually from December 7-17. It peaks this year on the night of the 13th and morning of the 14th. Unfortunately the nearly full moon will block out many of the meteors this year, but the Geminids are so bright and numerous that it could still be a good show. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Gemini, but can appear anywhere in the sky.

December 22 - December Solstice. The December solstice occurs at 04:19 UTC. The South Pole of the earth will be tilted toward the Sun, which will have reached its southernmost position in the sky and will be directly over the Tropic of Capricorn at 23.44 degrees south latitude. This is the first day of winter (winter solstice) in the Northern Hemisphere and the first day of summer (summer solstice) in the Southern Hemisphere.

December 21, 22 - Ursids Meteor Shower. The Ursids is a minor meteor shower producing about 5-10 meteors per hour. It is produced by dust grains left behind by comet Tuttle, which was first discovered in 1790. The shower runs annually from December 17 - 25. It peaks this year on the the night of the 21st and morning of the 22nd. The waning crescent moon should not interfere too much this year. Skies should still be dark enough for what could be a good show. Best viewing will be just after midnight from a dark location far away from city lights. Meteors will radiate from the constellation Ursa Minor, but can appear anywhere in the sky.

December 26 - New Moon. The Moon will located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 05:15 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.

December 26 - Annular Solar Eclipse. An annular solar eclipse occurs when the Moon is too far away from the Earth to completely cover the Sun. This results in a ring of light around the darkened Moon. The Sun's corona is not visible during an annular eclipse. The path of of the eclipse will begin in Saudi Arabia and move east through southern India, northern Sri Lanka, parts of the Indian Ocean, and Indonesia before ending in the Pacific Ocean. A partial eclipse will be visible throughout most of Asia and northern Australia.

**[\(NASA Map and Eclipse Information\)](#) [\(NASA Interactive Google Map\)](#)**



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Algol minima: (All times **LOCAL TIME**)

<b>12/01/19</b>	<b>2329</b>
<b>12/04/19</b>	<b>2018</b>
<b>12/07/19</b>	<b>1707</b>
<b>12/10/19</b>	<b>1356</b>
<b>12/13/19</b>	<b>1045</b>
<b>12/16/19</b>	<b>0734</b>
<b>12/19/19</b>	<b>0423</b>
<b>12/22/19</b>	<b>0112</b>
<b>12/24/19</b>	<b>2202</b>
<b>12/27/19</b>	<b>1851</b>
<b>12/30/19</b>	<b>1540</b>

Sun and Moon Rise/Set Times

		<b>Rise</b>	<b>Transit</b>	<b>Set</b>
<b>12/01/19</b>	Sun	063340	113758	164215
	Moon	110259	162010	213716
<b>12/15/19</b>	Sun	064138	114213	164248
	Moon	163249	234905+	070855+
<b>12/31/19</b>	Sun	065141	115206	165231
	Moon	104435	1628223	221304

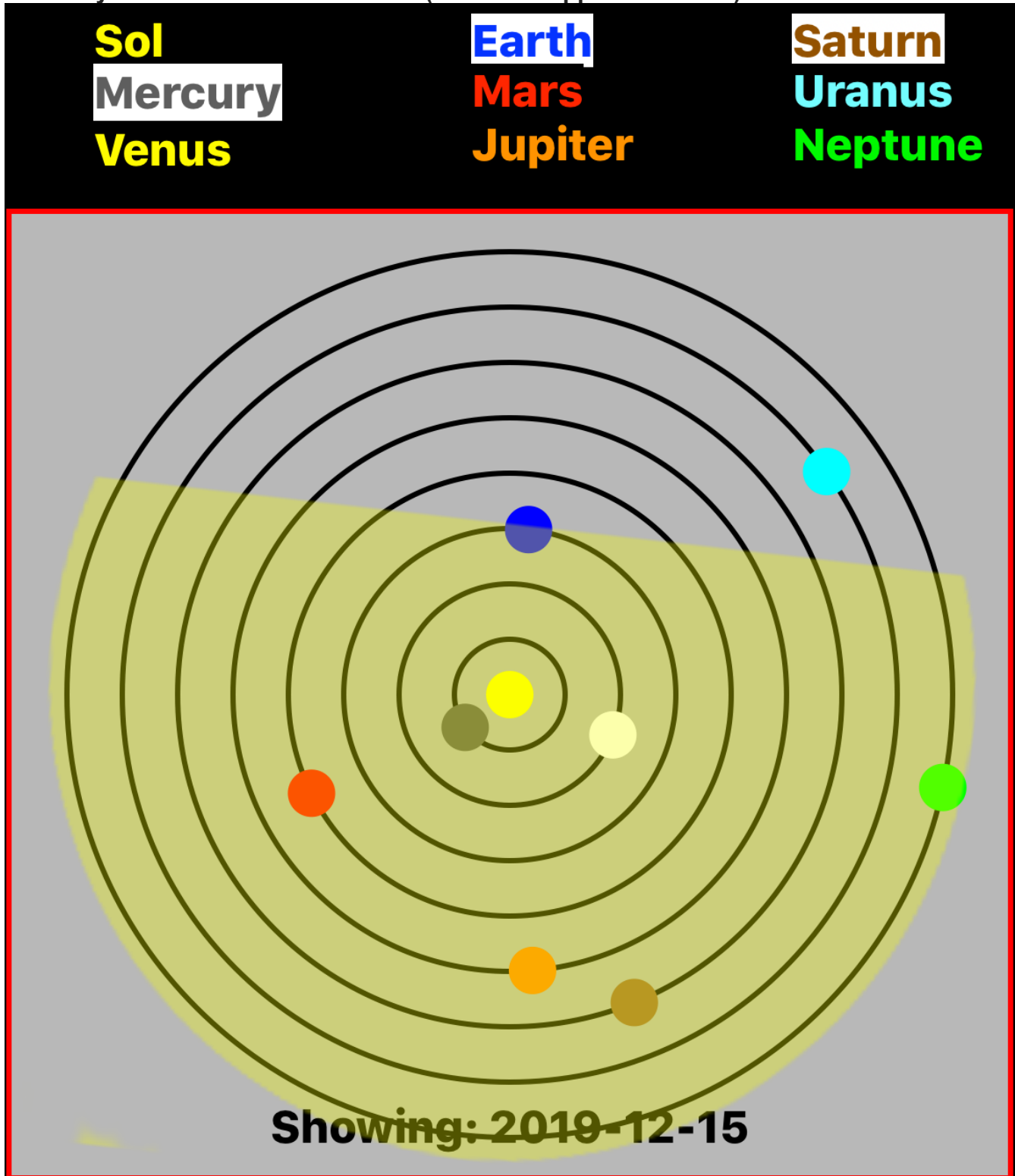


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Planets:

Planetary Positions December 2019: (from TVA App iOS version)





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- **Mercury:** Mercury is a morning object in the beginning of the month. It is well illuminated at 73% and -0.56 apparent magnitude and rises at **0457** with the sun following at **0633**. Mercury's rise time by mid-month is about **0538** with Sol following at **0644**. By the 31<sup>st</sup> Mercury is rising at **0632** with the sun following at **0651**.
- **Venus:** Is the Evening Star. Venus sets about **1833** following sunset at **1642** on the first. By mid-month Venus is setting at **1859** following Sol which set at **1643**. By the 31<sup>st</sup> Venus is setting at **1932** long after the **1652** sunset.
- **Mars:** Mars is a morning object. Leading the Sun, Mars rises at 0405 on the first. By mid-month Mars is rising at **0354**. End-of-month finds the Warrior rising at **0343**. So if you're a night-owl or an extremely early riser the Red Planet is coming back into view.
- **Jupiter:** Jupiter is leading Venus as a morning object setting at **1804** on the first of the month. By mid-month Jove is setting before the sun. by **1722**. Jupiter is fading fast.
- **Saturn:** Saturn is trailing Jove setting about **1926** on the 1<sup>st</sup>. Saturn is setting about **1838** by mid month. By the end-of-the-month Saturn sets at **1744**. Like Jove, Saturn is fading fast.
- **Uranus:** On the first Uranus transits at **2110** and doesn't set until **0347+**. The apparent magnitude is 5.69 so we're right on the ragged edge of being naked-eye visible. By the ides Uranus is transiting at **2014** however, there is a waning gibbous moon looming toward the west at 83% illumination. End-of-month finds Uranus transiting until **1910**. You won't be finding Uranus easily or with a scope less than about 10-inches aperture.
- **Neptune:** Neptune is leading Uranus, transiting at **1816** in the Eastern sky at the beginning of the month; setting about **0202+**. Unfortunately there is a waxing crescent moon with 30% illumination sitting just 31° to the east along the Ecliptic. By the 15<sup>th</sup> Neptune is transiting **1721**. There is an 82% illuminated moon that night but it doesn't rise until **2026**. By the end of the month Neptune is setting at **2205** but the moon is only 4° away with 30% illumination.
- **Pluto:** Pluto is hanging out within 3° of Saturn on the 1<sup>st</sup> setting by **1940**. So finding this elusive dot will not be easy. Mid-month finds Pluto setting by **1847**. Month end finds Pluto setting at **1747**.

## Asteroids:

- Still a dearth of asteroids. I searched for asteroids in 2019 with a reasonable magnitude; say less than or equal to +10 in December 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=2019>.

## Meteors:

- The Geminids are back and run from December 7-17. It peaks this year on the night of the 13<sup>th</sup>. See Highlights above for more details.
- The Ursids is a minor meteor shower running annually from December 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.





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- Short period comets December 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

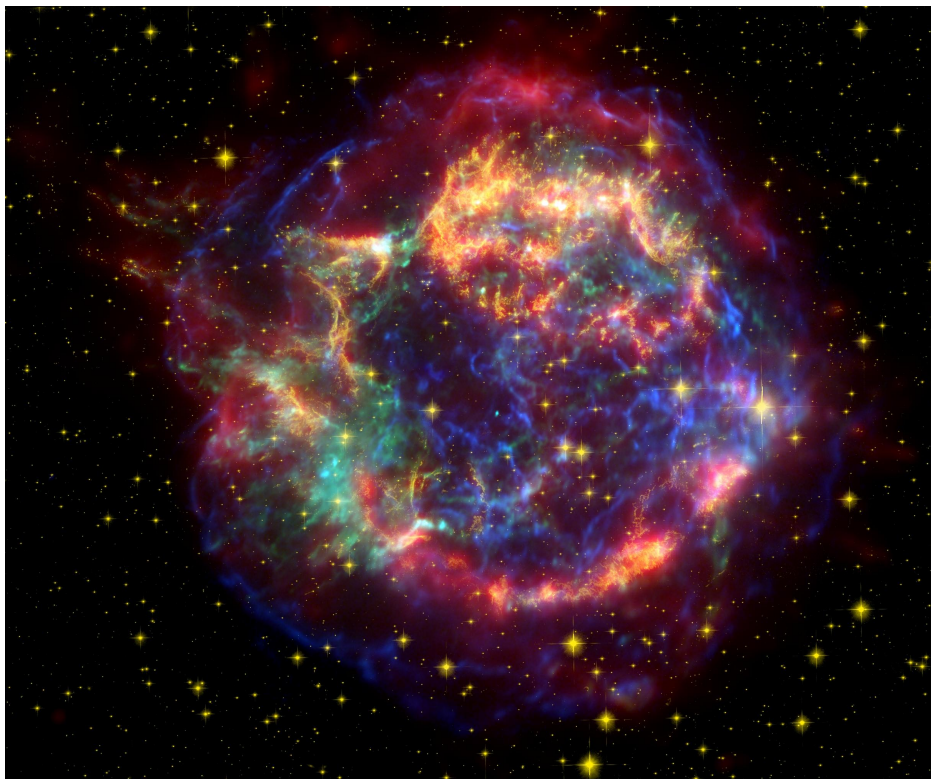
$\alpha$  is right ascension

$\delta$  is declination

In each case, unless otherwise noted, you should look for the following on or about the 15<sup>th</sup> Day of December 2019 at 2100 local time and you will have about 20 minutes of viewing time total.

Lets look for some familiar objects:

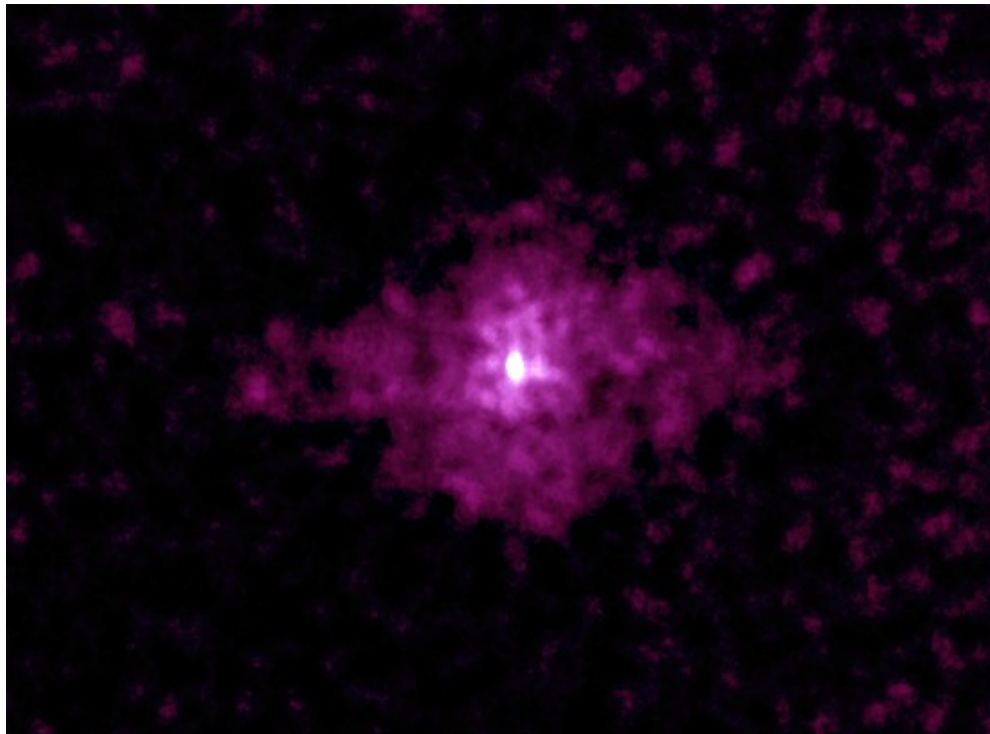
- **Cassiopeia A:**



*By Oliver Krause (Steward Observatory) George H. Rieke (Steward Observatory) Stephan M. Birkmann (Max-Planck-Institut für Astronomie) Emeric Le Floc'h (Steward Observatory) Karl D. Gordon (Steward Observatory) Eiichi Egami (Steward Observatory) John Biegging (Steward Observatory) John P. Hughes (Rutgers University) Erick Young (Steward Observatory) Joannah L. Hinz (Steward Observatory) Sascha P. Quanz (Max-Planck-Institut für Astronomie) Dean C. Hines (Space Science Institute) - [http://gallery.spitzer.caltech.edu/Imagegallery/image.php?image\\_name=ssc2005-14c](http://gallery.spitzer.caltech.edu/Imagegallery/image.php?image_name=ssc2005-14c), Public Domain, <https://commons.wikimedia.org/w/index.php?curid=4341500>*

**Cassiopeia A – AKA Cas A, Supernova remnant 1680:** is a supernova remnant (SNR) in the constellation Cassiopeia and the brightest extrasolar radio source in the sky at frequencies above 1 GHz. The supernova occurred approximately 11,000 light-years (3.4 kpc) away within the Milky Way. The expanding cloud of material left over from the supernova now appears approximately 10 light-years (3 pc) across from Earth's perspective. In wavelengths of visible light, it has been seen with amateur telescopes down to 234 mm (9.25 in) with filters. It is estimated that light from the stellar explosion first reached Earth approximately 300 years ago, but there are no historical records of any sightings of the supernova that created the remnant. Since Cas A is circumpolar for mid-Northern latitudes, this is probably due to interstellar dust absorbing optical wavelength radiation before it reached Earth (although it is possible that it was recorded as a sixth magnitude star 3 Cassiopeiae by John Flamsteed on 16 August 1680). Possible explanations lean toward the idea that the source star was unusually massive and had previously ejected much of its outer layers. These outer layers would have cloaked the star and re-absorbed much of the light released as the inner star collapsed. Cas A was among the first discrete astronomical radio sources found. Its discovery was reported in 1948 by Martin Ryle and Francis Graham-Smith, astronomers at Cambridge, based on observations with the Long Michelson Interferometer. The optical component was first identified in 1950. (Wikipedia)

- **Supernova 1181:**



By NASA/CXC/SAO/S.Murray et al. -  
<http://chandra.harvard.edu/photo/2001/0022/index.html>, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=6952324>



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- **Supernova 1181: – AKA –** First observed between August 4 and August 6, 1181, Chinese and Japanese astronomers recorded the supernova now known as SN 1181 in eight separate texts. One of only eight supernovae in the Milky Way observable with the naked eye in recorded history, it appeared in the constellation Cassiopeia and was visible in the night sky for about 185 days. The radio and X-ray pulsar J0205+6449 (also known as 3C 58), which rotates about 15 times per second, is possibly the remnant from this event. If the supernova and pulsar are associated, the star is still rotating about as quickly as it did when it first formed. This is in contrast to the Crab pulsar, known to be the remnant of the SN 1054 supernova in the year 1054, which has lost two-thirds of its rotational energy in essentially the same time span. Recent radio surveys of 3C 58, however, indicate that this supernova remnant may be much older and thus not associated with SN 1181. ([Wikipedia](#))

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

For now – Keep looking up.



## The Orion Nebula: Window Into a Stellar Nursery by David Prosper

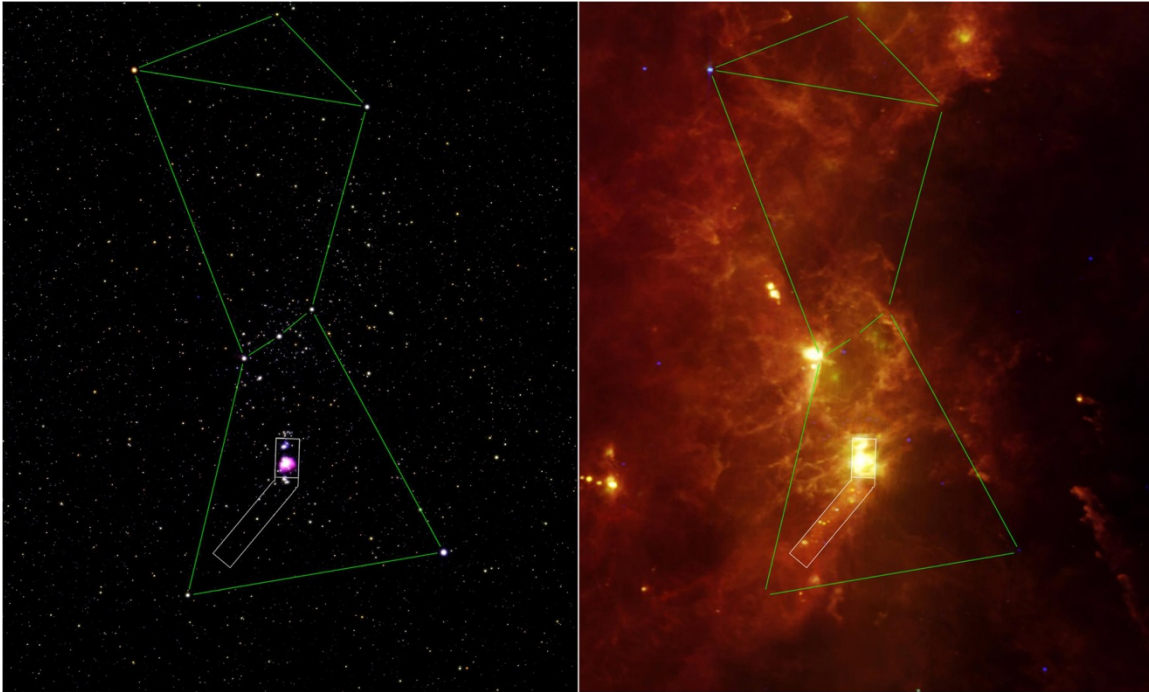
Winter begins in December for observers in the Northern Hemisphere, bringing cold nights and the return of one of the most famous constellations to our early evening skies: Orion the Hunter!

Orion is a striking pattern of stars and is one of the few constellations whose pattern is repeated almost unchanged in the star stories of cultures around the world. Below the three bright stars of Orion's Belt lies his sword, where you can find the famous Orion Nebula, also known as M42. The nebula is visible to our unaided eyes in even moderately light-polluted skies as a fuzzy "star" in the middle of Orion's Sword. M42 is about 20 light years across, which helps with its visibility since it's roughly 1,344 light years away! Baby stars, including the famous "Trapezium" cluster, are found inside the nebula's whirling gas clouds. These gas clouds also hide "protostars" from view: objects in the process of becoming stars, but that have not yet achieved fusion at their core.

The Orion Nebula is a small window into a vastly larger area of star formation centered around the constellation of Orion itself. NASA's Great Observatories, space telescopes like Hubble, Spitzer, Compton, and Chandra, studied this area in wavelengths we can't see with our earthbound eyes, revealing the entire constellation alight with star birth, not just the comparatively tiny area of the nebula. Why then can we only see the nebula? M42 contains hot young stars whose stellar winds blew away their cocoons of gas after their "birth," the moment when they begin to fuse hydrogen into helium. Those gas clouds, which block visible light, were cleared away just enough to give us a peek inside at these young stars. The rest of the complex remains hidden to human eyes, but not to advanced space-based telescopes.

We put telescopes in orbit to get above the interference of our atmosphere, which absorbs many wavelengths of light. Infrared space telescopes, such as Spitzer and the upcoming James Webb Space Telescope, detect longer wavelengths of light that allow them to see through the dust clouds in Orion, revealing hidden stars and cloud structures. It's similar to the infrared goggles firefighters wear to see through smoke from burning buildings and wildfires.

Learn more about how astronomers combine observations made at different wavelengths with the Night Sky Network activity, 'The Universe in a Different Light,' downloadable from [bit.ly/different-light-nsn](http://bit.ly/different-light-nsn). You can find more stunning science and images from NASA's Great Observatories at [nasa.gov](http://nasa.gov).



*This image from NASA's Spitzer missions shows Orion in a different light – quite literally! Note the small outline of the Orion Nebula region in the visible light image on the left, versus the massive amount of activity shown in the infrared image of the same region on the right. Image Credit: NASA/JPL-Caltech/IRAS /H. McCallon. From [bit.ly/SpitzerOrion](http://bit.ly/SpitzerOrion)*

## **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 <https://nightsky.jpl.nasa.org> to find local clubs, events, and more!





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

