Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers March 2024

Events: General Meeting, Monday, March 4, 2024, at the Ronald H. Roberts Temecula Library, Room B, 30600 Pauba Rd, and/or ZOOM, at 6:00 PM.

- **IFI & Gallery by Clark Williams**
- **Refreshments by Elvira**
- **Star Parties at South Coast Winery every Friday evening.**
- **For upcoming school Star Parties check the Calendar on the web page.**

WHAT'S INSIDE THIS MONTH:

Cosmic Comments
by President Emeritus Mark Baker
Looking Up Redux
compiled by Clark Williams
Random Thought – Crisis in Cosmology
by Chuck Dyson
Another Look
by Dave Phelps
PROJECT: $5 Dew Heater Controller
by Dave Ng
NASA Night Sky Notes
by Kat Troche

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).

President: Clark Williams <president@temeculavalleyastronomers.com>
Vice President: Gordon Dayton <vicepresident@temeculavalleyastronomers.com>
Treasurer: Will Kramer <treasurer@temeculavalleyastronomers.com>
Secretary & Star Party Coordinator: Kathleen Hefley <outreach@temeculavalleyastronomers.com>
TVA Webmaster Dave Ng <heli_av8r@sbcglobal.net>
Facebook: Dave Ng <heli_av8r@sbcglobal.net> and Mark Baker <shknbk13@hotmail.com>
Newsletter Editor: Sharon Smith <sas19502000@yahoo.com>

Address renewals or other correspondence to:
Temecula Valley Astronomers
PO Box 1292
Murrieta, CA 92564

Members' Mailing List:
<tvastronomers@googlegroups.com>
Website:
http://www.temeculavalleyastronomers.com/

Like us on Facebook

Cosmic Comments – March 2024
By Mark Baker

One of the common questions I hear at Star Parties when we are blessed with a crescent to quarter Moon is why do we faintly see the part not illuminated directly by the Sun??

Several years ago, during a crescent Moon, I overheard a father explaining to his son that the Moon's atmosphere diffuses the light…!!! It was one of those "danged if I do, danged if I don't" moments… so I did!!! I simply said to the father that the Moon HAS no atmosphere…the look of surprise, and then embarrassment, led to a great teaching moment and discussion.

Which leads us to the word "ALBEDO"… simply put, it is a scale from 0 to 1 that indicates the reflectivity of a surface, usually regardless of wavelength. A pure white surface can be .99, while a black surface can be .01… a high quality mirror can be 1. So what can be a zero?? A Black Hole of course…100% absorption!!!

AL-BE-DO… what a nice sounding word!!! Say it with me… ALBEDO!!! But what does that have to do with the father / son dialog and response to the frequently asked question??

Let's start with the Moon… it has an albedo of slightly over .1. It is basically pretty dark and absorptive, which explains why temperatures can be in the hundreds of degrees on its surface. But you are saying "Wait a minute… a Full Moon is really bright!!" Apparently yes, but all credit goes to Sol and what it radiates…

But to fully respond to the question, we have to look at the Earth too… it has an albedo of .3, triple that of the Moon. BUT… and it's a BIG BUT… the Earth's reflective area is so much larger than the Moon that it has a luminosity FIFTY times brighter!!! We complain about a Full Moon washing out the night sky… imagine being on the Moon and having to contend with a Full Earth!!!

So the answer as to why we can often see the non-Solar illuminated parts of the Moon is directly because of Earths albedo, the light of which is reflected back to the Moon, and then back to us… and also explains why the "pale, blue dot" was visible even out past Saturn!!! Fun stuff…

Clear, Dark Skies my Friends…

Looking Up Redux – March 2024

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
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:

Sunday	**the 25th**	**@0001 FULL in VIRGO**
Sunday	**the 3rd**	**@0724 THIRD QTR in SCORPIUS**
Sunday	**the 10th**	**@0201 NEW in AQUARIUS**
Saturday	**the 16th**	**@2111 First QTR in TAURUS**

Apogee comes on 2024-03-23 @ **1545 – 406,291 km (252,458 mi)**
Perigee comes on 2024-03-10 @ **0707 – 356,763 km (221,616 mi)**

2024 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: 2024-Mar-12 : Ends: 2024-Nov-05 (traditional) CA keeps PDT year-round

Luna: Luna is waning gibbous on the first of the month, headed for Last Quarter on the 3rd, rising at **2244-**, transiting at **0400** and setting by **0915**. Luna by the 15th is waxing crescent at 30% illumination. Rising at **0939-** and transiting at **1657-** setting at **0022**. By the-end-of-the-month Luna is waning gibbous, rising at

0044 transiting at **0532** and setting by **1019**.

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

March 10 - 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 09:02 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.

March 20 - March Equinox. The March equinox occurs at 03:01 UTC. The Sun will shine directly on the equator and there will be nearly equal amounts of day and night throughout the world. This is also the first day of spring (vernal equinox) in the Northern Hemisphere and the first day of fall (autumnal equinox) in the Southern Hemisphere.

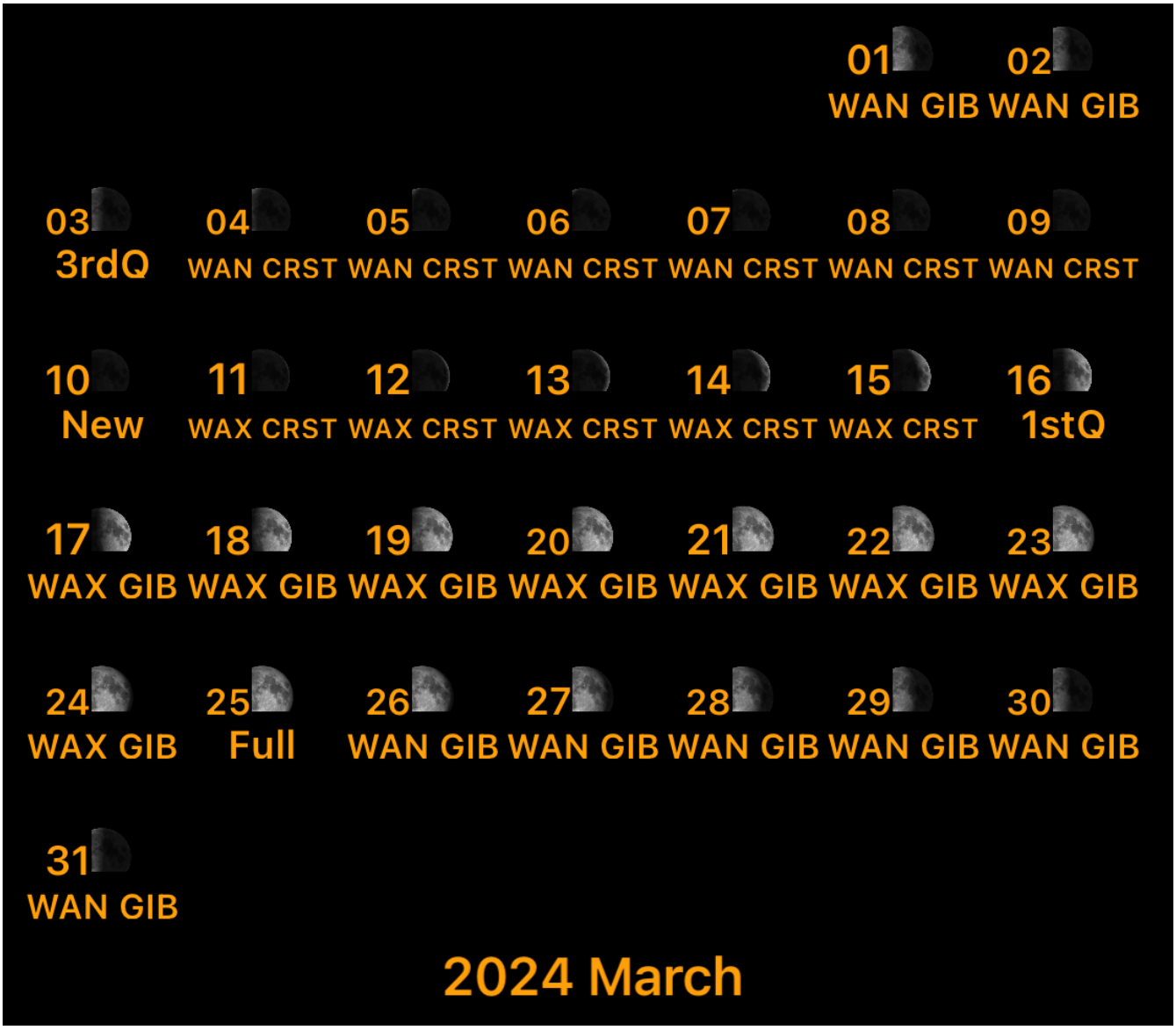
March 24 - Mercury at Greatest Eastern Elongation. The planet Mercury reaches greatest eastern elongation of 18.7 degrees from the Sun. This is the best time to view Mercury since it will be at its highest point above the horizon in the evening sky. Look for the planet low in the western sky just after sunset.

March 25 - 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 07:02 UTC. This full moon was known by early Native American tribes as the Worm Moon because this was the time of year when the ground would begin to soften and the earthworms would reappear. This moon has also been known as the Crow Moon, the Crust Moon, the Sap Moon, and the Lenten Moon.

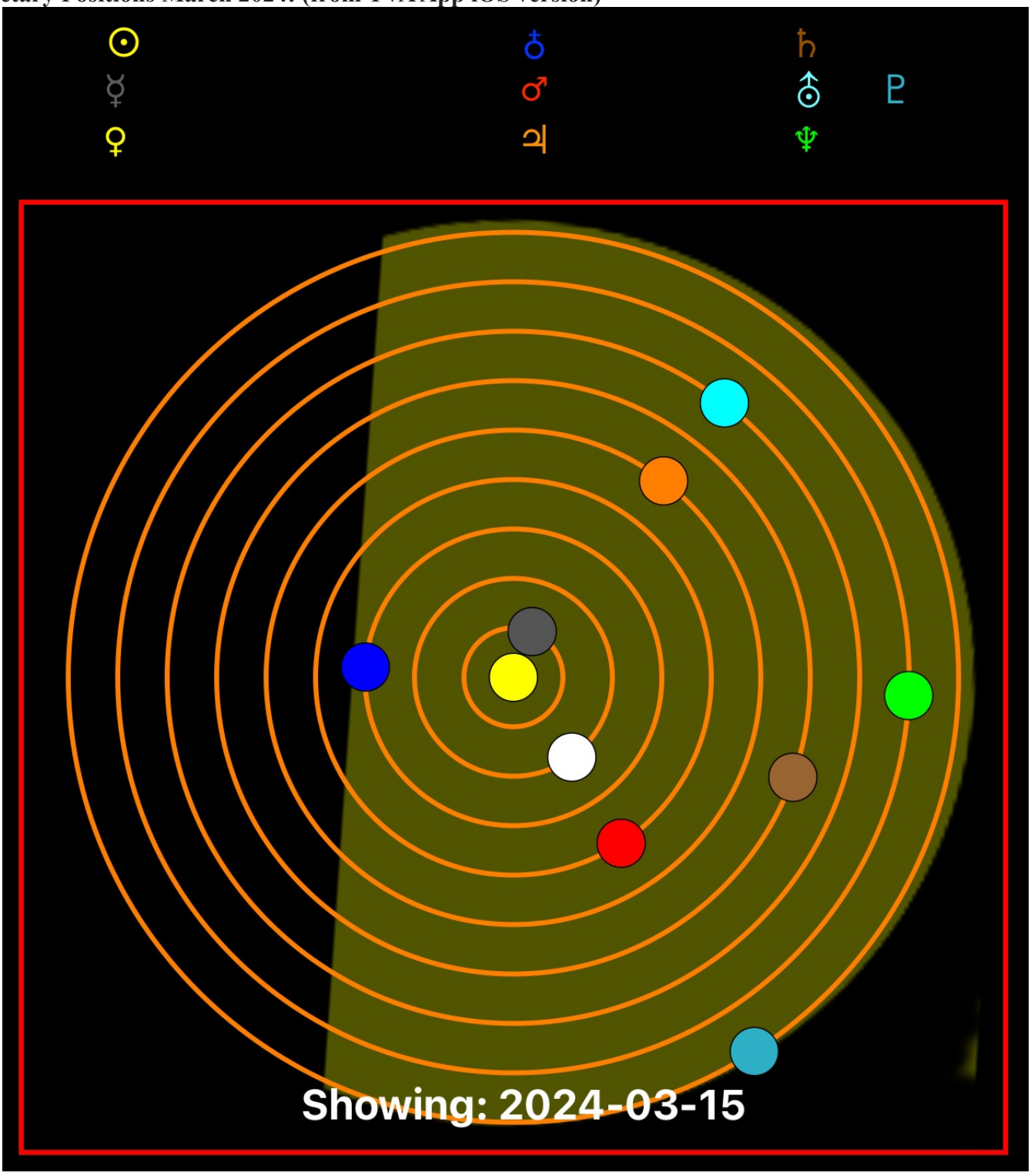
March 25 - Penumbral Lunar Eclipse. A penumbral lunar eclipse occurs when the Moon passes through the Earth's partial shadow, or penumbra. During this type of eclipse the Moon will darken slightly but not completely. The eclipse will be visible throughout all North America, Mexico, Central America, and South America. (NASA Map and Eclipse Information)

Algol minima: (All times Pacific Time)

03/01/2024	**0439**
03/04/2024	**0128**
03/06/2024	**2217**
03/09/2024	**1907**
03/12/2024	**1556**
03/15/2024	**1245**
03/18/2024	**0935**
03/21/2024	**0624**
03/24/2024	**0313**
03/29/2024	**2052**


01 WAN GIB
02 WAN GIB
03 3rdQ
04 WAN CRST
05 WAN CRST
06 WAN CRST
07 WAN CRST
08 WAN CRST
09 WAN CRST
10 New
11 WAX CRST
12 WAX CRST
13 WAX CRST
14 WAX CRST
15 WAX CRST
16 1stQ
17 WAX GIB
18 WAX GIB
19 WAX GIB
20 WAX GIB
21 WAX GIB
22 WAX GIB
23 WAX GIB
24 WAX GIB
25 Full
26 WAN GIB
27 WAN GIB
28 WAN GIB
29 WAN GIB
30 WAN GIB
31 WAN GIB
2024 March

Planets:
Planetary Positions March 2024: (from TVA App iOS version)



- **Mercury:** Mercury is a lost in the Sun in the beginning of the month. Mercury by the 15th is an evening object rising at **0735** with the .Sun rising at **0658**. Mercury transits at **1351** and sets at **2007**. Mercury will

be 79% illuminated. By the 31st Mercury rises at **0707, transits at 1346 and sets st 2024**.

- **Venus:** Is the Morning Star on the first of the month, rising at **0511** transiting at **1029** and setting by **1547**. Venus is 91% illuminated and has an apparent magnitude of -3.91. By the 15th Venus is still the Morning Star, rising at **0608**. transiting at **1142** and setting at **1755.** By end of month the Morning Star rises at **0559**, transit at 1153 and sets at **1746**.
- **Mars:** Mars is back in the sky as a morning object on the first of the month. Mars rises at **0500**, transits at **1014** and set at **1527**. However there is a waning gibbous Moon 70% illuminated, transiting at about the same time. By mid-month Mars rises at **0539**, transits at **1102** and sets by **1625**. End-of-month finds the Warrior rising at **0511**, transiting at **1046** and setting by **1622**.
- **Jupiter:** Jupiter is an evening object on the first of the month rising at **0904**, transiting at **1545** and setting at **2226**. It should become visible by 1815 or so. By the 15th Jove rises at **0916**, transits at **1600** and sets by **2244**. Jove should be visible by about **1930.** Come the end-of-month Jupiter rises at **0823**, transits at **1510** and sets by **2157**.
- **Saturn:** Saturn is lost in the Sun on the first of the month. Saturn by mid month has pulled slightly away from the Sun rising at **0629**, transiting at **1208** and setting by **1747** – all daylight hours Pacific Time. By the end-of-the-month Saturn is a morning object rising at **0532** followed by sunrise at **0637**. Saturn is approaching Mars from our view and transits at **1112** setting by **1653**
- **Uranus:** On the first of the month Uranus is an evening object transiting at **1616** and not setting until **2306**. It is sitting just above Jupiter along the ecliptic about 8° apart, Uranus is at apparent magnitude of 5.78 so in dark skies it would almost be naked eye visible. By the ides Uranus should be visible by **2000.** Uranus rises at **0933**, transits by **1623** and sets by 2313. It has closed the distance to Jupiter and is about 6° from Jupier at **2000**. End-of-month finds Uranus again visible at about **2000**. Uranus is low on the horizon about 3° above Jupiter. Uranus rises at **0832**, transits at **1523** and sets by **2214**.
- **Neptune:** Neptune in the beginning of the month will be extremely difficult to see. Its apparent magnitude is 7.95 but it is only 15° from the Sun all day. By the 15th Neptune is lost in the Sun. By the end of the month Neptune is again a morning object rising at **0608** followed by sunrise at **0637**. Neptune is just too close to the Sun to see.
- **Pluto:** Pluto on the first of the month is a morning object rising at **0427**, transiting at **0925** and setting by **1423**. Pluto's apparent magnitude is 14.51 so it is a little difficult to see.. By mid-month Pluto is rising at **0434**, transiting at **0931** and setting by **1429**.. Sunrise is not until **0658** so lots of viewing and imaging time is available if you are prepared. By the 31st Pluto has moved into being a morning object and rises at **0332** followed by sunrise at **0637**.

Asteroids:

- Still a dearth of asteroids. I searched for asteroids in 2024 with a reasonable magnitude; say less than or equal to +10 in March 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=2024

Meteors:

- Geminids Meteor Shower. (see Highlights above)
- Ursids Meteor Shower. (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 March 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.

Comet 12P/Pons-Brooks .closet approach to earth on 2024 Apr 21. Thought to be the progenitor of the κ-Draconids meteor shower. It may become visible just before next month's Total Solar Eclipse. More on this comet next month.

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 March 2024 at 2100 PDT and you will have about 20 minutes of viewing time total.

Lets take a look at some favorite objects (at least for me):

- NGC 3242**:**

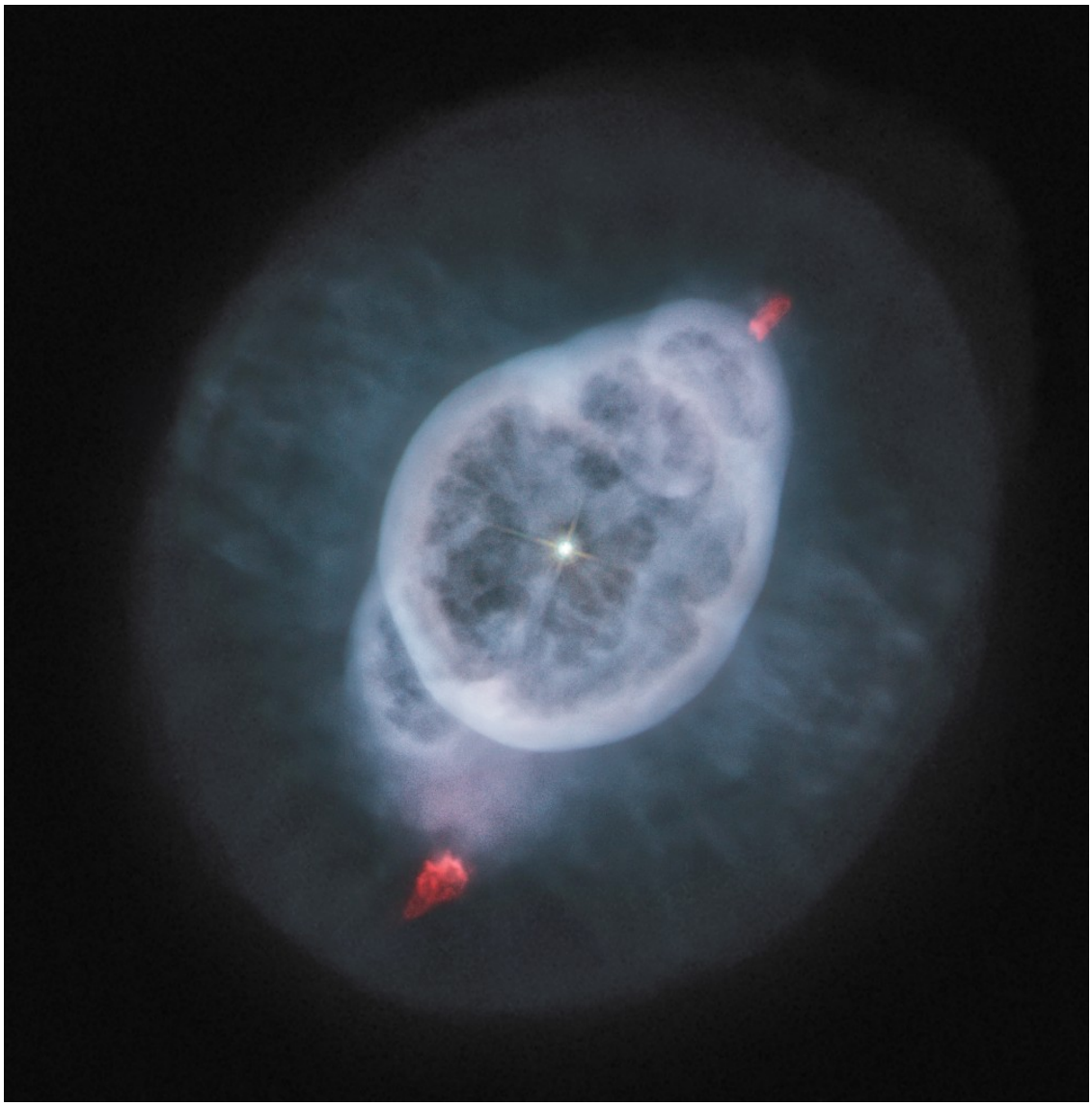


Illustration 1: By Judy Schmidt - Flickr: NGC 3242 "Ghost of Jupiter"

NGC 3242 (also known as the Ghost of Jupiter, Eye Nebula, CBS Nebula or Caldwell 59) is a planetary nebula located in the constellation Hydra.
William Herschel discovered the nebula on February 7, 1785, and catalogued it as H IV.27. John Herschel observed it from the Cape of Good Hope, South Africa, in the 1830s, and numbered it as h 3248, and included it in the 1864 General Catalogue as GC 2102; this became NGC 3242 in J. L. E. Dreyer's New General Catalogue of 1888.
This planetary nebula is most frequently called the Ghost of Jupiter, or Jupiter's Ghost due to its similar shape to the planet, but it is also sometimes referred to as the Eye Nebula. The nebula measures around two light years long from end to end, and contains a central white dwarf with an apparent magnitude of 11. The inner layers of the nebula were formed some 1,500 years ago. The two ends of the nebula are marked by FLIERs, lobes of fast moving gas often tinted red in false-color pictures NGC 3242 can easily be observed with amateur telescopes and appears bluish-green to most observers. Larger telescopes can distinguish the outer halo as well.
At the center of NGC 3242 is an O-type star with a spectral type of O(H}. (Wikipedia)

- **NGC 3292:**

Illustration 2: By NASA, ESA, Andrew Fruchter (STScI), and the ERO team (STScI + ST-ECF)

The nebula was discovered by William Herschel on January 17, 1787, in Slough, England. He described it as "A star 9th magnitude with a pretty bright middle, nebulosity equally dispersed all around. A very remarkable phenomenon." NGC 2392 WH IV-45 is included in the Astronomical League 's Herschel 400 observing program. (Wikipedia)

March is great for both viewing and imaging. Spend some time outside with your scope. Spring is coming.

For now – Keep looking up.

RANDOM THOUGHT March 2024
By Chuck Dyson

CRISIS IN COSMOLOGY

The James Webb Space Telescope (JWST) was predicted to produce a crisis in cosmology and so far it has not. It is, however, producing a plethora of changes in our understanding of how the early universe worked and evolved. Our ability to understand and interpret the JWST data would be better if there was not the "Crisis in Cosmology". The "Crisis in Cosmology" comes from our inability to accurately determine the physical properties of three basic questions about the universe. Our questions are how big is the universe, how fast is it expanding/contracting (The Hubble constant); and how has the rate of expansion/contraction changed over time? Straightforward questions but devilishly hard to answer.

Albert Einstein when he published the theory of general relativity in 1915 was criticized because his paper implied that the universe was dynamic and either expanding or contracting and not static as the majority of the astronomers knew it to be. In order to "correct" this error in his paper Einstein put in his now famous Lambda cosmological constant that made the universe static. In 1917 Vesto Slipher at the Lowell Observatory in Flagstaff, Arizona published a paper on what were then called spiral nebula and noted the majority of these nebula were redshifted, moving away from us, at a fair rate of speed. In 1923 Hubble finds his first Cepheid variable in a "spiral nebula" and realizes that it actually is a separate galaxy. In his 1929 paper Hubble identified Cepheids in many of Vesto Slipher's spiral nebula thus showing that they were all separate galaxies and moving away from us at different speeds. Hubble spends the rest of his life refining the Cepheid distance measurement technique and Einstein declares his Lambda constant the biggest mistake he ever made and Modifies Lambda to show an expanding universe that was gradually slowing down because of gravity.

All of our distance problems solved. Right? Not so fast. First off Henrietta Leavitt was able to use the Cepheids as standard candles because she found 16 bright enough to be seen throughout the entire variable cycle, some Cepheids are thousands of times brighter than our Sun. After identifying her Cepheids Leavitt reasoned that because all of the stars were within the Large Magellanic cloud, even though they were at different distances from Earth, the differences between them when compared to the distance to the Magellanic cloud were small and represented an acceptable error. Leavitt then identified stars in the Magellanic cloud that were very similar, by spectrographic analysis, to stars in our galaxy whose distances and thus intrinsic brightness had been determined from Earth by parallax. Parallax is still our most precise way to measure stellar distance today but only works over short distances, 65 to 70 light years from the surface of Earth but farther from orbiting satellites. Leavitt then compared the observed brightness of the Magellanic stars to the brightness of the stars in our galaxy and was then able to estimate the distance to the Magellanic clouds. Leavitt, in Cepheids, now has a Standard Candle to measure cosmic distances.

Now we are ready to use our Standard Candle to answer the question of just how big our universe is and just how fast it is expanding. There is just one problem. It turns out that there are three different types of regularly pulsing stars. As luck would have it Henrietta Leavitt chose mostly Cepheid II type stars for her seminal paper. Cepheid II stars are metal poor and one order of magnitude fainter than Cepheid I (metal rich) stars at max magnitude for the same cycle time. When Hubble measured the distance to the Andromeda Galaxy all of his Cepheid stars were Type I. Just to make things interesting, when Harlow

Shapley wanted to measure the distance to the globular clusters that surround our galaxy and use them to estimate the size of our galaxy (he had already found regular variables in many of them and assumed that they were Cepheid variables). Alas Shapley's stars were RR Lyrie stars. RR Lyrie stars are similar to Cepheids but are at least one magnitude dimmer than the Type II Cepheid. Eventually the brightness of all the star types was resolved and when it was; Leavitt's distance to the Magellanic Cloud was unchanged, Hubble's distance to the Andromeda Galaxy was doubled, and Shapley's estimate for the size of our galaxy was halved.

In the following decades astronomers continued to refine and improve the measurements associated with the standard candle technique. Astronomers were very comfortable with the data and their ability to interpret it correctly. Astronomers were so confident in the Cepheid variable data that when they were calibrating a new standard candle, the type 1A Supernova, for distances over 1.6 billion light years the Cepheids were used as the reference candle.

In science one always likes to have more than one way to measure an unknown because if the different methods agree, you are even more confident that your data is good. In 1964 Arno Penzias, Physicist, and Robert Wilson, Radio-Astronomer, were working for Bell Telephone on a project to get a static hiss out of the radio telephone calls. They determined that the hiss was from space, constant in all directions and had a wavelength (1.9mm) that would be produced by an object with a temperature of 3 degrees Kelvin (That is three degrees above absolute 0.) At Princeton University Robert Dicky was working on what the early universe would look like if there had been a singularity event (big bang). Dicky concluded that the early universe would be opaque to light until the particle density was low enough and the temperature low enough for photons to travel freely and then there would be a burst of energy emitted that could be detected today as a universal radio wave. Penzias and Wilson, on the advice of a friend, took their data to Dicky and showed it to him. The radio wave that Dicky had predicted from his theoretical work was 1.9mm. Because 1.9mm is in the microwave range of wavelengths the signal was called the Cosmic Microwave Background (CMB for short). The CMB is not completely even and studies of the CMB have shown small differences in the temperature, distribution of mass, and large pressure wave structures in the early universe. All of these features can and have been used to calculate the Hubble constant independent of the standard candle method.

Both the Standard Candle and the CMB have been used by multiple groups to measure the Hubble Constant. The Standard Candle groups all obtain values that are very close together. The CMB groups all obtain values that are close together. The Crisis in Cosmology is that the two camps have values that do not agree at all, and despite the best efforts of each group to resolve the differences in the data gap between the groups is growing not shrinking.

This situation leaves us with several options: Option one, we do not understand how the universe works and both methods can never be made to work. Option two, one method works and one does not and we need to figure out which is which. Option three, both methods work but have flaws in technique and we need to get the methodology correct. Option number four, come up with a new way to measure the Hubble Constant and see if it agrees with one of the other two methods and incidentally you then get to become astronomy's new golden child.

If you guessed that the number four is the most popular option you guessed right because one paper that I reviewed for this article had no less than seven new methods proposed to measure the Hubble constant.

Astronomers really want to end this crisis and know just how big the universe is, how fast it expanding, and what is the rate of change of the expansion because it just a touch difficult to understand just what Hubble and JWST are telling us without this foundation.

CHEERS CHUCK

And do not sell your telescopes; the clouds and rain will go away Eventually.

Temecula Valley Astronomer
The monthly newsletter of the Temecula Valley Astronomers March 2024

March 2024 Another Look
Dave Phelps

The New moon in March is on the 11th at 0358. The Full moon in March is on the 25th at 0983.

Daylight Savings time begins March 10.

A Penumbral lunar eclipse is visible this month from the continental United States, Hawaii and eastern Alaska beginning about 2200 and ending 4 hours later Pacific Daylight Time. Maximum immersion will be at 0013 PDT. The moon will be quite high, it will be interesting to see if we are able to register any appreciable dimming.

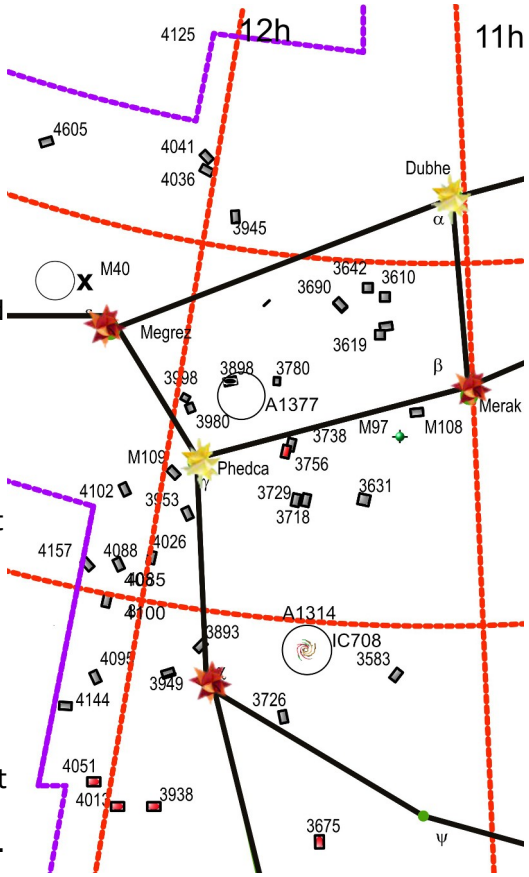
March is the Full Worm moon, referring to the larvae emerging from the bark of trees at this time. Native American names include the Crow Comes Back Moon, the Eagle Moon, Goose Moon, Snow Crust Moon, Sore Eyes Moon, Sugar Moon and the Wind Strong Moon.

The Vernal Equinox, i.e. the first day of spring arrives at 2004 PDT on Tuesday March 19. During much of March this year the Christian world celebrates the season of Lent. As a word, lent goes way back to the Old English and the Old German dialects and essentially means spring.

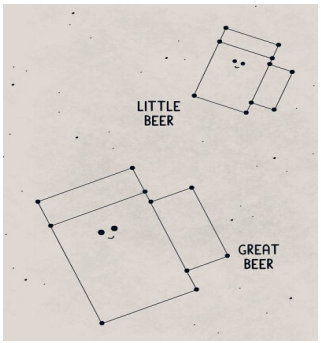
There are a number of lunar/planetary conjunctions this month including an occultation of Antares visible from Florida. Mercury and Neptune are being occulted on the 11th, visible from Antarctica, the So. Pacific and Central/So.

America. On the 14th, the Pleiades will be less than ½^0 from the moon and on the 21st Venus will be a ¼^0 from Saturn.

In Spanish its Luna Llena de Marzo,.in German Vollmond im März, in French Pleine Lune de Mars, in Italian Marzo Luna Plena, and in Greek Μαρτίου πανσέληνος (Martíou pansélinos)
In Gaeilge – Leo Mór agus Leo Mion.



I really wanted to talk this month about the bowl of the Dipper. Years ago I had the opportunity to spend an evening with Rev. Robert Evans of Hazelbrook, New South Wales. I believe he still holds the record for visual discovery of supernovas, over 40. He came to visit Southern California and I had the chance to spend an evening with him at the eyepiece of the 18" reflector at Ford Observatory near Wrightwood, CA. Robert was consummate at his profession and wanted to spend as much time as he could looking for supernova in the northern skies he couldn't see at home. He passed a year ago. So, I figured another evening galaxy hopping in Ursa Major was a good idea.



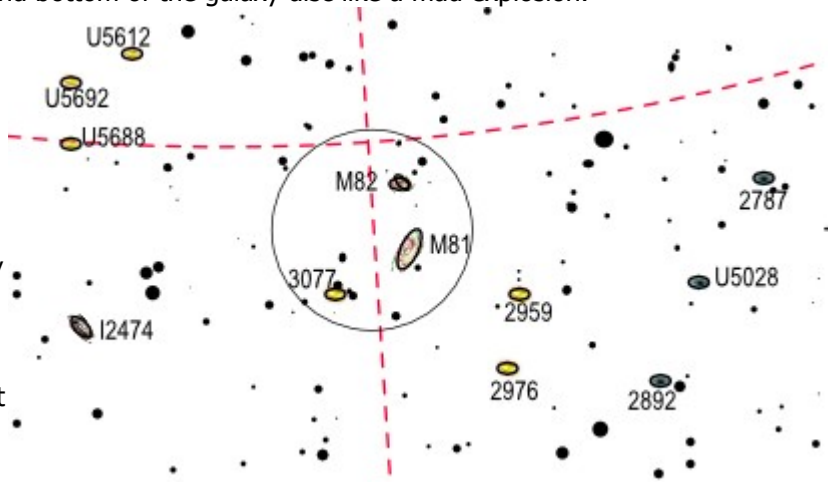
Londyn Brown

I was hoping to remember Robert this month by concentrating on the bowl of Ursa and to add to the fun the tail of Leo. It didn't work out. Most of the bowl's galaxies are too dim, you need some mirror and you need decent skies. Still, its hard to resist. So this month and next month in April we will look at several historically famous galaxy clusters, many of them bright galaxies, Messier's and even a Caldwell. We will search for a few of the over 500 NGC and IC objects in Ursa Maj and the over 135 in Leo. To add a dollop of whipped cream to our galaxy pie we will also find two Abell galaxy clusters, one in Ursa and another in Leo.

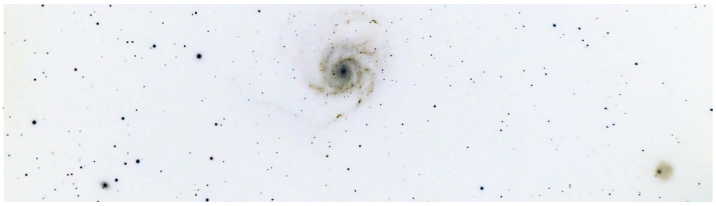
Dan Schechter **https://ocastronomers.org/wp-content/uploads/2019/01/m081-02.jpg**

Ursa Maj. Has two well know galaxy groups and two Abell clusters. The M81 & M82 group is well placed for viewing this month and the M101 group is rising steadily. Abell 1377 and Abell 1314 are also well placed at 2100 this evening.

M81, also know as Bode's galaxy, it a big, bright centerpiece of a family of over 70 galaxies. It is 7th magnitude, so easy to see and can be viewed in the same field as M82 and NGC 3077. M82 is 8th magnitude and 3077 is 10th. We have all seen those **https://apod.nasa.gov/apod/ap230120.html** beautiful images of M82 with red filaments boiling out from the top and bottom of the galaxy disc like a mad explosion. **https://apod.nasa.gov/apod/ap230802.html** Sadly you won't see anything like that. In your eyepiece you can tell its oddly shaped and you may see a little bit of structure in M81, but count yourself successful if you can identify all three galaxies in your field. Just outside the field is 10th magnitude 2787. 10th magnitude 2976 is also easily seen. 2892 is dim at 13th magnitude and small. 2959 is nearly 13th magniude, a tight spiral. Almost touching it is a nearly 15th magnitude lenticular (rod shaped) galaxy, 2961. The circle represents one degree.



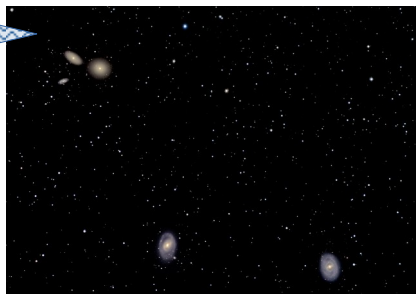
The M101 galaxy, called the Pinwheel, is the center for a number of group members. 5474 and 5477 are the closest members to 101. They are both dwarfs. 5474 has a big halo gravitationally bound to 101. You will find it at 11th magnitude. 5477 is near invisible at 14th magnitude. 5473 is 11.5 magnitude. 5475 is quite dim at 13th magnitude. 5485 and 5486 are close, but 14th magnitude. 5422 will be easier. It is a 12 magnitude lenticular galaxy with a quite bright nucleus and rather long arms. 5368 and 5443 are both near 14th magnitude, another tough find. The last galaxy on the chart is UGC 8837, a 13th magnitude dwarf that along with 5474 and 5477 are a family of (Jeff Malmrose from 2008 includes N5473 and 5474)



https://ocastronomers.org/wp-content/uploads/2018/12/M101.jpg

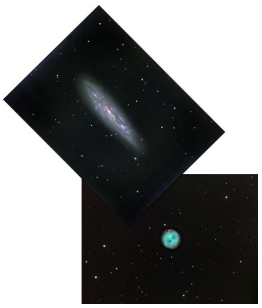
interacting galaxies with M101. U8837 is a small active galaxy, in fact all three galaxies are pretty messed up by the huge gravity of M101.

Donald Lynn 2010 m95-96-105 https://ocastronomers.org/wp-content/upload 2018/12/10.77112.16_06442_RGB_150secV2POvlysm.jpg



Other objects to look for in Ursa Major are M40, M97, M108, M109, Abell 1377 and Abell 1314.

August Winnecke is a German astronomer who published one of the shortest catalogs in our literature. The Winnecke Catalogue of Double Stars has seven items listed, Messier 40 is number 4 on the list. The two stars are magnitude 9 and 10. M108 and M97 are less than a degree apart and can be seen in the same field of view.
https://www.raysuniverse.space/

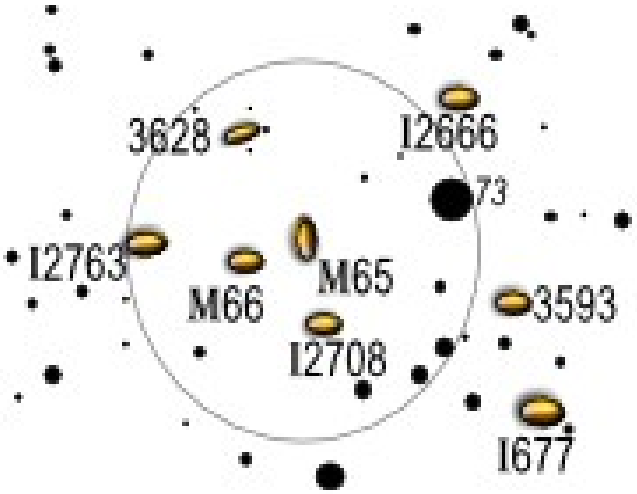


M97 is the famous Owl planetary and M108 is much larger but about the same brightness, around 9th magnitude. M108 is a flat spiral showing us about a 30^0 face. The more mirror you have the more blue M97 will appear.

M109 is a spiral with about a 60^0 tilt. It is the same apparent size as M108 and about the same brightness. With a little bit of glass you should be able to see the rather apparent bar and stringy spiral arms. This rather over processed image I cropped from jgscience.org (a good one, check it out), shows M 109 and Phecda, γ Ursae Majoris.

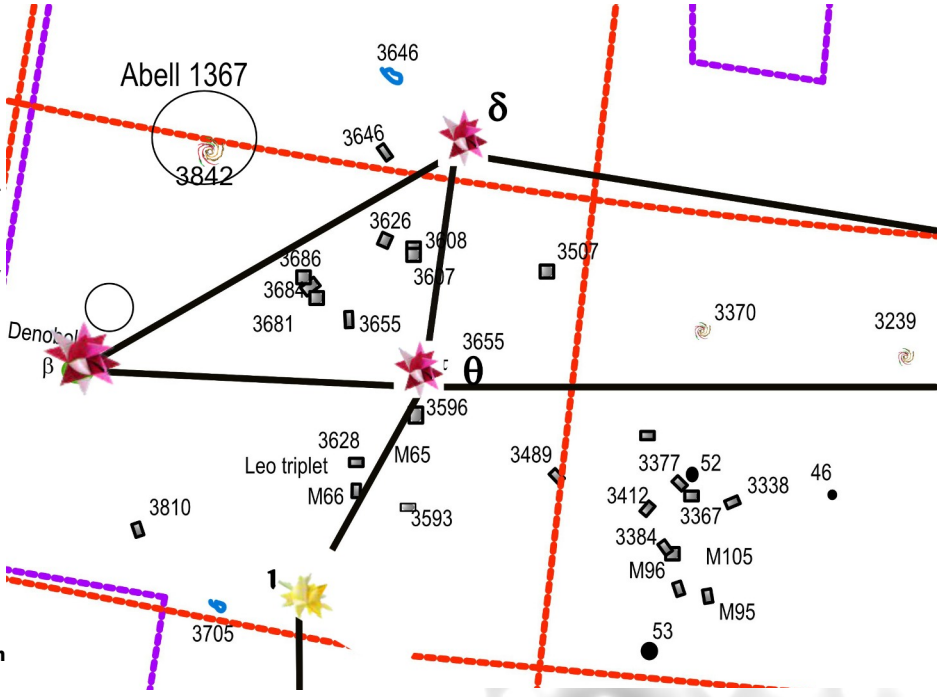
Abell'1314 and 1377 are not among the popular Abells. A1377 is13th and A1314 is 15th magnitudes. A1377 does have a 3rd magnitude star near the brighter galaxies that can be used as a finder. In A1314 is the famous 14th magnitude "Papillon" galaxy, IC708.

Between Theta and Iota Leonis lie the Leo Triplet. The principle components are M65, M66 and NGC 3628. The three are all about 9th magnitude and will be visible as a group in your wide angle eyepiece. They are an interesting study in galaxy formation. In the one field of view you have a 30^0 galaxy, M66, a 60^0 galaxy, M65 and an edge-on galaxy, 3628. Only a degree away from M66 is a smallish, 12th magnitude, nearly lenticular galaxy, N3593. Close by are four 14th magnitude galaxies that will reward careful search: IC's 677, 2666, 2708 and 2763. 2666 is brighter by half a magnitude. 2763, 2666 and 2708 are awarded only a couple of lines and no images in the NGC catalog.



IC 677, however, is interesting since it has an even smaller, close companion galaxy, IC688. 677 is lenticular and active, it will be interesting what you see.

Perhaps a little more satisfying is the Leo II group, located in the triangle of the tail made by Beta, Delta and Theta. The main four galaxies are NGC's 3655, 3681, 3684 and 3686, all 11th and a fraction magnitude and all spiral of one form or another. Leo II could have two dozen or more members, but probably only a dozen or so visible in our larger amateur telescopes. One of the Patrick Stewart Caldwell objects, number 40, NGC 3626 is also right there. 3626 and 3632 are the same galaxy confused back in the day until reconciled by Caroline Herschel. 3626 is between 11 and 12 mag.. Perhaps Sir Pat was stretching it a little when he chose this galaxy as number 40. **Gary Imm**
https://www.astrobin.com/337342/?q=ngc 3626



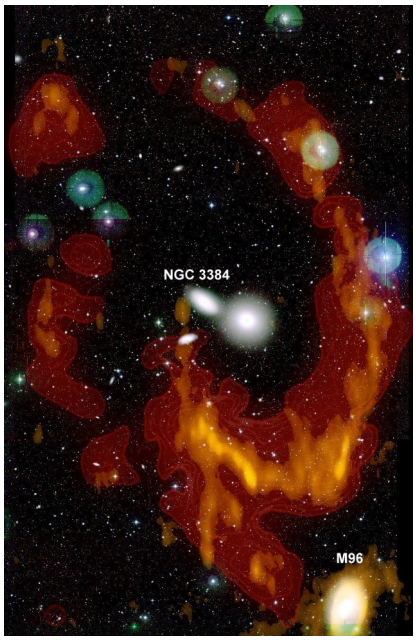
In the immediate vicinity of NGC 3842, and part of the Abell 1367 cluster are seven galaxies, all 14th or so, and all looking like what we think a galaxy cluster should look like. It will be great fun when you point your cannon to the tail of Leo.

It can be argued that he most popular galaxy group in Leo in near his midsection. There are over half a dozen galaxies 10th magnitude and brighter anchored by M95, M96 and M105. All the galaxies I have plotted are 10th and 11th magnitude or brighter, so galaxy hopping in your big Dob is right up your alley. Leo I is surrounded by a gigantic cloud of Hydrogen and Helium called the Leo ring. It was only discovered in the last 50 years or so and is not observable in our visual wavelengths. Messier 105 and its companion NGC 3384 are surrounded by a vast ring of neutral hydrogen gas. I took a Wikisky image and reduced it to the point were we can see the bridge of hydrogen gas between the two. You have to figure that that whole region of space is lying in a vast cloud of hydrogen and helium. We see the Leo ring as a ring but it is actually a sphere, the greater density of the gas on the sides being more visible and the center of the sphere blown out by the activity of M105, N3384 and N3389.

The Lion flames. There the sun's course runs hottest
Empty of grain the arid fields appear
When first the sun into the Lion enters. Aratos.

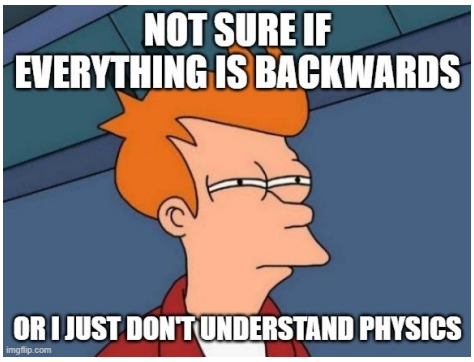

Chauvet

From late Bronze and Early Iron Periods, to roughly the 1600's, at least in parts of the world, Regulus, the diminutive of Rex, was considered the "Ruler" of the heavens. This was true in Persia, Babylonia, India, and Arkkadia-ancient Greece. He was king because for much of this time the summer solstice was in Leo which coincided with rivers rising, and the summer sun heating the earth and ripening the crops.



Thank You http://www.rhysy.net/
http://www.quickmeme.com/

The image of a lion up at the top can be found in early Egypt, inscribed on fountains and gates, on Paleolithic cave walls in Chauvet to Druid, Scots, Central American and Asian civilizations. Leo has been identified world wide for thousands of years.



Dark Skys, Dave Phelps

PROJECT: $5 Dew Heater Controller

Level: Easy+ *by: Dave Ng*

Description:

Create a simple dew heater controller that will allow for reducing dew ring/strap heat in order to conserve battery power. This is a low-cost project that uses a pre-built pulse width modulator (PWM). Although this is intended for use with my Nexstar 8SE with Celestron dew ring, it can be used with other 5-12v dew straps that do not exceed 2 amps maximum draw. Larger PWMs are available if needed. Additionally, the connector types can be replaced to fit your particular setup. Although this design is for a single dew ring (or strap), the same principles apply and you can use a larger project box and add multiple PWMs and outputs

Usage:
Start with dew heater at 50% power (knob half way). Monitor for dew, if fog begins to form on glass, increase power by 10% until gone. If there is no fog and you are concerned with battery consumption, you may reduce power by 5% at a time with continued checking at 15-minute intervals. After a few outings you will have a good indication of a suitable level. Note that conditions will change (temperature, dew point) so manage usage and reconfigure accordingly.

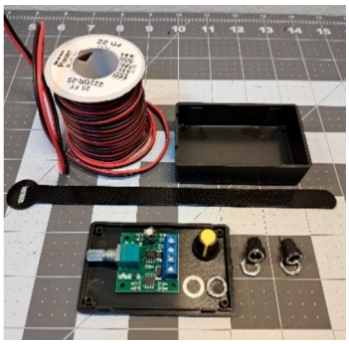
Steps:

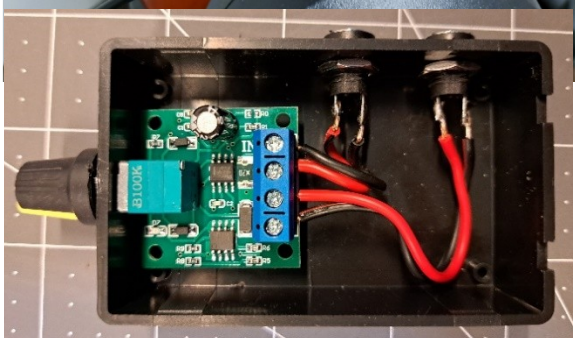
1. Loosely place components in project box and mark locations
2. Drill holes for PWM & DC connectors
3. Solder leads on DC connectors
4. Tin the loose leads
5. Install loose leads on PWM board and tighten
6. Label ports
7. Test output voltage

Parts:

1 Project box $ 1.40 Amazon $6.99/5
1 PWM 1.8-12v 2A $ 1.83 Amazon $5.49/3
2 DC5521 connectors $ 1.17 Amazon $6.99/12
Project Total: $ 4.40

Misc:
22 gauge wire ~6”
Hook & loop strap





This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Constant Companions: Circumpolar Constellations, Part II

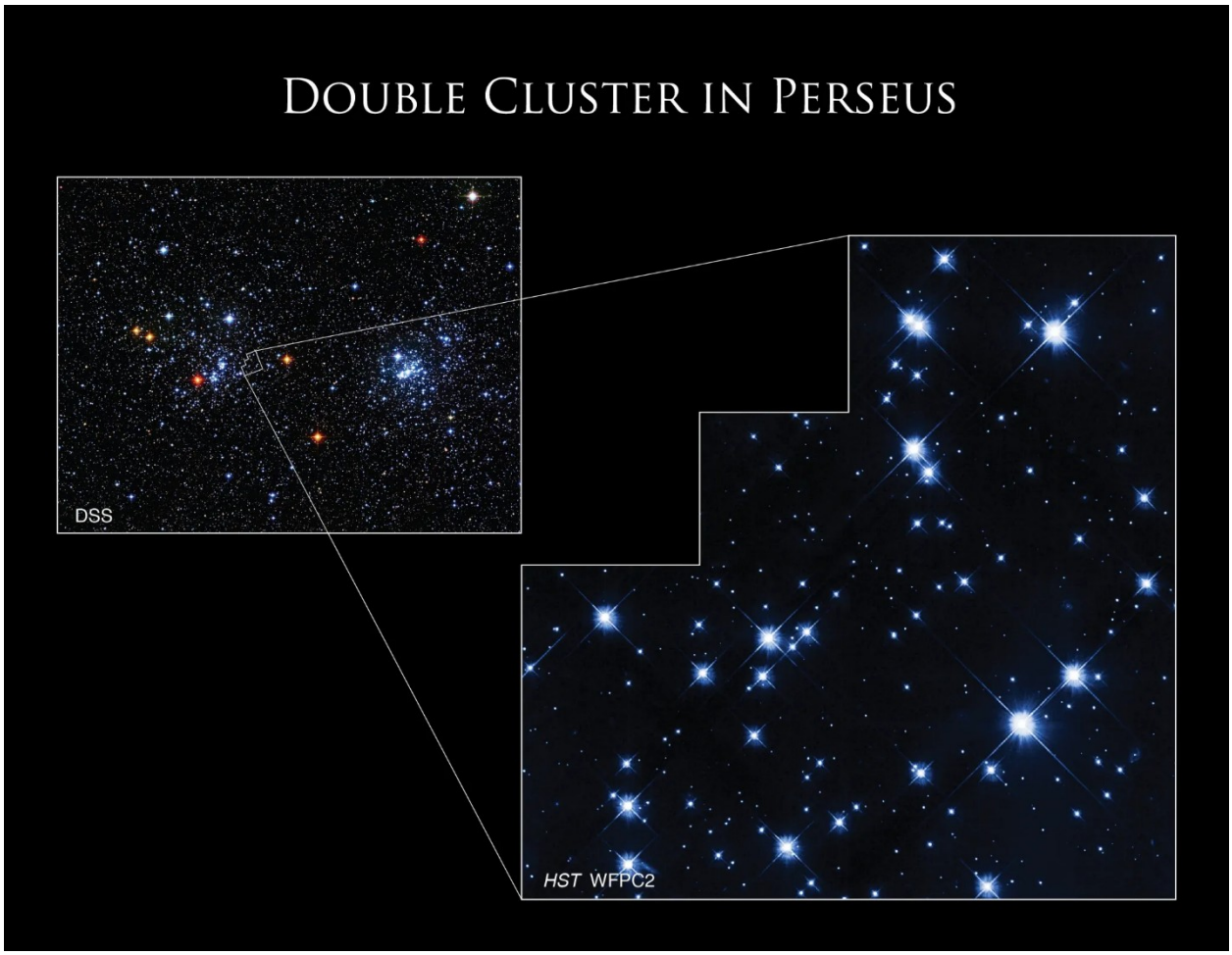
By Kat Troche

As the seasons shift from Winter to Spring, heralding in the promise of warmer weather here in the northern hemisphere, our circumpolar constellations remain the same. Depending on your latitude, you will be able to see up to nine circumpolar constellations. This month, we'll focus on: **Lynx, Camelopardalis, and Perseus**. The objects within these constellations can all be spotted with a pair of binoculars or a small to medium-sized telescope, depending on your Bortle scale – the darkness of your night skies.

In the appearance of left to right: constellations Perseus, Camelopardalis, and Lynx in the night sky. Also featured: Cassiopeia as a guide constellation, and various guide stars.
Credit: Stellarium Web

- **Double Stars:** The area that comprises the constellation Lynx is famous for its multiple star systems, all of which can be separated with a telescope under dark skies. Some of the notable stars in Lynx are the following:
  - **12 Lyncis** – a triple star that can be resolved with a medium-sized telescope.
  - **10 Ursae Majoris** – a double star that was once a part of Ursa Major.
  - **38 Lyncis** – a double star that is described as blue-white and lilac.

- **Kemble's Cascade:** This asterism located in Camelopardalis, has over 20 stars, ranging in visible magnitude (brightness) and temperature. The stars give the appearance of flowing in a straight line leading to the Jolly Roger Cluster (NGC 1502). On the opposite side of this constellation, you find the asterism **Kemble's Kite**. All three objects can be spotted with a pair of binoculars or a telescope and require moderate dark skies.



A ground-based image from the Digitized Sky Survey (DSS) in the upper left shows Caldwell 14, the Double Cluster in Perseus, with an outline of the region imaged by Hubble's Wide Field and Planetary Camera 2 (WFPC2).
Ground-based image: Digitized Sky Survey (DSS); Hubble image: NASA, ESA, and S. Casertano (Space Telescope Science Institute); Processing: Gladys Kober (NASA/Catholic University of America)

- **Double Cluster:** The constellation Perseus contains the beautiful Double Cluster, two open star clusters (NGC 869 and 884) approximately 7,500 light-years from Earth. This object can be spotted with a small telescope or binoculars and is photographed by amateur and professional photographers alike. It can even be seen with the naked eye in very dark skies. Also in Perseus lies **Algol, the Demon Star**. Algol is a triple-star system that contains an eclipsing binary, meaning two of its three stars constantly orbit each other. Because of this orbit, you can watch the brightness dim every two days, 20 hours, 49 minutes – for 10-hour periods at a time. For a visual representation of this, revisit NASA's What's Up: November 2019.

From constellations you can see all year to a once in a lifetime event! Up next, find out how you can partner with NASA volunteers for the April 8, 2024, total solar eclipse 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