

Morning Star

Summer 2021



*** Club Info ***

Announcements

Check out our new Member Forum on our web site (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 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).

Wanted - PR person

We have a Public Relations person now. Leah Christopher offered to fill the position and the board has accepted.

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 and port-a-potty.

Full Members can request access to the gate lock and the observatory locks.

Board approval is required in both cases. Some training is required. 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 member's 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

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@VTASociety](https://twitter.com/VTASociety)
[Facebook.com/Vermont-Astronomical-Society-113053818706458/](https://www.facebook.com/Vermont-Astronomical-Society-113053818706458/)
Email: info@vtastro.org (Goes to 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. Airls 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 interesting 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>)

"Spontaneous Night Under the Stars" July or August.

Joe Comeau will once again hold public observing at his observatory, Orchard Hill Observatory at 70 Poor Farm Rd. Alburgh VT. The plan is to make a list of interested people and contact folks up to a few days in advance based on the weather forecast. This event will likely occur in July but it may not happen until August.

Activities will begin at dusk. This will be a no-cost event for people of all ages. Families with children are welcome.

VAS members are invited to bring their telescopes to show participants around the summer sky. There will be a slide show of pictures taken by Astronomical Society members. Invite your friends for an exciting evening.

Contact Joe at 802-238-1664 or jcomeau@hotmail.com

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:

With the State COVID restrictions lifted, fully vaccinated people can now safely resume normal activities indoors and out. However, if you have concerns by all means follow the recommended precautions of wearing a mask and maintaining a 6' distance. It is still recommended that unvaccinated and not fully vaccinated people wear masks and maintain a minimum 6' distance.

Contact info@vtastro.org

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

Nothing scheduled yet

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

Corona Virus Note: We will likely not have public events for the next few months.

New Members

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

Jack Glade
Rya Park
Jessica Gilpin
Doug Dewitt
Carl DeRoberts
Sara Poisson
Richard Terrasi

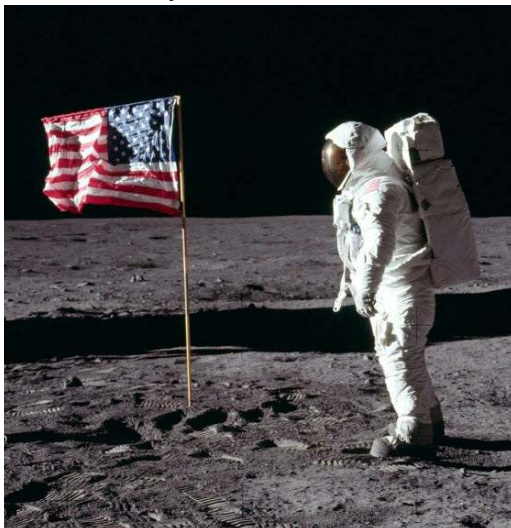
Meetings/Presentations

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.**

July 12

Journey to the Moon
By Carrie Cruz

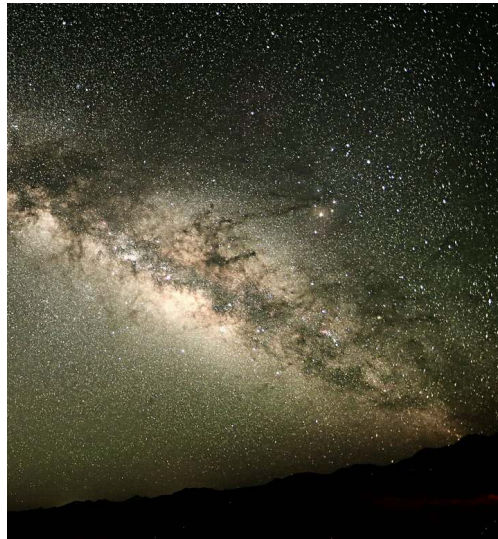


Human culture's relationship with moon has inspired many imaginations to take flight. From 1500 AD Chinese

stargazer Wan Hu to NASA astronauts Neil Armstrong and Buzz Aldrin in 1969, literature, society and science have built upon aspirations of human travel to the moon. Learn about the history of humankind's infatuation with Earth's satellite and the developments and exploration that led to the momentous Apollo 11 moon landing in July of 1969.

August 2

Remote Imaging at a Dark Sky Site
(From setup to images)
By Richard Whitehead



The dark sky of New Mexico

Imaging in the land of enchantment at Animas, NM

My story of driving 10,000 miles on two cross country trips to set up a new CDK14 telescope and L350 mount, the challenges, pitfalls, lessons and adventures along the way.



The Telescope & Mount

September 13

Binocular Viewing
Coordinator - Keith



Members of the VAS will talk about using binoculars for astronomical observing. This will include recommendations for what binoculars to get, options on mounting them as well as some of their favorite objects to observe.

Articles

Regarding Nicholas Copernicus
and the movement of planets

By Lisa Kirchberg

Nicholaus Copernicus was born in Royal Prussia, within the kingdom of Poland in 1473. He was a Mathematician, Astronomer and Catholic Canon. Perhaps most known for his work of the time regarding, a universe with a 'Sun-center'; his was the work of formulating a model of the universe which revealed how this might be true and a progression from the current 'Earth-centered' view of the time. He also studied economics and this vocation supported his research throughout his life. In 1517, he created the formula for economics called, "quantity theory of money"; this concept is now considered a key component of economics and later, a second formula he developed, now known as "Gresham's Law". From 1503 to 1510, N. Copernicus was his uncle's secretary and physician. It was during this time that he pursued his research on heliocentric theory. Lucas Watzenrode the Younger, his uncle, was a powerful political figure and later became Bishop of Warmice. He took part in nearly all of his uncle's

political, ecclesiastic and administrative-economic duties.

De Revolutionibus Orbium Coelestium (On the Revolution of Celestial Spheres), was published prior to his death in 1543. In this great life-work, N. Copernicus shows the Sun as the center of the universe, known as 'heliocentrism'; the astronomical model in which the Earth and planets revolve around the Sun at the center of the universe. During the 6th century declaration of this system by him, the Copernican Revolution followed. It had been held that the Earth was the center and not the Sun; this concept was wildly criticized, but at the same time, it became accepted- by 1615, Johannes Kepler, a German Astronomer, Mathematician and Astrologer, was running with the research of Copernicus and continued to evolve planetary motion theory. Copernicus was always resistant to non-circular patterns for orbit, but, Kepler explored this concept and tested his theory and discovered that they not only worked, but were the reason for the seasons.

N. Copernicus wrote a commentary on the theories of De Revolutionibus; they show his thought process for planetary movement and also reveal a little of his genius, in the way that he seemed to process information.

Copernicus' Commentariolus

1. There is no one center of all the celestial circles or spheres.
2. The center of the Earth is not the center of the universe, but only the center towards which heavenly bodies move and the center of the lunar sphere.
3. All the spheres surround the Sun as if it were in the middle of them all, and therefore, the center of the universe is near the Sun.
4. The ratio of the Earth's distance from the Sun to the height of the firmament (outermost celestial sphere containing stars) is so much smaller than the ratio of the Earth's radius to its distance from the Sun that the distance from the Earth to the Sun is imperceptible in comparison with the height of the firmament.
5. Whatever motion appears in the firmament arises not from any motion of the firmament, but from the Earth's motion. The Earth together with its circumjacent elements performs a complete rotation on its fixed poles in a daily motion, while the firmament and highest heaven abide unchanged.
6. What appears to us as motion of the Sun arises not from its motion, but from the motion of the Earth and our sphere, with which we revolve about the Sun like any other planet. The Earth has then, more than one motion.
7. The apparent retrograde and direct motion of the planets arises not from their motion, but from the Earth's. The motion of the Earth alone, therefore, suffices to explain so many apparent inequalities in the heavens.

en.m.wikipedia.org/wiki/nicolaus_copernicus

Please watch and enjoy this interesting commentary on the meaning of his scientific revolution.

You-tube

#Heliocentrism#ScientificRevolution

DIY Equatorial Wedge By Eben Gay



I found a good deal on a used 8" Celestron Edge HD with an Evolution computerized Altitude/Azimuth mount. I wanted to use it for astrophotography so I needed an equatorial wedge. Celestron sells one but I'd already blown my budget.

I built this DIY wedge with a few tools in my small apartment for about \$30. It is rough but has sufficient stability and precision to give me good results up to 2 1/2 minute exposures.



For example, this is a 60 second exposure of the Hercules Cluster.



I used the same mount with a bracket for my Olympus camera with an 840mm equivalent lens and stacked 15 sec, 30 sec, 1 minute, and 2 1/2 minute exposures to get this image of the Orion Nebula.

Features of the wedge



The weight of the scope is fairly well centered over the tripod (unlike the commercial Celestron wedge).



The opposed (push/pull) turnbuckles allow precision altitude positioning that is quite stable.

Putting the tops of the turnbuckles close together and the bottoms spread apart creates a triangular support that locks up any slop in the altitude hinges.

The large block clamping the azimuth board prevents the turnbuckles from warping the horizontal board. The wooden knob hot-glued over the butterfly nut makes it easier to turn with cold fingers.



The azimuth board pivot is a lag screw and washer (upper right). One of the tripod carriage bolt heads is visible (lower left). The other two are under the azimuth board. I carved out two oval divots in the under side of the azimuth board so it would clear those two tripod carriage bolt heads.



A curved slot in the azimuth board allows rotation. The length of the board is a long lever arm that allows very fine horizontal adjustments.

I put slippery "parchment baking paper" under the block and between the base and azimuth boards to minimize friction. This enables moving the horizontal position with only a slight loosening of the nut for minimal impact on the altitude adjustment.









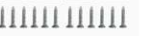
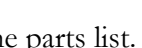
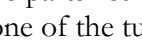
The support to the tripod leg prevents any flexing of the overhang. The edge where it rests on the leg is hollowed out slightly so it stays solidly on the leg.



The support is on hinges so it can fold flat. When the support is folded and the turnbuckles disconnected the entire wedge assembly folds into a flat package that fits on a shelf for storage.

Construction

One of the nice things about this project is that most of the dimensions are very forgiving. I give rough dimensions below. You can place most of the holes by eye. Read the Construction Details below for places where you have to be a bit careful.

	Description	Count	Item Cost	Total Cost
	1x8"x6" Board	1	\$12.73	\$12.73
	1/4x3" Lag Screw	1	\$.35	\$.35
	1/4x3" Carriage Bolt	3	\$.21	\$.63
	1/4x4" Carriage Bolt	1	\$.26	\$.26
	1/4" Washer	4	\$.13	\$.52
	1/4" Butterfly Nut	4	\$.32	\$1.28
	6" Eye Eye Turnbuckle	2	\$1.78	\$3.56
	1" Wide U-Bolt	4	\$1.20	\$4.80
	3" Hinges (pair)	2	\$3.27	\$6.54
				\$30.67

Here is the parts list. If you look closely at the photos you'll notice one of the turnbuckles has screw eyes at the end. Originally I used screw eyes and the tension ones pulled out so I replaced it with an easier-to-turn turnbuckle and U-Bolts. If I did this over I'd use U-Bolts for both of them.



This is what I used for tools. I also used a file and sandpaper to clean up edges and a hot glue gun to attach the knob, but none of those are necessary to put this together.

Construction Details

These are the parts of the process that need extra precision or additional explanation.

- 1) Center the weight of the scope over the tripod.

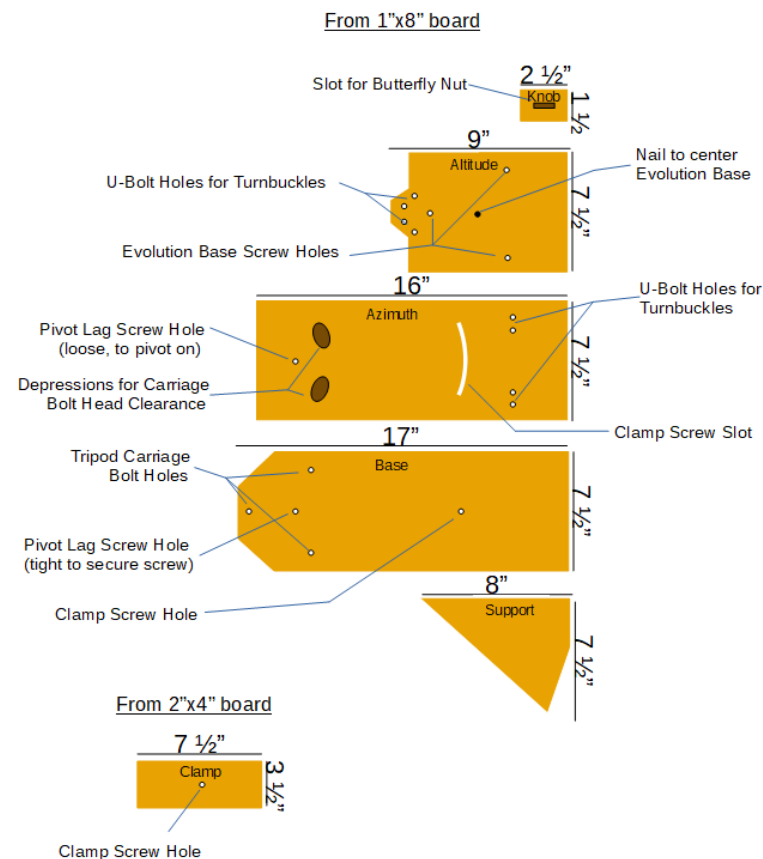


Position the hinges for the Altitude board off the top of the tripod so the center of weight of the telescope is roughly centered over the tripod.

- 2) Tripod and Mount holes.



The base board and the altitude board holes have to line up perfectly with the tripod holes and the Evolution base holes, respectively. To do that, hold each board in turn firmly on top of the tripod and put a pencil up through the holes in the tripod and rotate it around to mark the hole positions. Drill out the altitude board holes a little bit oversize to make it easier to get the Celestron screws



These are the parts to cut from the board. If I did this over I probably would spring for a piece of hardwood to reduce any hint of flex in the wedge.

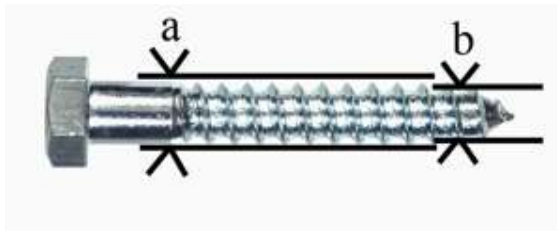
Note: I had a piece of 2x4" lying around to cut the clamp from. I think it would work fine if it were cut from the same 1x8" as the rest of the wood.

into the Evolution base holes. I also drove a nail into the center of the altitude board to go into the center hole of the Evolution base to help hold it in position when putting it on.

3) Azimuth Pivot and Azimuth clamp slot



- (a) When drilling for the Azimuth pivot screw:
The hole in the Azimuth board should be the diameter of the lag screw (a) so the board can turn freely but without any slop. The hole in the Base board should be smaller - the diameter of the screw inside the screw threads (b) so the screw will stay fixed in the board but not split it.



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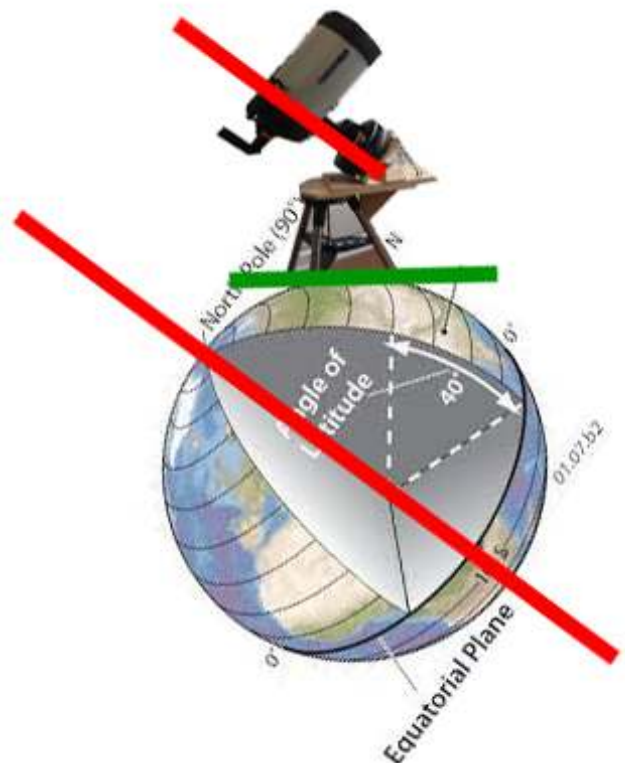
- (b) The Azimuth board needs 2 slightly curved grooves cut into the bottom of it where it covers two of the tripod carriage bolts. Put the tripod carriage bolts in the base board. Screw the Azimuth pivot lag screw down until the Azimuth board is hitting the top of the two carriage bolts. Push down on the Azimuth board and scruff the board left and right the full horizontal adjustment range. Then remove the pivot lag screw and turn the Azimuth board over. The carriage bolt heads should have marked where they hit the Azimuth board. Use a pen or pencil to draw out lines around the scuff marks that are big enough for the bolt heads. Then use a sharp small kitchen knife or a Dremel motor tool to cut about $3 \frac{1}{6}$ of an inch of wood away. This is probably the most annoying part of the project. Take it slowly and carefully.

4) Azimuth Clamp Slot



Mark where the Altitude hinges will go and roughly place where the Turnbuckles will go (for more info on Turnbuckle placement see step 6). Then drill the hole in the Base board for the clamp carriage bolt. With the pivot lag screw, assemble the Horizontal board onto the Base board. Then put a pencil up through the hole in the Base board and swing the Azimuth board back and forth over the pencil to mark where the slot will go. Disassemble the Azimuth board from the Base board. Using a drill slightly bigger than the diameter of the clamp carriage bolt, drill holes all along the slot mark. Then angle the drill and work it back and forth to finish clearing out the slot. If you have a small rat-tailed file or a Dremel motor tool that would help to smooth the slot.

- 5) Marking the holes for the turnbuckles.
The goal of an equatorial mount is to stand the base up



parallel to the axis of the Earth. If you aren't standing on the pole then the ground you are on is tilted relative to the pole and the wedge has to tilt the mount back the other way to align with the Earth's axis. The angle to tilt the mount from down from local vertical is 90 degrees minus your latitude. Here in Vermont you need about 45 degrees. If you are measuring up from local horizontal the angle equals your latitude.



You want your Turnbuckles to be about half extended at the ideal angle for your location. If you plan to use your wedge further south it will need to tip up higher and if you want to go north it will be lower. You want the turnbuckles to work across the whole range of latitude angles you might use the wedge at. Moving the bottom of the turnbuckles and/or changing to shorter or longer turnbuckles can allow you to change the latitude range. Prop up the Altitude board at the center of the range of angles you are going to use. I cut a piece of cardboard at 45 degrees and used it as a jig to hold the Altitude board in place.

Unscrew one Turnbuckle about half way. Hold it roughly in position and mark where it hits the Altitude board and the Azimuth board. If you have a range of angles be sure they are all within the working length of the turnbuckle.

Then use one of the U-Bolts to mark where you will drill both the Altitude and Azimuth boards.

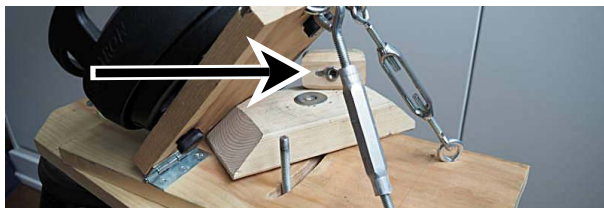
NOTE 1: Be SURE that the U-Bolt ends will clear the Evolution base when it is screwed onto the Altitude board!!!!

NOTE 2: Be SURE the U-Bolt ends will clear the wedge Base board.

Mark the position for the other turnbuckle's U-Bolts and drill the holes.

6) Clamp knob

I found the butterfly (wing) nut on the Azimuth clamp



hard to adjust with cold fingers. I cut a small block of wood and drilled a slot part way through it long enough to hold the wings of the nut and with a wider part in the center for the center of the nut. Then I filled it with hot glue and pushed it down over the butterfly nut. It works like a charm. Next time I would cut the slot first while the knob was part of the larger piece of wood because it would be easier to hold while drilling.

Summary

I was pleased with how this project came out. The wedge lets me do fine adjustment adjust for a good polar alignment. Well within the error inherent in the Evolution mount. With it in place I can take up to a 2.5 minute exposure without star trails. That's not much compared to a good mount, but the whole kit, including the 8" Celestron Edge HD cost less than a good mount, so I consider this a good starting point.

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Eben Gay - ebengay@gmail.com

Patterson Observatory

By Jack St. Louis

In August 2014 Dr. Russel Patterson contacted the VAS via email with an offer to donate his domed observatory to the club. He measured variable stars for many years but stopped due to increasing age. The offer was accepted, Keith Lawrence and I removed the 14" Newtonian reflector, Byers AC motor driven mount and many accessories in September, then went back to disassemble the observatory. Later we removed the cement base.

Work to erect the Patterson Observatory began on Sat-



urday June 12th with the installation of the concrete pier that was already at the site. Keith Lawrence, Paul Walker, Jim Bosek and I dug the hole and securely set the pier in place.

With the pier installation going so well we then dug the holes for the floor base frame supports. Keith designed and made the complete floor at his house, painted the floor



then disassembled the floor to transport to the site. After securing the supports in place the flooring frame was assembled, all going very well.

With the frame in place the painted plywood floor was set in place and screwed down. All the work was completed by noon, next step will be to clean the observatory walls and metal frame then paint before assembly on the floor, which is currently planned for June 26th.

The Heart of the Scorpion ~ by Maura Kelley



This image of the red supergiant star, Antares with M4 globular cluster in Scorpis was taken with a beginner 80mm Orion refractor telescope that I just set up for my daughter down in southern Arizona. Just south of Green Valley, where she now lives, is the Smithsonian Institution's Fred Lawrence Whipple Observatory.

The image consists of (16) 25" sub exposures & 3 darks, stacked in Starry Sky Stacker for a total exposure time of 6.66 minutes. NGC 6144 is the fainter globular.

Up on the 8550-foot summit of Mt. Hopkins is the Multiple Mirror Telescope Observatory with other instruments located on the 7600-foot ridge (hidden from view).



There is a special Amateur Astronomy Vista with about 6 concrete pads with benches, for setting up your equipment,

spread out among the various species of cacti in the Sonoran Desert. It was breathtaking seeing Scorpis so high and beautiful in the dark night sky! We even had a small visitor join us on our concrete pad (see image to the right).



Board & Committee Meetings

April Board Meeting

Jack requested officer's reports for the Annual Business Meeting in May.

Joe- The porch at his son's place on the lake would be a good place to view the partial eclipse from. He is planning to have "Spontaneous Night Under the Stars" at his observatory this summer. He also plans on having a couple small groups at his observatory sometime this summer.

Doug- Updated us on the financials. For the partial solar eclipse he suggested Basin Harbor in Pantown for consideration.

Jack suggested next to Burlington airport could be a good place to view the eclipse.

Keith- Found a source of small \$2 (\$1 in bulk) planispheres for us it give away at star parties and for inclusion with the Library Loaner scopes.

Jim- In addition to the above suggestions, received good reports from members of the Eclipse Committee of locations for viewing the June 10 partial solar eclipse.

MOTIONS: None

ACTION ITEMS: None

May Annual Meeting May 3

of Attendees _18

Due to the Corona virus pandemic we held the meeting remotely via Zoom.

Jack opened the meeting. This is VAS's 57th anniversary. Jack gave the President's Report. Jack announced plans to put up an 8 foot domed observatory that was donated by Dr. Patterson and install an 8" Schmidt-Cassegrain telescope donated by Tom Yandow. This will be for use by Associate members with gate access to the Hinesburg Observing Site. He has proposed naming the observatory the Patterson-Yandow Observatory. Dr. Patterson donated the observatory, a large Byers equatorial mount (currently in the Chmela

Observatory) and a 14" Newtonian (refigured by Bob Horton and now kept in the Chmela Observatory for use on the Byers mount) that he used for many years to make variable star observation but was no longer able to use. Tom Yandow is a long time VAS Full member and a Life member who recently retired and move down south. He donated most of his telescope and accessories to VAS.

Doug gave the Treasurer's Report.

Paul gave the Secretary's Report.

The total paid up members as of December 31, 2020 was 87, compared to 81 for the previous year. We had 19 new members in 2020. New members so far in 2021 is 10.

Election Results: We had 21 Full members return ballots. A quorum is 50% or more of Full members (16 out of 32). Candidates for the board were Doug Williamson (Treasurer), Paul Walker (Secretary), Board at Large- Bob Horton, Keith Lawrence, Terri Zittritsch and Jim Bosek. All candidates were re-elected.

Paul reported on last year's Site Committee activities (and submitted a written report).

Bob reported that the Earth continues to rotate :)

Joe gave the VP's report.

Keith's reported on the Membership Committee activities (and submitted a written report).

Jim reported on the plan to view the June 10th partial solar eclipse. It will be a member's only event at a few selected locations.

Jack drew another name for "Brunch with the president". He picked Karen Schoonover.

Jack announced awards and recognitions presented to members:

Duane Waller- VAS Messier Certificate

Terri Zittritsch- For her Constellation of the Month contributions to the monthly meetings.

Steve Quigley- For his work on refurbishing the telescope in the Grout Observatory at People's Academy in Morrisville.

Keith Lawrence- For his "First Scope Program".

Gary Nowak- A VAS Telescope Building certificate. He built an inverted

fork mount for his 4" refractor.

Keith Lawrence- For recognition on his receiving of a Messier Certificate and Pin from the Astronomical League.

ACTION ITEMS

Paul will update the site map for the Hinesburg Observing Site and contact the Town of Hinesburg to get permission to install the 8' domed observatory at the site.

MOTIONS:

Paul Walker made the motion that we accept the officer's reports as read. Terri Zittritsch seconded it. The I's have it.

May 18 Board Meeting

Jack met with Leah Christopher to talk to her about her offer to fill the Treasure position. Turns out she is much more interested in the PR (Public Relations) position.

Doug said if she would rather do PR than he would continue with the Treasurer duties. All officers and board members must be Full members.

Doug updated us on the financials.

Paul updated us on presentations for monthly meeting. We are booked through November.

Jim says we need one more meeting on the June 10 partial solar eclipse. He ordered and received 50 solar glasses.

MOTIONS:

Paul Walker made the motion that we offer Leah the PR position. Keith seconded it. Approved unanimously.

June 9 Special Board Meeting

This meeting was called to work out what equipment we are going to install in Patterson's 8' domed observatory. Jack came up with the idea of erecting the dome on the site.

Initial thoughts had been to install the 8" SCT with mount that Tom Yandow had donated and with some training make it available to Associate members. Jack expanded this to making it available for training beginners on all aspects of observing from finding their way around the sky to using a telescope.

There had been several emails discussing other options. Terri suggested calling the meeting.

From the options discussed we honed in on using Terri's offer of donating her GoTo Atlas EQ-G mount and installing the optical tube assembly of Tom's scope.

With this setup members can be trained on we can include training on using a computerized GoTo mount and even astro-imaging.

We don't know at this point how much interest there will be. With this in mind, we have purposely kept the cost down.

Costs to date:

The cost of the platform Keith built to place the observatory on is about \$360 and Paul has spent about \$270 for the hardware and wire to run power to the building. Jack spent about \$95 a kit for adding a standard dovetail to the 8" SCT optical tube assembly. The only other expense may be for paint.

We will follow-up with plans to create training. Jack will make himself available for basic visual observing training. Paul and Terri indicated they would be available for those interested in hands-on training for GoTo mounts and astro-imaging.

June 22 Board Meeting

Bob had an inquiry about the Library telescopes for a granddaughter

Jim mentioned the excellent solar eclipse media coverage set up by Leah Christopher

Keith said Greensboro Library wants a Telescope (or he already delivered it?), scopes are now in 19 Vermont libraries. He also mentioned a 6" Newtonian still in Bob's Hut with a special mount to be used on a concrete pier North of the observatories, not a good place, and the scope is not used. He suggested he could donate \$50 to the club, take the scope for his First Telescope Program - or - the club pay him \$50 for materials to build a Dob mount for the scope and leave the scope in Bob's Hut for newbies to try out. It was agreed to pay Keith \$50 to make the mount and keep the scope at the site.

We discussed having a first meeting for the 2024 Solar Eclipse, Jim will send Jack a date for a Zoom meeting. Jack will contact other Vermont clubs about their efforts to support the eclipse, and Bob suggested we talk with the Springfield ATMers at the Stellafane convention about their plans.

VAS Membership Committee

No meeting was held this quarter.

Observatory Site Committee

No meeting was held this quarter.

Under the Stars & Planets

OBSERVER'S CORNER

Observing Tips

► (repeat tip) It takes 20 minutes or more of being in the dark for your eyes to become fully sensitive to dim light (fully dark adapted).

► (repeat tip) Try using "averted vision" on 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 object 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.

► (humor) Drink a half a dozen martinis just before you start your session. That way you'll see more double stars.

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

Member's Observations

Partial Solar Eclipse

The highlight this last quarter was the partial solar eclipse of June 10. This was actually an annular eclipse if you were located in the right place, we weren't.

Still, it was a nice partial eclipse for us with it reaching maximum phase shortly after sunrise. We found 3 locations with good Northeastern horizons and sent the members an invitation to meet at these sites. The locations were: Wheeler Homestead Park, 1100 Dorset St., South Burlington; Dennis's residence, 400 Dog Team Road, New Haven; Sandbar State Park. Some members observed the event from other good locations that they found closer to home.

As we all know, the weather can be fickle in Vermont. With the beautifully clear sky the evening before we had high hopes for viewing the eclipse. Unfortunately clouds interfered considerably in all the locations from which members observed. On the bright side, it could have been a washout!

Members share their observations here and their images in the Member's Images section.

The Distorted Partial Solar Eclipse by Gary T. Nowak

I knew that the partial solar eclipse in the early morning of 10 June 2021 was unfavorable due to its extremely low altitude just after sunrise. So, I searched around a few days before the eclipse for an eclipse site and found a suitable fairly low horizon in the NE at Sunrise. It was in a Christmas Tree farm field about ¾ the way up the emergency vehicle access road from Williston Woods Road to the end of Old Stage Road in Williston, Vermont. I was in the Western part of the tree field. The grass in the field was tall; definitely above my knees and in some places up to my waist. This field was perfect tick attack country. Another VAS member Bill Bank was supposed to observe with me but decided to opt out. Bill decided that he was going to go to the Sandbar Causeway in the Lake Champlain Islands to observe with the Keith Lawrence group.

Since this partial solar eclipse was unfavorable; I knew I would need a very mobile equipment set up. My "Cheval de Bataille" solar telescope was a 2.4" (60mm) f/12.91 refractor solar projection telescope with tripod. This gear would be too much to carry on a hike to whatever observing spot I

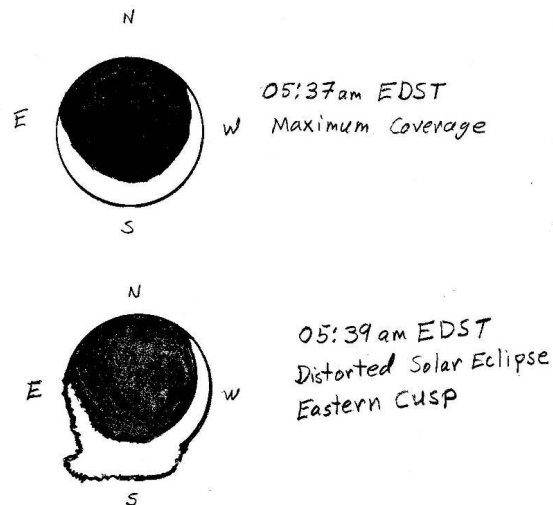
would use. So, I ordered some solar filter film about 1.5 months before this eclipse.

On the day before the eclipse, I was busy working on storm water permits for our home owner association so I was glad that a package came in from Agena Astro Products that afternoon. So, after supper, I started to work on my homemade solar filters. The Baader Solar Viewer AstroSolar® Silver/Gold Eclipse Glasses would not fit my face with my glasses on. So, I cut the bow arms off the eclipse glasses and mounted the filter section onto a piece of white foam poster board. Thus, I made a hand-held solar viewer. I had previously purchased 2" PVC Pipe Couplers to use as an over the aperture filter mount. The 2" PVC Coupler was the closest match to the objective bell of my 10 x 50 Garrett Optics Binoculars. I used the Baader AstroSolar® visual solar filter film (ND 5) for the binocular objective solar filter. I had completed the filter mounts by 10 PM. A thought crossed my mind that it was clear outside; so perhaps I should skip the partial eclipse and go out and observe instead. However, since I paid for the filters, I ought to try them out and observe the unfavorable eclipse.

In the morning of the partial eclipse; I had suited up with my anti tick gear; boots, tick gaiters, long khaki pants and long sleeve shirt. I had the day before sprayed all my clothing with Permethrin including my hat. So, I got my observing gear on and did the 15-minute hike to my observing place. The conditions were: Temperature +52° F, Humidity 90%, No Wind, and Barometer 29.65". I arrived at the field at 05:00 AM. I was surprised to find out that the tall grass was gone. Someone had come in and mowed an approximate 6 ft hiking path around the field. So, I would be observing on very short grass so the tick menace would be at a very low risk. I watched the NE horizon area which was full of dark thick clouds. The dark clouds went from a reddish-purple hue to a gray white color. So, I had a few minutes to wait until Sunrise. So, I took my 10 x 50 binoculars (without filters) and scanned the lower landscape area. I believe that I located a clump of trees which is near the home of VAS mem-

ber Sharon Provost. (Well, that's my guess). I also realized that if I get to see this partial solar eclipse; this would be the 1st solar (partial, total or annual) eclipse that I would observe without a solar projection telescope. Every solar eclipse I've seen, I've used a solar projection telescope.

The Sun cleared the distant hills and rose at 05:15 AM EDT. It appeared as a brighter milky spot in the clouds. I mounted the solar filters on my 10 x 50 and looked at that spot. All I could see was a dim hazy milky spot. Not even the unaided eye filter would show the Sun's disk. So, I continued to wait and thought that there would be a good chance that I may see nothing. Around 05:31 am, a split appeared between the darker gray white clouds. The clouds parted and I got my first view of the Solar Crescent. Some of the clouds went toward the horizon while other clouds went up higher in the sky. Thus, I had a relative clear slot from the dark clouds around the partially eclipsed Sun. The relative clear slot still had some thin clouds (probably cirrus stratus) in the area but the partially eclipsed Sun was easy to see in the solar filtered 10 x 50 binoculars and hand-held solar viewer. When I first saw the crescent Sun, it reminded me of the "Eye of Sauron" from the "Lord of the Rings Movies". I put the binoculars down (the binoculars have a neck strap) and wrote a few notes on an index card. Then I checked my watch and it was 05:36 am. So, I put the Solar Filter binoculars back on the Sun and watched it. I could see the Crescent Sun start to slant towards the eastern side. I then lowered the binoculars and checked the time: 05:37 am EDT so I got to see the 77% Eclipsed Sun at maximum coverage. I then put down the binoculars and did a sketch. After the sketch, I started to observe the Sun again in the binoculars. Like a good planetary observer, just like with Venus, I compared the cusp to each other. I first looked at the Western Cusp; it was sharp and well defined. Then I looked at the Eastern Cusp; it looked "shriveled". I knew at once that the atmosphere was affecting the image. The Southern part of the Sun had a projection off it and was exhibiting an "fish bowl base effect". So, I checked my



Gary's sketches

watch and it was 05:39 AM EDT. This was the first time that I had seen a solar eclipse being distorted by the atmosphere. The thing that made this so unusual is that only the eastern side was affected. The Western Cusp stayed sharp and shapely. Usually when bad seeing conditions affect an object like the Moon or Venus, or Mars, the whole disk is affected and not just one part. The unaided eye filter showed the effect but it was smaller and less notable. What I figure happened is a slightly thicker cloud had moved over the eastern side of the Sun and caused the distortion. At 05:45 AM, I got my last glimpse of the distorted eclipsed Sun as the darker heavier clouds spilled over the Sun and ended the view.

So, I decided to head back home because I knew that by 06:00 am, the Sun will have climbed above the NE trees near my home and be visible. As I was walking home, I ran into a friend from my neighborhood who told me I smelled like a "walking can of bug juice". By the time I got home and the Sun climbed out of the thicker dark clouds around 06:30 AM. I took my final look at the Sun through the solar filtered binoculars. It was disappointing in one sense because only a tiny black notch was left on the Sun's disk. That notch quickly shrank in size and moved off.

I wondered if any of the VAS imagers got a picture of the Distorted Crescent Sun. If any did get a shot; it would probably be Paul Walker. I later contacted Paul but he did not see nor get any images of the Distorted Solar Crescent. This information then leads me to be-

lieve that this atmospheric effect was entirely a local event.

One more note: Both Baader Solar Film Filters worked well on the eclipsed Sun. It's tempting to consider the possibility of making another set of, over the objective, solar film filters for a pair of giant binoculars such as 15 x 70 or 20 x 80. It would make an interesting study to compare the projected image of the Sun to the solar filter binocular view. Doing a comparison of the pros and cons of each system to find out which observing technique would be better for the upcoming partial solar eclipse in 2023, the total solar eclipse of 2024 and the two partial solar eclipses of 2025 and 2026.

The following solar eclipse notes were posted on the vtastronomy@uvm.org email list. Images that people shared can be found in the Member's Images section of the newsletter.

Greg Warrington-

I viewed from Shelburne Bay Park looked NE across the water. Horizon around 1.5 degrees. I set up two cameras:

- 1) A 50mm lens set to automatically take a picture every minute through #10 welder's glass (I only looked at the LCD screen and figured #10 was sufficient to protect the camera for a relatively wide angle like this). I will see if the results are suitable for some sort of composite.
- 2) A 600mm lens on a Nikon D5600 (APS-C sensor) with a solar filter.

The clouds were pretty thick initially and I realized only belatedly that I shouldn't have put the solar filter on right away. Attached is an image without the filter with the sun just under 2 degrees above the horizon (ie, about 5:23 AM). Specs are 1/1000s @ f/11 and ISO 100. I do have one solar-filter picture with the sun just crossing the horizon but it will need some processing. And then of course I kept taking pictures until the eclipse was over.

I'm looking forward to hearing what the eclipse looked like from the

various locations and seeing what people were able to capture. It was lots of fun and I'm glad the cloud cover was only partial.

Lawrence Garrett

Thick clouds at sun/moon rise, but I did get at least one favorite shot here. EXT 90mm at 775mm f.l., no filter. Later as I was driving to work, I was amazed to see the crescent in both side view and rearview car mirrors on a hill leading away. Yes I was watching the road. Also, I watched the egress at work in Lunt 8x32 solar binoculars. too.

Surprise Lunar Occultation Paul Walker



May 17, 2021 - I decided to view and image the Moon last night. The seeing was so-so. But good enough that I took some prime focus shots of the Moon. I also took some HD video of the Moon at prime focus on my 10" f/5.6 Newtonian. I used 3x and 10x digital zoom on the videos using my Canon T7i camera.

As I sometimes remember to do now, I looked to see if there were any visible stars that might get occulted by the Moon. Since I had the camera attached I cranked up the ISO to brighten any stars in live mode. To my surprise there was a rather bright one not very far from the Moon's dark side and a dimmer one a little closer to the

Moon. I scooted inside to check Starry Night Pro planetarium software to see how much time I had. I found another surprise there, the bright star was a close double (Kappa Geminorum, 3.6 mag with an 8.2 mag companion only 7.2 arc seconds away). They were only about 15 minutes from being occulted so I hurried back out and upped the magnification by going from prime focus to using a 2X (2") Barlow. With the camera I actually get 2.65X. Prime focus gives me the equivalent of 45x visual magnification, with the Barlow I get 120x.

Here's the 7th mag star just seconds from disappearing. Kappa Gem is in the bottom of the image. You can make out the 8.2 mag companion in

the image. North is to the left. Below is a 10% crop of Kappa Gem and its companion.



How to find out when an occultation will be visible

Any planetarium program that shows the Moon is a tool you can use.

The RASC handbook lists occultations for stars down to magnitude 6. They have them listed by “station” with the stations shown on a map.

<http://www.lunar-occultations.com/iota/bstar/bstar.htm>

This web site lists occultations. The only drawback is they are not segregated by location.

The site also has a link to an application (Occult v4.12.x.x) that does occultation predictions for stars, planets, asteroids, etc for any location. One drawback is that it uses separate data files, some of which get updated regularly and need downloading periodically.

Difficult Targets on the Moon Paul Walker

Back in March Larry Garrett mentioned spotting 2 challenging targets on the Moon, Rima Oppolzer and Rima Reaumur, near the small crater Seeliger.

The image on the right is a single frame from a video, one of the few that showed the details well. It is rotated with North up to match up with the LAC (Lunar Astronautical Chart) map on the next page. Seeliger crater is labeled toward the bottom.

The cropped image to the lower right points to features I could detect and one unnamed rille that I couldn't or that I just didn't notice.

In the top image, to the north (up) I could see all those rilles next to the crater Triesnicker. This was pretty exciting as it was the first time I have seen them. I never knew of their existence. But that night when viewing the very obvious Rima Hyginus just to the north out of the frame, I couldn't help but notice them. I have viewed Hyginus many times. I could see Rimae Triesnicker I, II, III, V and VII (see map). II was the easiest and V the hardest.

Also take note of the distinctive curved feature in the mountains to the upper right of Seeliger. It on the LAC map but is not named. Don't know whether it is a fault or something else.

Referring to the light area in Rima Oppolzer, noted in the small image, there are indications that it due to a slight rise on the surface. On the other

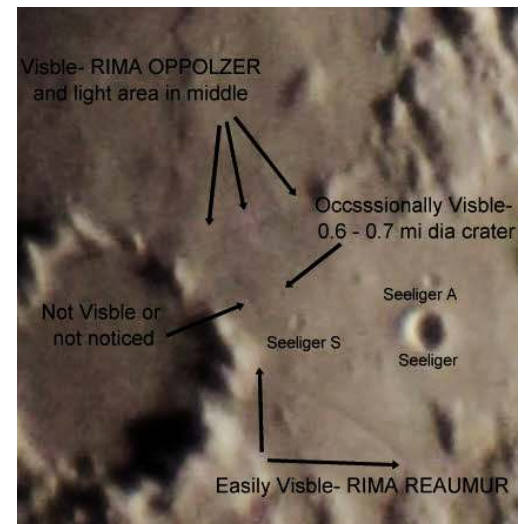


hand it may be due to lighter colored material. The map does not indicate a rise there but does show a low ridge to its right that is also visible in the image.

Below is a link to the video I took that evening. I will leave it up for a while (~230x visual magnification). 10" f/5.6 Newtonian, 2x Barlow, Canon Rebel T7i camera, 4.9x Digital zoom (file size 136 Mb). For the best viewing quality you will need to download the video. By the time I waited for holes in the clouds to get the video, the seeing had deteriorated noticeably.

https://drive.google.com/drive/folders/1HHtj9_NjGfsIpvglOZjF75C96-8vw1T?usp=sharing

The LAC reference map covers most of the area of the image and the video. The area was evenly split between charts #59 and #77 so I



cropped each and combined them to create this map.

In the upper left corner of the LAC map I pasted in part of the locator map and part of the miles and kilometers scales.



Things to Observe

Constellation of the "Month"

Adapted from Terri Zittritsch's "Constellation of the Month" that she presents at the club's monthly meetings.

Hercules

Pronounced – 'HUR + KYUH + LEEZ'

The constellation was known by the Greeks in ancient times as Engonasin 'the kneeling one'.

Eratosthenes, a Greek scholar and astronomer, named the constellation Heracles.

The mythology:

- Heracles is the son of Zeus and Alcmena (a mortal).
- Heracles was nursed by Hera (thus his name which means Hera's Glory) unbeknownst to Hera.
- When Hera found out she cursed Heracles to go insane and he killed his children.
- Heracles, after regaining his senses went to an oracle to atone for his sins. The oracle sent him to serve King Eurystheus, of Tiryns, one of the Mycenaean strongholds who gave Heracles his 12 labors.
- Kill the Nemean Lion 'LEO'.

- Destroy the serpent 'Hydra'.
- Hera sent a crab to distract Heracles and Heracles killed it, Hera placed it in the sky as 'Cancer'.
- Catch a deer with golden horns.
- Catch a ferocious boar.
- Clean the stables of King Augeias – stables contained the greatest number of cattle. Never cleaned until Heracles.
- Kill a flock of marauding birds.
- Kill a fire breathing bull terrorizing Crete.
- Catch the flesh eating horses of king Diomedes.
- Bring the king the belt of Hippolyte, Queen of the Amazons.
- Steal cattle from Geryon – monster of Erytheia.
- Steal golden apples from Heras garden on Atlas.
- The garden was guarded by the Herperides who were guarded by the dragon Ladon 'Draco'.
- Capture Cerberus the three headed dog who guards the river Styx, and bring him to the king.
- Zeus eventually placed Heracles into the sky as Hercules.

Most notable Asterism

- The Keystone – Pi, Eta, Zeta, Epsilon Herculis

Bright stars

- Beta Herculis – Kornephoros 'Club Bearer'
- Zeta Herculis
- Delta Herculis - Sarin
- Pi Herculis
- Alpha Herculis – Rasalgethi ' – fifth brightest star

Messier / NGC Objects

You will find the objects listed range from detectable to the unaided eye under dark sky conditions (M13) to difficult in large amateur telescopes (most of the Abell and ARP objects).

- **M13 / NGC 6205** – Great Hercules Cluster. 5.8 magnitude globular cluster.
 - Nice object for binoculars to large telescopes. Some people



can detect it with the unaided eye in dark skies.

- Discovered 1718 by Edmond Haley, Added to Messier's list June 1, 1764
- 25K ly distant, 145 ly diameter, brightest star is mag. 11.95
- Trivia: Arecibo message sent in 1974 towards M13 - M13 will be in a different position by the time it gets there.

- **M92 / NGC 6341** – Mag 6.3 globular cluster.



- Nice object for binoculars to large telescopes. Only half a magnitude fainter than it's more famous neighbor M13.

- Discovered by Johann Elert Bode – 1777, rediscovered by Messier in 1781
- Trivia: In 14,000 years it'll be the northern cluster, at 1° of the pole, as it was 12,000 years ago
- **Abell 2151** – Hercules galaxy cluster.



- Difficult target visually. Requires telescope 12" or larger. Brightest members are <14.0 mag.
- 500 Million Ly distant – 200 galaxies rich in spirals
- **Abell 39** – Planetary nebula, 6800 Ly away.



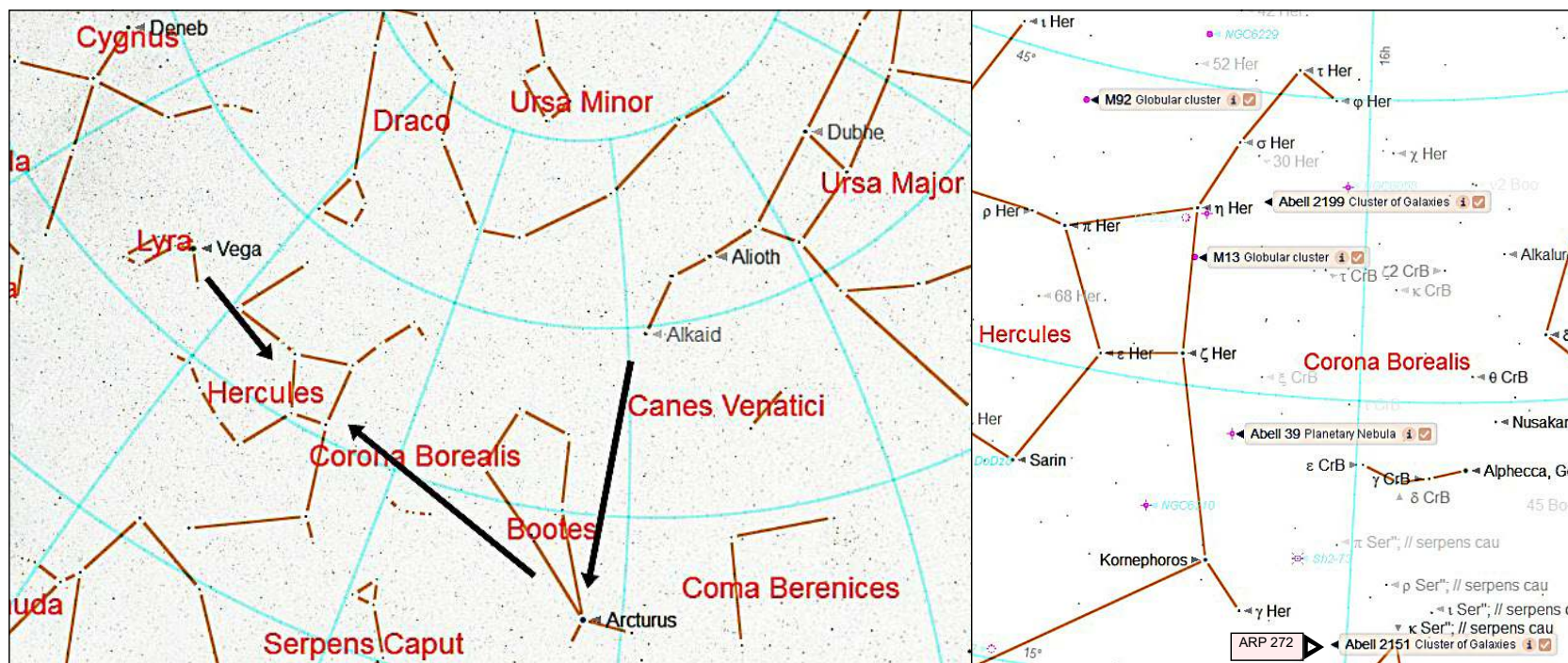
- Mag 13.7, spread over 155 arc sec. with a central star at mag. 15.5. Difficult object requiring a large telescope, dark sky and probably a nebula filter.
- **Abell 2199** – Galaxy cluster – brightest is NGC 6166 at mag 12.8.



- Most members are <14.5 mag.
- NGC 6166 should be visible with a 10" telescope but most would require a larger scope.
- **ARP 272** (NGC 6050 / IC 1179) – interacting pair of galaxies, 15.2 & 16.3 mag. respectively, at 450 MLy.



- Large telescope (16" or larger) target for sure, for visual.
- A 3rd interacting galaxy is at top.



How to find Hercules

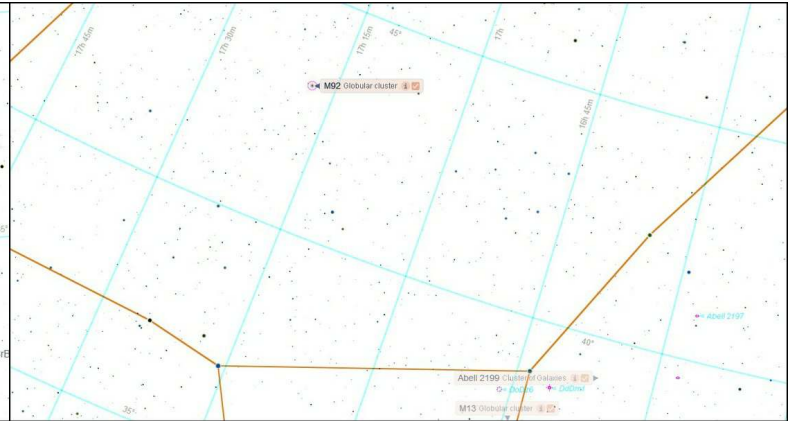
Locations of listed objects

Detailed Finder Charts

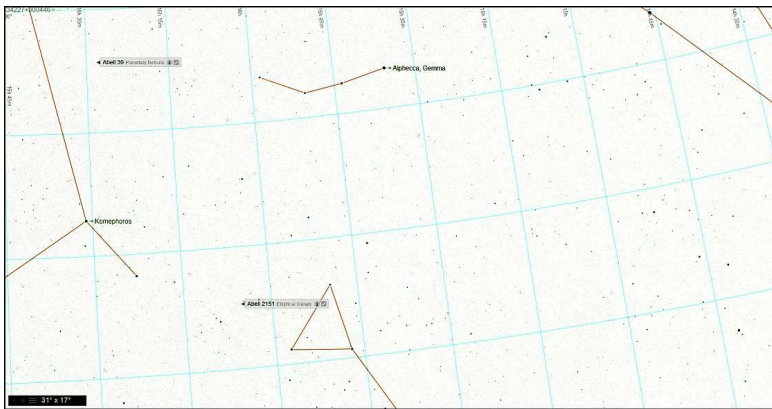
These may not be detailed enough, especially for the fainter objects. To print them larger, copy them and past them into an image editor or into a Word document where you can re-size them and print them large enough to see the details.



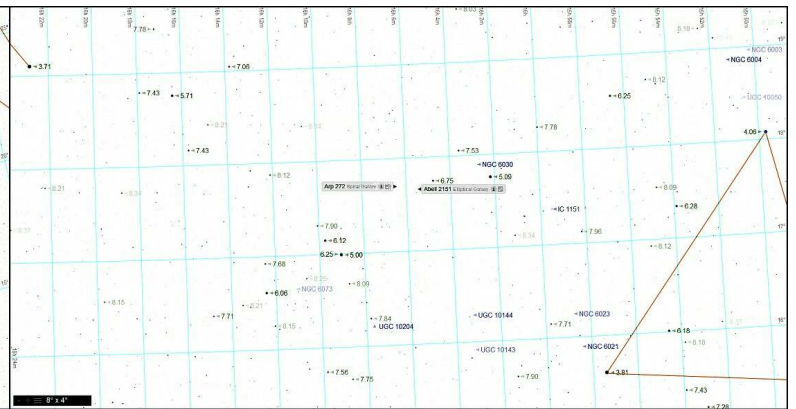
M13 Finder Chart



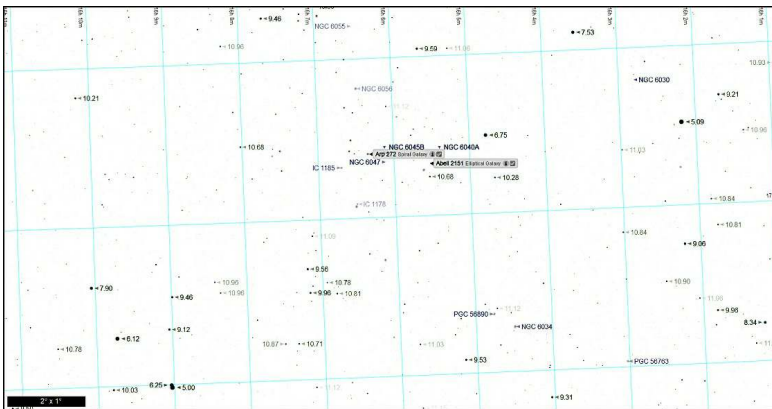
M92 Finder Chart



Abell 2151 & ARP 272 Finder Chart #1



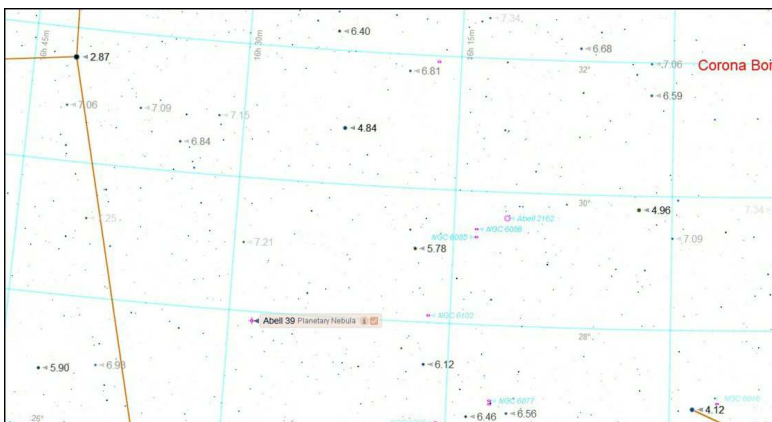
Abell 2151 & ARP 272 Finder Chart #2



Abell 2151 & ARP 272 Finder Chart #3



Abell 2151 & ARP 272 Finder Chart #4



Abell 39 Finder Chart #1

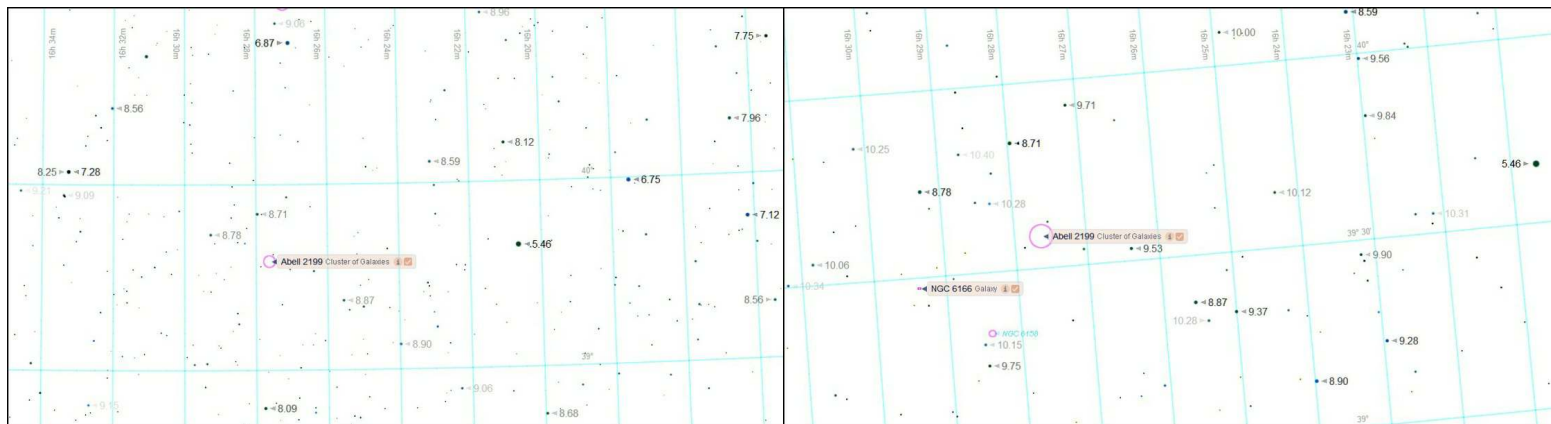


Abell 39 Finder Chart #2



Abell 39 Finder Chart #3

Abell 2199 Finder Chart #1



Abell 2199 Finder Chart #2

Abell 2199 Finder Chart #3

ASTRO-IMAGER'S CORNER

All things astrophotography, for the beginner to the expert.

Imaging Tips

Both cell phones and point & shoot cameras can be used to image the Moon and some planets through a telescope. One can hold the phone or camera up to the eyepiece for the Moon. There are also adapters specifically for holding the phone and others specifically for cameras. These make taking pictures a lot easier.

Software/On-line Info

How to Learn Astrophotography

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

Articles

Tiny Camera "Big" Results By Bob Horton

I recently bought a small industrial board camera (AR0135 Monochrome

from ARDUCAM) for capturing interferograms of mirrors I'm testing with my Bath interferometer. This camera has a Global Shutter which helps eliminate the effects of vibration in the images. While it doesn't have the monster megapixels of most cameras these days, nor is it cooled to frosty temperatures, I decided to put it out under the stars to see what it could see. The camera takes 1280x960 pixel images with 12-bit gray scale output and can only integrate to a maximum of 4 seconds. The lens is a standard M12 web camera lens of 25mm focal length and 10mm aperture (f/2.5).



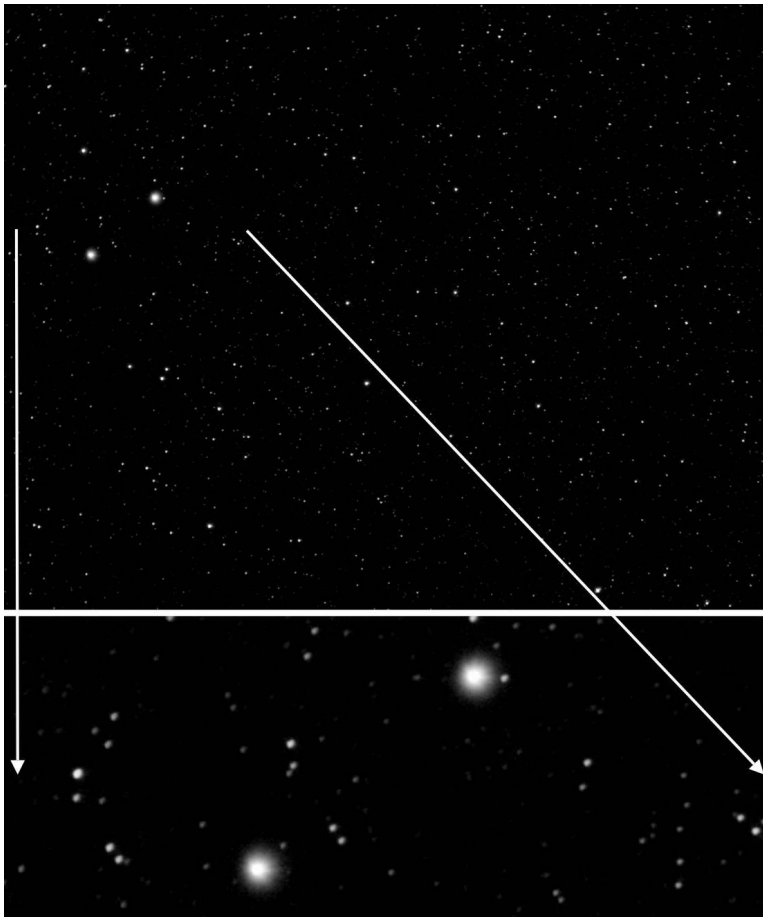
The first images were taken on April 3, 2021 by resting the camera on

a table pointing straight up, completely un-tracked. I made 100 x 2-second exposures (3 min 20 sec total) at maximum analog gain (I don't know the ISO) as well as 100 Darks, Flats and Bias frames. These were drizzle stacked and processed with Siril to produce the left hand image on the next page. Talitha Borealis and Talitha Australis in Ursa Major are the two bright stars in the upper-left of the image and the dimmest stars visible are <13.5 magnitude.

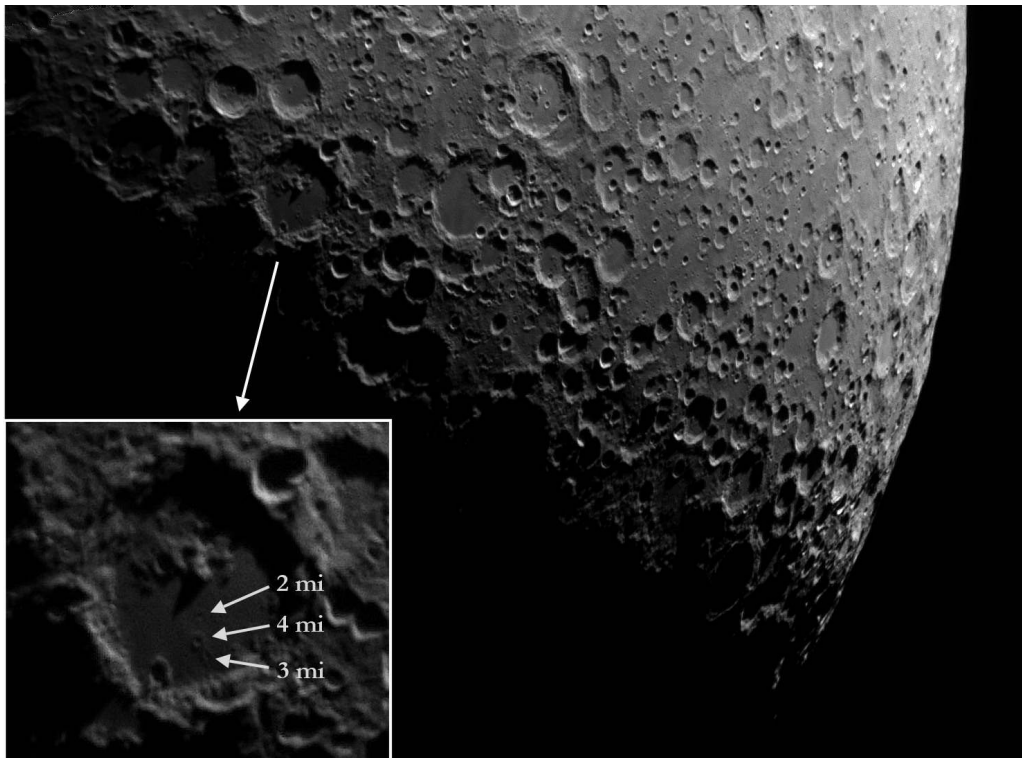
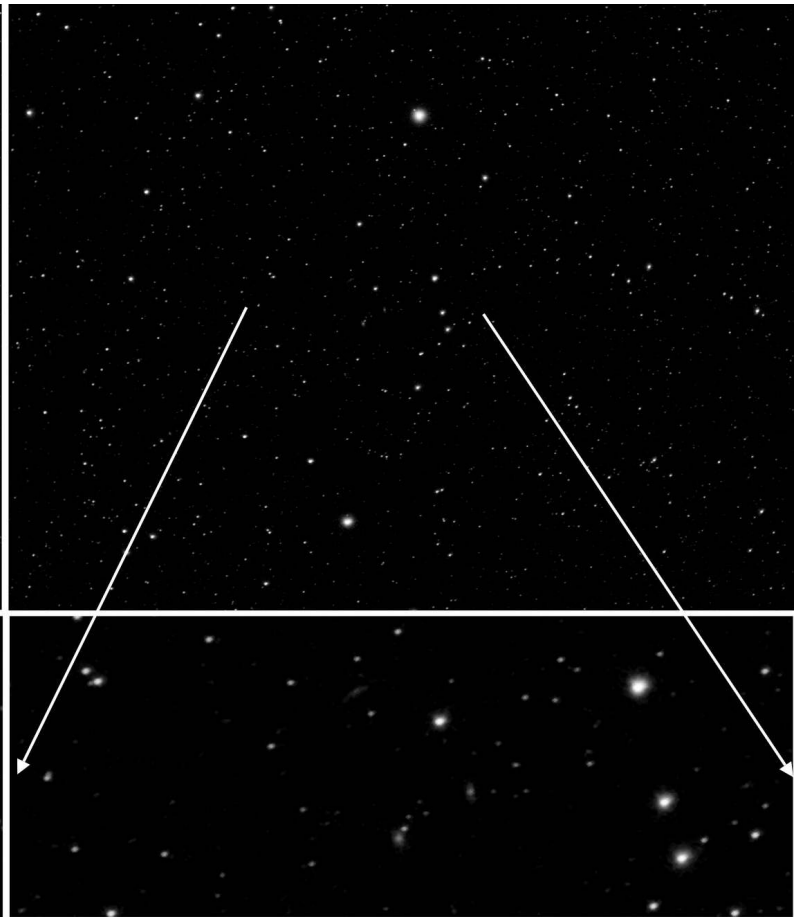
Next I decided to see if I could pick up any galaxies with this diminutive lens and so I pointed it in the area of the Leo Triplet and took 50, 4-second exposures. These were again drizzle stacked and histogram stretched with Siril to produce the right hand image. Sure enough, the three galaxies are faintly visible in the center of the frame. Limiting magnitude is <13.5.

Finally, I decided to try the June 19th first quarter Moon shot through a 6" f/8 Dobsonian. I removed the 25mm lens and screwed on an M12 to 1-1/4" adapter but found that the scope didn't have enough back focus, so I removed the adapter as well as some bits from the draw tube and

Talitha Borealis and Talitha Australis



Leo Triplet



hand-held the camera to the telescope while also manually trying to keep the Moon in frame! The results were surprising considering the gymnastics involved... I used Siril to stack about 170 images, then cropped and applied a very slight amount of wavelet processing to enhance the craters.

Post Processing with Deep Sky Stacker (DSS)

By Paul Walker

Many people producing high-quality images online are beginning their processing with DSS, so it's for both beginners and advanced astro-imagers. A reminder, this software is free. See

the article in the Spring 2021 for basic instructions for stacking your images with this software.

This article is intended mostly for the beginning astro-imager. Therefore I have included more detail than some may need. Even those with experience may want to consider stacking with DSS and using it for the initial post processing.

Stacking with DSS is simplicity itself (see article in the Spring 2021 Morning Star). For those who like more control over the process it has that as well. The post processing is somewhere in between. Though they recommend other software, with DSS I was able to produce very good results with a stack of 51, 45 sec exposures of M51. DSS doesn't have a lot of post processing features but it has enough and enough nuance in the controls it does have that it will likely be a bit of a challenge for the budding astro-imager with no image processing experience.

At first, I was going to create step by step instructions, similar to what I did in the last newsletter with the basic instructions for stacking images with DSS (see the Spring 2021 Morning Star). I found it was going to take a lot of

screen shots. I also knew there is an on-line user's manual (<http://deepskystacker.free.fr/english/index.html>) on the site for downloading the program (<http://deepskystacker.free.fr/english/index.html>), so I checked it out.

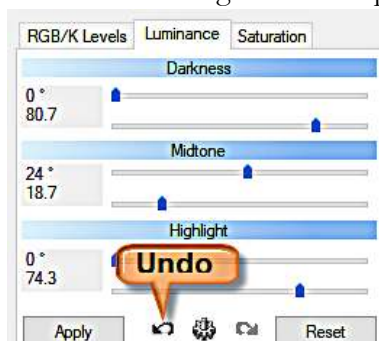
I found the users manual is a good starting point so I'll just add in a few useful tips. But first, read the part of the manual labeled "Processing Tab".

- 1) Draw a box around a small portion of the image by placing the mouse



pointer on the image, pressing and holding the left mouse button and dragging the pointer. While you are making adjustments to the image this will save time by limiting the applied processing to this box. To undo the selection, left mouse click anywhere on the image.

- 2) Based on my limited experience with DSS, I would suggest one start with the Luminance tab, Midtone sliders. As the on-line instructions say, this will affect the pixels in the middle range of brightness (nebulae and galaxy arms).
- 3) Until you get some experience move one slider at a time.
- 4) Also start by moving the sliders only a little at a time. Often this is enough to make a notable difference. As you gain experience you can be more adventurous.
- 5) Press the "Apply" button to see the results.
- 6) To undo the change, press the "undo" icon. Pressing undo multiple



times will undo multiple processing steps. To undo all processing steps press the "Reset" button.

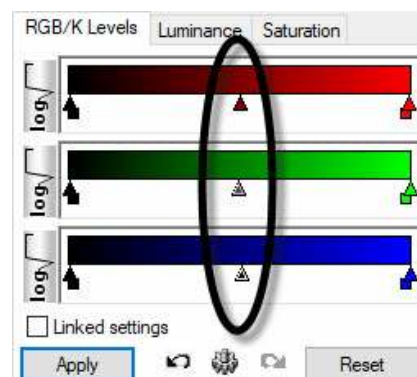
- 7) There is some overlap and therefore interaction between the Midtone and Darkness sliders so you will likely see the background get brighter as you brighten the mid-range. Use the darkness sliders to bring the darkness of the background back down some. Some people like the background to be black when they are done others prefer dark gray. Dark grey will preserve the faintest details but black or almost black is often more aesthetically pleasing.



- 8) The results may not show much color at this point. So you may want to go to the Saturation tab at this point. This function will bring out any color in the image. Moving the slider to the right increases the intensity of the colors.



- 9) After increasing the color saturation you will likely find the background has a color cast or the main subject looks too blue or green or red, go the RGB/K Levels tab (the image above has a greenish tint due to use of a light pollution filter). Here you can do what's called color balancing. You will mostly use the center (or mid-range) control on one or two of color sliders. I have found these to be very sensitive, requiring very small movements. The triangles on the left control the



low range (dark portions), the ones in the center the mid range (mid brightness pixels and the ones on the right the high range (brightest pixels). I have found, so far, that I have had the best luck with only moving the center ones. You will find you only want to adjust 1 or 2, not all 3 of the colors. Though you may have to tweak the mid-range on one color and the high range on another. Most objects have subtle colors when imaged with standard DSLR camera. If you have a camera that is designed for astro-imaging or a DSLR that has been modified for astro-imaging, (red) hydrogen emission nebula will show more intense color and may extend over most or all of your image. With these images the finished image should actually have a reddish cast in at least parts of the background sky. Galaxies like M51, the Whirlpool galaxy "below" the Big Dipper's handle should have neutral gray background. There will be "clouds" of young hot bluish stars and some red hydrogen emission nebula. Old stars in the central halo will have a yellowish to reddish tint.



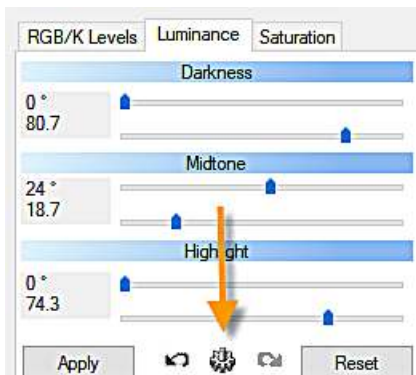
- 10) Another round of adjustment using the Luminescence sliders may be in order, or not. A nice thing about astro-images is there is no one right result. Some will consider some

MEMBER'S IMAGES



results more aesthetically pleasing than other results but as with artists painting pictures, it's up to the "artist" to decide the result they like. Both this image and the previous one are fine ending points. You can also save the image, re-open it and do another round of processing. You will note when you open it that the software automatically analyzes the image and applies adjustments so the image will look quite different than the one you saved. But don't worry, the saved image is still on the hard drive unchanged.

- 11) You can save all the adjustments you applied to your image. This is in the on-line manual but worth mentioning here. Click on the gear icon, type a name into the top box and click on "Add". To load and use a saved



setting, select the name from the list in the lower box and click on "Load". I can see where this could be useful whether you use just one exposure time/ISO setting or multiple combinations. You will likely have to do additional adjustments as each object is different and sky conditions vary.



Rosette Nebula (NGC 2244) By Richard Whitehead

This is my SHO rendering of the Rosette Nebula (Caldwell 49) or the "Flaming Skull" Nebula as I like to call it. A beautiful winter and early spring deep sky object sitting to the left of Orion. Subs were shot in January, with an additional session in April when it was very low in the sky.

The Rosette Nebula is an HII star forming region lying about 5,200 Light Years from earth in the Monoceros Constellation and spans a massive 65LY across. The bright stars at its center (NGC 2244 or Caldwell 50) are associated with the nebulosity, having formed from the gas and dust, leaving the hollowed out center "Eye socket" ?? But you can still think of it as a Rosette if you like.

Scope: RASA 11", Mount: Celestron CGX, Camera: ZWO ASI 6200 MM Pro, Filters: Astronomik 12nm Ha, OIII, SII. All 5 min subs, 3 hrs Ha, 1.5 hrs each OIII, SII. Location: Vermont and New Mexico. Processing: Pixinsight and PS 2021



M13 (Globular Cluster in Hercules)

By Richard Whitehead

As some of you know, I've been installing a telescope in New Mexico and it's been quite a complex process. I just got a better adapter on the camera and this isn't perfect but the first pic I'm semi happy about. There are a number of other little problems to attend to But it's starting to show it's potential. This is a full frame (no crop) at 2560mm f.l. f/7.

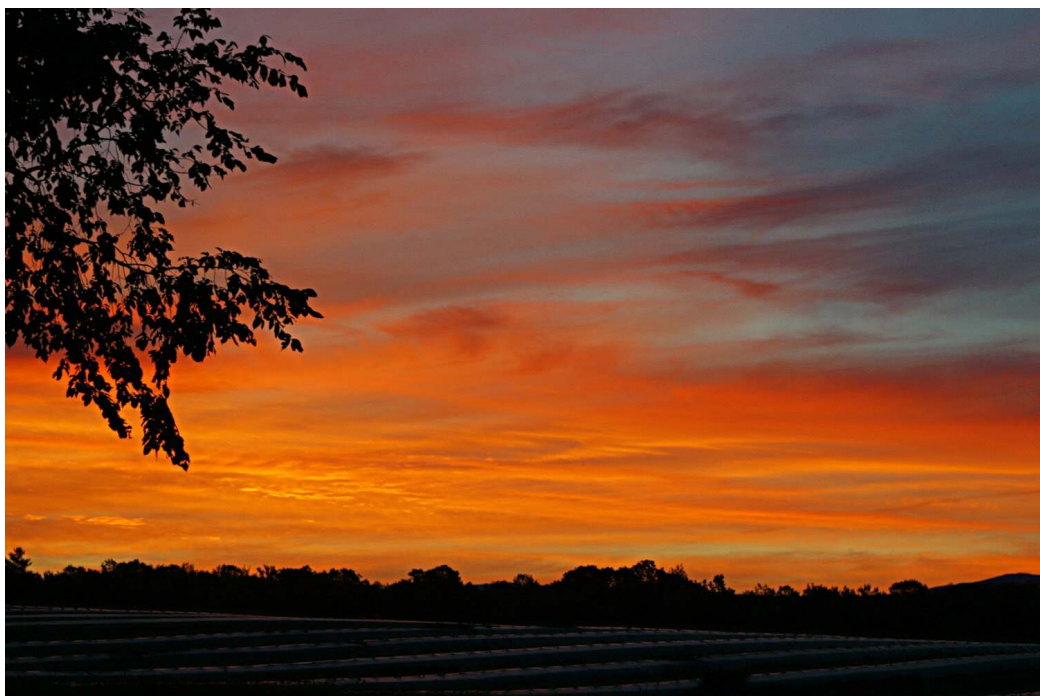
Planewave CDK 14 on L350 mount, ZWO ASI 6200 MM pro 62 MP cooled camera, 2x2 binned L 120sec x 40, RGB each 180sec x 20, Pixinsight/ PS 2021, no darks or flats. Animas, NM taken in early June.

The following are images of the partial solar eclipse taken by VAS members

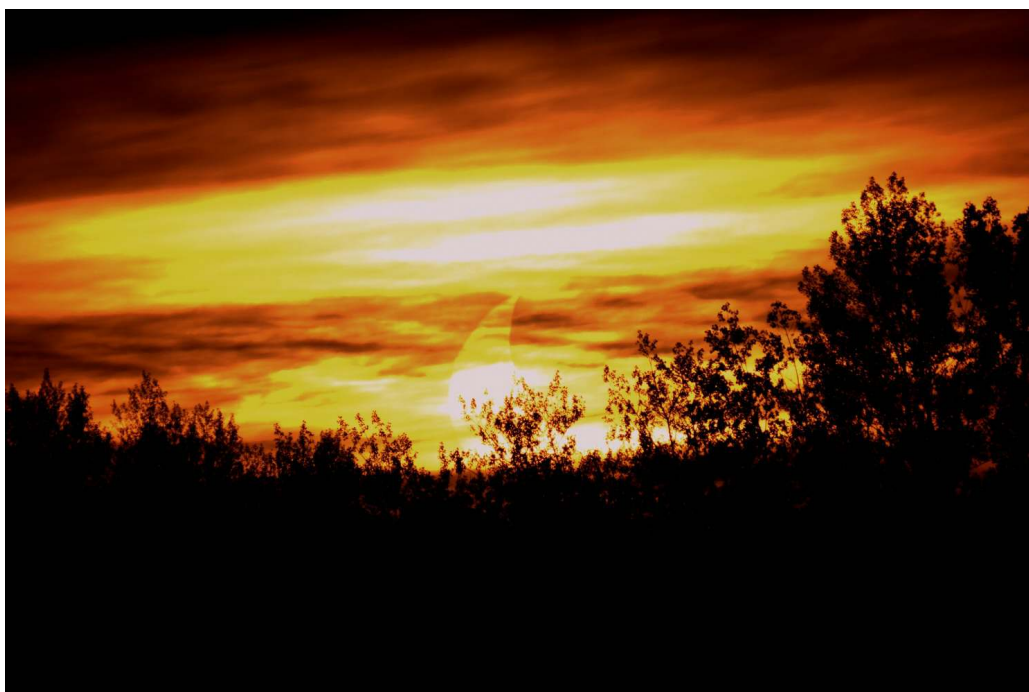


By Paul Walker

5:07 AM, waiting patiently at Dennis's for the Sun and Moon to rise.



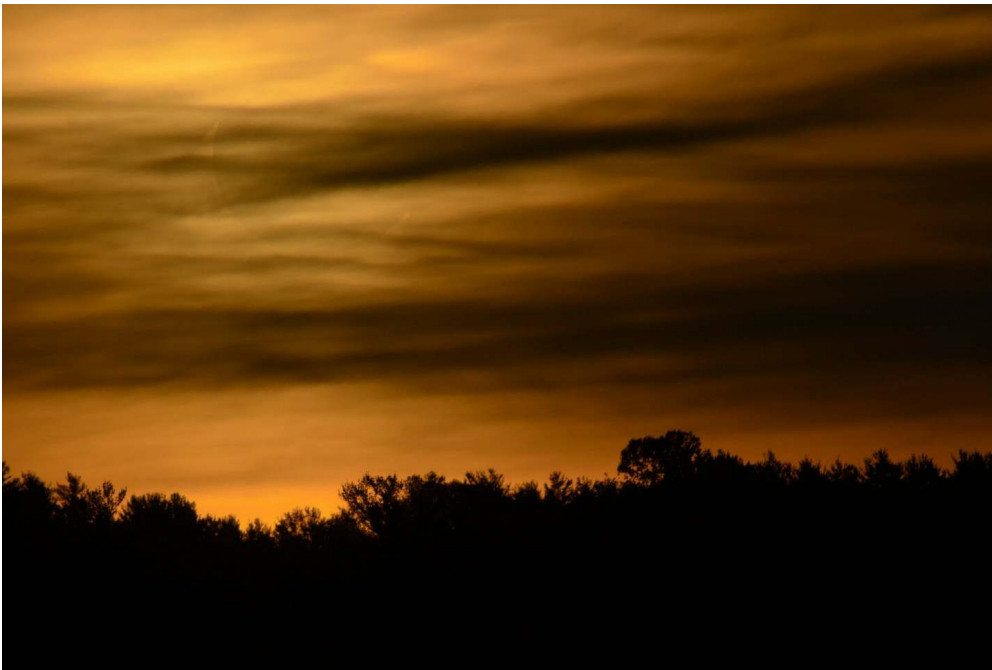
By Paul Walker
4:52 AM. We were greeted by beautiful
sunrise colors.



By Joe Comeau
This among the earliest images taken.



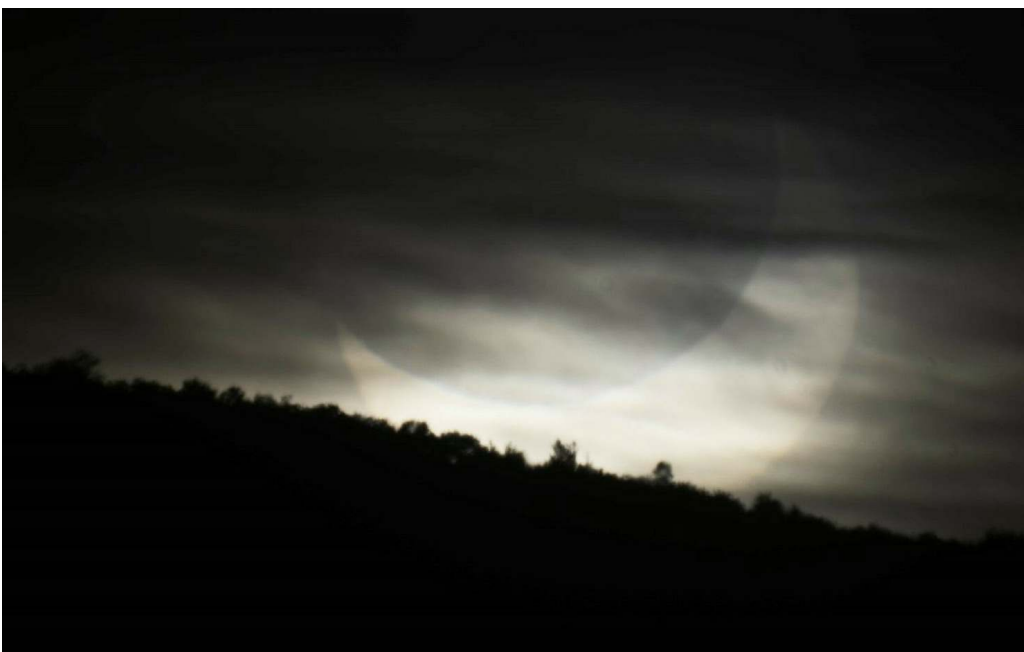
By Richard Whitehead



By Greg Warrington
About 5:23 AM. The Sun is just visible on the left through the clouds. This image is without the solar filter. The sun was just under 2 degrees above the horizon.

Nikon D5600, 600mm lens @ f/11, 1/1000sec, ISO 100.

By Terri Zittritsch
From South Burlington at 5:37 AM



By Lawrence Garrett



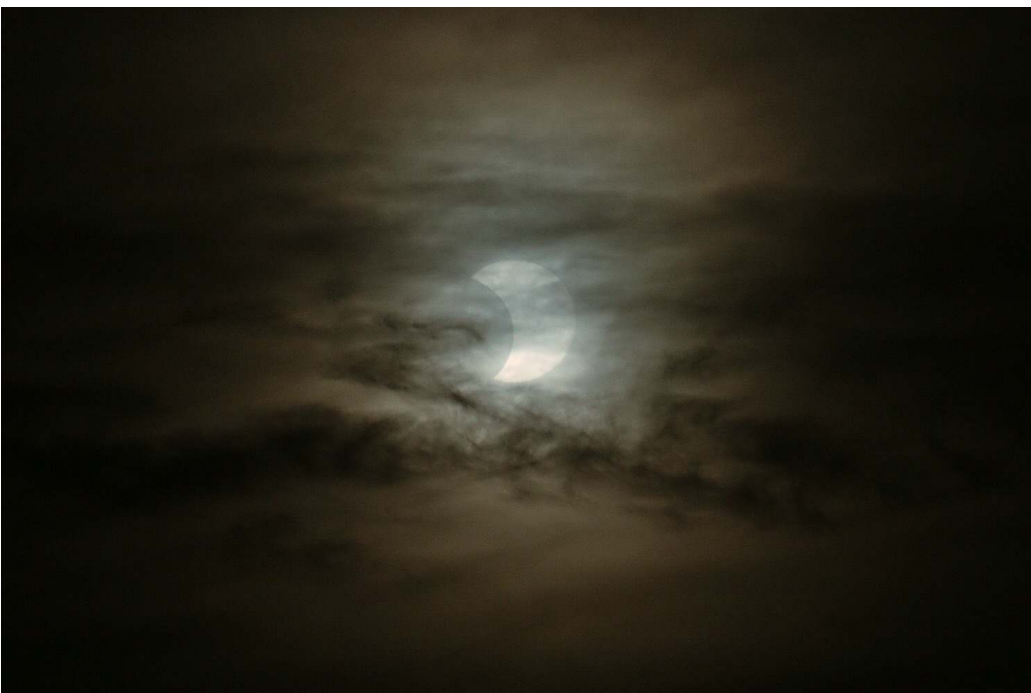
By Joe Comeau



By Richard Whitehead

5:40 AM

SONY A7rI camera, 600mm Sigma zoom,
1/250 sec., f/6, ISO 800.



By Paul Walker

5.45 AM

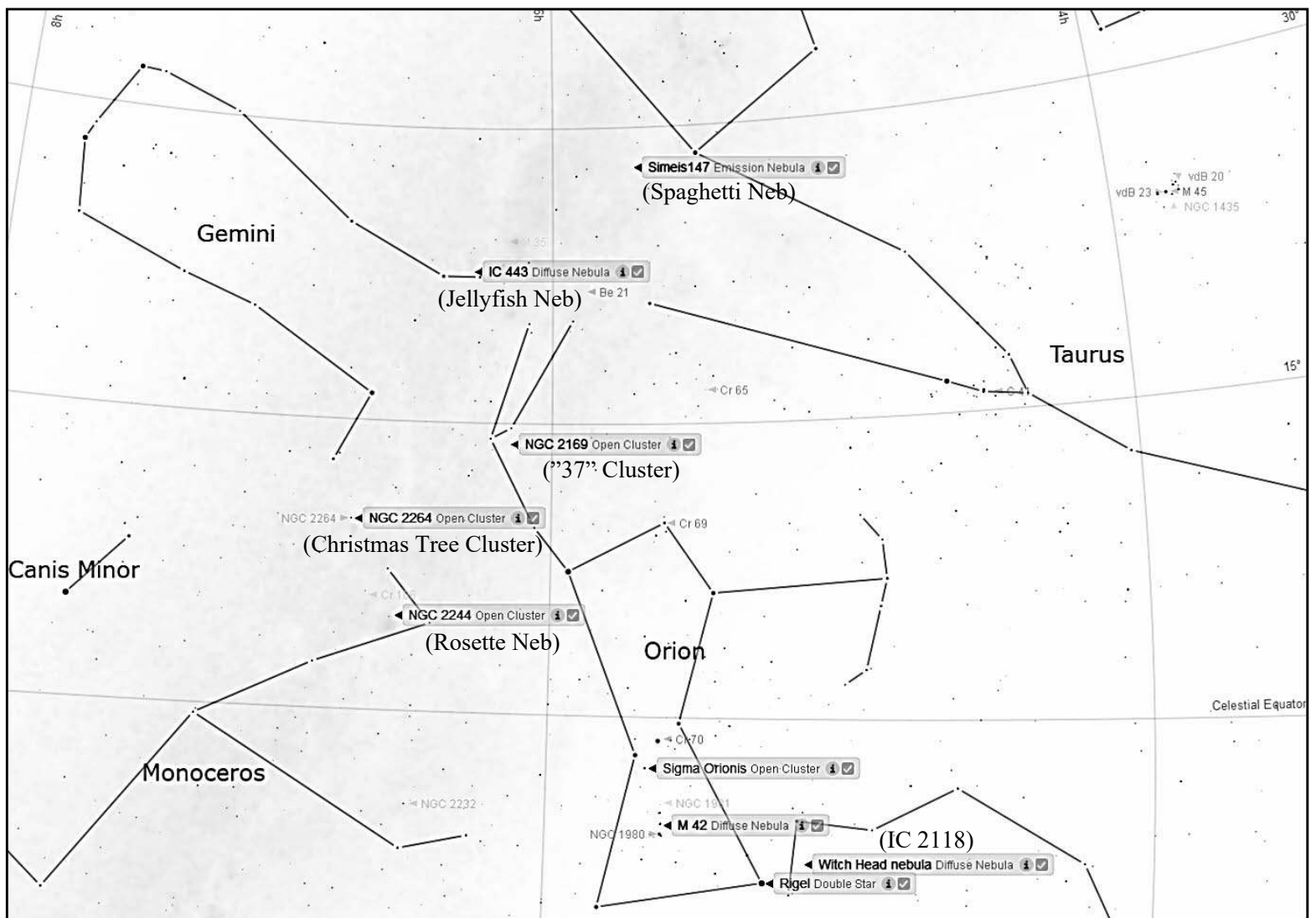
Canon Rebel T7i, 75-300mm lens @
300mm f/5.6, 1/20th sec @ iso1600, Baader
photographic solar film.

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

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

For the Rosette Nebula, see the chart below.

For M13 see the charts on pages 16 and 17.





**Moonset In the Grand Canyon
By Joe Comeau**

Here is a picture from my rafting trip to the Grand Canyon. The Camera was a Panasonic Lumix with a 400 mm lens.

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

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 have mini milling machine and a mini lathe.

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

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

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.

Telescopes for sale:

1) Takahashi FC-100DC - this optical tube assembly is in near-mint condition and includes the upgraded Takahashi MEF3 fine focuser and Takahashi clamshell holder: **\$1900.**

2) Edmund Scientific Astroscan - a nice, collimated made-in-Japan specimen of this classic telescope with clean and surprisingly good optics. Includes the original mount, strap, and dust caps - **\$160**

Mount & tripods for sale:

1) Scopetech Zero alt-az mount - excellent condition. Includes ADM slow-motion knobs: **\$315.**

2) Manfrotto 475B geared tripod - good condition: **\$275.**

3) Berlebach Report 212 tripod - like-new condition: **\$275.**

Combination:

The FC-100DC + Scopetech Zero + either of the tripods that I listed makes for an outstanding alt-az refractor setup. I'll **reduce the total price by \$50** if you would like to purchase these together.

Eyepieces for sale:

1) Tele Vue 3-6mm Nagler Zoom - like-new condition: **\$300.**

2) Tele Vue 27mm Panoptic - like-new condition: **\$250.**

3) Meade 12.4mm "Research Grade" wide-angle (70°) - excellent condition: **\$60.**

Binoculars for sale:

Zeiss Jenoptem 10x50 wide-angle (73°) - beautiful, clean, collimated pair that includes dust caps, strap, and the original leather case: **\$225**

Contact Siddhesh (Sid) Mukerji at siddmukerji@gmail.com if you're interested. I'm happy to answer questions.

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)



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)

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

10" Telescope Kit

Parts for a 10" Newtonian Telescope (used), these were in a home-made Dobsonian scope that was build many years ago. The tube assbly and base were in bad shape so we discarded them.

Includes:

10 inch f/5.5, lightweight (1") mirror, Pyrex glass.
Heavy duty 9 point floatation Mirror mount (Kenneth Novak & Co.)
Diagonal mirror (2.5" minor axis)
Diagonal mirror mount
1.25 inch rack and pinion focuser
Mirrors are usable as-is though could use re-coating.

Asking \$75 or best offer

This was given to the club and is being sold by the club. It is located at Paul Walker's house.

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

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

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:ContactKeithLawrence@together.net)