



# Morning Star

## Spring 2021



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

#### Announcements

Check out our new Member Forum on our web site, 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 as well 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

If interested in this position contact Jack St. Louis or Paul Walker.

#### 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 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](mailto: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](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

**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 President and Secretary)  
[webmaster@vtastro.org](mailto:webmaster@vtastro.org) (Goes to Secretary and Webmaster)

#### Board Members

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Paul Walker	Sec'y	388-4220
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(My apologies if I missed anyone)

## Stargazing and other Events

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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 mail 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](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

**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:

Members are welcome to use the Hinesburg Observing Site. Please use precautions when more than 1 person is there. For those on the [observing@vtastro.org](mailto:observing@vtastro.org) email list, as always it is at your discretion as to whether or not to send a notice via that email list.

Remember to follow appropriate social distancing and mask usage recommendations. Other restrictions for us is no sharing of eyepieces, so you will have to bring your own to look through the club's or other member's scopes and a recommendation of wearing gloves of some type when using someone's scope (could be light cotton or leather or the rubber kind)

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 likely not have public events for the next few months.**

#### June 10<sup>th</sup> Partial Solar Eclipse

Time: ~5:15 AM

Location(s) TBD

This is an early morning event.

The eclipse will be at it's midpoint just after sunrise. The Sun will only be 4 degree high, the width of 2 fingers at mid-eclipse (5:40 AM EDT). If we are lucky there will be sunspots to add it the view.

**Always use proper solar filters to view the Sun.**

The club is planning observing at 1 or more locations for this event. Contact Jim Bosek if you are available to help at 802-879-1697 or [jamesbosek@yahoo.com](mailto:jamesbosek@yahoo.com).

### 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. Airs 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>

### 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)

Nothing scheduled yet

### New Members

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

Damien Leonard  
Tim Shea  
Ebenezer (Eben) Gay  
Kate Hill  
Carrie Cruz  
Lisa Kirchberg

## 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 5

**Buzz Aldrin and Orbital Maneuvers**  
By Christopher Mauro of the North Jersey Astronomical Group

Objective: Present the highlights of Apollo 11 Astronaut Edwin "Buzz" Aldrin's contribution to the science of orbital maneuvers, specifically spacecraft rendezvous and docking.

The presentation begins with a brief discussion of the historical perspective of the United State's space programs - Gemini and Apollo, and Buzz Aldrin's role in those programs and his doctoral thesis: Line-of-sight Guidance Techniques for Manned Orbital Rendezvous.

The presentation proceeds with a discussion of the science of orbiting objects. Defining an orbit mathematically, different types of orbits, orbital decay, orbital and escape velocity, changing orbits, Hohmann transfer orbit, O'berth sequence, rendezvous and docking maneuvers with relevance to current and future missions in space.

Buzz Aldrin's contribution to spacecraft maneuvers is then presented with an overview of his doctoral thesis including basic assumptions, velocity matching, measuring changes in range and rotation of line of sight and use of computer simulations to model spacecraft rendezvous.

The presentation concludes with the Hall of Fame of scientists who made space travel to other worlds a reality including Buzz Aldrin.

### Bio of speaker:

Retired Information Technology executive managed the design and development of business systems solutions including mathematical models and simulations. Avid amateur astronomer and photographer. Pursued additional education in science, history and astronomy.

Joined the North Jersey Astronomical Group in 2016. Participated in community outreach and public telescope viewing events. Developed and presented talks on The History of Events Leading to the First Manned Lunar Landing and Orbital Dynamics and the Contribution of Buzz Aldrin "Dr. Rendezvous"

### May 3

**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.**

### June 7

**So You Want to be an Astrophotographer**  
By Terri Zittritsch  
Terri's first astro-imaging setup.



I've been a lover of the starry skies and all things Astronomical since I was a young child after my parents purchased me a big book on the Solar System and all things having to do with space. After that they bought me a couple of telescopes, one of which I had into early adulthood.

I purchased my first real telescope after starting a career at IBM, an 8" LX5 and upgraded that to an 8" LX90 a decade or two later. During this time I was also an avid photographer for most of my adult life, being a fan first of Kodachrome slide film and then becoming an early adopter of digital SLRs.

At some point 10-12 years ago I decided to marry these two hobbies together and dip my toes into astrophotography and slowly experimented my way to where I am today, which is still an amateur, but love to look at the things I image, which is what matters to me.

What I'll share here is less theory and more practical lessons I've learned in starting astrophotography and maybe help you avoid some of the lessons I had to learn the hard way if you're just starting out.

## Articles

**Telescopes for Beginners**  
By Keith Lawrence



4 1/4" version

How many times have you been asked "what is a good telescope for a beginner"? With this question in mind, I have begun a program called "First Telescope". The goal is to provide a good working instrument to help members be successful with their first venture into observational astronomy.

I renovate small Newtonian telescopes, build easy to use Dobsonian mounts and make them available to members of the club at reasonable prices. At this point I am working with 4 1/2" and 6" telescopes.

Here is how the program works. A customer buys a telescope-

**4 1/2" - member price \$100  
(non member \$125)**

**6" - member price \$150  
(non member \$175)**

A customer may return the telescope within 1 year for a full refund if still in good condition. After a year the return value will be dependent on condition. I offer this return police in case they decide to upgrade on their own to a larger telescope or they find that the telescope is just not being used.



**Close-up of Dobsonian base showing storage compartment and eyepiece rack.**

So if you have old equipment I can use for this program (focusers, eyepieces, finders, telescopes, etc.) please contact me 802-453-5496 or email (sleepingbearwoodworking@yahoo.com).

## Notes on Perception

By Lisa Kirchberg

Merriam-Webster:

Perceive-

1a) to attain awareness or understanding of 1b) to regard as being such 2) to become aware of through the senses

Greetings fellow astronomers! 'Perceptions' will be a new section in the Morning Star newsletter. My intention for it is to share interesting and practical information on how we perceive objects and how to develop and increase this ability for enhancing star gazing.

Perception is intimately connected to our senses and thus, our brain. In one of Kepler's writings, "On the nature of light", he states that "light flows in all directions from every point of a body's surface; it has no matter, weight or resistance- the motion of light takes place not in time but in an instant. (in momento) light is propagated by straight lines (rays) which are not light itself but its motion."<sup>1</sup>

We perceive the objects of the sky through our eye's ability to take in light and our brains ability to interpret the light that lands on our retina. For solid objects, like Mars, the color that we perceive a given object to be, is the wavelength that that object absorbs. Color information is pickup up by 3 types of Cone cells in our eyes, one is sensitive to red wavelengths, one to green and one to blue. The Rod cells of our eyes are much more sensitive to light and allow us to see in low light conditions. However, there is only one type of Rod cell so we can only see varying shade of gray with them. The human eye is not the most adept at this. For instance, a cats pupil dilates to a much greater degree than a human eye letting in more light and provides a greatly increased ability to see in low light.

I am sure that everyone know that observing the celestial sky improves as we allow our eyes to adjust to the darkness. The Rods cells in the eye take time to adjust to the darkness and become sensitive to the available light. "In extreme darkness, over a period of 30-45 minutes your iris will open up even

more and your rods will begin to respond to the dark more. This is called 'dark adaptation'."<sup>2</sup> So, as you set up your telescope, which also needs time to adjust to the outside before 'ideal' viewing, you have just the right amount of time for that midnight snack!

The sciencelearn.org.nz, is a New Zealand government web site for environmental information. Here are some 'Alternative Conceptions About Light' to contemplate from that site; 1. Light keeps traveling in a straight line until it hits another object. The evidence for this is that we can see a dim candle even from a distance on a dark night. We can see it because light from that candle has reached our eyes. Some of it has entered our eyes and causes us to see an image. 2. Light travels the same distance during the day time as at night time. The 'glow' seen around a flame does not represent how far light travels. Light keeps traveling until it hits something else, such as a wall, the retina at the back of our eyes or another object many miles/kilometers away. 3. A shadow is simply an absence of light. A shadow is caused because light travels in straight lines until it hits an object. If none of that light gets past the object, the whole region after that object will have less light reaching it. This shadow region is the whole region between the object and the ground or wall, not just the outline that appears on the ground or wall. 4. Rough surfaces do reflect light. This is called diffuse (or irregular) reflection. The reason we can see objects like a person or a tree is because light is reflected off that object and traveling in all different directions. 5. Light takes time to travel through space at 186,000 miles per sec. or 300,000 kilometers per sec. In a darkened room when a light is switched on, it gives the impression of instantaneous illumination. Light still takes a very small fraction of a second to reach the walls.

On May 26 of this year, there will be a Lunar Eclipse, a total eclipse for some areas of the world, but here, a Penumbral Lunar Eclipse. Penumbral eclipses are when the moon moves through the brighter outer part of earth's shadow- call the penumbra. This word, broken into two parts in Latin;

the root being umbra meaning 'shadow' and pen meaning 'almost'. The eclipse will begin at 4:47 AM, it will peak at 5:15 AM with a magnitude of 0.480 and finish at 5:18 am.<sup>3</sup> Be sure to view in a high, flat place if possible as the Moon will be sinking into the western horizon upon sunrise. Let's remember while viewing the May eclipse that it is not just the area that we see shaded on the Moon that is in the shadow of the Earth, but all of the space "behind" the Earth is at least partially blocked as the light from the Sun travels out into space, if there where anyone 'out there' beyond the shadow to see it.

I invite you to observe daily shadows in your life between now and the next newsletter and log any interesting things that you notice.

And, lastly, here is a fun memory game available on youtube; <https://youtu.be/fTvpmFFBf5M>

- 1 plato.stanford.edu/entries/kepler/
- 2 fortworthastro.com
- 3 timeanddate.com

## Board & Committee Meetings

### Board Meetings

#### January

Jack opened the meeting. The COVID-19 status was discussed, we will continue to follow social distancing recommendations which for us includes not holding group observing events. Jack will be doing a Zoom presentation with 6th graders in Essex Jct.

Joe- Received a request from a yoga class in Winooski to have a tour of his observatory. He also has a request from a school to do a presentation.

Doug- Updated us on the financials.

Jim- Eclipse Committee- With a partial solar eclipse coming up this June that will be visible from Vermont he is thinking of changing the name of the committee to the Astronomical Event Committee and using the partial eclipse as practice for the 2024 total solar eclipse.

Paul- Scott Turnbull has requested Full Membership. The board approved his request. A vote will be put to the Full Members.

Terri- Bought an old Edmunds Astroscan telescope from Siddhesh (Sid) that she plans to use for outreach activities.

MOTIONS: None

ACTION ITEMS: None

#### February

Jack opened the meeting and updated us on the solar farm project next to our observing site. Hinesburg has approved the project (the town solicited the project). It will be a 150Kw system and occupy part of the capped landfill northwest of our site. When completed it will have no impact on our observing site, parking area or observing. There will be no outdoor lighting. During construction a good part of our parking area will be fenced off and used as a temporary storage and staging area. They will provide us access to the observing area by cutting down some of the trees on the north side of the parking area (near the port-a-potty). Access to the observing area will be from the East side of the Warming Hut only. Work planned to start on or shortly after May 1 and will take about 10 weeks.

Doug- Updated us on the financials. Members can request this info. Paid liability insurance and PO Box in Williston. Received check from Fletcher Library for the Library Loaner Scope they purchased from us.

Paul- Richard Whitehead has requested full membership. We discussed it and approved his request.

Keith- We have requests for 3 more Library Loaner Scopes. From Stowe, South Burlington and Charlotte. Keith has permission to order 2 more scopes (it's not known whether they will all decide to get scopes).

Jim- Looking to set a date for the first Observing Event Committee (for public viewing of celestial events).

MOTIONS: None

ACTION ITEMS:

#### March

Jack opened the meeting. Another update on the solar farm project next to our observing site. They wouldn't start building until next Spring. He sent out a notice to the membership that Stella-fane will happen this year.

Doug- Updated us on the financials.

Jim- The Eclipse Committee met. For the June 10 partial solar eclipse they are looking for places with low eastern horizons as possible sites from which to observing it. A few possible sites have been identified.

Terri- She is starting an astro-imaging column in the newsletter.

Keith- When planning and getting together for club member and public viewing events we will follow the CDC and state guides in place at the time.

We have several donated telescopes in the Warming Hut at the Hinesburg Observing Site (HOS). The board is letting Keith use any that are suitable in his First Scope Program.

Jack- Doug is stepping down from the Treasurer's position. Doug has been planning this for some time. We thanked Doug for his service.

#### VAS Membership Committee

No meeting was held this quarter.

#### Observatory Site Committee

No meeting was held this quarter.

#### Newsletter Survey (Summary)

By Paul Walker

With the help of Terri Zittritsch, Maura Kelley and Scott Turnbull we conducted a survey for input about the newsletter. Thank you.

And thanks to the 36 members who took the time to participate in the survey. The overall response was very positive. 83% of the respondents Always or Usually read the newsletter (53% always, 30% usually. 14% rarely or never.

Of those that read the newsletter regularly, most read most of the sections (77-90%) with "Under the Stars and Planets" getting the most attention and "Wanted/For Sale the least).

94 % are satisfied to very satisfied with the content, 1 person neutral and 1 very dissatisfied.

15 (42%) of respondents have contributed at least once, 9 (25%) occasionally and 4 (11%) often. 3 have considered contributing a regular column.

When it comes to what people liked didn't like, the responses pretty much canceled out. For what you would like to see less of, most couldn't think of anything, a couple said less astro-photos and a couple less non-VAS articles. What you would like to see more of- suggestions for objects to observe, observing reports, observing tips for beginners, how-to articles, beginners section. Also Astro-imaging tips, basic astro-imaging processing steps, astro-imaging articles on equipment for various objects.

Beginning this issue of the newsletter you will see 2 new sections, the Observer's Corner with observing tips, articles and objects to observe and the Astro-Imager's Corner with imaging tips and articles.

## Under the Stars & Planets

### OBSERVER'S CORNER

#### Observing Tips

► Before you start each observing session check that your finder scope, red-dot finder (or other "unity" finder is aligned to your telescope. This can be done before it gets dark if there is a fairly distant terrestrial object you can use as target, which, unlike a star or the Moon won't move on you. Put your lowest power eyepiece in the focuser and center to target. For unity finders there is no need to fine tune the alignment by using a higher power eyepiece. This can save a lot of time searching for objects.

► When searching for an object start with your lowest power eyepiece. As you gain experience with your telescope and the location of your favorite objects you will find this is not always necessary.

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

► 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.

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

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

- One common place for humidity problems is the sky end of the finder scope. One thing that can help quite a bit is to use a dew shield. You can buy scope-specific shields, you can buy generic shields, or you can make your own. People have used a roll of cardboard (e.g. a toilet paper roll or paper towel roll can work nicely when blackened with paint or felt pen), sheets of foam, or very thin plywood. One rule of thumb I've heard is that it should be 1.5 times as long as your aperture is wide (I'd guess even longer is better).

- An alternative (or additional) trick is to replace the lens cap whenever you aren't using the finder. I usually check the humidity level before I go out, and if it's expected to be high I'll do this and usually get through a few hours without dew/frost.

- I apply the same method when humidity gets really bad for my eyepiece. When I'm sketching or checking charts for any time at all I put the cap over the end of the eyepiece.

\_\_\_\_\_

If you have other tips to share whether for beginners or experienced observers send them our way - [paulwaav@together.net](mailto:paulwaav@together.net)

#### Member's Observations

Most of the following come from [vtastronomy@list](mailto:vtastronomy@list) email communications so some you will already of seen much of it. This is a way to share it with those who haven't and preserve it

for those who follow. You may even find some observing tips hidden in here you missed the first time around.

### *A Jupiter, Saturn and Mercury Get Together*

2021-01- 10 from Lawrence Garrett

Don't know if skies have allowed you to even look forward to much of anything these days, but last night I saw the first night of the planetary trio of Jupiter-Saturn-Mercury at dusk, around 21h50m (4:50 PM EST). Its clearing here again and I hope to catch these as a near triangle tonight. Low, this is a binocular event unless you have great skies. Tonight, Mercury moves up to Saturn's level.

### *A Very Small Moon*

2021-02-13 Lawrence Garrett

While I stayed inside last night to avoid below zero temps., a few items came along to indeed find that little can be HUGE for sure.

Observing from the dining room picture window(not open), I watched for the very small Moon coming into view, and for a change clouds did NOT eclipse the show. Using 10x50mm binoculars at last spotted the 1.49% illuminated, 1.14 day old Moon at 22h33mUT (5:33 PM EST) and then at 22h47m naked eye. This Moon fell in a gap in the trees so despite being just 3.4 degrees high, the sliver of a Moon was visible for a very short time in twilight. The apparent "moonless sky" was anything but, a treat for those on the prowl for it. But I screwed up leaving my 90mm EXT packed away, gr-rrrrrr, next time.

2021-01- 10 Keith Lawrence

Thanks for bringing this up. I did catch the 3 of them on a sketch last night. I saw all 3 for just a few seconds as Saturn quickly hid behind a low cloud. Neat sight with 15 x 70 binoculars.

### *Vesta - Visible with the Unaided Eye?*

In the above mail Larry also wrote:

Later, I was reading the RASC, page 82-83, for an upcoming very bright opposition of asteroid 4

Vesta, another example of where little can be HUGE!

I could go into a long drawn out explanation, but to make things short here, the magnitude of 5.5Mv (visual magnitude) for Vesta is wrong! But just a little, but this little really places the hopeful naked eye observer in the field seeking a target that could be much harder than they expect.

Without getting too involved, Vesta is closer to magnitude 6.0 at the times of best viewing, March 1-15.

If you were to observe (from my house) at March 1 1h00m UT, GUIDE 9.1 states Mv 6.1, and JPL APmag 5.9. But, at this time, Vesta is only 25 degrees high (for me) so it will appear 0.3 magnitude fainter dropping it to magnitude 6.2-6.4! Add haze, seeing, and who knows what else, and that unaided eye favorable opposition sighting is out the window.

This "little" is really HUGE, perhaps placing an observer in the field with their project out of reach. But "little" comes to the rescue here, in the form of perhaps even the smallest of binoculars! I plan to try with my 10x 25mms binos, just about the only thing I have not seen an asteroid in yet. And larger ones too. Observing a bright Vesta with a single map, binoculars, and short night out, is exactly the way I got started in 1974 (in asteroids), and it has not gotten old yet!

I will put forward something for those who might want to try this later, or if you want write me right away.

Reply from Mark Moyer:

Many thanks for your email. I was particularly interested in your comments on Vesta. Seeing an asteroid naked eye sounds fun to me!

From what JPL says, it reaches peak brightness on March 5 at mag. 5.837, though it's fairly close to that for several days. Early in the evening it is very low, as you say, but it looks like later at night it's much higher (it culminates at over 60 degrees altitude) and so the effective magnitude is around 6.0 (I see you talk about [viewing] it at 8PM, but at midnight it's quite high).

Viewing late won't be possible very much before the 5th of March because

of the Moon, but after the 5th it should be good.

Does all this sound right to you? If so, then if there is a cloudless night in that timeframe, I'll probably give it a try!

Lawrence Garrett replies:

Very good message Mark. You are right in your comments, and Vesta can be seen naked eye, if all the pieces fall into place. I might try it too.

I have seen Vesta naked a few times, the first in 1974, very easy at the time at Mv 5.3 or 5.4, from Taft Corners no less, try that now! The RASC handbook error is off by just 0.337, but I have > seen so many times when I have spotted a 15th magnitude target, and that 0.34 mag. fainter target is just not visible. It's the edge of vision coming into play, ...

...Have you thought about the fraction of "visible time" yet? The percentage of time the object will be visible during, what I use, a 10 second look? At the cutting edge of this visibility, plan to try for a percentage of 3 to 5 %, that's right, 0.3 to 0.5 seconds of visibility of Vesta in a 10 second span. This was always the standards we used in the ALPO (Association of Lunar and Planetary Observers). If you see Vesta longer you are above this lowest standard.

Yet another reason I bring this 0.3 error up, there is just so much to it!!!!

All the more fun!!!!!!!!!!!!

March 7, 2021 9:33 PM from Larry Garrett:

I hope someone images Vesta tonight, with 81 Leo 2.47 degrees away, at MV 5.7, they may capture the colors of these to compare each other.

I'm just in and did just this in 20x80mm binoculars, to find Vesta indeed colored as described at S+T, and even a planetary glow. Vesta seemed more solid than the bright stars. But it's hard to believe this could be seen so easily. Perhaps being very near its maximum brightness make's all the difference too.

Please get some confirming sighting here, even with this, I will have to see this again to make sure seeing is believing.

Reply from Brian J:

I've noticed the non-stellar aspect of asteroids.

I forget which asteroid I was observing with my 10" Dob. at Stellafane but it was in a view amongst stars of similar brightness. To me it appeared starkly non-stellar. I even had Dennis Woos take a look and he was able to identify which object was the asteroid without any hesitation or foreknowledge other than me asking, "Which of these would you pick as the asteroid?".

Reply from Peter Gillette:

I'm just in from my observatory, too. I took a time-lapse sequence of Vesta, I think. I'll know better after I go thru the image sequence, which will wait till tomorrow. But I agree that it seemed bright, and steadier that I thought it would be, if, indeed, I was looking at the right object, which I'm pretty sure I was. Oh, and I thought the color was kind of creamy, not the sharp, almost blue-ish white of most stars.

From Mark Moyer:

I went to the observatory, one of my main goals being to try to see Vesta. I wasn't having much luck but once it got closer to culmination I spent some time on it and was barely able to see it naked eye. I could see hints of an area of brightness fairly easily, but seeing a pinpoint of light took work (I suspect the brightness of Theta Leonis was making it harder). Eventually I was able to see a pinpoint of light several times for about 1 second, but was never able to fix on it for longer (all of this is with averted vision, of course). Maybe the poor seeing was causing it to come in and out?

When I looked at it through the 18", it looked pretty much like a normal star to me, though I didn't spend much time on this.

3/8/2021 9:01 AM, Lawrence Garrett wrote:

For tonight if possible does anyone else have 20x80mm mounted or close try for color like I did?

Brian, what was the year and date you observed that resolved asteroid, remember which one?

Mark if you try again stop down the 18 inch way down, might too much light keep color away? You might think more is better but look how high [a magnification] those drawing were done in only a 10 inch, like 830x, that dimmed Vesta for sure

I plan to try my 6 inch also tonight but at just 37x to see if color is seen plus use my 20x80s again.

I really wonder just which shows color best, have I been overpowered all these years?

3/8/2021 10:51 AM, Paul Walker wrote:

On Brian's note about the non-stellar view of some asteroids and in particular Vesta one time from Stellafane. I didn't consider this as a possibility last night, the seeing may have been good enough (I could see the E and F components of the Trapezium last night so it was above average seeing). This morning in Starry Nigh Pro planetarium software I clicked on other info about Vesta. It's current apparent diameter is 0.47 arc sec across. So definitely large enough to appear non-stellar in his 10" scope [I'm not actually sure that this is true]. The theoretical resolution for a 10" under good seeing conditions (pertaining to splitting double stars) is in the range 0.3 to 0.5 arc sec.

We don't have any masks made for the 18", though it wouldn't be too hard to make one out of cardboard. Another easier way to improve the ability to see color in bright stars (or Vesta) in larger scopes is to de-focus the image a little. This has the distinct advantage that it can be done with any scope and fine tuned to the scope and the object's brightness. There is a "sweet spot" for the brightness, too dim and your cone cells (color detectors) don't activate, too bright and they saturate producing the impression of white. I like Peter's description of Vesta color as cream.

I have Gary's old 20x90 binos, maybe I'll give them a try. I should have de-focused my camera. Might get another chance tonight or tomorrow night.

March 10, 2021 4:53 PM from Lawrence Garrett:

Got to Vesta with 20x80s and my 6" telescope last night, and the off color

and planetary appearance. Peter describes its color as cream, and the Wikipedia shows an image for color that is "muted white" or cream I would say.

Still a ting of color beyond this seems present, perhaps due to eye persons response to color. Both binoculars and telescope agree on color.

Last night found me using my new 32mm Takahashi orthoscopic eyepiece for one of the first times in good dark skies. Very sharp 1.12 degrees FOV in my 6" telescope, right to the edge of the field. I bounced around on the beehive, M42, M35, and NGC 2908 with nothing but great views. I plan to compare this to my 25mm Kokusai Kohki next time out.

Caught the crescent Moon rising just north of Mount Mansfield this morning with Jupiter nearby and Mercury in binoculars. Great start to the day.

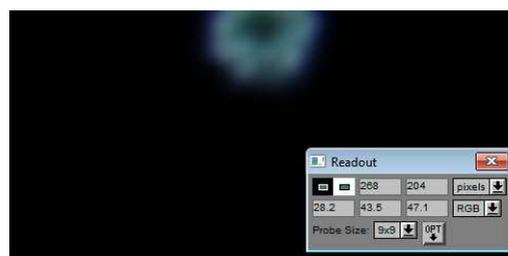
March 10 2021 from Paul Walker:

I took some out of focus images of Vesta last night to see what color it was. Larry didn't say what color Sky & Telescope said it is. But my images show that Peter's cream color and my very slight yellowish tint observations are born out reasonably well by the images.

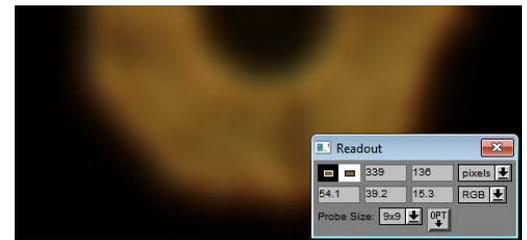
Note the Readout tool in the lower right. It shows the red, green and blue values as a percentage. I tried to get the images all about same brightness for better visual comparison. The colors are more obvious than viewing through a telescope. Images are cropped.



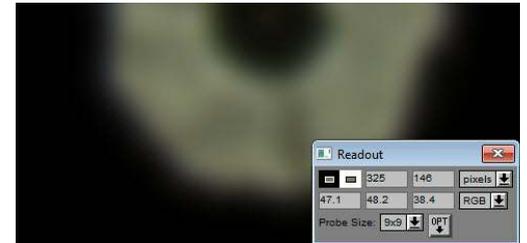
Vesta



Nearby Theta Leonis



Betelgeuse



Pollux

### **Local Meteor Seen and Heard on Sunday, March 7**

3/10/2021 11:27 AM, Paul Walker :

Did any of you see (or hear) the bright meteor at sunset (~5:38 PM) over northern Vermont, Sunday, March 7?

I didn't see it but was told about it, than forgot to check for info about it until the Times Argus newspaper sent an inquire to us via info@vtastro.org.

3/10/2021, 11:58 AM Terri Zittritsch

Yes, I was outside setting up AP, and though it was some kind of guard shooting range thing.. I'm in Williston and it seemed to come from the north-east from where I am.

It was quite loud. Had no idea this is what it was.

3/10/2021 12:06 PM Bob Horton

We heard it and it shook the whole house!

I took a note of it on my phone that the boom occurred at 5:42pm.

Saw the articles from WCAX and NASA (among others) that confirmed it.

3/10/2021 4:23 PM, Lawrence Garrett:

Here in Fairfax, my wife heard three booms, and asked me to see if there was a problem downstairs, but with my bad hearing in a back room at my home, I heard nothing.

I did get the BIG ONE here around 1971, when the smoke trail

hung around for more than an hour after the event. I was out with the scouts at the time.

3/10/2021, 4:45 PM, Paul Walker

I did the math. Bob said he heard it at 5:42 PM, 4 minutes after it was sighted. Newport is 55 miles from Bob's house. Well within the error band as the times are only known to the minute (sightings reported to be at 5:38) and not knowing exactly where the explosion occurred. 4 minutes @ 1,100 ft / sec gives a distance of 50 miles. Clearly it was a loud bang!

If I use the location information from the link that Maura supplied (<https://www.livescience.com/vermont-meteor-explodes.html>), the distance from the end of the arrow to Bob's house is about 50.5 miles.

3/10/2021, 7:40 PM, James Bosek

Yes we did hear it. Marcia asked "what was that?". I told her "I think a plane crashed". I looked for a pall of smoke and none was found by me. I then blew it off until I saw the story in the newspaper. Jim

3/10/2021, 8:54 PM, Bill Banke

As Bob described it, we heard and felt its effects. The whole house shook in Essex Junction. I thought a tree branched fell on our house.

### **VAS represented at the first Lowcountry Stargazers Messier Marathon**

Cale Shipman reporting from his winter abode in South Carolina.

I just finished my first Messier Marathon last night, March 12. It is something I have always read about and wanted to do, however as we all know...March in Vermont can be a challenge for an all-nighter. Since I spend my winters in Charleston, South Carolina and belong to an amateur astronomy club here, I finally got my chance. In a nutshell, it was a fantastic experience and even though I missed a couple of targets at sunset and a couple in the early dawn. My final tally was 105 of the possible 110. Admittedly it was a bit hard and boring once I got into the many galaxies around Leo and Virgo. 8 members of the Lowcountry Stargazer participated at our dark sky site down

near Kiawah Island. I even saw Omega Centari very, very low in the south along with a great ISS pass around 5:20 AM.

Apart from the usual banter about eyepieces, filters and focal length considerations, I was able to regale the group with stories about Stellafane and VAS (most of which were partially true).

Like everyone, this club is looking forward to doing public outreach again by the fall if the COVID vaccinations and some degree of normalcy return.

### **The Posidonius Adventure**

As Lawrence Garrett noted in his Lunar Gazette #39 one might think this is about exploring large crater Posidonius on the northeast edge of Mare Senenitatis (Sea of Serenity) with plenty of interesting features inside. Assuming of course you were familiar with Posidonius. But no, this is about trying to detect the tiny satellite crater Posidonius Y located on a wrinkle ridge out in the Sea of Serenity.

From Lunar Gazette #39- Posidonius Y, is listed as 2.0 to 2.2 km (1.2-1.4 mi.) in diameter in several sources, at just 1.07 arc seconds in the Virtual Moon Atlas (VMA). Suggested telescope size in the VMA is 12 inches.

Larry's notes from Gazette #39- I had not expected the shadows to be so absent. Normally I research my targets to death before approaching them for best results, but not this time, leaving me with unexpected adventure and discovery.

The dark feature Posidonius Y sought turned out to be a bright feature on a slightly less bright ejecta background. Indeed, sources online describe Posidonius Y as a bright spot, making the shadowing observed by Alberto Anunziato an example of just how much lunar angle of illumination can change a features appearance.

Peter Gillette - Reading the Gazette, and knowing that the sky is going to be good tonight, and that the moon will be a major factor, I started wandering around tonight's moon, via the Virtual Moon Atlas, which then caused me to revisit a most hallowed book of mine, titled "Full Moon", by Michael Light, published back in 1999. Do you have a

copy? It is almost entirely a collection of images from the Apollo missions, printed in very high quality, with annotations at the back of the book. Well worth a visit, at the least.

Paul Walker - Wow, great catch Larry. That is a tiny and low contrast crater to see with a 6". With my 10" reflector I have trouble with slightly bigger features on good nights. Reminds me of viewing the planets at the Hinesburg Observing site in the Fall of 2019 and comparing views in my 12.5" Dob to Terri's 6" APO (apochromatic) refractor. One night the 12.5" gave better views on another the much smaller 6" did notably better due to differences in the "quality" of the atmospheric turbulence (seeing).

Brian J. - It's good to see some reports from Visual Observers!

Seeing wasn't very good for me last night but I had fun cruising my favorite, Copernicus and its numerous secondary craters.

And the terminator in general. Was very neat to see multiple detached & illuminated, large peaks, floating in inky blackness right at the South Pole!

## **Things to Observe**

### **June 10<sup>th</sup> Partial Solar Eclipse**

This is an early morning event. The eclipse will be at it's midpoint just after sunrise, that is **if you have a low enough horizon**. The Sun will only be 4 degree high, the width of 2 fingers at mid-eclipse (5:40 AM EDT). 10 minutes later it is still only 6 degrees high, approximately 3 fingers above the true horizon and there will be notably less Sun covered by the Moon. If we are lucky there will be sunspots to add it the view.

**Always use proper solar filters to view the Sun.**

The club is also planning observing at 1 or more locations for this event. Contact Jim Bosek if you are available to help at 802-879-1697 or [jamesbosek@yahoo.com](mailto:jamesbosek@yahoo.com).

**Constellation of the "Month"**

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

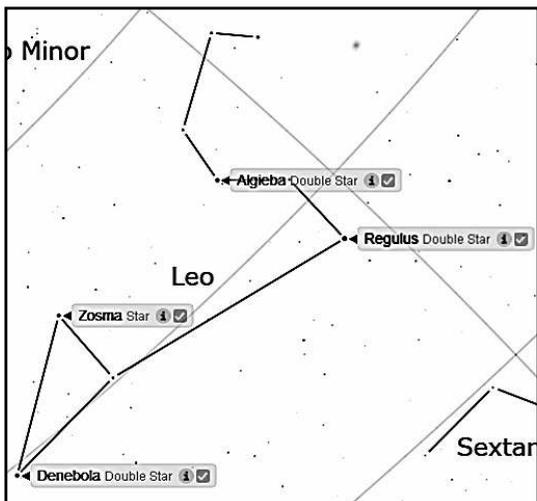
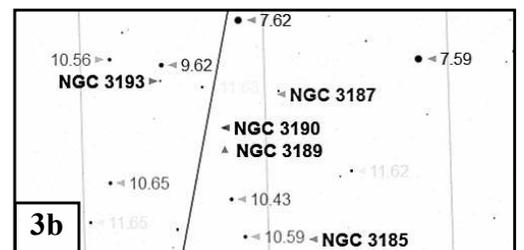
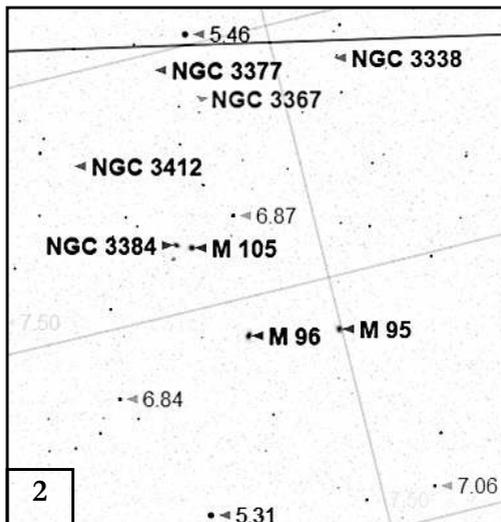
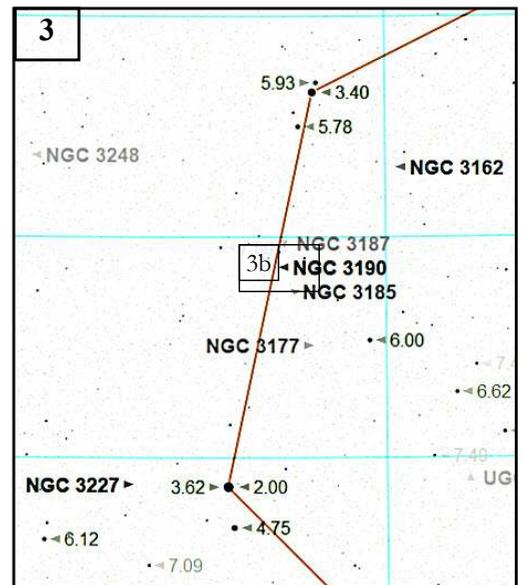
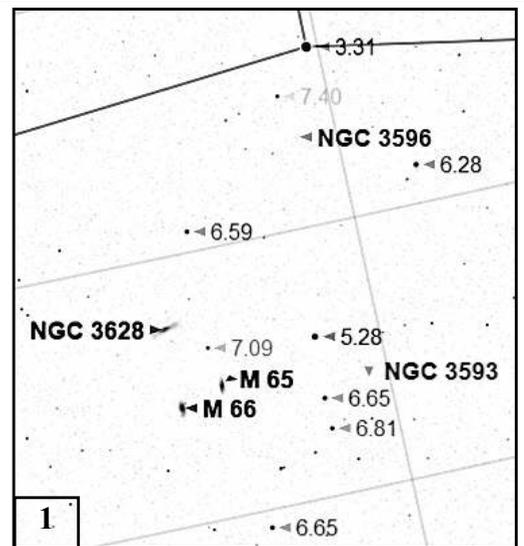
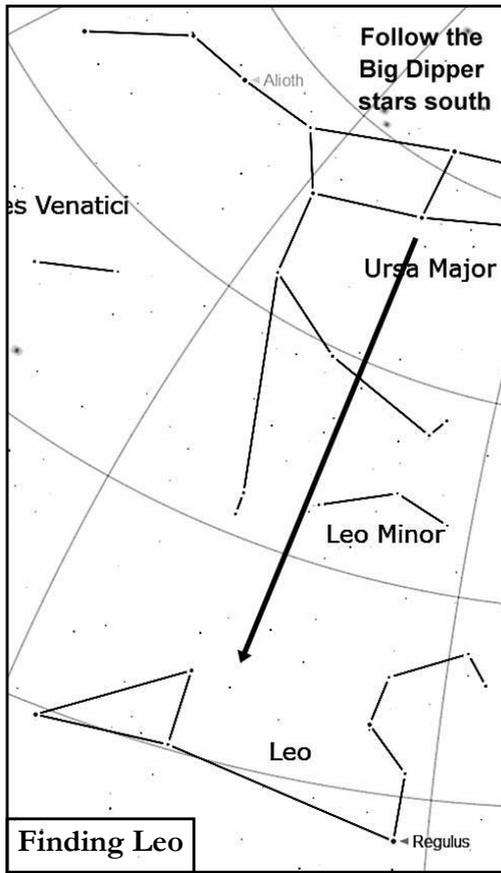
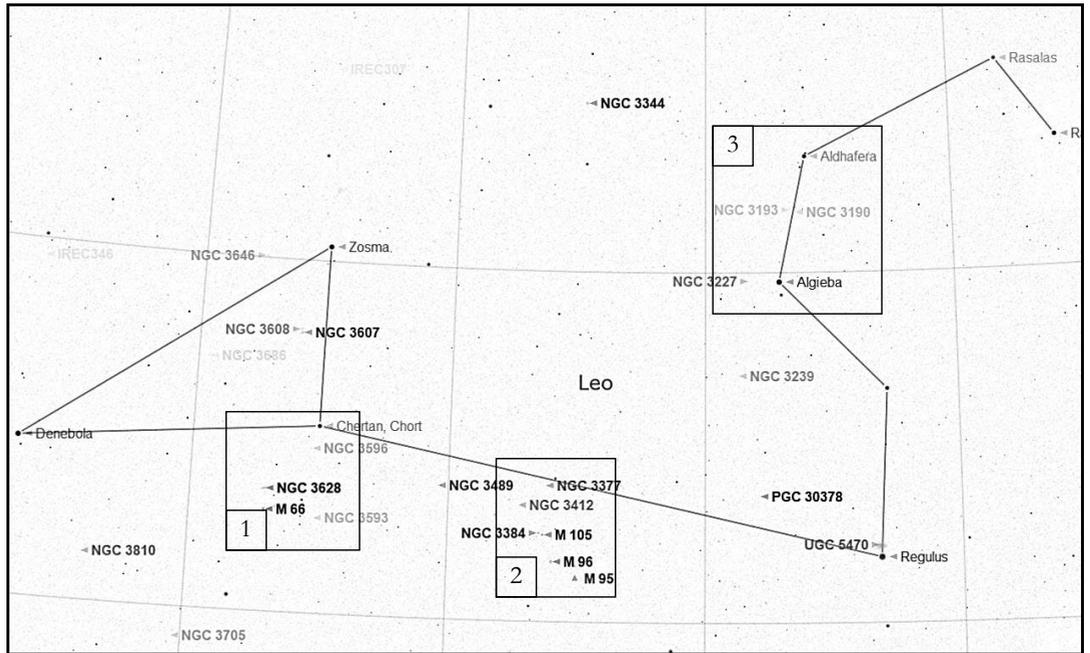
**Leo the Lion**

Known as far back as 4000 BC as

- Persians - Shir or Ser
- Babylonians - Ur.Gu.La.
- Syrians - Aryo
- Turks - Artan
- Greeks associated Leo with the Nemean lion in Greek Mythology

**Key Stars**

- **Alpha Leonis, Regulus** - magnitude 1.4, 36 light-years (ly) away - Lions heart or King star. Multiple star system. It has a close companion that can only be detected stereoscopically. There is a distant 8.2 mag. companion, 177" (~3 arc minutes, 0.05 deg) to the northwest. This star is easy to spot in most any telescope. However, it too is a double with a 13.5 mag. companion only 2.5" away. This is a challenge for larger scopes on good nights using high magnification.
- **Denobola** - mag 2.1, 36 ly distant. It supposedly has a mag 15.7 companion 40" away but that was observed in 1898 but can't be found now. Such a faint star that close to Denobola would be a challenge indeed. There is nice "line of sight" 8.4 mag star about 4' to the south.
- **Algieba** - mag 2.3, 126 ly distant with a dimmer mag 3.6 star 4.8" away makes this a nice pair that's easy in most scopes.
- **Delta Leonis, Zosma**, also know as Duhr - mag 2.6, 58 ly distant. It has a faint mag. 10.9 line of sight companion 204" (3.4') to the north.



The numbers next to the stars are their magnitude. Note how the lettering is dimmer for the dimmer stars and deep sky objects (magnitude numbering reference starts at 0 for the brightest stars and increases for dimmer objects).

When it comes to viewing galaxies their magnitude is only one factor that determines how easy or hard they are to see in a given telescope. Just as important of not more so is their surface brightness. A galaxy that is larger, spread out more, may be harder to see than a smaller galaxy of the same magnitude. But not always. It's easier for the eye to detect large faint objects than small faint objects. And then there is transparency of the sky. Even a little haze can make a galaxy disappear that was visible the night before.

Another note, the stated magnitudes are from one source, other sources may state different magnitudes.

#### **Box 1 - Leo Trio or Leo Triplet**

- M65 - mag. 10.1
- M66 - mag. 9.3
- NGC 3828 - mag. 10.0

Of these three NGC 3828 is the hardest to see but most people can probably see all 3 in a 4 inch telescope.

#### **Box 2 - The M96 Group**

- M96 - mag. 10.1
- M95 - mag. 10.6
- M105 - mag. 10.2
- NGC 3384- mag. 10.9

Not shown is mag. 12.5 NGC 3389 forming a right triangle with M105 and NGC 3384 and positioned SSW of 3384. The Messier (M) objects should be detectable in a 4" scope. A 6" scope may be needed NGC 3384, 3389 may be pushing the limits of an 8".

#### **Box 3 & 3b - The Hickson 44 Group**

- NGC 3185- mag. 12.9
- NGC 3187- mag. 13.8
- NGC 3189- mag. 11.9
- NGC 3190- mag. 11.9
- NGC 3193- mag. 12.0

3189 & 3190 may be same object.

The brighter of this will need at least a 6" scope, if you know what your looking for.

Whether a beginner or seasoned observer, let us know how you fair on some of these.

## **ASTRO-IMAGER'S CORNER**

*All things astrophotography, beginner and experienced alike*

*Column Coordinator- Terri Zittritsch*

This is a new column as a result of our recent newsletter survey and is intended to provide both tips and how-to for our astrophotography (AP) community. I've picked up the editor responsibility for this column, but don't consider myself the club expert on astrophotography, as we have many accomplished astrophotographer's in the club. Moving forward I will be reaching out to all of our astrophotographers to provide their tips and recommendations for our newer members who are interested in Astrophotography.

For this month, given the short timescale, I'll provide some input from my own experience and some tips from a couple of our committee members. As always, remember that this information is worth every penny that you're paying for it (smile).

### **What to buy?**

By Terri Zittritsch

Starting out in Astrophotography and you want to know what to buy?: This is one of the most frequent questions I see on forums and one that comes up in conversation with those who want to get into astrophotography, is what do you need to get going. As with many kinds of questions like this, it depends. There are many factors: 1) What kind of equipment do you already have? Do you have a telescope, a mount or camera such as a cellphone camera or DSLR? A great place to start is to dip your toes in with the equipment you already own. Just about any camera including a cellphone camera can be used for some form of astrophotography. Some of the most beautiful astro-images are extra-wide fields of the Milkyway and can be had with a cellphone camera or your DSLR. If you add a telescope of any kind, you can now narrow that field of view to get more detail on the moon and bright nebula, which are fabulous targets to start with. Here is a great link for a good overview of starting astrophotography with a cellphone published by Nasa and provided by our Nasa ambas-

sador, Scott Turnbull:

<https://spacemath.gsfc.nasa.gov/SMBooks/AstrophotographyV1.pdf>. Also, if you take a look at the VAS forum, Scott has taken some great images of the moon that are worth looking at.

2) What kind of AP do you want to do: planetary, nebula, galaxies, milkway, video astronomy, or maybe all of them? Each kind of AP has better and worse options for mounts, scopes and cameras. And each one can be done on a budget, or the skies the limit (literally). Do you want a setup that's also appropriate for visual observing as well? A DSLR camera on a small tripod and small tracking mount can do wonderful milkyway images, but not useful for any kind of observing or for focal lengths over maybe 200mm. Similarly, while an 80mm F5 scope is a great wide field scope for astrophotography, it's probably not the best thing for faint and small object observing. I chose as my first real scope, an 8" SCT, which most on AP forums will mourn this choice because it's a difficult platform to learn AP on. But given my engineering background, and love of problem solving, it was absolutely perfect for me. In my case, the journey is as important as the destination. I could observe reasonably dim and small objects with the 200mm objective and 2000mm focal length, but also take images of a range of tiny galaxies and reasonable sized nebula by plugging my DSLR in with a focal reducer. But this isn't the right solution for everyone, or even the majority, but it can be the solution for some. This leads to another factor in choosing you're AP platform. 3) What kind of aptitude do you have for problem solving, dealing with computers, software and peripherals, software drivers, and gobs of wires as well as cobbling together a bunch of mechanical pieces that make up the whole system? Part of this can be helped by choosing a platform that's used by many others. For instance, Canon and Nikon DSLRs are probably used more than any other camera for AP, and then Skywatcher/Orion/Celestron/Ioptron equatorial mounts are some of the most popular AP mounts used by 1000's. For these, there are entire forums dedicated to supporting the hardware and

software, tuning up the mounts for AP, and showing solutions for just about any kind of problem you may have run into. If you choose a little used camera or mount, you run the risk of needing to solve problems by yourself or, be at the mercy of the manufacturer which may or may not be quick to reply to your inquiries and issues. Lastly there is the question of budget. For those on a budget, like most of us, my suggestion is to talk to someone who's done the kind of Astrophotography you're intending to do. There are many of us in the club who've done AP and are more than happy to provide some guidance on your choices, and maybe help you avoid some of the pitfalls many of us have fallen into along the way, because there really is no one-size-fits-all. And for those without a budget, we love you guys as well, because when you're bored with all of that expensive gear, we can swoop in and get a bargain.



Authors first Astrophotography setup. A Meade LX90 on a wedge with a Canon DSLR.

### Imaging Tips

**Dithering** - Dithering is a technique used by imagers to reduce noise issues by moving the telescope/camera a few pixels between each image. Short exposure unguided imaging effectively uses the tracking errors of a mount to “automatically” dither the images.

## Software

### Deep Sky Stacker

By Maura Kelley

‘Deep Sky Stacker’ is a free program for Windows that will stack your sub exposures (also called “lights”) in your camera’s RAW, .jpeg or pretty much any other format. You can stack only your “lights” and get good results. The advantage to using RAW files is that you can use calibration frames: darks, flats (and even bias) for further noise reduction and elimination of vignetting.

It can also stack images of comets with a choice of star-field focus with comet moving, or focusing on the comet with star trails in the field (you can also play with the option of combining both). What is really handy is that you can combine different nights work on an object, using different camera settings each night, by creating ‘groups’ and combine them into a final image. Download it from -

<http://deepskystacker.free.fr/english/index.html>

There is an unofficial Mac-translated German version out there, but for me, it works too slow.

<https://starchaser.de/deepskystacker-fuer-mac-osx/>

For very good stacking/noise reduction results at a frugal price of \$24.99 for Mac, ‘Starry Sky Stacker’ using .tif files, is a great choice and very easy to use.

<https://sites.google.com/site/starryskystacker/home?authuser=0>

### Using Deep Sky Stacker at It's Most Basic

By Paul Walker

Here are simple instructions for stacking 10 JPG files (or 500) of your favorite deep sky object. You can of use RAW files just as easily if your camera has RAW format. This is intended to get you started in the easiest way I currently know. I haven't really used this software yet other than to run through the steps as I wrote these instructions. I also watched pieces of a couple tutorials as before starting.

1. After downloading and installing Deep Sky Stacker (DDS) open the application.

2. Open the folder that has the images you want to stack.
3. Select the files, drag and drop them any where within the DDS window. (You can also open the files from within DDS just like any of Windows based software)
4. A little dialog box opens, verify “Light Frames” is selected, click OK.
5. Under Registering and Stacking (top left side) click on “Register checked pictures...”
6. In the dialog box that pops up change “Select the best XX % to 100%. When starting out leave everything else in the default setting.
7. Click OK. Click OK in the next dialog box.
8. When stacking completes save the file. Select “Save picture to file...” (middle left side), browse to the appropriate folder, give it a name, the default file type “TIFF image (16 bit/ch)” is fine. Click “Save”.
9. You can do some image processing as well. I won't go into details here but you can adjust the histograms of the red, green and blue channels in order to color balance the image. You can also adjust the luminance (brightness) of the image and the color saturation. Move the slides only a little bit at a time and start by moving only 1 slider at a time. The histogram curve is displayed to the right of the sliders. When you move a slider take note of how this affects the histogram curve. There is no preview, you have to click on “Apply” to see the results. Hold on, I just discovered there is a means of previewing. Click and drag the mouse anywhere within the image to draw a preview box. After doing the adjustments within the box, double click anywhere outside the box than click “Apply”. There is an on-line manual for the software and on-line tutorials.

An additional note- DDS is well suited for stacking wide and medium angle Milkyway shots taken with a camera on a tripod without a tracking device. You may not be able to get away with an hour's worth of images, but maybe 30 minutes or more.



Compare this crop from stack of 10, 60 sec. exposures, stacked and post processed with DDS only, with the other images of M66 on this page.

### *Some On-line Tutorials on Astro-Imaging*

Orion Nebula WITHOUT a Star Tracker or Telescope, Start to Finish, DSLR Astrophotography.

Camera, tripod, intervalometer, Deep Sky Stacker. Has more info than one needs just starting out but you can go back to it as needed. This guy talks at a nice easy pace.

<https://www.youtube.com/watch?v=iuMZG-SyDCU>

This talks about sky trackers for camera and telescope mounts.

<https://www.youtube.com/watch?v=giLNICw0KVo>

This one shows using Deep Sky Stacker. It also gets into a little image processing with PhotoShop. It includes using Dark frames, Flat frames and Bias frames.

<https://www.youtube.com/watch?v=Mf8gnuw4WMo>

### **Short Exposure Imaging with a DSLR (digital single lens reflex) Camera to Encourage Others**

By Paul Walker

Images were taken by me using a my "big" 10" a 10" f/5.6 Newtonian. (1407mm f.l.), Canon T7i, 24Mp, APS-C sensor. I don't have this set up for autoguiding so I am limited to short exposure times.

What I did was take several 30 second and 60 second exposures to see how good the tracking is. This included seeing what percentage of images were well tracked for each exposure

time and therefore which provides more efficient use of scope time. Part of the plan was to again demonstrate that stacking a modest number of images produces a notable improvement in the image quality. Also to demonstrate that the resulting image is essentially the same whether the "subs" are 30 sec. or 60 sec. long.

Exposure- 30s @ iso6400. I took 36 frames of which 24 frames (66%) were good (no visible trailing at 10x inspectoin). This translates to 18 minutes of imaging for 12 minutes of usable time.

Exposure- 60s @ iso 1600. I took 27 frames, of which 10 frames (37%) were good. That is 27 minutes of imaging for 10 minutes usable time. I only kept the ones with round stars.

Note the difference in the ISO settings. For many modern DSLR's the quality is independent of the ISO so there is no down side to setting the ISO high enough so you can easy see the object. It can also benefit you by reducing the amount of additional processing you need to do.

So looking at time spent at the scope, the 30 second exposure in my case is more efficient. Another factor to consider is how many images do you want on your computer, not to mention that you have to inspect all the images to find and delete the bad ones. I recommend doing this on the camera. That is, if you can magnify them on the camera and then go from image to image while staying in the magnified mode. Just be careful you don't delete good images. You may want to download all the them into a temp folder first.

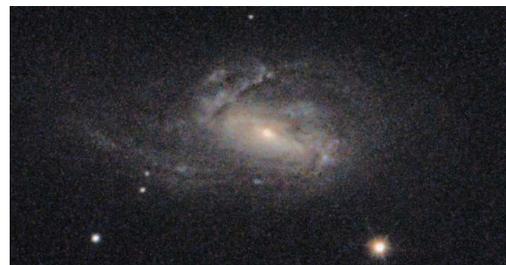
### **The Leo Trio (M65, M66 & NGC 3628)**



Single 60sec exp as is out of the camera.



Single 60sec exp with processing.



M66 cropped from single 60sec exp.



M66 cropped from single 30sec exp.



M66 cropped from stack of 10, 60s exp.



M66 cropped from stack of 12, 30s exp.

I processed the images similarly but not identically which is why you see some differences the colors. Ignoring that, there is clear differences in both the graininess and detail between the single 60s and 30s images. However, in the stacked images the only difference you will notice is due to the differences in processing.

If your camera can't save images in a RAW format, don't fret. I used JPG (or JPEG) images in this demo. All cameras take images in a raw format (12-14 bits/channel) but then process them internally before saving them as JPG's (8 bits/ch). That, along with what I mentioned earlier about the ISO being independent of actual image quality for many cameras, is part of why it works to crank up the ISO. So even with JPG images you can reap a fair bit of benefit from these facts simply by increasing the ISO enough that you can easily see the object in the image. Of course RAW images will be better but you may be hard pressed to tell, especially on the brighter objects.

For additional info related to why stacking JPG images is not as bad as you might think, go to our web site (vtastro.org), Articles, Astro Imaging - Processing Concepts & Processes, pages 16-20 (Bits and Color "Depth"). Though you do lose data when it is converted to JPG, the software stacks them as 16 bit images which, due to small random variations from image to image effectively gets some of that back.

## MEMBER IMAGES

### More Short Exposure as Well as Ultra Short Deep Sky Shots

By Paul Walker



2021-02-08 **"37" Cluster (NGC 2169)** in Orion. Field of view cropped to equivalent of ~56x visual. 10" f/5.6, Canon T7i camera at prime focus, **30s X 9 @ iso 1600**. Also notice the fancy "J" in the lower left corner. Unfortunately in the 10" scope the J is not noticeable as only the brightest 4 stars are easily visible. Maybe in my 12.5" it will work. Now that I know where the 37 cluster is, it's on my list of favorite objects.

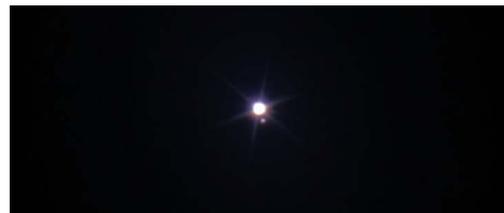
Sometimes exposures of only a few seconds is too long. Check out these next images.



2021-02-08 **Sigma Orionis** multiple star system - the 4 stars left of center. Though the 3 stars to the upper right are not associated they add to the visual appeal of the view. 10" f/5.6, Canon T7i at prime focus, **0.33s X 7 @ iso 1600**, cropped to effective visual field of view of 186x. I didn't really need to stack the images but even here stacking produces a better looking image. Even at 0.33 second the stars appear brighter here than visually in my 10" scope. The faintest Sigma component is mag. 10 and looks like a tiny pin prick visually. I love looking these up when they are up. And they are easy to find just under the east end Orion's belt.



2021-02-08 **Trapezium in M42** Along with the 4 Trapezium stars (right of center) if you look closely you can see the fainter components E (upper right of the main stars) and F (lower left). Both are mag. 11. They are all in the core of the Orion Nebula and light it up. You can faintly see the nebulosity. This shot required steady skies and a short exposure. Bad seeing and/or too long an exposure will cause the brighter stars to bloat covering the E and F and cause E and F to fuzzy out into invisibility. 10" f/5.6 Canon T7i at prime focus, **0.33sX15 @ iso 1600** in haze cropped to an effective visual magnification of 224x.



2021-02-08 **Rigel and companion**. This is a nice pair using a medium to large telescope under steady skies. Rigel is mag. 0 while it's companion is mag. 6.7 and only 9.5 arc sec away making the companion a challenging target. 10" f/5.6 Canon T7i camera at prime focus, **1sX4 @ iso 400**, cropped to effective visual field of view of 224x.



### Lunar Occultation Image

By Maura Kelley

The time I had on the occultation was 10:28. Here is a screen shot from the video I posted last night - 1/1.3 sec images at ISO 320



### ISS Image 2021-21-03

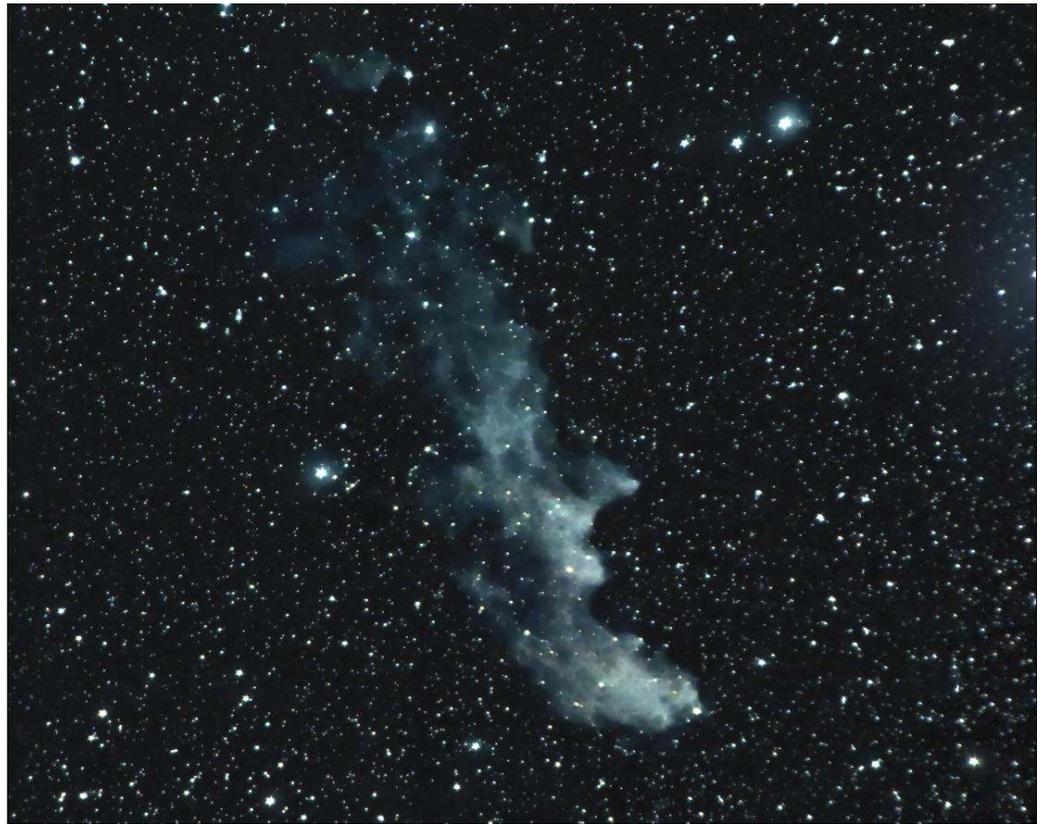
by Greg Warrington

I've tried the past two nights. First night I couldn't find my Bahtinov mask so everything was out of focus, but last night worked better. That's the Dragon capsule sticking off of the lower left. It boggles my mind that we can make out details on this whizzing past. 8" f/6 Dobsonian, Nikon D5600 at prime focus, 1/1600 sec @ iso800

### Witch Head Nebula

By Joe Comeau

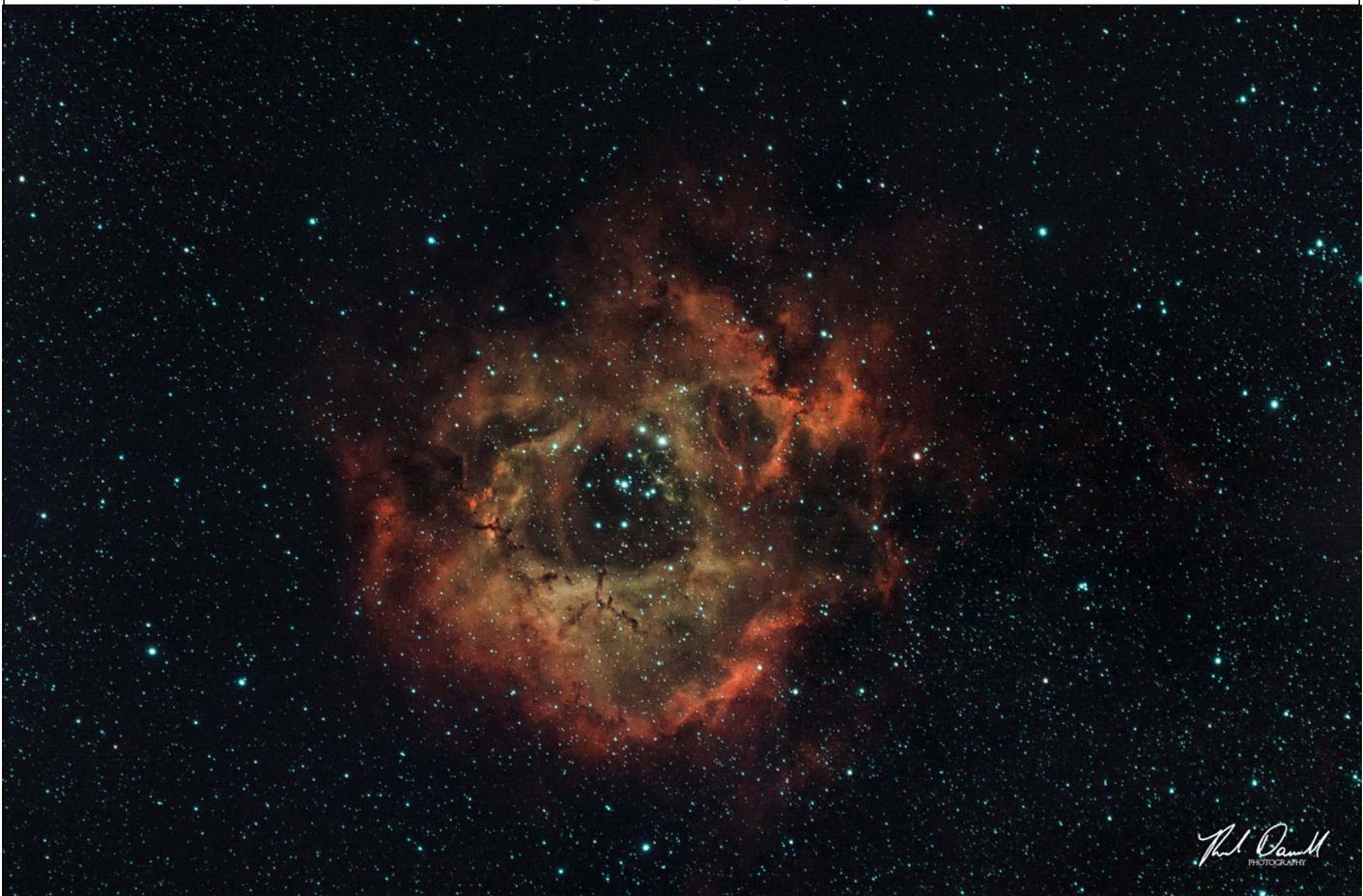
Taken on 3/7 and 3/9/21. 2-minutes X 184 frames taken with a 200 mm f/3.5 Telephoto lens at ISO 1600. This is a very difficult target at magnitude 13. The image is inverted to show the face and light from Rigel is coming in from the right.



### Rosette Nebula (NGC 2244)

By Rick Daniell

Even though our skies have been nothing but clouds over in St Jay, I got one evening (1/8/2021) where the skies were half-way decent for about 3 hours. I grabbed a few subs on a number of different targets. This one of the Rosette Nebula kind of surprised me. Only 4, 300 sec subs! I was completely surprised how much detail I managed to pull out of four subs!! This was with a Williams Optics Redcat and a QHY183C sitting on top of an Orion Skyview Pro with the Goto kit installed. Processed in PI and Photoshop! Definitely going back for more on this one!

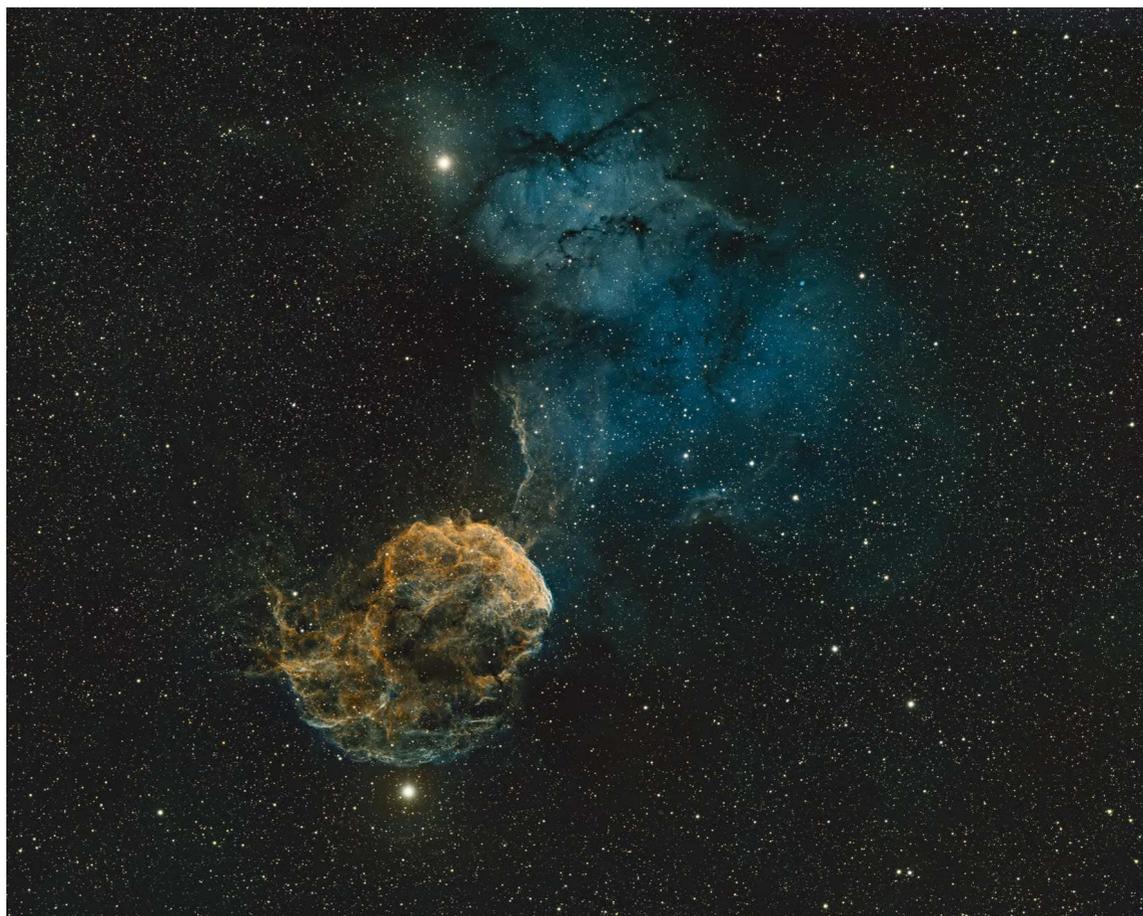


*Rick Daniell*  
PHOTOGRAPHY

**IC443,**

By Terri Zitttritsch

Also known as the Jellyfish nebula is a supernova remnant. Supernova remnants are some of my favorite astrophotography targets. These remnants are the result of the spectacular and cataclysmic ending of some stars lives. Although, thought about differently, they are a metamorphosis of stars into the beautiful objects we can now photograph. IC443 is considered a mixed morphology supernova remnant. It has aspects of a shell type remnant created by the supernova shock wave exciting nearby gas and material, but also has aspects of a crab-type supernova remnant which are created by high energy electrons thrown off by a remaining pulsar that interacts with magnetic fields and throws radio, x-ray and visible light as a result. The crab-type supernova remnant is named after M1, the crab nebula which is the most famous example. IC443 is one of the most studied supernova remnants and has a pulsar in the middle. IC443 is a dim large object with low surface brightness and visual magnitude of 12. IC443 has an apparent size of 50 arc-minutes and is approximately 5,000 light years distant making its actual size 70 light years across! I imaged IC443 through an

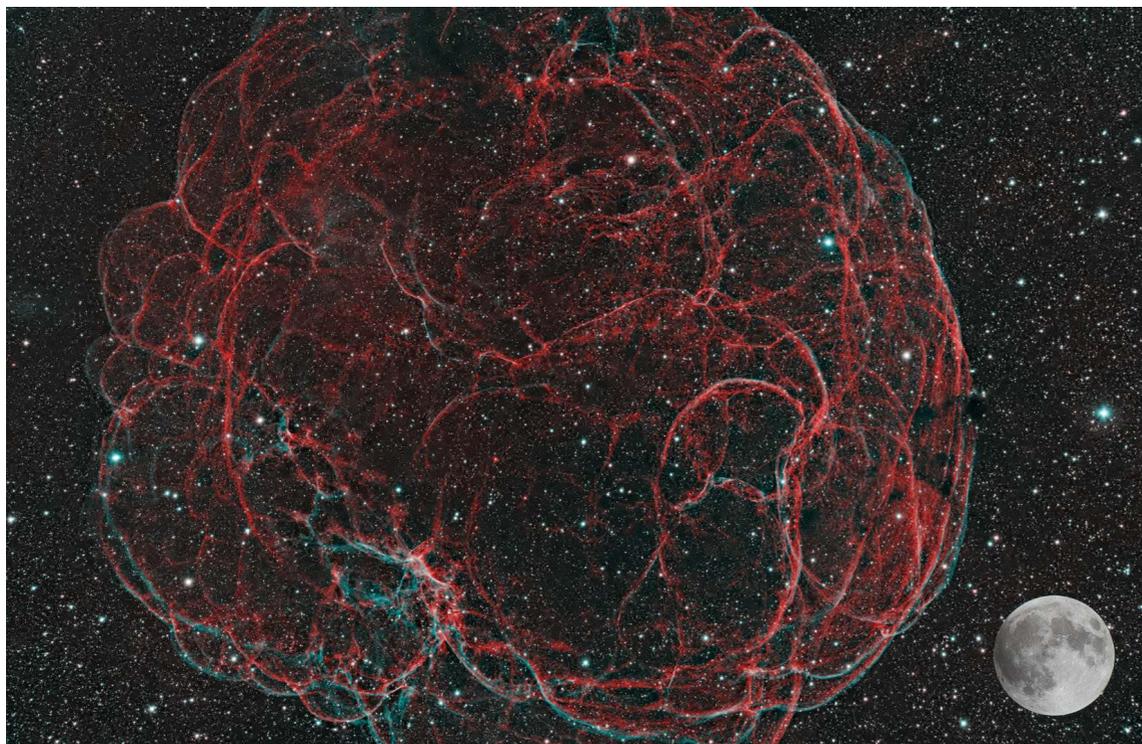


Astro-Physics Stowaway telescope reduced to a 492mm focal length with a 60Mp ASI6200 CMOS monochrome camera through Chroma 3nm Ha, OIII and SII filters. I'm displaying the image in the Hubble (SHO) palette. This image is the result of 9 hours of total image integration. I have RGB data as well, and plan to integrate it when time allows.

**Sharpeless 2-240, or Simeis 147**

By Terri Zitttritsch

Also known as the Spaghetti Nebula is another supernova remnant. Simeis 147 lies on the border between Auriga and Taurus, has an apparent diameter of 3 degrees making it a object with very dim surface brightness and a challenge even for astrophotography. Simeis 147 is framed by the bright stars El-nath, Beta Tauri and 136 Tauri. Besides this beautiful shell, the supernova explosion also left behind a neutron star, or Pulsar. I imaged Simeis 147 through an Astro-Physics Stowaway telescope reduced to a 492mm focal length with a 60Mp ASI6200 CMOS mono camera through Chroma 3nm Ha and OIII filters. I'm displaying the image in an HOO palette. This image is the result of 8 hours of total image integration.





**M81 (Boyd's Galaxy) & M82 (The Cigar Galaxy)**

By Richard Whitehead

Plus little dwarf galaxy Holmberg IX shows quite clearly (above M81).

Had some real problems with light pollution so cropped heavily - but managed to show a lot of Hydrogen activity on M82

5.5 hrs Ha with 5 min subs, 1 hr each RGB with 3 min subs, 1hr 30m with Lum 90sec subs

Celestron RASA 11" f2.2 , 620mm focal length, CGX Mount, ZWO ASI 6200MM Pro (monochrome camera) with filters noted above.



**M42 (The Great Orion Nebula)**

By Richard Whitehead

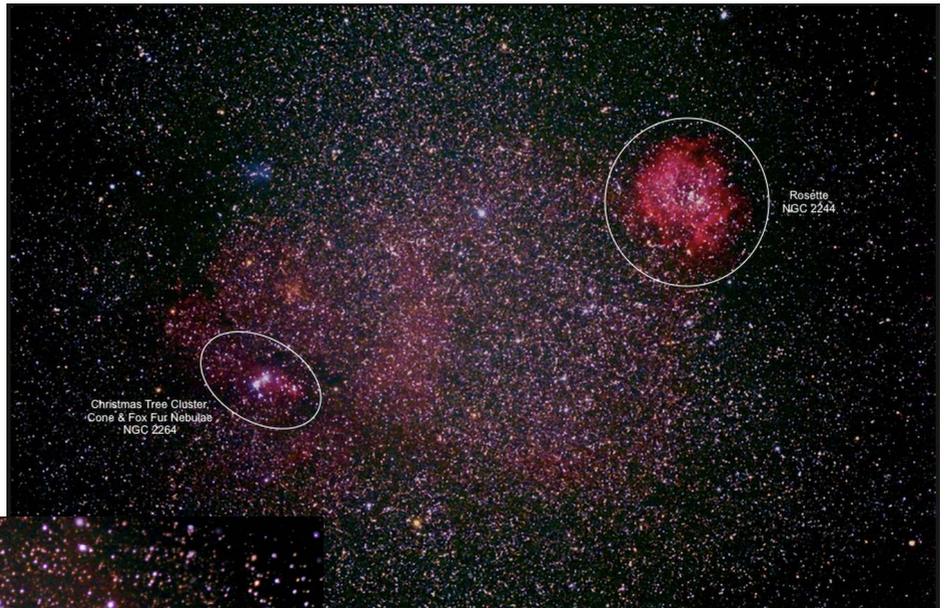
I found a few hours today to really separate out my batches of different exposures to produce a deep yet realistic rendition of this popular subject. Set up tonight but looming clouds and small flurries led me to abort the mission

Celestron RASA 11" f2.2 , 620mm focal length, CGX Mount, ZWO ASI 6200MM Pro (monochrome camera) with filters.

"A quick wide-field look into Monoceros.. and then focusing in on the Rosette Nebula (NGC 2244) and the Christmas Tree Cluster (NGC 2264) which includes the Cone & Fox Fur Nebulae."

Maura Kelley

Modified an Olympus DSLR and Explore Scientific ED80CF refractor



Christmas Tree Cluster (NGC 2264)

Rosette Nebula (NGC 2244)





3/21/2021 **First Quarter Moon**  
By Scott Turnbull

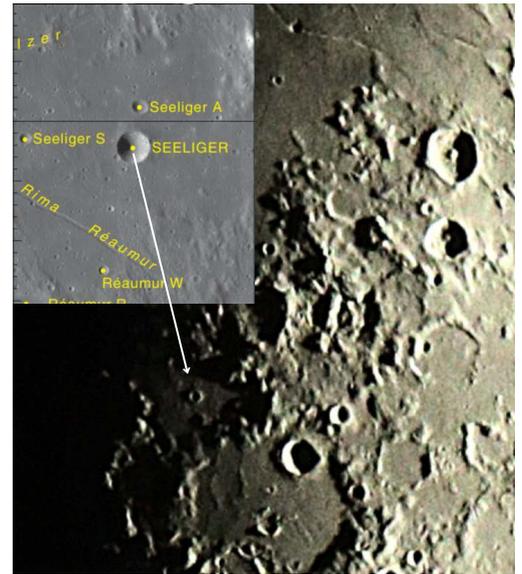
Captured an image of this evening's Moon. Consider it an example of an inexpensive entry level setup for easy astrophotography. Single frame post-processed for mirroring and contrast. Celestron NexStar 6 inch Evolution telescope, Celestron Plossl 40mm eyepiece, Celestron NexYZ Phone Clamp, Pixel 3 Android Phone using Standard Camera App in Nightsky Mode Camera Exposure set Automatically by App to /20 sec. @ f/1.8

4.44mm (f.l. the phone's camera), ISO 65

The turn around from snap to post is a couple of minutes, most of which is the in-phone image editing to mirror-flip and adjust levels.

Some details on the image processing mechanics behind the Pixel 3's Astrophotography mode.

<https://ai.googleblog.com/2019/11/astrophotography-with-night-sight-on.html>



**Rima Reaumur, challenge feature**

While at first these were very fleeting views, they much improved around 2h00m (10 PM EDT), with both (Rima Oppolzer, not shown, and Rima Reaumur) visible at the same time but briefly. These are not small telescope targets, as I used my 12.5" f/6 reflector at 280x for them. Seeliger is 8km (5mi) and Seeliger A 4km (2.5mi). The complete study of the un-shadowed was measured to be about 60 seconds in the rough rounded area. More is shown in this chart.

Lawrence Garrett

Image by Paul Walker- 10" f/5.6 Newt, 24Mp DSLR, Reaumur just detectable.

**EQUIPMENT CORNER**

No reviews or recommendations this issue.

**BOOK REPORTS /  
RECOMMENDATIONS**

A book just came out with a subject that will pique the interest of fellow club members. "First Light" by Emma Chapman discusses the time after the Big Bang up to the where stars began to switch on. It's written to appeal to both budding astrophysicists to seasoned veterans of the cosmos. The book was published in the UK last year so the information it contains is up to date.

Submitted by Jim Williams.

## Space Science Roundup

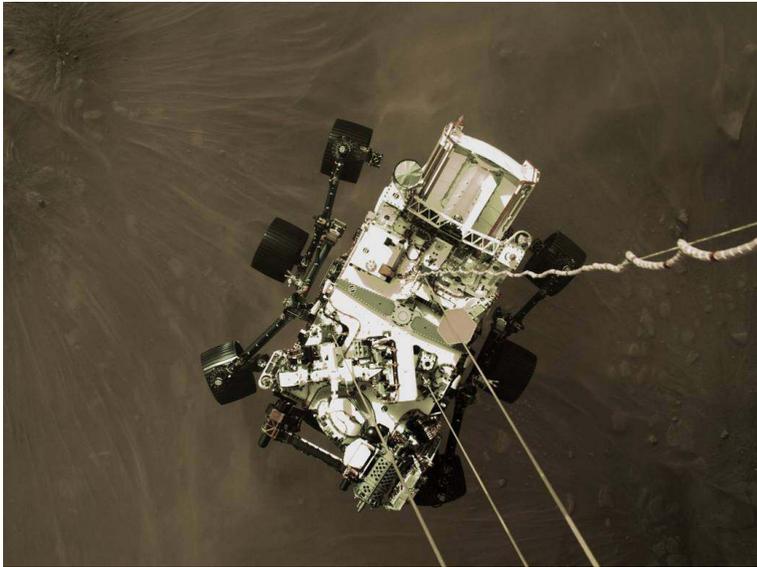
By Scott Turnbull, VAS Member  
and Solar System Ambassador vol-  
unteering for JPL/NASA

### NASA Perseverance and Ingenuity Spring Update

In the previous newsletter I wrote of the upcoming landing of the Mars2020 Mission. I'm pleased to report that the Entry, Descent, and Landing (EDL) took place as planned on February 18<sup>th</sup>. The Perseverance Rover, and its companion hitchhiker, the Ingenuity Helicopter, are on the surface of Mars at Jezero Crater. By all accounts both vehicles are healthy and ready to begin their missions.

Technically the helicopter is not exactly on Mars. It is still nestled in the undercarriage of the Perseverance Rover. In that respect, it has not yet completed its journey to the surface of Mars. More about that, later.

### Unprecedented Views of the Descent and Landing – After the Fact



The pesky laws of physics keep us from seeing a live feed from the Mars2020 descent stage as it plummets through the atmosphere of Mars on its way towards the surface. Two different attributes of the EDL conspire to keep us from watching events as they happen.

With a total time for EDL of just over 7 minutes, and with a signal delay from current Mars to current Earth positions of approximately 11 minutes, by the time we received the first telemetry that entry was beginning, the

entire EDL was actually already over.

We would have been thrilled with a signal transit delayed video feed, but the second conspiring aspect of EDL makes a video feed unfeasible. As the spacecraft enters the atmosphere, the outer shell heats to over 1300 degrees Celsius, which causes a communication blackout due to ionization of the surrounding atmosphere. Even after the heating subsides, and radio communication is once again possible, the spacecraft is undergoing turbulence and trajectory adjustments that preclude any directed high bandwidth communications. Only low bandwidth telemetry signals make it back to Earth as the spacecraft performs the descent and landing maneuvers. Notifications of parachute deployed, measurement of increased G forces indicating deceleration, confirmation of descent rockets firing, and finally a report of touchdown.

Minutes after telemetry confirmed touch down, the first low resolution images of the surface of Mars were received. The second ever “Sky Crane Maneuver” had gently deposited its payload on the surface of Mars.

Three days later, NASA released the high resolution video footage of all of the events described above. It took that long to transmit and decode the gigabytes of data stored in Perseverance’s memory. An image of the car sized Perseverance rover being lowered to the surface of Mars by cables is shared above.

### Near Term Mission Objectives

At the time of this writing, the Perseverance Rover has been on the



surface of Mars for just over 2 weeks. During that time, it has extended its sensors, shared with us the first recorded sounds of Mars, and taken some tentative drives of a few meters. A photo of Perseverance’s first tracks on Mars is shared, here. All systems are reported to be in excellent health, including the Ingenuity helicopter that continues to be nestled against the undercarriage of the rover.

Perseverance will begin by exploring the area immediately around its landing site, which has been dubbed the Octavia E. Butler Landing in honor of the science fiction author of that name. Perseverance will then head towards the geological formation that appears to have been formed by flowing water that may have filled the crater at some point in the distant past.

By the time the next newsletter is being authored, the Ingenuity helicopter is scheduled to have been deposited directly upon the surface of Mars. After setting the helicopter on the surface, the rover will retreat short distance and the Ingenuity will undergo initial rotor spin-up and flight tests.

Watch for news in the resource sites listed below. Mission summaries will be added in future editions of this newsletter, too.

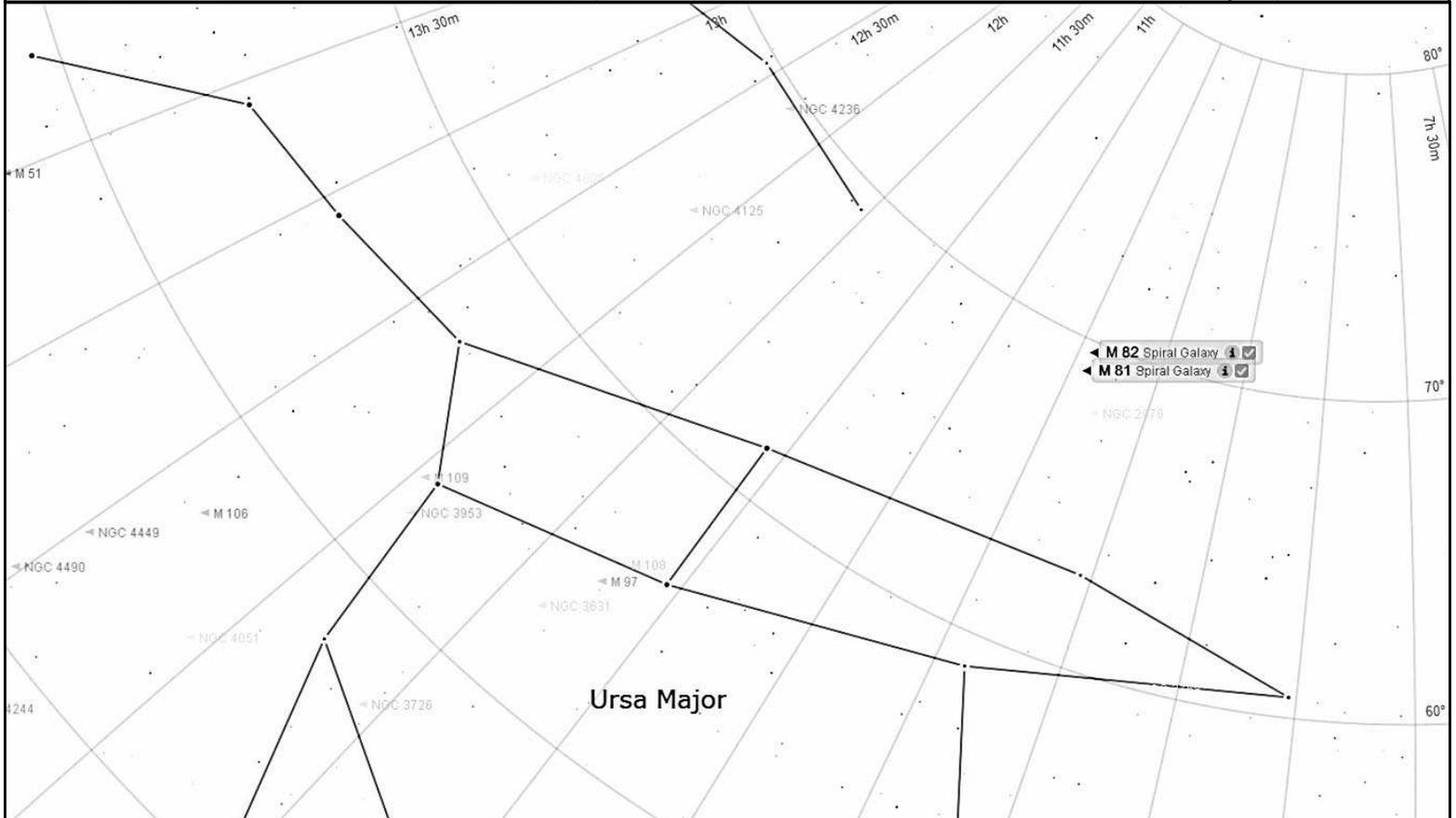
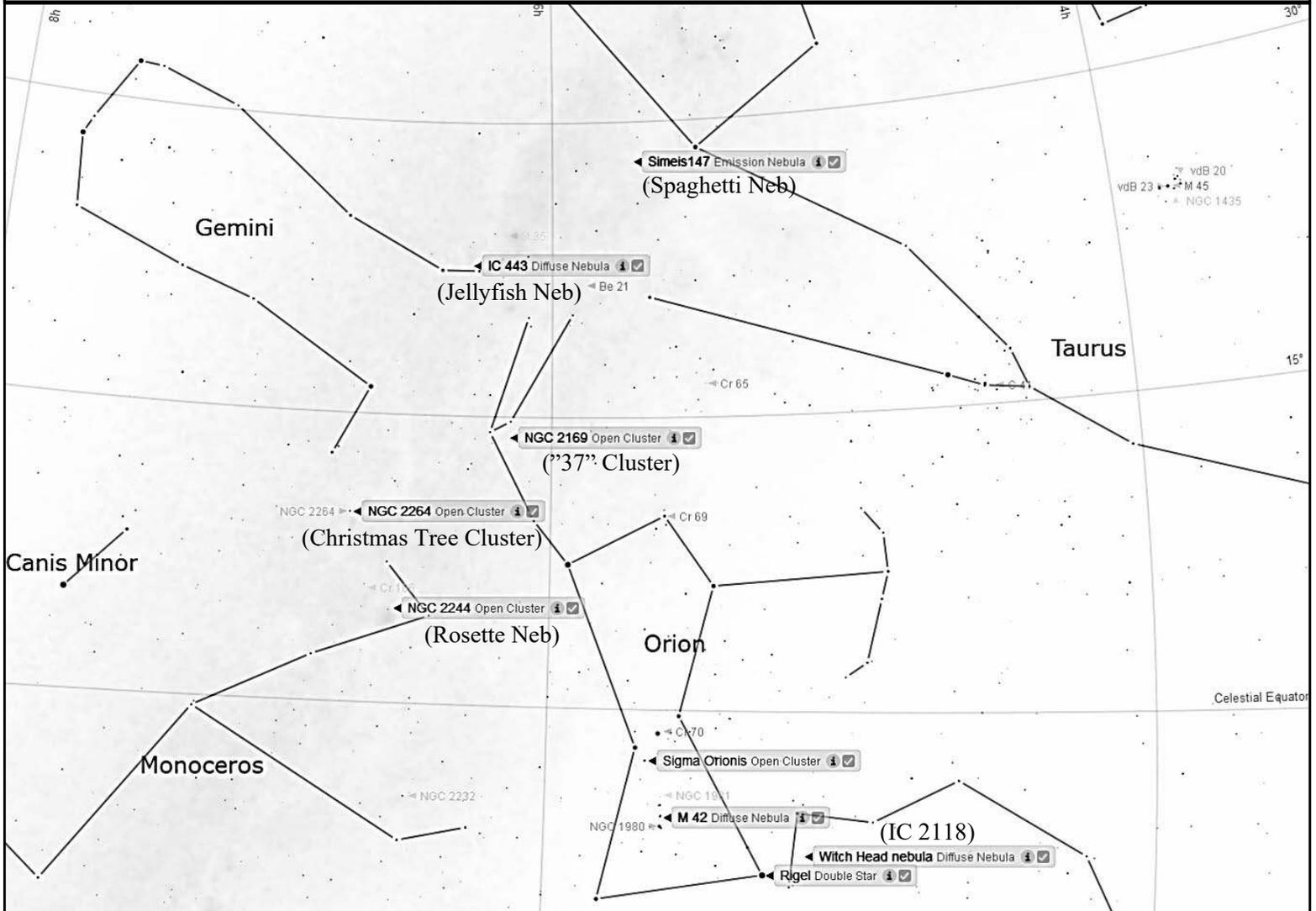
### Resources

Information presented in this article was provided by NASA and JPL from their online resources.

For more information, please refer to Perseverance Mission Updates: <https://www.nasa.gov/perseverance>  
Library of Perseverance Raw Images: <https://www.nasa.gov/perseverance/images>

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

Created using Starry Night Pro 8 & 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](mailto:sleepingbearwoodworking@yahoo.com)

**Wanted**- Old medium duty tripods and/or legs that I can use to manufacture binocular parallelogram mounts.

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

## For Sale

### 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)

**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, due shield, and other accessories. Over \$11K invested, asking \$5K.**

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



**4 inch, 550mm f.l. brass Televue Renaissance scope** with carrying case

Equatorial mount with oak tripod

2", 20mm Nagler type 2

2" 45deg. righting prism

2" Big Barlow

2", 4.8mm Nagler

1-1/4", 26mm Plossl

2", 45deg. Prism camera adapter

**New Price \$1700 - will negotiate.**

Contact Richard Cummings at [Rick@vsbmetal.com](mailto:Rick@vsbmetal.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](mailto: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](mailto:siddmukerji@gmail.com) if you're interested. I'm happy to answer questions.

**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)

**ETX-125 OTA** only--This one has the USA made optics. Just too heavy for my needs. Needs some TLC but gives the images you expect out of this model. Contact me for more details if interested. **\$50**

**Orion Tri-mag 3x Barlow** in very good condition - **\$30**

**Celtstron Omni 2x Barlow** in excellent condition - **\$25**

Contact Paul Marino, [paulmarino@gmavt.net](mailto:paulmarino@gmavt.net) or call (802) 482-5128

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

**10" Telescope Kit**

**Parts for a 10" Newtonian Telescope (used)**, these were in a homemade 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)

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

**Explore Scientific 6" apochromatic telescope** The scope purchased new 5/2014. The scope has had light use over the years. list price \$5,400 asking **\$2,999.00.**

152mm aperture Air-Spaced Triplet Optics with HOYA FCD1 ED Glass and EMD Coatings; Carbon Fiber Tube Assembly and Removeable Dew Shield; Two-Speed 3" Feather-touch Focuser; Cradle Ring with Handle and Losmandy Style Dovetail Plate; 99% Reflective 3-inch Diagonal (with 2-inch and 1.25" Adapter); Deluxe Carry Case.

Contact Ron Anstey 802-233-0726 or [rgaranstey7115@gmail.com](mailto:rgaranstey7115@gmail.com).

**First Telescope Program**

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

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

**Orion EQ-1 equatorial mount and tripod with Orion AstroTrack Drive.**

Small portable mount good for a small telescope and/or as a camera platform for wide field astro-imaging. Also has Orion 1/4"-20 Adapter for quickly attaching cameras.

The drive runs off a 9v battery, uses a dc servo motor and has variable speed control.

All together the combination goes for \$192 new, **asking \$50.**

Tom Cleveland at [ClevelandT@biotek.com](mailto:ClevelandT@biotek.com)

**Meade 6" LXD55 telescope** with the following: 26mm eyepiece, Finder Scope, Anniversary eyepiece kit with 15mm; 6.4mm; 9.7mm; 12.4mm; 40mm; 32mm; and 20mm. Solar filter, Dew cap, Autostar Instruction Manual, Martin Preston users guide **Asking \$350** with the accessories listed.

Contact Bruce Harmon, 802-876-7535 or [bdhinv@t@yahoo.com](mailto:bdhinv@t@yahoo.com).