



Morning Star

Fall 2022

Newsletter of the Vermont Astronomical Society



*** Club Info ***

Announcements

Check out our Member [Forum](#) on our website (vtastro.org), under Discussions.

Several [past meeting presentations and newsletter articles](#) on imaging, observing and equipment are posted on our website, check them out.

[Past newsletters](#) are posted on our website under What We Do.

Associate Members interested in becoming full members make your interest known to one of the board members. To become a Full Member one has to actively participate in club functions and events and be active in some other aspects of astronomy (more details are in our by-laws).

Moving or Changing Email?

Please send changes to Paul Walker, 53 Valley View, Middlebury, VT 05753, paulwaav@together.net (info@vtastro.org will also work)

Hinesburg Observing Site

We have an observing site in Hinesburg, VT. (Located on town property). A locked gate (required by the town) limits access to the site.

Associate Members can request access to the gate lock. They have to be a member for 3 months. This provides access to the Warming Hut, 115v AC power, the port-a-potty and the Teaching Dome.

Full Members can request access to the gate lock, Green Mountain Observatory (18" Obsession) and the

Chmela Observatory (5" folded optics planetary scope) locks.

Board approval is required for Associates. Some training is required in all cases. There is a training checklist and an access agreement that need to be filled out.

Contact the Secretary, Paul Walker or Jack St. Louis for more information at info@vtastro.org

Observing List for HOS

We have an email list for members interested in getting a heads-up when someone will be at the Hinesburg Observing Site (HOS).

If interested in getting on the list contact info@vtastro.org

Observing Certificates

Several certificates (beginner to advanced) are available to members as encouragement to get out under the stars and hone their observing skills. Follow the link on our web site.

Outreach

Acknowledgment Letter

To help record our broad community involvement with public star gazing events, projects and classes, we have developed an Outreach Acknowledgment Letter with a Sample Form. It is posted on the website and can be found under **Members, VAS Club Materials for Members, Outreach Acknowledgement Letter**.

Direct Link: http://vtastro.org/wp-content/uploads/2018/03/VAS_Outreach_Ack_Letter_V3.pdf

Dues

Are due the first of each year.

Associate Members \$15

Full Members \$25

Send dues and any address or email updates to VAS, PO Box 782, Williston, VT 05495. Or bring to any monthly meeting or Contact Paul Walker, 802-388-4220, paulwaav@together.net.

Connect On-line

www.vtastro.org

[Twitter@VTAstroSociety](https://twitter.com/VTAstroSociety)

[Facebook.com/Vermont-Astronomical-Society-113053818706458/](https://www.facebook.com/Vermont-Astronomical-Society-113053818706458/)

Email: info@vtastro.org (Goes to the President and Secretary)

webmaster@vtastro.org

(Goes to Secretary and Webmaster)

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(My apologies if I missed anyone)

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Jack on the Radio

Listen to Jack's astronomy update on radio station WJOY AM (AM 1230) on Ginny McGehee's 'Breakfast Table' morning show. Aired the first Wednesday of the month at 8:40 AM.

Gary's Astronomical Events for the Month

can be viewed via WCAX at <https://www.wcax.com/weather/astronomy>

Stargazing and other Events

All observing events are weather permitting unless otherwise stated.

Bring extra clothes. Even a summer evening can be chilly after standing still for a couple hours in damp air. We have an email list for members interested in getting a heads-up on impromptu events at the Hinesburg Observing Site (HOS).

If interested in being on this list contact info@vtastro.org

Events are listed on our website (vtastro.org) and Google Calendar- (<https://calendar.google.com/calendar?cid=Nzc5dnQ1bnZrN2ljcDA2NG9vbXFnczI1M2NAZ3JvdXAuY2FsZW5kYXluZ29vZ2xlLmNvbQ>)

Member & Invited Guest Star Gazing at HOS & other events

Keep watch for emails announcing impromptu observing at the Hinesburg site.

Note: If you would like to be a host, greeter/orienteer or want some training on operating the scopes, let Paul Walker know.

COVID Note:

We will follow the current State COVID restrictions recommendations.

HOS - Oct 14 (Friday), rain date the 15th. Gate opens at 7:00, sunset 6:08 PM, full darkness 7:45. Moon clears the hill ~9:30 Very good for **Saturn** and **Jupiter** with a little time for deep sky. Mars, size 13", next to Moon and clears the hill ~10:00, 30 deg high 12:15 AM.

HOS - Oct 21 (Friday), rain date the 22nd. Gate opens at 7:00, sunset 5:53 PM, full darkness 7:30. No Moon this night. Very good for **Saturn** and **Jupiter** and deep sky. **Mars**, size 14", clears the hill ~9:30, 30 deg high 11:50.

HOS - Nov 18 (Friday), rain date the 19th. Gate opens at 7:00, sunset 4:20 PM, full darkness 6:00. No Moon this night. Very good for **Saturn (if you catch it early)** and **Jupiter** and deep sky. **Prime time for Mars**, size 17", clears the hill ~6:30, 30 deg high 8:45.

Contact info@vtastro.org

Public Star Gazing at Schools, Libraries, and other groups.

If you know of a group or institution that would like to schedule a star gazing session have them contact: info@vtastro.org

COVID Note: We will follow the current State COVID recommendations.

Oct 17, 6:30-10:00 PM. Rain date TBD. At **Dorothy Alling Memorial Library**, 21 Library Lane, Williston VT. Go past the Library, take the first right. The road will curve to the left. Keep going until you see a white fence on the left. We will be set up somewhere behind the fence. Planets and deep sky objects.

Green Mountain Astronomers (GMA)

All events start about sunset. Check before going as some events are not cast in stone or written in the stars yet.

Contact Ron Lewis for info
802-779-5913 (cell)
802-247-5913 (home)
vtpoet@gmail.com

Stay tuned for email notices.

New Members

VAS welcomes the following members who joined us since the last newsletter:

Maeve Gustafson
Stasia Bartsch
Mike Thompson

Meetings/Presentations

Meetings can be attended in-person or remotely. We are back to holding meetings in-person at Brownell Library. They can also be attended via Zoom. The Zoom link will be emailed to members with the meeting reminders. Non-members can request the link via info@vtastor.org.

Meetings are held the first (non-holiday) Monday of the month, at 7:30 P.M. in the Kolvoord Community Room of the Brownell Library, 6 Lincoln St., Essex Jct (2nd building north of Essex 5 corners on the left on Rt. 2A). Extra parking is available in the Bank North parking lot across from the library. For inclement weather call Jack St. Louis (802-658-0184) or Paul Walker (802-388-4220) to confirm.

October 3

**Safe Visual Solar Observing:
Solar Filters - Part 2
By Gary Nowak**



An Orion full aperture glass solar filter on an 8" Dobsonian Telescope.

There will be 3 sections:

The First Section will cover various types of solar filters. This will include the 3 types of White Light Filters and the 4 types of Special Narrow Band Filters. White light filters are used on telescopes and binoculars while the Narrowband filters are used on telescopes only. These are often called Aperture or Objective filters because they go on the front of the telescope. The

use of the Welder's Glass as a solar filter will be covered. There will be a review of some of the unaided eye filters that are available for the general public (called eclipse glasses and viewers).

The Second Section will look at various homemade (specialized) Solar Telescopes which can be used to safely look at the Sun. Almost all of these homemade telescopes have fallen out of favor and are rarely seen or used any more.

The Last Section will cover the unsafe "Ad Hoc" so called "solar filters" which will damage your eyes. One has to be careful about some of the information posted on the Internet. The materials used to make these "Ad Hoc" "solar filters" are unsafe and should be totally avoided.

November 7

**Stardust in Maine: Finding Micrometeorites on a Rooftop
By Jon Wallace**



Picture of a Micrometeorite and a human hair for a size comparison

Micrometeorites are some of the oldest matter known. About 100 tons per day hit our Earth and yet, very few have been found outside of Antarctica, a few deserts and the deep ocean... until 2015, when Jon Larsen from Norway discovered the first "urban" micrometeorite. Since they are tiny (only a few times the width of a hair!), they are diffi-

cult to find, but Jon Wallace, a local scientist and educator, was intrigued and started looking in 2017. Using the protocol developed by Jon Larsen in 2016, he found his first two micrometeorites in his roof gutters.

Come view his images of micrometeorites found in Maine and discover what micrometeorites are, how they are found, how they can be photographed, how to identify them, and what we might learn from these most ancient visitors to our planet.



Another example of a micrometeorite.

Bio:

Jon Wallace has a passion for geology which began with a third-grade teacher's excitement about the subject. Since then, he has pursued a degree in Geology from the University of Connecticut and then other degrees in the physical sciences. He was an award-winning high school science teacher in Meriden, Connecticut for over 32 years. He is past president of the Connecticut Association of Physics Teachers and was an instructor in Wesleyan University's Project ASTRO program. He has managed the Naugatuck Valley Community College observatory and run many astronomy classes and training sessions throughout Connecticut and was chosen a NASA Solar System Ambassador several years ago. He began collecting meteorites in the 1980's, while running observation sessions, as a program to use when weather didn't cooperate and found his passion for geology re-ignited. He has collected many specimens as well as thin sections for study and education. Currently, he is searching for and has found micrometeorites in various locales around Maine and is receiving analysis

help from Colby and the Maine Mineral and Gem Museum. Other interests include optical and radio astronomy, raising arthropods ("bugs"), fossils, and insectivorous plants. Jon has a BS in Geology from the University of Connecticut; a Master's Degree in Environmental Education from Southern Connecticut State University and a Certificate of Advanced Study (Sixth Year) in Science (Astronomy) from Wesleyan University. He currently lives in Maine and gives free presentations in schools, libraries and other venues in the Freeport area.

December 5

2 Mini Talks

Apollo 17 and 50 years

By Jim Bosek

A brief look back at Apollo 17 and highlights of US manned space exploration since. Skylab, Apollo-Soyuz, the Space Shuttle, and the International Space Station. What worked and what was mainly abandoned. A quick look in the crystal ball at what the future may hold.



Apollo 17



Skylab



Space Shuttle



International Space Station (ISS)

Deep Sky Images from Stellafane 2022

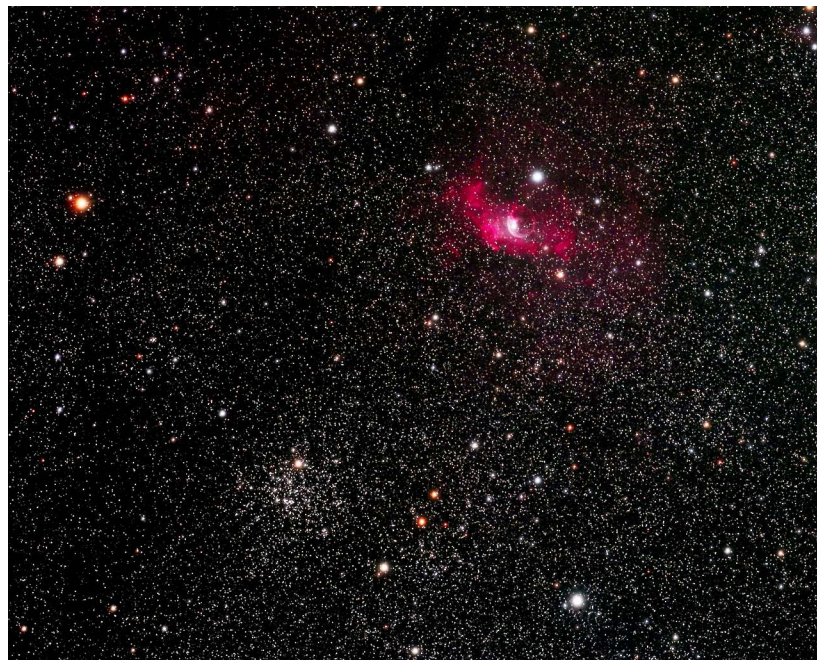
By Steve Grimsley

Only one night, Saturday, was ideal for images. I captured two medium field areas of the sky with multiple objects in each. The constellations where these images were taken are Cepheus and Cassiopeia. A few images captured before this year's Stellafane are also included.

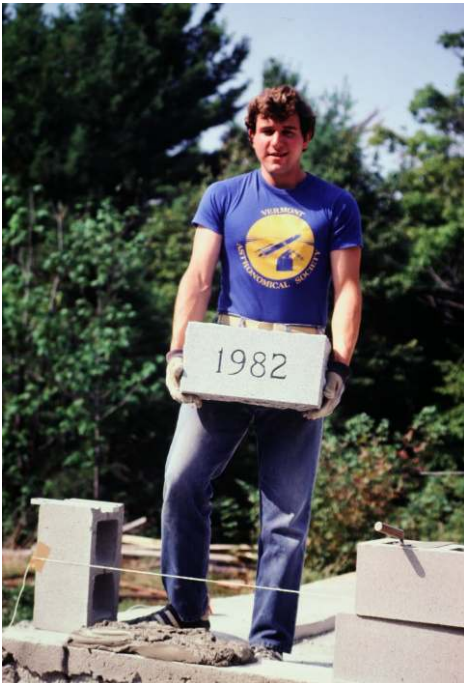
Articles

The Tale of The Planetarium Lady By Carrie Cruz

Approximately 50 years ago, college-age members of The Vermont Astronomical Society discovered there was a 9-inch Alvin Clark refracting telescope in storage at the University of Vermont and they expressed a strong interest in acquiring it. (Records are unclear, but UVM most likely acquired the scope from Governor Edwin Curtis Smith's estate in St. Albans.) The cost of housing, mounting, and adjusting the 9-inch Clark telescope was more than it would be worth to the University and so the University agreed to loan the scope to the Vermont Astronomical Society. The VAS built an observatory in Underhill, the 9-inch Clark was installed there in July of 1974, and the astronomers enjoyed exploring the night skies. However, in 1980, the lease expired at the Underhill site and VAS had to leave their observatory behind. Not daunted by this eviction, the indus-



trious group constructed a new observatory in Williston.



Green Mountain Observatory Corner Stone, Williston

The new structure was built on West Oak Hill Road in Williston. (West Oak Hill Road was renamed Old Creamery Road in the late 1990's. The structure is currently situated on Snow-drift Lane, designated in 2006.) The 9-inch Clark telescope was mounted in the Williston observatory in July 1983.



The 9" Alan Clark in the Green Mountain Observatory, Williston

As fate would have it, the VAS lost their lease on the land in the summer of 1989 and was forced to abandon the Williston observatory. Not able to secure a more lasting location for the Clark telescope, it was returned to the UVM Physics Department in 1989, where it remains today.

In 1992, a home was built on the Williston property and the observatory building became a glorified storage shed. By 2020, when I was looking for a new home in the area, the retractable roof on the cinderblock building was inoperable, the decking on the front rooftop was dangerously decayed and the interior of the building was a disaster filled with birds' nests, mold and manure. Yet...I was drawn to the quotes engraved over doorways and the vision I had for reincarnation of the neglected structure.



The observatory as a "glorified storage shed"

Moving to Vermont (to follow two of my kids and live in a place with room to breathe), I was originally looking for a property with a barn that I could convert to a small cooking school. However, when I laid eyes on the dilapidated observatory, thoughts of baking bread drifted away and the idea of a small planetarium rose in its stead. Having experience in planetarium education, I looked at the mess and envisioned a place where people could enjoy the wonderment of the sky any time of day, rain or shine. I took it as a sign from the Universe that this property and its cinderblock side-kick were meant to be mine! The eyesore was filled with potential, as far as I could imagine. (Besides, the house is great and the view is spectacular!)

I renovated the structure to accommodate a portable Digitalis Iota Digitarium system and 5-meter dome in the section that once housed the Clark Telescope. One new stationary roof, two windows, electricity and a major clean-up later, the home of The Planetarium Lady was born!



The new life of the observatory

As a retired public school educator of 34 years and former museum planetarian, I take delight in channeling people's inspiration and curiosities. The Planetarium Lady is the joyous capstone of what I've shared with learners through the years. Using the Digitalis Digitarium computer, the portable dome is a place where we can view the sky without variables like cloud cover or light pollution.

Guests can watch as time moves forward and day rolls into night to present the sky in all its beauty. We locate the constellations and asterisms, view

the boundary lines, the ecliptic, the circumpolar circle and the orbits of the planets. We can fly closer to planets, moons and dwarf planets in our solar system—an exciting trip to see! My programs, both on site in Williston and at public libraries in Vermont, mix legends, myths and science in an immer-



sive experience for all to enjoy.

References:

Manley, Don. "UVM's Alvan Clark 9' Refracting Telescope." 9 Inch Clark Refractor, University of Vermont, 20 Feb. 1996, https://www.uvm.edu/~dahammon/museum/clark_history.html.

Received by Gary Nowak, Fwd: VAS History, 1 Oct. 2022.

Received by Jack St.Louis, Fwd: VAS History, 29 Sept. 2022.

Received by Paul Walker, Fwd: VAS History, 1 Oct. 2022.

ROAD NAME AND ROAD LOCATION ADDRESSING ORDINANCE . Town of Williston, 3 Oct. 2006.

"Williston's 250th Anniversary: What's in a Name?" Williston Observer, 14 Mar. 2013, https://www.willistonobserver.com/archive/williston-s-250th-anniversary-what-s-in-a-name/article_2e830c88-6d65-duce-9777-4b656c003972.html.

A Spontaneous Evening Under the Stars 2022

By Joe Comeau

August 27th was a perfect night. The air was still and cloudless. Amateur astronomers started to gather around 6 PM, setting up their telescopes at the summit of Orchard Hill in South Al-



Guests and VAS Members on the Summit of Orchard Hill
Taken by Joe's grandson, Lucas, with his iPhone.



Phantom of the Observatory.....

Actually a picture taken by Brian Johnson of himself in front of Joe's Observatory dome

burgh. By 8 PM, people were gathering for the 2022 "Spontaneous Evening Under the Stars" event. This joint collaboration between Island Arts and the Vermont Astronomical Society (VAS) has been ongoing since 2011 and was only interrupted once by the COVID pandemic

This was the last event in the Island Arts 2022 season and once again brought together local people and visitors to the Champlain Islands to view wonders of the sky. A laser tour of the constellations along with fantastic views of Saturn, Jupiter, Mars, Uranus and Neptune highlighted the evening. As the sky darkened, the Milky Way arched across the sky. There was clearly an unofficial attempt to rename Saturn "Oh Wow!!!"

Star cookies, apple cider, citronella candles and strings of red solar lights helped greet visitors as they made their way from the parking area to the telescopes.

Nights have not always been this perfect. Astronomical society members

are adept in spotting opportunities to view galaxies, star clusters, nebulae and planets through any hole in the clouds. During some really cloudy events, resourceful islanders have adapted by setting up chairs and drinking wine. It has always been a good time.

The future holds more opportunities. Next August, the 2023 Spontaneous Evening is planned. The event is spontaneous because we never know what the weather will bring. Information will be in the 2023 Island Arts Brochure.

In 2024, we have the Great American Eclipse. This will start centered in North Hero at 2:14 PM and be total for 3 minutes and 33 seconds starting at 3:25 PM. The towns in Grand Isle County will have among the longest eclipse durations in Vermont. Since this could be a major event requiring a great deal of local and state planning, stay tuned for more information on how and where the eclipse can be safely viewed in the Islands.

Board & Committee Meetings

July Board Meeting

Jack met with the Hinesburg Design Review Board regarding the housing development NW of the HOS site. They did a walk around of the development site and showed a map of the current building plans. Looks like the impact on the HOS will be minimal with the big-est impact in the winter when the trees are bare.

Terri updated us on the finances.

Paul- Presentations are set through October. Dave Legrow and Greg Eri-
anne have requested HOS gate access.

Kieth- Has been checking on some of the Library Loaner Scopes. We have no requests for more at this time.

Jim- The 2024 solar eclipse letter is coming along well.

ACTION ITEMS:

None

MOTIONS:

Terri moved to approve Dave Legrow and Greg Erienne for HOS gate access. Paul seconded. All voted in favor.

August Board Meeting

Jack- The local guy who had been mowing the path over the capped portion of the landfill agreed to mow our site as needed when he had his mower there, has decided not to. We discussed some options (besides current scenario of members bringing their own equipment). One was to buy a used push or riding mower and build a small shed to house it. Another was to find a local contractor who mows lawns. Jack will look into the 2nd option.

Jack has several items donated to the club to sell. He is still looking for a home for a large 6" refractor. It has a built-in turret with built-in eyepieces and an alt-az mount (appears to have been set up mostly for terrestrial viewing.

Joe- His yearly "Spontaneous Night Under the Stars" is scheduled for August 25, 26, 27 or 28. He is planning a presentation on the James Webb Telescope and a stargazing event at Wake

Robin. Also, a constellation presentation at (Wake Robin?) for October.

Terri- Public stargazing event is scheduled at the Dorothy Alling Library in Williston for the first or second week of October. Discussed concerns about the low participation on the website's Forum and what might help boost participation

Bob- He had received a request for a presentation for a middle school group. He filled the request about a month ago.

Jim- Eclipse Committee update: They are good with the artwork design for the solar viewers and the letter that will be sent out to state officials and businesses to provide some guidance and offer help in preparing for the likely influx of tourists for the 2024 total solar eclipse.

ACTION ITEMS:

Update artwork for the solar eclipse viewer (with a minor change) and send to the vendor, Rainbow Symphony.

MOTIONS:

None

September Board Meeting

Joe- Has some events scheduled for the residents of Wake Robin. Terri Zittritsch will do a Constellation Talk for them in November. Scott Turnbull will give them a talk about the WEBB telescope, also in November. There will also be a stargazing event, the date TBD based on the weather.

Joe's Spontaneous Night Under the Stars was a great success. This is the tenth year for this event.

Paul- Monthly Meeting presentations are set through December.

Terri- There is an event scheduled for the Williston Library that Terri is the coordinator for. She announced that unfortunately she won't be able to attend. Others have stepped up to fill in for her.

She will be doing 2 talks for other groups; the Wake Robin talk (above) and a talk for NJAG, a club in New Jersey that VAS member Mary Lou West is a member of.

The Atlas mount in the Teaching Dome has been failing intermittently. Terri tracked the issue down to the motor controller board where she found a

bad solder joint, which she fixed. Apparently that was not the only issue as it failed again. She has ordered a new board.

Keith- Noted that we don't seem to have VAS info to hand out at star parties. We do, we just have not been diligent at making sure people have copies to hand out. Maura created a tri-fold brochure. Jack has copies of this brochure. Jack also has the file and will update it, primarily adding a piece about our recycled optics program (formerly Keith's "First Scope Program".

Keith has a few scopes in his "First Scope Program" ready but is asking the club to take over responsibility for it. He still plans to help and knows of others in the club who would like to participate in refurbishing scopes. For these others to more easily participate, the scopes would need to be kept in a more central location like the HOS. This means we need an appropriate amount of storage space at the site.

We discussed what to do about mowing the HOS. Jack found one place who would do it for \$100 each time and would mow every 3 weeks (~9 times a season for \$900). It has been suggested by a couple people that we get a used mower as it would be much cheaper than paying someone. Having a lawn mower at the site would make it possible for members without a lawn mower or don't have a good way to transport to help with this task. We discussed the associated issues of maintenance and storage. It was suggested for reliability that new lawn mower would be better and that we could get a good one for the cost of paying someone for a season. With a new lawn mower, especially, we would want a place to store it that is secure. We could build or buy a shed. To buy and place it on the site will cost in the ballpark of \$3000-\$4000. We will have to mull this over some more. We did discuss concerns about cost effectiveness. However, not part of the meeting- now that I have had time to really think about the numbers, even with the cost of a shed the cost for mowing would be cheaper over time than paying someone. We did discuss that if we have a lawn mower on site, there are some members ready to help with the mowing. And we can use the shed for

the telescopes in the "Recycled Optics Program" essentially for free.

ACTION ITEMS:

Send out monthly meeting reminder.
Print business cards for Jack and Keith

Create and send out quarterly reminder about the 1st Scope Program

MOTIONS:

None

----- VAS Membership Committee -----

Observatory Site Committee

No meetings this quarter.

Under the Stars & Planets

OBSERVER'S CORNER

Observing Tips

► (repeat) Try using "averted vision" on deep sky objects, that is, look a little off to the side. The center of your vision is good for seeing small details but is less sensitive to dim light than the areas away from the center. Because of this objects look dimmer when you look directly at them. Dim objects can even disappear. This works for both stars and extended objects. Even away from the center the sensitivity varies from place to place so you may have to "look around" to find the most sensitive area.

If you have tips to share whether for beginners or experienced observers send them our way at info@vtastro.org

Equipment Suggestions

► Filters for Observing Jupiter.

NOTE: Colored filters are most effective when the seeing (atmospheric steadiness) is at it's best and not particularly effective when seeing poor.

Red Filters: Bring out details in the Equatorial Belts.
Examples- W21 Orange, W23a Light Red, W25 Red, Baader 610 nm, also W85 Salmon (Pink)

Yellow Filters: Improve polar regions and zonal areas (light bands).
Examples- W8 Light Yellow, W12 Yellow, W15 Dark Yellow, Baader 495 nm Yellow

Green Filters: These are most commonly used filters on Jupiter's Belts (and other dark bands), usually darkens the belts
Examples-W56 Light Green, W58 Green, Baader 500 nm Green, , also W11 Yellow Green.

Blue Filters: Help bring out bright details in the Equatorial Belts, Also the Great Red Spot (sometimes)
Examples-W82a Light Blue, W80a Medium Blue, W38a Blue, Baader 470 nm Bright Blue

Note: "W" stands for Wratten filters.

► (repeat) Tips for dealing with humidity (whether dew or frost):

One way to address humidity problems is with a dew heater and/or fans. But here are a couple more ideas.

One common place for humidity problems is the sky end of the finder scope. A dew shield can help quite a bit. You can buy scope-specific shields, you can buy generic shields, or you can make your own. People have used a roll of cardboard (e.g. a toilet paper roll or paper towel roll can work nicely when blackened with paint or felt pen), sheets of foam, or very thin plywood. One rule of thumb is that it should be 1.5 times as long as your aperture is wide. Another trick is to replace the lens cap whenever you aren't using the finder.

You can apply the same method to your eyepiece when humidity gets really bad when checking charts taking a break.

To get an idea as to how much you will need to keep an eye the situation you can check the dew point on the local weather forecast if they include it or check your local humidity level with a humidity meter before going out.

If you have equipment suggestions to share whether for beginners or experienced observers send them our way at info@vtastro.org

On-line Resources

► Here's a really nice, printable Star Atlas. It shows how to go about printing, laminating and binding the atlas. And, even more, with supplements! <http://www.deepskywatch.com/deep-sky-hunter-atlas.html>

► ALPO

<https://alpo-astronomy.org/>
No not the dog food, the Association of Lunar and Planetary Observers. They are a good place to check out for those interested in learning more about the Moon and planets, observing them or submitting your images or drawings of them.

The Moon is a good place to start as it is often visible and close enough to lots of different geological features. The Lunar Section produces a monthly newsletter containing observations and images of the Moon.

It is a little tricky finding the link to the newsletter. From the link above, look on the top left side for Lunar Section under Observing Section. The link for each issue is the underlined word "here" about halfway down the info for each month. Then click on "Click here to view PDF file".

Member's Observations

7/26/2022 Paul Walker:

Wow, best planetary viewing I've ever had last night. Early this morning actually. After a night of imaging M27 (3 hours worth, now I need time to process). The seeing, though not perfect was the steadiest I've seen. I am pretty sure I spotted Saturn's C, or Crepe Ring. Though I have seen pictures showing it I didn't really know what to expect visually. I was using my 12.5" f/4.8. I know, not ideal for planetary viewing but it does have good optics. I was using my Denkmeier Binotron 27 at 304 X. The A and B rings were very bright. The C ring was quite faint and appeared to be about 2/3 the width of the B ring (the part of the rings beyond Cassini's Division. I also tried my 10" f/5.6 at the same magnification using a 8-24mm Meade zoom eyepiece and a 2X Barlow. The view through the 12.5 and Binoviewer was better.

I also looked a Jupiter. I have seen the Galilean moons as fuzzy disks before and could note the different sizes of them, but not like last night. Ganymede and Europa were on one side with Europa appearing about 1/2 the size of Ganymede. Looking them up I see the ratio is actually 1/1.6. At 304x they were super sharp but even tiny Europa showed as a tiny disk.

And then there was Mars. It was about 4 AM when I turned to Mars. It is only 8.1 arc sec in size but I could easily make out the South Polar Cap and that there was a dark area just to the north and the north end of the planet was very light. Using a Baader Bright Blue (470nm Bandpass) filter, the north area was even brighter, likely due to clouds. Looking up Mars on Starry Night Pro I saw that Olympus Mons, Arsia Mons, Parvonis Mons and Ascraeus Mons were all in that area making it very likely to have clouds.

Though it's rare in Vermont, I appreciate having a good quality large scope that can take advantage of a sky like last night. The only downside it's a long wait between times! But then, it's great for deep sky on the more typical nights.

9/8/2022 Paul Walker:

Another night of excellent seeing. Viewing Jupiter, Io and Io's shadow both passing across Jupiter's disk.

1:21 AM EDT entry-

Io is no longer visible, it is about half way across the disk and has blended into the background of Jupiter's cloud tops. Io's shadow is very prominent. Using the Binotron-27 with a 2X Barlow on my "big" 10" f/5.6 Newtonian the Galilean moons are well defined, if fuzzy, disks at 333 and 548x. 333x is quite good while 548x was too much magnification. There has been many a time I have viewed a shadow transit and either could barely see the shadow or not been able to see it at all.

9/29/2022 Paul Walker:

At about 8:19 PM EDT while observing Saturn and it's moons with my 8" f/6 Dobsonian, I notice a faint spot of light drifting by. For the heck of it I decided follow it for a while. I soon realized the object wasn't moving rela-

tive to my scope indicating it may be in a geosynchronous orbit. I watched it for about a minute over which time it varied in brightness from about magnitude 11 (as faint as the fainter of the visible Saturn moons) to invisible. It drifted noticeably to the South during this time but not East or West. It's the first time I have seen a geosynchronous object that far from the celestial equator. From our latitude they are usually about 5 degrees south of it. Saturn was 16 degrees south.

Because it got brighter after getting dimmer it was likely rocket booster or defunct satellite slowly tumbling. Geosynchronous Satellites usually get slowly get brighter than dimmer as they pass through the ant-solar point. It turns out this object was about 50 degrees west of that point.

Always happy to include your observation. Send them to info@vtastro.org.

Member and Invited Guest Stargazing Event 9/24/22
By Paul Walker

We had a very good turnout last night for the Member and Invited



Guest Stargazing Event. 17 or so folks showed up. About half were members and half invited guests. We viewed Saturn and Jupiter as well as some deep sky objects.

Here we are setting up.
Picture taken by Maura Kelley

We also observed something unusual. When we first spotted this object it was low in the south, it looked like a comet with a small but bright point of light at the "head" and a bright "tail" maybe 4 or 5 degrees long. Maura even jokingly told one of our guests that was Comet Herculean (or something like that). Of course we knew it wasn't a

comet. But we didn't know what it was. Some suggested it was an airplane with its landing lights shining through some fog or clouds. It certainly looked like that. Only as we watched, it wasn't quite right for that. The "light" appeared to be shining a little to the right (West) but we could see that the "plane" was moving slowly to the left and if it was a plane it should have come out of the cloud or fog and the light become much brighter. Then it clicked, it also looked like a video I had seen of rocket launches when the rocket has reached very high altitudes where the air is very thin and the plume of exhaust spreads out in a wide fan shape.

Maura got on her smart phone and after a quick search found a likely suspect, a Falcon 9 launching another batch of 52 Starlink satellites. I had assumed since we could see it this far North that it had launched from NASA Wallops Flight Facility on the coast of Virginia. But no, it was launched from Cape Canaveral, Florida at 7:32 EDT. I didn't check the time until 7:45 but I think we saw it from about 7:35 to 7:40. The next day, I looked up more info and watched a video of the launch, based on the timing of the first and 2nd stages, what we saw was the 2nd stage. We watched for what seemed like 5 minutes and saw the 2nd stage shut off and the exhaust plume slowly fade while the plume continued follow the trajectory of the rocket. The rocket was high enough when we spotted it that it was in full sunlight, while for us the sun had set about an hour before.

Maura posted this VAS Facebook write up later that night (early am) -

"Tonight's event at the observatory was a blast!

We started off noticing what looked like a very strange plane in intense fog, however, there was no fog, it was clear. Just afterward, some people arriving very excitedly were asking if we saw "the strange thing in the sky!" Some folks reported pulling their car off the road to watch it.. "a UFO?" .."a comet?"

Nope, it was a rocket.

The first phone pic here was taken at 7:39 PM with the video at the end at 7:40 PM (consecutively) where the rocket appears to break up. (turn up your

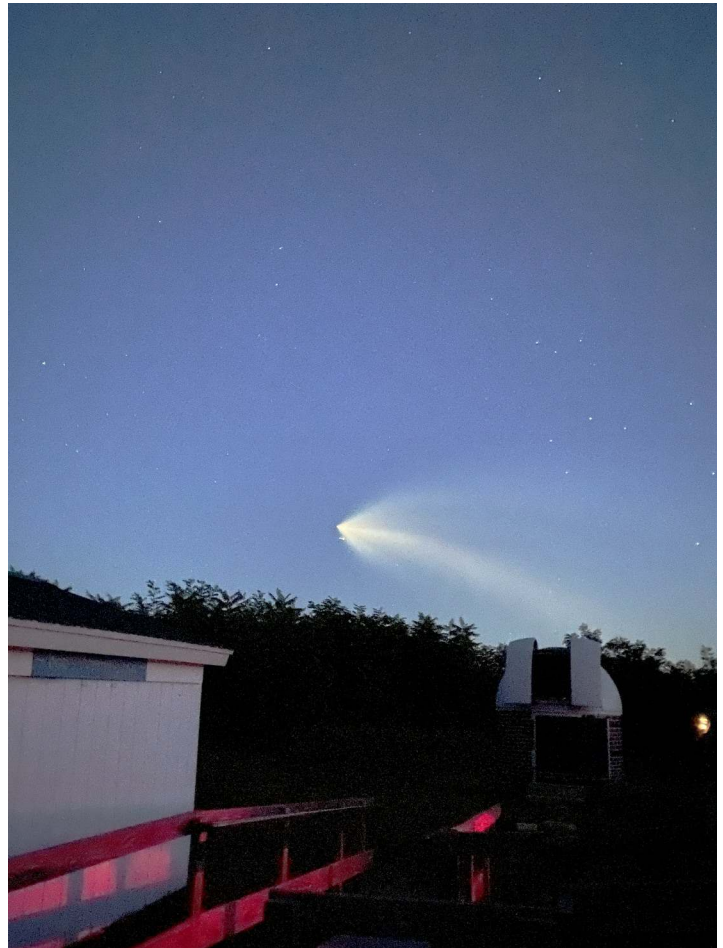
volume to hear Paul's video narration). Click hear to watch:
https://drive.google.com/file/d/1_z6TtIt2rZ9kuQt_JXHTS_oLR3ROUViPW/view?usp=sharing

"A Falcon 9 rocket topped with 52 Starlinkspacecraft lifted off from Florida's Cape Canaveral Space Force Station Saturday at 7:32 p.m. EDT (2332 GMT).

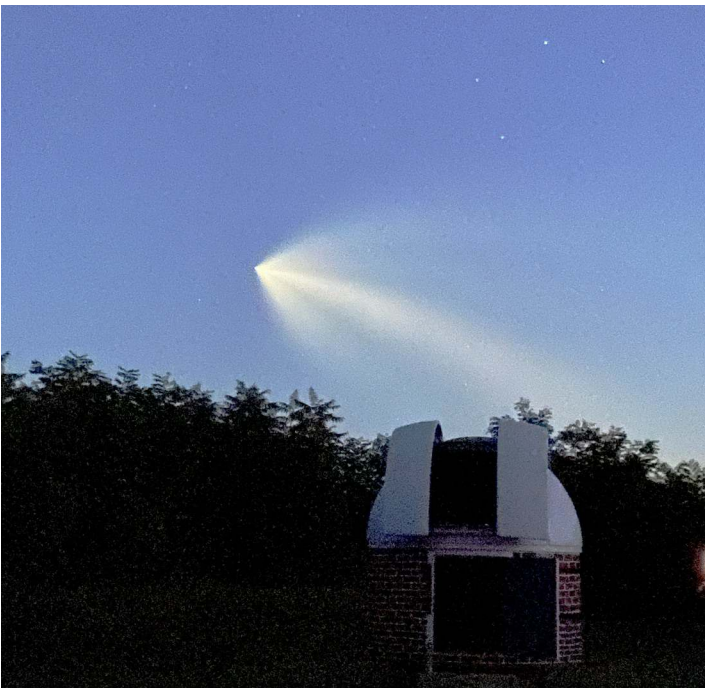
Just under nine minutes later, the Falcon 9's first stage came back to Earth for a pinpoint touchdown on the SpaceX "droneship" A Shortfall of Gravitas, which was stationed in the Atlantic Ocean."



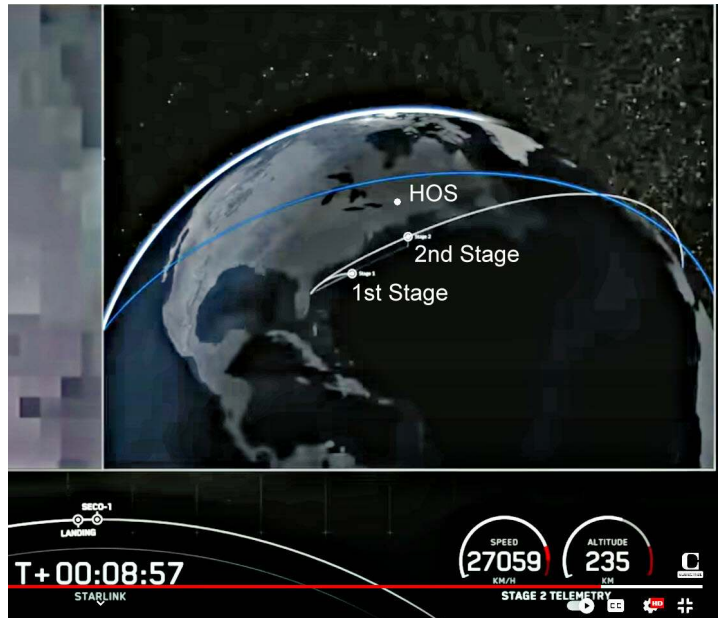
Maura's first picture of the rocket plume. It is rather difficult to see in but the rocket itself is below the handle of the "Teapot" (Sagittarius) and almost directly south of our location.
 Taken 7:39 PM, 4mm f.l., f/1.8, 1.1 sec @ ISO 2500.



Maura's last image; just below the rocket is an airplane going the other way looking like it almost crashed together. Wonder what the pilot thought of the sight.



(Next to last image) For this image Maura zoomed in (digital zoom). The teapot's handle can be seen in the upper right corner.
 Taken 7:40 PM, 4mm f.l., f/1.8, 1.1 sec @ ISO 3200



Taken 7:40 PM, 4mm f.l., f/1.8, 1.1 sec @ ISO 3200
 This was a screen shot from the launch coverage. It shows the location of the 1st and 2nd stages of the rocket 9 minutes after launch. It also shows our approximate location. It was about 370 miles (600 Km) from us when the 2nd stage shut down.

Objects to Observe

Plate 4 of 32

Cepheus

Pronounced SEE-fee-us

(one of Terri's Zitttritsch's Constellations of the Month)

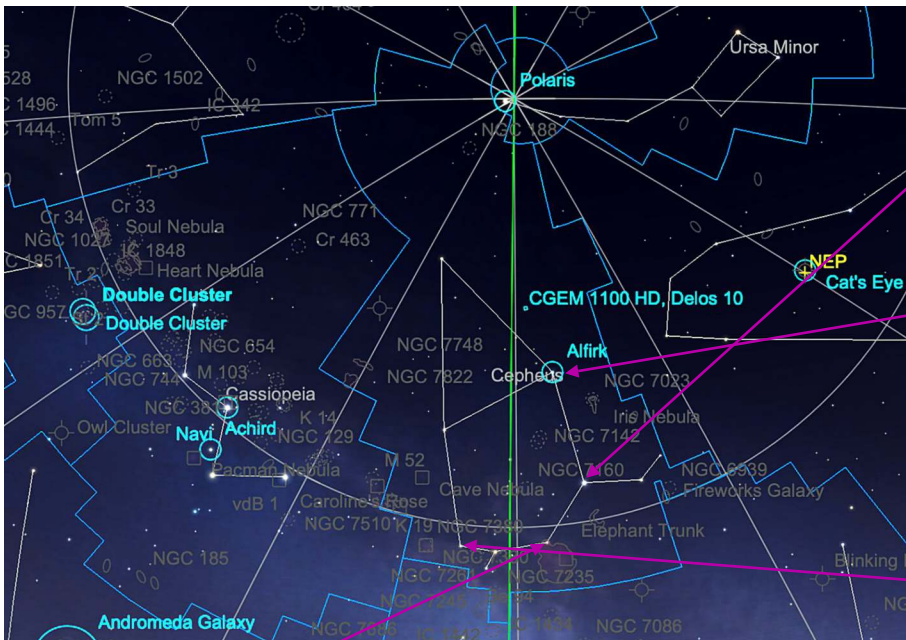
- Always visible at our northern latitude, it's called a circumpolar constellation along with 4 other constellations at 44.5 degrees including: Cassiopeia, Camelopardalis, Ursa Minor, and Draco
- The name means "King" in Latin
- Like other Greek Constellations, Cepheus was first named by the Greek Astronomer Ptolemy in the 2nd century although this constellation was known as far back as 500 B.C.
- Cepheus Myth:
 - The King of ancient Ethiopia which is the area now covered by Egypt, Jordan and Israel.
 - Cepheus's wife was Cassiopeia, and his daughter Andromeda.
 - Cepheus's wife once bragged she was more beautiful than the Nereids, one of which is Poseidon's wife
 - Poseidon sent Cetus the Sea Monster to ravage Cepheus's lands
 - Cepheus was told he had to sacrifice Andromeda to Cetus to appease Poseidon and stop Cetus
 - Cetus and Cassiopeia chained Andromeda to a rock for the Cetus but Perseus found her first and slayed the monster
 - Perseus, after marrying Andromeda had to fight off his brother Phineus and his followers, and used the head of Medusa which unfortunately the King and Queen looked upon

Finding Cepheus is easy

- It leads Cassiopeia around the pole.
- Use the two end pointer stars of Cassiopeia which will point to Alpha Cephei

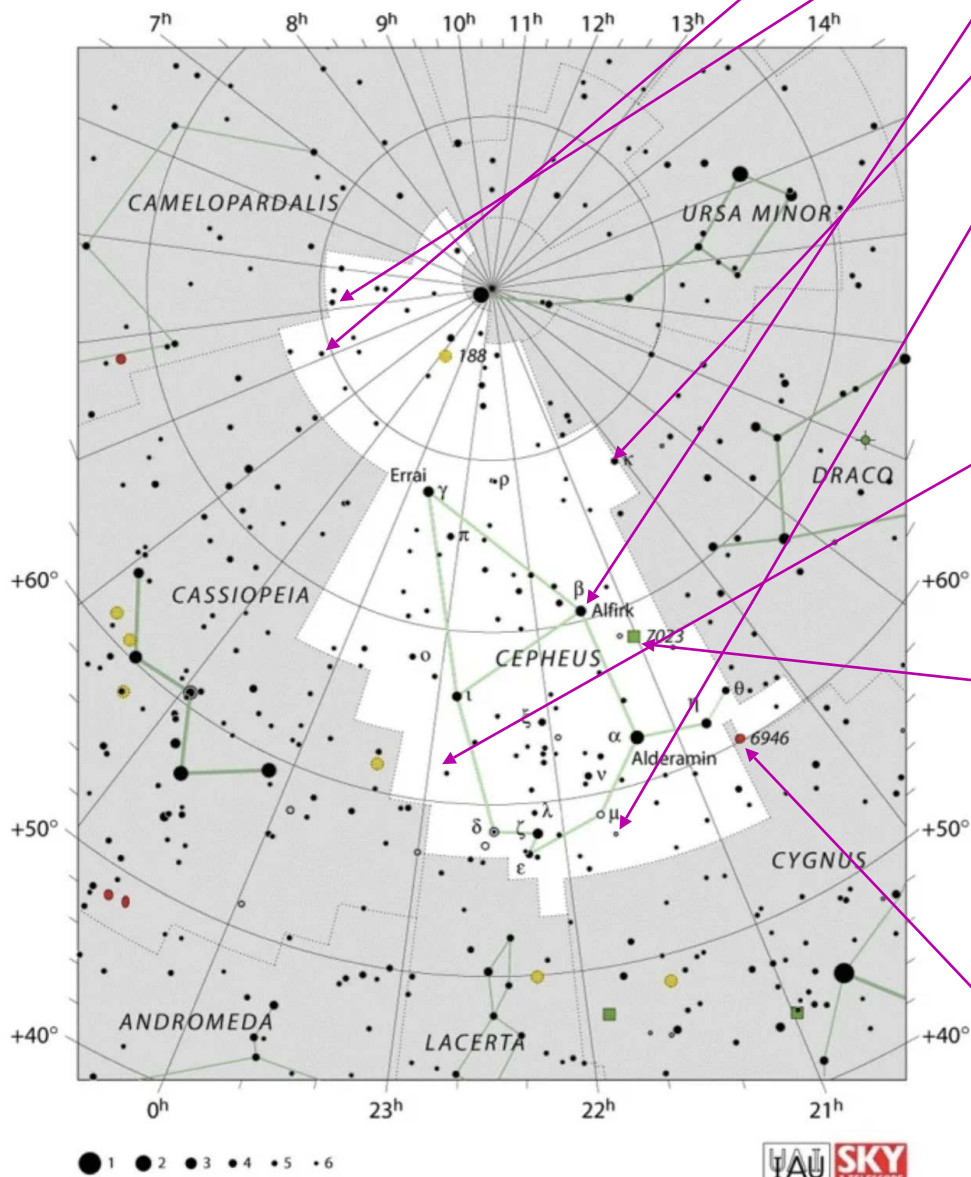
Cepheus notable stars:

- α Cephei (Alderamin) – Mag 2.4, White A7 V at 7600 K (hydrogen fusing main seq), 49ly distance and 18X solar luminosity and 2.5 x solar mass.
- β Cephei (Alfirk) – Mag 3.2, class B2 IIIev, 26,700 K, subgiant (at or near ending its hydrogen fusing phase). 12 Solar masses and 14,600 x solar luminosity. Beta Cephei is the prototype of $\beta\beta$ Cepheid variable stars which vary in mag .01-.3 mag over .1 to .6 d. Alfirk's period is 4.6 hours. A triple star system but only visual double with companion at mag 8.63 and 13.5".
- δ Cephei - Mag varies 3.6-4.3 over 5.36634 d, class F5 to G3 (Super Giant) and varies 6800K to 5500K, 891 ly, 2nd Cepheid variable was



discovered by John Goodricke in 1784. Henrietta Swan Leavitt later discovered the relationship between the period of light variation and absolute luminosity on this type of Cepheid variable, later to be used as a cosmic yardstick to determine cosmic distance and the existence of galaxies besides the Milkyway by Edwin Hubble.

- μ Cephei (Erakis) – Also known as the Garnet star. A Mag 4.0 class M2 (red supergiant), one of the largest and brightest stars in the Milkyway! If it replaced our Sun it's surface would fall midway between Jupiter and Saturn. Its luminosity is 350,000 x Sun. A prototype of μ Cepheid variable stars. It varies in brightness between 3.62 and 5 without a pattern over 2-2.5 yrs. Distance is uncertain (390-1600 parsec)



Cepheus constellation map by IAU and Sky&Telescope magazine

Double stars

- Struve 320 – yellow/blue double; Red giant mag 5.5 with mag 9 companion at 4.7"
- Struve 460 – Mag 5 primary with Mag 6 companion at 0.7" a good 6" scope test
- β Cephei – Alfirk and mag 8.6 companion at 13.5"
- κ Cephei – Blue white pair, Mag 4.4 primary with Mag 8.3 companion at 7.3"

Deep sky objects:

- IC1396 – Elephant Trunk, Bright nebula, Mag 5.7, 170x140' nebula at 294ly distance. A difficult visual target but fantastic for Astro-photos. The trunk itself, mag 10, is also named vdb 142 (van-den-Bergh)
- Sharpless 2-155 or Caldwell 9 - Cave nebula, mag 7.7 and 2700ly distant and 50'x40' across. A dark lane on its eastern side is what creates the 'cave' effect. Another difficult visual object but a popular astrophotography target.
- NGC7023 / Collinder 427- Iris nebula/open cluster. An open star cluster associated with a reflection nebula. The Mag 7.2 Iris nebula is 6 ly across and 1300ly distant and the central star powering the reflection is mag 7. Cr 427 can be seen on the west side of the nebula at 4' wide but it's 13-15 mag stars will limit to large instruments
- NGC6946 – Fireworks galaxy. Centered on the boundary between Cygnus and Cepheus. A mag 8.9 face on spiral galaxy 40,000ly across. At a distance of 10 million ly, it's fairly close but not a part of the Milkyway local group. Called the Fireworks galaxy due to the large number of supernova found (9), 3 more than the next closest galaxies (M61 and M83).

Information Sources

Constellation-guide.com
 Space.com
 earthsky.com
 Wikipedia.com
 Sky Safari 6.0 Pro

ASTRO-IMAGER'S CORNER

All things astrophotography, for the beginner to the expert.

Imaging Tips

“Stretching” an Image In the Camera

Shooting images in the Raw format of your camera will produce the best results when stacking images. However consider this, whether you "stretch" these images before or after you stack them will have little to no affect on the results. Therefore, it stands to reason that "stretching" the image in the camera by using a high ISO setting will have little affect on the results. This is true even if you save your images only in JPG format, especially if you save them at the highest quality setting (largest, least compressed, file size) available. For many older digital SLR cameras the true (versus apparent) amount of noise increased with the ISO setting. For almost all newer cameras this is not true, the noise and the signal/noise ratio does not increase at higher ISO setting.

If you have tips to share whether for beginners or experienced imagers send them our way at info@vtastro.org

Software/Online Info

Astrophotography How-to

<https://www.allaboutastro.com/how-to-learn-astrophotography.html>

If you have imaging software or a site with imaging info to share whether for beginners or experienced imagers send them our way at info@vtastro.org

Imaging Projects--

Making your own projects can add another dimension to your imaging experience.

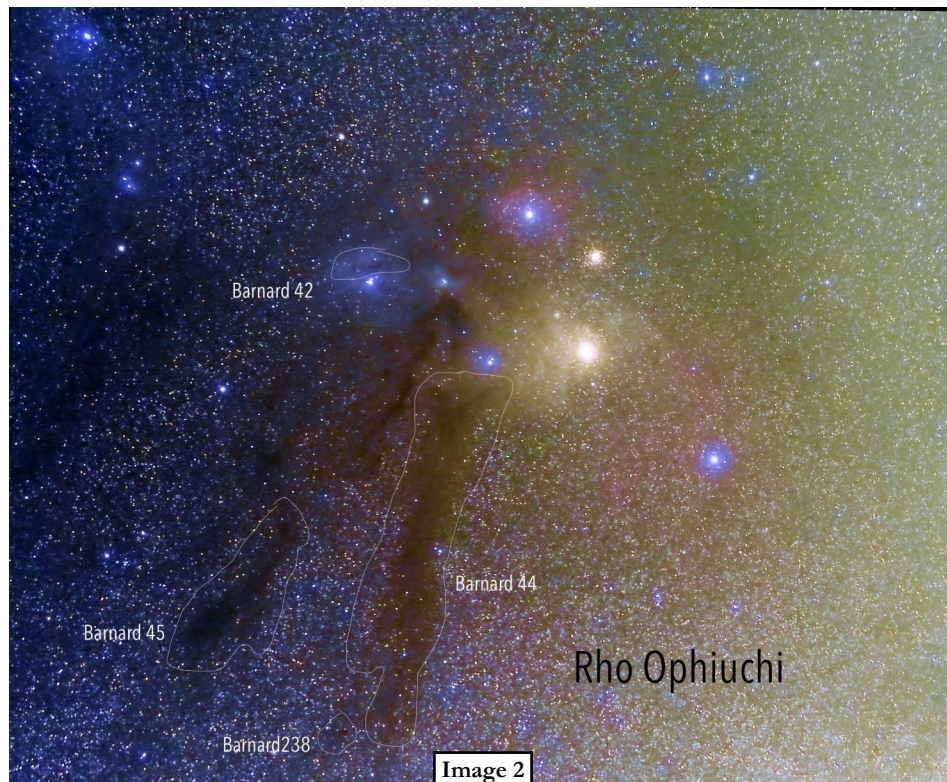
If you have an imaging project you would like to share, drop us a line at info@vtastro.or.

Imaging Articles

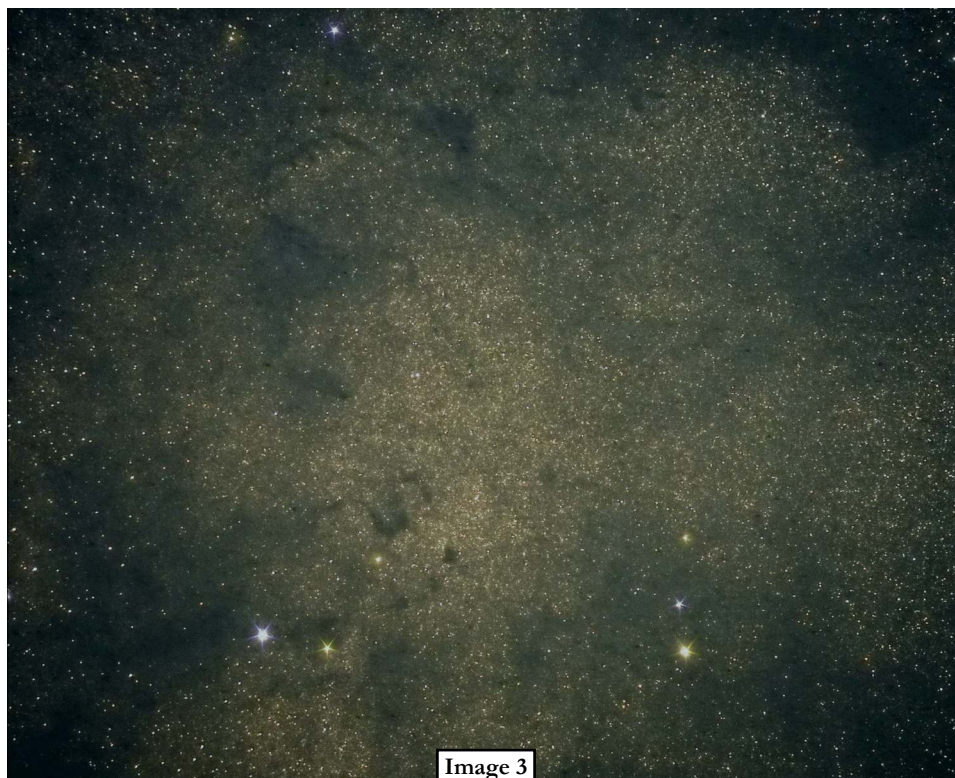
Looking for Dark Nebula in the Dark by Maura Kelley



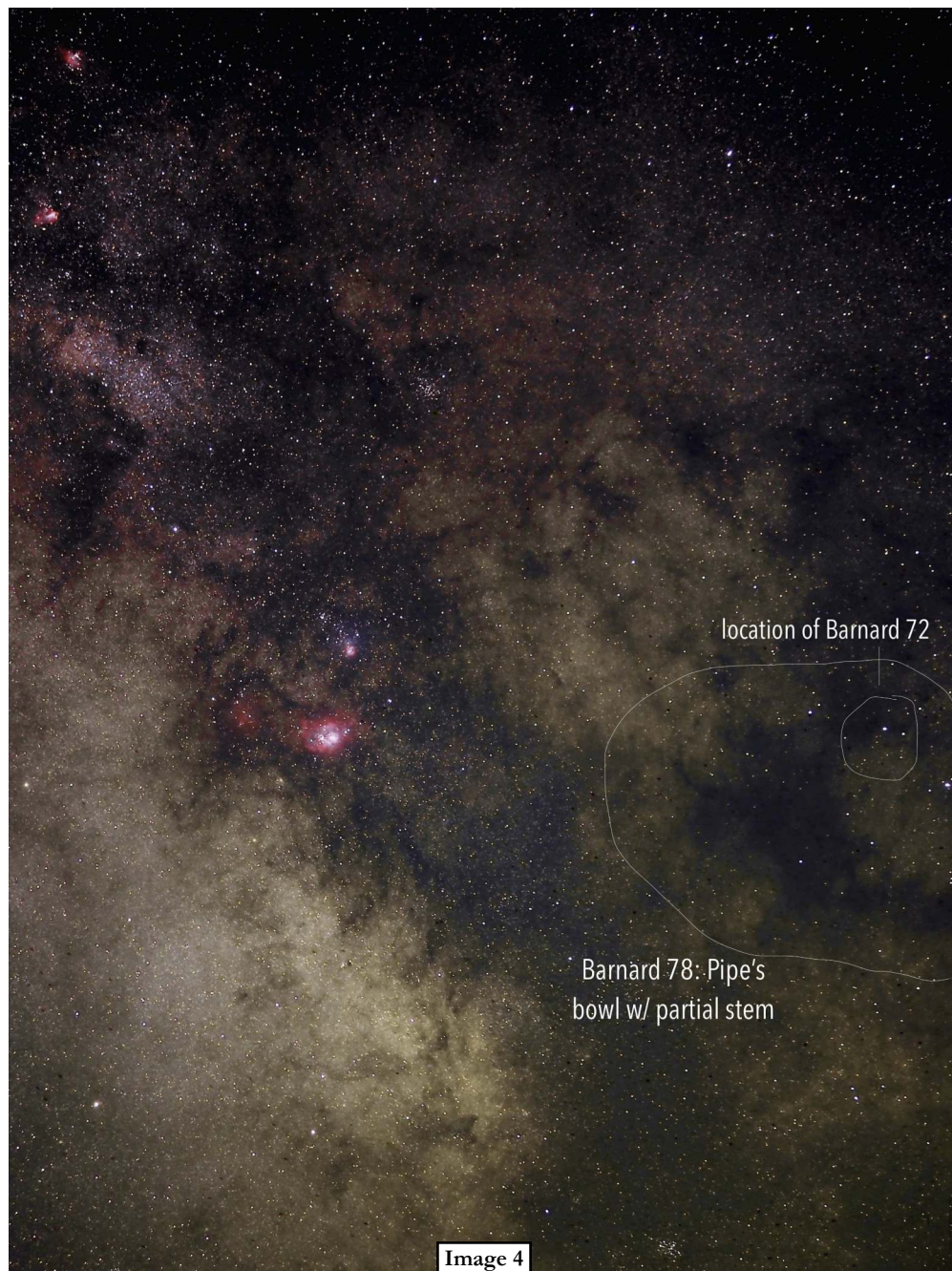
Dark nebulae typically involve a lot of exposure time to appear in photos. Such is the case with the Seahorse Nebula, Barnard 150 that swims in the incredibly rich sea of colored stars within the boundary of constellations Cepheus and Cygnus the Swan. **Image 1** depicts this mysterious Seahorse. With unguided short exposures, this is 4.15 hours of integrated exposure time over 5 nights.



Traveling over to the HOS, our southern horizon's Milky Way offers very interesting dark nebulae. From the cloud complex of Rho Ophiuchi, you can see really lovely lanes of dark nebulae that look like a beautiful bow presented as a gift to us star-gazers! These large extensions of the complex are also called Dark River clouds, or Rho Ophiuchi Streamers, and are identified as Barnard 44 and 45. In **image 2**, I've noted some of these dark nebulae, listed in the 'Barnard Catalogue of Dark Markings in the Sky' compiled by astronomer Edward Barnard. Interestingly, dark nebulae were once thought to be holes in the Milky Way and later discovered to be interstellar dust clouds that block the background stars from our view. This image consists of unguided shorts exposures = 32 minutes.



Moving in the sky toward the Milky Way core are many interesting dark nebulae. The Snake Nebula, Barnard 72, is very interesting to me (**image 3** - again using unguided short exposures for just under 7 minutes). Not annotated in this cropped image: to the right of the Snake is Barnard 68 and below are Barnard 69, 70 and 74.



In wide-field (**image 4**), I noted its location on the north-north-west edge of the bowl of the Pipe Nebula, Barnard 78. You can also see the Lagoon Nebula (M8), Trifid (M20), and faintly, the locations of nebulae Omega (M17) and Eagle (M16). This is 27 minutes of unguided short exposures. All of these images were captured using an Olympus micro four thirds camera on my telescope's tripod.

If you have an imaging article (long or short) you would like to share, drop us a line at info@vtastro.org.

MEMBER'S IMAGES

The Sun

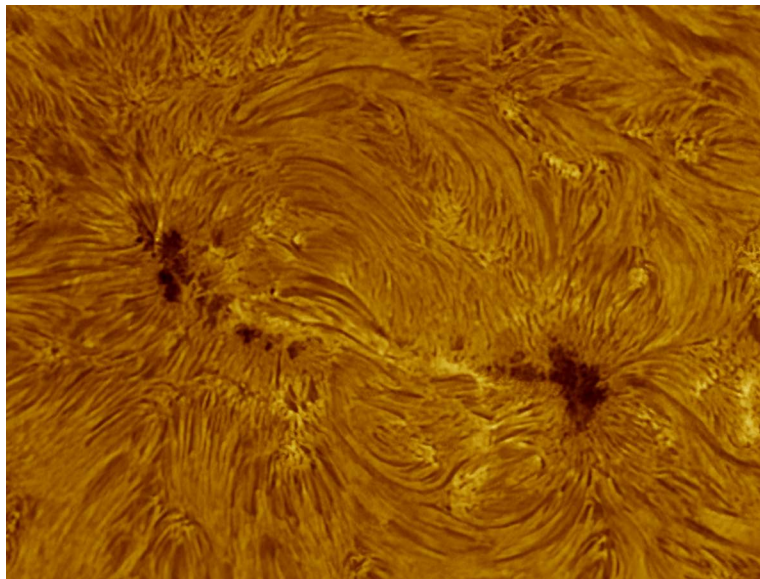
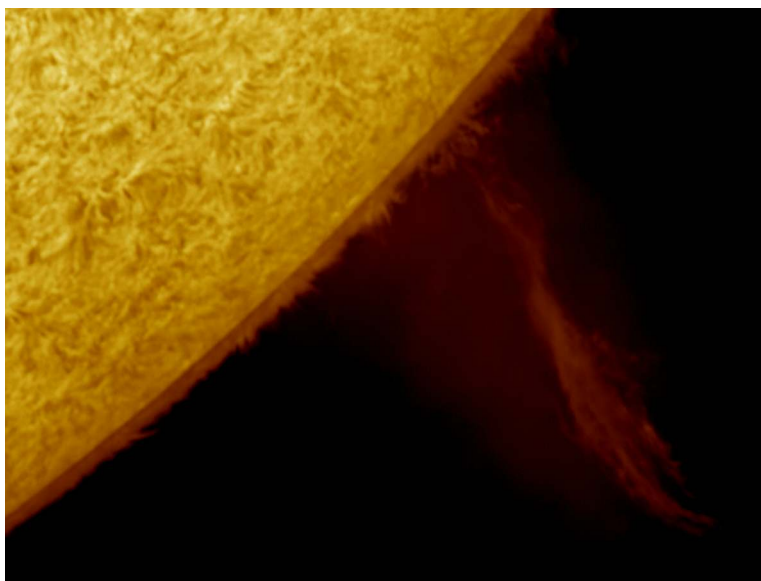
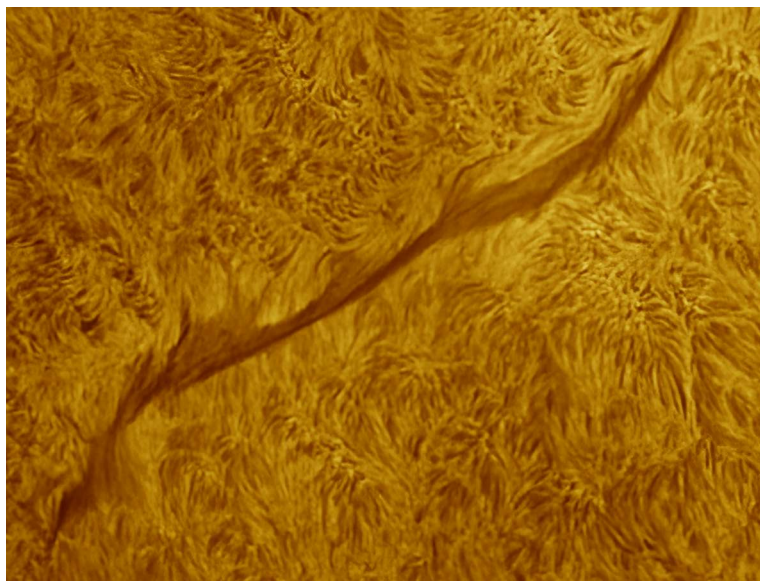
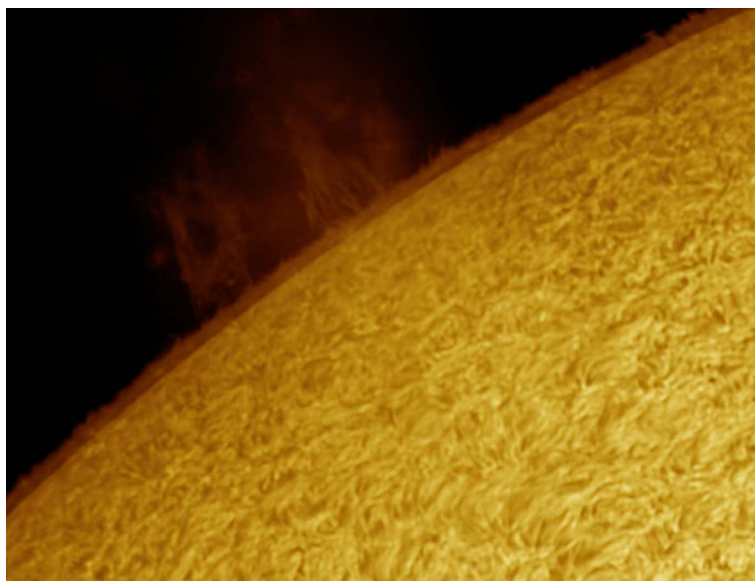
We'll start at the center of the universe, oh, wait, the Sun was demoted years ago. We'll start at the center of the solar system.

As many of you may know, the new solar cycle is in progress. The Sun has been exhibiting large active sunspot groups which tend to produce flares. If you don't have a solar filter for you scope (or camera lens) you may want to get one. It will also be handy for viewing the partial phases of next year's partial and the 2024 total solar eclipses. Hopefully you attended the October monthly meeting where Gary Nowak presented part 2 of his Safe Solar Observing presentation.

A Solar Prominence's, Filaments and Sunspots in H-alpha

By Terri Zitttritsch

A few images from July 11th. Lots of action on the Sun. Taken with her H-apha Solar telescope.



White Light Solar Images Taken by Paul Walker on 9/2/22

I continue to be surprised and pleased with the amount of detail I can see visually and in images on the better days. The day before these images were taken was a day with poor seeing. Visually I have been using an 8" f/6 Orion SkyQuest Dobsonian telescope with a full aperture Orion glass solar filter. For imaging I am using my 10" f/5.6 Newtonian with an 8" Baader ASTF 200 solar film filter which stops it down to f/7.

These are single images with the contrast enhanced using a histogram stretch (curves tool) and sharpened using an Unsharp Mask tool.

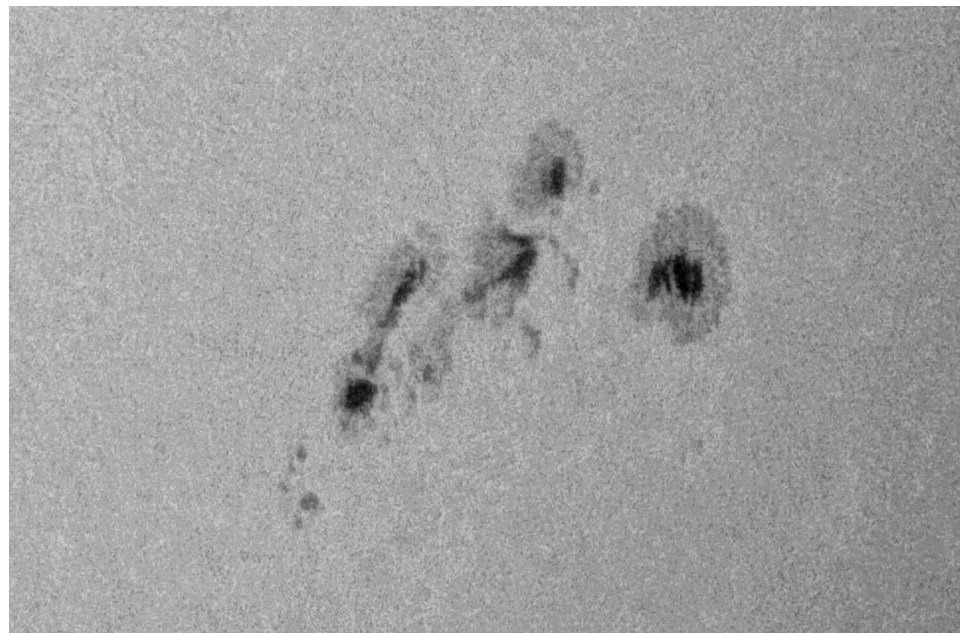
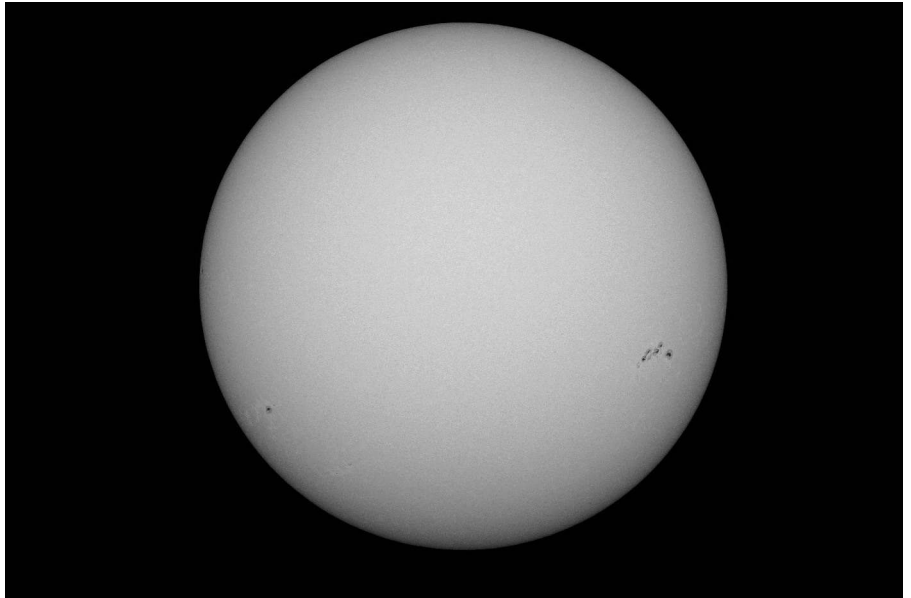
The top image is prime focus using a Canon Rebel T7i DSLR (24Mp, "crop sensor"), 1/800 sec @ iso 100. The middle is a crop from the full disk image. In this image the smallest, medium to high contrast features are 2-3 pixels across. At the system's resolution of 0.52" (arc sec) per pixel this translates to 1" to 1.5".

I also took images using a Barlow lens which gives me 2X the magnification of the prime focus shot. The bottom image is a crop from one of those images. I picked this and the prime focus image as being the best of 51 and 42 images taken respectively.

The images were taken 10 minutes apart so most of the visual differences are due to atmospheric distortion. I measured the size of only the features that were visible on both images. In this image the smallest, medium to high contrast features, are 3-4 pixels across. In this configuration the camera's resolution is 0.26" (arc sec) per pixel making these features 0.75" to 1.0" across. This is close to the actual visual resolution in the 8" Dob. This shows that even in Vermont in the daytime that very fine detail can be seen on the Sun.

To give an idea of physical size of these spots- The Sun's mean diameter is 865,370 mi. Its apparent angular size is $\sim 30'$ (1800") of arc. So 1 arc sec (1") on the Sun = 480 miles (865,370 mi/1800").

This sunspot group spans about 520 px = 135" = 65,000 mi. or 27% the distance to the Moon (in an email to vtastronomy@list I miscalculated this span as 221,000 mi).

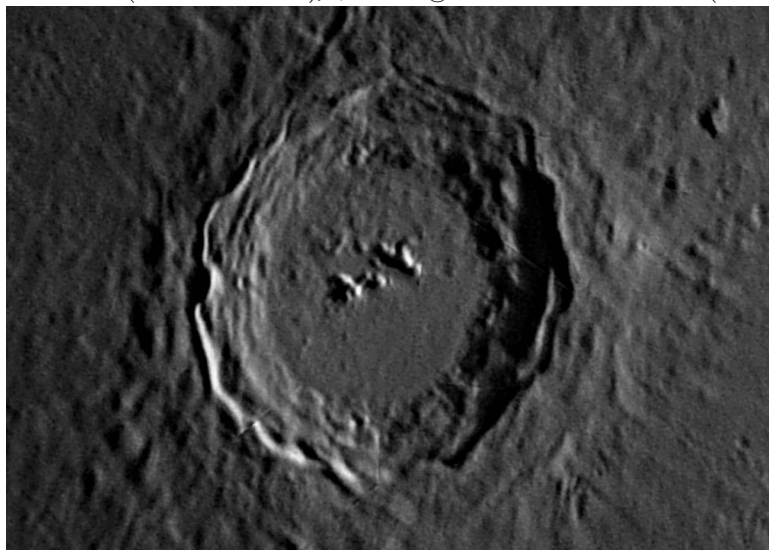


Next Up, the Moon



Northern half of the Full Moon - 10/9/22 by Paul Walker

The details visible along the terminator (day/night edge) of the Moon is great, so is the view of the Full Moon. The only drawback I find is the overwhelming number of features visible. This image was taken only 5 1/2 hours after the time of Full Moon. 10" f/5.6 Newtonian, Canon T7i camera, 1.5x Barlow (2x with the camera), 1/320 sec @ ISO400. The field of view (side to side) here the same as 175x with a 65 deg. fov eyepiece



Close-up of Copernicus Crater - 8/20/22, ~5:05 AM EDT, by Paul Walker

Copernicus A is the small crater imbedded in the left wall of Copernicus and centered vertically. Using Copernicus A's diameter of 2 miles as a reference, I find the smallest hills in this image visible in the bottom of Copernicus are on the order of 0.5 - 0.6 miles across. Visually I could see Copernicus A most of the time but nothing smaller. There are some linear artifacts from the stacking process due to using multiple alignment points and that medium scale seeing caused considerable distortion between the frames. North is down. The image is cropped about 50%. 10" f/5.6 Newt., eyepiece projection with a 15mm eyepiece, Canon T7i in video mode, 3x digital zoom, 1/50 sec. @ ISO1600, 144 frames.

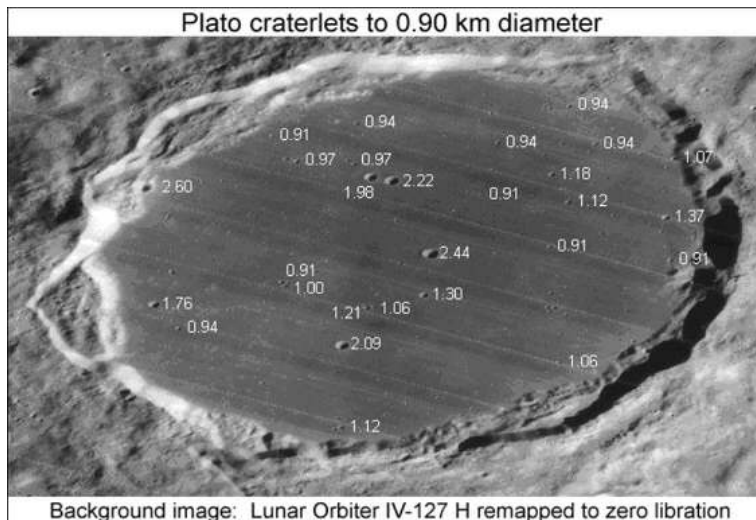
The Craterlets of Plato (dark round crater near top) By Joe Comeau

From Wikipedia:

Plato is a lava-filled lunar impact crater on the Moon. Its diameter is 101 km. It was named after ancient Greek philosopher Plato. It is located on the northeastern shore of the Mare Imbrium, at the western extremity of the Montes Alpes mountain range. In the mare to the south are several rises collectively named the Montes Teneriffe. To the north lies the wide stretch of the Mare Frigoris. East of the crater, among the Montes Alpes, are several rilles collectively named the Rimae Plato. The age of Plato is about 3.84 billion years, only slightly younger than the Mare Imbrium to the south. The rim is irregular with 2-km-tall jagged peaks that project prominent shadows across the crater floor when the Sun is at a low angle. Sections of the inner wall display signs of past slumping, most notably a large triangular slide along the western side. The rim of Plato is circular, but from the Earth it appears oval due to foreshortening. The flat floor of Plato has a relatively low albedo, making it appear dark in comparison to the surrounding rugged terrain. The floor is free of significant impact craters and lacks a central peak. However, there are a few small craterlets scattered across the floor.

My recent astro-imaging efforts have been focused on these craterlets. I know it is possible to image them. In the November 2018 issue of Astronomy Magazine, Damian Peach presented an extraordinary picture of Plato and the craterlets.

The most recent release of the virtual moon atlas barely shows the craterlets at maximum zoom. The Lunar Orbiter gives craterlet diameters in km. Clearly, the craterlets are very small.



The Virtual Moon Atlas gives the following information on Plato (not the craterlets):

Apparent size: 29.51"

Interest: Exceptional formation

Observation period: One day after the First Quarter or 6 days after Full Moon

Minimal Instrument: 50 mm refractor.

My first attempt using a Celestron C14 scope and a Sen-
tech STC-MC33USB was taken on the morning of Septem-
ber 17 at 12:22 UT. The moon was fairly high in the sky (60
deg.) and six to seven days after the full moon. I would have
imaged it before daybreak but didn't get up. I took 1000
frames and processed them with Registax 6. Craterlets were
not visible. I contacted our local moon expert Larry Garrett
for consolation and he offered that "those pesky craters are
only visible when they want to be. Try stopping down too,
nothing to lose." It was apparent that more effort was re-
quired for the project.



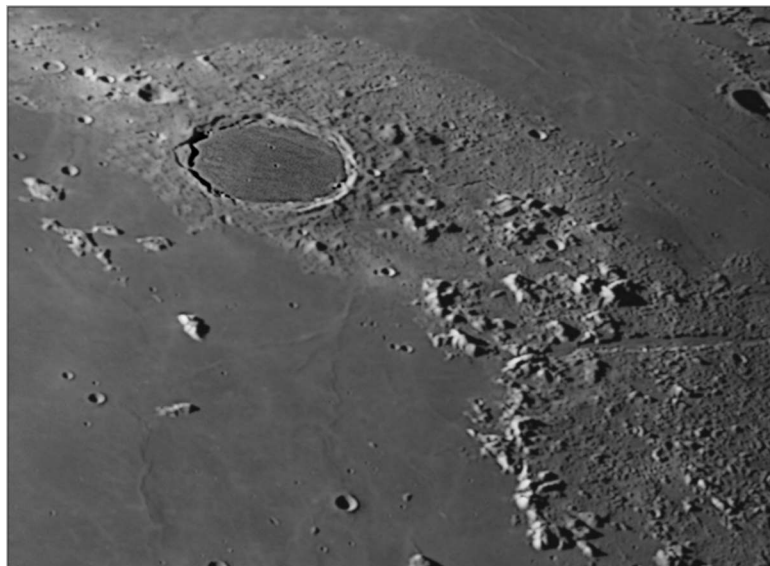
My next attempt was on October 6 at 2:10 UT, three days after the first quarter. Seeing was 4 out of 5. Using the same equipment, I took 2000 frames and processed them with Registax. Several of the craterlets showed up in the image.

Again, I contacted Larry and sent him the UT for the video. He said "Selenographic colongitude of the sun 38.74 degrees, Great job!"



I was quite pleased with myself until I looked at that Damian Peach image again. After the first quarter, the moon was very low in the sky (25 deg.). My new strategy was to wait until it was high in the sky. I was planning on winter when it occurred to me that near the last quarter, it would be quite a bit higher (66 deg.).

My third attempt was on October 16 at 8:30 UT, about 6 days after the full moon. The seeing was 4 out of 5. Again, using the same setup and processing routine, the image was quite a bit sharper. Still not a Damian Peach but a little closer. The effort continues.



Next up - Mars

Mars, 8/20/22 by Paul Walker



This was about the detail visible in a scope. 4:29 AM EDT when Mars was 9.1" across.



This is after applying wavelets in Registax 6. It is also a 25% crop. 10" f/5.6 Newt., Canon T7i DSLR in video mode, eyepiece projection (15mm e.p.) (~9360mm efl), 3x digital zoom, stack of 750 frames from a 1 minute video.



This screenshot from Sky & Telescope's Mars Profiler marks the center of the Mars' disk at the time of my image (go to <https://skyandtelescope.org/observing/interactive-sky-watching-tools/> and scroll down) From it you can identify the main features in the image, including Hellas Basin (upper right edge) and either the North Polar cap or the Polar Cap Hood (bottom edge).

Note that this is "flattened" so the South and North (top and bottom are distorted).



This image was taken with the same setup a week later on 8/28/22 at 3:52 AM, when Mars was 9.6". It is a stack of 400 frames from a 34 second video. Below is the Mars Profiler view for this image.



9/8/22, 2:08 AM EDT. Hey look, not more double image! I finally re-



collimated the scope. Mars had "grown" a little, here it is 10.2" in size. Some features in the 1 arc second size range are visible here. These and the

preceding images are cropped to show them at approximately the same scale. There is a strong limb brightening effect because I processed the image to highlight the surface markings. In the lightly processed version you see that the limb on the right side is actually a little brighter. Most likely due to limb clouds or haze. At the 9 and 10:30 positions are barely detectable patches of clouds. These are fairly easily seen in the more processed image. The Mars Profiler for this is below.



Mars will reach opposition in early December with its closest approach to Earth on December 1 and have a size of 17.2". One week later Mars reaches opposition (opposite the Sun) on December 8 which coincidentally is when the Moon occults Mars! (Night of Dec. 7 for us)

Occultation of Mars by the Moon
See: <http://lunar-occultations.com/iota/planets/1208mars.htm>

For Burlington, Vt it occurs on 12/8/22 at 4:25 UT which is 11:25 PM EST on 12/7/22 for us and lasts about 40 minutes. Special note: Using Starry Night Pro planetarium software the event starts 20 minutes later than this. I don't know which is correct. The Moon will be a little past full and 70 degrees high in the sky at the time. Mars will disappear behind the southwestern limb of the Moon. It will take about a 1 1/2 minutes for the Moon to fully cover Mars. It will reappear 40 minutes later on the Southeastern limb.

Jupiter, King of the Planets and Saturn, the Ringed Wonder

Editor's note: These images were pulled from the VAS Forum on our website. They are grouped by person and then date. Since Scott took the earliest image of Jupiter, I started with him. Because in some cases an imager posted both Jupiter and Saturn images together, I decided not to separate Saturn into a separate section. You will see differences due to equipment and experience but a lot, if not most, will be due to the "seeing" (the steadiness of the air).

Scott's Shots

Scott Turnbull used a 6" SCT on a GoTo Alt-Az mount and a smart phone (a Pixel 3). This goes to show one does not need an large expensive scope nor an equatorial mount.

"[I] recently took the next baby step up the astrophotography mountain and started stacking with frames from short videos. The nice thing about just starting out is that the curve is flat enough you can make good progress with modest effort. First pic was my first attempt, the source being a 30 second video from August 19th. Second pic is my second attempt, the source being a 1 minute video captured August 27th. Captured with a Pixel 3 android phone clamped to my Celestron NexStar Evolution 6". I used PIPP to convert the phone's MP4 to raw AVI. AutoStakkert for the stacking. PhotoShop Elements for level adjustments." --Scott



Jupiter 8/19/22

"Nice photos with a Pixel 3, Scott! Have you tried Registax 6 (free) for your post ASI3 and pre-Photoshop processing? The wavelet functions in there are really good and might be able to bring out some detail in your images. (I'm still learning how to use them, so I can't give you much advice other than to say give it a try.)

It amazes me what you can do with a mobile phone in terms of photography!! Have you used the Pixel 3 for any Milky Way shots? I'm curious how it performs." --Greg

"You inspired me to dust-off my RegiStax install, watch a couple of tutorials, and take another look at my Jupiter video.

There's some black box magic and knob frobulating going on, but this image is PIPP/AutoStakkert/RegiStax, with no PhotoShop touch up." --Scott



Jupiter 8/28/22

"Wow. Every time I think I'm getting a handle on these things, I see posts that raise the bar and challenge me to get up that learning curve faster.

All of these planet images are great. Not sure how much further I'll get with a 6" SCT and smartphone, but I never thought I'd get as far as I have with an entry level setup like that.

Keep on posting. It's an inspiration." --Scott

"I really didn't think that a 6" SCT and a smart phone would lead to this level of planetary imaging.



Saturn 9/8/22

60 second 4K video using a 6" SCT w/ 12mm Possl and 2x Barlow. Captured with clamped Pixel 3 phone.

The NexStar 6 has an f/ratio of 10

Took a quick swag at calculating the specs of my setup using <https://skyandtelescope.org/observing/telescope-calculator/>

Focal Length: 3000mm (You are using a 2x Barlow lens)

Magnification: 250x

True Field of View: 0.1° (Less than half of the full Moon's disc would fit into the field of view)

Exit Pupil: 0.6 mm

Theoretical Resolving Power: 0.77 arcseconds

Approximate Limiting Magnitude of Telescope: +13.7 (under dark, moonless skies)

That's for when the 12mm eyepiece is used. I've used 9mm, too, which pushes the magnification to 333x, but that's a stretch for this scope.

The dimming due to the Barlow works to my advantage for Jupiter and Saturn, as it keeps the camera on the phone from over exposing the planets. Without it I resorted to using a neutral filter to get the image brightness within the phone's video exposure range." --Scott

"Gave Jupiter another go with my expanding bag-of-tricks. I think I'm bumping up against the limit of my scope and phone at this point." --Scott



Jupiter 9/10/22

"One more pass at the Jupiter video data from Friday night. The same stacked data as the previous image, but with a different set of wavelets applied to pull out the two moons in the original raw data. Io and Ganymede? I have not un-mirrored the image so it's reversed from what an Orrery would show for that night for Jupiter. The more aggressive wavlets have made the image of Jupiter much harsher as the cost for pulling out the moons." --Scott



Jupiter 9/10/22 reprocess

"Nice. I was going to mention that you could pull out a little more detail in Jupiter (I tried it myself the other day). That's as much or more that one can see through a telescope on a typical night. I don't know what the seeing was at the time but you may find that with better seeing you can get even better results." --Paul

Terri's Shots (hum, doesn't rime)

"I'm a newbie at planetary imaging, here are some tries from this month on Jupiter and Saturn. Seeing doesn't seem to be great, at 5600mm no matter what Astrospheric says.

Using Astrostack and Registax wavelets." --Terri



Saturn 8/20/22



Jupiter 8/28/22

"I captured a couple of images tonight before clouds rolled in.. one of them of Saturn isn't too bad. Still lots to figure out.

Shot with Edge 1100HD scope, no barlow, ASI224MC camera." --Terri



Saturn 8/30/22, Saturn's largest moon, Titan, is faintly visible to the lower right.

"I shot some images on 9/3, only this time I used the TEC140 with stacked extenders (Barlows). I used a 2X Powermate stacked with a Televue 2x Barlow to create an F/28 scope. The seeing had it's moments. I'm seeing just how sensitive that seeing is to getting detail, I'm also seeing the affect of different focal lengths. I'm using a color camera, ASI224MC with 3.75um pixels, which isn't great. I'd do better with a mono camera and a filter wheel. When I shot at only 2X, my stacks look ok but trying to get fine detail was difficult. I was getting all kinds of false artifacts. I needed the 4X to just get the details large enough to record accurately on my 3.75um pixels. You can decide." --Terri



Saturn 3 9/3/22



Jupiter 3 9/3/22

"Still processing shots.. took quite a few. The sky wasn't terrible here but wasn't a 100% either. These were shot with a TEC140 with both 2X powermate and 2X barlow and an ASI224MC color camera." --Terri



Jupiter 9/25/22



Saturn 4 9/25/22

"Here's another stack. I am going to try a de-rotation of images around this time and see if it gets me more. So far, I haven't seen much benefit. I think it's because my quality just isn't there." --Terri



Jupiter 9/25/22

"Fine looking shots. Yes, could be better, if your name is Christopher Go and [and] you're shooting from the Philippines. The sky hasn't been very good lately, unfortunately." --Peter

"Here's a stack of stacks with Jupiter de-rotated using Winjupos. I've never seen much out of this but it seems to smooth out some of the noise. Not really getting any added detail." --Terri



Jupiter 9/25/22 (reprocess of top image)

Terri's brother

"These images, were taken by my brother here in Michigan who's fallen into Astronomy and Astrophotography in a big way. He's actually taking these images with a 14" Dobsonian and ASI224MC camera. The dob is NOT driven, so he takes the image by letting it drift across the frame. And then he uses a program called PIPP to do initial centering and then the same programs everyone uses (Autostakkert and Registax)." --Terri



Jupiter 10/4/22

"Wow, his image is comparable to or better than the best we have been able to get. Would never guess this was from a non-tracking scope. By the way there are more details in the images that more aggressive processing will bring out before processing artifacts start creeping in.

Goes to show what technology can do. Also shows how a large telescope with an inherently larger image scale (longer focal length) can [potentially] produce a better image given good seeing. Just as with deep sky imaging a high signal to noise ratio (S/N) (from a brighter image) is important to clean images. You don't mention whether he used a Barlow or not. But assuming he used only a 2X Barlow and his scope is f/4.5 his f/ratio for the image is only

f/9 compared to something like f/20-f/45 for a smaller scope which are 5-25 times dimmer. I am operating my 10" f/5.6 at f/32 using eyepiece projection which makes my image 12.6 times dimmer. He can shoot at much lower exposure times and lower gain settings." --Paul

"Thanks Paul, I passed you comments on to my brother.. he's pretty happy with the results as well. He was over my dad's last night and I processed his latest data using astrosurface.. The latest data is even better. And as soon as he sends me his final image (it was on his laptop) I'll post it. It has more detail than I've been able to get in Vermont. So what I don't understand, is that I keep on hearing why Vermont seeing is so bad, and that's because of the jet stream. But the jet stream also passes through this area in Michigan just as often it seems (just doing a brief look). So then why can we get such good seeing in Michigan, while it eludes us in Vermont??"

My brother Gene is using an Orion 14" dob, on a manual mount. His stacks are like 10 seconds long at most due to how quickly the planet flies across his small FOV. I know it's all about the seeing, but why is Michigan seeing better given they seem to be under the jet stream just as much as us? Is there another factor that causes the bad seeing?

He's using a 2X power mate on the scope, which is F/4.9 and an ASI224MC camera (same as I use)." --Terri

"Well, I don't know much about the Jet Stream other than that it is associated with poor seeing. I have seen on <https://www.astrospheric.com/> that if you click on the map, you get the option to select the Jet Stream overlay. Checking that out for this weekend, I see that there seems to be poor correlation between the Jet Stream and the seeing predictions, but then one probably should compare them only when there are no clouds.

There are a lot of other sources that create poor seeing, the Jet Stream is at the higher levels of the atmosphere. Poor seeing can come from any level of

the atmosphere and warm air rising from a nearby road, parking lot, one's own paved driveway, houses (especially if looking low over them), heat coming off your own body (when showing people the planets I pay attention to the wind direction and often ask people to change where they are standing or when imaging planets move myself if I can) and from the scope itself. If one racks the focuser out (focusing closer to the scope) while viewing one can get an idea of where some of the bad seeing is coming from. You can even see warm air currents in the tube of the telescope when they exist.

Now that I have more time to observe, I have been surprised by how often the seeing is above average, that is, times when I get the best views the planets using magnifications of 200x or more. That's my personal criteria for above average seeing. I usually don't even try imaging the planets unless the best views are at 250-300x.

Does your brother stack frames from just one 10 sec sequence or several? He can stack frames from each sequence and then stack the stacks." --Paul

"Hi Paul, he typically adds numerous videos of <10seconds each (say a whole 1-2 minutes worth). So like us, he tries to limit a stack to a minute or two. Then he uses that catenated video (using PIPP). I'd never heard of PIPP until from him. As you can expect, there's a huge Astronomy presence in Michigan (given the population).. so he has many people around here to draw from. There are multiple dark sky preserves in Michigan as well. There's a huge one up west of Mackinaw city which I didn't know of. I think this next year I'll be bringing a telescope with me on my summer vacation to Michigan.

Give it a try with your big Meade dob! I'm dying to try my 'fixed' C11. It came back to Vermont on Wednesday but since I'm in Michigan for another week, it sits untested." --Terri

"The latest images are even better. Some great seeing nights. To be honest, he said this is the best seeing he's ever had.. so it's not always like this."
--Terri



Jupiter 10/5/22

Greg's Shots

"Got home late last night and it was clear, to my amazement! I thought I'd give 'planetary' a try with my very limited equipment.

Sky-Watcher 150P Classic (1200mm fl, F/8) -- Dobsonian mount

Baader Mark IV zoom (at 24mm fL) with **Tele Vue PowerMate** (2x)

Canon SL3 (250D) - 1920x 1080, 60 fps; roughly 2,500 frames

Software: PIP, ASI3, Registax, and Photoshop (only to increase the exposure/visibility of Jupiter's moons seen in the photo: Io, Europa, and Ganymede)

worth investing in a planetary camera? (I was looking at a ZWO ASI585MC) I really don't know if the image quality will be better with a dedicated planetary camera that has better SNR than my Canon SL3 and a also has a higher frame rate (max about 95 fps). I thought I'd ask those of you who know more about it!" --Greg

"I was finally able to image the GRS on Jupiter last night! The seeing was much better than it has been (sorry, Terri!), so I didn't really sharpen much at all. Still looks a little blurry to me, but I had to resist the urge to sharpen more.

Didn't get Mars or Saturn, though. Too busy ironing out problems with the nebula I was trying to capture at the same time." --Greg



Jupiter 10/5/22

He contacted me for some advice. He's just starting into planetary imaging too. He had only used about 150 frames out of 15,000, so one of my suggestions was to use more frames to get a better signal to noise ratio. He was also shooting over the roof of his house which didn't help. I have found even though I only use 1 minute video clip (~1800 frames), even so, have found that I usually get better results stacking 600-700 frames (~30%) than with only the 200-300 best (~15%).

I was out last night as well, good night, and took some video of Jupiter but haven't processed any of them yet."
--Paul

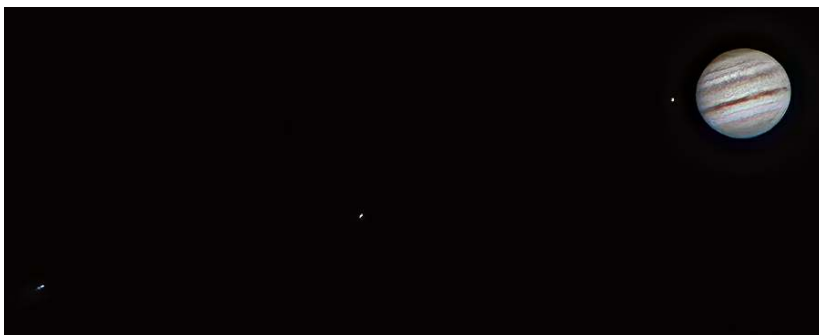
"Did a little bit of sharpening in RegiStax6 using mainly the mid-range sliders. I can see a little more detail. I also ran Topaz DeNoise on my original image. Not sure which is better, to be honest... I guess I can see more detail in the Registax-sharpened image (_Sharpened.jpg), though.



Jupiter with additional sharpening 10/5/22



Jupiter with Topaz DeNoise 10/5/22



Jupiter 8/24/22

I think I over- sharpened the image in Registax a bit.

I really posted this to ask a question of those of you who do planetary imaging regularly. Given that I don't have a Goto/tracking capability on this 150P and have to track manually, and this is about the highest magnification I can go without over-extending my 'reach' on this system, do you think it's

"Very nice. I would suggest you play with pushing the sharpening (particularly at the mid-range spacial scale) and/or the contrast at least a bit more. I copied it from the site and played with it a bit and think it can handle it. I find a small amount of graininess is acceptable without detracting from the image.

How many frames did you capture and how many did you use? Rick Dan-

I was able to sneak in an image of Saturn on 8/24 after I imaged Jupiter. The image is blurry and lacking detail, though. I didn't realize I had my eye-

piece zoomed in to about 10-12 mm, and it was way too much magnification for my scope (6", 150mm). My best guess is about 320X magnification! Yikes. Under perfect seeing and being generous, I think I'd be limited to about 300x magnification. Anyway, it's a good lesson for me about not going beyond the limits of: 1) my equipment, and 2) seeing conditions. I thought I'd post it to share the experience / outcome with everyone.



Saturn 8/24/22

But, as always, the entire process was educational and a great learning experience! I hadn't attempted this before with my Dob-mounted reflector and camera. --Greg

Hi Greg, you're going across the full gamut of astrophotography! This is great!

I have a suspicion you have more there than you're seeing. It looks like you've either over-done the wavelets or some other processing step to cause Saturn to look so bright and over-processed.

On your magnification, how did you come to 320x? A 1200mm scope with a 12mm eyepiece gives you 100X, and a 2X powermate gives you 200X. Unless there's something you're not sharing, that's about the magnification you have. Assume this is eyepiece projection since you're using an eyepiece. I don't think 200X is too much for a 6" scope. In my 11", I had a 2X powermate and at 5600mm, although just using a small camera but it was highly magnified, although probably too much for bad seeing. I should have shot more at 2800mm. It's easy to do planetary, but like most things, take a bit to master. Others like Joe Comeau has done more than many so he may be more help.

I was trying my hand at this recently and gave Saturn a whirl on opposition day and the day after. I tried a bit of Jupiter as well. None of the days was really great seeing. My Saturn images were not very good, but I have at least one Jupiter image I don't mind. --Terri

Thought I'd throw my Jupiter/Saturn pics in the mix. Not nearly as good or as detailed as Terri's, but I thought I'd post them



Jupiter ~9/28/20



Saturn ~9/28/20

In the Jupiter pic, there's something I haven't encountered before and Terri was good enough to give me some info about it. The rim on the right side of the planet is an effect coming from sharpening called a Gibb's effect (rind, rim effect...). First time I saw this, so I thought I'd post this. If I went beyond the sharpening I already applied, I could really see it a lot more. Anyway, thanks Terri! As always, I learned something. --Greg

They look darn good to me! It apparently was a steady night over a fairly large area. You can compare them to my images taken the same night. Evening of 9/2/2022 and morning of 9/3/2022.

Yours are noticeably smoother than my and show more detail but then you are using an astro camera designed for this type of imaging (referring Terri's images). Hard to tell how much of the difference the equipment and how much may have been better seeing at

your place or differences in processing. I also overprocessed my images a bit. One thing you may notice on your Saturn image is a bluish edge on top and reddish on bottom. Saturn is low enough that atmospheric dispersion is a factor, especially in images. Less so with visual observations. On my Saturn image I have shifted the RGB channels to undue this effect.

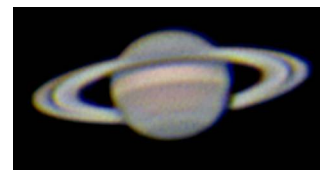
Even being retired I have been finding it hard to find the time to muck with the planetary and Moon images I have been taking.



Jupiter 9/3/22

10 inch f/5.6 (1407mm fl) Newtonian (Homemade with Coulter Optics), Camera- Canon Rebel T7i, Exp 1/80 sec., ISO 3200, Eyepiece Projection with 15mm eyepiece (~9360 mm efl f/37, 6.7x prime) and 3x digital zoom

Stack of 500 frames from a 56 second video. Stacked, wavelets, color balance with Registax 6. Noise reduction and Unsharpmask with Picture Window Pro 7



Saturn 9/2/22

Same equipment as above. Exp 1/60 sec, ISO 6400, 3.6x digital zoom in this case

Stack of 300 frames from a 49 second video.

Stacking and registration of the RGB channels with Registax 6 (Saturn is so low that atmospheric refraction separates the colors a little)

Curves (histogram stretch and Color Curves (used to further adjust the color correction in this case, most imagers use this "trick") with Picture Window Pro 7



Star Trails over the Hinesburg Site
By Maura Kelley

At the October 14th observing event Maura took a series of wide angle shots from the South end of the observing area and combined them into this beautiful image of the VAS Observing Site.

Member & Invited Guest Stargazing at the HOS
By Paul Walker

The October 14th observing event at the Hinesburg Site went well. 9 people total. No clouds, atmospheric seeing starting out was below average but improved to a little above average. We had about an hour of full darkness before the light from the rising Moon started to brightening the sky. No rocket launch this time : (

We mostly used my 8" f/6 Newtonian on a Dobsonian mount. We viewed Saturn and Jupiter. We could see Saturn's moons Titan, Rhea and Iapetus. When the seeing improved I could also see Tethys. Also several deep sky objects; the Andromeda Galaxy (M31) and it's companions (M32 and M 110) with a 38mm 2" wide field eyepiece (giving 32X), the Pleiades (M45), the Double Cluster NGC 884 & 869 (all with the same 38mm eyepiece) and Mizar and Alcor (in handle of the Big Dipper. Joe and I used the Chmela scope (4.9" f/20) on Saturn briefly. I started with a 24mm eyepiece. That gave a decent view. I then tried a 16mm. That was definitely too much magnification and dropped back down to the 24mm. I then decided I should check to see what the magnifications were so I looked at the handy chart hanging on the side of the mount. That told me why the 24mm gave a decent view while the 16mm didn't, the respective magnifications were 185x and about 280x (the seeing was at this point was not good enough for magnifications above 200x, 150-170x was about the limit for the planets).

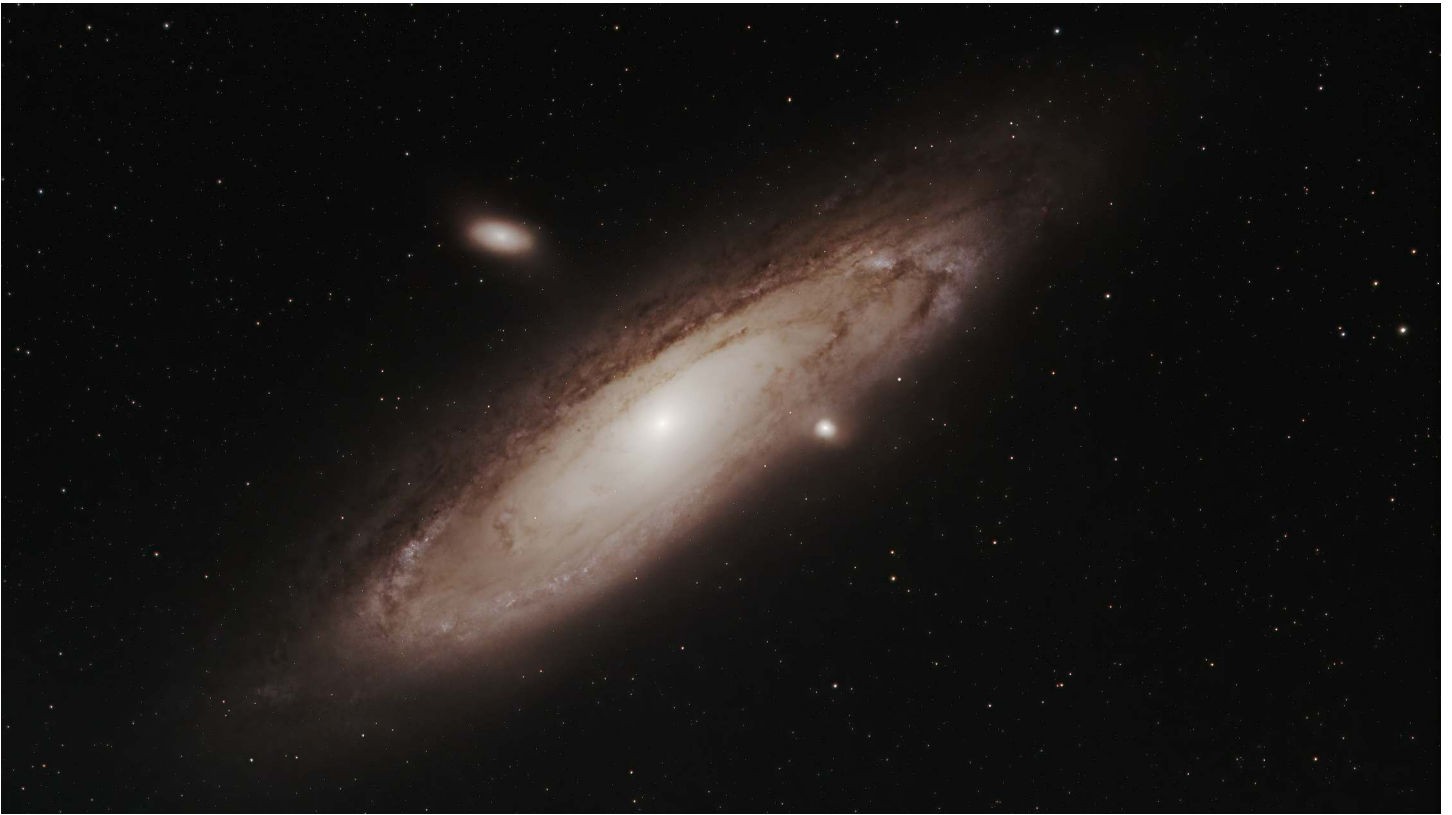
Most people stayed until about 10:00. The last of us left a little after 10:30.



The Bubble Nebula (NGC 7635) and the Open Cluster M52

By Rick Daniell

Telescope- Orion RC8 @ 1250mm fl (with 0.75x focal reducer), Camera- QHY 268c @ gain 56/offset of 150, 39- 300 sec exposures (3 hr 15 min total), PHD2 guiding, Processed in Pixinsight. North is up.



Andromeda (M31) and Companion Dwarf Galaxies M32 and M110

By Greg Erianne

First time photographing the Andromeda Galaxy with a dedicated astro camera. I wasn't sure how to avoid blowing out the central bulge so I opted for 3 min exposures, but I think I would have been better off with 2 minute subs. The core looks a bit blown out to me.

This wasn't as easy to process as I thought it would be! What do other folks use as far as gain/sub-exposure length so the core is more visible?

Telescope- AT60ED and field flattener, ASI2600 MC Pro (no filters used)iOptron SkyGuider Pro with guiding via ASIAir Plus and an ASI120mm mini/30F4 guide scope

3 min x 50 lights (2.5 hrs) with corresponding dark, flat, dark-flat, and bias calibration frames

Stacked/Processed in Astro Pixel Processor and in Adobe Photoshop 2022. North is left.



Rho Ophiuchi
By Richard Whitehead

This is a 2 image mosaic.

1st image- A rare two clear nights in a row a couple of weeks ago (early July) enabled me to get my Takahashi FSQ106EDX/ A-P 1100GTOAE scope/ mount combination into action. Yes a picture taken in Vermont at HOS (Hinesburg Observing Site)!

35 x 4 min subs (2 hr 20 min) with darks and flats. Camera is a ZWO 6200 MC Pro - an OSC (One Shot Color) Camera pretty much the first OSC image I've taken in a while.

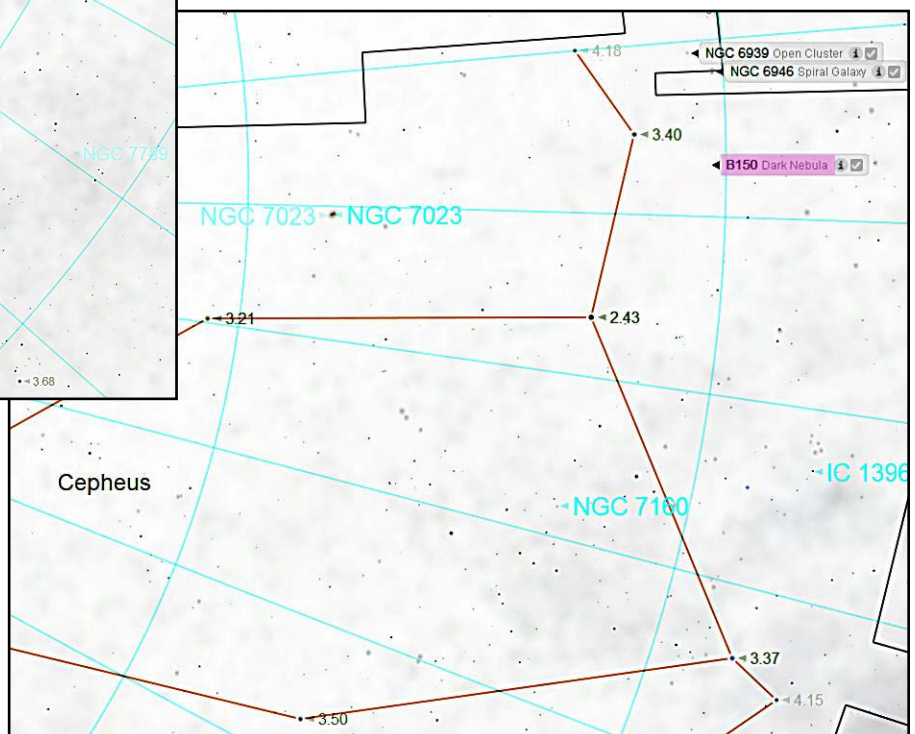
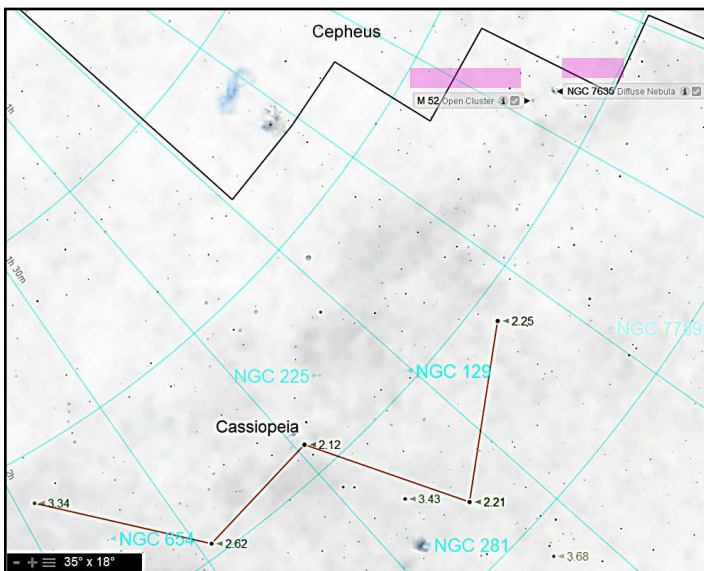
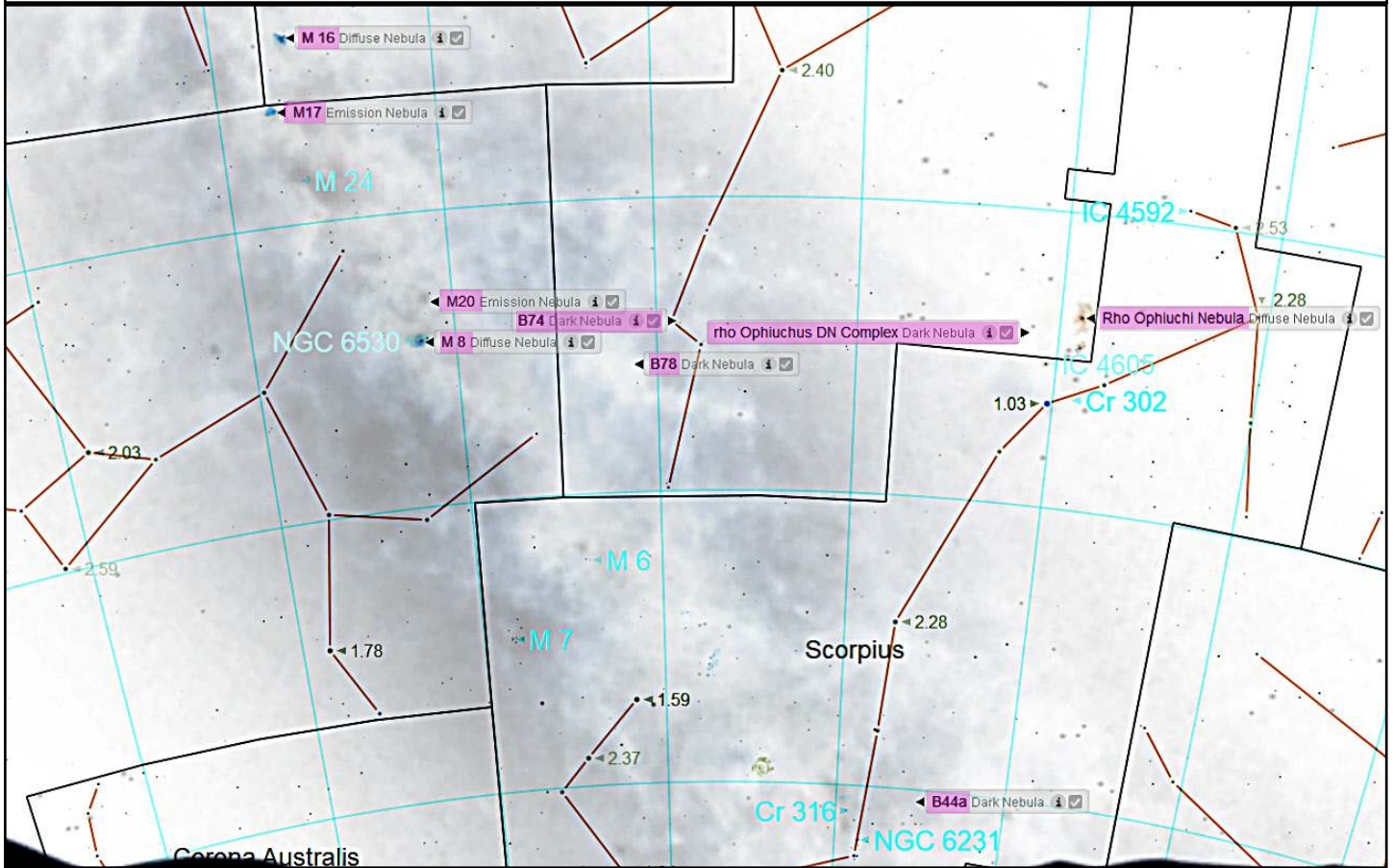
2nd image- 24 x 4 min subs (1 hr 36 min) This subject is only available for a couple of hours after dusk before it hits the trees.

Processed in Pixinsight and PS CC and stitched together in PS CC.

At the bottom Antares is left of center and M4 is right. Rho Ophiuchi is the star toward the top surrounded by the blue reflection nebula. North is up.

Location Charts for the deep sky object images in this issue.

Created using Starry Night Pro 8 & Picture Window Pro 7.



Space Science Roundup



NASA News

--by Scott Turnbull, VAS Member and Solar System Ambassador volunteering for JPL/NASA

DART : Probe Successfully Destroyed

On September 26th the Double Asteroid Redirection Test (DART) Team at NASA celebrated the destruction of the DART space probe. While that may seem like an odd reaction to the obliteration of a space probe, the destruction was all part of the plan. The DART mission was undertaken with the singular goal of crashing into the small asteroid, Dimorphos, which orbits the larger asteroid, Didymos. The purpose of this ultimate encounter is to measure the effect of such an impact on the orbit of the smaller asteroid around its larger companion. By predicting and measuring the potential effect on the small asteroid's orbit we hope to gain additional information needed to plan future planet defense asteroid redirection missions.

The spacecraft used a state of the art solar powered ION drive to propel itself towards its target. The spacecraft's sole instrument, the Didymos Reconnaissance and Asteroid Camera for Optical navigation (DRACO), together with a sophisticated guidance, navigation and control system that works in tandem with Small-body Maneuvering Autonomous Real Time Navigation (SMART Nav) algorithms, enabled DART to identify and distinguish between the two asteroids, targeting the smaller body.

These systems guided the 570-kilogram box-shaped spacecraft through the final 90,000 kilometers of space into Dimorphos, intentionally crashing into it at roughly 22,530 kilometers per hour to slightly slow the asteroid's orbital speed. DRACO's final images, obtained by the spacecraft seconds before impact, revealed the surface of Dimorphos in close-up detail.

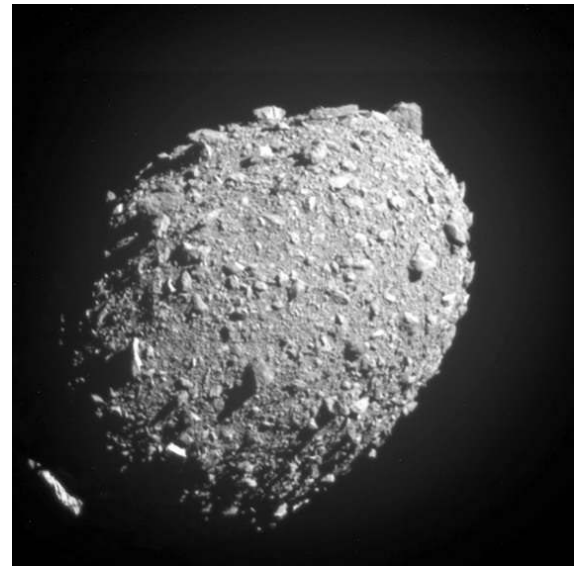


Figure 1: Photo of Dimorphos taken by DART Spacecraft from distance of 68 kilometers

Webb Telescope Update

The James Webb Space Telescope continues to produce high quality imagery and spectroscopic data since its initial calibration was completed in early summer. Deep space images of nebulae and distant galaxies were released in July. Additional images highlighting Jupiter, Neptune and Mars were released in late summer. The high resolution infrared images provide views unparalleled by previous equipment.

Not everything has been exactly according to plan. On Aug. 24, a mechanism that supports one of the mid-range infrared modes, known as medium-resolution spectroscopy (MRS), exhibited what appears to be increased friction during setup for a science observation. This mechanism is a grating wheel that allows scientists to select between short, medium, and longer wavelengths when making observations using the MRS mode.

The Webb team has paused in scheduling observations using this particular observing mode while they continue to analyze its behavior. They are currently developing strategies to resume MRS observations as soon as possible. The observatory is in good health, and MIRI's other three observing modes – imaging, low-resolution spectroscopy, and coronagraphy – are operating normally and remain available for science observations.



Figure 2- Webb NIRCam composite image of Jupiter from three filters – F360M (red), F212N (yellow-green), and F150W2 (cyan) – and alignment due to the planet's rotation. Credit: NASA, ESA, CSA, Jupiter ERS Team; image processing by Judy Schmidt.

Mars 2020 Mission (Perseverance/Ingenuity) Update

The Perseverance Rover, and its companion helicopter, Ingenuity, continue to explore the surface of Mars. NASA's Perseverance Mars rover is conducting its science campaign, taking samples at Jezero Crater's ancient river delta, but it's also been busy scouting. The rover is looking for locations where the planned Mars Sample Return (MSR) Campaign can land spacecraft and collect sample tubes Perseverance has filled with rock and sediment. The sites being scouted are under consideration because of their proximity to the delta and to one another, as well as for their relatively flat, lander-friendly terrain.

Mars Sample Return is a historic endeavor that would retrieve and deliver samples of that faraway terrain for intensive study in laboratories on Earth to look for signs of past microscopic life on the Red Planet. The strategic partnership between NASA and ESA (European Space Agency) would involve multiple spacecraft, including a rocket that would launch from the surface of Mars.

Meanwhile, the Ingenuity helicopter has successfully completed its 33rd flight in the area around Perseverance. It has accumulated nearly one hour of flight time over the course of the 16 Earth months it has been operating on Mars.

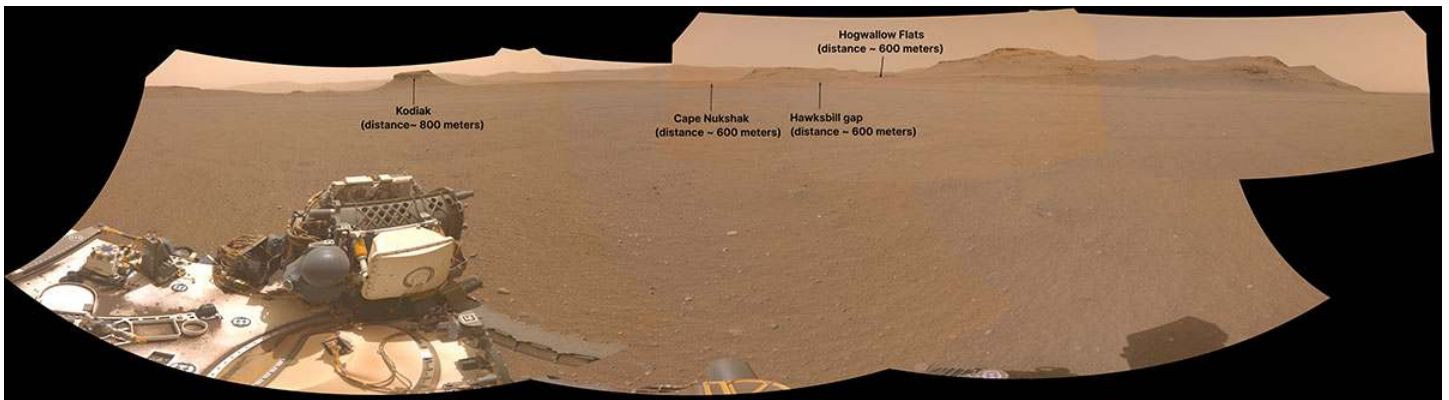


Figure 3- NASA's Perseverance Mars rover used one of its navigation cameras to take this panorama of a proposed landing site for the Mars Sample Return lander.

Resources

Information presented in this article was provided by the NASA/JPL mission web sites.

For more information, please refer to

<https://www.nasa.gov/planetarydefense/dart/dart-news>

<https://blogs.nasa.gov/webb/>

<https://mars.nasa.gov/mars2020/>

Services

Planetarium

There's a planetarium in Williston! The Planetarium Lady's immersive Digitarium planetarium dome is a great introduction to sky viewing. This immersive experience builds familiarity with sky objects and the stories and science that surround them.

[Learn more about this experience at www.theplanetariumlady.com.](http://www.theplanetariumlady.com)

Light-duty Machining

Custom machining of brackets / adapters and modifications to existing hardware for astronomy purposes.

Nominal fee (~\$10 - \$50 depending on size and complexity).

I have a mini milling machine and a mini lathe.

[Paul Walker 802-388-4220 or paulwaav@together.net](mailto:paulwaav@together.net)

Observing Aids Made to Order

Observing chairs - Enjoy longer observing sessions. Adjustable seat height for comfort and better viewing. **Starting at \$90.**

Binocular parallelogram mounts - Raise and lower your binoculars while maintaining an object in the field of view. Work well for use with lounge chair for observing at higher elevation or for multiple observers of different height. I will fit your binoculars to the mount for optimum performance. **Starting at \$195.**

Binocular mount for your tripod - replace the bracket with a system that keeps the binoculars in balance. Find an object, release the binoculars and they stay where their pointed. **\$50**

Clip on red book lights with variable brightness - I am working on modifying these for use on clip boards etc. If you have an interest please email or call me to discuss your need.

[Contact Keith Lawrence, 802-453-5496, sleepingbearwoodworking@yahoo.com](mailto:sleepingbearwoodworking@yahoo.com)

Wanted

Wanted - First telescope program - I am working to recycle old 4.5" reflectors to construct starter Dobsonian telescopes for first time users. I am looking for donations of old telescopes, 1 1/4" rack and pinion focusers, Plossl eyepieces and other parts..

[Contact Keith Lawrence, 802-453-5496, sleepingbearwoodworking@yahoo.com](mailto:Keith.Lawrence@sleepingbearwoodworking.com)

For Sale

1. Denkmeier Binoviewer Package: Standard binoviewer with Powerswitch (integrated 2.5x barlow) and OCS (for use in any telescope), includes two 32mm Plossls: **\$450**

2. Farpoint 2-inch autocollimator: **\$80**

3. 50mm RACI finderscope (excellent optics, 1.25" helical focuser): **\$35**

[Contact Siddhesh Mukerji, siddmukerji@gmail.com](mailto:siddmukerji@gmail.com)

First Telescope Program

With the support of the VAS Board, I am developing a First Telescope Program for new members of the club. For now I am seeking a few of the old 4 1/2" f/8 Newtonian telescopes that I can renovate, fit with 1 1/4" rack and pinions and eyepieces then outfit with Dobsonian mounts. **My target is to sell these to club members for \$100 or non-members for \$125.** For the first year the new owners can return it for full refund in case of non-use or to upgrade, etc. After a year the refund will depend on condition. Sales will depend on availability of telescopes and components, so if you have old telescopes, eyepieces or parts you want to sell or donate or if you know of someone who would like an inexpensive telescope that really works, please contact me.

[Contact Keith Lawrence, 802-453-5496, sleepingbearwoodworking@yahoo.com](mailto:sleepingbearwoodworking@yahoo.com)



Meade model 390 refractor with alt-az mount, 90mm f/11
\$100 or best offer

For sale by the VAS.
[Jack St. Lois 802-857-5049 or jack.st.louis@comcast.net](mailto:jack.st.louis@comcast.net)



Copies of "Mirror Mirror" - A History of the Human Love Affair with Reflection by Mark Pendergrast of Colchester, Vt. available for **\$25**. Mark will split the profits with VAS.

Contact Mark at markp508@gmail.com or see Jack St. Louis at any monthly meeting.

Celestron NexGuide Autoguider

I purchased used at the Stellafane Swap Tables as a backup to the one I am using, however, I forgot had already purchased a backup at the Swap Tables the previous year. I don't really need 2 spares.

\$140 OBO. (\$300 new)

It is a stand alone autoguider, does not use a computer, connects directly to your mount's autoguider port. Has an screen for displaying stars and menu.

Note: to use this you will likely need a an 80-90mm guide scope to find a star to guide on (I use a 90mm and get down to mag 7). You will also likely need a way to aim the guide scope at a suitable star. There is now a commercially available guide scope aligner, Google Lftscop.

Paul Walker 802-388-4220 or paulwaav@together.net

Celestron alt-az tripod for sale by the VAS. **Make an offer.**



Jack St. Lois 802-857-5049 or jack.st.louis@comcast.net



6" F/8 Newtonian, homemade by C.J. Park, won Stellafane award in 2006, gold-coated primary mirror, **alt-az & equatorial mount.**
\$200.00 minimum

For sale by the VAS.
Jack St. Lois 802-857-5049 or jack.st.louis@comcast.net

(This is also one of items Jack put in the auction) Orion StarMax 90mm EQ F/13.9 Maksutov-Cassegrain Telescope & equatorial mount

90 degree diagonal, correct image diagonal, finder scope, Sirius Plossl 25mm eyepiece, Sirius Plossl 12.5mm eyepiece, Moon filter, Optics Cleaning Kit
Make an offer (no offer too small).

For sale by the VAS.
Jack St. Lois 802-857-5049 or jack.st.louis@comcast.net



Telescope mirrors and a couple mounting cells
3.5" f/10 with 3/4" diagonal.
6", probably f/8.
8", probably f/8, in nice **cast aluminum cell.**

10" f/9, 1/10 wave (measured by Bob several years ago), Beral coating that is in good condition though the edge has several chips (edge not beveled) and a note from the coater says there are a few scratches and it is not fully polished (may be saying that because of the scratches). From St. Michael's College.

Other than the 10" f/9 I cannot vouch for the figure of the mirrors.

The only one that may be Pyrex is the 8" mirror, I'd have to pull it out of the cell and look again. The rest have the slight greenish-yellow tint of plate glass.

Make an offer on any of the items.

Paul Walker 802-388-4220 or paulwaav@together.net

Orion Parallelogram/Oberwerk Tripod/Head (for sale as a set only)

Orion parallelogram-style mount is for binoculars as large as 80mm in aperture. Constructed of aluminum, the mount features a sliding counterweight for perfect balance and an L-adapter for attaching virtually any tripod-adaptable binocular. For more details see Orion website, Telescopes.com.

Oberwerk 3000 Series tripod/head (works with above parallelogram) combo for binocular astronomy. Maximum height (78")- Tripod construction is black-anodized aluminum, the pan head is cast aluminum. Also included is a padded carrying case. For more details got to Oberwerk.com.

All in excellent, near-new condition. Purchased earlier this year and have now moved to other gear. Will meet for delivery in Chittenden or Franklin counties.

(for sale as a set only) \$250

Text Russ Lavigne at 802-343-7356 with "Orion/Oberwerk" as Subject."

Complete astro observatory with 8-ft Exploradome. Equipped with Meade 14-inch Advanced Coma Free SCT and accessories including heavy-duty polar-alignment wedge, heavy duty tripod, autoguider, dew shield, and other accessories. Over \$11K invested, asking \$5K.

[Al Boudreau at astromanvt@gmavt.net](mailto:AlBoudreau@astromanvt@gmavt.net)



Tele Vue Dioptrx 1.50; Used, Excellent Condition This will finally eliminate you having to wear glasses for astigmatism when you're at the telescope! This is in excellent condition and there are no scratches on the lens.

Note: if you're planning to use the Dioptrx with something other than a Panoptic eyepiece, please check the Tele Vue website to be sure the Dioptrx is compatible with the lens you intend to use.

I will ship within the Continental US only, and only accept PayPal. The item will ship within two days (usually 1 day) after payment is accepted.

\$85 including shipping (\$75 if picked up locally; I'm in Williston, VT)

Farpoint Universal Binocular Mount (UBM) (\$439 at the Farpoint site). Included at no additional cost -- a 3/8" mounting post (\$24.20), FAR-Sight Mount in a bolt case (\$45.75), Swing Hinge (\$46.50), Dovetail Assembly (\$42.90), and 2 Balance Counterweights.

All for \$400 (~\$200 off the retail cost).

Shipping only within Continental US. Buyer pays shipping (estimated at **about \$45**; I will firm up and inform you before invoicing) and I will accept only PayPal. Once your payment has been accepted, I will ship within 2 business days.

If you're local to VT, it would be easiest to pick this up rather than ship it. You'll save yourself about \$45!

[Greg Erianne 203-206-9116](tel:203-206-9116) or greg.erianne@gmail.com

SkiFi Wireless Adapter for sale. This can be used with numerous kinds of telescopes to provide wireless control from a laptop or handheld device. It comes with adapter and cord to attach to an Atlas hand controller. I can probably hunt up a cord for a Meade controller as well (or make one).

\$25.00 Proceeds to go to Vermont Astro Society.

Local buyers only

[Terri Zittritsch](mailto:Terri_Zittritsch@theresamarie11@gmail.com)
theresamarie11@gmail.com