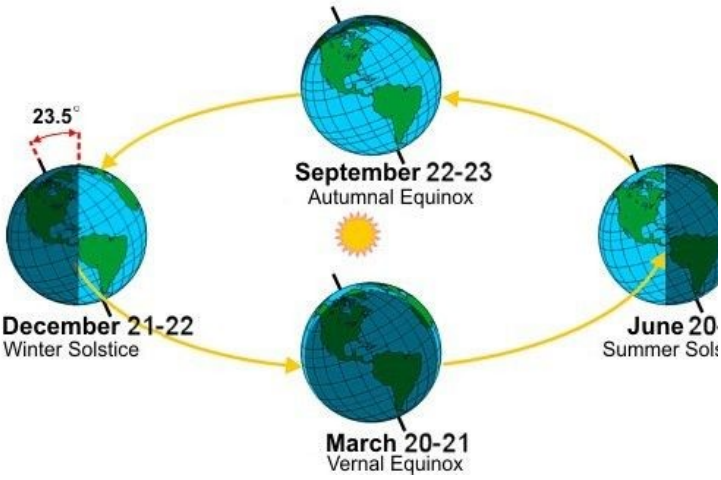
Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers March 2021

Events:

Virtual meeting via Zoom on 1 March at 7PM. Join your fellow astronomers for an IFI and Gallery assembled by Clark Williams followed by a talk "There and Back… How I got into imaging and how I do what I do" by Dave Ng. Virtual refreshments by Annette Brown. Watch your club email for meeting ID and password.

Until we can resume our monthly meetings, you can also interact with your astronomy associates on Facebook or by posting a message to our mailing list.



The March equinox, known as the vernal equinox in the Northern Hemisphere and as the autumnal equinox in the Southern Hemisphere, is 20 March at 0227 PST.

WHAT'S INSIDE THIS MONTH:

Send newsletter submissions to Mark DiVecchio <markd@silogic.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).

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Cosmic Comments
by President Mark Baker

To paraphrase…"MARS is Calling, So We Must Go"!!!

The successful landing of Perseverance (and Ingenuity) at Jezero Crater has served to inspire people all over the world to Look Up… much more than even I imagined!!!
The last few months at the winery Star Parties, we would get an occasional inquiry about Mars and a few would even want to see it through a telescope… more than a few would mumble "That's IT…??", thoroughly not impressed.

This changed dramatically at the SP on the day after the landing… EVERYONE coming through wanted to know where Mars is, look at it, talk about it, and my looping PowerPoint on Ingenuity never attracted so much attention!!! I just put my scope on M31, the Andromeda Galaxy, and talked Mars all night…

Of particular and gratifying interest to me was the display of ownership by several visitors… they wanted to know where WE were at!!! Not NASA, not JPL, but WE…prodigious!!!
Like all things, the excitement will wear off over time, pick up again with the flights of Ingenuity, and even that will be "old hat" eventually… but for this moment in time, humanity is looking up in wonder and awe. And I like it…

So, as always, I thank TVA for their contributions to promoting such a positive and healthy curiosity (no, that's the previous rover…)… my enthusiasm boils over right now because of you all. Stay tuned in and keep the faith as there is much, much more yet to come…

Clear, Dark Skies my Friends…

Editor's Note
by Mark DiVecchio

After many years of assembling the Temecula Valley Astronomer, it is time for me to step away. I have told President Baker that the April 2021 newsletter will be my last.

Long time contributor to the TVA, Clark Williams will be doing his last "Looking Up Redux" column in the April TVA. Here is another chance for you to give back to the group and become a magnitude zero star.

Mark DiVecchio

In Memoriam

From Debi Jonhson

Ken loved life. He was always able to find the fun in anything. Life with him was always an adventure. Whether he was dressing up for an occasion, sitting on the beach, enjoying time in a cozy Idyllwild cabin, cooking an incredible meal, driving his tractor, going to church, or looking up at the stars, he found so much joy in everything and was never afraid to try something new. He was always ready to lend a helping hand to anyone who needed it. He taught me about life, love, trust, and marriage. I am truly blessed to have had Ken in my life for 35 years. He took such good care of me and our pups and made us feel so loved and for that I will be forever grateful. I've loved him with all my heart and he has always been my best friend. I will miss him forever but know that he's with God and is on another adventure.

From Mark Baker

Ken n Debi had become Star Party stalwarts the last couple of years, and really jumped into Astronomy and Outreach with both feet. Even though Ken was seriously bothered by cold, it never deterred him from bundling up, turning on a heater, and being there. Their positive attitudes and enthusiasm in learning and sharing will ever be appreciated.

The memorial service will be Friday, 3/19 at 2pm t the Calvary Chapel Bible Fellowship on Rancho California Road**.** No food will be allowed because of COVID. The service will be broadcast live on the CCBF.net website for those that can’t attend.

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
https://www.fourmilab.ch/earthview/pacalc.html

ALL TIMES ARE LOCAL PACIFIC TIME 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:

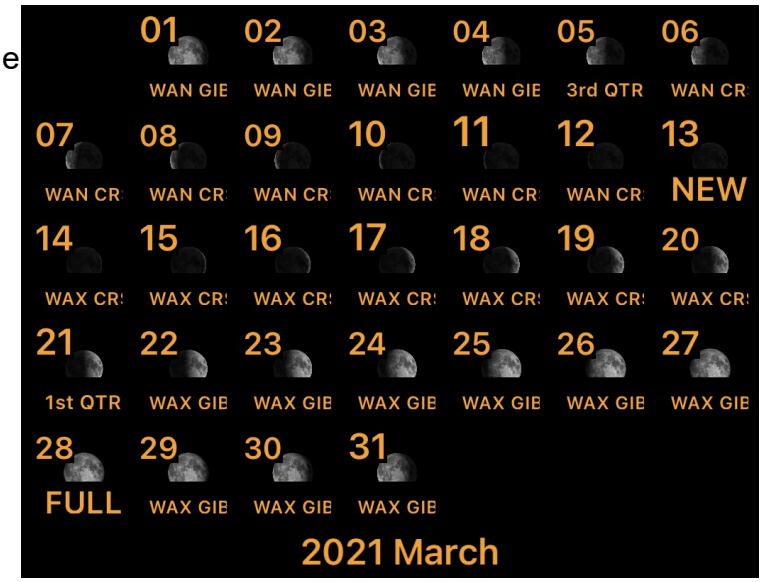
Sunday	**the 28th**	**@ 1149 FULL in VIRGO**
Friday	**the 5th**	**@ 1731 THIRD QTR in OPHIUCHUS**
Saturday	**the 13th**	**@ 0222 NEW in AQUARIUS**
Sunday	**the 21st**	**@ 0741 First QTR in GEMINI**

Apogee comes on 2021-03-18 @ **0505 – 405,252 km (252,564 mi)**
Perigee comes on 2021-03-02 @ **0520 – 365,421 km (221,901 mi)**
Perigee comes on 2021-03-30 @ **1525 – 357,378 km (222,064 mi)**

2021 has: (12) new moons, (13) 1st Qtr moons, (13) Full moons, (12) 3rd Qtr moons
(1) Blue moon and (0) Black moons

Daylight Savings: Starts: 2021-Mar-14 : Ends: 2021-Nov-07

Luna: Luna is in waning gibbous on the first of the month, headed for 3rd quarter on the 5th rising at **2039**, transiting at **0238+** and setting by **0835+**. Luna by mid-month is 7% illuminated. Rising at **0823** and transiting early afternoon at **1448** setting at **2021**. By the-end-of-the-month Luna is once again in waning gibbous, 90% illuminated transiting at **0313** and setting by **0845+**.



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

March 6 - Mercury at Greatest Western Elongation. The planet Mercury reaches greatest western elongation of 27.3 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 morning sky. Look for the planet low in the eastern sky just before sunrise.

March 9th-19th Messier Marathon. Observe and/or image all 110 Messier objects in a single night. March 17th is the best night to do this on but New Moon is on the 13th and that means that the 17th will have a 19% illumination. If you're quick on the 13th, 14th and 15th you should be able to get all 110 Messier objects in. Practice on the 9th through the 13th and then get serious. The Astronomical League has a badge for this category.

March 13 - 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 **0323**. 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 **0227**. 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 20 - Venus at Greatest Western Elongation. The planet Venus reaches greatest eastern elongation of 46.6 degrees from the Sun. This is the best time to

view Venus since it will be at its highest point above the horizon in the morning sky. Look for the bright planet in the eastern sky before sunrise.

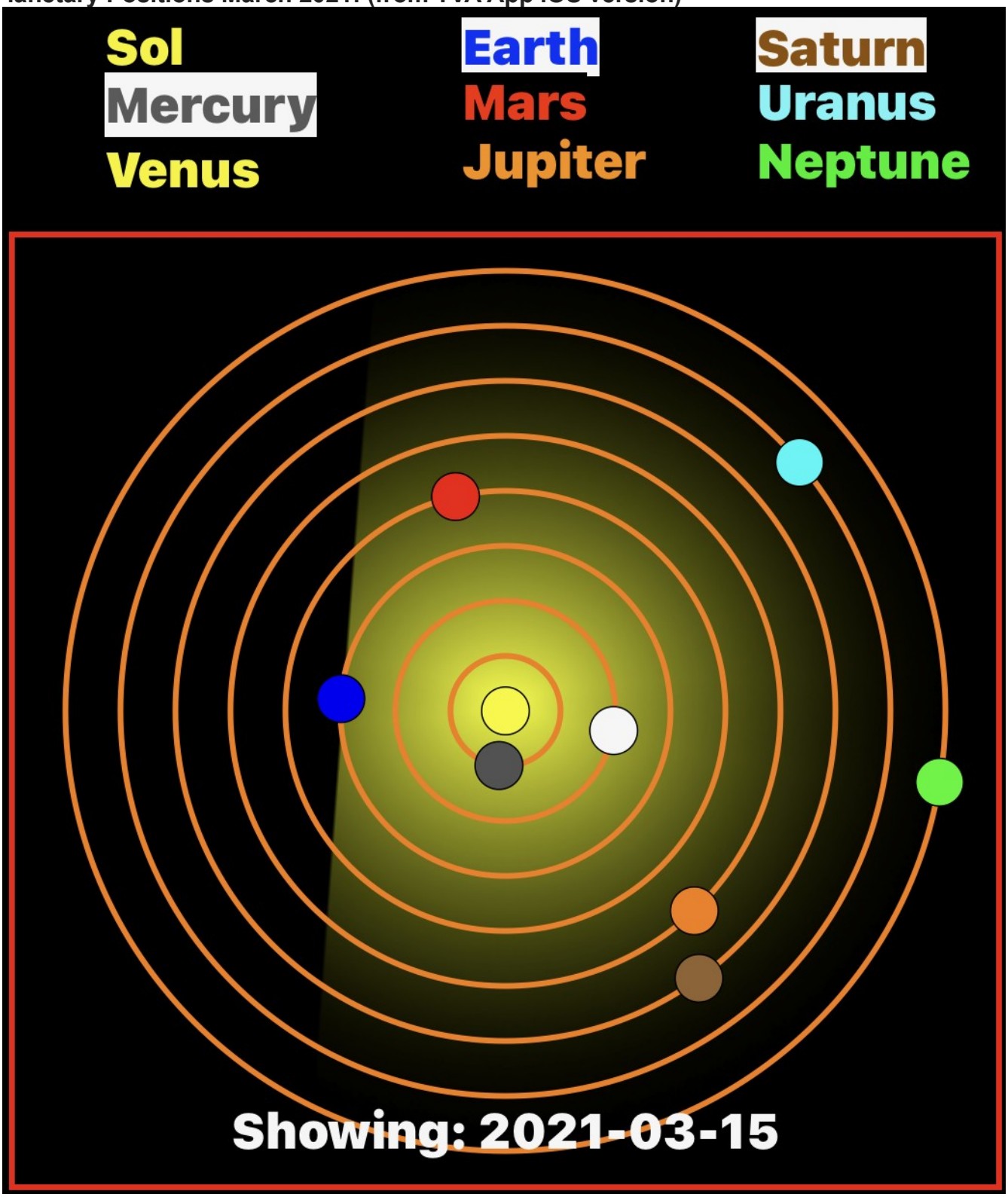
March 28 - Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be will be fully illuminated. This phase occurs at **1149**. This full moon was known by early Native American tribes as the Worm Moon because this was the time of year when the ground would 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.

Algol minima: (All times Pacific Time)

03/01/2021	**2021**
03/04/2021	**1710**
03/078/2021	**1359**
03/10/2021	**1049**
03/13/2021	**0738**
03/16/2021	**0427**
03/19/2021	**0116**
03/21/2021	**2206**
03/24/2021	**1855**
03/27/2021	**1544**
03/30/2021	**1233**

Planets:

Planetary Positions March 2021: (from TVA App iOS version)



- **Mercury:** Mercury is a morning object in the beginning of the month. It is illuminated at 48% and 0.26 apparent magnitude. Mercury rises at **0458** with the sun following at **0615**. On the 6th Mercury will be at Greatest Western Elongation. Mercury by mid-month is rising at **0556** with Sol rising at **0657**. By the 31st Mercury is very close to the Sun, rising at **0601** preceding sunrise at **0634**.
- **Venus:** Is the Morning Star. Venus rises about **0605** preceeding sunrise at **0615** on the first. By mid-month Venus is lost to the sun. On the 20th Venus will be at Greatest Western Elongation. By the 31st Venus ihas changed to an evening star. Setting at **1915** preceeding Sol by 5 minutes.
- **Mars:** Mars is an evening object on the 1st of the month. Mars doesn't set until **2358** on the first. By mid-month Mars is transiting at **1733**. End-of-month finds the Warrior doesn't set until **0025**.
- **Jupiter:** Jupiter is a morning object on the first of the month rising at **0508** and preceding sunrise at **0615**. By mid-month Jove is rising at **0523** the sun follows at **0657**. Come the end of month Jupiter is peaking above the horizon by **0430** with sunrise at **0635**.
- **Saturn:** Saturn rises about **0452** on the 1st while sunrise is at **0657**. Saturn by mid month is rising by **0358** preceding sunrise at **0600**. By the end-of-the-month Saturn is rising at **0353** followed by the sun at **0635**.
- **Uranus:** On the first Uranus doesn't set until **2211**. The apparent magnitude is 5.83 so we're on the ragged edge of being naked-eye visible. By the ides Uranus is setting at **2219**. End-of-month finds Uranus setting by **2119**.
- **Neptune:** Neptune is an evening object setting at **0645** in the beginning of the month. You should be able to squeeze in a peek if you're up by that hour. By the 15th Neptune is lost to the Sun. By the end of the month Neptune is a morning object rising at **0550** and Sol is rising at **0635**.
- **Pluto:** Pluto rises by **0402** on the first of the month preceding sunrise at **0615**. By mid-month Pluto is rising by **0408** preceding sunrise at **0657**. By the 31st Pluto is rising at **0306**.

Asteroids:

- Still a dearth of asteroids. I searched for asteroids in 2021 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.asteroidsnear.com/year?year=2021

Meteors:

- See Next Month

- See Highlights above for more details. (SeaSky.org**)** (American Meteor Society)

Comets: come in various classifications:

- 1) Short Period comets – further broken down into:
  - Halley Type: The Halley Types are believe to come from the Kuiper Belt and have periods in excess of 20-years.
  - Jupiter Type: The Jupiter types have a period less than or equal to 20-years.
  - Short period comets 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.

Nothing really available this month in comets, perhaps something in April.

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 2021 at 2100 PDT and you will have about 20 minutes of viewing time total.

- NGC 2392**:**

NASA/ESA/Hubble

The Eskimo Nebula, NGC 2392, also known as the Clown-faced Nebula, Lion Nebula, or Caldwell 39, is a bipolar double-shell planetary nebula (PN). It was discovered by astronomer William Herschel in 1787. The formation resembles a person's head surrounded by a parka hood. It is surrounded by gas that composed the outer layers of a Sun-like star. The visible inner filaments are ejected by a strong wind of particles from the central star. The outer disk contains unusual, light-year-long filaments.
NGC 2392 lies about 6500 light-years away, and is visible with a small telescope in the constellation of Gemini. (Wikipedia)

- **Messier 99:**

Credit Line and CopyrightAdam Block/Mount Lemmon SkyCenter/University of Arizona.

http://www.caelumobservatory.com/gallery/m99.shtml, CC BY-SA 3.0 us, https://commons.wikimedia.org/w/index.php?curid=20446086

Messier 99 or M99, also known as NGC 4254, is a grand design spiral galaxy in the northern constellation Coma Berenices approximately 15 megaparsecs (49 megalight-years) in distance from the Milky Way. It was discovered by Pierre Méchain on March 17, 1781. The discovery was then reported to Charles Messier, who included the object in the Messier Catalogue of comet-like objects. Messier 99 was one of the first galaxies in which a spiral pattern was seen. This pattern was first identified by Lord Rosse in the spring of 1846. (Wikipedia)

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

For now – Keep looking up.

Random Thoughts – A Memo to Mark Baker
by Chuck Dyson

In August and September of last year I was running around with different types of eyepieces and shanghaiing club members to look through them and comment on what they thought of the view with each eyepiece. As I was doing all this high scientific stuff for my November 2020 ramble, Mark Baker cornered me and said, “why don’t you work up a suggested list of eyepieces for the C 11?”. OK, I can definitely do that, and it will be an easy, short Random Thoughts article.

However, I then started to think about the project and realized that when we see articles titled “How to Choose Eyepieces for Your Telescope” the authors are invariably talking about one scope and one type of viewing scenario, just like Mark, but, in reality, most of us have either more than one scope or we get into different viewing scenarios (dark sky sites or bright sky sites), or both. It also goes without saying that if you take a scope to a TVA event your scope and especially your eyepieces will be exposed to *THE PUBLIC*. Be honest now, do you really want to take your new $666.99 Nagler 31 mm eyepiece to a public star party only to find at the end of the evening there is either the thumb print nebula, or the nose drop globular or some minor planet mascara streaks on its surface. It is also equally important that you remember that Phineas Fog Bound and Ditzy Lizzy, your two eccentric but absolutely lovable neighbors, are also just *THE PUBLIC* when it comes to your eyepiece safety. Let us explore the possibility or desirability of having one expanded eyepiece set or even two separate sets for our telescope.

In my November 2020 article I covered two different telescopes, one with a focal length of 700 mm and one with a focal length of 1500 mm and two sets of eyes, one with a maximum pupil size of 7 mm and one with a max pupil size of 5 mm. The appropriate eyepiece selection for two scopes was different and it was different for the different eyes, mostly at the low power end. As we invite *THE PUBLIC* to look through our eyepieces the range of items that we must consider to ensure a successful viewing experience will only multiply.

First, let me start off with a tale of my solar eclipse experience. To view the eclipse, I trucked to Nebraska my 22X85 binoculars, with appropriate solar filters, and my 114mm X 600mm Vixen telescope. One of the eyepieces that I took was one that would give me a 22 power magnification with a 5.2 mm light cone and even though I knew that in the daylight my eye would not open up to the 5.2 mm, I wanted the 2.6° field of view that would let me see all of the possible corona. My first view through the eyepiece convinced me that I had made a big mistake, the image of the sun was really dim because so much light was not going into my eye. I then went to a shorter focal length eyepiece that gave me a 2.6 mm cone of light and the image was much brighter and I still had a 2° field of view. Lesson learned.

Now let us look at what would be an optimum low power eyepiece for our three telescopes, the 700 mm Focal length (Fl) with an objective diameter (Od) of 127 mm, the 1500 mm Fl with an Od of 150 mm, and finally the mega Mark scope with a 2800 mm Fl and a Od of 280 mm. Let us agree that as most of our public star parties are in less than perfectly dark sites (yes, I am being quite genteel with the lighting situation here) we will only assume that our eyes will not be dilated to more than 5 mm of diameter. To get the optimum eyepiece for each scope we will first divide the Od by 5 (this is the maximum diameter of the light cone we want for our eyes) and

this will give us the magnification that will give us our 5 mm diameter light cone. We will then divide our resultant magnification into the Fl of the scope, and this will give us the focal length of the eyepiece that we looking for. I will show all the calculations for the first scope and then just give you the eyepiece focal lengths for the last two (you may do the calculations on your own if you wish and submit your work for extra credit). For the 127 mm Od /700 mm Fl our first equation is $127 \div 5 = 25.4$ magnification; we now divide the focal length of our scope by the magnification and that gives us the focal length of our desired eyepiece, $700 \div 25.4 = 27.5$ mm or we can just round off to 28 mm and that will be the focal length of our eyepiece. Now for our 150 mm Od/ 1500 mm Fl scope we are looking for a 50 mm eyepiece, and for our 280 mm Od/ 2800 mm Fl scope we are looking for 50 mm eyepiece. You will notice that both of the last two scopes have the same focal length eyepiece for our low power eyepiece. That's because they have the same f/ratio; but, the larger scope will have a larger image and will have a smaller field of view No free lunch here folks. There is another problem with our last two scopes. With 1¼ inch eyepieces, the longest practical focal length eyepiece is 32 mm. After that, as the focal length gets longer the field of view just gets smaller, it has to do with the maximum cone of light that you can get into a 1¼ inch eyepiece. In order to get any real usefulness out of a 50 mm eyepiece you need to go to a 2 inch diagonal and eyepiece or just get a good 32 mm eyepiece and be happy.

Now that we have looked at our low magnification options - what are our high magnification options? As we go up in magnification our eyepiece light cone gets smaller and is generally agreed that 1 mm is the smallest practical light cone under average (school yard) conditions. Well, this is dead easy because you just divide the Od of the scope by 1 and that is just the diameter, we're done. How do we find the focal length of the eyepiece that we need? Lucky us and dead easy again, just get an eyepiece that has the same focal length as the f/ratio as your telescope. For our first scope it's $700 \div 127 = 5.5$ mm; so, just get a 5.5 mm eyepiece and you are done. For our next two scopes, are both f/10, it is a 10 mm eyepiece for both of them with a max magnification of 150x and 280x. Unfortunately, we need to look through an atmosphere and there is turbulence and that means the for practical purposes we can rarely go over 200 magnification. For our 280 mm Od scope that means dividing 2800 Fl by 200 and our eyepiece focal length is 14 mm.

Now that we have our max magnification and our minimum magnification for our telescope how do we fill in the middle? First item, in reality I really do not go over a 150X magnification with my telescopes because the seeing in Menifee just will not allow it except on exceedingly rare nights and the lowest magnification is what will produce a 5 mm cone of light with the scope that I am using. My basic eyepiece selection is a high power, a mid-high power, a mid-low power, and the low power eyepiece. This arrangement is OK but if the atmosphere will not support my high magnification eyepiece then I must drop way down to my next eyepiece and that one is usually less than ideal for planetary viewing; so, I will usually have two more eyepieces that are close to the focal length of my high magnification eyepiece. For example, say my scope is the 700 mm Fl scope and my high power eyepiece is 5 mm and I also have both 6 mm and 7 mm eyepieces to go with it. The 5 mm eyepiece gives me 140X magnification and if the image is fuzzy then the 6 mm eyepiece will give me 116X magnification, still fuzzy image, the 7 mm eyepiece gives me 100X, still fuzzy then switch to viewing open clusters, globular clusters, and emission nebula

because you will not be seeing planetary detail tonight. And that is my basic six eyepiece set-up that I use for my viewing sessions.

Now that we have our eyepieces selected are we done? Nope, there is also the little matter of eye relief. If *THE PUBLIC* will be looking through these eyepieces or you will and those who must use glasses need to be certain that the eyepiece has enough eye relief to accommodate glasses. For someone wearing glasses 13 mm of eye relief is the absolute minimum needed in order to see the entire telescopic field, 15 to 18 mm of eye relief is considered ideal. On the other end of the spectrum, long focal length eyepieces, too much eye relief can be a problem. In long focal length eyepieces, the eye relief should be limited to 20 to 22 mm maximum. In the short focus eyepieces, finding one with 15 to 18 mm of eye relief can be a problem; however, you can use a longer focal length eye piece with a Barlow lens to reduce the eyepiece's focal length but still keep the desirable eye relief distance. If we take a 25 mm Fl eyepiece and use a 2X Barlow then the eyepiece is a 12.5 mm Fl, a 3X Barlow and the eyepiece becomes an 8 1/3 mm focal length eyepiece. The downside of this arrangement is that, in the dark, you are now fumbling with both eyepieces and Barlows.

Now that we are finally ready to welcome *THE PUBLIC* to an evening of viewing with appropriate focal length eyepieces with the appropriate eye relief and a Barlow or two, we have a lot of stuff to organize! Is there a simpler way to show the public the wonders of the night sky? As I was reviewing articles to see how other people conducted their star parties and what equipment they used, I was quite surprised at the number of people who only used a zoom lens on their telescopes. The most common ranges found on Zoom lenses are 7 to 22 mm focal length and 8 to 24 mm focal length and that seems a reasonable range for many telescopes. The field of view is a little narrow compared to single focal length eyepieces and the image is OK but not the sharpest. Are you cheating the public by not giving them the lost in space, ultra-sharp definition experience? No, remember the first time you looked into an eyepiece all you wanted was to see something and you saw something and were thrilled. Only later, after accumulating hours of time at the eyepiece, did you start to look for details on things and that is the way with *THE PUBLIC,* they just want to see something and have you explain to them what that thing is, joy and happiness have you brought them.

If you decide to have an eyepiece set for public viewing one august writer of public thoughts opined that you not pay over $60.00 for the eyepieces that will be used for public viewing. Does this limit us to junk eyepieces? No way. The Astro-Tech Paradigm eyepieces have a tremendous reputation and the Celestron Omni eyepieces are not far behind; so, there are plenty of solid choices at this price point.

Everyone agrees that if you are going to public viewings then you need to know how to clean your eyepieces properly and safely. For this I highly recommend an article titled *Clean your eyepieces and lenses safely* astronomy hacks. Both technique and supplies are discussed.

If your want help finding reviews on equipment that you are interested then I recommend going to: Reviews at BBC Sky at Night Magazine. At this site you will find your self in equipment review heaven.

OOPS! Almost forgot. We need to work up outreach eyepiece recommendations for the 11 inch (280 mm) Cassegrain with its mighty 2800 mm focal length. Unfortunately, our selections are limited with 1¼ inch eyepieces. The first recommended eyepiece is easy either an 18 mm FI, just above my 150X max, or a 19 mm FI, just below my 150X max magnification. Next is our lowest power eyepiece would be one that gives us a 5 or 5.5 mm light cone to our eyes; and that would be a 50 or 56 mm eyepiece and they are available, just not in 1¼ inch eyepieces. The longest focal length but still practical eyepiece would be a 32 mm eyepiece. Going with the 18 mm high end eyepiece and the 32 mm low end we get a midpoint of 25 mm and all three of these eyepieces are available in our $60.00 price point, we are off to a good start. Our mid-low point works out to 28.5 mm but a readily available 27 mm one will do. Unfortunately, in our mid-high range we are looking for a 21 mm to a 22 mm eyepiece and we hit a roadblock. There are many different eyepiece manufactures in the market, but they all tend to produce eyepieces of the same focal lengths and 21 and 22 mm is not a popular option. We can leave the mid-high spot empty and go with 4 eyepieces for approximately $240 or we can purchase an Edmund 21 mm eyepiece at $90 but with a 45 degree field of view or we can purchase a 3D Astronomy eyepiece at $149. In any event we will now have an eyepiece collection that gives us a practical range of magnifications for the telescope at a reasonable price point.

The preceding exercise should give some idea of how to select eyepieces for a telescope and some of the compromises that you may need to make.

Cheers, Chuck

Taking the Dog Stars for a Springtime Walk: Sirius and Procyon!

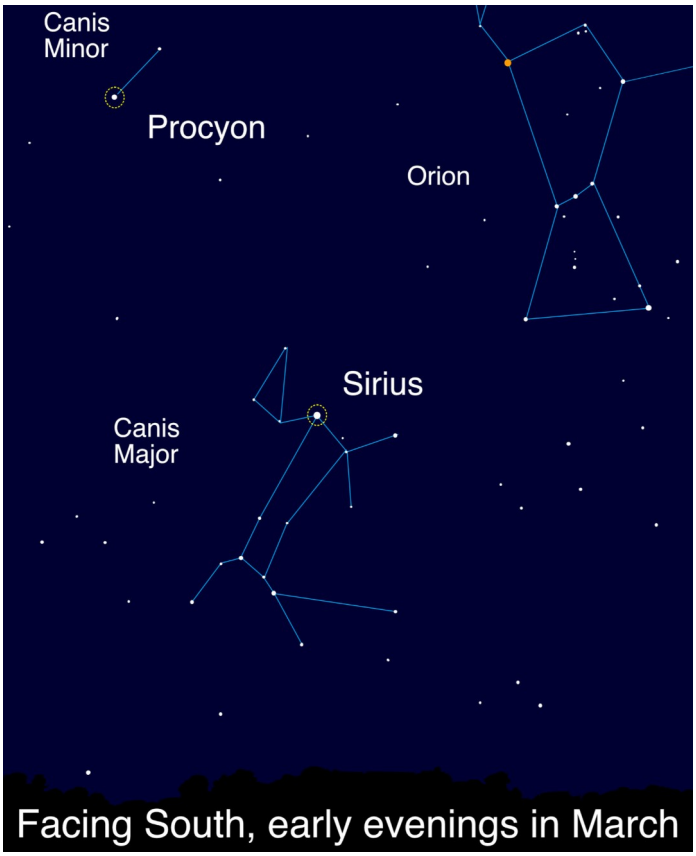
by David Prosper

March skies feature many dazzling stars and constellations, glimmering high in the night, but two of the brightest stars are the focus of our attention this month: Sirius and Procyon, the dog stars!

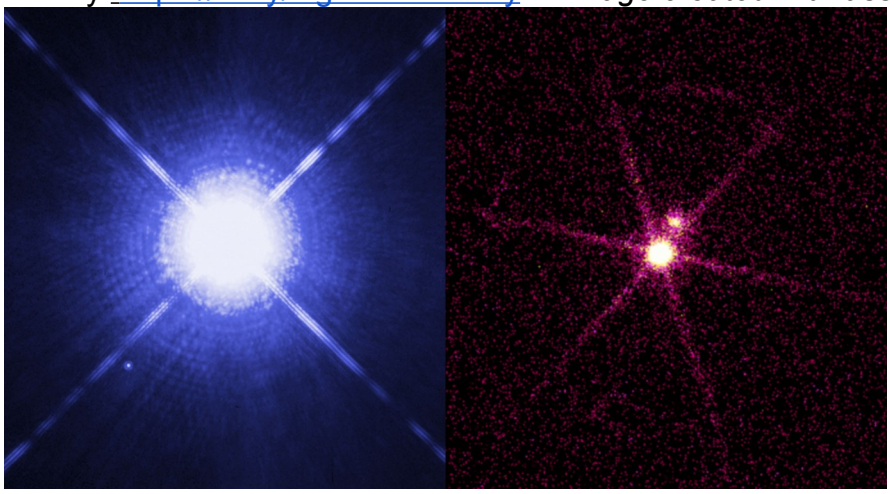
Sirius is the brightest star in the nighttime sky, in large part because it is one of the closest stars to our solar system at 8.6 light years away. Compared to our Sun, Sirius possesses twice the mass and is much younger. Sirius is estimated to be several hundred *million* years old, just a fraction of the Sun's 4.6 *billion* years. Near Sirius - around the width of a hand with fingers splayed out, held away at arm's length - you'll find Procyon, the 8th brightest star in the night sky. Procyon is another one of our Sun's closest neighbors, though a little farther away than Sirius, 11.5 light years away. While less massive than Sirius, it is much older and unusually luminous for a star of its type, leading astronomers to suspect that it may "soon" – at some point millions of years from now – swell into a giant star as it nears the end of its stellar life.

Sirius and Procyon are nicknamed the "Dog Stars," an apt name as they are the brightest stars in their respective constellations – Canis Major and Canis Minor – whose names translate to "Big Dog" and "Little Dog." Not everyone sees them as canine companions. As two of the brightest stars in the sky, they feature prominently in the sky stories of cultures around the world. Sirius also captures the imaginations of people today: when rising or setting near the horizon, its brilliance mixes with our atmosphere's turbulence, causing the star's light to shimmer with wildly flickering color. This vivid, eerie sight was an indication to ancient peoples of changes in the seasons, and even triggers UFO reports in the modern era!

Both of these bright stars have unseen companions: tiny, dense white dwarf stars, the remnants of supermassive companion stars. Interestingly, both of these dim companions were inferred from careful studies of their parent stars' movements in the 1800s, before they were ever directly observed! They are a challenging observation, even with a large telescope, since their parent stars are so very bright that their light overwhelms the much dimmer light of their tiny companions. The white dwarf stars, just like their parent stars, have differences: Sirius B is younger, brighter, and more energetic than Procyon B. Careful observations of these nearby systems over hundreds of years have helped advance the fields of: astrometry, the precise measurement of stars; stellar evolution; and astroseismology, the study of the internal structure of stars via their oscillations. Discover more about our stellar neighborhood at nasa.gov!



Sirius and Procyon, the loyal hunting dogs of nearby Orion the Hunter! What other stories can you imagine for these stars? Learn about "Legends in the Sky" and create your own with this activity: https://bit.ly/legendsinthesky *Image created with assistance from Stellarium.*



Sirius A and B imaged by two different space telescopes, revealing dramatically different views! Hubble's image *(left)* shows Sirius A shining brightly in visible light, with diminutive Sirius B a tiny dot. However, in Chandra's image *(right)* tiny Sirius B is dramatically brighter in X-rays! The "Universe in a Different Light" activity highlights more surprising views of some familiar objects: http://bit.ly/different-light-nsn *NASA, ESA, H. Bond (STScI), and M. Barstow (University of Leicester) (left); NASA/SAO/CXC (right)*

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