



# Morning Star

## Spring 2022



### \*\*\* Club Info \*\*\*

#### Announcements

Check out our Member [Forum](#) on our web site ([vtastro.org](http://vtastro.org)), under Discussions.

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

[Past newsletters](#) are posted on our web-site 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](mailto:paulwaav@together.net) ([info@vtastro.org](mailto: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 and 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](mailto: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](mailto: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](http://vtastro.org/wp-content/uploads/2018/03/VAS_Outreach_Ack_Letter_V3.pdf)

#### Dues

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](mailto:paulwaav@together.net).

#### Connect On-line

[www.vtastro.org](http://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](mailto:info@vtastro.org) (Goes to the President and Secretary)

[webmaster@vtastro.org](mailto:webmaster@vtastro.org)

(Goes to Secretary and Webmaster)

#### Board Members

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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. Airst 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](mailto:info@vtastro.org)

Events are listed on our website ([vtastro.org](http://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.

#### Corona Virus Note:

We will follow the current State COVID restrictions recommendations.

Contact [info@vtastro.org](mailto: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](mailto:info@vtastro.org)

**Corona Virus Note:** We will follow the current State COVID recommendations.

### 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](mailto:vtpoet@gmail.com)

Stay tuned for email notices.

## New Members

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

Matt Dooman  
David Legrow  
Everett Hickey-Briggs  
Louis Varricchio

## Meetings/Presentations

Normally meetings are held at Brownell Library, however, due to COVID-19 we are currently holding them remotely. The Zoom link will be posted on the web site under "Events" a couple weeks before each meeting and emailed to members with the meeting reminders.

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.

### April 4

Part 1 of 2 - VAS Eclipse Committee Presents: Safe Solar Visual Observing: For Eclipses and Sunspots  
By Gary T. Nowak

To observe the Sun, whether to see sunspots or most phases of a solar eclipse, one must use safe proper solar equipment and techniques to avoid eye damage and/or blindness. This talk is

intended to educate folks about safe solar observing and is given what may seem early, to allow folks to have the time to purchase the necessary solar equipment. As we get closer to the Total Solar Eclipse date there will be shortages of certain solar observing equipment. Usually within a year of a total solar eclipse there will be great demand, outstripping supply and causing price hikes.

For the Greater Chittenden County Region there will be 3 Partial Solar Eclipses and 1 Total Solar Eclipse visible in the next few years (2023-2026). A brief time table of these events will be presented.

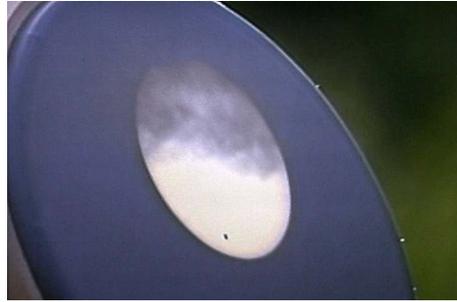
There will be a brief overview of the dangers of improper/unsafe solar observing. This includes the effect of bright sunlight, including infra-red (IR) and ultra-violet (UV) wavelengths on the human eye. These dangerous effects will cause eye damage which can reduce vision and even cause permanent blindness.

Most of the talk will deal with one of the recommended ways to observe the Sun, Solar Projection (projecting an image of the Sun onto a surface). Among the solar projection techniques discussed are: Pinhole, Simple Lens, Multi-Lens (Binocular / Monocular / Spotting Scopes and Telescopes). The 2 most common solar projection screen set ups, "Classic" and "Sun Funnel", will be discussed along with solar projection formulas (how to calculate how big the projected image will be). Not all telescopes are appropriate for use in solar projection, the problem of using an APO refractor will be mentioned. There will be instructions on how to build a simple, very low cost "DIY" pin hole solar projection screen. Information will also be provided on how to build a very low-cost solar projection



Small telescope with "Sun Funnel"

screen for existing telescopes and binoculars.



Viewing the 2012 Venus transit of the Sun with a "Sun Funnel"

Part 2 of the talk is scheduled for October 3rd meeting. It will cover various special solar filters for use with your unaided eye, binoculars, and telescopes.

About the author: Gary T. Nowak is a long-time member of the Vermont Astronomical Society and a member of "ALPO" (Association of Lunar and Planetary Observers). He has observed 5 Total Solar Eclipses using the safe observing methods presented in this talk.

**May 2**

**Annual Banquet & Business Meeting  
Via Zoom  
Starts 7:30 PM**

**No Banquet this year just the Business part.**

Members and invited guests only.  
**Contact any member to get an invite.**

#### Election of Officers

Board Positions up for election/re-election this year- President, Vice President, 3 Board Members at large with a 4<sup>th</sup> at large position that is unoccupied. Let Jack or Paul know if you are interested in any of these positions by emailing [info@vtastro.org](mailto:info@vtastro.org). **You must be a Full Member** (if you are an Associate, you must request to become a Full Member early enough to give us time to consider making you a Full Member first).

**June 6  
2 Mini-Talks**

**My experience using remote observatory data for astrophotography  
By Terri Zittritsch**

My mini-talk is on using data from commercial remote observatories for astrophotography. This is just a short discussion on my experiences in creating a few astro-images from remote telescope data and how this differs from doing the image capture myself. I've chosen Telescope Live as the hosting company to work with because one of the people I know in the field, Adam Block, has been using their data for some of his Pixinsight tutorials. I hope to start some discussion among the astrophotographers in the club on this topic on using a remote commercial observatory as an option to putting up one's own remote observatory or a local observatory in a clear sky challenged state such as Vermont.



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**The eVscope  
By Cale Shipman**



I recently purchased a lightly used eVscope made by UniStellar. This is a small go-to telescope with a built-in camera for viewing and sharing images. It's not unlike using a Revolution Imager, a number of us have, on a small telescope. The difference being on what it reveals in nebula. It also connects to smart phones and pads so that up to 10

people at a public viewing can share what is being captured.



This is an image of the Dumbbell Nebula (M27) taken with Cales eVscope as displayed on a smart phone. It is a 1 min 52 sec exp.

## Articles

### The Canary Islands February 2022

By Joe Comeau

The Canary Islands are volcanic in origin and are located in the Atlantic Ocean off the coast of Morocco. They are the most southern of the autonomous regions of Spain. Although it might seem logical, they're actually not named for the little yellow bird commonly known as the canary. Instead, the islands get their name from a Latin term—Insula Canaria—which means “Island of the Dogs.” The ancient Romans who first visited the islands gave them this name.

(<https://wonderopolis.org/wonder/where-are-the-canary-islands>)

Our family visited Tenerife, the largest of the group and stayed at a beautiful house in San Miguel de Abona. The elevation is 2320 ft. and is close to Teide (Tay-day) National Park. At the center of the island is Mount Teide (**Figure 1**). At 12,188 ft, it is the highest peak in Spain.

On a day trip from Tenerife, we took a ferry to the island of La Gomera and visited Columbus' departure port for the new world. We heard a fascinating demonstration of Silbo Gomero, the whistle language still in use by inhabitants in the mountains for long distance communication.



Figure 1 -Mount Teide

The islands of La Palma and Tenerife are ideal locations for Astronomy. According to Wikipedia, the seeing statistics on La Palma make it the second-best location for optical and infrared astronomy in the Northern Hemisphere, after Mauna Kea Observatory, Hawaii. The site also has some of the most extensive astronomical facilities in the Northern Hemisphere; the fleet of telescopes on La Palma include the 10.4 m Gran Telescopio Canarias, the world's largest single-aperture optical telescope as of July 2009, the William Herschel Telescope (second largest in Europe), and the adaptive optics corrected Swedish 1-m Solar Telescope.

The Teide observatory complex is located on Tenerife at 7,840 ft above sea level. The useful observing time is given as 78% and the median FWHM seeing from DIMM measurements is given as 0.76" and 0.70" at two sites near the Carlos Sánchez Telescope. There are many solar, nocturnal and radio telescopes on the site, including the GREGOR 1.5 M Solar Telescope, the third largest in the world.

I used the visit to Tenerife to test out my new iOp-

tron sky Guider Pro mount. At 3.2 lb with the battery and base, the mount is rated for up to an 11 pound payload. The tripod weighs about 5 lb and easily fits in a suitcase. The mount includes a polar align scope that really works.

I downloaded a Polar Scope app from iOptron for my phone. The app uses the phone's GPS coordinates and time to show a picture of what Polaris should look like in the polar scope. Leveling the mount and polar aligning only takes a few minutes. My cell phone compass works to get a rough alignment during the day.

For cameras, I brought a Panasonic DMZ-FC1000 25-400 mm F2.8-4 for daytime photography and a modified Canon 350XT for nighttime work. On the Canon, I used a QUANTARAY 28-200 mm F3.5 lens, along with Canon's 18-55 mm F3.5-5.6 and 75-300 F4-5.6 lenses. In addition, I brought an ASTRO-TECH 66 mm f/6 ED refractor.

Everything is up and down in Tenerife. In San Miguel, I took a picture of the nearly full moon setting over the town below our house (**Figure 2**).



Figure 2 -Full Moon over town.

As it turned out, the back yard of the house was dark enough for astrophotography. Our host was wonderful and asked his neighbor to turn off the only street light. The electric company did it the day before we came. There was a good view in all directions.

I used the AT-66 to photograph some of my favorite objects. The first two were single test frames without calibration files of the Pleiades (60 sec) **Figure 3** and the Orion Nebula (90 sec) **Figure 4**. After checking out

There is a peak in Teide National Park called Mount Guajara. Mount Guajara is the third highest peak of Tenerife. Isaac Newton's work Opticks of 1704 suggested that telescopes should be installed on the highest peaks in



Figure. 5 -The Flame and Horsehead Nebulae



Figure. 3 -The Pleiades



Figure. 6 -The Andromeda Galaxy



Figure. 4 -The Orion Nebula



Figure. 7 -The Seagull Nebula

the system, I took multi-series shots of the Flame Nebula region in Orion (67 x 1 min.) **Figure 5**, the Andromeda Galaxy (85 x 1 min.) **Figure 6**, the Seagull Nebula (111 x 1 min.) **Figure 7**, and the Soul Nebula, **Figure 8** (with red and green channels swapped, 12 x 4 min.).

I also photographed the Sun, **Figure 9** and the Moon, **Figure 10**.

order to position them above the clouds to better observe the sky. In 1856, Charles Piazzi Smyth, Astronomer Royal for Scotland, organized an expedition to carry out astronomical observa-



Figure. 8 -The Soul Nebula



Figure. 10 -The Moon



Figure. 9 -The Sun

tions on 8917 ft. Mount Guajara and verify Newton's prediction. Remains of his observatory can be seen near the top.

I attempted to climb to the summit of Guajara with my daughter and granddaughter but we only made it to

8000 ft. before we had to turn back due to weather.

Named objects on the moon (Figure 11) include Mons Pico named after the peak of Mount Teide, Montes Tenerife and the crater Piazzzi Smyth (Figure 12).

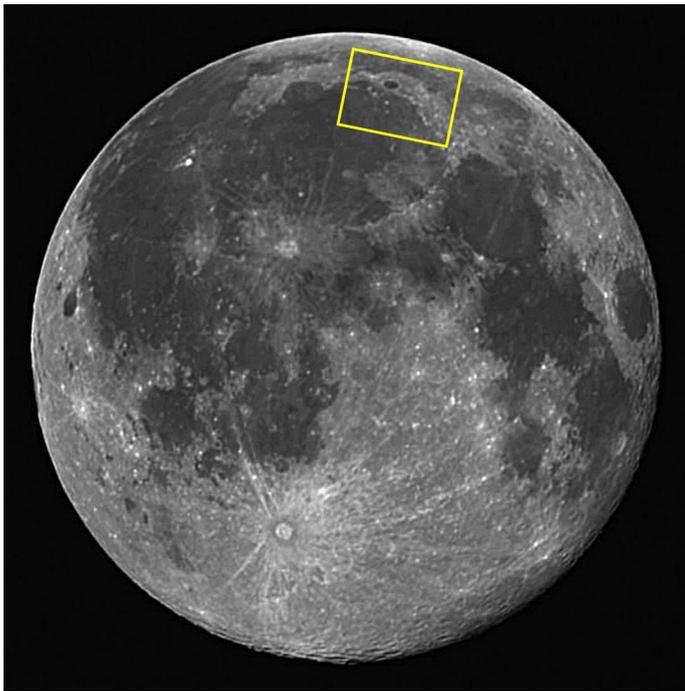
The Montes Tenerife on the Moon, located at approximately 47° North latitude and about 13° West longitude, is a group of isolated mountains that emerge in the northern part of Mare Imbrium—

also known as the Sea of Showers—and they extend over an area of approximately 110 km. Some of the peaks of the Montes Tenerife on the Moon reach 2,400 meters. They owe their name to the British astronomer William Radcliffe Birt, who named them in honor of the astronomer

Charles Piazzzi Smyth. Johann Hieronymus Schroeter, a German astronomer, named Mons Pico after the peak of Mount Teide. [https://www.volcanoteide.com/en/the\\_sky\\_of\\_teide](https://www.volcanoteide.com/en/the_sky_of_teide).

At the 7000 ft level, I captured a wide field of the mountain with Orion rising above Guajara using a 28 mm F3.5 lens, Figure 13. The image is a composite to allow for both the dark sky and the mountain to be visible. The mountain is a single frame captured just before dark and overlaid on the sky (35 x 100 sec. images) captured just after dark.

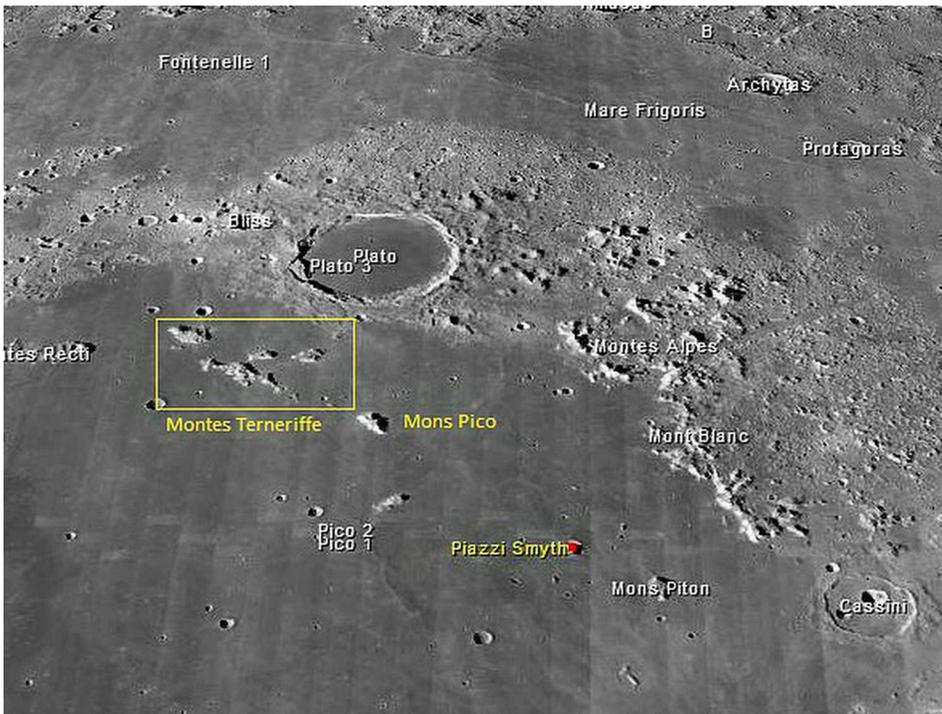
The people we met in Tenerife were very gracious. Our host, Ralf, had a Celestron 127 Maksutov Cassegrain that he had kept in his closet for five years. He had tried using it but quickly became frustrated trying to get it aligned. He pulled out the scope and after a short course, he was once again up and running. We found a t-adaptor and nosepiece for his Nikon on the web and he ordered it immediately. It came in a few days and he took his first astrophoto of the Moon. Now, every morning, he looks at the Venus crescent from his balcony. We examined software possibilities for his



**Figure. 11 -The Moon**  
Marked with location of detailed image below (Figure 12)



**Figure. 13 -Orion rising above Guajara**



**Figure. 12 -The Moon**  
**Mons Pico , Montes Tenerife and the crater Piazzi Smyth**

**Part 1 of 2: A look at the Adirondack Sky Center**

**By Lou Varricchio**

When it comes to stargazing, the dark skies of the Adirondack Mountains of New York may be among the best places for astronomers to gather in our part of the world. Of course, a dark sky alone won't guarantee access to Mother Nature's heavenly sights; there's that little thing called "cloud cover" up here in Vermont and the North Country. While mountain clouds may put a damper on stargazing, when a clear, crisp night does occur there's no better place to be than peering through the eyepiece of one of the large, precision telescopes operated by the Adirondack Sky Center & Observatory in Tupper Lake.

Sky Center Vice President Seth McGowan is the spokesperson for this astronomical resource which boasts the classical, century old equatorial-mounted "Old Town Pump" Newtonian telescope built in Massachusetts. The Sky Center's "Pump" telescope,

MAC computer ... yes, another astro-photographer is born!

Due to weight limitations, I could not bring my usual entourage of large scopes and a heavy go-to mount but my new lightweight mount performed beautifully and kept me imaging under

warmer clearer conditions than those I could have experienced in February at home.

The Canary Islands provide a very nice spot for vacationing, with good food, excellent scenery and many activities for all.

designed and built by New England engineer Wally Everest — who helped test Corning glass samples for the 200-inch Mt. Palomar telescope — saw its "first light" at Stellafane in 1928. It was restored in 2007 and made a second visit to Stellafane (more about it in the next issue).

McGowan says that the combination of Tupper Lake's locally high altitude (a tad over 1,500 feet above sea level) provide nearly ideal conditions for night sky viewing. "We're on the dark side of a hill here on Big Wolf Road," McGowan said. "We offer a variety of incredible public stargazing opportunities, educational lectures, family-friendly events, and a lot more." McGowan said the operation is designed for the public to learn about astronomy and experience the cosmos through the eyepiece of the center's best astronomical instruments. "The combination of low humidity, high altitude, and lack of light pollution provide ideal conditions for night sky viewing," he added.

You can plan a visit to the Sky Center by monitoring the facility's up-to-the-minute Facebook page at <https://www.facebook.com/adirondackskycenterandobservatory>.

**Continued in the Summer 2022 issue:** A look at the Sky Center's telescopes and Wally Everest's century-old "Old Town Pump" Newtonian.

## Board & Committee Meetings

### January 18 Board Meeting

Jack opened the meeting. Mentioned he had arranged for VAS to help with a public star gazing event just north of Middlebury with MALT (Middlebury Area Land Trust) at a TAM (Trail Around Middlebury) parking area.

Terri, in her new role as Treasurer, updated the officer list on the State Corporation Certificate. Went over our current insurance coverage and a question about the value of the observatories related to that coverage. Terri will update the list of property value for the purposes of depreciation of the values.

Jim Jarvis, who works for the town of Hinesburg and is on the board of the Carpenter-Carse Library in Hinesburg, contacted Paul about having an astronomy event tied in with their Library Loaner Scope sometime this Spring. Paul will work out the details of the event with the library and club outreach members.

Lisa Kirchburg has requested Full Membership. Prior to the meeting Paul provided information on her contributions to the club. The Board unanimously proved Lisa for full membership. It will go to the Full Membership for discussion and a vote.

Keith has 2 more library scopes ready for placement (at Westford and Stowe). There are also 2 more interested in getting scopes.

Jim says he still needs to write the letter for sending to businesses and State entities about preparing for the 2024 Total Solar Eclipse. The Eclipse committee will discuss whether to recommend that VAS buy more solar glasses. This may include buying some made with #14 welder's glass.

Terri bought up that there are some issues with our web site. The forum has some issues, the site is out dated in its look and that the site is not operating in a secure mode (http versus https). Scott and Paul are aware of the secure mode issue. The board agreed to consider spending some money to address the issues. Terri will gather more information on the issues and contact a contractor to give us an estimate of costs.

### February 22 Board Meeting

Jack opened the meeting. New member Matt Dooman would like to get involved with the club in the social media arena. Being new to the club the Jack will recommend he take some time to get familiar with the club and for us to get familiar with him.

We will update the VAS resource list (lists all of VAS's assets, an IRS requirement for tax purposes even though we don't pay taxes). Jack has found a formula on-line for depreciating our assets over time. He will send the list to the board members so we can go through it based on board member's knowledge of where these assets reside

and provide an estimate of their current value.

Terri gave a treasure's report. 101 "active members", 9 "inactive members", 60 currently paid up (includes 4 life members).

Joe is in the vacationing in Canary Islands but joined us anyway. He has been doing some astro-imaging from there.

Paul gave an update on the Carpenter-Carse event featuring their Library Loaner Scope. Paul plans to do a PowerPoint that shows approximately what objects look like in medium sized telescopes. He will than demo the library's scope and encourage everyone to get hands-on experience operating the (first inside the library than outside). The board gave permission to bring a limited number of the participants up our observing site as "invited guests". The board recommended inviting the participants to join the VAS. Maura and Jack have volunteered to help at the event.

Web Site Update Discussion Update - info from the proposed contractor (see addendum for more details):

1) Our site is not currently secure, the pages are not all configured as https and therefore can not use SSL (Secure Socket Layer) properly. SSL encrypts sensitive data before it is sent to the server. We do have an up to date SSL certificate for the site. This is the first issue to fix.

2) The "theme" we are using is no longer supported was not well written and is causing most of the issues with the site not being able to be displayed properly on various devices.

3) The forum "plugin" is a good one. The forum is will likely be better after items 1 and 2 are addressed.

Some is discussion ensued. The board agreed that the security and outdated/unsupported theme issue need addressing.

Bob is "vacationing" in Florida but also joined the meeting. He saw his first "green flash" as the Sun set one evening.

Keith reported that he has placed our 25th Library Loaner Scope. This was the last of these scopes we have on hand. He is looking to order one more from Orion as he has enough "kit" parts to build up one more loaner scope.

## Under the Stars & Planets

### OBSERVER'S CORNER

#### Observing Tips

##### ► **Electric Heating pad for your scope.**

If you are one of those observers who braves the winter temperatures and use a goto mount, this tip is for you, or rather your mount. Because most lubricants become stiff at cold temperatures some mounts will freeze up, especially when slewing to objects or trying to star align the mount. Most annoying!

Once I used a hair dryer to warm my mount when that happened, but it took several minutes. A couple of times I literally took a blow torch to warm it up. It was faster but required a lot of care to avoid damaging wires, other plastic parts and avoid burning the paint. Another technique I have used is covering the equatorial head with a vest to slow down the rate of cooling. But on really cold nights that is not enough.

The other day I had an aha moment. I could use an electric heating pad to keep it warm (my wife uses one to keep her feet warm while using her computer). With the heating pad set to high and the air temperature at 13 degrees F, the mount was a relatively warm 40 degrees. I could have used a lower setting with no problem. This pad uses 55 watts at max heat so you can use the pad with a small inverter running off car battery or large lithium-ion battery for at least a few hours.

Note, you should try running it with the inverter you plan to use as most inverters produce a very "dirty" line voltage and the heater electronics may not work. FYI- the inverter at the Hinesburg Observing Site is a "true RMS" (has a clean sinusoidal line voltage) and 600W output so any pad will work on it. Any modern heater pad will likely have a safety feature that shuts it off after 10-15 minutes, so keep an eye on the power light and turn it back on.

In most cases you can probably just drape the pad over the housing of the equatorial head without it falling off as the scope moves. You don't want to tie it down in a way that will interfere with the movements of the mount.

The organization that was supplying the "kits" (labels, manual, planisphere, etc.) is seeing some significant changes and may not be able to continue supplying them.

The Eclipse committee met again. Jim has a draft letter for sending information to businesses and state entities to help them prepare for the expected influx of people into the area of the eclipse.

#### MOTIONS:

Terri made the motion that the board authorize a \$500 retainer for Steve Kastner owner of Design Wise Studios, a web design and support company, for fixing the security issue with our site and refurbishing/updating aspects of our site.

The motion was seconded by Keith. There was no further discussion.

The vote for the motion was unanimous.

#### **March 22 Board Meeting**

Jack opened the meeting. Jack helped an 8th grader with a presentation for their class on explaining constellations.

We updated the VAS Resource List with life expectancy and scrap value and in some cases current value. This list is for insurance value purposes, also so we know what equipment we have and where it resides.

Terri updated us on the financials. The web site work is underway.

Keith asked permission to order \$50 more planisphere at \$1 apiece. Someone donated an 80mm refractor with an alt-az mount to the club. The small Meade equatorial mount needs a new battery pack (so the mount doesn't have to be run using an AC adapter plugged into a wall socket). This mount is used with the Lunt H-alpha scope.

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#### **VAS Membership Committee**

No meeting was held this quarter.

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#### **Observatory Site Committee**

No meeting was held this quarter.

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If you have other tips to share whether for beginners or experienced observers send them our way at [info@vtastro.org](mailto:info@vtastro.org)

#### **Equipment Suggestions**

**Marathon Digital Wall Clock.** A good choice for observers who want accurate time for their observations whether from a home observatory or the field. This is a battery operated (2 "C" size) clock that synchronizes itself to the national time signals out of Colorado. This signal is strongest at night and the clock likely won't synchronize during the day. The time and date can be set manually as well.

It has amber backlighting that is perfect for preserving your night vision and has 3 settings, off, high, and low that turns off automatically in brighter conditions. I found that in the light of the Full Moon with the setting on low that it automatically switched to hi. Hi is still fairly dim and perfect in Moonlight. Low was a good intensity when observing deep sky objects.

This clock displays the time to the second, the day of the week, date, temperature and relative humidity (handy for knowing when your equipment will start dewing up). The hour and minute digits are 2 3/8" tall, the seconds and other digits are 7/8". The small digits are readable at 25 ft, but 15-20 feet is better limit. The display is readable from extreme side angles. With the clock hanging in opening of my middle telescope shed it is readable from most anywhere on my 10x20ft observatory deck.

I purchased the clock on Amazon for about \$60. It is also available from the manufacturer at <https://www.marathonwatch.com/sku#CL030052-WH-SV> (white with silver trim) for about \$90.

#### **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>

Member's Observations

**Venus**  
**January 8, 2022**

Greetings all!

Just in from spotting Venus on its day of inferior conjunction, any other success/images?

I found this starting at 15h00m UT, in 20x80mm binoculars, and with my 6" XT6 telescope until 15h30m. I found it excellent at 71x in the XT6 using filters W80a, W82a, and the pair stacked as well. Cold out at 13 degrees. It's been a Venus week with observations on the 3rd and 6th too, what a great way to close out this [Venus] elongation!

Clear Skies!

Lawrence Garrett

([https://spaceweathergallery.com/individual\\_upload.php?upload\\_id=181382](https://spaceweathergallery.com/individual_upload.php?upload_id=181382))

This image at spaceweather is just what I saw, but I believe at best seeing the horns were at least 75% complete if not more for me.

L.Garrett

I got this picture in the morning in 2020.

Joe Comeau



Joe to the rescue, nice shot

L.Garrett

Hi Lawrence,

I see that Venus was only 4° 48' from the Sun at the time of your observation. A very difficult, not to mention potentially risky, observation. Did you have extra long "dew" shields for your scope and bino to keep Sun from shining into them? The one time I imaged Venus near conjunction with the Sun back in 2009 (March 28), they were separated by about 8 deg. I jury rigged a sun shield which worked but I was surprised to find when I was done and looked into the scope (my 10" f/5.6)

that sunlight was falling one side of the primary! My shield wasn't really long enough. It just occurred to me that using an aperture stop could be a better way to shield against sunlight, or maybe a long "dew" shield plus an aperture stop. Maybe that's what is typically done and I just don't know it.

Joe's image from 2020 better quite a bit better than the one I got in 2009. Joe, I curious, what day was your image taken? I see than the minimum separate of Venus and the Sun on June 3, 2020 was 1//2 degree.

Paul Walker

Hi Paul and all:

My sun blocker was kinda' large, 24x60 feet, my home and its safe shadow. I had both my 20x80mm's and XT6 set up in the north shadow without any chance of danger. You might think seeing would be very bad, but it was about the same as when I used my porch as a sunblock for my 2020 sightings. The view was seeing 4-6/10 in best moments. Very thin faint horns extending far.

As much as I would like to try the inferior conjunction of Mercury on the 23rd in the same manor, just clearing more than 100 feet of snow to transport the telescope to that position is too much. And I doubt I could find Mercury at Mv 4.6 even in the 12.5" telescope.

L.Garrett

I vaguely remember you or someone else mentioning using a building to block the Sun. I have read that suggestion in Sky & Tel mag and/or Astronomy mag. but had forgotten. Not an option for my 10" nor for my go-to set-up. Though if I got the timing and geometry was right, a neighbor's house might be in the right place in the middle of winter.

Paul Walker

***2022-01-31 - Paul Walker - I targeted some double and multiple star systems with the idea of getting familiar with some for showing at public star gazing events.***

12 deg F, SQL (Sky Quality Meter with lens) readings @ zenith 19.74 (mag. / sq arc sec) @ Polaris 19.84, seeing 4/10 (below average).

Equipment: 10" f/5.6 Newt. on equatorial, 12.5" f/4.8 Dob (Dobsonian), Denkmeier Binoviewer with 21mm eyepieces.

**Rigel** (double) viewed with 12.5" @ 188x and 10" @ 174x. Image better in 10". Was easy to split in both. Rigel mag. 0.1, companion mag. 9.3, separation ~10" of arc.

**Theta Orionis** (The Trapezium on M42) (multiple system). Viewed with 12.5" @ 304x, D component occasionally visible, F comp not detected. 10" @ 282x, E comp visible ~50% of the time and the E comp visible <10% of the time. [I did not note the magnitudes or separations in my notes; F is 10.2 mag. and 4.5" from 5.1 mag. Theta1C, E is 10.3 mag. and 4.6" from 6.7 to 7.5 mag. Theta1 A]

**Zeta Orionis** (Alnitak) (double) (western star in Orion's belt). Mag 1.7 primary, mag. 3.7 secondary separated by 2.4". Easy to split, very pleasing in 10" @ 284x.

**Delta Orionis** (Mintaka) (double). Mag. 2.5 and 6.8, separation 52". Viewed with 10" @ 174x and 106x, very nice at both magnifications. Easy double in any scope.

**Sigma Orionis** (multiply system just south of eastern belt star and west of the Horeshead Neb.) One of my favorites. With 4 visible stars. [I didn't note the magnitude and separation here either. Sigma AB (actually a triple too close to separate), the primary, is mag. 4.1, C is mag. 8.8 at 11", D is mag. 6.2 at 13" and E is mag. 6.7 at 41".] Viewed with the 10" @ 106, 174 and 282x. Looked best at 174x. [What adds to this system is 3 stars to the view of this system is 3 nearby unrelated stars of 8<sup>th</sup> magnitude, 2 of which are only 8.3" apart, the 3<sup>rd</sup> is 71" away from the these two. Sigma is very easy to find.]

**Lambda Orionis** (Meissa) Mag. 3.4 and 5.4 stars separated by a comfortable 4.3". 10" @174x easily splits them. Very nice pair. There is a very faint star to the south. The faint star is 20-25" away and better seen at 284x, at least in good seeing.

### 2022-02-05 Paul Walker - Viewed the 4.75 day old Moon.

6 deg. F., seeing 4/10 (below average).

Equip: 10" f/5.6 on equatorial, Denkier Binotron 27 Super System with Filter Swtch upgrade with 21mm eyepiece. Magnifications used 106, 174 and 282x.

Planned features to view- Lyell C2 & C3 (volcanic domes) [Located in a "bay" on the northeast side of the Sea of Tranquility].

Perfect lighting conditions [on the Moon]. Moon over 35 deg high.

C2 bigger than C3 but both easy at 282x and 174x. Harder at 106x but readily visible once identified.

Viewed a nearby rille, Rima Cauchy, 2 miles wide and 127 miles long. Best at 284x.

Also viewed nearby fault, Rubes Cauchy, best at 282x.

### 2022-02-24 Paul Walker, Deep Sky objects.

SQL readings, 20.54 mag/sq arc sec @ Polaris, 20.52 @ zenith.

Equip: 10" f/5.6 Newt on equatorial, 12.5" f/4.8 Dob, Denkmeier binoview w/ 21mm e.p. (106, 174, 282x on the 10", 114, 188, 304x on the 12.5").

[I read in S&T about a small but interesting reflection nebula near M42 with a "keyhole" in the middle of it.]

**NGC 1999** Reflection nebula lit by variable star V380. Keyhole maybe hinted at as a slight shading to the West of V380. Viewed with 10" and 12.5" [did not record magnifications used, nor whether keyhole was hinted at in one or both scopes]

**M42** Viewed with 12.5".

**"37" cluster (NGC 2169) and nearby "J"**. [In an image I took of the cluster I had noticed a group of stars forming a "J" about 10' to the east of it. I could not see enough stars in the 10" scope to make out the J shape. The "J" is just a little taller than the "37" and oriented the same side up.] 8 stars were visible in the "J" with the 12.5" which was enough to readily make it out.

**M52** The spiral arms were not discernable in the 12.5".

**M35 and it's distant companion NGC 2158**, Both star clusters were nice

in the 12.5". Some granularity visible in NGC 2158.

**Algieba** (Gamma Leo) double in Leo's head was nice in the 12.5", good in any size scope.

**Mizar** (Zeta Ursa Majoris) & **Alcor** Viewed with 12.5" scope, nice multiple star system. [2 brightest are a visual double for those with good eyesight. In any sized telescope Mizar and Alcor spread apart and reveal a 7<sup>th</sup> magnitude star forming a squashed triangle with them. They are not physically associated but make for a pleasing view. Mizar (mag. 2.2) is revealed to be a true double itself, with a mag. 3.8 companion only 14" away. Each is a double, making this a quadruple star system, but these additional companions are to close split. You'll just have to imagine them.]

## ASTRO-IMAGER'S CORNER

*All things astrophotography, for the beginner to the expert.*

### Imaging Tip

► **Electric Heating pad** to keep your equatorial mount from stalling out when it's very cold. See Observing Tips for more information.

### Software/Online Info

#### AstroSurface

<http://Astrosurface.com> is a stacking and post processing software suggested by Peter Gillette. He hasn't checked it out much but it looks like it has some nice features. There are links on their site to some instructional videos. Perhaps someone could check it out and write up a report on it.

#### Astrophotography How-to

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

## Imaging Articles

### Cassiopeia's Dark Serpent, The Ghost & Open Cluster 654 by Maura Kelley



Although the temperature's typically been around zero, on dark clear nights, you feel like you want to be out!

I was looking for some dark nebulae that I could attempt to image from my yard. The one I found, fortunately, is located nearby open star cluster NGC 654. It is the 'Dark Serpent' (see image above) in the "LDN" catalog: Lynds Catalog of Dark Nebulae, published in 1962. The serpent is divided into 4 listings, 3 are LDN objects: top to bottom - 1337, 1334, 1332. It lies between 2 of the major stars in the "W" of constellation Cassiopeia (see my wider-field image).

Imaging dark nebulae requires many hours of integration time to display. My image is very amateur, cropped, taken with an 80mm refractor and non-modified DSLR camera (2.26 hours). I need more data.

Looking above Ruchbah to the next major star, marking the center in the "W", is the dramatic blue-white Gamma Cassiopeiae that enlightens the 'Ghost Nebula' IC 59 & IC 63 (see image 3). This is both an emission of hydrogen-alpha radiation (shown in red) and reflection - the



Wide Field Image



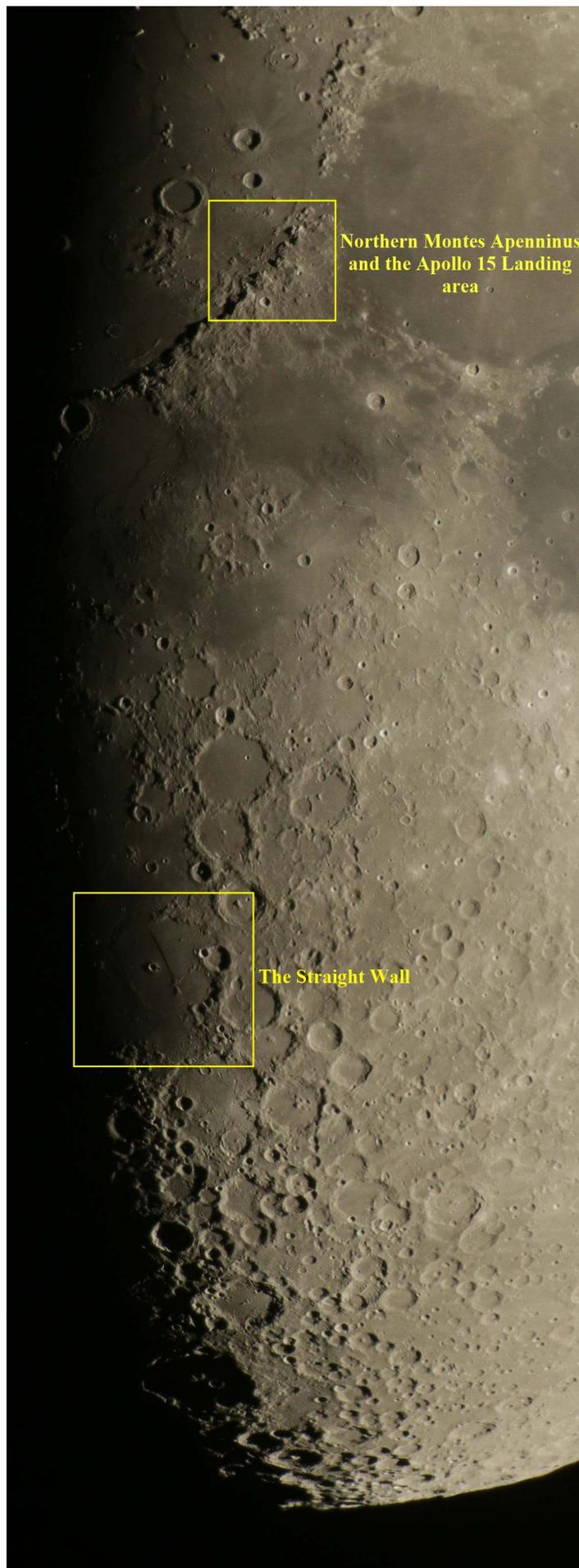
Image 3 'Ghost Nebula' IC 59 & IC 63

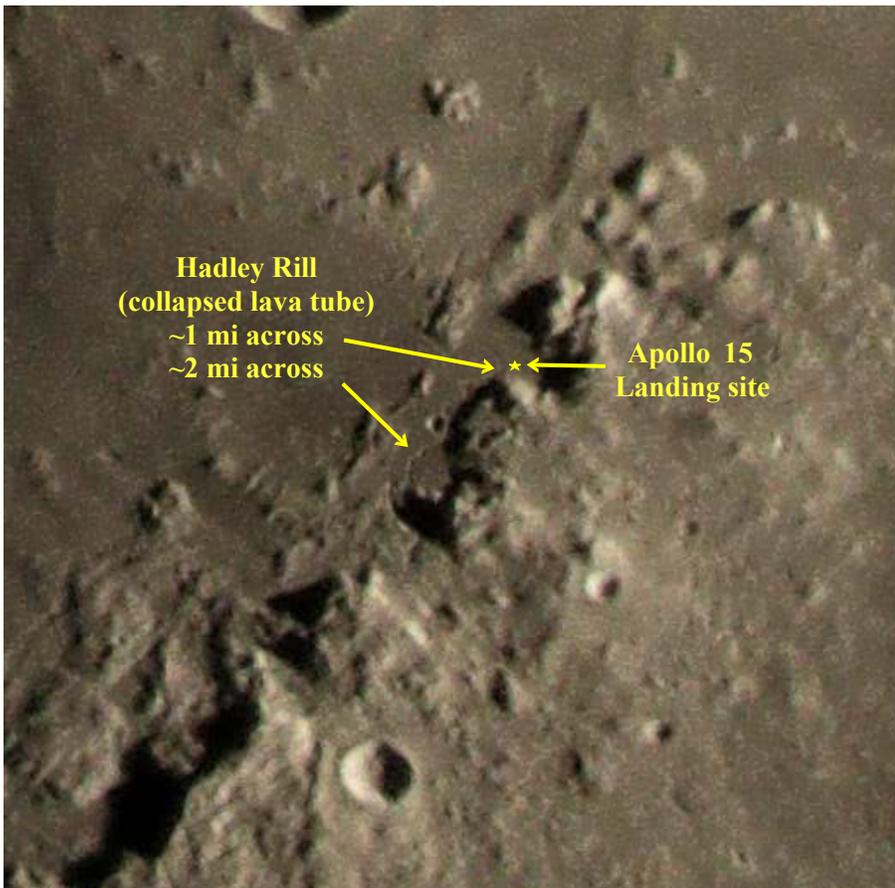
star's light reflected by dust particles (shown in blue). Also known as the 'Melting Ice Cream Nebula', this image was taken over 4 nights in 2019, 2020, 2021 (3.27 hours).

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**Lunar Imaging "Project"**  
by Paul Walker

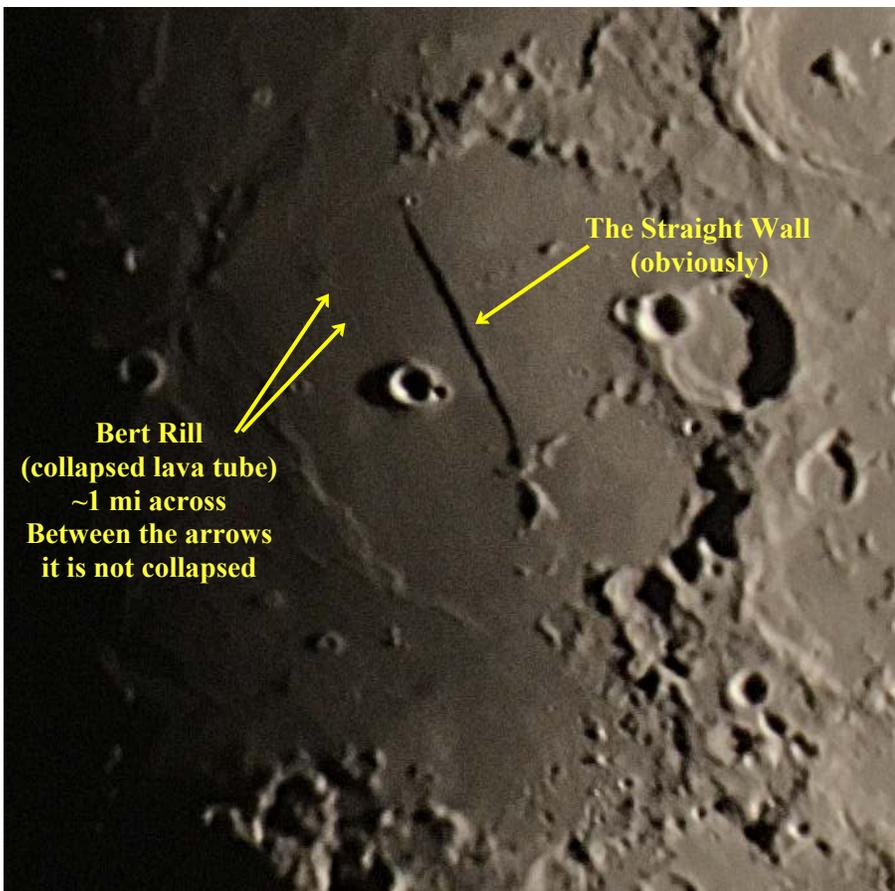
I've been taking images of the Moon most every opportunity I've had for some time now. I'll go out and take a peek visually and if the seeing is good enough, after viewing for a while I'll bring my camera out and attach it to the scope. I use my 10" f/5.6 (1407mm f.l.) as it has the best optics of my imaging telescopes.

Most of the time the images are so-so, but once in a while I get some really good results such on the night of 2022-02-09 when I took the image you see on the right.





Northern Montes Apenninus and the Apollo 15 Landing area . Hadley C is small crater just above center. Hadley Rille snakes past its right side and is about 2 miles wide.



The Straight Wall. Look carefully a little to the left of the top end of the wall for the volcanic dome Birt 3. Look more carefully to see the 1 mile wide Rima Birt, a collapse lava tube. coming from Birt 3 down toward the prominent crater Birt.

It has given me a good excuse to get out more often than I might otherwise, especially on moonlit nights. Vermont has a reputation for poor seeing and often does. However, I have been finding a surprising number of nights with reasonable seeing for imaging and viewing the Moon.

A bit of an aside- For the more detailed Lunar images like these, I use a 2", 2x Barlow between the camera and the telescope. The magnification factor is not 2x when using the Barlow with DSLR because the camera sensor is farther away from lens (outside the Barlow's tube) than the focal plane of an eyepiece (which is inside the Barlow's tube). I won't show the math, but whether using a positive lens or negative lens (as in a Barlow) to project an image onto a surface, the farther the image is projected the larger the image. Without knowing the specifications of the lens the easiest way to determine the magnification factor is to take images of any star field. Take a picture at prime focus (just the DSLR in the focuser) and one with the Barlow. View each on your computer without zooming in, using a ruler measure the distance between the same 2 stars on each image, divide the measurement from the Barlowed image by the measurement from the prime focus image (larger / smaller number). This is the magnification factor for the Barlow with the camera.

For my 2x Barlow it comes out to 2.65x. I recently got a 1.5x Barlow (a Wollensak brand through Surplus Shed) to fit more of the Moon in the image, this provides 2x. This Barlow seems to be of sufficient quality.

The image on the previous page is taken with the 1.5x Barlow. The top image here is cropped from that image. The bottom image is cropped from a different image. All images are single enhanced frames. I took 64 images and searched through them for the best of each feature (another means of "lucky imaging").

**Additional Tech info:**

2857 mm eff. f.l. @ f/11.4  
 1/200 (top) & 1/125 sec (bottom) @ iso 800  
 0.26"/pixel  
 1 mi = 0.83" = 3.2 pixels

**Imaging Projects--**

If you have an imaging project you would like to share, drop us a line. Making your own projects can add another dimension to your imaging experience.

**A new Toy for Amateur Astro-Photographers & Public Outreach**

By Cale Shipman

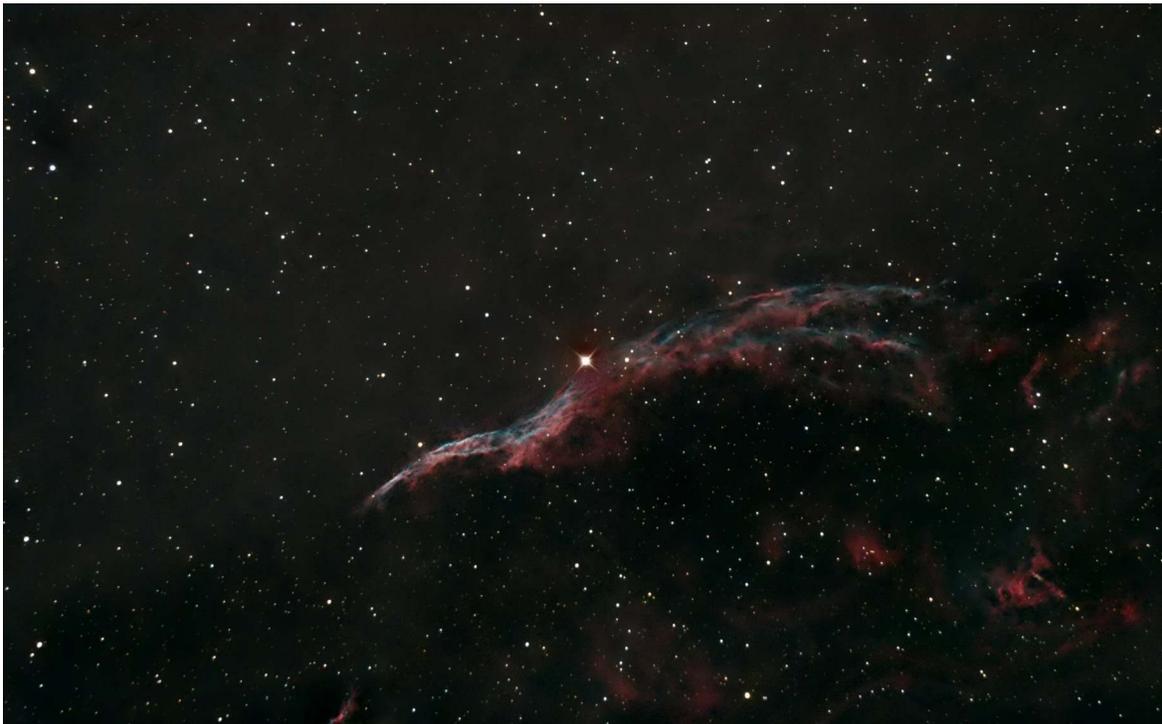
I recently purchased a used Unistellar eVscope from a club member here in Charleston, SC. I use it at outreach because it has a wifi connection that allows up to 10 persons to stream the live view from the telescope to their phones or pads while in the field. The scope also has an eyepiece but most people view the target via their iPhones. While the images it captures and stacks are not nearly the quality of most astro-images, it does a remarkable job within 3-5 minutes worth of capture. Certain objects work better than others but neb-

ula and galaxies seem to work very well. Planets and double stars not so much. I have included just a few of my recent captures. It also uses a process called "plate solving" to do its initial alignment and that seems to be very accurate and effective especially early in the evening when you always get people who want to see something before Polaris is visible or you don't have time for a traditional 2 star alignment.

The reason the member wanted to sell this scope is because they just released the newer version with a larger Sony chip and a Nikon lens. His wife said "before you get another telescope, one has to go!" Has anyone heard that before ?



**MEMBER'S IMAGES**



**Western Veil Nebula (part of NGC 6960), reprocessed with new techniques**

By Joe Comeau

Joe pulled out some very faint nebulosity and dust in this old 6-6-2019 image which has only 100, 60 sec subs taken with "vintage" Canon XT (released in 2008 ) on his 6 inch f/4 Newtonian.



**M51 (The Whirlpool Galaxy)**  
**By Richard Whitehead**

Captured in Feb '22 from Richard's setup in Animas, NM. Planewave CDK14 telescope on an L-350 Mount, ASI 6200MM Pro Camera. Image is LRGB with added H $\alpha$  to better demonstrate the star forming regions.



**M81 (The Whirlpool Galaxy)**

**By Richard Whitehead**

Captured in Feb '22 from Richard's setup in Animas, NM. Planewave CDK14 telescope on an L-350 Mount, ASI 6200MM Pro Camera. Image is LRGB with added Ha to better demonstrate the star forming regions.



**M33 (The Pinwheel Galaxy)**  
**By Terri Zittritsch**

Here's M33, taken in 2020. It's around 6 hours of exposure through a Tec140 scope using an ASI1600 mono camera in LRGB+Ha.



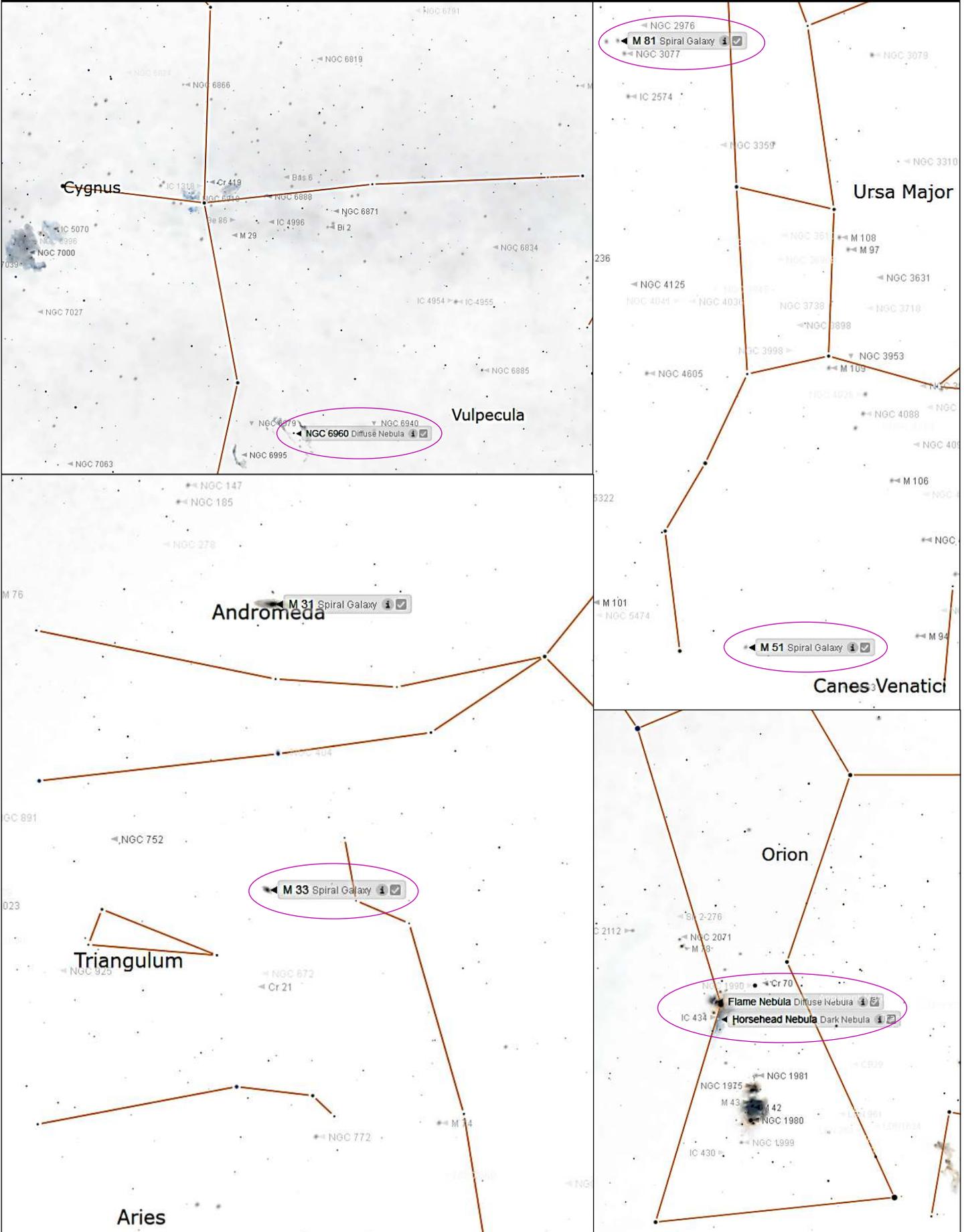
**The Horsehead and Flame Nebulae and Several Others**

**By Steve Grimley**

An oldie but one that never gets old. Taken at Eldorado Star Party in Texas with his Astro Physics 92mm f/7 Stowaway telescope and his new Canon Ra camera.

# 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  
This edition's news from NASA visits the Perseverance and Ingenuity missions on Mars, and provides an update on the status of the Webb Space Telescope.

### Ingenuity Continues to Fly and Follow Perseverance Rover

The Ingenuity helicopter has recently completed its twentythird flight on the planet Mars. Ingenuity continues to accompany the Perseverance Rover as the rover collects rock samples for subsequent return to Earth.

The rover has completed observations at its initial location and has started a record-breaking series of auto-driving sprints. Perseverance is backtracking to the landing site and will continue past it to the Jezero Crater Delta. It is believed the delta is the site of a lake that existed billions of years ago. The aerial surveys provided by the Ingenuity helicopter help the operations team select safe driving paths for the rover.



### Webb Telescope Completes Phasing

New this month is an image released by the Webb Observatory Project team. The image, see figure 2, showcases the successful primary mirror element alignment and phasing. The image, intended to show the single converged image of a single star reflected by the 18 primary mirror segments, also captured several distant galaxies that were in the field of view. The refraction rays present in the image are an anticipated result of imaging such a bright object with the segmented mirror.

The image was created using an exposure of 2100 seconds. Discussion of the image has compared it to the Hubble Deep Field image, which used 21 days of exposure. If Webb can image these Deep Fields in minutes, versus the tens of days used with Hubble, then Webb will be capable of providing us a bounty of never-before-seen images of the Universe.

The following quotes are direct from the Webb operating team.

“Webb’s alignment at the NIRCcam field showed some spectacular diffraction-limited images, producing a tantalizing glimpse of the capabilities this observatory will carry for its science program. This was a major milestone because it required nearly all of the observatory systems to be functioning as designed. It all worked as well as we dared to hope, and it was certainly a moment to celebrate.” - Michael McElwain, Webb observatory project scientist, NASA Goddard

“The Webb optics team analyzed the multi-instrument dataset and determined that only minor focus adjustments are needed on the secondary mirror and science instruments. Since the telescope is still cooling along with the MIRI instrument, we will not apply the corrections at this time and will defer them until the next round.” - Charles Bowers, Webb deputy observatory project scientist, NASA Goddard

In other news, the VAS has been selected as a host for a Webb First Images Community Event to showcase the first science images anticipated from Webb. Those images are scheduled to be available in July, 2022. Details are being for what form that Community Event will ultimately take for the VAS. Scott Turnbull is coordinating the event for VAS and as a representative of the Solar System Ambassadors program.

### Resources

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

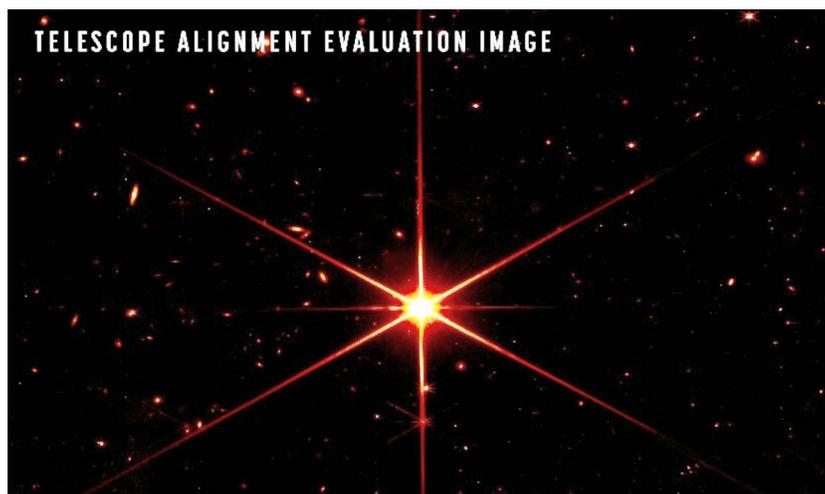
For more information, please refer to

<https://mars.nasa.gov/technology/helicopter/>

<https://mars.nasa.gov/technology/helicopter/#Flight-Log>

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

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





**Sunspots are Back!**  
By Paul Walker

If you have been waiting for sunspots, and haven't heard, the wait is over.

I was reminded of this by Maura the other day, she emailed to say she has branched out to daytime astronomy, taking pictures of the Sun. With Gary's upcoming talk about safe solar viewing I was prompted to prepare by ordering a solar filter for my 75-300mm zoom. This is a 20x13% crop of a 5 image stack taken this morning (2022-03-30) using a Canon T7i (24Mp, APS-C) with the lens at 300mm @ f/5.6. Stacked and sharpened with Registax 6, finished in Picture Window Pro 7.

**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

**For Sale**

**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



**Baader Contrast Booster filter with IR-Cut, 2" - Excellent condition, Asking \$130 (new\$147).**

Contact Greg Erianne, 203-206-9116, greg.erianne@gmail.com

**Bresser AR102S wide-field achromatic refractor OTA: asking \$150  
Old Vixen 1.25" prism diagonal: \$40**

Contact Siddhesh Mukerji, siddmukerji@gmail.com

**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.**

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



**8" Celestron Schmidt-Cassegrain on a CGEM computerized mount**

Included accessories:

9.25" Glass solar Filter	\$ 124
9mm eyepiece	\$ 30
25mm MA eyepiece	\$ 30
90 deg star diagonal	\$ 44
T-Adapter-SC	\$ 25
Universal camera adapter	\$ 75

**Total Cost New \$2828**

**Asking (for the package) \$2500**

Myron Dunbar, 405-779-8102  
Medunbar54@gmail.com

**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.



**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

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



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

**Light duty machining for custom brackets/adaptor 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)

### **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](mailto:paulwaav@together.net)

### **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](mailto:sleepingbearwoodworking)



### **Observing Aids for sale**

**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)

### **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](mailto:paulwaav@together.net)