Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers December 2023

Events: General Meeting, Monday, December 4, 2023, at the Ronald H. Roberts Temecula Library, Room B, 30600 Pauba Rd, and/or ZOOM, at 6:00 PM.

- **IFI & Gallery by Clark Williams**
- **Racing with the Moon/Dancing with the Stars by Dr. Richard Lederer**
- **Refreshments by TVA**
- **Star Parties at South Coast Winery every Friday evening in June.**
- **For upcoming school Star Parties check the Calendar on the web page.**

WHAT'S INSIDE THIS MONTH:

Send newsletter submissions to Sharon Smith <sas19502000@yahoo.com> by the 20th of the month for the next month's issue.

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

Address renewals or other correspondence to:
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Members' Mailing List:
<tvastronomers@googlegroups.com>
Website:
http://www.temeculavalleyastronomers.com/

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Cosmic Comments – December 2023
By Mark Baker

November came and TVA now has a new BOD for 2024!!! I am grateful for them stepping up and taking on the mantle… as well as picking up the gauntlet!!! I am proud of where the Club is, but realize it is an unfinished work…

I look forward to participating under the guidance and facilitation of President Clark, VP Gordon, and Treasurer Will… but wait, you say. Isn't there one spot not mentioned?? Yes, the Secretary / Outreach Coordinator position remains to be filled, but I have a feeling that it soon will be… I know someone out there will earnestly take on the responsibility and associated, awesome blessings!!!

I'd again be remiss if I didn't mention those others who have left their stamp on TVA and who I learned much from… Curtis Croulet, John Garrett, Dave Ng, Mark DiVecchio, and my darling wife, Deborah, to name a few. It seems like a lifetime ago that Kent Smith and I shared viewings and talked about doing a Club… over 30 years later and that gab is still a reality!!!

So, after more than a decade, I steer my longboat into the sunset, but only to practice what I preach about Looking Up… my association with the TVA members is near and dear to me and I will not sever it if at all possible…

Soooooo… as always, I thank TVA for the great memories and for the experiences yet ahead. We have done an awful lot of good in these communities… and even contributed to promoting cutting edge science via Palomar Observatory Docent efforts. Keep it up…!!!

Clear, Dark Skies

Looking Up Redux – December 2023

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
StarParty App (1.0.14)
FullAndNewMoon App (2.0)
Starry Night Pro Plus 8 (8.1.1.2078)
SkySafari 6 Pro (6.8.2)
Stellarium (23.1)
timeanddate.com/astronomy
https://www.fourmilab.ch/earthview/pacalc.html

ALL TIMES ARE LOCAL PACIFIC TIME (PST / PDT) 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)
yyyymmddThhmmss (Full date as: year month day Time separator hours minutes seconds)

Moon Phases for the month by date:

Tuesday	**the 26th**	**@1634 FULL in GEMINI**
Monday	**the 4th**	**@2150 THIRD QTR in LEO**
Tuesday	**the 12th**	**@1533 NEW in OPHIUCHUS**
Tuesday	**the 19th**	**@1040 First QTR in PISCES**

Perigee comes on 2023-12-21 @ 2121 **– 369,823 km (223,68 mi)**
Apogee comes on 2023-12-06 @ **0621 – 405,568 km (252,456 mi)**

2023 has: (12) new moons, (12) 1st Qtr moons, (13) Full moons, (12) 3rd Qtr moons
(1) Blue moon and (0) Black moons

Daylight Savings: Starts: 2023-Mar-12 : Ends: 2023-Nov-05 (CA does not keep PDT year-round)

Luna: Luna is waning gibbous on the first of the month, headed for 3rd quarter on the 4th, rising on the first at **2039**, transiting at **0400+** and setting by **1114+**. Luna by mid-month is waxing crescent. Rising at **0938** and transiting at **1439** setting at **1940**. By the end of the month, Luna is waning gibbous, 78%

illuminated, rising at **2123** transiting at **0403**+ and setting by **1037**+.

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

December 4 - Mercury at Greatest Eastern Elongation. The planet Mercury reaches greatest eastern elongation of 21.3 degrees from the Sun. This is the best time to view Mercury since it will be at its highest point above the horizon in the evening sky. Look for the planet low in the western sky just after sunset.

December 12 - 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 23:33 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 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. This should be an great year for the Geminids. The nearly new moon means dark skies for what should be an excellent 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.

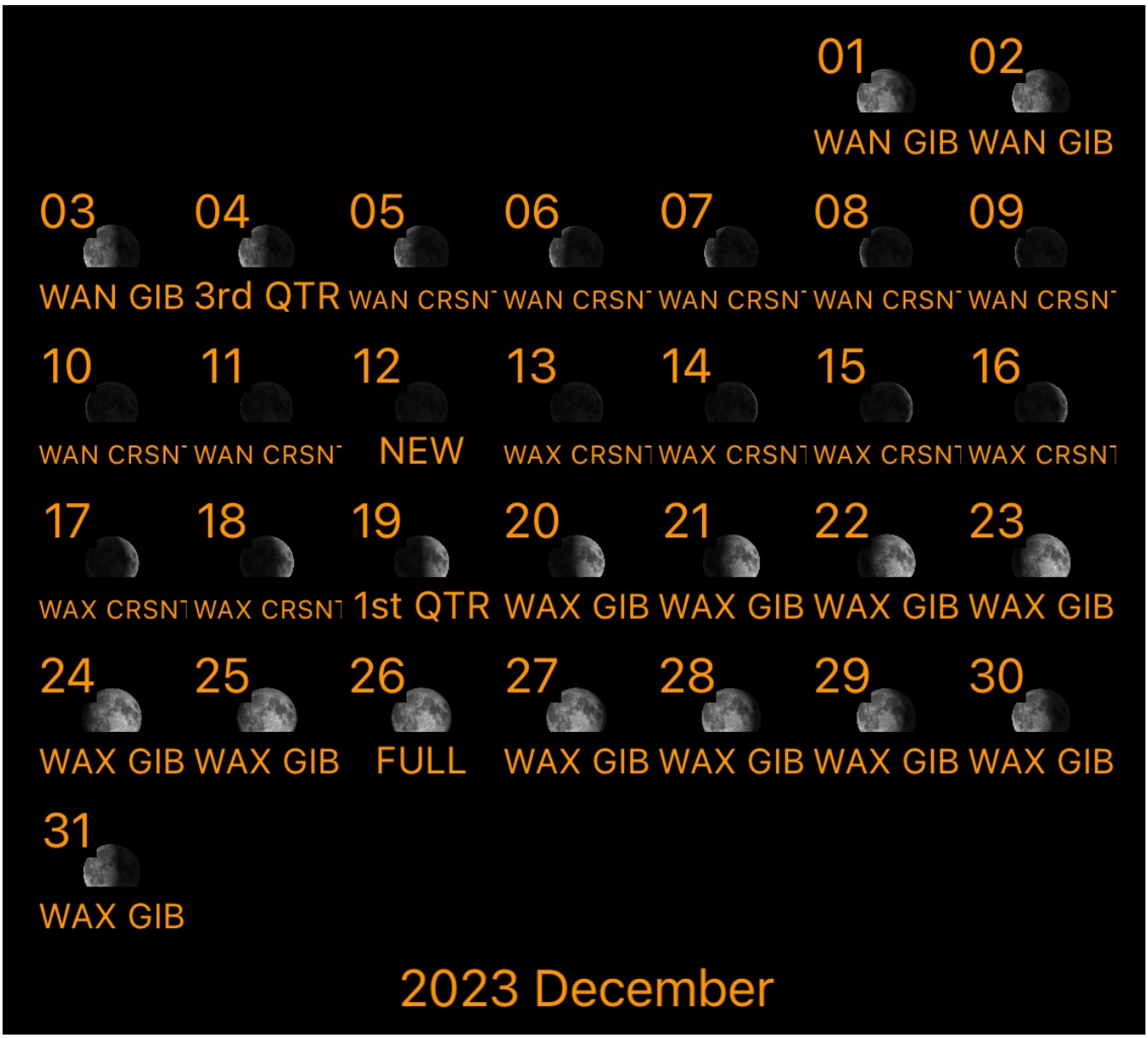
December 21, 22 - Ursids Meteor Shower. The Ursids is a minor meteor shower producing about 5-10 meteors per hour. It is produced by dust grains left behind by comet Tuttle, which was first discovered in 1790. The shower runs annually from December 17-25. It peaks this year on the the night of the 21st and morning of the 22nd. The waxing gibbous moon will block out most of the faintest meteors this year. But if you are patient, you should still be able to catch a few good ones. 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 22 - December Solstice. The December solstice occurs at 03:21 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 27 - Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be will be fully illuminated. This phase occurs at 00:34 UTC. This full moon was known by early Native American tribes as the 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 Long Nights Moon and the Moon Before Yule.

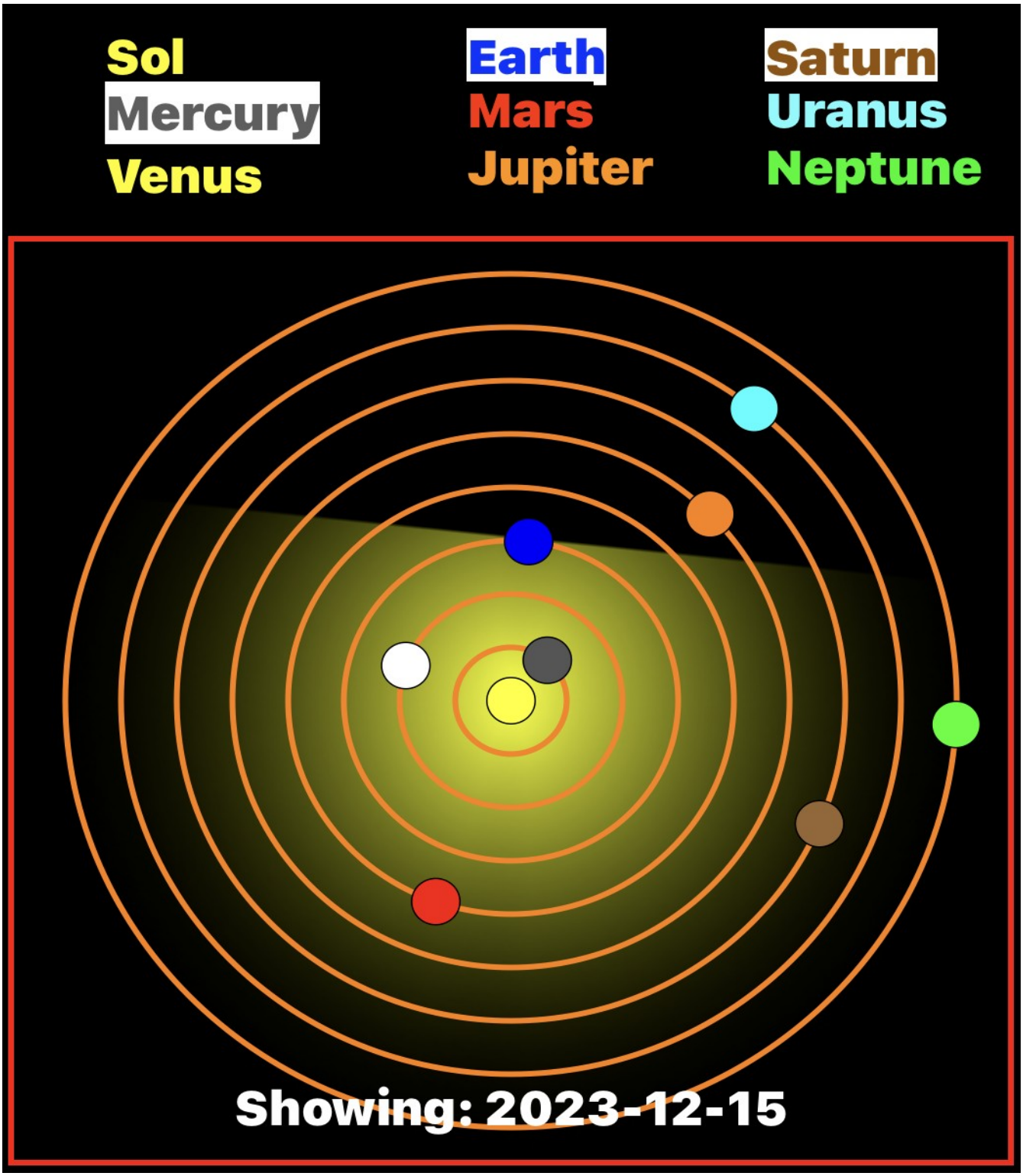
Algol minima: (All times Pacific Time)

12/03/2023	**0711**
12/06/2023	**0400**
12/09/2023	**0049**
12/112023	**2118**
12/14/2023	**1827**
12/17/2023	**1517**
12/20/2023	**1200**
12/23/2023	**0855**
12/26/2023	**0544**
12/29/2023	**0233**
12/31/2023	**2323**


01 WAN GIB
02 WAN GIB
03 WAN GIB
04 3rd QTR
05 WAN CRSN-
06 WAN CRSN-
07 WAN CRSN-
08 WAN CRSN-
09 WAN CRSN-
10 WAN CRSN-
11 WAN CRSN-
12 NEW
13 WAX CRSN+
14 WAX CRSN+
15 WAX CRSN+
16 WAX CRSN+
17 WAX CRSN+
18 WAX CRSN+
19 1st QTR
20 WAX GIB
21 WAX GIB
22 WAX GIB
23 WAX GIB
24 WAX GIB
25 WAX GIB
26 FULL
27 WAX GIB
28 WAX GIB
29 WAX GIB
30 WAX GIB
31 WAX GIB
2023 December

Planets:

Planetary Positions December 2023: (from TVA App iOS version)



- **Mercury:** Mercury in the beginning of the month is a evening object, rising at **0820**. transiting at **1308** amd setting by **1756**. Mercury by mid-month is further from the Sun but still an evening object. Mercury rises at **0751**, transits at **1246** and sets by **1741**. By the end of the month, Mercury has become a morning object. Mercury rises at **0531**, transits at **1036** and sets at **1542**.
- **Venus:** Is the Morning Star on the first of the month. Venus rises at **0307**, transits at **0848** and sets at **1429**. Venus is 68% illuminated and has an apparent magnitude of -4.17.
  By mid-month Venus remains the Morning Star rising at **0331**, transiting at **0857** and seting by **1423**.
  By end of month the Morning Star rises at **0400**, transits at **0911** and sets at **1422**.
- **Mars:** Mars on the first of the month is rising and setting with the Sun. Mars rises at **0618**, transits at **1120** and sets by **1622**. By mid-month Mars is moving ahead of the Sun**.** Mars rises at **0611**, transits at **1108** and sets at **1605**. End-of-month finds the Warrior, a morning object still, very close to the Sun, rising at **0602** transiting at **1056** and setting at **1550**.
- **Jupiter:** Jupiter is an eveving object on the first of the month. Jupiter rises at **1454--**, transits at **2130--** and sets at **0406**. By mid-month Jove as an evening object rises at **1356--**, transits at **2031--** and sets at **0306**. Come the end-of-month Jupiter rises at **1251--**, transits at **1926--** and sets at **0201**.
- **Saturn:** Saturn is an evening object on the first of the month rising at **1154**, transiting at **1721** and setting at **2249**. Saturn by mid month rises by **1101**, transiting at **1629** and setting at **2158**. By the end-of-the-month Saturn rises by **1001**, transits at **1531** and set at **2101**.
- **Uranus:** On the first of the month Uranus is an evening object rising at **1527**, transiting at **0120** and setting at **0811**. By the ides Uranus is rising at **1430**, transiting at **2120** and setting by **0410+**. End-of-month finds Uranus as a morning object rising at **1326**, transiting at **1652** and setting at **2245**.
- **Neptune:** Neptune in the beginning of the month is an evening object. Neptune rises at **1256**, transits at **1849** and sets by **0346+**. By the 15th Neptune rise at **1201**, transits at **1754** and sets by **2347**. By the end of the month Neptune is rising at **1058**, transiting at **1857–** and sets by 0050.
- **Pluto:** Pluto on the first of the month is an evening object rising at **1015**, transiting at **1511**. and setting at **2008**. By mid-month Pluto is rising by **0921**, transiting by **1418** and sets by **1914**. By the-end-of-the-month, Pluto is rising at **0820** transits at **1317** and sets at **1814**.

Asteroids:

- Still a dearth of asteroids. I searched for asteroids in 2023 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.asteroids near.com/year?year=2023
- Vesta is a 6.6 Mag Asteroid/protoplane,t in Orion it rises 1716 2023 Dec 15 and sets at 0718+.

Meteors:

- (see Highlights above).

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 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.

Rising in the East on the 15th of the month (extremely low on the horizon) is C2017 K2 PANSTARRS. This is a Mag 10.5 comet right now It rises at **2053** and sets at **0821**. It should reach its maximum altitude above the horizon sometime in early April of 2024.

The other known comets are all at or above Magnitude 11.0

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 December 2023 at 2100 PDT and you will have about 20 minutes of viewing time total.

Lets take a look at some favorite objects:

- Vesta**:**

Illustration 1: By NASA / JPL / MPS / DLR / IDA / Björn Jónsson

Vesta (minor-planet designation: 4 Vesta) is one of the largest objects in the asteroid belt, with a mean diameter of 525 kilometres (326 mi). It was discovered by the German astronomer Heinrich Wilhelm Matthias Olbers on 29 March 1807 and is named after Vesta, the virgin goddess of home and hearth from Roman mythology.

Vesta is thought to be the second-largest asteroid, both by mass and by volume, after the dwarf planet Ceres. Measurements give it a nominal volume only slightly larger than that of Pallas (about 5% greater), but it is 25% to 30% more massive. It constitutes an estimated 9% of the mass of the asteroid belt. Vesta is the only known remaining rocky protoplanet (with a differentiated interior) of the kind that formed the terrestrial planets. Numerous fragments of Vesta were ejected by collisions one and two billion years ago that left two enormous craters occupying much of Vesta's southern hemisphere. Debris from these events has fallen to Earth as howardite–eucrite–diogenite (HED) meteorites, which have been a rich source of information about Vesta. (Wikipedia).

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

For now – Keep looking up.

RANDOM THOUGHT December 2023
By Chuck Dyson

THE SECRET LIVES OF TELESCOPES
PART TWO

As I said in Part 1 you would think that astronomers would be excited and pleased with the results the people at the Lick Observatory were getting after the disastrous results and poor productivity from the Foggy Bottom Observatory but NO they were not. In Part 2 we will look at the impact those unhappy astronomers with their mad scramble to build observatories on mountain tops had on 20th century astronomy.

The first group of astronomers to head for the mountains were sent by the director of Harvard College Observatory one Edward C. Pickering. In January 1889 Pickering's brother, William, and telescope maker Alvan Clark surveyed the Mt Wilson area for an observatory site. William wrote to his brother, "I consider this the point of all others to place the largest and finest telescope in the world". By spring of 1889 the Harvard 13-inch Alvan Clark refractor was installed in a hastily constructed observatory to do observations over the winter and confirm William's impressions.

Upon receipt of William's letter Edward, perhaps a bit prematurely, began discussions with the chancellor of U.S.C., prominent bankers, and land developers to build the worlds largest refractor on Mt. Wilson. Edward, with seed money in hand, commissions Alvan Clark to order two 40-inch lens blanks from France and then grind and polish them.

Perhaps Edward had not read John Muir's description of the Mt Wilson range "More rigidly inaccessible than any other I ever attempted to penetrate". Also, as luck would have it, the 1888-1889 winter was a very mild one and the observatory staff was expecting a repeat performance. In the 1889-1890 winter what they got was one of the coldest on record.

Come the 1890 spring the astronomers wanted off that mountain and to never see it again, U.S.C and Harvard had decided not to pursue the telescope project, and the land boom in the Los Angeles area had collapsed so the bankers and land developers withdrew their promised monies from the project. This left Edward with a 13-inch refractor and a brother in Pasadena with nothing to do and Alvan Clark with the world's largest refractor lenses and no buyer.

For his part Edward Pickering knew exactly what to do. He got monies from a rich donor and shipped the telescope and his brother off to Lima, Peru to set up a station in the Southern Hemisphere to measure the spectra of stars. William and the telescope arrived in Lima and realized that as a beach town with a maximum elevation of 528 feet this was no place to set up an observatory and decided to go to the city of Arequipa (average elevation 7660 feet). The Harvard Boyden station (named after the donors) would stay in Arequipa until 1927 and then our 13-inch refractor would move to the Union of South Africa, where it is today, for clearer skies.

William, who was mostly an observational astronomer, was not doing the work that his brother wanted and after the 1894 close approach of Mars he was pulled back to the United States. William immediately set to working with Percival Lowel in Flagstaff on the 24-inch refractor. In 1896 the refractor is operational and William and Lowel use it to view Mars at the closest approach. Lowel sees way more canals and supporting structure than William and this has two effects. The first was that Lowel was convinced that because William did not see what he saw the atmosphere seeing was not as good at Flagstaff as he, Lowel, needed and so Lowel took his telescope to Tacubaya, Mexico for darker skies and better seeing; this experiment lasted only two months and then the telescope with Lowel returned home. Second, Lowel never let William Pickering near his telescope again.

Although we remember Percival Lowel for his outrageous claims about Mars he also hired Vesto M. Slipher to do spectrographic studies of planets. In his spare time Slipher studied the spectral shifts of what were then called spiral nebule, galaxies, and in 1912 gave a talk on the odd recession speeds of these nebula. A young Edwin Hubble heard that paper and decided that he needed to really study this phenomenon with the new telescopes that were being built at Mt Wilson.
The last telescope on Mt. Wilson B.H. (Before Hale) is the Thaddeus Lowe 16-inch refractor (Whoops I'm sorry that is the Professor {self-appointed} Thaddeus S. C. Lowe Chief Aeronaut of the Union Army Balloon Corps). Lowe was a colorful character who had made millions in ice making machines and hydrogen gas production, thus his connection with the Balloon Corps. Lowe moves to Pasadena and forms a group entrepreneurs that build a railroad up to Mt Wilson and a world class hotel with a world class observatory and resident astronomer. Unfortunately, the project never is profitable and Lowe and partners declare bankruptcy. The operation struggles on and the observatory is kept open and staffed because it is a tourist draw. In 1905 there is a mountain fire and the observatory staff dismounts the scope objective lens, wraps it in burlap and puts the lens in the hotel water pond to save it from the fire. The hotel is completely destroyed but the observatory is spared; so, the staff retrieves the lens, cleans and remounts it, and the observatory is back in business. In 1928 General Santa Ana and his wind army pay the

observatory a visit and blew the observatory building completely off the foundation. The 16-inch telescope was in storage until 1941 when the directors of the University of Santa Clara observatory heard of it. The University of Santa Clara had been trying to upgrade its 8-inch Alvan Clark refractor since 1924 with no luck; so, they purchased the 16-inch refractor and as of today it is still in use at the university.

George Ellery Hale graduates from MIT in 1890 and two days later is married and then honeymoons at the Lick observatory where he is fascinated by the 36-inch refractor. Returning from his honeymoon he starts teaching physics and astronomy at the University of Chicago and because the University lacks a decent observatory Hale's father builds one at the family compound on 4545 Drexel Boulevard that Hale uses to teach advanced astronomy to the students. During his tenure at Chicago Hale convinces a Charles T. Yerkes, arguably Chicago's most hated millionaire, to rehabilitate his public image by funding a world class observatory. Yerkes agrees with the stipulation that the observatory be built close to Chicago so the people can appreciate his generous gesture. Hale goes to Alvan Clark and buys the two 40-inch lens from the failed Los Angeles Mt. Wilson project and creates the world's largest refractor telescope that sees first light in 1897. The Yerkes telescope is not just an observatory but also is home to a chemistry and physics lab, Hale has made astronomy a science. The Yerkes telescope is operational until the 1980's primarily doing work on the orbital motions of stars in globular clusters; however, it is the telescope observatory that really marries astronomy and the physical sciences. During his tenure at Yerkes Hale does two things of note. First he talks his father into giving him a 60-inch mirror blank as a birthday present (the world's largest mirror blank by the way) and second he talks Helen Snow to fund the construction of a horizontal solar telescope to honor the memory of her father. Although we primarily remember Hale for the optical telescopes he had built it was the solar telescopes that he constructed that excited him the most.

In 1903 Hale visits Mt. Wilson and is impressed with the seeing at the mountain compared to Yerkes. In 1904 he returns as the Director of the Mt. Wilson Observatory. Only problem, there is no observatory. No problem for Hale as he shows up with the Snow telescope on loan, 119 years later it is still on loan, E.E. Barnard, astrophotographer at Yerkes, with another loaner telescope from Yerkes, and his own 60-inch mirror blank.

1906 turns out to be quite the year for Hale. By 1906 the Snow telescope has been operational for two years and Hale now knows that it will never produce the image resolution that he needs. E. E. Barnard has produced stunning images of our galaxy thanks to the spectacular seeing at Mt. Wilson but sadly has had to return to Yerkes, and the 60-inch mirror is almost ready to mount in the telescope.

But wait, there is more. Hale decides if horizontal solar telescopes will not work he will go vertical and starts plans for the world's first vertical telescope, the 60-foot tower (the telescope sees first light in 1908 and is wildly successful). Because the 60-inch telescope program is going so well and Hale's friend, John D. Hooker, who wants to be the next guy to fund Hales next "The Biggest Telescope in the World" project, offers Hale $45,000 to kick start a $500,000 100-inch telescope project, Hale jumps at the project.

Finally on April 18 Hale has his 1906 lucky day; the mount and optical tube for the 60-inch telescope is complete at the San Francisco Union Iron Works and although the factory is heavily damaged by that famous earth quake (80% of San Francisco is destroyed) the telescope is not.

By 1917 Hale has the 60-inch plus the 100-inch reflector telescopes in operation along side the 60-foot and 150-foot solar towers and what is now called the Era of Mt. Wilson Astronomy is under way. The most significant difference between the 60-inch reflector and the 100-inch reflector is that the 100-inch telescope has no capability for optical observing it is purely an instrument dedicated telescope. The era of professional optical observing is definitely over.

Not willing to rest on past accomplishments and with the night sky over Los Angeles getting ever brighter in 1928 Hale starts on a new observatory project the Palomar Mountain Observatory.

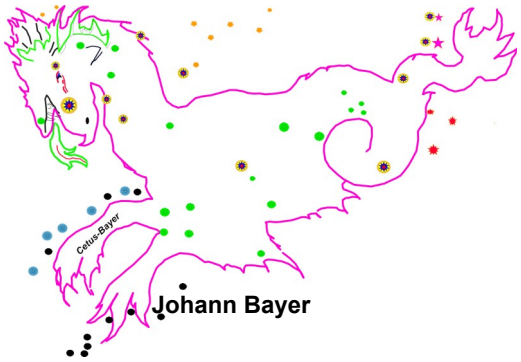
Compared to all of the comings and goings of people and telescopes on Mt. Wilson the Palomar observatory seems almost prosaic except for one tiny little fact. All of the major telescopes that we have talked about were either manufactured completely in Europe or had their lenses manufactured in Europe. The American glass industry was focused on the manufacture of glass chimneys (the glass part of oil lamps) or cut crystal glass for dining sets with some red glass Fresnel lenses for railroad warning lanterns. The Corning Glass Works agreed to work with Hale on the Palomar project, after a General Electric attempt to make the mirror flopped. With the Palomar project the 200-inch mirror was fabricated in New York state and transported to Pasadena, California for grinding and then transported to Palomar where it is today (no real excitement here folks). However, the Palomar project did provide mirror blanks (test pour mirror blanks), at reasonable cost, to other projects. The first mirror blank was a 98-inch solid glass blank that was sold to the University of Michigan for an observatory project that never happened; after WW II the blank was given to the Royal Greenwich Observatory at Herstmonceux, East Sussex. And was used in the Isaac Newton telescope at Herstmonceux by the British until they realized that the weather in England was horrible and had the entire observatory moved to La Palma island in the

Canary Islands. During one of the mirror's resurfacings it cracked and could not be repaired and was shipped back to Herstmonceux where it on display today. The second test pour was a 36-inch blank with the honeycomb holes in the back to lighten the mirror. The blank was purchased by a Dr. Goethe Link and taken to Indianapolis, Indiana where it is ground and polished and is used by Dr. Link as his personal scope from 1939 to 1948 when it is gifted to Indiana University. Indiana University used the scope for research until the 1980's, today it is a public outreach scope. The final test blank was a complete 120-inch mockup of the proposed 200-inch blank. The test pour went perfectly and the mirror was held in reserve, just incase a 200-inch couldn't be produced, until 1949; then, after a successful first light of the 200-inch mirror it was sold to the University of California and was installed as the Shane telescope at the Lick observatory.

For the Rockefeller Foundation's six million dollar investment into the Palomar project Hale produced the world's largest and second largest telescopes plus two other research telescopes, not a bad return on investment and remember that looking at a telescopes history can be as interesting as looking through it.

CHEERS CHUCK

December 2023 Another Look
Dave Phelps



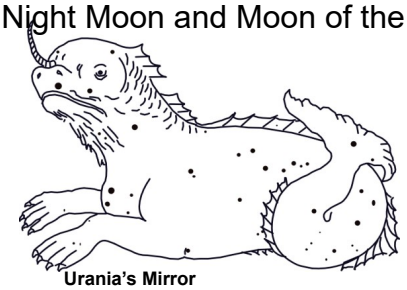
Johann Bayer

December's New Moon is on Tuesday the 12th. The Full Cold Moon will be on Tuesday the 26th. Fridays the 8th and the 15th have smallish moons that will contributed to dark skies for your star parties.

The Full Cold Moon on the 26th will be the first full moon of winter. The winter solstice is on December 21, at 1927 hrs.

There are a number of conjunctions this month, one with Venus on the 9th and one with Saturn on the 17th. Neptune will be occulted by the moon on the 19th. Occultation visibility will be in the southern Indian Ocean off the southwest coast of Australia. In the southwestern US, we can expect a close approach.

Native American names for the December Full Moon include Drift Clearing Moon, Frost Exploding Trees Moon, Hoar Frost Moon, Little Spirit Moon, Long Night Moon and Moon of the Popping Trees.


Urania's Mirror

The Old English and Anglo-Saxon names are the Moon Before Yule or the Long Night Moon while the Celts added the Oak Moon and the Full Cold Moon.

In French its Pleine lune de Décembre,
In German Vollmond im Dezember,
In Spanish Luna llena de Diciembre and in Greek Φεγγάρι Γεμάτος Δεκεμβρίου, or Fengári Gemátos Dekemvríou,

This year 1st magnitude, El Nath, Beta **β** Tauri, will be occulted on December 25th from 1657 to 1920 hours.

The constellation of Cetus is identified across the world. In French we have Baleine, In Italian its Balaeua, and in German Wallfiseh and in classical Greek its Ϗetos-Ketos

Cetus is the fourth largest constellation, it has dimensions of 50^0 East to West and 20^0 North to South, at one time it was written that Cetus is the largest constellation, but contains few telescopic objects of interest.


Thank you to Percy Jact At Skylarks

There appears to be some thought on how Cetus died. We are .accustomed to the story of Perseus unmasking the head of the Medusa and turning our sea monster to stone. This is a very popular legend bolstered by the accounts of historians claiming the petrified remains were carried to Rome. No less a personage as Jerome, who first translated the bible from Greek to Latin, claimed to have seen them in Tyre.

Charles Kingsley has so beautifully told the story:

"On came the great sea-monster, coasting along like a huge black galley, lazily breasting the ripple, and stopping at times by creek or headland to watch for the laughter of girls at their bleaching, or cattle pawing on the sandhills, or boys bathing on the

beach. His great sides were fringed with clustering shells and seaweeds, and the water gurgled in and out of his wide jaws as he rolled along, dripping and glistening in the beams of the morning sun. At last he saw Andromeda, and shot forward to take his prey, while the waves foamed white behind him, and before him the fish fled leaping."

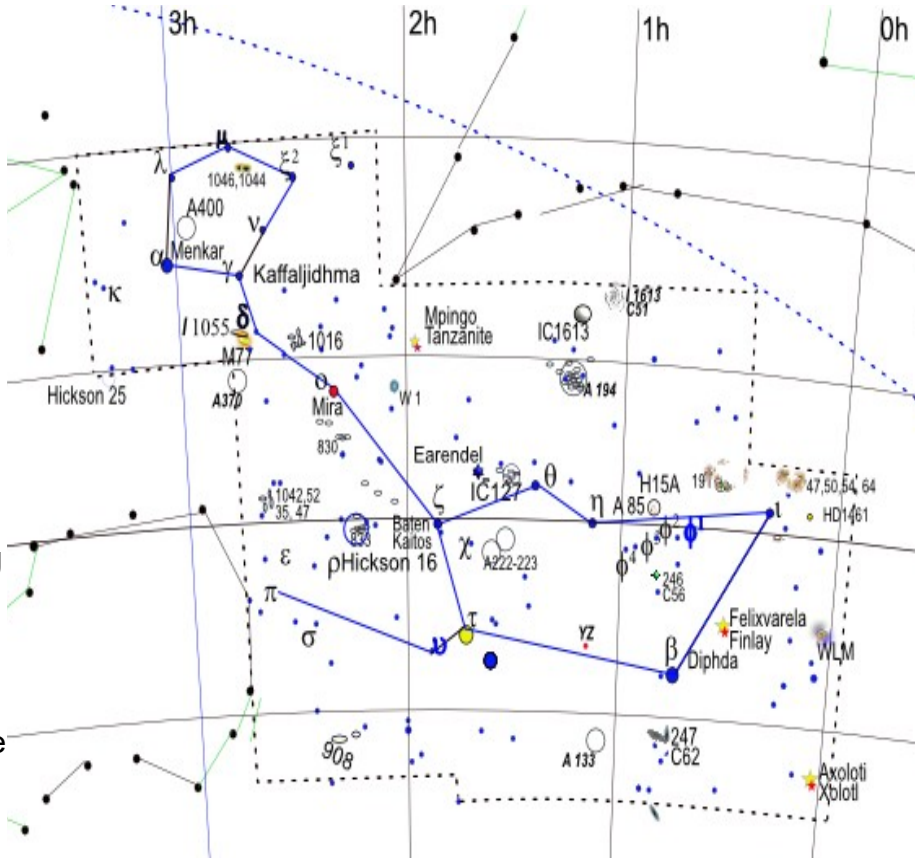
" Then down from the height of the air fell Perseus like a shooting-star—down to the crest of the waves, Andromeda hid her face as he shouted. And then there was silence.
"Slowly she looked up trembling, Perseus springing toward her; and, instead of the monster, a long, black rock, with the sea rippling quietly round it."
(Adapted from "Astronomy with an Opera Glass" Garrett P. Serviss 1888)

An alternative, though not as poetic, view is that Perseus had to put up a fight, using his sword to slay the monster.

Commonly depicted by the Greeks as a hybrid creature, Cetus had forefeet, huge jaws, and a scaly body like a giant sea serpent. Even though the constellation is also known as the Whale, the mythical creature does not in fact look like a whale. Historically, we can track Cetus back to the Two Rivers and the Babylonians, at least 4000 years ago. We believe the original Cetus was the dragon Tiamat, a creature still feared in fantasy novels today.

Of course, Chinese culture has also named the stars around Cetus, seeing farms silos, and even a farm manager.

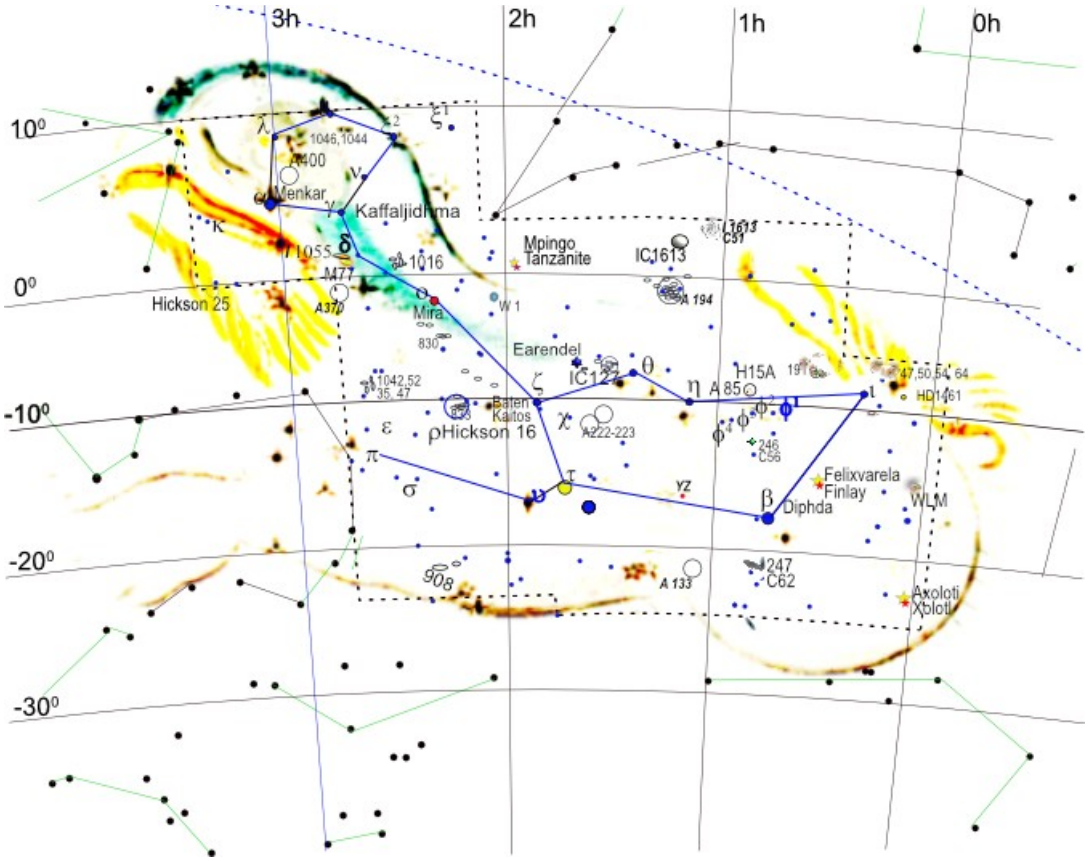
In time and for thousand of years water was feared as "Chaos" and Tiamat was one of the agents of Chaos. In the centuries before, during and after the agrarian civilizations of the Euphrates, water was the source of life. The story of the flood almost certainly originated with the annual flooding of the Tigris and Euphrates. It was paralleled by early Egyptians who also relied on the annual flooding of the Nile to reinvigorate the land with new soil and nutrients. It was along the coast of the Mediterranean, for millennia the sea was the source of food, commerce, travel and trade.



Is it any wonder than that those same ancients, trying to understand their existence, created connections with the nature surrounding them and ascribed reason to the rising of the constellations and reason to the movement of the sea. Our first sea monsters, our first Cetus' were demigods in need of appeasement to bring the rain, grow the crops, calm the water and bring luck to the fishing. It is little wonder that in times of drought, flooding and wild storms, we offered gifts and sacrifices, even, if necessary a young woman.

To the original Babylonian astrologers, a large portion of the sky became "The Sea"; water-related constellations: Cetus, Aquarius, Pisces, Eridanus. Pisces Austrinus and Capricornus the sea goat.

With gills pulmonic breathes the enormous whale,
And spouts aquatic columns to the gale;
Sports on the shining wave at noontide hours,
And shifting rainbows crest the rising showers. Darwin.



Cetus is a somewhat faint constellation without any stars brighter than 2nd magnitude. However it is still a rich hunting ground for double, multiple and variable star observers. Plus since it is away from the glare of the Milky Way it is a wealthy hunting ground for galaxies. It even has a planetary nebula bright enough to reach from your backyard. Also in Cetus, Patrick Moore chose three objects for inclusion in his Caldwell catalog.

Cetus has several stars with wonderful names that show a little of rhe Arab influence in the constellation. Alpha **α** Ceti's name is Menkar, meaning Nose. It is also a part of one of the Chinese celestial granaries and in Arabic a hand,

Beta **β** Ceti has two names, Diphda and Deneb Kaitos. **β** is the brightest star in Cetus, a bit brighter than **α**. Diphda comes from the Arabic "southern tail of the frog" and Deneb Kaitos from the Arabic "tail of the whale". In China this star bore the strange title of "Superintendent of Earthworks." Gamma **γ** Ceti

has the tongue twister name of Kaffaljidhma, meaning the "Short Cut Hand", the name actually includes several other stars in the Arabic cosmos. **γ** is a triple star system.

The most famous star in Cetus is Mira, "The Wonderful, Omicron **o** Ceti. Mira is the first variable star scientifically described and the first variable I reported to the AAVSO.

There are 19 more stars in Cetus with Bayer designations, many of them multiple systems, 18 stars are named either alone or in system combinations.

There are 61 planetary systems and close to Mira, on the line between **δ** and **ζ** is a star with the beautiful name Earendel, the Morning Star. You will not see Earendel, she is 27th magnitude and 28 billion light years away. She is the oldest star we' ve found yet. . You see her on the distortion caused by the gravitational lensing in the center of the red circle.

Another beautifully named star is Axólotl, named in Mexico, Axólotl means water animal and is a species of salamander. Axólotl is a planetary system having a massive planet named Xolotl after the god of fire and lightning.

Felixvarela and its planet Finley were named by Exoplanets in honor of a great human being. The first to teach science in Cuba.

Mpingo is an ebony type wood used in Tanzanian music. It is also a star with a planet named Tanzanite.

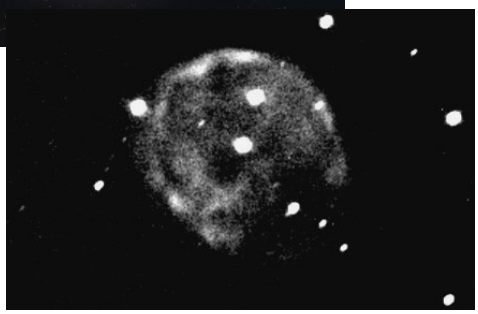
Cetus' distance from the Milky Way allows us to spend some quality time searching for galaxies away from the dense background of the Milky Way. Historically, Cetus was considered rather boring, with no bright stars or star clusters. Certainly we have some individual galaxies we love to come back to time and time again, and, it is my experience that galaxies tend to like to group together. There always seems to be another just a bit out of the field of view. Cetus is no exception. It has Abell clusters, a Seyfert galaxy called Cetus A, the planetary nebula and its Caldwell objects.

M77 is close to **δ** and is 9th magnitude so will be easy to find. Its a big face on spiral with an easy to see bright nucleus. M77 is also known as Cetus A https://www.astrobin.com/91f58r/B/?q=M77

NGC 246, Caldwell 56 is an 8th magnitude planetary nebula that you will enjoy finding. Its big enough and bright enough that you will see some detail.

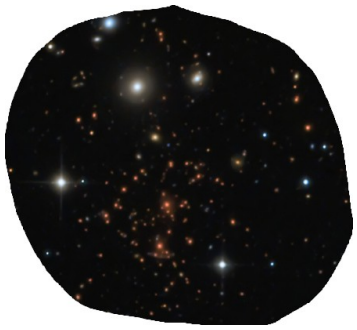
This image by John Sanford taken back in 2003 will help you get an idea of what it will look in your eyepiece.

https://ocastronomers.org/wp-content/uploads/2018/12/NGC246Cet.jpg

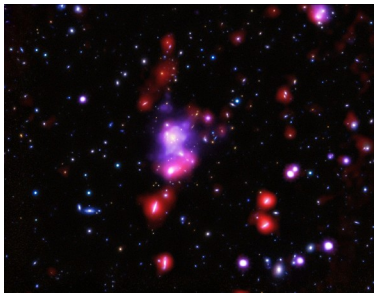


Abell 370 https://www.astrobin.com/352w9d/B/

There are 5 galaxy clusters in Cetus. Abell 133, Abell 222, Abell 370 and Abell 400. There is also JKCS 041, near Mira, and in 2009 the furthest cluster of galaxies seen from earth. Also not too far from Mira is



IRC 0218, the most distant strong gravitational lensing galaxy currently known.
Very close to **β** is a galaxy cluster with the
curious name Gioiello, which is Italian for Jewel. Gioiello, found in 2011, is, at that time, the most distant massive galaxy cluster found. It got its name from the jewel-like colors in its image.



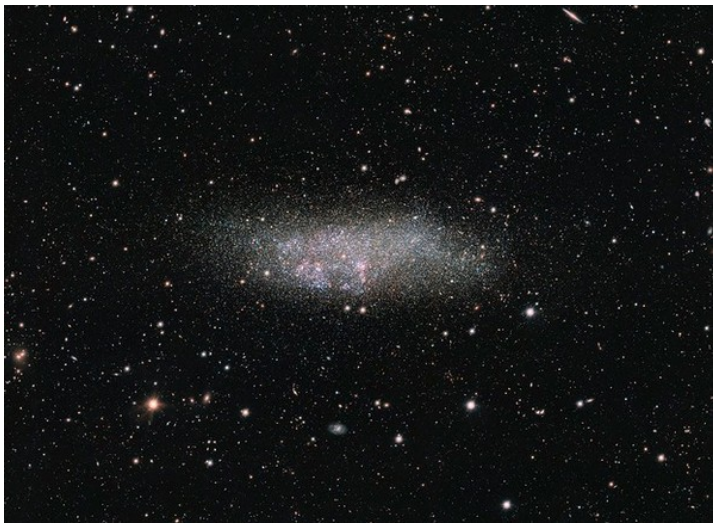
https://upload.wikimedia.org/wikipedia/commons/7/73/XDCP_J0044.0-2033_(Gioiello_cluster).jpg

Two of our Caldwell objects in Cetus are C51 and C62, They are both 9th magnitude, however, C51 is a dwarf galaxy, I.e.low surface brightness. It'll be fun to find it. **NGC247 https://www.astrobin.com/search/?q=ngc+247#vv7eq7IC 1613 https://www.astrobin.com/zss9uq/?q=ic 16**

For you guys with big mirrors, Whiting1 is a15th magnitude Globular Cluster in the halo of our Milky Way galaxy. It is not too far from Mira. I have its location labeled W1 on the chart.

Holmberg 15A is also on the chart at RA 00h 42m and -9^0. It is almost 15th magnitude. It anchors Abell 85, which is faint. Holm 15A is a huge elliptical galaxy with a huge central core, which you can find in your larger scopes. The closest bright galaxy to H15A is NGC 191, a 12th magnitude colliding pair of galaxies, a good starting point.

Over close to Eridanus is a small group of galaxies and an extremely diffuse rather strange galaxy. NGC 1052 is an 11th magnitude elliptical galaxy close to 14th magnitude 1042 and in a tight group with 12th magnitude 1035 and 13th magnitude 1047. Interestingly, the group contains NGC 1052-DF2 an ultra diffuse galaxy with no visible magnitude determined



jclopez01 @https://www.flickr.com/search/?text=wlm galaxy
and reportedly with no Dark Matter.
DF2 would be an incredible find.

It will be interesting to observe Wolf-Lundmark-Melotte. It's at 11th magnitude and 11' x 4' in size, so not too small. WLM stands for, the three astronomers who had a hand in finding and figuring out what it is. They determined that its an irregular galaxy as seen in this image by jclopez01. Its way out there on the outer edges of of the local group, so not a bad galaxy to put on your life list. **WLM-Jon Flickr**

So Cetus, the 17th, 18th, 19th and early 20th century astronomers did not have too much to say about it except for the obvious. They didn't have the equipment we have today for visual work, so it was mainly a large open area sprinkled with some interesting stars and whatever their four and six inch Clark's could find. Best of luck stretching your observing chops and

Dark Skys

Dave Phelps

This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach.
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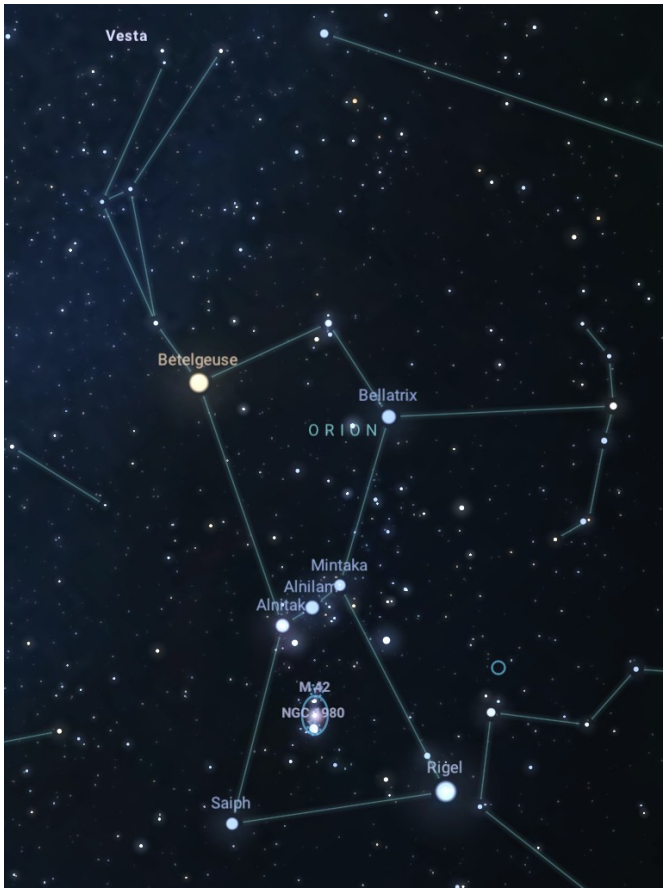
A Flame in the Sky – the Orion Nebula
By Kat Troche

It's that time of year again: winter! Here in the Northern Hemisphere, the cold, crisp sky offers spectacular views of various objects, the most famous of all being Orion the Hunter.



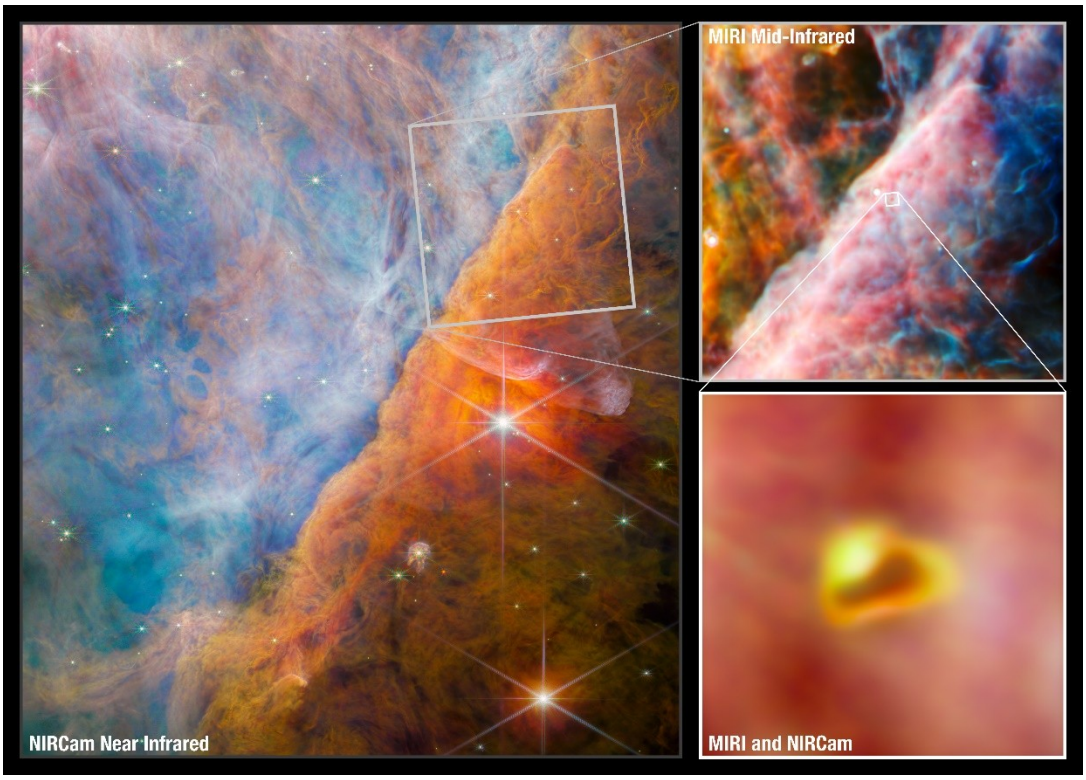
Credit: Stellarium Web

As we've previously mentioned, Orion is a great way to test your sky darkness. With your naked eye, you can easily spot this hourglass-shaped constellation. Known as an epic hunter in Greco-Roman, Orion and all its parts have had many names and meanings across many cultures. In Egyptian mythology, this constellation represented the god *Sah*. The Babylonians referred to it as *The Heavenly Shepard.* In most cultures, it is Orion's Belt that has many stories: *Shen* in Chinese folklore, or

Tayamnicankhu in Lakota storytelling. But the Maya of Mesoamerica believed that part of Orion contained *The Cosmic Hearth* – the fire of creation.

1,500 light years away from Earth sits the star-forming region and crown jewel of Orion – Messier 42 (M42), the Orion Nebula. Part of the "sword" of Orion, this cloud of dust and gas sits below the first star in Orion's Belt, Alnitak, and can easily be spotted with the naked eye under moderate dark skies. You may also use binoculars or a telescope to resolve even more details, like the Trapezium: four stars in the shape of a baseball diamond. These young stars make up the core of this magnificent object.

Of course, it's not just for looking at! M42 is easily one of the most photographed nebulae around, by astrophotographers here on the ground, large ground-based observatories, and space telescopes alike. It has long been a place of interest for the Hubble, Spitzer, and Chandra X-ray Space Telescopes, with James Webb Space Telescope joining the list in February 2023. Earlier this year, NASA and the European Space Agency released a new photo of the Orion Nebula taken from JWST's NIRCam (Near-Infrared Camera), allowing scientists to image this early star forming region in both short and long wavelengths.



ESA/Webb, NASA, CSA, M. Zamani (ESA/Webb), PDRs4ALL ERS Team

But stars aren't the only items photographed here. In June 2023, JWST's NIRCam and MIRI (mid-infrared instrument) imaged a developing star system with a planetary disk forming around it. That's right – a solar system happening in real time – located within the edges of a section called the Orion Bar. Scientists have named this planet-forming disk **d203-506**, and you can learn more about the chemistry found here. By capturing these objects in multiple wavelengths of light, we now have even greater insight into what other objects may be hiding within these hazy hydrogen regions of our night sky.

In addition to our Dark Sky Wheel, a fun presentation you can share with your astronomy club would be our *Universe Discovery Guide: Orion Nebula, Nursery of Newborn Stars* activity. This will allow you to explain to audiences how infrared astronomy, like JWST, helps to reveal the secrets of nebulae. Or, you can use public projects like the NASA-funded MicroObservatory to capture M42 and other objects.

Learn more about what to spy in the winter sky with our upcoming mid-month article on the Night Sky Network page through NASA's website!

The TVA is a member club of The Astronomical League