Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers September 2021

Events:

Virtual meeting via Zoom on 13 September at 6:30 PM. Watch your club email for meeting ID and password.

- **IFI & Gallery by Clark Williams**
- **Virtual Refreshments by Annette Brown**

Star Parties at South Coast Winery every Friday evening in September.

WHAT'S INSIDE THIS MONTH:

Cosmic Comments
by President Mark Baker

Editor's Note
by Paul Kreitz

Looking Up Redux
compiled by Clark Williams

A Proper Pad for My Dobs at Home
by Will Kramer

Random Thoughts – "The Forgotten Astronomer"
by Chuck Dyson

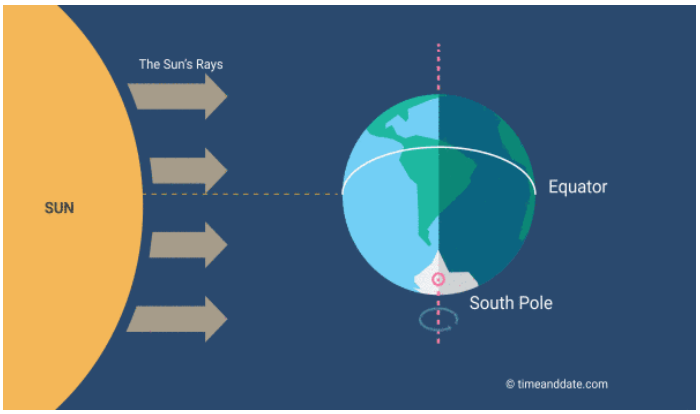
Another Look
by Dave Phelps

Beginner's Telescopes
by Sam Pitts

Catch Andromeda Rising
by David Prosper (NASA/JPL)

Send newsletter submissions to Paul Kreitz <pkreitz@sbcglobal.net> by the 20th of the month for the next month's issue.

September 22 is the Autumnal Equinox this year. See Clark's explanation below, in *Looking Up Redux*.



Time and Date

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

I love to sometimes just listen in on dialog and comments from our participants during our various and sundry events… they are often entertaining, but also enlightening too!!!
I've found that most people look at Astronomy as a "Good Ol' Boy Club", which is true to a degree, but we also enjoy our share of women and youth participating in meetings and Outreach, and enhancing the experience. And it's not just a TVA phenomenon, but In fact, quite pervasive in many of our fellow organizations here in this country. I've heard it mentioned several times how "cool" it is that we have "sisters with 'scopes"… and we get a lot of positive comments about the youth that participate right alongside of us!!! They are our future after all… And it's not new to the science either…. history shows that women have many times been the primary contributor to many astronomical discoveries, even if they received little to no credit in their day. And the growing trend worldwide is for young enthusiasts to make the bulk of optical discoveries of new asteroids and even comets, especially in Asia. The science enthralls people of all demographics in every corner of the world…

So here's to us "good ol' boys" that often provide the "cake" of our affection, but we are sure grateful for the "icing" that our women and youth add to the experience… it makes the activities that more delectable!!!

So thanks to you all, regardless of gender or age, that do such a great job of inspiring our communities to Look Up and wonder… and wanting more!!!

Clear, Dark Skies my Friends…

Editor's Note
by Paul Kreitz

Would you like to see one of your astrophotographs featured on an upcoming TVA Newsletter? Please send pictures to me (pkreitz@sbcglobal.net), along with a brief description of the subject, where the image was taken, and the equipment used.

Looking Up Redux – September 2021

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 8
SkySafari 6 Pro
Stellarium
timeanddate.com/astronomy
https://www.fourmilab.ch/earthview/pacalc.html

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

Times are given in 24-hour time as: (hh is hours, mm minutes, ss seconds)
hh:mm:ss or hhmmss
hhmm**+** (time of the next day)
hhmm− (time of the previous day)
hhmm (seconds not shown)
yyyymmddThhmmss (Full date as: year month day Time separator hours minutes seconds)

Moon Phases for the month by date:

Monday	**the 20th**	@ **1655 FULL in PISCES**
Tuesday	**the 28th**	@ **1858 THIRD QTR in GEMINI**
Monday	**the 6th**	@ **1752 NEW in LEO**
Monday	**the 13th**	@ **1340 First QTR in OPHIUCHUS**

Apogee comes on 2021-09-26 @ **1445 – 404,639 km (142,520 mi)**
Perigee comes on 2021-09-11 @ **0307 – 368,463 km (251,095 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 Waning Crescent on the first of the month, headed for NEW on the 6th rising at **0056**, transiting at **0827** and setting by **1559**. Luna by mid-month is 65% illuminated, Waxing Gibbous,

rising at **1454,** transiting at **1951** and setting at **0048+**. By the-end-of-the-month Luna is in the 3rd Quarter, 37% illuminated rising at **0030** transiting at **0800** and setting by **1528**.

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

September 6 - New Moon. The Moon will be located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at **1752**. 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.

September 14 - Neptune at Opposition. The blue giant planet will be at its closest approach to Earth and its face will be fully illuminated by the Sun. It will be brighter than any other time of the year and will be visible all night long. This is the best time to view and photograph Neptune. Due to its extreme distance from Earth, it will only appear as a tiny blue dot in all but the most powerful telescopes.

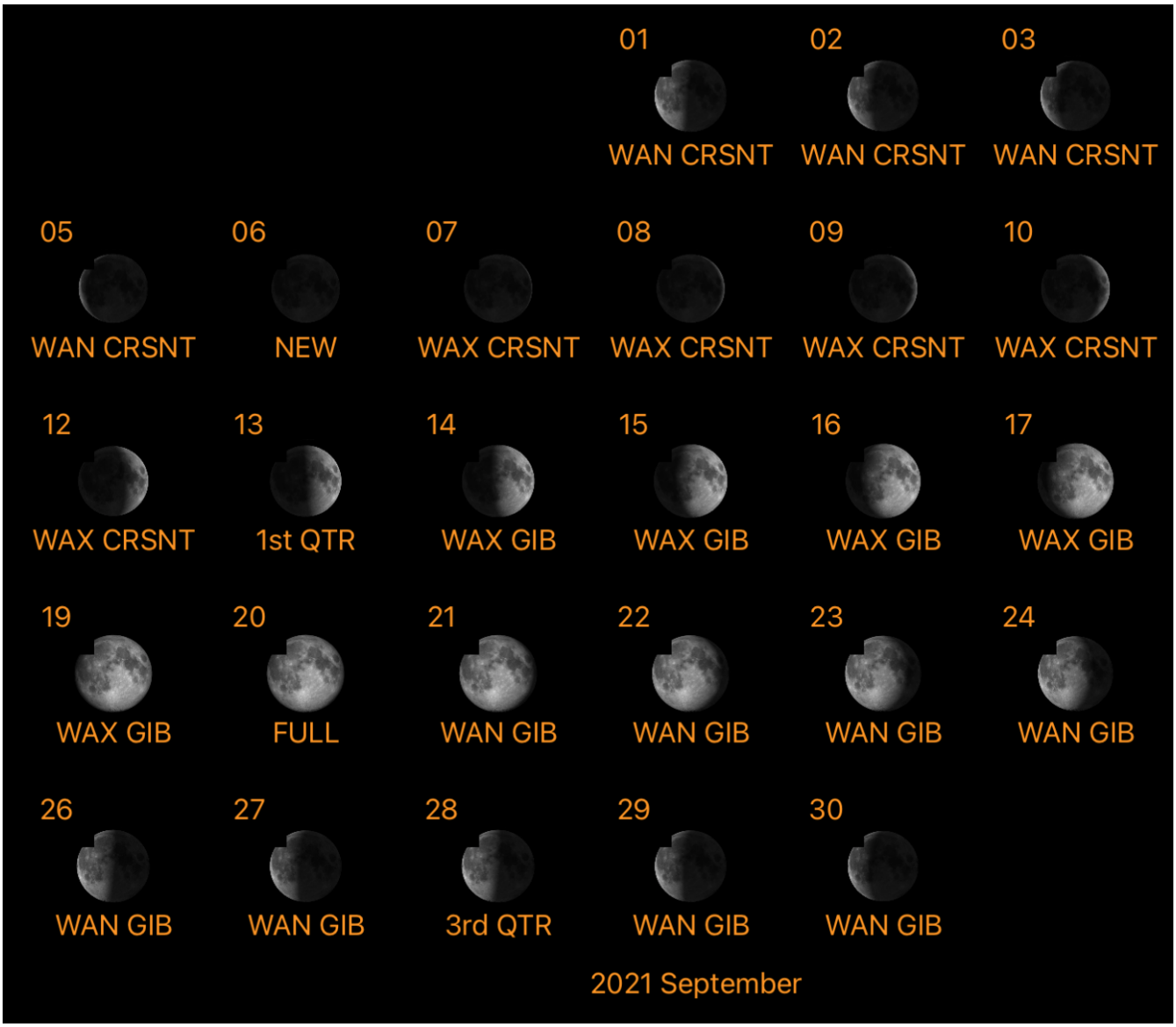
September 14 - Mercury at Greatest Eastern Elongation. The planet Mercury reaches greatest eastern elongation of 26.8 degrees from the Sun. This is the best time to view Mercury since it will be at its highest point above the horizon in the evening sky. Look for the planet low in the western sky just after sunset.

September 20 - Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be fully illuminated. This phase occurs at **1655**. This full moon was known by early Native American tribes as the Corn Moon because the corn is harvested around this time of year. This moon is also known as the Harvest Moon. The Harvest Moon is the full moon that occurs closest to the September equinox each year.

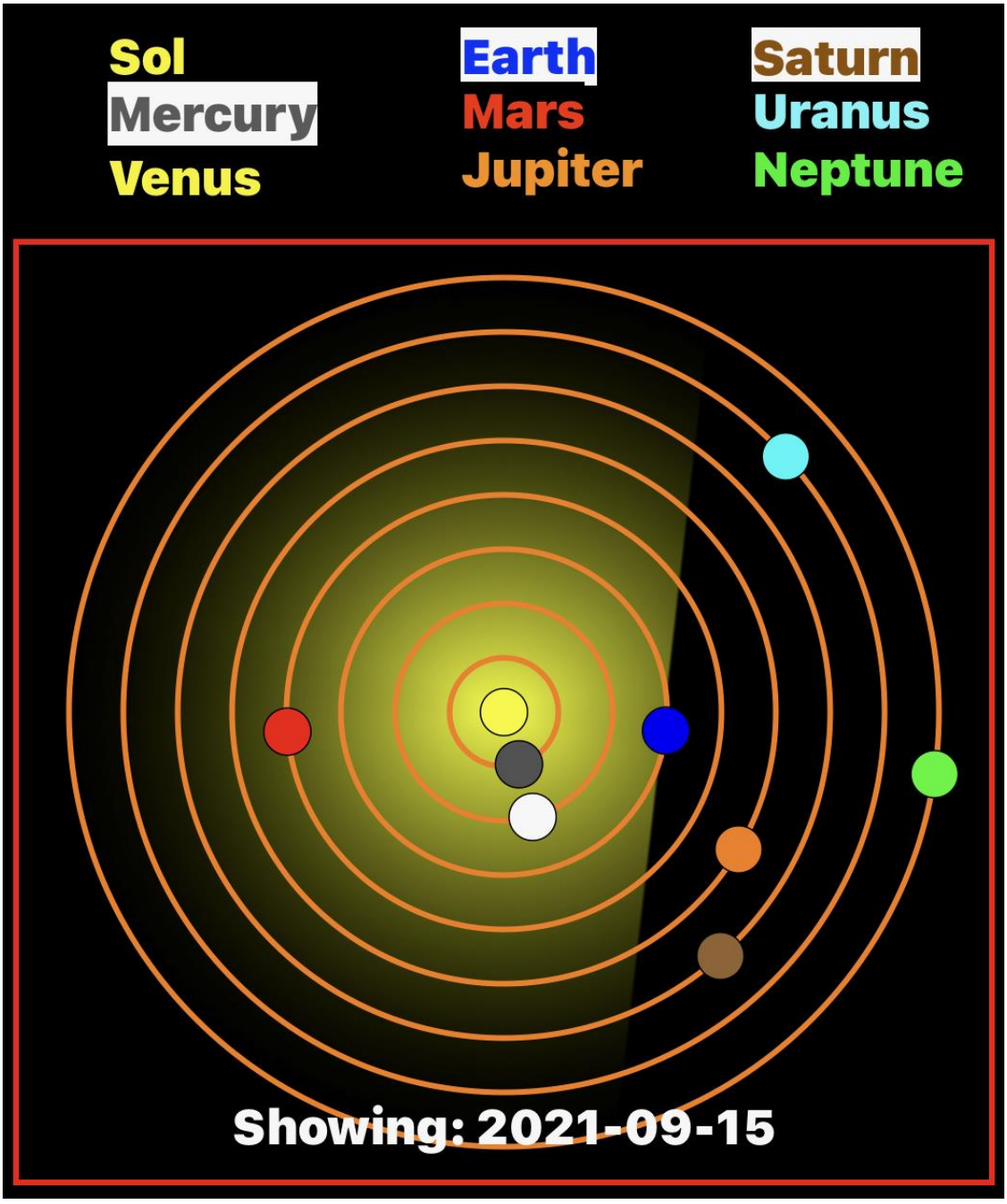
September 22 - September Equinox. The September equinox occurs at **1211**. The Sun will shine directly on the equator and there will be nearly equal amounts of day and night throughout the world. This is also the first day of fall (autumnal equinox) in the Northern Hemisphere and the first day of spring (vernal equinox) in the Southern Hemisphere.

Algol minima: (All times Pacific Time)

09/01/2021	**0930**
09/04/2021	**0618**
09/07/2021	**0307**
09/09/2021	**2355**
09/12/2021	**2044**
09/15/2021	**1733**
09/18/2021	**1421**
09/21/2021	**1110**
09/24/2021	**0758**
09/27/2021	**0447**
09/30/2021	**0136**


01 WAN CRSNT
02 WAN CRSNT
03 WAN CRSNT
05 WAN CRSNT
06 NEW
07 WAX CRSNT
08 WAX CRSNT
09 WAX CRSNT
10 WAX CRSNT
12 WAX CRSNT
13 1st QTR
14 WAX GIB
15 WAX GIB
16 WAX GIB
17 WAX GIB
19 WAX GIB
20 FULL
21 WAN GIB
22 WAN GIB
23 WAN GIB
24 WAN GIB
26 WAN GIB
27 WAN GIB
28 3rd QTR
29 WAN GIB
30 WAN GIB
2021 September

Planets:
Planetary Positions September 2021: (from TVA App iOS version)



This month is a special month for planetary viewing. For most of the month there will be a string of “planetary pearls” spanning the ecliptic. Uranus, Neptune, Jupiter, Saturn, Pluto, Venus, Mercury, and Mars all visible during the same night. You'll have to start with Mars since it sets nearest to sunset, moving to Mercury and Venus. Then you can leisurely pick up Pluto, Saturn,

Jupiter, and Neptune, followed within about an hour by Uranus. Start on the 6th as that is new moon. Then try again on the 26th as the moon is Waning gibbous and rising later at about **2206**.

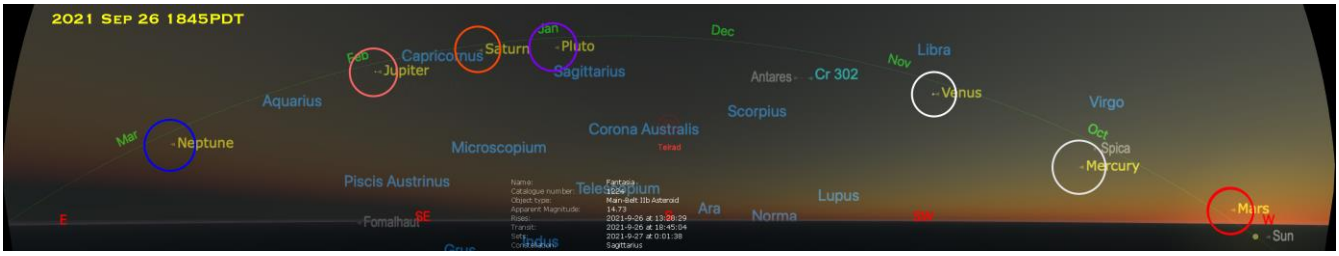


Illustration 1: 2021 0906 T1845 Getting Mars & Mercury (All 4 illustrations immediately below were created with Starry Night Pro Plus 8, © Simulation Curricula, Corp.)

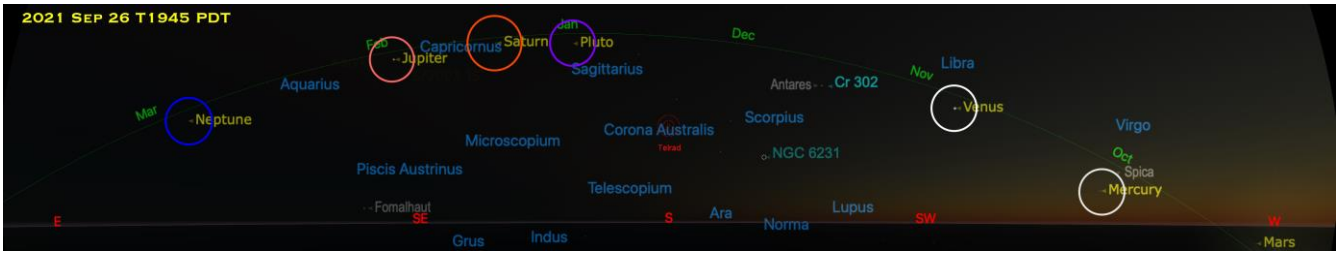


Illustration 2: 2021 0926 T1945 Getting Mercury & Venus

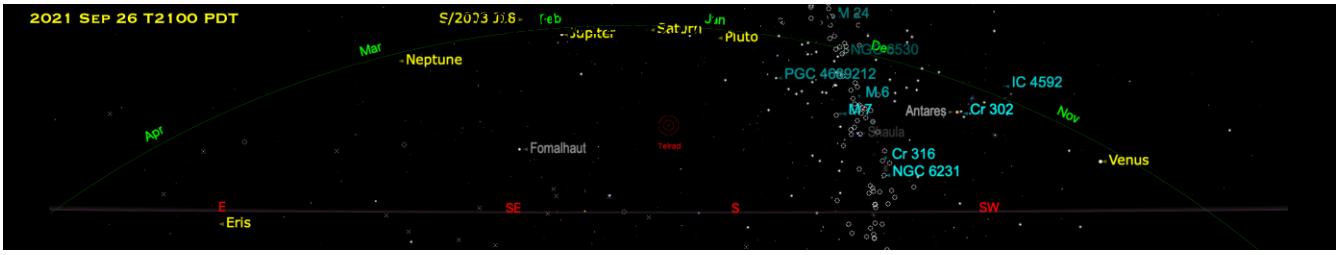


Illustration 3: 2021 0926 T2100 Getting Venus through Neptune

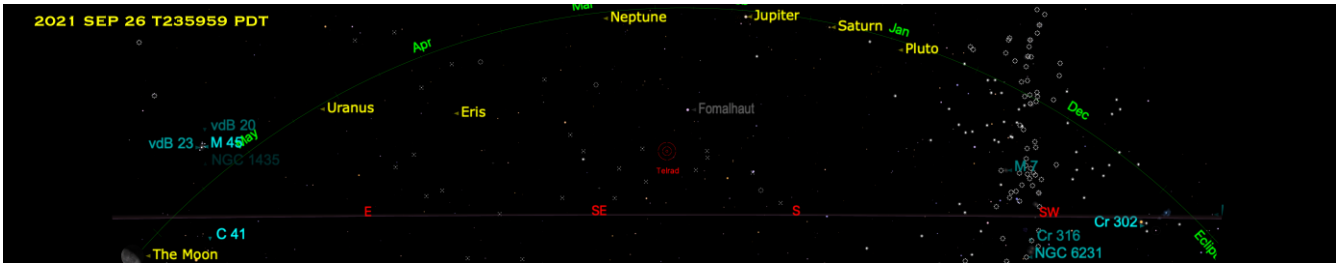


Illustration 4: 2021 0926 T235959 Getting Pluto through Uranus

- **Mercury:** Mercury is an evening object in the beginning of the month, rising at **0817**, transiting at **1415** and setting at **2014**. Could be a good time to image Mercury as it follows sunset by 59-minutes. Mercury by mid-month rises at **0841**, transiting at **1417** and setting at **1953**. By the 30th Mercury is still an evening object. Rising by **0808** and setting at **1903**.
- **Venus:** Is the Evening Star on the first of the month, setting by **2058**, preceded by sunset at **1915**. By mid-month Venus is setting at **2045** preceded by sunset at **1856**. Venus will be 67% illuminated at Mag -4.10 for those looking for a planetary image challenge. By the 30th Venus is setting at **2035** preceded by sunset at **1835**. This is a good chance for a crescent Venus as it will be 62% illuminated but at Mag -4.18.
- **Mars:** Mars is still in the sky on the first, setting at **1949**. By mid-month Mars is transiting at **1312** and setting at **1917**. End-of-month finds the Warrior transiting at **1248** and not setting until **1843**.
- **Jupiter:** Jupiter is an evening object on the first of the month rising at **1830.** By mid-month Jove is rising at **1730,** transiting at **2254** and setting at **0417+**. Come the end of the month Jupiter is peeking above the horizon by **1628**, transiting at **2150**. and setting by **0312+**.
- **Saturn:** Saturn rises about **1734** on the 1st, transiting at **2245** and not setting until **0355+**. Saturn by mid-month is rising by **1637**, transiting at **2147** and setting at **0257+**. By the end-of-the-month Saturn is rising at **1537**. Saturn transits at **2046** and does not set until **0156+**.
- **Uranus:** On the first of the month Uranus is rising by **2204.** Uranus will transit at **0451+** and sets by at **1137+**. By the ides Uranus is rising at **2108**. Uranus will transit at **0355+** setting at **1041+**. End-of-month finds Uranus rising at **2008**, transits at **0254+** and sets by 0**940+**.
- **Neptune:** Neptune is rising at **1943** in the beginning of the month. Neptune transits at **0135+**. Neptune sets at **0726+**. By the 15th Neptune is rising at **1846, t**ransiting at **0030+**. Setting by **0630+**. By the end of the month Neptune is rising at **1746** and transits at **2348**. Setting at **0529**+.
- **Pluto:** Pluto rises by **1651** on the first of the month and transits at **2150**. The “planetary pearls” along the Ecliptic mentioned in above will be visible except for Uranus at Pluto's transit. By mid-month Pluto is rising by **1759** while the Moon is 56% illuminated getting ready for moonset at **0015+**. By the 30th Pluto is rising at **1456**, transiting at **1954** and setting at **0053+**.

Asteroids:

- Still a dearth of asteroids. I searched for asteroids in 2021 with a reasonable magnitude; say less than or equal to +10 in September 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:

- No significant meteor showers this month.

Comets: come in various classifications:

- 1) Short Period comets – further broken down into:
  - Halley Type: The Halley Types are believed 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 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.

Your best bet this month is comet 342P/SOHO. It is at Mag +9.8 on the first through the 30th. Low in the southwestern sky.

Deep Sky:

Notes:

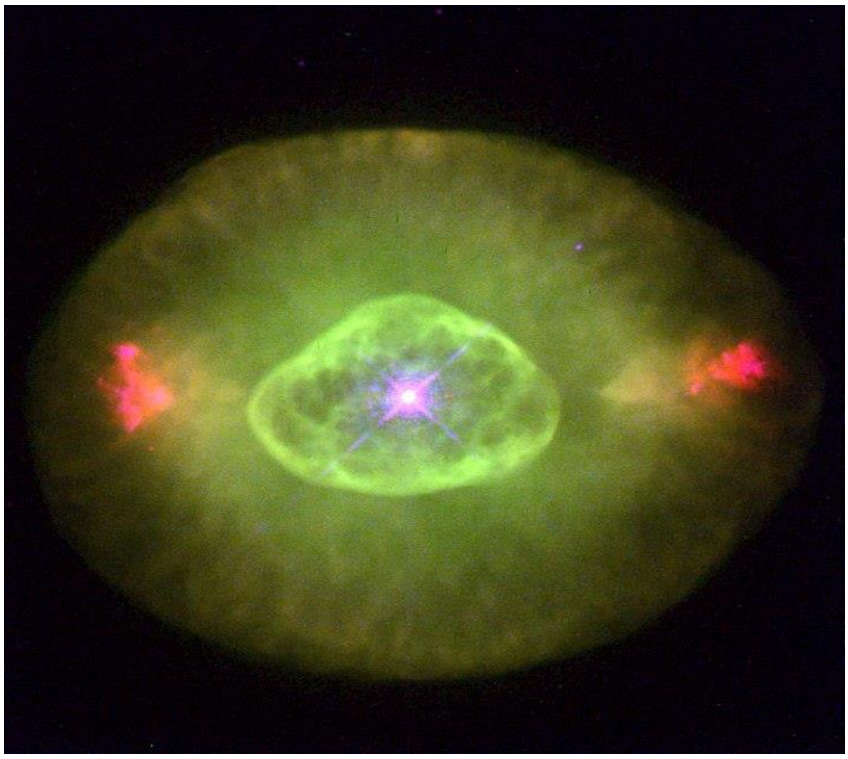
L/Z abbreviation for ALT/AZ
R/D abbreviation for Right Ascension/Declination
α is right ascension
δ is declination
In each case, unless otherwise noted, you should look for the following on or about the 15th Day of September 2021 at 2100 PDT and you will have about 20 minutes of viewing Time total

One especially for Paul this month; an interesting cluster.

Illustration 5: By NASA Hubble Space Telescope - Caldwell 78, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=97660605

NGC 6541 (Caldwell 78):

A.K.A. ***The Tom Thumb Cluster***, is a globular cluster in the southern constellation of Corona Australis. It is estimated to be around 14 billion years old. The globular cluster was discovered by Niccolò Cacciatore at the Palermo Astronomical Observatory, Sicily, on March 19, 1826. It was independently found by James Dunlop on July 3, 1826. The cluster is relatively small, having just 94 blue straggler stars (Wikipedia)



NGC 6826 – The Blinking Planetary Nebula:
A.K.A.: **Caldwell 15,** is a planetary nebula located in the constellation Cygnus. It is commonly referred to as the "blinking planetary", although many other nebulae exhibit such "blinking". When viewed through a small telescope, the brightness of the central star overwhelms the eye when viewed directly, obscuring the surrounding nebula. However, it can be viewed well using averted vision, which causes it to "blink" in and out of view as the observer's eye wanders. A distinctive feature of this nebula are the two bright patches on either side, which are known as Fast Low-Ionization Emission Regions, or FLIERS. They appear to be relatively young, moving outwards at supersonic speeds. (Wikipedia)

Illustration 6: By Bruce Balick (University of Washington), Jason Alexander (University of Washington), Arsen Hajian (U.S. Naval Observatory), Yervant Terzian (Cornell University), Mario Perinotto (University of Florence, Italy), Patrizio Patriarchi (Arcetri Observatory, Italy) and NASA

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

For now – Keep looking up.

A Proper Pad for My Dobs at Home
by Will Kramer

Recently, my air conditioner at home broke down after over 30 years, and I noticed that along with the old air conditioner, which was going to be hauled away, was the cement pad that the condenser had been set upon. It was not cracked or broken, and I thought there must be something I can use it for, so I decided I'd like to keep it. It's a 30" square, and over 3 inches thick along the outside edges, and at first I could not see an obvious place where I could use it, but then I remembered the 8 foot diameter circle of thin concrete that I hand troweled in the back yard when I moved in, just so I would not have to set up my scopes in the dirt. Looking at this area now, it is not smooth, and is not even level, so I thought, "maybe there is some way that I can use the 30" pad out on this old circle of concrete". I hoped the job could be done with

precision, so I did not want to attack the existing 1 inch thick concrete with a sledge hammer! Fortunately, one trip to Home Depot's equipment rental department answered the question right away – they have portable concrete cutting saws, so I planned on an upcoming morning when I would be off work to rent one of these saws for a few hours.

In the meantime, I had set the cement pad out on the circle area, and traced a line around it so I could see right where to cut when the time came. I had never actually used a concrete saw before, but once I got it started, I found that it rolled easily along on small rubber wheels, and it cut through the 1 inch thick concrete like butter!

After cutting, the inside pieces lifted out easily, but I had to dig out a wagon full of dirt to set the pad down inside the square I had cut out. The 30 inch pad is much bigger and heavier than the normal bricks and flats I have worked with, but with a digger and a bag of sand, I was finally able to work the pad in to where it was level and would not move. Then, I put in a rubbery sealer around the outside of the pad so no weeds will grow in. I think the job turned out well, and I know that because of this new level pad, I will be setting up my 10" and 15" Dobsonians out in the back yard more often again!

RANDOM THOUGHTS
By Chuck Dyson

THE FORGOTTEN ASTRONOMER

The first time my business associate and I presented an idea to a medical device company the only two questions that the executives asked us were “What is your market size and what is the disposable component?” All marketing decisions are based on the number of units that can be sold and what type of continuing income can the company get from the sold units.
In the happy, mostly, world of astronomy the closest thing that we have to disposable components are eyepieces, my wife has a closet full of shoes and I have a closet full of eyepieces, and astrophotography cameras. I have a perfectly good (and still used) thirty-year old telescope; anyone using a thirty-year old astrophotography camera? So, the only thing that optical manufacturing companies can concentrate on for long-term continuing income are cameras and producing products that have the greatest appeal to the largest part of the potential market. A perfectly good example of this is in binoculars. For the astronomer the Porro prism design is preferred and a better value than the roof prism binoculars, but the majority of binocular buyers, hunters and bird enthusiasts, prefer roof prisms and so most of the new offerings are of this design. The majority dictates what everyone will use and in this era of hyper competitiveness niche market segments tend to disappear.

Just who gets left behind or ignored in the astronomy marketplace? Pretty much the poor little guy who just wants a grab-and-go system for visual observing. On the other hand, the guy who wants a grab-and-go setup for astrophotography has friends in the industry and has several equipment options, there are multiple star trackers on the market (star trackers are lightweight mounts that allow you to mount a camera and modest telephoto lens on them and take guided Astro photos). Finally, while there are a plethora of 60mm, multiple 70mm-ish, and two fabulous, but very expensive, 85mm refractors by Tele Vue and Takahashi that will work really well with CCD setup; the poor visual observer, because he cannot store up photons to make a brighter image really needs an 80mm or slightly larger telescope in order to have a satisfying visual experience. Are there just not enough potential grab-and-go visual astronomers to attract the industries’ attention?

Let us just take a quick look at some numbers in order to just get an idea of how large a segment of the population could benefit from a grab-and-go telescope setup. In Europe about 75% of the population lives in a city or urban area but in America that number is a shocking 86.6% of the population is city bound, and 80% of the population will never, ever see the Milky Way. It seems, at first glance, that there is a generous portion of the population that could benefit from a grab-and-go system.

Let’s backup for just a minute here. So far, in this random ramble, I have insinuated two things; first that refractors are the grab-and-go scopes of choice; second that all people have the same grab-and-go goals in mind. Definitely not so, and this is a big problem/challenge for marketers. Binoculars, refractors, Newtonians, compound telescopes, and even the new electronic sensor and eyepiece scopes, at $3000 and up; all can, and are, peoples lug-a-bout scopes of choice.

And just where are you going when you say grab-and-go? For me there are three ranges. Range one: is my front yard or my back yard and occasionally my neighbor's yard, all with my only form of transportation being my feet. Range two: any observing session that has a car, or any wheeled transportation component involved. Range three: any viewing session involving an airplane or a ship.

When I look back on my grab-and-go equipment viewing choices I am surprised at how many times I use one of my binoculars, this despite the fact that I almost always have a telescope set up in my back yard. If the seeing is of good quality, no haze, then I use my 12X56 binoculars, but if the seeing is not so great then I will go to my 15X70 binoculars on a lightweight tripod with a video head. If I am still unhappy with my view, I will go to the "monster" my 22X85 binoculars and a heavyweight tripod. Even the "monster" binoculars can be picked up and moved around my yard to get the best viewing position for whatever my object of interest is for the moment whereas, except for the smallest of telescopes, you are sort of glued to one spot. I mention this because there are two types of light pollution; skyglow from parking lot lights, streetlights, and store lights that cause a general glow; localized from a nearby streetlight and your neighbor's security lights, not shielded naturally, and I have both of these annoyances; so, moving around in my backyard helps, a little, to mitigate the light's impact on my observing. My favorite telescope for backyard grab-and-go viewing is my Vixen 114mm diameter 600mm focal length ED refractor. I have used this scope for decades, it has been out of production for over twenty years now, images in the Vixen snap into focus, it shows great detail on planets, sky conditions permitting, and it is not afraid of high magnification. 114mm is just shy of 41/2 inches and this is the largest refractor that one can reasonably call a grab-and-go. I say this because I also have a 5 inch refractor and it is much heavier and more cumbersome than the Vixen. The 5 inch is more of a grab-and-groan and my 6 inch makes the 5 inch look petite and light.

Am I advocating only binoculars and refractors for grab-and-go astronomy? Absolutely not! Two of my favorite grab-and-go scopes are my 127mm (5 inch) and 150mm (6 inch) Schmidt-Cassegrain scopes. It appears that today the 5 inch scope is only available on the used scope market. The Schmidt's cousin the Maksutov-Cassegrain is also in the 90mm (3.5 inch), 102mm (4 inch), 127mm (5 inch), and 150mm (6 inch) apertures. Although there are larger Mak scopes they are not exactly grab-and-go. The main concern I have with the Mak scope is they all have very long focal lengths and this limits the field of view a bit and this, if you travel, can make finding objects just a touch difficult. If you plan on doing the majority of observing on a city balcony or urban backyard then your targets, by skyglow necessity, will be double stars, globular clusters, planetary nebulae, and the planets themselves, and a Mak is a scope that you are definitely interested in. And that brings us to Newtonian telescopes. Newtonians come in two basic flavors; the tripod mounted Newtonian and the Dobsonian. The Dobsonian, be it floor or table mounted, is basically just the simplest alt-azimuth mount design of all time. The only problem with most Dobsonian mounts is that most of them are made of particle board and besides being heavy there is the particle board formula (particle board + water = sawdust) so never leave a Dobsonian mount out in the rain. The F8 eight-inch Dobsonian may well be the most popular telescope on the planet, and it is remarkably portable for its size. The ten-inch Dobsonian is not remarkably portable, and yes I have owned two of them. If an eight inch Dob is too much for you then a six inch in either a floor model, long tube, or a table model, short tube, may be just the grab-and-go for you and at six inches it has plenty of aperture to bring in even

dimmer celestial objects. If six inch is still too much for you there are a boat load of 130mm (5.1 inch) and 114mm (4.5 inch) Dobs that are reasonably priced and just dead-easy to use. The smallest dob I would consider is the 102mm (4 inch) because I bought a 76mm (3 inch) to use with my grandson and with reasonable eyepieces, (the eyepieces that it came with were not reasonable), we could enjoy the Moon, Jupiter, and Saturn but, not much beyond that; 76mm is just too small of a Newtonian to be practical. There are Newtonians of all sizes mounted on every imaginable type of mount; one has to be right for you.

How does my grab-and-go formula change when cars are involved? Depends on the car and how many people you want to observe with. With my old Honda CRV it was three people, a ten inch Dob, and a box of binoculars. If you and a friend are in the two seater Miata it's probably with just binoculars. My general feeling is "if it works in the city, it will work in the country"; so, my goal is to get to the country with equipment that I am familiar with, but in comfort, not with a tripod leg jammed into my back.

Grab-and-go gear for use on board a ship. Company Seven, an astronomy store with an excellent reputation sums it up in this way "avoid exposing optics to salty sea-air". If you use your equipment on a ship all exposed surfaces will deteriorate. To date I have only used my older 15X70 binoculars when at sea and I think that I will continue with this practice for the foreseeable future.

Air travel, you got options and limitations. If you absolutely just have to take a really large scope and mount with you then you have two options; you can ship it UPS, ground as this option is so much cheaper than air (going to Hawaii, no worries, it goes air but you still pay ground), or you can have your airline take it in the cargo hold. There are obvious risks either way. Better you remember six sets of numbers, 22X14x9 and 17X10X8, these numbers are the **MAX** size of your carry on and personal bag for most US carriers (foreign carriers will vary). If your carry on or personal bag is equal to or smaller than the max size it goes with you, it is best to keep the weight of your carry on under 20 pounds. And, yes, people do get by with larger bags but if you get measured your telescope could have a really rough flight. Is the risk worth it? All of this means that the largest carry on scope is probably going to be a short focus 4 inch refractor or a 5 inch Cass or Mac. One could try a 6 inch Cass or Mac but with a max depth of your carry on case 9 inches and an outer shell of at least 7 inches on the scope that would leave you with a ½ inch padding on the top and bottom sides of the scope. A Newtonian carry on would be limited to a 4 inch or a 41/2 inch F5 tube and a serious collimation upon landing.

Perhaps the urban and traveling astronomers are not all that forgotten but are so diverse in their travel scope selections that manufactures feel that not only is there not a one size fits all but one size fits practically no one. Still, all in all, I think that authors and companies could be a wee small bit more helpful in the information and suggestions that they make for the urban and traveling astronomer. In the August issue of Sky and Telescope there was an article reviewing binoculars for astronomers and the author argued that the 10X50 binocular was the most practical size and power over the 7X50 because when we are over 35 years of age our eyes will not dilate to the 7mm diameter needed to take full advantage of the 7X50; in the urban and suburban environment your eye will never dilate to 7mm, there is too much ambient light. Another author suggests that you should not look over the roofs of buildings. OK, I will just point

my telescope at the zenith and wait for something to drift through the eyepiece. The reality of urban viewing is you are always looking over a roof and, yes, sometimes the lunar craters do a hula dance from the heatwaves. Then there is the author who advises people to go to city parks to observe. Yes! I want to tuck a $1000 scope under my arm and stroll into a dark park. A final author suggests that if one drives 60 miles from your city center you will be at a dark sky site. If I go 60 miles East from downtown L.A. I am in the city of Riverside not L.A. but not dark skies either. Go West young man, so West we go 60 miles; we are 10 miles West of Catalina Island and the skies are dark, unfortunately we are on the flight deck of a carrier and the Air Boss wants us off his flight deck NOW! If we go 60 miles south we are on the beach at San Clemente, still in a city. If we go north 60 miles we are in Ventura. Are there any dark skies within 60 miles of L.A.? If you go just 16 miles northeast of L.A., as the crow flies, you are at Mt. Wilson but it is more like 25 to 30 miles as the road wanders. Similarly 60 miles to the northeast of L.A, is Frasier Park and dark skies. This author was right as there are dark sky sites within 60 miles of major cities; but, be prepared to do a lot of hunting for those sites.

Companies could help a little too. Several telescopes come with their own carry or travel bags and just a mention by the manufactures if the case is carry-on acceptable would be helpful. Also, the latest binoculars and telescopes that I have bought have had semi lens covers. I say semi because they fall off at the slightest tap and that is not what I want in a lens cover. I would rather have a ding in my lens cover than a crack in my corrector plate.

When I do travel I always try to book myself into a hotel or condo next to a golf course. Hotels are always lit up, like many of the guests, but the fairways of the golf courses can be surprisingly dark just a short walk away from your room.

Remember, as an astronomer, when you travel leave your teddy bear at home and take your binoculars instead and keep looking up.
Cheers,
Chuck

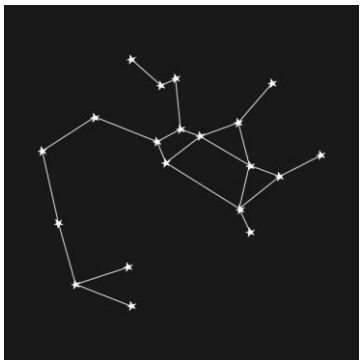
Another Look
By Dave Phelps

September is great. Warm nights for shirt sleeve observing. Great Summer constellations slipping into Fall. Cassiopeia, Cetus, Cygnus and the Milky Way stretching out above us from Northeast to Southwest. Get oriented. Identify some of the stars and asterisms shining above from the “W” of Cassiopeia, the House of Cepheus, Ursa Major the Plow, pointing up to the pole and Ursa Minor jutting out to the side. Relive the wonder you had when you first looked up at all those stars.

September 3 is a Friday, a few days before new moon, so a potentially good night for observing. At 8:00pm Sagittarius is due south and astronomical twilight ends at 8:56pm. Still plenty of time to look for the Teapot, the Scorpion and the Eagle.

I get it. The Babylonians, Greeks, Tycho Brahes, and Hershels with their circles and astrolabes, armillary spheres and 40 foot Behemoths didn't have much in the way of artificial light to contend with. They were able to let their imaginations run wild and it takes a lot of imagination to visualize a Centaur pointing an arrow at the heart of a Scorpion.

Because there is so much to see in Sagittarius, we will leave most of the double, multiple and variable stars to the specialists and professionals and look for some faint and fuzzys instead.



We have all read about Sag. A, the center of the galaxy, the black hole and the stars whipping around it like thoroughbreds at Churchill Downs. Fascinating stuff, but we will ignore them and instead look over at Ascella, Zeta Sagittarii. Ascella marks the base of the arm (armpit?) pulling back the bowstring. Ascella is a good star to use as a starting point to trace out the whole constellation of Sagittarius.
Starting at Zeta star hop to Epsilon (Kaus Australis). Kaus is a double and marks the bottom of the Centaur's bow. From Zeta to Epsilon we have the Messiers, M54, M69 and M70, All three are globulars and visible in your binoculars and eyepiece though probably not too resolvable except in a little larger telescope, still they have brilliant foreground stars, dense, rich centers, blue and gold stars in abundance and spectacular views.

Up from the base of the Teapot we have the Trifid and Lagoon Nebulas. Thank you Dave Kodama, of the Orange County Astronomers, for your Fourth of July image of the Lagoon/Trifid region.


Photo of the Lagoon – Trifid area, compliments of Dave Kodama, OCA.

The Trifid is one of the biggest and best of its kind. I have always liked it better than its big brother, the Lagoon, because it's harder to pick out detail. The dark lanes in the Trifid are Barnard 85 (B85) and the cluster to the upper left is M21.

The Lagoon has several named pieces including B88 & 89, visible in Dave's image. About 6 minutes east and a half degree up is Collinder 367 a faint and sparkly. Find it then brag about it. The concentration of stars and gas in the neighborhood could keep you searching for hours. Sag 7 and Sag 9 are two 5th magnitude stars in M8 that you should find easily. They are both massive stars and burning away fiercely. I blew up Dave's 4th of July image and identified both easily.

The test now is to do it visually. 5th magnitude stars should be readily visible in a 3 inch telescope. Come on, get to work.

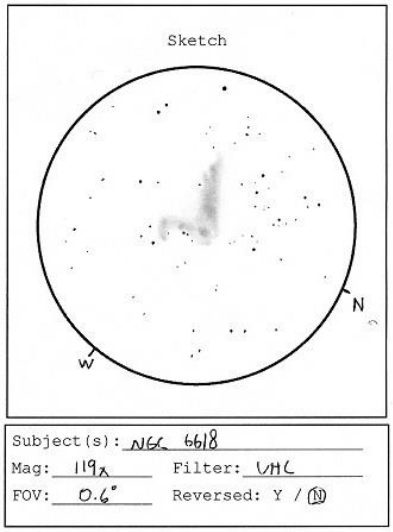
Use the original photo on Dave Kodama's page - https://astrocamera.net to help you search the Lagoon. B91 and B303 are there off the Lagoon. So is NGC 6559, a star forming region, also picked up in the image on Dave's web page.

The Sagittarius star cloud, M24 is naked eye. We can pick up M24 as a brighter patch of light above the Teapot's spout. Imagine the steam rising from the spout condensing into M8, M20 and M24. We call it a star cloud because visually it's a little brighter and denser against the background stars. Through the scope it's another one of those objects that can take up hours finding and identifying little faint and fuzzy's in and around it.

Sam and Mike's (the Berkeley Boys) little 3" resolved many of the stars in M24 at Hurkey Creek campground even though the seeing was kind of poor and we had way too many lights. If you can use a larger telescope search for Markanian 38, a small condensed area. Markanians are supposed to be galaxies. What do you see? Use your atlas as a finder chart. Deep-Sky-Hunter is a good one. (The Internet is your friend!) You can also search APOD for a really good shot to help you stay oriented.

The dark clouds along the upper edge are B92 and B93, between them is Cr 468, a small open cluster. I'm not sure I ever picked it out. M18 is just above the upper edge. It's an open star cluster that you should easily resolve.

M17, The Swan. I have rejected all the spurious nomenclature assigned to this beautiful nebula, like Omega , Checkmark and Horseshoe. Ugh. At one time it may have been my favorite nebula.



Don't expect to see anything like what NASA publishes in your eyepiece either. Various filters will give different looks but forget about the massive clouds of nebulosity forming a stellar nursery. (**Thank's to Dave and anonymous internet person)**. You won't see it. But what you will see is a crisp image in your eyepiece that you will want to spend minutes scanning. Happy Trails.

Finding the Swan is a relatively easy star hop from M24 up to M18 and then to the Swan. They should all fit into the field of view of your Telrad or if you have a decent finder and know its parameters M17 is about 2.5 degrees north of M24.

I realize the Eagle (Star Queen) nebula, Trumpler 32, Planetary NGC 6604, Open cluster NGC 6605 and more are all within a couple eyepiece fields of M17 and M24, but we will wait till we take a close look at Ophiuchus, Aquila, Scutum and Serpens later.

Last Note: There are 15 Palomar globular clusters up there, and they are a bear. Several are in Serpens, Aquila, Ophiuchus and Sagittarius. Something to look forward to next Spring

Last Look (A bit of a Challenge)
Barnard has his own galaxy. It's near the eastern edge of the constellation and is faint and diffuse. I saw it fine in the 17.5, so it will be interesting to hear what size scope you used. It's NGC 6822 and I used star hopping to find it. It's at the same Dec. as Beta Capricorni and about an hour in RA west. So find Beta, Dabah, and turn off your drive. Soon you will find that you are drifting further away with every minute. So, get back on Beta, get out your chart, and start hopping. You'll find it. With any luck, in the same low power field, you'll pick up NGC 6818, the Little Gem, a 10th magnitude planetary. Use averted vision.

Dark Skies.
Dave

Beginner Telescopes

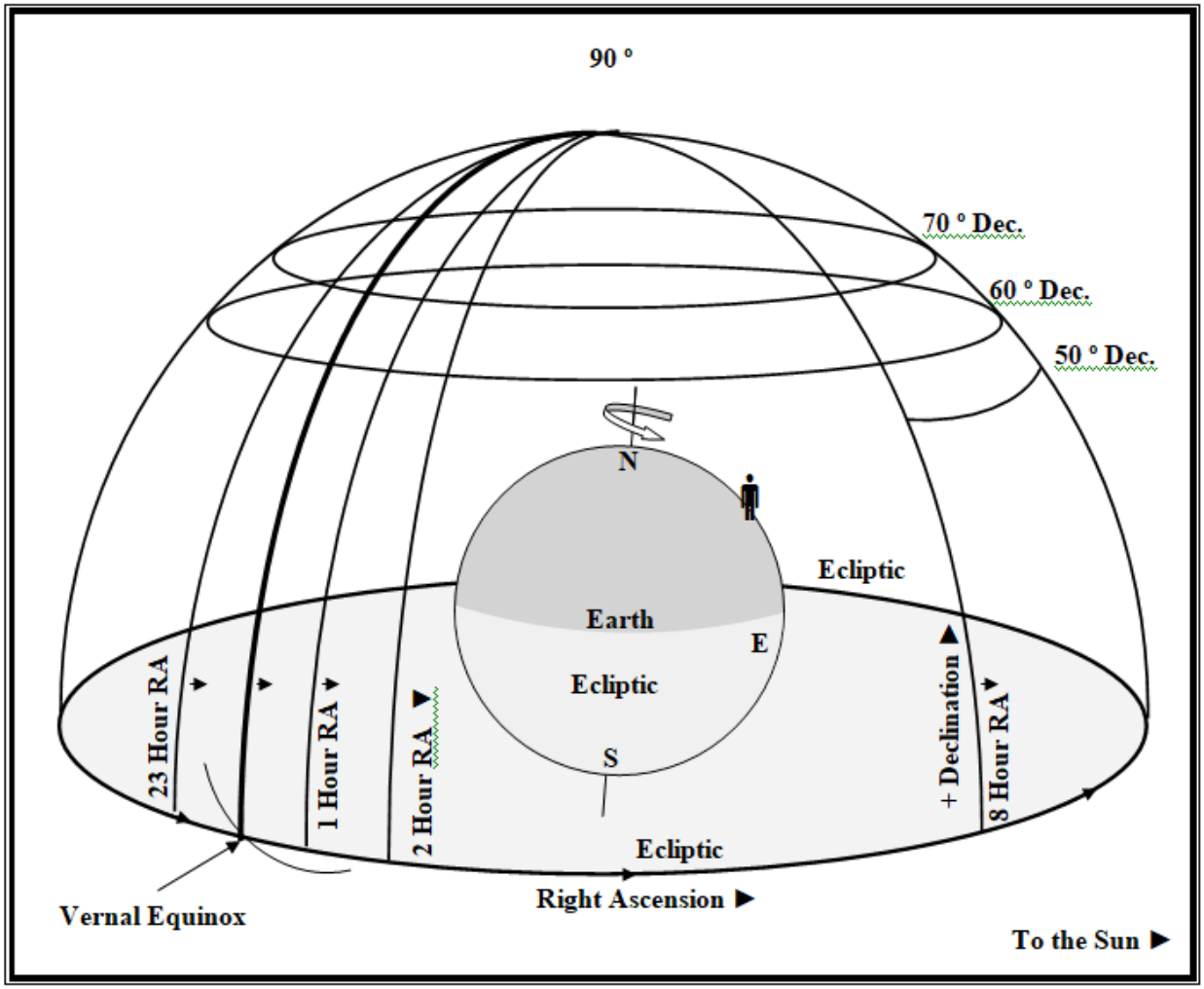
By Sam Pitts

You want to buy a telescope but are not certain where to start. Let's explore some of the instruments available within a reasonable budget.

First steps, attend some local star parties and join your local astronomy club. You can look through many types of telescopes attached to a variety of mounts. Amateur astronomers are ready and willing to answer your questions and demonstrate their equipment. This will give you some foundation in terms and types of telescopes that you may want to purchase. Astronomy clubs (Temecula Valley Astronomers) have a lending program for members. What an opportunity to actually use some equipment to see what you like and the type of equipment combination that will suit your needs/wants.

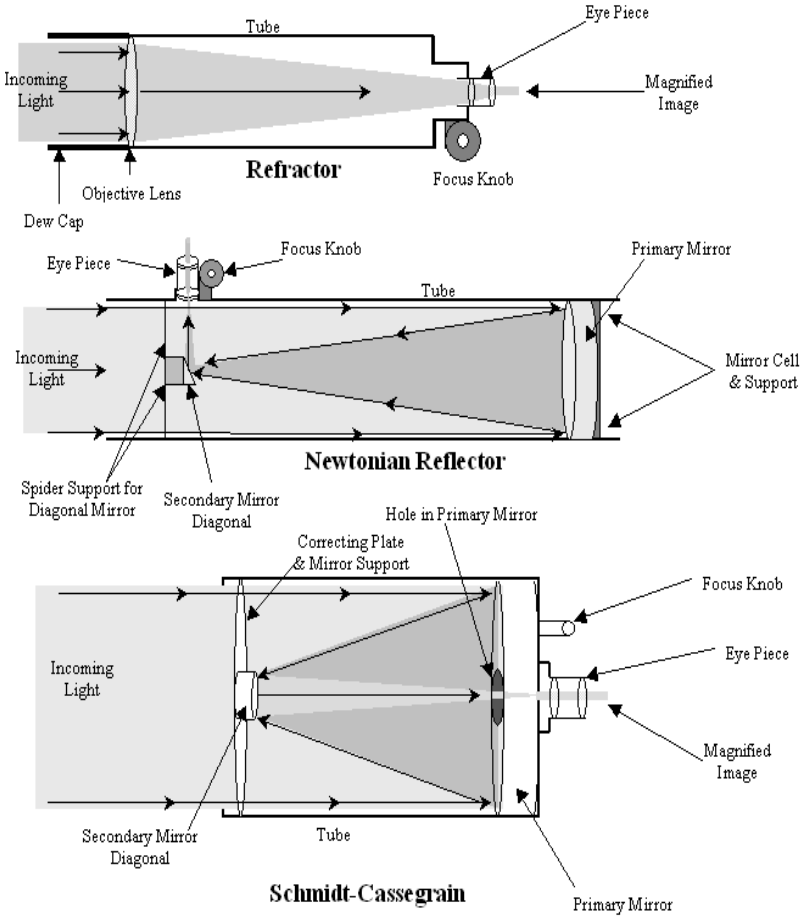
First, there are 3 basic telescope designs to consider; Refractor, Newtonian reflector and Schmidt - Cassegrain reflector. These OTA's (optical tube assemblies) need mounts, which fall into two basic designs. First, altazimuth mounts which swings about two perpendicular axes, much like the standard camera tripod. This designs advantage is the simplicity of its mechanical design. The primary disadvantage is it's inability to follow astronomical objects as the earth spins.

The second is an equatorial mount which swings the mounted scope on two distinct axes, the RA (Right Ascension) and DEC (Declination), which corresponds to the coordinate system used to map the sky. This coordinate system is similar to the longitude and latitude system we use to map the earth's surface. The equatorial mount only needs to be rotated about a single axis, at a constant rate, to follow the rotation of the night sky. This can be accomplished with manual slow motion knobs or a clock drive that compensates for the Earth's rotation. Take note, there are altazimuth mounts that have motors and a computer drive that will track objects.



Celestial coordinate system

First we will address some of the jargon that may not be familiar to an observer just starting out. Telescopes use an Objective lens (refractors) to project a cone of light to a point of focus. Reflectors on the other hand use a concave type mirror that reflects light back to a point of focus. The point of focus is where an eyepiece is used to increase the magnification of the image. Most astronomical reflectors use a type of parabolic or spherical mirror.



Refractor's have a long closed tube with an objective lens which bends the light when it passes through and the light rays come to focus at the focus point.

Reflectors are open tube and use a curved mirror to reflect the light back to a point of focus, usually using a flat mirror (secondary) to project it to the side of the tube to focus.

Schmidt-Cassegrain telescopes, borrow from both refractors and reflectors and are a catadioptric optical system. They use both mirrors and lenses to achieve focus. The lights enters the closed tube of an SCT (Schmidt-Cassegrain) through a front corrector plate (lens) which bend the light slightly to the rear mirror which reflects it back to another central mirror (secondary) suspended on the corrector plate which in turn reflects the light back through a hole in the primary mirror. This folded optics system has made large instruments with long focus ratios compact enough to use on a portable mount.

The size of the Object or mirror refers to the size of the telescope. The diameter of the telescope's object (lens) or mirror, is specified in millimeters or inches. The focal length is the distance it takes to reach focus. The description 4" f/6 telescope, refers to the aperture (4") and focal ratio (speed) of 6. When you multiply the focal ratio (speed) by the aperture you get the focal length. 4" x 6= fl/24" usually expressed in millimeters, fl/ 610 mm. When you divide the focal length fl by 50 you get the prime focus magnification of the telescope 610/50 =12.2x. Inserting an eyepiece with a focal length of 20mm renders a magnification of 30.5x

You do not need high magnification or huge telescopes to enjoy the hobby. No one telescope or mount will satisfy all your desires. Right now we just want to get something simple & utilitarian that we will use!

What should I get?

One of the biggest surprises that beginner astronomers have is when they find that the view they are seeing through their telescope is upside down or backwards. Refractor and Cassegrain telescopes will produce an image that is upside down when used without a diagonal. When a diagonal is used the image will be corrected right side up, but backwards from left to right. Celestron Erect Image Prism for Refractor and Schmidt Cassegrain $ 44. Newtonian Reflectors

will produce an image that is upside down and are not recommended for land use. There are no ways to correct this with a Newtonian Reflector.

Here are some suggestions for 1st time buyers

Orion's " VersaGo GX 80ST 80mm $ 250

Orion ShortTube 80mm Equatorial Refractor $ 279

Orion StarBlast 102mm Travel refractor Kit $ 340

Orion's VersaGo GX 80ST 80mm can be both wide field and with different eyepieces to zoom in on the moon or planets. The Orion ShortTube 80mm Equatorial Refractor Telescope is also a great way to go and this setup is great for star hopping. I only wished it came with a corrected angle finder and diagonal for the beginner to better follow star charts. The Orion StarBlast 102mm Travel Refractor Kit does come with a corrected 90° diagonal and red dot finder.

Simple refractor designs all show some violet fringing but offer pleasing results for a beginner at reasonable prices. One may wish to add a Baader Planetarium Fringe-Killer Filter or Baader Planetarium 495nm Long-pass 1 ¼" Yellow $57. Baader Planetarium Semi APO Filter 1.25" $94. One other important filter for lunar observing is a 1.25" Orion Variable Polarizing Telescope Filter for the Moon to add to your setup. I like to use the Meade 07286 no.905 1.25-Inch variable polarizing filter. It comes with (2) polarizer filters that are mounted for comfortable glare reduction when viewing the Moon. You simply rotate the thumbscrew at the side of the unit to achieve light transmission between 5 and 25-percent of its original value. ($40) You don't have to remove the eyepiece while adjusting the light transmission.

Orion AstroView Equatorial Mount
EQ-3M Single-Axis Telescope
Motor Drive $ 350

SkyQuest XT8 Classic Dobsonian
8” Telescope Kit $ 490

Celestron NexStar 5SE
Computerized Telescope
5” SCT $ 749

Check out Orion Telescopes “Beginner Telescopes section”. I would shy away from any Newtonians unless it is a Dobsonian design, they require a large mount. A Really good deal is the Orion SkyQuest XT Classic Dobsonian $450 or the Orion SkyQuest XT8 Classic Dobsonian Telescope Kit for $490 These two Dobsonians are easy to transport and setup and offer lots of light gather power for observing both planets and deep sky objects. You will also need a finder to point the scopes. Red Dots or Telrad, the latter being the best, $25-$55 respectively.

Refractors usually never need any type of tuning or collimation. Reflectors on the other hand need to be collimated. Some hold collimation better than others. The larger the mirror the more stress during transportation and the need to fine tune the collimation of the primary.

You can get a collimating eyepiece “Cheshire” ($35) or a laser Collimator $ 70 to facilitate this. It only takes a few minutes and can really improve your view. (Check out You Tube)

Many entry level telescopes, mounts and combinations are available on the used market at a substantial savings. Check out Astromart & Cloudy Nights. Go to the classified sections tailored for astronomers.

Eyepieces are another involved subject where you get what you pay for. Start out with the simple 1¼”Plössl with focal lengths of 30-40mm for low magnification and 20-28 for medium magnification and a good 2x barlow which will double the magnification of your eyepieces. Remember the focal length of your telescope divided by the focal length of your eyepiece gives

your magnification. 200mm f/6 fl 1200mm (typical 8" Dobsonian) with a 35mm eyepiece 1200/35 = 34x and with a 2x barlow 70x.

Learn to view with offset vision. Instead of looking directly at an object through any optics look to the side of it so you can engage more rods and cones of your eye. This technique will take time to master but you will be able to see more details.

With any of these basic setups you can buy a cell phone holder $ 20-80 that attaches to an eyepiece and start taking some great planetary and lunar pictures. Use your smart phone's headphone jack with a shutter release cord to prevent shaking…Apps are also available to turn your smart phone into a astro-camera: NightCap Pro , Camera FV-5, SnapSeed etc., check them out!

Please go to a star party and talk to a fellow astronomer for guidance. Feel free to contact me.

Catch Andromeda Rising

By David Prosper – NASA / JPL

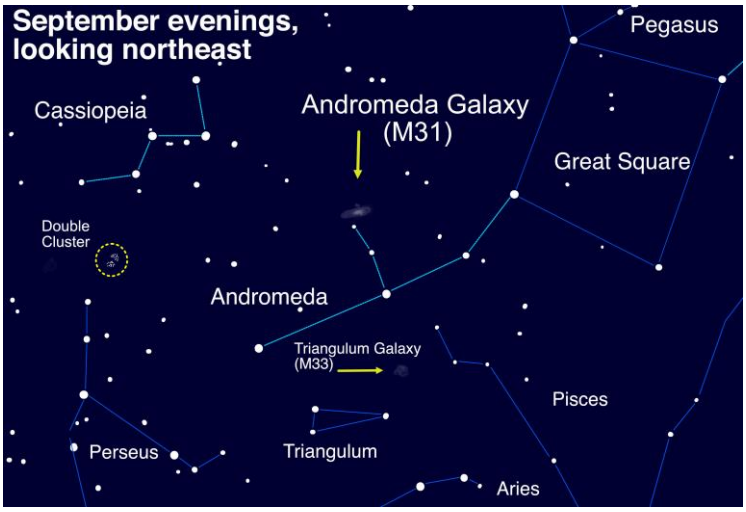
If you're thinking of a galaxy, the image in your head is probably the Andromeda Galaxy! Studies of this massive neighboring galaxy, also called M31, have played an incredibly important role in shaping modern astronomy. As a bonus for stargazers, the Andromeda Galaxy is also a beautiful sight.

Have you heard that all the stars you see at night are part of our Milky Way galaxy? While that is mostly true, one star-like object located near the border between the constellations of Andromeda and Cassiopeia appears fuzzy to unaided eyes. That's because it's not a star, but the Andromeda Galaxy, its trillion stars appearing to our eyes as a 3.4 magnitude patch of haze. Why so dim? Distance! It's outside our galaxy, around 2.5 million light years distant - so far away that the light you see left M31's stars when our earliest ancestors figured out stone tools. Binoculars show more detail: M31's bright core stands out, along with a bit of its wispy, saucer-shaped disc. Telescopes bring out greater detail but often can't view the entire galaxy at once. Depending on the quality of your skies and your magnification, you may be able to make out individual globular clusters, structure, and at least two of its orbiting dwarf galaxies: M110 and M32. Light pollution and thin clouds, smoke, or haze will severely hamper observing fainter detail, as they will for any "faint fuzzy." Surprisingly, persistent stargazers can still spot M31's core from areas of moderate light pollution as long as skies are otherwise clear.

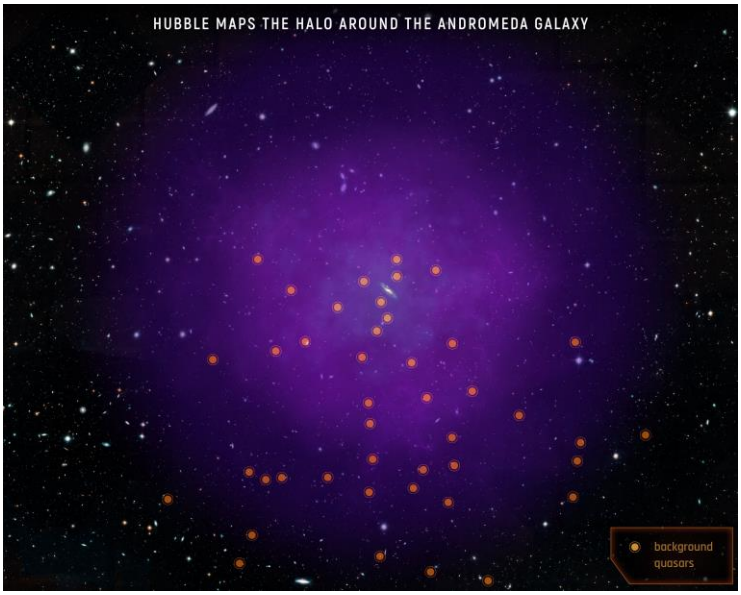
Modern astronomy was greatly shaped by studies of the Andromeda Galaxy. A hundred years ago, the idea that there were other galaxies beside our own was not widely accepted, and so M31 was called the "Andromeda Nebula." Increasingly detailed observations of M31 caused astronomers to question its place in our universe – was M31 its own "island universe," and not part of our Milky Way? Harlow Shapley and Heber Curtis engaged in the "Great Debate" of 1920 over its nature. Curtis argued forcefully from his observations of dimmer than expected nova, dust lanes, and other oddities that the "nebula" was in fact an entirely different galaxy from our own. A few years later, Edwin Hubble, building

on Henrietta Leavitt's work on Cepheid variable stars as a "standard candle" for distance measurement, concluded that M31 was indeed another galaxy after he observed Cepheids in photos of Andromeda, and estimated M31's distance as far outside our galaxy's boundaries. And so, the Andromeda Nebula became known as the Andromeda Galaxy.

These discoveries inspire astronomers to this day, who continue to observe M31 and many other galaxies for hints about the nature of our universe. One of the Hubble Space Telescope's longest-running observing campaigns was a study of M31: the Panchromatic Hubble Andromeda Treasury (PHAT): bit.ly/m31phat . Dig into NASA's latest discoveries about the Andromeda Galaxy, and the cosmos at large, at nasa.gov.



Spot the Andromeda Galaxy! M31's more common name comes from its parent constellation, which becomes prominent as autumn arrives in the Northern Hemisphere. Surprising amounts of detail can be observed with unaided eyes from dark sky sites. Hints of it can even be made out from light polluted areas. *Image created with assistance from Stellarium*



While M31's disc appears larger than you might expect (about 3 Moon widths wide), its "galactic halo" is much, much larger – as you can see here. In fact, it is suspected that its halo is so huge that it may already mingle with our Milky Way's own halo, which makes sense since our galaxies are expected to merge sometime in the next few billion years! The dots are quasars, objects located behind the halo, which are the very energetic cores of distant galaxies powered by black holes at their center. The Hubble team studied the composition of M31's halo by measuring how the quasars' light was absorbed by the halo's material. *Credits: NASA, ESA, and E. Wheatley (STScI) Source: https://bit.ly/m31halo*

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The TVA is a member club of The Astronomical League