VILLAGES STAR

Newsletter of The Villages Astronomy Club

Volume 5, Number 11
November 2024

Club Website:
http://vlgastroclub.org/
Facebook:
https://www.facebook.com/groups/vlgastroclub/

Club Officers & Directors

President	Mark Graybill
Vice President	Ken Katta
Secretary	Randy Gilbert
Treasurer	Linda Meng

Newsletter Contact
saundby@gmail.com
(please include TVAstro in subject line)

UPCOMING EVENTS

Exec Directors' Meeting, Nov. 1st, 11am

All members are welcome at our Executive Directors' Meetings, where our directors plan and prepare for future events and meeting. We have a busy schedule planned for the this winter including Starry Starry Nights in December. Fishhawk Recreation Center, 2318 Buttonwood Way, in the card room, from 11am to 12pm.

Telescope Workshop, November 4th, 7pm

Join us to learn how to use or select a telescope, share your knowledge, and get a look at the sky, weather allowing. In the event of bad weather, the event will be cancelled as our indoor room is not available because it is in use as a polling place this month.
Truman Rec Center, 2705 Canal St.

Space Academy Cancelled for November
There will be no meeting this month as Truman Rec Center is in use as a polling place.

Dwarf II Smart Telescope by Mark Graybill

EAA Meeting, November 6th, Homestead Astronomy Park, 5:15 pm

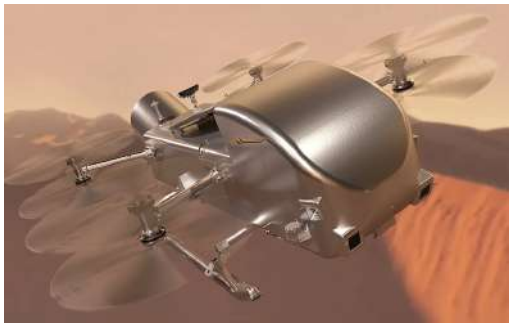
Join us at Homestead Astronomy Park for an evening of observing with smart telescopes! Owners of smart scopes or scopes with smart controllers are welcome as are those who are interested in learning more about the options to get started in Electronically Assisted Astronomy (EAA). We will remain open late if weather permits.

November 16th, 5pm:
Fruitland Park Astronomy Group

The Fruitland Park Astronomy Group meets for an evening of observing and talk on the third Saturday of the month every month, conditions allowing. The meeting is at the Cales Soccer Field in Fruitland Park at 300 Shiloh Road (at the corner of Shiloh Road and Dixie Avenue, north of the Fruitland Park water tower.) Enter on Shiloh Road (some GPS's will guide you to the Dixie Avenue entrance.) The Villages Astronomy Club members and the public are welcome. Gate opens at 5pm.

General Meeting, Nov 19th, 6:30pm:
Future Space Missions by Drake Shepard

Carl Sagan will come alive as he will detail 20 specific NASA, ESA, SpaceX and other countries' plans that include robotic and manned space missions. Sagan will also cover missions to the exotic moons of Jupiter and Saturn plus Venus and Mars.



NASA Image

Starry Starry Night, Dec 7th, 6:30pm

Our evening under the stars for this autumn will be on Saturday, December 7th at Everglades Recreation Center, 5497 Marsh Bend Trail, with observing beginning at 6:30pm and running until 8:30pm. See the Moon, Jupiter, Saturn, the Great Orion Nebula, and more!

Everglades Recreation map by The Villages.

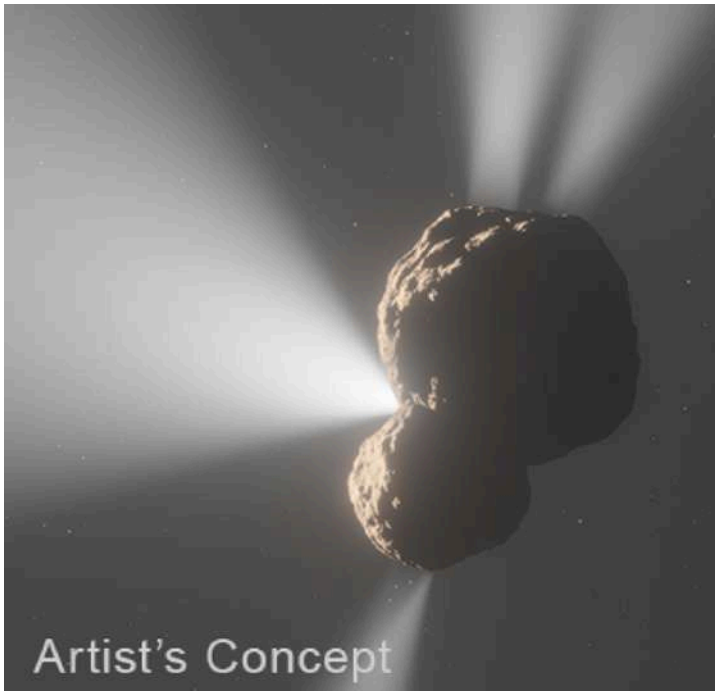
This event is open to Villages residents and guests with ID. We will be located behind the Platform Tennis and Pickleball courts at the north end of the Everglades recreation complex, on the multi-use field (aka soccer field), the basketball court, and the picnic pavilion there.

Join our astronomers who will be showing the sky through their telescopes.

Calendar: https://vlgastroclub.org/calendar/

NEWS

Webb Discovers Gaseous Emission



NASA image

The James Webb Space Telescope has discovered unexpected gasses outgassing from a Centaur, one of the distant objects that orbit between Jupiter and Neptune in our solar system that previously orbited outside Neptune, but have been drawn inward by Neptune's gravity.

JWST used its NIRSpec spectrometer to study the composition of gasses that are erupting from Centaur 29P/Schwassmann-Wachmann 1. Moving closer to the Sun which can cause volatile substances that were frozen farther out to melt and outgas in energetic jets..

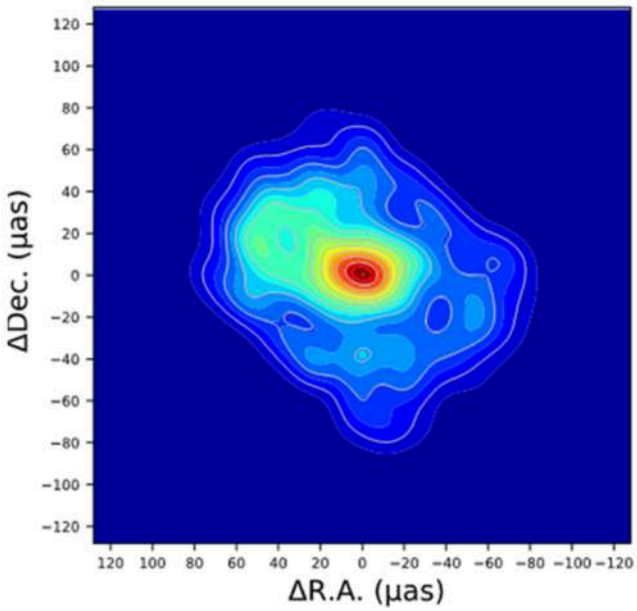
JWST targeted 29P to study a known jet of material that is erupting on the side facing us, but

while doing so discovered 3 additional jets of gas. The jet that is face on to us is mainly carbon monoxide gas, two of the new ones are carbon dioxide, and one new one is also carbon monoxide like the first.

This leads researchers to thing that 29P is a composite object, made up of parts of multiple objects with different compositions that came together to form 29P. This suggests that other Centaurs may likewise be composite objects formed from smaller objects that were created in the outer solar system under differing conditions.

Full story online:
https://webbtelescope.org/contents/news-releases/2024/news-2024-130

New Analysis of Milky Way's Black Hole



NAOJ image. The black hole itself may be the dark blue spot at lower right of center.

A team led by Makoto Miyoshi has performed an independent analysis of the data collected by the Event Horizon Telescope (EHT) study of the black hole at the center of our galaxy in 2017.

The new analysis shows a more elongated form for the black hole than previously indicated, suggesting a high speed accretion disk around the black hole that has material moving at 60% of the speed of light.

Their analysis not only suggests that the black hole has a far larger accretion disk than supposed by the original analysis, but that the black hole is offset from what the earlier team considered its center by a large margin.

Full notice and addtional graphics here:
http://jasmine.nao.ac.jp/2024_2/EN/press_release_20241025_en.html

Full paper (available for free download):
https://academic.oup.com/mnras/article/534/4/3237/7660988

SpaceX Starship Flights 5 and 6

On October 13th, SpaceX conducted its 5th launch of its full Starship launch vehicle. Despite earlier indications from the FAA that clearance for the flight would not be granted until late November, clearance for both flight 5 and flight 6 was granted in mid-October.

The new test would be very similar to flight 4, but with an upgraded heat shield on the Starship's second stage. On flight 4, the ship landed successfully, but off its original target because of burn-through on its forward flaps due to the heat of re-entry. Flight 5's ship was fitted with a new heat shield design.

Starship Stacked for Flight 5. SpaceX image.

Unlike Shuttle's heat shield, Starship's is designed to require little or no maintenance between flights to avoid the months-long delays required by servicing the Shuttle's heat shield tiles.

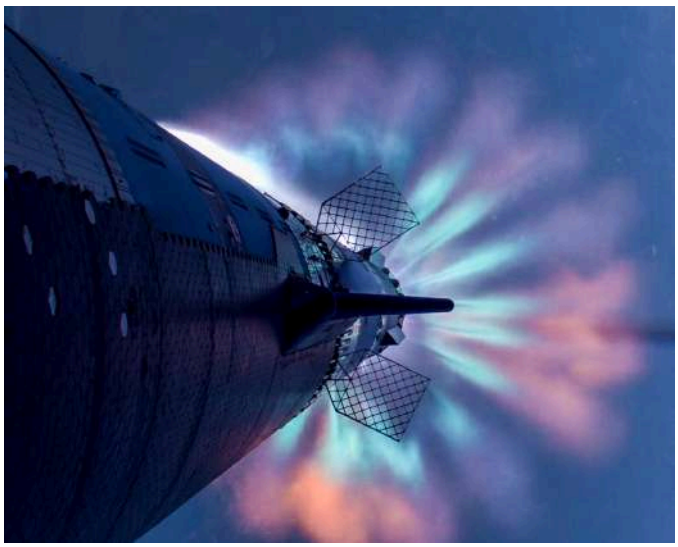
In addition to testing the new heat shield, flight 5 had one other major objective: returning and catching the booster stage at the launch site.

In the days prior to the launch, William Gerstenmaier, now of SpaceX and formerly NASA Associate Administrator, revealed that the accuracy of the return of flight 4's booster to the Gulf of Mexico was accurate to within half a centimeter! (About 1/4"!)

On the morning of October 13th, half an hour after their original launch time of 7am CST, the mighty Starship lifted off from Pad East at Boca Chica, TX. All 33 engines of the first stage fired successfully for the full duration of the boost phase. Then, as planned, all but 3 engines shut down for staging.

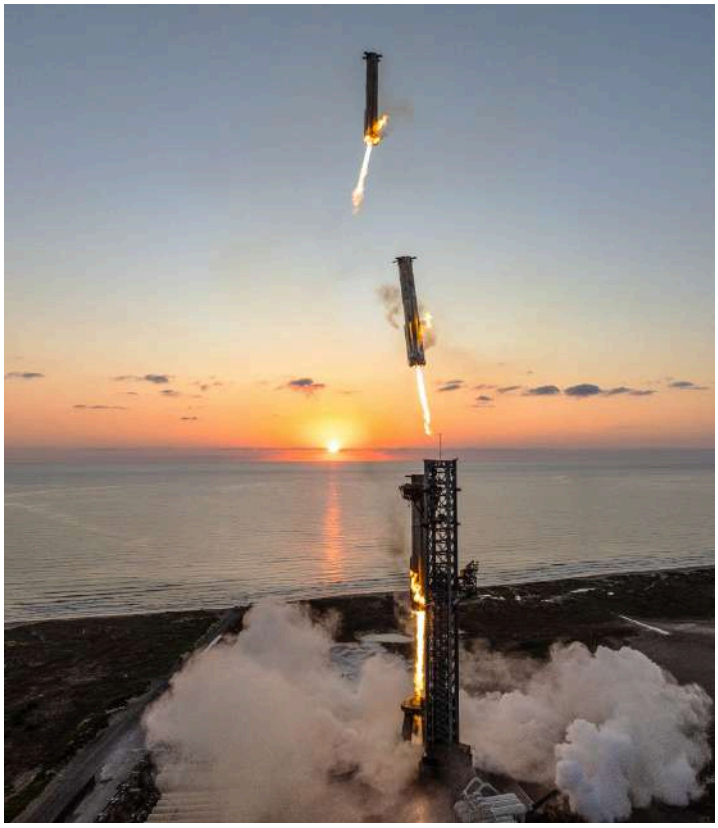
With 3 engines still running, the second stage fired its engines and lifted itself off the top of the booster. At this point, the booster turned end for end then relit the ring of 10 engines surrounding the center 3 to boost it back to its launch site in Texas.

On the way, it detached its hot staging ring, a cap that protects the booster from the rockets of the second stage. It then flew back with its engines out, approaching the launch tower and its catch arms.



Hot Staging of Starship Flight 5. SpaceX image.

About 8 minutes into flight, the booster returned to the pad, firing its center engines to slow itself and direct itself to hover beside the launch tower. There, with 3 engines running, it inched its way into place between the tower arms and descended until the arms caught the catch pins on the booster to hold it in place. The engines went out, and for the first time in history a rocket booster had been caught out of the sky!



Starship Booster 12 returns to its launch tower. Time lapse composite image by SpaceX.

Meanwhile, the ship itself continued into space, targeted for re-entry in the Indian Ocean. SpaceX had more cameras on board than on flight 4, so multiple views of the rocket and its fins were available. The heat shield showed some signs of burn-through by the forward fins, but far less than on flight 4.

As the vehicle approached the landing site, it was close enough to its target location that a prepositioned camera on a buoy saw the landing in the ocean. The Starship came down on its tail, then fell sideways into the ocean according to plan (and exploded, but that wasn't a problem.)

Starship Flight 6 on Tap

SpaceX has been rapidly preparing for the

sixth flight of Starship. So far, the plan appears to be for a similar flight to flight 5. The purpose of flight 6 is to demonstrate a rapid reflight capability using the launch pad without having to take time for major repairs between flights. So far, progress has been rapid with Booster 13 conducting a static firing on the launch pad on October 24th. Soon Starship 31 should be joining it on the pad, which could mark only a few days until launch.

Starship 31 is believed to be the last Version 1 Starship that will fly, as Ship 32 does not appear to be configured for flight, and Ship 33 is a Version 2 Starship that is rapidly being prepared for its own test flight.

Booster 13 rolls out to the pad for static testing. SpaceX image.

Starship Version 2 includes changes to the forward flaps on Starship to protect them from the heat of re-entry better than those of Version 1.

Meanwhile, Booster 12, which flew and was caught on flight 5, has been returned to the Starfactory where it is being disassembled to be analysed by engineers to see what the effects of flight and capture were on its systems.

Watch the entire test flight: https://x.com/i/broadcasts/1RDGlyognOgJL

Crew-8 Dragon Docked at ISS. NASA image.

SpaceX Crew-8 Mission Returns

After 232 days docked to the International Space Station, the Dragon for the Crew-8 mission undocked on October 23rd for a return and splashdown of the 4 member crew on October 25th. This is the 13th human spaceflight mission for SpaceX, and the longest Dragon mission.

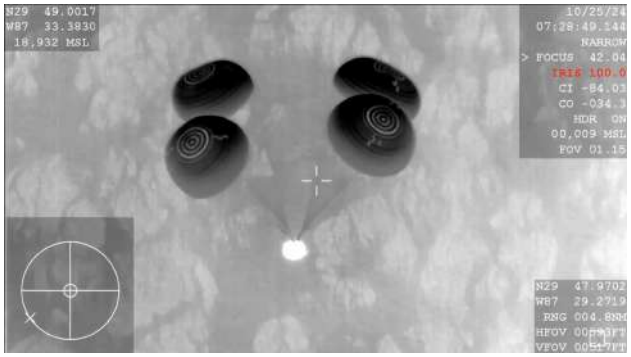
Crew-8. Cosmonaut Alexander Grebenkin, and NASA astronauts Michael Barratt, Matthew Dominick, and Jeanette Epps. NASA image.

Weather effects from Hurricane Milton and subsequent high seas conditions near Florida delayed the return of Crew-8 several weeks beyond its original planned return. The delayed return proceeded smoothly once the weather was cooperating, and the crew was recovered from off the coast of Florida. Only a few remaining Dragon

flights will be recovered in Florida, however, as SpaceX will be moving recovery operations to the Pacific off the coast of California next year to prevent debris from Dragon's trunk falling on land.

One of the astronauts, unidentified, had a medical issue upon return and the entire crew was taken to Ascension Sacred Heart Hospital in Pensacola. Three of the astronauts were released immediately after evaluation, and the fourth was released after an overnight stay with no medical issues.

The crew is now at Houston's Johnson Space Center conducting post-flight activities.



Crew-8 Return on Thermal Imaging Camera during their return to the Gulf of Mexico for splashdown. NASA image.

SpaceX Falcon Heavy Launches Europa Clipper

NASA's space probe to study the underground ocean of Jupiter's satellite Europa was launched on board a SpaceX Falcon Heavy on October 14th, It is the heaviest and largest interplanetary spacecraft ever launched by NASA, and will arrive at its destination in 2030.

Europa Clipper being placed in the Falcon Heavy fairing before flight. SpaceX image.

Originally planned to be launched on board the SLS launch vehicle, it was moved to Falcon Heavy when it became clear that not enough SLS vehicles could be produced to cover the requirements of the Artemis moon program and for Europa Clipper. Also, NASA would have required certification of the SLS vehicle for a flagship mission launch, and would have required an additional SLS as well.

Falcon Heavy was used in its fully expendable mode for the first time, where none of the boosters were recovered. This provided the maximum amount of propellant to send Europa Clipper on its way to Jupiter. The side boosters were veterans of five prior Falcon Heavy missions, making their 6th flight, and the core was new.

Falcon Heavy launches Europa Clipper. SpaceX image.

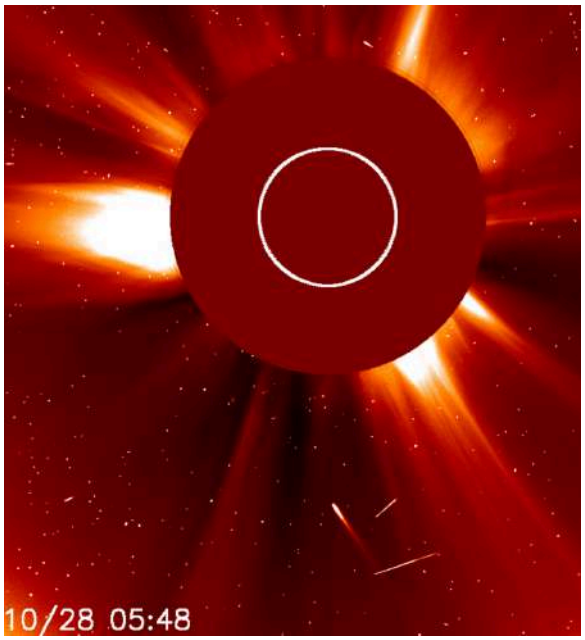
Europa Clipper was successfully placed on its trajectory, which will take it on multiple planetary fly-bys to give it the extra energy it needs to reach Jupiter. It will travel almost 2 billion miles to reach Jupiter, then it will orbit Jupiter to conduct about 50 fly-bys of Europa to study its composition, ejecta from the icy moon, perform subsurface radar imaging, and use a magnetometer to analyze the ocean beneath Europa's surface.

Comet ATLAS 2024 S1 Dies at Perihelion

Hopes for a second bright comet this year were dashed when Comet ATLAS 2024/S1 was captured by NASA's SOHO solar observation space telescope coming to a sudden end during its perihelion on October 28th.

Sharing its name with Comet Tsuchinshan-ATLAS 2023/S3, the new comet was also thought to be a new visitor in the inner solar system with the prospect of a bright outburst visible after its closest approach to the Sun.

Unfortunately the comet appears to have completely broken up and melted.



The final hours of Comet ATLAS 2024/S1. Within 2 hours of this image, there was no remains of the comet. Comet at lower center, near the 2 small streaks. NASA image from SOHO.

Comet Tsuchinshan-ATLAS 2023 S3 Shines Over The Villages

This fall's special event has been Comet S3 as it is known for short. It was nicely visible prior to its passage behind the Sun, in the early morning sky. The clear sky in the immediate aftermath of Hurricane Milton revealed it as a bright streak by eye just before it passed behind the Sun from the Earth's perspective.

Comet S3 by member John Keller

When it emerged from behind the Sun a few days later, it was difficult to pick out of the Sunset sky. Each day took it higher into the evening sky, making it easier to see when the sky got darker, until October 18th. After that it was mostly too dim to see directly, with binoculars required, except for on the evening of October 22nd when it appeared again, either because of the comet brightening, or because of favorable sky conditions.

Many of our members caught images of the comet as well.

Currently, the comet is too dim to be seen

directly by eye, but using binoculars, wide field views with a telescope, or photographically it will be visible for a short time at the beginning of November before it dims and goes too far out into the solar system to create a visible tail.

A finder chart for the comet is at: https://in-the-sky.org/findercharts.php?obj=CK23A030&duration=28

The comet can also be followed on the Comet Observation Database (COBS) for current news and information from other observers:

https://cobs.si/comet/2410/

IN THE SKY THIS MONTH

Please also refer to the sky map on the last page of the newsletter.

The Moon:

New Moon, November 1st
1st Quarter, November 9th
Full Moon, November 15th
Last Quarter, November 22nd
New Moon, November 30th

Venus is our evening star this month, shining brightly in the sunset sky. It brightens slightly over the course of the month, going from magnitude -4.0 to -4.2. It will be in a gibbous (more than half-full) phase through the month, and getting closer to Earth as it comes up from behind us in our orbits. It's width will increase from 14.2 arcsec to 16 arcsec from the 1st to the 30th.

Venus online finder chart: https://in-the-sky.org//data/object.php?id=P2

Saturn remains bright this month as the showpiece of our autumn sky. Visible high in the evening sky at dusk, it will be setting at about midnight at month end.

The rings will appear ever narrower as we approach next March's ring-plane crossing, when Earth moves through the plane of Saturn's rings, making them appear to disappear briefly.

Saturn finder chart: https://in-the-sky.org//data/object.php?id=P6

Astrophotographer Damian Peach's guide to observing Saturn: https://www.damianpeach.com/sat_best.htm

Jupiter rises at about 9pm at the start of November, shining at magnitude -2.7. By the end of the month, it rises at about 6pm, at a slightly brighter mag. -2.8. Binoculars will show Jupiter's four Galilean moons. Magnification of 30x or more will show its bands and zones. At over 46 arcsec apparent diameter this month, Jupiter is a great object to observe.

The Sky & Telescope guide to observing Jupiter: https://skyandtelescope.org/observing/celestial-objects-to-watch/planets/jupiter-an-observing-guide/

Jupiter observing information: https://in-the-sky.org//data/object.php?id=P5

Uranus reaches opposition this month, shining at magnitude 5.6. This makes it too dim to observe by eye from The Villages (and most of Florida), but at a dark site or high altitude it would be visible as a very dim star. Binoculars are better for observing Uranus, which enlarge it enough to show it as a non-stellar object with some color in it (faded blue or green depending on atmospheric conditions.)

Online finder chart for Uranus: https://in-the-sky.org//data/object.php?id=P7

Neptune is in the evening sky at sunset, in Pisces near Cetus, the Whale. At magnitude 7.8 it takes binoculars or a telescope to see it.

Neptune finder chart: https://in-the-sky.org//data/object.php?id=P8

Mars rises at midnight at the start of November, and 9:30pm at the end of the month. It is slowly getting closer to the Earth as we catch up with it in its orbit, growing from 9 arcsec to almost 12 arc this month.

It appears as a bright red star to the eye,

but under a telescope it can show a disk and some surface features at 100x magnification or better. Still air conditions are important for making out detail on Mars, and color filters will bring out surface details as well.

Online observing information for Mars: https://in-the-sky.org//data/object.php?id=P4

Mercury is favorably positioned for observation this month's sunset sky, rising to its point of greatest elongation (furthest from the Sun) of 23 degrees on the 15th. It goes from magnitude 0.3 at the beginning of the month down to magnitude 1.2 as it dims rapidly in the last week of the month. It grows from 6 arcsec to 9.2 arcsec this month, making mid to late month a good time to use a telescope to try seeing surface detail on Mercury!

Mercury online viewing chart: https://in-the-sky.org//data/object.php?id=P1

Deep Sky November sees the summer constellations depart the evening sky, with the winter constellations rising early in the night. The autumn constellations of **Capricorn, Aquarius, Cetus, Pisces, and Pegasus** make attractive early evening viewing, with many Messier and Caldwell objects in them.

Globular cluster **M15** sits near the apex of the sky, with a high surface brightness that makes it easily visible even in binoculars, though it isn't as large as **M13** in Hercules to the northwest.

M31, the Andromeda Galaxy, is one of the month's showpiece objects in the high sky near the **Great Square of Pegasus**.

The **Pleiades** look great by eye and in binoculars in **Taurus**, with the **Hyades** in the Bull's head to the east.

When **Orion** rises before midnight, it brings the winter showpiece **M42, the Great Orion Nebula** into view. Good in any telescope, and nice in binoculars as well, it is one of the brightest and nicest deep sky objects in the sky. Since it's visible by eye in Orion's sword, it's easy to find as well. It has been the first deep sky object seen by many observers.

More information on sky events this month: https://in-the-sky.org/

Holiday Buying Guide for Astronomy

by Mark Graybill

Here's a guide to telescopes, binoculars, and books to buy (or NOT buy) either as gifts or for yourself. The market is complex, and it's been made even more treacherous by the exit of Meade and Orion from the scene this year.

In brief, I recommend NOT buying a telescope as a first astronomical instrument. The best instruments to get started are a chaise lounge and a pair of binoculars. Plus a book, to guide you on your way. **365 Starry Nights by Chet Raymo** is by far my favorite, and many many people who have followed my recommendation have sought me out to thank me for it (link below).

I won't cover specific chaise lounge recommendations, though a comfortable way to spend time with the sky is important even if you do it standing or in a lawn chair. An important accessory is a favorite beverage and a way to keep it close to hand.

Binoculars pair perfectly with a chaise lounge, but also work from a seated or standing position. More about those, plus specific recommendations later.

SEPTEMBER 2024 NEWSLETTER

Refer to our annual Resources listing in the September newsletter. That's where we collect recommendations for a wide range of astronomy resources from our members each year. The resources article also includes information on a number of astronomy vendors, additional books and video resources for astronomy, etc.

The September newsletter can be found online here: https://vlgastroclub.org/newsletter/pdf/2024-009-TVAstro-STAR_compressed.pdf

DECEMBER 2023 NEWSLETTER

Also, last December's newletter contains a telescope buying guide for novices. Unfortunately, since that article was published both Orion and Meade, who sold some of the recommendations, have gone out of business. However, the principles of selecting a decent telescope hold, as do the type of features you should look for.

The December 2023 newsletter is online here:
https://vlgastroclub.org/newsletter/pdf/2023-012-TVAstro-STAR_compressed.pdf

This guide will be divided into sections as follows:

JUNK SCOPES that are fit to toss.
BOOKS to tell you what you're looking at.
BINOCULARS for viewing the sky or nature.
TELESCOPES that actually work, by budget.
ACCESSORIES that make this more fun.
SMART SCOPES at different price points.

JUNK SCOPES

The holidays bring out piles of horrible telescope-shaped objects that are sold as part of a multi-million dollar industry that does about the same thing for business as throwing rocks through windows. Stuff sells, but the transfer results in no improvement of the overall condition of humanity. In fact, replacing windows actually results in the sale of a product that does what it claims, which gives the rock-throwing industry one step up on the junk telescope hucksters.

People are going to buy them no matter what I say, so we might as well review them! Side note: If you buy one of these just because you saw the picture here in the newsletter and thought that meant it was good, I take **no** responsibility for your actions. Everything listed here under "JUNK SCOPES" should be laughed at, not purchased!

TOYERBEE 70MM TELESCOPE FOR KIDS & ADULTS

This horrible little piece of garbage is the first non-sponsored result I got on an Amazon search for "telescope for kids". It's a sure-fire interest-killer with a range of features that will make it completely unusable for astronomy or even casual viewing of the landscape.

The tripod wobbles like a willow with a Volkswagon perched in the branches. The weak little plastic mount shakes whenever the telescope is touched, and features a short little handle that makes it impossible to even catch the Moon. Even if you did accidentally catch the Moon, as soon as you let go of the handle the mount will flex to move the scope somewhere else before you get your eye to the eyepiece.

The finder, which you'll need to use to point the scope, is a tiny little telescope-looking thingie that's there to give the so-called scope an air of scientifical respectability. It has too narrow a field of view and collects too little light to be useful, and just in case that wasn't enough, it's mounted insecurely on a single stalk with two screws and a little springy thing that make sure it's impossible to align with the scope (so that you can, you know, use it to point the scope.)

The optics are terrible, but that honestly doesn't matter. Because you'll never even get this scope pointed at something to notice.

I'm pretty sure these are the wobble ratings. And check out the stumpy little adjustment handle. Guaranteed inaccurate to over 5 degrees when you need to get within half a degree.

The reviews are high, having been purchased from one of the leading review farms in China, assured of giving a false high rating capable of wiping out any actual reviews by users who've been burned.

In keeping with the times, a cell phone holder has been included, because everyone wants pictures. It might be perfect, it might be terrible, but it doesn't matter because putting this on top of the mount and tripod is like adding a Cadillac to the top of that willow tree. You'll go from seeing nothing to seeing the empty space above nothing, and you won't be able to get it aligned with the eyepiece or focused properly, either. It's a win-win.

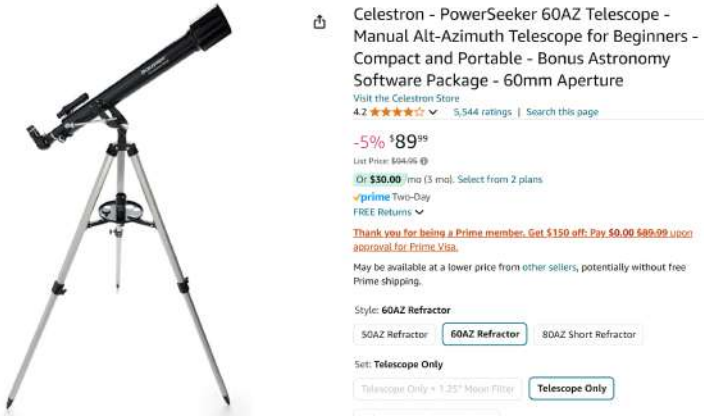
The eyepieces are made out of translucent plastic, because why waste optics on a scope you can't point? The Barlow lenses increase the operating magnification to something a bit higher than binoculars, making the telescope 3x as unless as with the regular eyepieces alone!

The people who sell it don't even know what a Moon Filter is. But it's Easy to install!

The included cell phone shutter remote uses Bluetooth, and this is probably the only part of the entire setup that actually works. It's a stroke of optimism to assume that you'll get a shot of the Moon like the one copy-pasted onto the cell phone screen in the image. Remember, most NASA images are public domain which means anybody can do anything with them, even if it's lying.

If you give it to some poor kid, make sure you ask them frequently what they've managed to see in their telescope lately so that they really know how much you hate them and how incompetent they feel when using something with so many glowing fake reviews.

CELESTRON POWERSEEKER 60AZ



OK, so what about a Celestron? I heard that Celestrons are good!

Yeah, but even their corporate masters aren't made of stone, and when somebody offers to drive a truck full of money up to their front door, they'll sell garbage too.

Celestron makes some of the best commercial telescopes on the market, and they're my go-to recommendation for many telescopes and accessories. Not *everything* they sell is good.

Case in poin is this little hobby-killer.

First, notice is how freaking LONG that tube is. Long tube, narrow field of view. But just like that stumpy little Toyarbee scope, the optics don't even matter. Because the mount is going to keep you from seeing anything before your eye gets to the eyepiece.

The Classic "You Suck and We Hate You" Fork Mount, now with Altitude Bar for extra awfulness.

Back in the 50s and 60s scopes came with fork mounts with narrow little trunnions to try and keep the United States from beating the USSR to the Moon by beating interest in space out of kids in the free world. Many of us were too mule-headed to be put off by such tricks thanks to a full court press by all the major media to convince us that we'd all starve in a post-apocalyptic wasteland if we couldn't find the Moon in a "perfectly good" telescope. But we hated these mounts.

You see, the scope would always either droop or raise up because the tiny trunnions (the ears that stick out the sides of the scope and connect it to the fork mount) don't have enough friction to hold the scope still against the slightest imbalance, passing breezes, mild changes of temperature, or dirty looks. The balance of the scope changes with different eyepieces, different focus positions, the diagonal, etc. etc.

So in the 70s, the industry responded. Did they put on wider trunnions with a reasonable amount of friction? Oh, no! They put on the dreaded Slow Motion Altitude Bar. Now it was possible to lock the telescope in place vertically. And they put in a screw to let the altitude be adjusted. Sounds like a great idea, right?

Since we're looking at objects in the sky that are moving across as well as up and down, it turns out we've just created a new problem. And implemented it poorly.

When you tighten the lock knob on the altitude bar, it moves the scope about 2 degrees. That's aside from the effect your hand has on the mount, twisting it from side to side. So now you have your fork mount stably locked at an altitude where you can't see what you're looking at, and pushed to one side. Naturally, our first reaction is to blame ourselves for not being sufficiently deft to work the controls. So we indulge in a little self-hatred then try again. And again, and again. Then, usually by accident because of our tiredness and frustration, we get it! Elated, we think that now we've "got it" and can use the scope. Till the Moon or planet moves out of view. Then we try to carefully track it.

And discover that it's not us as the scope flies across 5 degrees instead of half a degree.. But we *still* blame ourselves. Because we *know* that Celestron/Meade/Tasco/ChinaCorp can't possibly be selling THOUSANDS of these each year, year after year, with a basic design flaw. It *must* just be we're not good at this.

And the scope goes into a closet.

Now, the optics of the scope itself aren't bad. But they're not for beginners.

Looking Through Celestron's Straw

Long and Thin. Too thin. And that Dew Shield tries hard to make it look like a bigger scope.

Remember that comment about how LONG the scope is compared to its thickness? That means it has what's called a "slow" focal ratio, and that means it has a *narrow field of view*. Which makes it harder to point, and track. A good beginner's scope will generally have a focal ratio from f/8 to f/5 (though f/4 can be OK in the right scope with a good mount.)

Again, back in the days when it was die in a nuclear holocaust or learn to use the telescope, we lived with f/10, f/12, and even f/20 scopes and saw things in them. A few of us did. The others found better ways to stave off the end of the world.

The mount on this scope is too flimsy for its narrow field of view (notice how all these defects roll up like a giant snowball?) And that finder is inadequate, though if this scope were on a decent mount and tripod, it'd be worth buying a good red dot or reflex finder for it and throw the mini telescope finder away. Or a little time in a workshop would produce a peepsight finder, which is what I had on my Missile Gap era telescope, and it literally saved the hobby of astronomy for me, if not the Free World (I tried to play my part with that, too, and the telescope helped.)

Upshot: There are much better models of scope from Celestron for beginners. Skip this thing.

Starboosa 70mm Telescope with ULTRA STABLE TRIPOD and ADVANCED STAR FINDER!!!

Our final delve into the crapulent world of junk scopes is one that tries to defuse the objection to junk scopes that you hear from people who know what they're doing right off the bat. They know that we open our objections with the mount and the finder (don't get me wrong, there are lots of fake optics out there, too, but if the mount and finder don't work, the optics don't matter.)

They therefore put the words "Ultra Stable" on their crappy little tripod that couldn't balance a flea circus, but since there is no specification for what "ultra stable" means, they could make it out of spaghetti noodles and still call it "ultra stable."

Next is the finder. Look, they put a holder for a phone on it, and we all know about those apps that tell you what you're looking at when you hold up your phone, right? Why not just attach the phone to the scope and BOOM instant finder!

When you're holding your phone up by hand, it doesn't matter if the sky isn't perfectly aligned with the phone. You get the idea that that bright light over there must be Saturn because the app says so. But the phone isn't accurate enough to point a scope.

We have to get within half a degree, remember? The width of a pencil eraser if you hold the pencil at arm's length by the tip. That gets you lined up for a low power view. The area of sky covered by a high power view is even

smaller, hold up the pencil by the eraser--the area covered by the lead at arm's length is how big a piece of sky you're looking at. But since we're talking beginners here, we'll stick with the eraser end.

The phone will be lucky to get you within 5 degrees of the object. That's 10 times the width of the area you can see. And how do you adjust that phone finder? Normally you adjust a finder by finding something easy to locate through the scope, like the top of a telephone pole, then adjust the finder to match the scope. You can't do that here. Even if you do try to move the phone, it'll just adjust its display.

But look, it includes one of those awful little telescope finders, too! And it's as useless as all the rest. They'll call them 25mm finders, because it has a 25mm lens on the front. But because it's an awful little plastic lens, it has a "field stop" inside--that's a ring that blocks out almost all the light to hide the optical imperfections of that plastic lens. It'll have a 12mm or 16mm hole in it, so it lets through less than half the light of a 25mm optic. Oh, and it's on a crappy single stalk with two screws and a spring so you can't align it, either.

The case is probably the best part of the entire package.

A typical Junk Scope finder. It can't be aligned properly, and even if it does get aligned, it won't stay aligned because looking at it will knock it out of alignment. Throw it away, stalk and all.

JUNK SCOPE WARNING SIGNS

Anything listed "for kids". ESPECIALLY if it has a "trusted" name like National Geographic, Smithsonian, Discovery Channel, Bushnell, etc.

Anything with a cell phone holder, either for photos or as a finder.

Anything under or around $150.

Anything that advertises magnification.

Anything that comes with a Barlow lens.

Anything with eyepiece diameters under 1.25" (though they usually won't tell you if it's 0.965", the old standard under 1".)

RIPOFFS YOU'LL NEVER SEE COMING

Plastic focusers that won't move or the knobs fall off. Or they won't stay put.

The telescope has a decent aperture listed, but it actually has a field stop installed that blocks more than half the light.

Finder mounts that aren't even built correctly, so that it's impossible to align the finder at all. (I see lots of these lately.)

Mounts with joints that are too stiff, so that you can't move it a little bit, only a big jump.

Plastic threads that either snap off or strip out the first time you use them (or before.)

Eyepieces assembled improperly so you can't actually use them, even in a decent scope.

Tripods that are too short and put the eyepiece at belly level or below.

AVOIDING JUNK SCOPES

Don't buy from any place that doesn't sell optics year round.

Don't buy from any place that doesn't have a dedicated optics department or display.

Buy online from actual astronomy shops, or buy known good models from Amazon, Walmart, etc. online shops (same *exactly* as sold by astronomy shops--beware of "special" models!)

Buy a scope you've actually seen or used (come to our star parties and telescope workshops.)

Buy a good scope used from somebody who is upgrading.

Don't buy a telescope at all. (See Binoculars, below.)

SO I'VE GOT A JUNK SCOPE, NOW WHAT?

Hey, it happens. The predators get us and we buy something out of trust and we get burned.

First, is there anything good about the scope, or that can be reused for something else? The tripod might be garbage for a telescope, but it's OK for a camera or stick one of those cellphone holders on top and use it for timer shots.

Are the optics kinda OK, but the mount is terrible? It might be worth getting a better mount to put it on. But then it usually needs a better finder, too. Maybe you can get a mount that is OK, then buy a finder. Then someday replace the scope with something better when you've outgrown it.

Are the eyepieces 1.25"? Do they have parts that aren't plastic? Save them for a better scope. If the lens holders and barrels are both plastic with coatings to make them look like metal, they're probably not worth saving.

Is it still returnable? High returns on items are the best way to let Amazon or whoever know it's junk. Get your money back if you can.

The club regularly gets junk scopes donated. In many cases, I'm able to use parts from those scopes to make better packages for people with the decent scopes we get. It lets me package them with a better range of eyepieces, or replace a broken part, or something. So I can often get something out of a junk scope for another scope.

This is how I know so much about junk scopes. I don't buy them, but I try to help people with their scopes even if they are junk. Or people give them to the club, and I try to give each scope a fair shake before I condemn it. Maybe this one has done something that makes it work? I have been surprised a time or two that somebody managed to pull off a design that works. Far more frequently I find out that a manufacturer has managed to find a way to ruin something that worked before.

BOOKS FOR ASTRONOMY

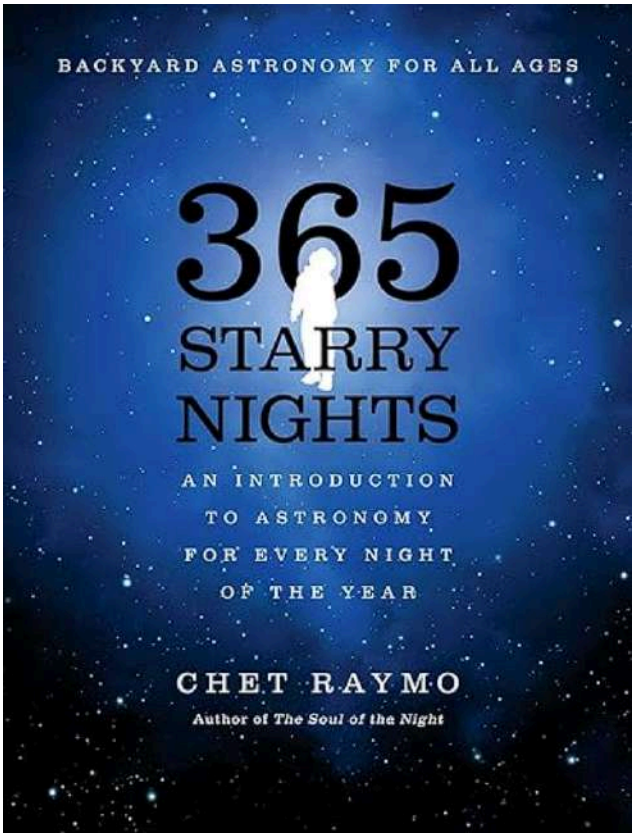
Physical books will teach you better than an ebook. It can be accessed more easily (it's a codex, an ebook is a scroll. We settled the debate on codices vs. scrolls over 500 years ago) and it caters to a wider variety of learning styles.

Physical books stay the same, and form a fixed reference for your brain. When you come back, what you saw there is still the same.

They went through a process of editing and review prior to publication. Online publications, and many books that are ebook only were usually entered directly by the author without editing.

For beginners, a good book will excite the imagination and inform. A good book is worth more than a telescope that costs 10 times as much because it allows you to *see* what you've often *looked at* without noticing.

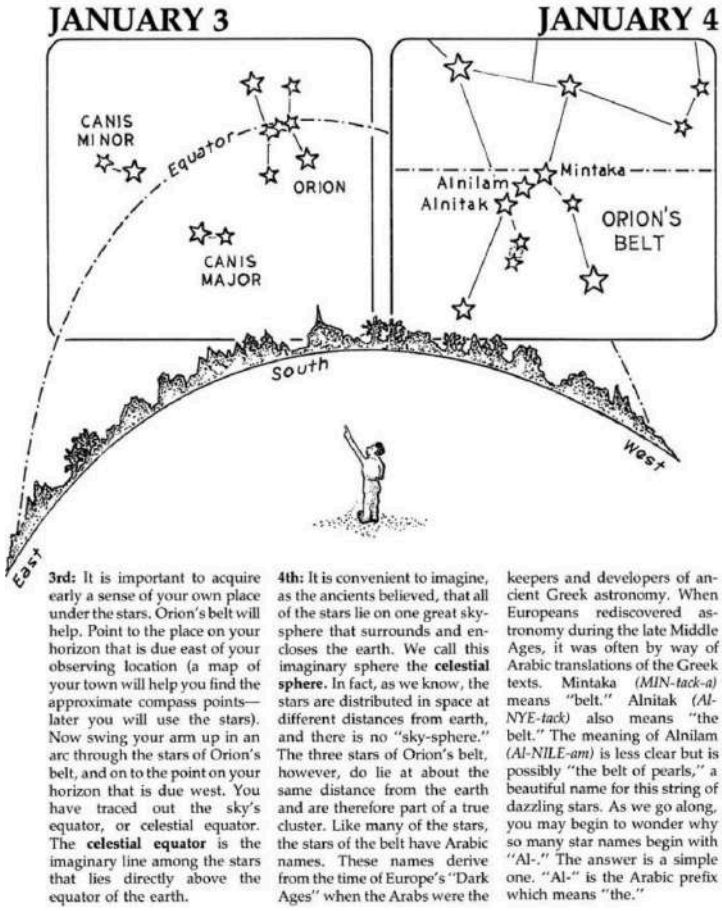
365 Starry Nights by Chet Raymo



My top book recommendation for anybody interested in astronomy. Beginner or Advanced.

This book has a page for each two nights of the year. Dip in anywhere, start with tonight, and start learning what's up in the sky tonight.

Each month is a chapter, covering a part of the sky. The first of the month introduces the month's sky, and each day covers more details.



3rd: It is important to acquire early a sense of your own place under the stars. Orion's belt will help. Point to the place on your horizon that is due east of your observing location (a map of your town will help you find the approximate compass points—later you will use the stars). Now swing your arm up in an arc through the stars of Orion's belt, and on to the point on your horizon that is due west. You have traced out the sky's equator, or celestial equator. The **celestial equator** is the imaginary line among the stars that lies directly above the equator of the earth.

4th: It is convenient to imagine, as the ancients believed, that all of the stars lie on one great sky-sphere that surrounds and encloses the earth. We call this imaginary sphere the **celestial sphere.** In fact, as we know, the stars are distributed in space at different distances from earth, and there is no "sky-sphere." The three stars of Orion's belt, however, do lie at about the same distance from the earth and are therefore part of a true cluster. Like many of the stars, the stars of the belt have Arabic names. These names derive from the time of Europe's "Dark Ages" when the Arabs were the keepers and developers of ancient Greek astronomy. When Europeans rediscovered astronomy during the late Middle Ages, it was often by way of Arabic translations of the Greek texts. Mintaka *(MIN-tack-a)* means "belt." Alnitak *(Al-NYE-tack)* also means "the belt." The meaning of Alnilam *(Al-NILE-am)* is less clear but is possibly "the belt of pearls," a beautiful name for this string of dazzling stars. As we go along, you may begin to wonder why so many star names begin with "Al-." The answer is a simple one. "Al-" is the Arabic prefix which means "the."

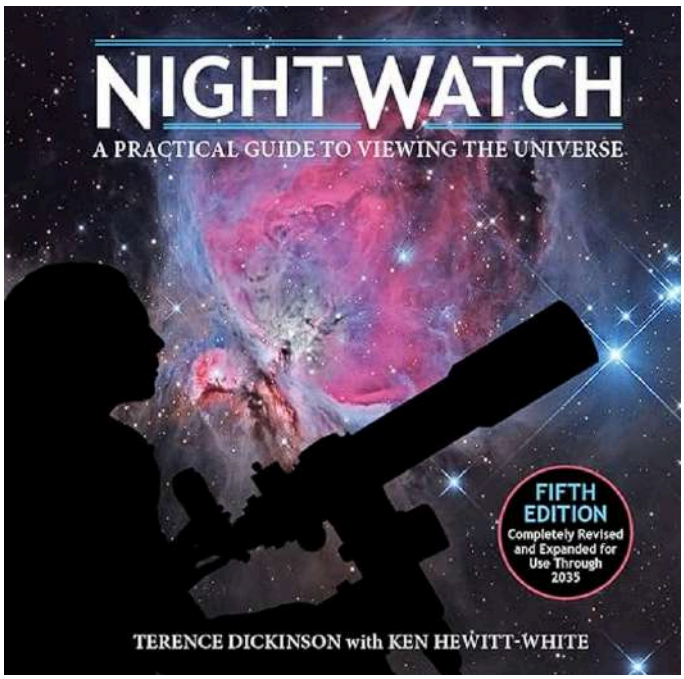
Written to teach naked-eye astronomy, it will show you the major constellations, locations of some of the best objects that can be seen by eye, binoculars, or telescopes. It includes lore and stories as well as some lightly touched on science.

It's a pleasure to read, and if you give yourself a chance to look up every so often, you'll start learning your way around all those lights up there in the sky. Casually, at your own pace, and enjoyably.

Hand-drawn illustrations show everything you need to see on each page.

Everyone who likes to look up at the sky at night should have a copy.

NightWatch by Terence Dickinson and Ken Hewitt-White

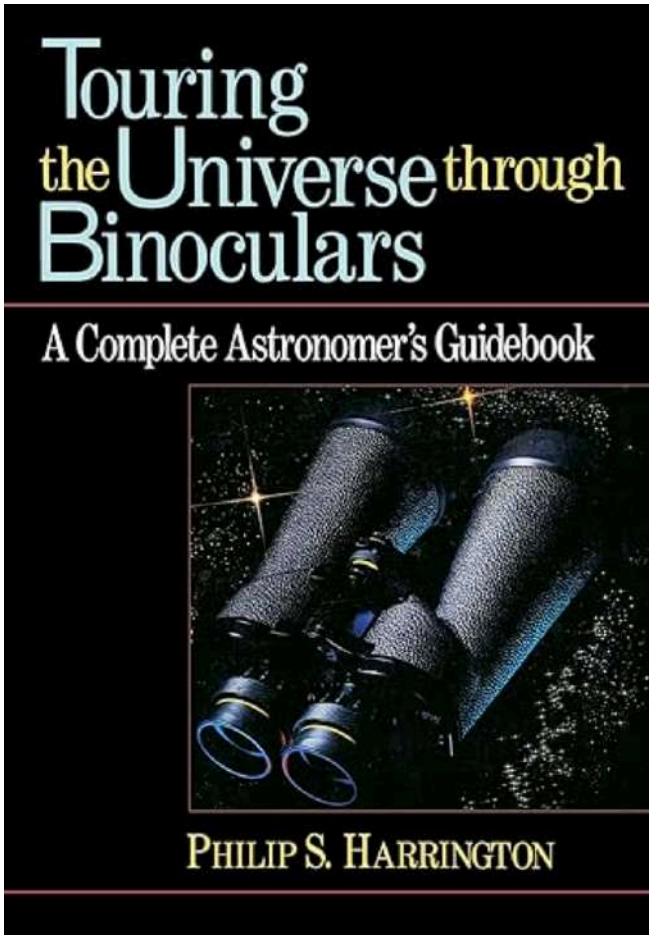


Nightwatch is another book I've long recommended to anyone interested in viewing the night sky. Beautifully laid out and approachably written, it includes star charts for the different times of the year, guides to learning the constellations, information on choosing binoculars and telescopes for astronomy and getting started with them. It covers modern Wi-Fi enabled telescopes as well as astrophotography.

The book has a website that is regularly updated with new information: https://nightwatchbook.com/

Star Charts in Nightwatch

Touring the Universe Through Binoculars by Philip Harrington



My copy of this book shows heavy signs of wear from living behind the seat in my pickup along with a pair of 7x35 binoculars for many years.

Once you've used it to select the right binoculars (or just use the binoculars you happen to have, as I did), then it will guide you through the sky for the various wonderful sights you can get through binoculars. Or a telescope--because if it looks good in binoculars, it'll generally look good in a telescope at low powers.

It gives great guides to finding objects in the sky without headaches. I used it to learn my way around to lots of objects, first with binoculars then later with my telescope because I knew how to find them with the binoculars first.

Excellent for beginners or casual astronomy.

For additional book recommendations, see the September newsletter Resources Guide.

BINOCULARS

Most of the time that people are buying somebody a telescope as a gift, they really *should* be buying them binoculars. For the same price as a junk telescope, a nice pair of binoculars can be obtained that will give far better views of the sky than a cheap telescope.

To plus-up the gift, give a good tripod or monopod and an adapter for the binoculars.

For the nee-plus-ultra in astronomy binoculars, give a parallelogram mount and a sturdy tripod. A simple parallelogram mount with a pair of binoculars will do more astronomy than any telescope under $500.

Binoculars provide twice the light of a telescope of the same aperture. The use of both eyes will give most people a more engaging experience. A tripod mount will allow the view to be shared. Monopods can't be shared, but they'll give a much steadier view than hand-held alone and they're easy to take along, especially if they're collapsable.

The wide field view of binoculars means that objects that you fix a mounted binocular on won't disappear from view rapidly, as in a telescope. While a telescope's wide field will be about 1 to 1.5 degrees, binoculars typically range from 5.5 degrees (290 feet at 1000 yards) to 8.5 degrees (470 feet at 1000 yards.)

That means you can point them without a finder, and hold them on target without a mount. Though for astronomy, a mount is very nice to

have (there are techniques for holding the binoculars manually that help steady them for better observations, too.)

Binoculars should be 7 to 10 powers of magnification. Anything over 12 powers is difficult to hold by hand or on a monopod steady enough to get a good look at things.

Zoom binoculars should be avoided, since the zoom feature cuts the field of view to a fraction, and field of view is one of the things that makes binoculars so good for astronomy.

If you already have a pair of zoom binoculars, or ones with higher magnification, don't let that stop you from taking them out under the sky. But if you're buying new for a beginner, stick with lower, fixed magnifications.

However, sporting goods outlets are among the good places to buy binoculars. They don't suddenly stock up on junk binoculars during the holidays, they carry them all year.

Porro prism binoculars are generally going to be better for astronomy, as opposed to roof prism binoculars (again, go ahead and take your roof prisms out, but don't buy them new for astronomy.)

Any ruby coatings will block out the very light that you're trying to see. Antireflection coatings are OK, but most other color coatings are going to block the rare photons you're trying to catch.

JUNK BINOCULARS

There are junk binoculars. Unfortunately, Celestron diminished the quality of some of their low end binoculars and made them no good. This affects both their astronomy and birding binoculars, which were a go-to recommendation for year. The bridge between the eyepieces breaks easily. Celestron appears to have discontinued them, but many retailers are still selling existing stock. Hopefully they'll come back in a good form someday.

Something that will ruin binoculars for astronomy is if the focus can't hold the eyepieces in place when you look up (or press then to your face.) You don't need to get the awkward binoculars that require each eyepiece to be twisted for a separate focus. But you do need a focus that's tight enough to hold the eyepieces from slipping, which will knock them out of focus.

Another thing to watch out for is misalignment between the two sides. Many cheap Chinese binoculars come this way, or are easy to knock out of alignment with normal handling. In the past, I've seen some Russian binoculars with this problem as well.

For the most part, buying binoculars is much safer than buying a telescope. Far fewer binoculars are given as gifts than telescopes, so it's not as good a market for fleecing people.

The worst binoculars I have ever seen (and bought, out of morbid curiousity) were a pair that had been designed by somebody who'd obviously been given a picture of binoculars, but never actually used them. The body was molded out of rubbery plastic--they weren't rigid. The lenses were single plastic lenses, and the prisms weren't prisms, they were hot-glued plastic mirrors. When you held them, they were so floppy that the lenses popped out at both ends.

They had a neckstrap, but there was no place to attach it, because the shape of the swivels for mounting it had been molded into the plastic body, but there were no actual swivels.

It came with a metal tripod bracket, though, and that was worth the $5 I paid for them at Walgreens.

BINOCULAR FEATURES TO LOOK FOR:

7x or 8x magnification, up to 10x is OK.
35-65mm aperture (larger is heavier, for a kid no more than 50mm aperture.)
Porro prism.
No colored coatings (ruby, blue block, orange, etc.)
Tripod mount connector.
Neck strap.

Oberwerk 6.5x32mm Lightweight Binoculars

Good for kids with an extra narrow interpupillary distance adjustment. Excellent optics, nitrogen purged to prevent mildew. Light, handy, good for anyone. Great for astronomy or nature. Sold for about $100.

https://oberwerk.com/product/65x32mm-lightweight-binoculars/

Fujifilm Fujinon 7x50 WP-XL Mariner Binocular

Good construction binoculars for general observation on land and in the sky (or at sea), the Fujinon Mariner binoculars give a good field of view and good clarity. Fujinon also sells much more expensive binoculars that are good for astronomy, but are outside the price range that would normally be considered for a beginner.

About $200.

Oberwerk 8x42 Explore

Oberwerk is the go-to source for quality binoculars at reasonable prices now that Orion has closed shop and Celestron has outsourced their design and manufacture. The 8x42 provide more light gathering power than the 6.5x32mm binos, while still being compact and light. About $120.

8x42 Deluxe | Oberwerk | Rugged Porro Prism Binoculars

Oberwerk 10x50 Explore and Deluxe

Also in their beginner's instrument "Explore" line up is their 10x50 binoculars. The higher magnification is less suited to young users than the 6.5 or 8 power binos in smaller sizes, but for adults and youth 10x is not difficult to handle when hand-held, and is even better with a monopod or tripod mount.

About $130.

For those who want to take an optical step up, the Oberwerk 10x50 Deluxe provides higher performance at about $200 a pair.

https://oberwerk.com/product/10x50-explore/
https://oberwerk.com/product/oberwerk-10x50mm-deluxe/

Oberwerk Astronomy Binocular Telescopes

For prices starting at about $1500, Oberwerk sells a line of binocular telescopes with mounts. Their astronomy binocular scopes include an offset to the eyepieces of from 35 to 45 degrees to make viewing the sky less stressful to the user's neck. Starting at 70mm aperture, these binoculars are worth considering as a telescope replacement. Their magnification can be changed by changing the eyepieces (2 matched standard telescope eyepieces) for viewing different objects.

They can also be used with a finder, such as a Telrad or Quikfinder, or a red dot finder. Some include a finder.

Vixen Astronomy Binocular Telescopes

Vixen is a well known and long standing brand of high quality. Many of their products are industry standards. With prices also starting at about $1300, serious observers should consider their binoculars alongside those of Oberwerk.

Vixen's handheld binoculars are also worth considering, but are usually priced higher than equivalent Oberwerk binoculars.

Vixen

TELESCOPES

This section covers beginner's scopes for visual observation. Astrophotography with a telescope is an intermediate level pursuit, at least, though images of the Moon can be made with almost any scope (my first images of the Moon, which were good enough to frame, were taken with an 8" Newtonian that was held by hand.)

Despite Florida's challenges, visual observation is a very rewarding way to view the sky, giving a deeper connection than electronic instruments.

Brands and Reputations

With the departure of two full-line telescope manufacturers from the field, there is a big hole in the astronomy marketplace. There are good manufacturers looking to fill the gap.

Celestron

Celestron is the remaining U.S. based full line telescope manufacturer, though most of their manufacturing is performed overseas and their ultimate ownership is in Taiwan. As noted in the Junk Scopes section, not all their offerings are of acceptable quality. However, most are, and they offer a full line of accessories and aids for astronomy. Their equipment is known for being well engineered once you rise above the junk scope tier of products.

Their binoculars used to be good, but are currently junk. Rumor has it that they are preparing to re-launch the line, but we'll see.

Their manual equatorial mounts used to be a go-to recommendation as well, but they have recently been redesigned to look fancier, and they now creep and wobble off target, rendering them unusable (I just parted one out because even I couldn't get it on target without too much trouble.) So this eliminates an entire tier of entry-level scopes from consideration.

The **Zhumell** brand is now part of Celestron.

Celestron

Sky-Watcher

Sky-Watcher is a relatively new entrant to the field, with a like of very nice products. They are owned by the same Taiwanese corporation that owns Celestron (Synta), but they operate independently, developing their own products and lines. They have a number of very nice niche use products, such as an automatic solar tracking mount, as well as some general use telescopes. Their quality is quite good, though some are not well suited for beginners, and others are good for beginners but require upgrades or replacement when the beginners advance to more adventurous pursuits in observation.

Sky-Watcher

Apertura (High Point Scientific)

Apertura is another relative newcomer that has become well known for sound telescope designs. They have changed ownership, and are now owned by Guan Sheng Optical, in Taiwan, who also own the Zhumell brand. Both Apertura and Zhumell make sound scopes sold with decent packages of accessories. They sell scope packages targeted at both beginner and intermediate level astronomers.

Apertura Telescopes

SVBONY

SVBONY is a Hong Kong manufacturer known for selling quality products at relatively low prices for beginners and intermediate level astronomers. While most of their specialized products are lesser quality than the high end manufacturers, many astronomers find their products the right balance of price and quality. Most of their products are sold piecemeal, rather than as beginner's bundles.

SVBONY

Vixen

Vixen is a well respected Japanese brand that has maintained its quality since the 1960s. While typically priced outside the range of beginner equipment, they have a few products

priced reasonably for beginners. Unlike many beginner products, where upgrades mean replacing the mount and keeping the optics, with Vixen the optics will often be the part that is upgraded as the user's interests develop.
Vixen

High End Brands

I'm not covering high end brands here because they're typically not going to be best for a beginner scope (if you want to buy yourself a "dream scope" and have a budget to cover it, talk to me directly.) But there are brands out there that make exceptional products and command appropriate prices.

Most sell refurbished/used/trade-in equipment that can be excellent values.

Stellarvue	Stellarvue
Tele Vue	Tele Vue
Takahashi	Takahashi America
Astro-Physics	Astro-Physics
William Optics	William Optics

Bad, Bad Brand Names to Avoid:

Smithsonian
National Geographic
Bushnell
Jason
Discovery/Discovery Channel
GSkyer
Toyarbee
NASA Lunar
Blue Marble
Dianfan
Ecoopro
Opaita
Koolpte
Popular Science
Celestron Kids
Celestron Science Kit
Celestron Travel Scope
Celestron Powerseeker
Celestron Astromaster

General Rules for Beginner Scopes

Mounts for visual scopes should be manual German Equatorial Mounts or Dobsonian Alt-Az mounts. Vixen also makes good Alt-Az mounts. Not all manual German equatorial or Dobsonian mounts are good, but they give you the best chance of coming up with a usable mount. Decent Alt-Az mounts start at about $400.

Finders should be reticle finders, which few scopes come with. So budget for buying a Telrad or a Rigel Quikfinder separately. If you get an optical finder (a small telescope-style finder) it will be useless unless its aperture is at least 25mm, and even at that, some 25mm finders are stopped down even smaller, to 10-12mm, making them collect too little light to provide an image you can use to point the telescope. Practically all 18mm (3/4") finders are stopped down, and give too narrow a field of view. Stick with a reflex finder.

Some red dot finders are usable, but most aren't. The companies use air gun sights, which don't turn down the brightness of the red dot enough to be used at night.

Budget for some accessories. Most scopes do not come out of the box fully ready to use. As noted, many come with unusable finders, so expect to buy a different finder. The eyepieces included may not be adequate, or they may provide a single good eyepiece rather than 2 crappy ones and a Barlow lens (avoid Barlow lenses!) A good third-party book on the telescope model or type can be worth its weight in gold, and a set of usable star charts or a guide to the Messier or Caldwell objects gives you things to point the telescope at.

My rules of thumb for telescope components (if bought separately) is this:

Half the price should go into the mount.

One third goes into the optical tube.

The rest goes into the finder and one good wide field low power eyepiece (70 degrees apparent field or better, 25 to 32mm focal length.) If there's anything left over, get a good mid-power

eyepiece, like a 9-12mm Televue Plossl. The higher the power, the more high quality you will require from the eyepiece.

Now on to the specific telescope model recommendations...

TABLETOP DOBSONIANS

Zhumell Z100 Portable Altazimuth Reflector Telescope (~$120)

This scope, plus the larger 130mm ($280) version are good tabletop Dobson-style designs. The red dot is usable for astronomy. Its downside is that it comes with scant instructions on use and adjustment. Online information can help, or an experienced helper for a beginner.

It usually comes with good collimation out of the box, but it will probably need to be collimated at some point in its life. For some beginners this renders it “broken”, but a user that can follow a collimation video on YouTube will be able to address that.

The included eyepieces are both useful.

The scope requires a tabletop or other stable surface. Some people use them on their car’s hood or trunk. Any surface that it’s set on needs to be stable, or the advantage of the mount’s stability is lost.

Because the whole thing is so compact, kids will often take ownership of the scope very readily, rather than treating it as a parents’ thing that they get to use.

It’s good for seeing the Moon, planets (it will show Saturn’s ring), star clusters, and about 3/4 of the Messier and Caldwell objects. Pair it with 365 Starry Nights or one of the binocular astronomy books to provide a list of things to view with it.

Zhumell Z100 Portable Altazimuth Reflector Telescope | Celestron

Zhumell Z130 Portable Altazimuth Reflector Telescope | Celestron

Celestron’s Starsense Explorer 114 Tabletop Dobsonian ($300-350) is a similar design that is likewise good that comes with the Starsense finder system. It requires the use of a cellphone, and can be tricky to use but once understood it can act as a good finder and guide to the sky. The tripod mounted versions of this scope (AZ and EQ) use bad mounts.

Celestron does sell a tripod specifically made for the tabletop Starsense telescopes ($130) that is very good. But it is also large and heavy for a youngster. Add a good carrying bag for the whole kit if you get one, it will make both storing and moving the whole setup a lot easier.

StarSense Explorer 114mm Smartphone App-Enabled Tabletop Dobsonian Telescope

Also in the category of tabletop Dobsonians are the **Sky-Watcher Heritage Flextube Dobsonians**. They come in 130mm ($275) and 150mm ($310) sizes, and use collapsible tubes to reduce their overal size. They come with usable red dot finders, and are a very good value given their large apertures.

[Heritage 130 Tabletop Dobsonian — Sky-Watcher USA]

[Heritage 150 Tabletop Dobsonian — Sky-Watcher USA]

Sky-Watcher 102mm StarTravel Altazimuth Telescope ($400)

This telescope has great optics and a good mount. Its weak points are the awful finder and its tripod. The tripod is usable, and light, but is not as stable as it should be. The finder should be replaced with a reflex sight, like a Telrad.

The advantage of a refractor is that the optics will not require maintenance (no collimation.)

[StarTravel 102 AZ3 — Sky-Watcher USA]

Vixen Mobile Porta A70Lf Telescope Set

The **Vixen Mobile Porta A70Lf ($480)** breaks one of my typical rules for what I'll recommend for a beginner's scope. But for a reason. It's a 'slow' focal ratio refractor, at f/12.9, which means that it has a relatively narrow field of view, which requires a steady mount that can be accurately aligned to the object, then tracked to keep the subject in the field of view.

Because the mount in this set is the Vixen Mobile Porta, it is actually usable with this scope. Any other mount in a package that is affordable for beginners (who shouldn't be spending too much on a first scope, even if they have it) isn't going to be up to the task. In fact, the owner is more likely to replace the telescope on this mount with a different scope than upgrading the mount.

The mount (also listed under accessories, below) can be bought separately and paired with a fast focal ratio refractor (f8 or less), a finder, and eyepieces as a great starter scope system.

This scope is well suited for planetary observation and the Moon at high powers. It is also suited for viewing double stars and compact objects like planetary nebulas and globular clusters. It will not be as good at large objects like the Andromeda Galaxy, which cover large areas.

The finder is likely to be the first thing upgraded, as the included finder is barely usable and is not easy to keep aligned to the main telescope.

Next would be additional low power eyepieces. Wide field eyepieces would extend the utility of the scope and make it easier to use, such as a 32mm or 40mm eyepiece with an apparent field of view about 70 degrees or more.

Vixen Telescope MOBILE PORTA A70Lf

Vixen Mobile Porta A70Lf Telescope Set — Explore Scientific

Sky-Watcher Startravel 80 AZ-GTe

The **Sky-Watcher Startravel 80 AZ-GTe ($400)** combines a number of attractive features into a single package. It has a good Alt-Az mount that can be used as a Go-To mount (with manual calibration against objects in the sky) or as a manual mount, though its Go-To mode is the better of the two due to a lack of slow motion controls on the mount.

The scope is of a type I often recommend to new users: a short focus refractor. This model uses an 80mm f/5 refractor, which gives a wide field of view, making it easy to align with targets and easy to keep things in the field of view. Once calibrated, the mount will automatically track objects when the Go-To is used to point the scope at them.

The mount is adequate for beginning astrophotography, and has the ability to control a camera, as well as to integrate with a smart controller like the ASIAir series of controllers to form a light, portable astrophotography rig.

Also worth considering is the upgraded model with a 102mm f/5 refractor for $450.

See the entries on this AZ-GTe mount and its upgraded twin, the AZ-GTI in the section on mounts, below.

The Go-To features require the use of a cellphone or tablet running the SynScan app.

Startravel 80 AZ-GTe — Sky-Watcher USA

Startravel 102 AZ-GTe — Sky-Watcher USA

Dobsonian Telescopes

For many years, a 6” Dobsonian telescope was my primary recommendation for a beginner’s scope. They’re easy to use, not too large, easy to accessorize and build on, and the best all-around telescope type for observing both solar system objects and the deep sky (outside the solar system.) You can see all the objects in the Messier and Caldwell catalogs with one.

It’s also a telescope that will always be your “second” telescope even if you get another, such as a high quality refractor.

Unfortunately, most manufacturers that made them (and 4.5” Dobsonians) have ceased production because profit margins aren’t very high on anything less than an 8” Dobsonian. Fortunately, there is still one reputable manufacturer making them: Apertura.

Apertura AD6 Dobsonian 6" Telescope

The **Apertura AD6 ($450)** classic Dobsonian design with the addition of friction clutches (which work, though I'm ambivalent on them because of the added complexity and weight) on a base that has the altitude axis high enough to use capably. The finder is usable, but not great, consider replacing it with a Telrad, possibly with the 90 degree attachment for non-youths.

The taller base adds to the weight of the design, but makes the scope more useful than the short bases formerly used by Meade that put the eyepiece at knee level near the horizon.

The included eyepieces are good, and the eyepiece holder bracket on the side is handy.

I like the Apertura Dobsonians, and feel that they are the best Dobsonians currently being commercially sold at the beginner level. The **Apertura AD8 ($600)** is also worth considering for a youth or adult. It includes a better finder and a collimation alignment tool that's a little wonky, but usable (you have to take out the batteries to turn it off.)

Both have focusers for 2" eyepieces, which are nice for a wide field low power eyepiece to get the "spacewalk" experience at the eyepiece.

[Apertura AD6 Dobsonian 6" Telescope with Accessories | High Point Scientific]

[Apertura AD8 Dobsonian 8" Telescope with Accessories]

ACCESSORIES

Finders

Since many scopes don't come with an adequate finder any more, this is likely to be your first accessory to add.

What makes an adequate finder? It must:

-Be aligned to the main telescope.

-Stay aligned.

-Allow the scope to be pointed within about half its field of view of a selected point in the sky.

Illuminated finders also have to be able to be turned low enough that the light doesn't wash out the thing you're trying to see. This is a failing of many red dot finders that are nothing more than air gun sights put on a telescope.

Telrad Reflex Sight

The **Telrad finder ($40-50)** is a non-magnifying finder that allows you to see the sky naturally. When you look through the plexiglas screen of the Telrad, it appears to project a series of rings on the sky. Using those rings, it is possible to both target something you can see, and use the rings to target unseen objects by

walking off the distance from a visible object.

By far the best finder available for any telescope, its biggest shortcoming is that it's too big to fit on small telescopes.

There is a right angle finder available to avoid bending to look through it, though I typically use the reflection off the back of the plexiglass to do the same thing.

It is very easy to align with the main scope, and can easily be removed when storing the scope. Extra bases are available to allow it to be used with multiple scopes (though it should only be used with one per session. I have four Telrads, myself.)

The Telrad is so popular that there are many books of finder charts just for the Telrad, and several astronomy packages include Telrad sight rings to find objects in the sky.

[Telrad Finders]

Rigel Quikfinder

If the Telrad is too large for your telescope, the **Rigel Quikfinder ($54)** is the second best finder. It has one less ring than the Telrad, and the rings are a different scale. However, it sits up high and is easy to adjust. The battery is awkwardly placed, but the optional external battery pack can solve that problem.

Like the Telrad, you can get bases to move it from scope to scope. While its rings are smaller diameter than the Telrad's, once you get used to the scale, you can use Telrad resources like finder charts and software displays of Telrad rings to find things with it effectively.

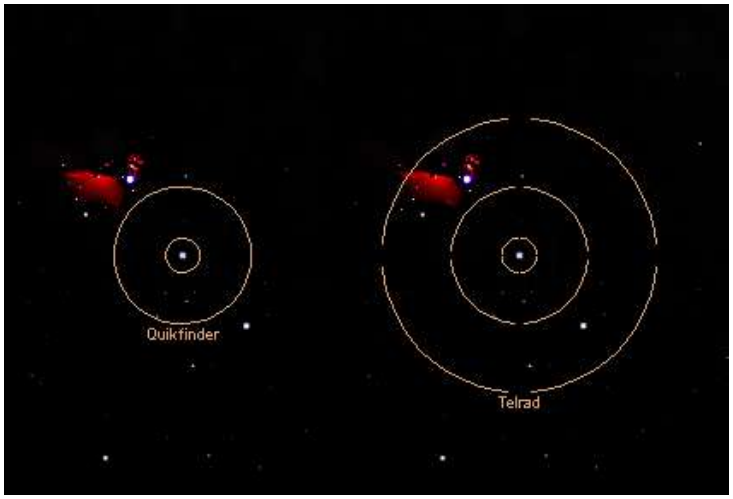
[QuikFinder]

Stellarvue MRF-002 Multi-Reticle Finder

Stellarvue MRF-002 Multi-Reticle Finder ($60) is the only red-dot type finder that I have purchased as an add-on to a telescope. It has multiple reticles that allow it to be used to align the scope either with or without a center dot. Its major shortcoming is that it requires a tool to align it (hex wrench), though mine stays on my scope and gets put in and out of its storage case without needing alignment very frequently.

It can be coupled with a stalk to raise it above the scope tube for easier viewing.

[1. F002 MRF Finder]



Quikfinder (left) vs Telrad (right) finder view. Image by Joo Beng.

See the comparison article at:

[Telrad vs Quikfinder]

Mounts

You may have a decent scope that needs a better mount and tripod. Or you may decide to buy the telescope's optical tube assembly (OTA) separate from the mount. A good mount will cost as much or more than a basic starter scope". But a better mount will take a scope that's usable and turn it into something that's actually pleasant to use.

Alt-Az Mounts:
Vixen Porta, Porta II, and Porta Mobile

The Vixen Porta series of mounts ($220-450 with tripod) are the standard against which other manual alt-az mounts are judged. At a relatively low price, they will provide a lifetime of service with any scope that fits within their weight limits. Especially good for refractors and small reflectors, they have all the characteristics you need in an alt-az mount--stability, ease of movement, precision of movement and control. They of course fit the Vixen dovetail, which is an industry standard for all telescopes up to the heaviest ones that use Losmandy dovetails.

Vixen also sells a line of good equatorial mounts.

[Astronomical Telescopes | Vixen]

Sky-Watcher AZ5 Alt-Az Mount

The **Sky-Watcher AZ5 mount ($420)** compares very favorably with the Vixen Porta II mount at a similar price. Its included tripod uses tubular legs rather than the 3-piece sliding legs of the Vixen, which I have a preference for as they are more rugged and more rigid. Like the Vixen, the telescope is mounted via a Vixen dovetail, so it is suitable for any scope that is within its weight limit.

Sky-Watcher AZ-GTi and AZ-GTe Mounts

These mounts are perfect for grab-and-go portable setups. They are very light and sufficiently stable for light astrophotography tasks. They are best paired with light short focus refractors (focal ratio f/3.5 to f/8) and can be used

with smart controllers like the StellarMate and ASIAir for guided astrophotography or to obtain the features of a smart scope with the flexibility of a regular telescope in magnification and field of view (which are fixed values on smart scopes.)

The difference between the two mounts is that the **AZ-GTi mount ($475)** has encoder wheels whereas the **AZ-GTe mount ($400)** does not. The encoder wheels allow the GTi mount to be moved freely by hand without needing to recalibrate the mount after moving it. The GTe needs to perform all movements through the SynScan app's software control or else it will need to be recalibrated. Most users report that they don't have a problem with using the GTe as they use the app to control the scope for all movements once it is calibrated.

AZ-GTe Mount — Sky-Watcher USA
AZ-GTi Mount — Sky-Watcher USA

Eyepieces

For many telescope packages, additional or better eyepieces will be the first thing purchased once the scope has been equipped with a good finder. Eyepieces are one of the things it is worth investing in the best right off the bat because you will keep using them with all the scopes you ever own.

Tele Vue Eyepieces

Tele Vue eyepieces are the best on the market. They range from low cost Plossl eyepieces to the sky's the limit.

The **Plossl** eyepieces have a 50 degree field of view, exceptional clarity, and are priced from $100-150. I like them as both low power eyepieces (40-25mm) and as middle power eyepieces (15-8mm).

The other lines are more expensive. The **DeLite** range ($200-350) are specially designed for eyeglass wearers, and my personal experience with them is that they're a mixed bag. But if you have cataracts, and have to observe with your glasses on I recommend borrowing or looking through them on somebody else's scope to see if they suit you.

The **Delos** line also has long eye relief that's good for glasses wearers, but they are one of the premium lines at higher prices. They fill the same role as the Ethos eyepieces (below).

The **Panoptic** range is designed to give excellent wide angle views at lower cost than the higher end Ethos and Nagler eyepieces. I recommend investing in one Panoptic eyepiece, of the lowest power your scope will work well with (telescopes with a central obstruction may show a "blind spot" with the 41 or 32mm models.) They cost as much as a whole beginner's telescope setup, about $400+, so they won't be your first addition to your astronomy setup!

The **Ethos and Nagler** eyepieces are the ultimate in wide angle viewing, with apparent fields of view up to 110 degrees. The cost as much or more as the Panoptics, and range from medium levels of magnification to high magnification focal lengths. If you see a good used one of these, you'll probably want to snap it up! For myself, I try not to spend more on an eyepiece than I can afford to drop on pavement, so I have only one (bought used.) But the field of view in a 2" barrel eyepiece is amazing, and you will see the Moon in a whole new light with a mid-level magnification Nagler!

Tele Vue Plossls: https://amzn.to/3YtOmRl

Televue Eyepieces | High Point Scientific

Explore Scientific Eyepieces

The Explore Scientific eyepieces I have used have been high quality as well, but they are priced similarly to the Tele Vue eyepieces--you pay for what you get. I have a low power Explore Scientific 100 degree field eyepiece that I like even better than my comparable Tele Vue because it creates a higher contrast image.

Like the Tele Vues, they come in a variety of types with different fields of view. Your low power eyepieces will be the ones you use the most, with your mid power eyepieces being next. Spend appropriately.

Eyepieces — Explore Scientific

Stellarvue Eyepieces

Another source of high quality eyepieces is Stellarvue. They are also usually substantially less expensive for a comparable magnifcation and field of view than the Tele Vue and Explore Scientific eyepieces.

Tony Hallas reviewed the Optimus line in Astronomy Magazine: Stellarvue Optimus Astronomy Review

Stellarvue: Eyepieces for astronomy

Filters

Under our local light polluted conditions, I recommend having a light pollution filter or deep sky filter. Lumicon were formerly the go-to source for filters, and they still make excellent filters, but many other manufacturers are making good, low cost filters including SVBONY.

I won't go into deep detail, but if you have an extra $50-100, look up reviews on filters for visual use (most will be for astrophotography).

If you become an avid planetary observer, a set of color filters will be inexpensive and a good addition for pulling out details on the planets or in their atmospheres. Any standard set of color astronomy filters will do. Buy a set and try them out. Also, while most lunar filters are a dark green, I have had good experience with seeing details better under other colors, such as light yellow or blue.

Luggage and Storage

More general advice: being able to store and haul your telescope and accessories easily and safely is important. The easier it is, the more you'll use the scope. And the more you use it, the more you'll appreciate having things protected, organized, and easy to tote.

There are a wide range of telescope carry cases on the market, some for specific models, others for general sizes and types of telescope. A case for your eyepieces is good as well, whether it is specially made or whether it is a repurposed tackle box. If your finder doesn't pack conveniently with your telescope, consider getting an eyepiece case large enough to carry it as well.

Smart Controllers

These go a bit beyond the basics, but if you're interested in both a smart telescope and a regular telescope, a smart controller can provide you with a middle path.

To be most effective, a smart controller needs a camera finder on the scope. This will add about $100-200 to the scope's cost, unless it already comes with a finder that will accept a digital camera (the low cost "planetary cameras" work fine.)

The best smart controller to use at present is the ZWO ASIAir series, either the ASIAir Mini ($200) or one of the deluxe models (Up to about $400.) Be sure to get a guide camera that is compatible with the ASIAir, which only works with DSLRs or a ZWO camera.
ASIAIR - Discovery Astrophotography with ZWO ASTRO

There are other brands of controller, but for the moment the ASIAir is by far the easiest to use despite its limitation in which cameras it will work with.

With a smart controller on a Go-To scope like a Sky-Watcher GTi mount, the controller will take care of the calibration for you. It will use the guidescope to detect where the telescope is pointed, and to refine the pointing when you select an object to look at, turning an ordinary Go-To scope into a smart scope.

By adding a second camera in place of an eyepiece, you can use the scope for "Live Viewing", similar to the smart telescopes, below, as well as for astrophotography.

I don't recommend buying a setup like this for somebody else as a gift, but it's something to consider if you're buying for yourself, or a possible upgrade path for an interested youth in future gift-giving opportunities once they've mastered their basic telescope system.

Smart Telescopes

Smart telescopes are a completely integrated electronic telescope package. Unlike other scopes, you don't actually look through smart scopes, you look at a display of an image captured by the camera built into the scope. Some have a display inside that you look at through an eyepiece, which gives a feel like looking through a normal scope. But most use an external display, such as one on your cellphone or tablet, with software on the mobile device to control the smart scope.

There are two basic tiers of smart scopes, low end units that are about $500 or less, and higher tier units that cost $1000 or more. I will only cover the low end units here, though the difference between low end and high end is that the high end scopes usually have higher native magnification and far more polish to their control software than the low end. High end scopes are appropriate for a wider range of astronomical objects, whereas low end units usually won't give good views of planets, small planetary nebulas, and other objects better suited to mid- to high-magnification.

These units have been very popular in our club over the past year. Ownership of smart telescopes has exploded thanks to the advent of the lower cost units, the Dwarf 2 and SeeStar S50. They are small, light, and can often be used in marginal viewing conditions when a regular visual telescope would be frustrating to use.

If you're looking to buy one as a gift, I recommend only giving them to an older teen with good patience and technical skills, as well as an ability to research and learn from YouTube videos. They'll also need a fairly current cellphone

or tablet to use the software to control it.

If you're buying for yourself, you'll find it a good investment, and you can use it alongside a regular telescope by setting it up and giving it a job, then using the visual scope while it does it, just checking up every so often.

There are two brands of smart scope currently available under $1000, and a third device that is more of an astronomical accessory to a cellphone than a true smart scope. We'll cover that one first.

Vaonis Hestia

The **Vaonis Hestia ($200-350 depending on accessory package)** is less a smart scope than a telescope accessory for a limited range of cellphones. It does not have any guiding motors, but it uses your cellphone's camera to identify where it is pointing in the sky, then gives you prompts to move the mount manually.

It is capable of doing some basic imaging this way, giving your cell's camera much more magnification than it would have natively. It is capable of doing solar imaging (its original impetus was as a device to observe the April 2024 solar eclipse.)

Be sure that your phone is one of the compatible models before purchasing, or you'll need to add the cost of a phone, too!
HESTIA : Turn your smartphone into a smart telescope. - Vaonis

DwarfLab Dwarf 3

The **DwarfLab Dwarf 3 ($500)** is the follow-on to the highly successful Dwarf 2 smart telescope. The Dwarf 2 was well known for its small size and light weight, and compatibility with standard accessories like 1.25" eyepiece filters and camera tripods. The Dwarf 2 has been discontinued, but some units remain in stock at liquidators, or can be purchased through online auction sites. I got mine from Sam's Club in Lady Lake, Sam's Club was one of the liquidators that DwarfLab sold their remaining stock through.

If you can still find a Dwarf 2, it will typically be about $350 or less.

The Dwarf 3 is currently on sale, but production is still ramping up. In October, DwarfLab stated that orders made in that time frame were likely to be shipped in January 2025. So presently there is a bit of a lapse in availability unless you pay a premium from resellers.

Both Dwarf telescopes feature a wide field landscape view and a telescopic view, through two separate cameras built into the scope.

The Dwarf 3 has a larger aperture than the Dwarf 2, at 35mm. It also has built in filters for light pollution and deep sky imaging, and external solar filters for solar observation.
DWARF 3 Smart Telescope – DWARFLAB

DWARF II Smart Telescope – DWARFLAB

ZWO SeeStar S50

The Zwo SeeStar S50 ($500) has been the most popular of the low end smart telescopes so far. It is larger than the Dwarf, in both good and bad ways--it has greater aperture (good) but it's also bulkier and heavier (not enough to really be bad, it's still very portable.)

Its software has been continuously upgraded to give it new and better capabilities. It can image the Sun (with the included external filter), Moon, and many astro-objects. Like the Dwarf 3, it has a mosaic mode that allows it to image objects larger than its field of view by building multiple images into one.

These are very well represented in our club, so help on using it is right here among our membership.

It does not have an equatorial imaging mode like the Dwarf scopes, but that doesn't hinder its capabilities. It's also available for purchase now, unlike the Dwarf 3.

Seestar

Summary

Thus ends this year's long and very extensive guide to buying astronomical instruments. I have tried to give a lot of background information on purchasing astronomy equipment to assist you in making your own choices, while still providing some "packaged" options for you to consider.

Let me know how this format worked for you. It is very difficult to recommend specific equipment outside the give and take of conversation because there are no good for anything scopes, just a range of choices.

Club Calendar

Yellow marks special events hosted by The Villages Astronomy Club
Blue marks events that are not hosted by The Villages Astronomy Club
Green Marks notable dates.

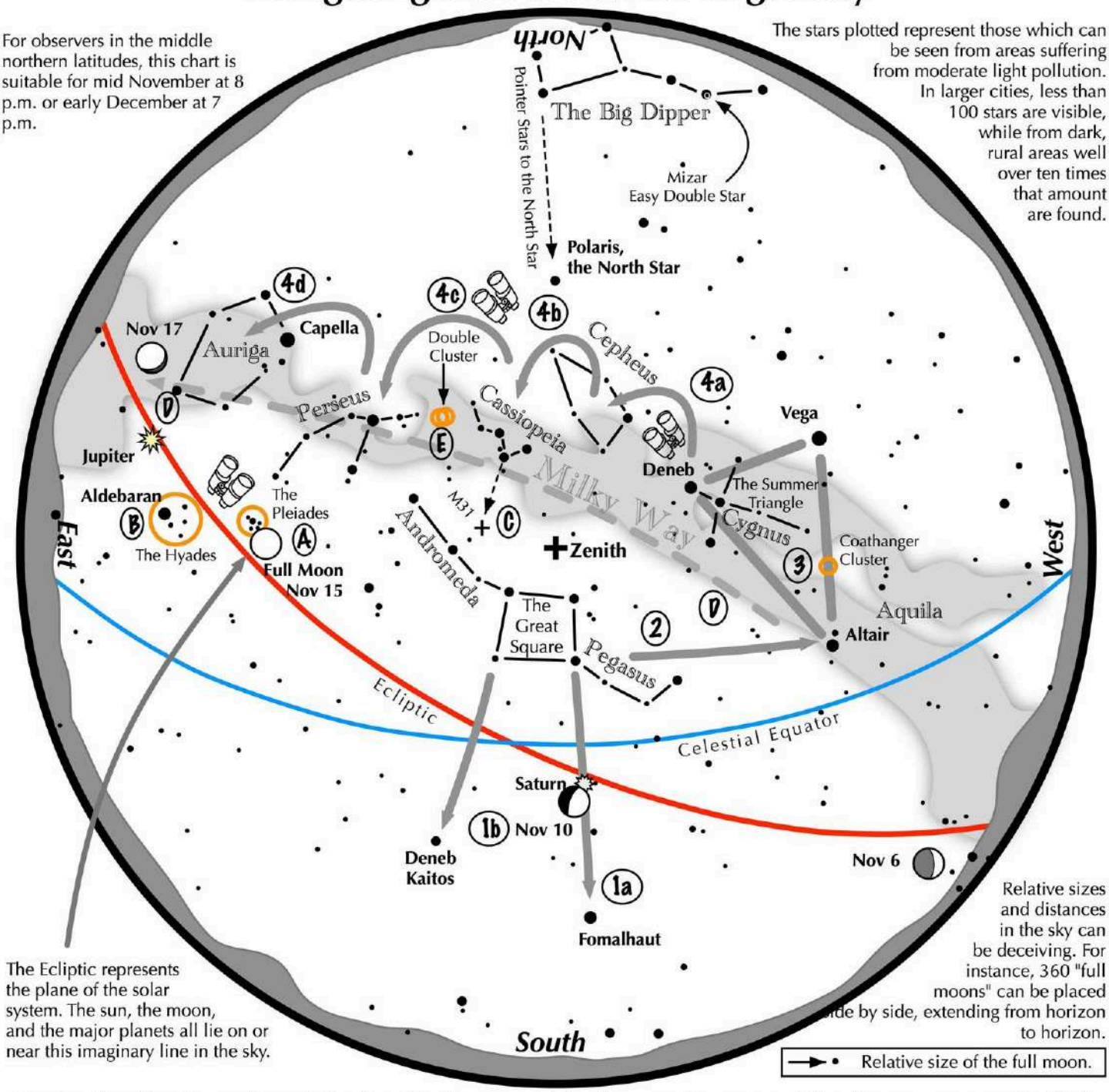
November 2024
1 Exec Meeting 11am Fishhawk
3 DST Ends
4 Telescope Workshop TBA (7pm)/No Space Academy This Month (Elections in Studebaker Room)
6 EAA Meeting 5:15pm
16 Fruitland Park Observing
19 General Meeting: Drake Shepard, "Future Space Missions", Laurel Manor 6:30pm

December 2024
2 Telescope Workshop 6pm/Space Academy 6:30pm
4 EAA Meeting, 5:15pm
5 Camp Geneva Star Party, ~40 kids expected
6 Exec Meeting 11am Fishhawk
7 Starry Starry Night, 7 day Moon, Sunset 5:24pm, Civil Twilight 5:54pm, Venus, Moon 38% sets 11:14p, Saturn, Jupiter. Observing 6:00 to 8:30pm Ever Everglades Rec Ctr
7 Jupiter at Opposition
14 Scout Leadership Star Party
17 General Meeting: Anne Holland, NASA Ambassador, "Comets, Asteroids, and Meteors", Laurel Manor 6:30pm
21 Fruitland Park Observing

Club Calendar on the web:
https://vlgastroclub.org/calendar/

See Monthly Sky Chart Next Page

Navigating the November Night Sky



Navigating the November night sky: Simply start with what you know or with what you can easily find.

1. Face south. Almost overhead lies the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend a line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the south. A line extending southward from the two easternmost stars, passes Deneb Kaitos, the second brighest star in the south.
2. Draw a line westward following the southern edge of the Square until it strikes Altair, part of the "Summer Triangle."
3. Locate Vega and Deneb, the other two stars of the Summer Triangle. Vega is its brightest member, while Deneb sits in the middle of the Milky Way.
4. Jump along the Milky Way from Deneb to Cepheus, which resembles the outline of a house. Continue jumping to the "W" of Cassiopeia, then to Perseus, and finally to Auriga with its bright star Capella.

Binocular Highlights

A and B: Examine the stars of the Pleiades and Hyades, two naked eye star clusters. **C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **D:** Sweep along the Milky Way from Altair, past Deneb, through Cepheus, Cassiopeia and Perseus, then to Auriga for many intriguing star clusters and nebulous areas. **E.** The Double Cluster.

Astronomical League *www.astroleague.org/outreach; duplication is allowed and encouraged for all free distribution.*