

Morning Star

Fall 2020



*** Club Info ***

Announcements

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 (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

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

Facebook.com/Vermont-Astronomical-Society-113053818706458/

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

webmaster@vtastro.org

(Goes to Secretary and Webmaster)

Board Members

Jack St. Louis	Pres	857-5049
Joe Comeau	VP	238-1664
Doug Williamson	Treas	388-3482
Paul Walker	Sec'y	388-4220
Bob Horton		879-7802
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(My apologies if I missed anyone)



Jupiter and Saturn are still well placed for viewing.

This image is by Joe Comeau the shadow of Ganymede crossing Jupiter. That's Ganymede to the left.

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Gary's Astronomical Events for the Month

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

Jack on the Radio

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

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 mail List for Member's 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=Nzc5dnQ1bnZrN2ljcDA2NG9vbXFnczI1M2NAZ3JvdXAuY2FsZW5kYXluZ29vZ2xlLnNvbQ>)

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 use the Hinesburg Observing Site. Please use precautions when more than 1 person is there. For those on the 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.

Update:

With the limit on group gatherings up to 25. We can have star gazing parties following appropriate social distancing and mask usage recommendations. The only 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

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

Sept 26 (Sat) GMA Members Only, Bristol Harvest Festival, Solar Event.

Oct 10 (Sat) GMA Members Only, Tracy Holden's, Wheeler Road, Brandon.

New Members

VAS welcomes the following new member who joined us since the last newsletter:

Jen Barney
 Leah Christopher
 Taylor Garner
 James Garner
 Flyod Pike Jr
 Zach Shiver
 Siddhesh Mukerji

Peter Williams (returning member and designer of our original logo)

Meetings/Presentations

Normally meetings are held at Brownell Library, due to COVID-19 we are holding them remotely.

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.,

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

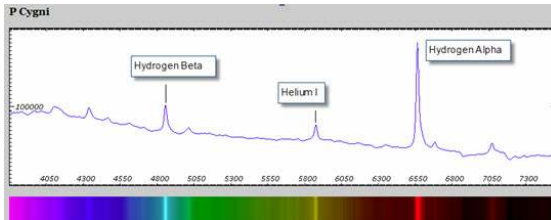
If you know of a group or institution that would like to schedule a star gazing session have them contact: info@vtastro.org

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

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.**

Oct 5 **Remotely via Zoom**

You Can Almost Touch the Stars By Tom Field



Emission lines of the super-giant star P Cygni
Graphics Credit: RSpec

Even if you wanted to touch a star, they're all impossibly distant. Despite these great distances, astronomers have learned an enormous amount about stars. How? The most common method to study the stars is called spectroscopy, which is the science of analyzing the colorful rainbow spectrum produced by a prism-like device.

Until recently, spectroscopy was too expensive and too complicated for all but a handful of amateurs. Today, though, new tools make spectroscopy accessible to almost all of us. You no longer need a PhD, dark skies, long exposures, enormous aperture ... or a big budget! With your current telescope and FITS camera (or a simple web cam or even a DSLR without a telescope) you can now easily study the stars yourself. Wouldn't you like to detect the atmosphere on Neptune or the red shift of a quasar right from your own backyard?!

This talk, with lots of interesting examples, will show you what it's all about and help you understand how spectroscopy is used in research. Even if you are an armchair astronomer, understanding this field will enhance your understanding of the things you read and the night sky. We'll do a live Q&A after Tom's 45-minute presentation.

Speaker Bio: Tom Field is has been a Contributing Editor at Sky & Telescope Magazine for the past 7 years.

He is the author of the RSpec software (www.rspec-astro.com) which received the S&T "Hot Product" award in 2011. Tom is a popular speaker who has spoken to hundreds of clubs via the web at many conferences, including NEAF, the NEAF Imaging Conference, PATS, the Winter Star Party, the Advanced Imaging Conference, SCAE, and others. His enthusiastic style is lively and engaging. He promises to open the door for you to this fascinating field!



Nov 2 **Remotely via Zoom**

Observing Asteroid Occultations By George Viscome

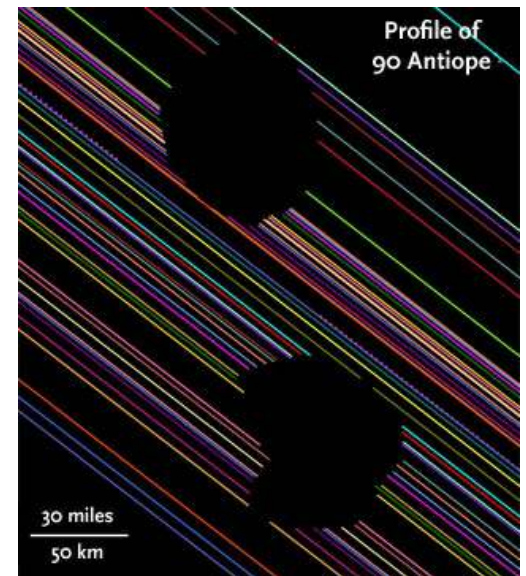
A million known asteroids,... a few billion stars,... it's only inevitable that every night a star up there "winks" at us (as an asteroid briefly eclipses it). But which one? And from where on Earth can this be seen?.....

Only recently can these "occultations" be accurately predicted. And when it happens, amateurs with rather small scopes have the ability to measure the asteroid's size, shape, (and orbit) - often with even better resolution than can be obtained by the Hubble Space Telescope!

This talk, will blend a unique mix of average, everyday backyard observing with small scopes, in with cutting-edge wizardry in equipment and computers. For the astrophotographers, we'll look at unique ways of using cameras. For computer-savvy folks we'll explore computer programs that interface with the computers at JPL and Harvard. For those who simply just like the visual aspects, we'll see how you can easily get a listing of some of the nicer "events"

to simply watch through the eyepiece - many of which are predicted to occur to an accuracy of a few seconds (so it isn't a time-consuming chore to catch them). We'll explore star charting programs and look over some interesting past observations.

Observing occultations allows amateurs to work side-by-side with professionals. And having a big telescope on a mountaintop often isn't any more important than having a little 6-inch Dobsonian. Usually it's simply where you happen to be observing from that matters most!



The shapes of the double (or binary) asteroid Antiope. Each "line" represents an observer on Earth, and the breaks in a line indicate the time interval when the asteroid's components passed in front of a star - as seen by each observer. The result is a silhouette of the shape of both components of the "once thought single" asteroid.

Dec 7 **Remotely via Zoom**

Do-It-Yourself (DIY) Push-To and Go-To Telescope Computer By Robert Horton

With the advent of very low cost, but very powerful microcomputers, as well as open-source toolchains and a seemingly infinite well of example programs available on the web, it is now possible to put together telescope control computers with as much (or more!) functionality for much less expense than the commercial systems that are available today.

In this talk, I will show how I built a DIY Digital Setting Circle system that I have attached to the VAS's 14"-Irene Dobsonian Telescope (figure 1). This box interfaces to two 10,000 tick encoders that are attached to the Altitude and Azimuth axis of the telescope and helps you to select and point to bright stars, the planets, all of the Messier and Caldwell objects as well as many beautiful double stars. There will be a quick overview of the hardware and software development as well as a demo of the easy-to-navigate menu system that you would use during an observing session.



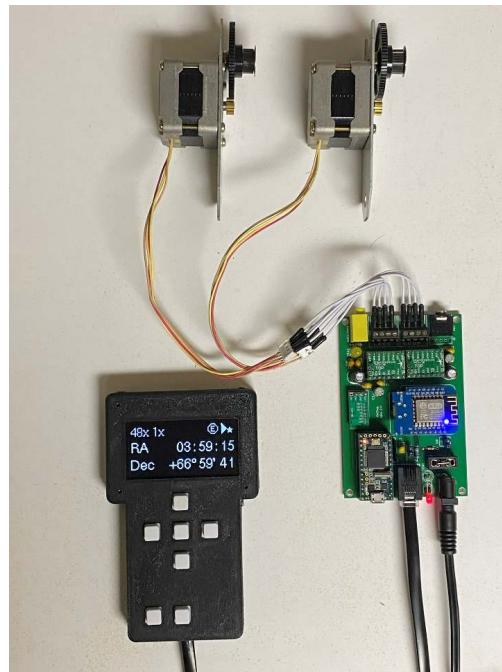
DIY Digital Setting Circle system attached to the VAS's 14"-Irene.



Close-up of the control unit.

Next, I will talk about the OnStep Go-To controller that I have put together and plan to mount on my 17.5" Dobsonian in the near future. This system

provides fully motorized control of the telescope through many interfaces, including a Smart Hand Controller with over 24,000 objects, WiFi (or Bluetooth or Ethernet) to your laptop/tablet/cellphone with a custom App or through the ASCOM interface to planetarium programs such as SkySafari, Stellarium or KStars. The OnStep system has been (and continues to be) developed by Howard Dutton and has a large on-line following and a very active forum. Many types of telescopes have been built or retro-fitted with the OnStep system with great success, as shown in the Showcase pages.



OnStep Go-To hand controller, main circuit board and motors.

Articles

First Telescope Program (Kept in as a reminder for all)

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 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 availabil-

ity of telescopes and components, so if you have old telescopes, eyepieces or parts you want to sell or donate please contact me.

Keith Lawrence

sleepingbearwoodworking@yahoo.com

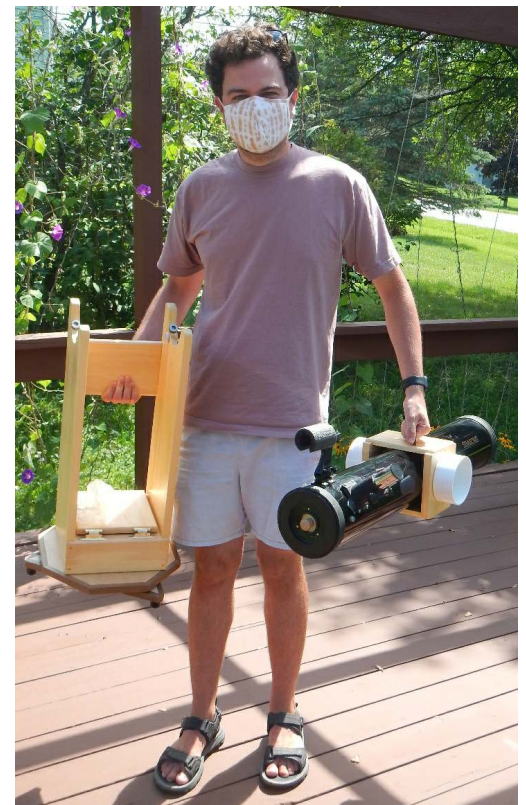
802-453-5496

First, First Telescope Recipient

By Paul Walker

Zach Shiver is the first purchaser of one of Keith's First Telescopes. Zack literally lives just down the street from me in Middlebury. He was one of 4 people who walked by one night as I was observing Comet NEOWISE C-2020 f3 this Spring from my front yard.

I gave him one of my VAS business cards and a while later he contacted me with an interest in getting an inexpensive telescope. At first I was going to give him a small refractor I have. But then I remembered Keith's First Telescope program with its 4.5" f/8 telescopes. I contacted Keith and as luck would have it he had the first one almost ready. One of the items he needed was one more eyepiece so I decided to donate some of my spare eyepieces, one of which went with this scope, a 10mm Plossl.



Keith did great job on the Dobsonian mount. Some detail may be a little

hard to see in the picture but he made it with a built-in storage compartment, an extra wide base for stability nicely trimmed out. Most of the wood is pine which keeps the weight down. It is all nicely finished. He even included a carrying handle on the tube assembly.

This article is distributed by the NASA Night Sky Network, a coalition of hundreds of astronomy clubs across the US dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, stargazing info and more.



Summer Triangle Corner: Deneb By David Prosper

The Summer Triangle is high in the sky after sunset this month for observers in the Northern Hemisphere, its component stars seemingly brighter than before, as they have risen out of the thick, murky air low on the horizon and into the crisper skies overhead. Deneb, while still bright when lower in the sky, now positively sparkles overhead as night begins. What makes Deneb special, in addition to being one of the three points of the Summer Triangle? Its brilliance has stirred the imaginations of people for thousands of years!

Deneb is the brightest star in Cygnus the Swan and is positioned next to a striking region of the Milky Way, almost as a guidepost. The ancient Chinese tale of the Cowherd (Niulang) and the Weaver Girl (Zhinü) - represented by the stars Altair and Vega - also features Deneb. In this tale the two lovers are cast apart to either side of the Milky Way, but once a year a magical bridge made of helpful magpies - marked by Deneb - allows the lovers to meet. Deneb has inspired many tales since and is a staple setting of many science fiction stories, including several notable episodes of Star Trek.

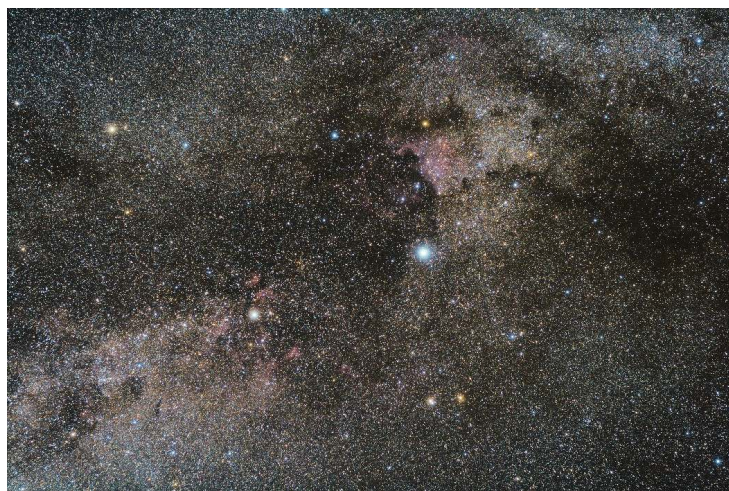
Astronomers have learned quite a bit about this star in recent years,

though much is still not fully understood - in part because of its intense brightness. The distance to Deneb from our Sun was measured by the ESA's Hipparcos mission and estimated to be about 2,600 light years. Later analysis of the same data suggested Deneb may be much closer: about 1,500 light years away. However, the follow-up mission to Hipparcos, Gaia, is unable to make distance measurements to this star! Deneb, along with a handful of other especially brilliant stars, is too bright to be accurately measured by the satellite's ultra-sensitive instruments.

Deneb is unusually vivid, especially given its distance. Generally, most of the brightest stars seen from Earth are

within a few dozen to a few hundred light years away, but Deneb stands out by being thousands of light years distant! In fact, Deneb ranks among the top twenty brightest night time stars (at #19) and is easily the most distant star in that list. Its luminosity is fantastic but uncertain, since its exact distance is also unclear. What is known about Deneb is that it's a blue-white supergiant star that is furiously fusing its massive stocks of thermonuclear fuel and producing enough energy to make this star somewhere between 50,000 and 190,000 times brighter than our Sun if they were viewed at the same distance! The party won't last much longer; in a few million years, Deneb will exhaust its fuel and end its stellar life in a massive supernova, but the exact details of how this will occur, as with other vital details about this star, remain unclear.

Discover more about brilliant stars and their mysteries at nasa.gov.

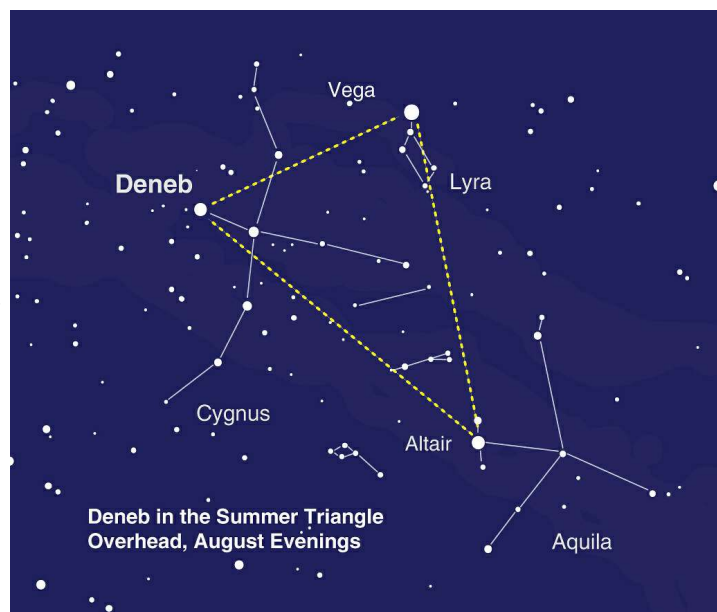


Long exposure shot of Deneb (brightest star, near center) in its richly populated Milky Way neighborhood. Photo credit: Flickr user jpstanley.

Source:

<https://www.flickr.com/photos/jpstanley/1562619922> License:

<https://creativecommons.org/licenses/by-nc-sa/2.0/>



Spot Vega and the other stars of the Summer Triangle by looking straight up after sunset in August!

Summer Triangle Corner: Altair By David Prosper

Altair is the final stop on our trip around the Summer Triangle! The last star in the asterism to rise for Northern Hemisphere observers before summer begins, brilliant Altair is high overhead at sunset at the end of the season in September. Altair might be the most unusual of the three stars of the Triangle, due to its great speed: this star

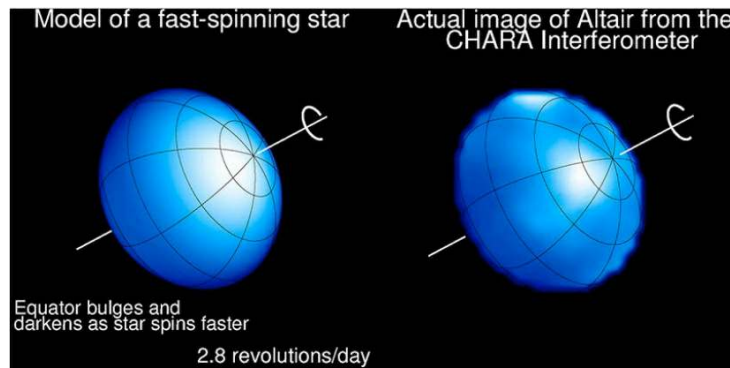
spins so rapidly that it appears “squished.”

A very bright star, Altair has its own notable place in the mythologies of cultures around the world. As discussed in our previous edition, Altair represents the cowherd Niulang in the ancient Chinese tale of the “Cowherd and the Weaver Girl.” Altair is the brightest star in the constellation of Aquila the Eagle; while described as part of an eagle by ancient peoples around the Mediterranean, it was also seen as part of an eagle by the Koori people in Australia! They saw the star itself as representing a wedge-tailed eagle, and two nearby stars as his wives, a pair of black swans. More recently one of the first home computers was named after the star: the Altair 8800.

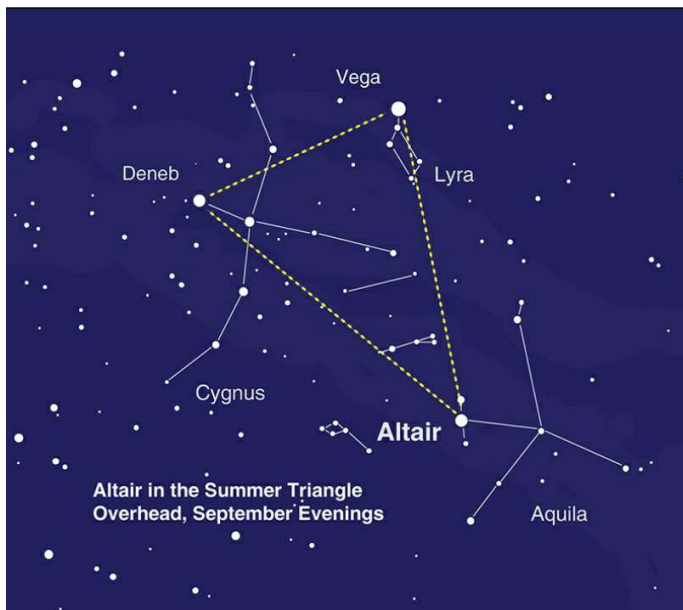
Altair’s rapid spinning was first detected in the 1960s. The close observations that followed tested the limits of technology available to astronomers, eventually resulting in direct images of the star’s shape and surface by using a technique called interferometry, which combines the light from two or more instruments to produce a single image. Predictions about how the surface of a rapidly spinning massive star would appear held true to the observations; models predicted a squashed, almost “pumpkin-like” shape instead of a round sphere, along with a dimming effect along the widened equator, and the observations confirmed this! This equatorial dimming is due to a phenomenon called gravity darkening. Altair is wider at the equator than it is at the poles due to centrifugal force, resulting in the star’s mass bulging outwards at the equator. This results in the denser poles of the star being hotter and brighter, and the less dense equator being cooler and therefore dimmer. This doesn’t mean that the equator of Altair or other rapidly spinning stars are

actually dark, but rather that the equator is dark in comparison to the poles; this is similar in a sense to sunspots. If you were to observe a sunspot on its own, it would appear blindingly bright, but it is cooler than the surrounding plasma in the Sun and so appears dark in contrast.

As summer winds down, you can still take a Trip Around the Summer Triangle with this activity from the Night Sky Network. Mark some of the sights in and around the Summer Triangle at: bit.ly/TriangleTrip. You can discover more about NASA’s observations of Altair and other fast and furious stars at nasa.gov.



The image on the right was created using optical interferometry: the light from four telescopes was combined to produce this image of Altair’s surface. Image credit: Ming Zhao. More info: bit.ly/altairvsmode



Altair is up high in the early evening in September. Note Altair’s two bright “companions” on either side of the star. Can you imagine them as a formation of an eagle and two swans, like the Koori?

How Globular Clusters Have Enriched Our Knowledge of the Universe

Excerpts from the Webb Society Deep-sky Observers Handbook, vol 3 Open and Globular clusters.

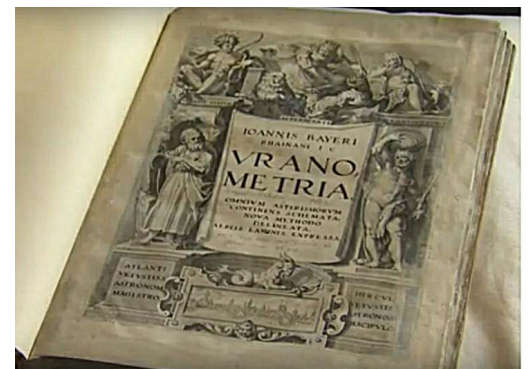


M13

Picture taken by Kitt Peak National Observatory

There was no such category of a celestial object recognized as a globular cluster until Wm Herschel first used the description in his 1786 catalogue of nebulae. And even there, the description does not always match the distinctions we apply today to globular clusters.

We eventually determined omega Centauri to be a globular cluster. But to ancient observers it was considered a single star. Hence its enumeration as omega by Bayer in his Uranometria of 1603.



The first recognition of omega Centauri as a 'nebula' (or 'lucid spot like a cloud') was made by Edmund Halley who examined it telescopically at St. Helena in 1677. And it was also Halley who in 1714 discovered the globular cluster we now know as M13 in Hercules, which he described as “but a little Patch, which shows itself to the Naked Eye when the Sky is serene, and the Moon is absent”.



Edmond Halley (1656-1742)

The first globular cluster to be discovered as a 'nebula' was found by the German amateur astronomer Abraham Ihle, who came upon the globular cluster we now know as M22 in Sagittarius. It is said, Ihle came upon it by accident in 1665, while observing Saturn.

Between the dates of Halley's two globular cluster discoveries, another was found by Gottfried Kirch in 1702. The cluster we now know as M5 in Serpens.

In 1745 the total count of recognized globular clusters was raised to six, when Jean-Philippe Loys de Cheseaux came upon M4 within Scorpio, (which he described as "small white and round"), and M71 in Sagitta.

The next year (1746) saw the addition of two more clusters; M2 in Aquarius, and M15 in Pegasus, both being sighted up by the French-Italian astronomer Giacomo Maraldi who discovered them while looking for de Cheseaux's comet.

During his expedition to the Cape of Good Hope in 1751-52, the Abbe Lacaille added five new globular clusters to the known total. These being NGC 104 (47 Tucani), NGC 4833, NGC 6397, M69 and M55.

The contribution of the French astronomer Charles Messier to the gathering of new globular clusters is impressive. He began by picking up eight: M3, M9, M10, M12, M14, M19, M28, M30, between May and August of 1764, and thereafter he and his comrade Pierre Mechain contributed another ten by March 1781.

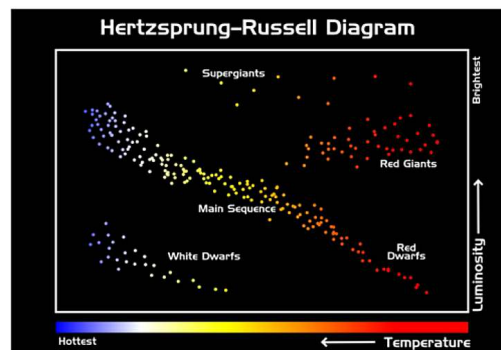
The phenomenal gathering of nebulae by Wm. Herschel brought many globular clusters into view. But a more definitive analysis had to await the invention of the spectroscope and its application within astronomy by pioneers

like Wm. Huggins, and the classification of stellar spectra by Secchi.

Further progress followed the recognition of RR Lyrae variable stars within globular clusters by Bailey and Shapley in the 1900s.

Between 1914 and 1918 Harlow Shapley measured the distances of Globular clusters, and thereby revolutionized the understanding of the structure and scale of the Milky Way Galaxy.

So, this era saw the introduction of the Hertzsprung-Russell diagram in 1905, and, in 1917, the derivation of the distance of the solar system to the nucleus of the Galaxy by Shapley.



Further impetus was gained in the study of globular clusters by Walter Baade's analysis of stellar populations in 1944. Since then, due primarily to the large-scale plates of the Sky Survey, further globular clusters have been identified within the Galaxy, while plates taken by large reflectors have even revealed many globular clusters within external galaxies.

Some consider Walter Baade as the second most important observational astronomer in this century after Edwin Hubble, who changed our place in the universe, and our perception of it. And Baade's two stellar populations is considered one of the most important diagrams in this century.



WH Walter Baade (1893-1960)



Baade's Window

An approximately 1° peephole into the Milky Way's galactic bulge

Baade was first to recognize the significance of this location, which serves as porthole into deep space, spans about 1° in diameter, and is centered on the globular cluster NGC 6522 in Sagittarius. Though it is very small, Baade's Window serves up one of the brightest visible patches of the Milky Way.

Thus, we can see, the study and observation of globular clusters has garished a rich and rewording history.

This piece was sent to us by Duane Waller.

Board & Committee Meetings

Board Meetings

July

Jack opened the meeting. Jack opened the meeting. Asked Terri about the status of the Forum. She has been putting in a lot of hours at work so she hasn't had time to put into the forum.

Keith updated us on the Membership Committee (he's the Chair). See committee notes. Asked the board how we felt about having a Persied Meteor Show Event at the HOS. Most were OK with it, some were not due to about COVID-19. Keith suggested that because there was some concern that we not have it. We had consensus on that count and won't have the event. We will revisit the idea of having a member event at the HOS this Fall.

Keith updated us on his thoughts for the Light Blocking Fence at the HOS. Rather than build the fence from scratch as we originally planned he suggests we purchase off the shelf sections of Spruce stockade fencing (~\$300 for 7, 8 foot sections). The 8, 4x4 posts to

support them is about \$100. Well below the ~\$700 the board approved last year. He also suggests that we not paint the fence. The fence won't last as long but this will allow us to recycle the wood rather than have to pay to dispose of it as construction waste. It will also save the time and expense of painting it. The posts will last much longer and not need replacing as often.

We have a request for a Library Loaner Telescope from Ludlow, VT.

Maura suggested that in addition to "Zooming" our meetings that we should consider Live Streaming them via our Facebook account. We have many followers that would likely be interested in watching.

Terri will continue to do the Constellation of the Month at the monthly meetings.

Doug updated us on the financial's. He has the handles for the roll-off sheds. (he installed them on 8/9/20).

Jim asked if there have been any more issues with people not opening the Warming Hut to sign in. Not that anyone knows about. (Paul has since installed a metal box next to the Warming Hut door with the sign-in sheets and sent a notice to the membership).

August and September meetings will feature Gary Nowak with a 2-part presentation about Mars and equipment and techniques for observing it. October- Tom Field will give a talk on Spectroscopy that amateur astronomers can do, he is the president of Field Tested Systems.

Keith reminded us that Angele is doing a presentation about Star Clusters on Saturday, August 8 for the club. This was set up by the Membership Committee as mid-month activity for engaging members.

MOTIONS: None

ACTION ITEMS: Noen

August

Jack opened the meeting. Asked for thoughts on streaming the monthly meeting live on Facebook. Most of the board members are OK with this. However, it will be up to the individual presenters as to whether they are OK with it for their presentations.

Doug updated us on the financial's.

Monthly meeting presentations are set through December. September - Part 2 of The 2020 Opposition of Mars by Gary Nowak. October- Tom Field will give a talk on Spectroscopy that amateur astronomers can do, he is the president of Field Tested Systems. December - Bob Horton is doing a talk on a home-built digital setting circles and home-built Go To hand controller for telescopes.

Keith has 2 Library Loaner Scopes on order but they are on back order. He is planning to organize some workshops through the Membership Committee. One will likely cover binocular use.

MOTIONS: None

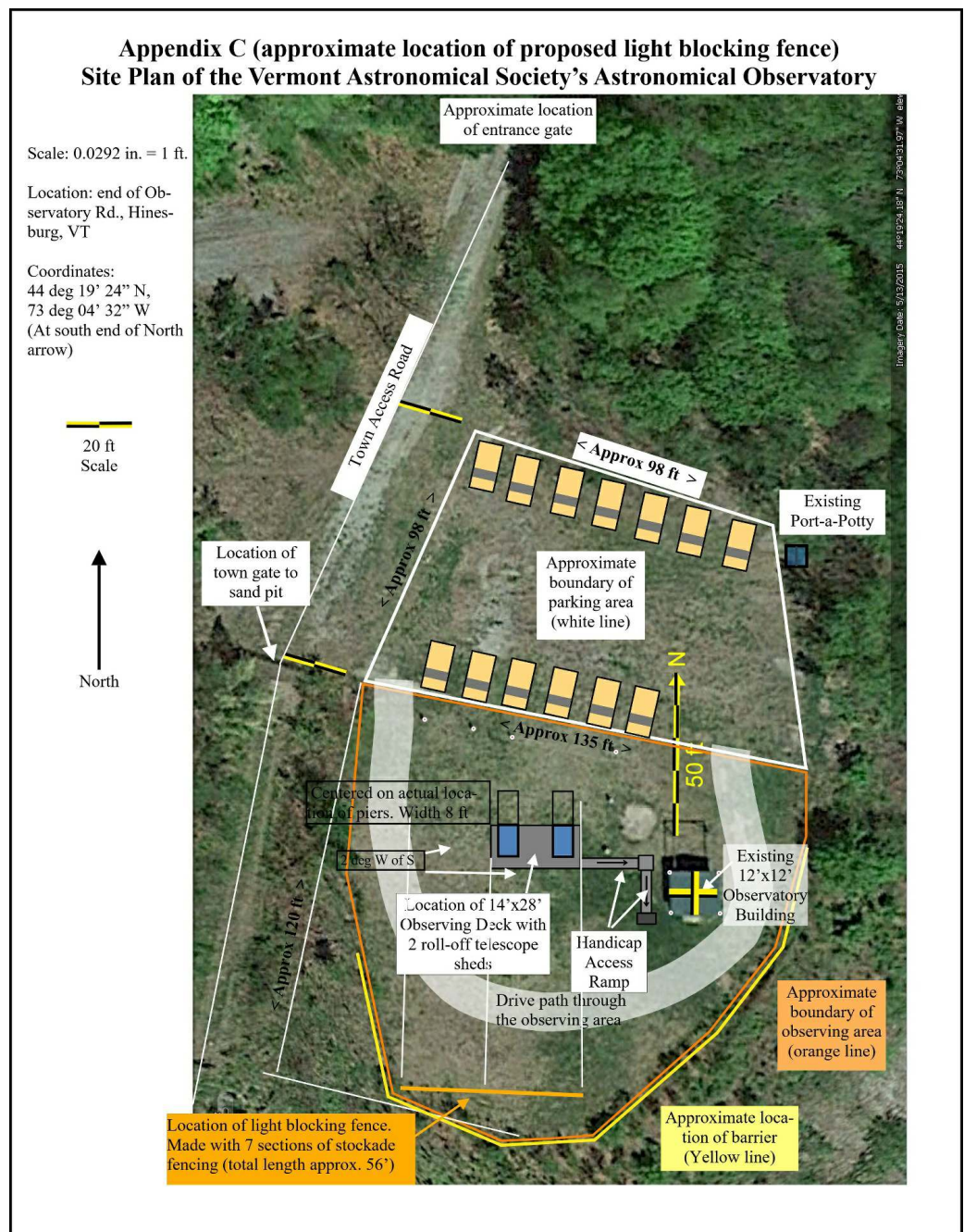
ACTION ITEMS: None

September

Jack called a special Board meeting to address a plan for the town of Hinesburg to have solar panels installed on the landfill near our observatories.

Jack opened the meeting.

Jack had received a packet from Aegis Renewable Energy, the company which responded to Hinesburg's RFP (Request for Proposal) for a solar power system. AEGIS based in Waitsfield, VT. A solar power system at the old landfill was one of 3 or 4 siting locations the town offered. The other locations were on buildings and much smaller systems. Jack attended a virtual meeting with them that they set up for neighboring landowners. Jack was the only invitee to attend.



VAS Membership Committee

July

The information given to Jack shows panels on most of the area we currently use for parking.

Joe asked why they didn't seem to know about our use of that area. We don't currently know.

Terri mentioned that the newer members of the board (Jim and herself) did not know the history of the site. Jack filled them in with some of the history. We had heard from the town some 3 or 4 years ago that they might consider having solar panels installed on the capped landfill but we have not heard anything since.

Jack read the town's RFP for the project. It appears Aegis was made aware of us but maybe not agreement with the town and the site plan we had to provide the town.

Jim asked whether Aegis's plan included security lighting. The information provided Jack only included the general location of the panels and the power converter. And a proposed road bed around the East end of the panels for us to access the buildings and observing area. He also said we need to know why Aegis had not included us in the loop earlier in the process.

MOTIONS:

None

ACTION ITEMS:

Jack will also have another meeting with Aegis.

UPDATE:

At the Monthly Meeting on 9/14/20 Jack updated us on this issue. Aegis has updated their site plan (we haven't seen their official plan). Based on what they told Jack they will be just West of the area on our site plan that is marked as our parking area and that they will provide access to our parking. During construction they will likely use much of our parking area as a staging area. (Note- our parking areas does not include the "roadway" between the gate on Observatory road and the 2nd gate that blocks access down into the sand-pit). **Our site map is on the previous page for reference.**

Keith opened the meeting. Keith started a discussion asking how comfortable committee members were with having gatherings at the Hinesburg Observing Site. Several members indicated they would not attend but most were not opposed to others gathering if precautions were taken. Angele cautioned that we should be clear to members ahead of time about what is expected (face masks, distancing, use of equipment, etc.). Paul indicated that at the work parties this spring members found it difficult to remember social distancing once we were working. We discussed some difficulties of sharing telescopes including each observer having their own eyepieces, common focusers, closeness without masks, etc.

Some suggestions did come out of the discussions.

1) Host a Perseid meteor shower party promoting only naked eye observing. Dennis later suggested we could have someone give a sky tour pointing out interesting observing targets using a green laser pointer. He remembered Gary Nowak had done this at some point in the past with great success. Dennis also indicated he might consider leading this tour. We set a date of August 7-8 with a rain date of August 15-16 for this event.

2) Have someone with a live video setup (to a video monitor) at the site to demonstrate its use. Paul will contact Steve Scaravella, Joe Comeau, and Peter Gillette about this idea.

We moved into a discussion on promoting gatherings verses other means of being in contact within the club. Dennis suggested we send out a club wide e-mail polling members to see if enough would attend a gathering to make the event worthwhile. Angele addressed how her club, the Rose City Astronomers, tries to keep in contact especially with new members via presentations on ZOOM and videos on their web site. Terri asked if our data base contains information on how experienced our members are and in what areas. Paul said it does not.

We began discussing the idea of our presenting workshops on ZOOM. Angele shared that she has prepared one for her club promoting star clusters and offered to present it for our club. After some discussion we set a date of August 8th at 11 am EDT. The presentation will take about 30 minutes.

Keith complimented Terri on her presentation of Constellation of the Month in July. He suggested we add perhaps 5 observing targets which he would be glad to supply. Dennis reminded him of a good target in Sculptor, NGC 253, the Silver Coin Galaxy. Keith said he gave it an 8 out of 10.

Dennis suggested we consider the possibility of running a virtual star party on ZOOM. Also suggested was promoting more observing with binoculars, perhaps a video on the subject.

Steve said that He and Gary Nowak are trying to put together a star party at Grout Observatory in Morrisville.

Observatory Site Committee

No meetings

Site Survey Analysis

The results were reported in the Winter 2020 newsletter (available on our website, www.vtastro.org). The full 2018 Site Survey results are available as a PDF file on request (contact info@vtastro.org)

Observers Page

Comet NEOWISE C-2020 F3



NEOWISE - 2020-07-09, 3:24 AM

By Paul Walker, first image as it was clearing the trees. ~30% crop of 50mm at f/2.2, 15s, iso400.

Comet NEOWISE was arguably the astronomical highlight of the summer. The earliest views required getting up before 3 AM and waiting for it to rise above any trees or buildings blocking the view. Wait too long and it would be lost in the twilight. Luckily for Paul, he managed to get up early enough to get his first glimpses and images on July 9.

"I got up at 2:30 this morning and setup my 20x90 binos and setup my Canon T7i on a SkyTracker in a field about 400 feet from our house (it took 2 trips). I had measured the top of the tree line to the Northeast during the day to be about 5 degrees altitude. Using planetarium software I knew the comet would clear the trees by about 3:30 AM.

I barely got the camera focused by then, and though I could not see it with the unaided eye, there it was in the image, just barely clearing the trees. Through the 20x90 binos it was gorgeous. I could see 1.5 degrees of tail, maybe even as much as 2 degrees (the 20x90's have a 3 degree field). Could even see a "shadow" going down in the middle of the tail. The head has a bright inner coma with a star like false nucleus. All this was visible at only 20x. A little later, once I knew exactly where the comet was, I could just barely make it out with the unaided eye using averted vision. Even then, I had to try placing it in different parts of my vision before I found the most sensitive area! This was at about 3:40 AM before twilight started to interfere, but did have

the waning gibbous Moon in the south brightening the sky."

Many other members of the club observed it and took pictures. Gary Nowak one of the club's most experienced observers started observing NEOWISE on July 18th.

Gary's notes from his observing log.

You may notice his notes include particular details and notations. Gary is a member of the Association of Lunar and Planetary Observers (ALPO) and has many years experience providing observations that require standardized descriptions and notation. You will also find interesting notes about the local observing conditions.

18 July 2020 UT

Seeing 6.0, Transparency 5.2, Temperature +67 degrees F, Barometer 29.54", Wind 0, Humidity 99%.

01:30 UT C/2020 F3 (NEOWISE) seen in 8 X 42 Binoculars.

01:45 UT, C/2020 F3 (NEOWISE) easily seen in 8 X 42 Binoculars.

02:00 UT Comet seen by unaided eye, also observed in 15 X 70 Binoculars.

Comet Visual Observations in 15 X 70: Nucleus Condensation 7.0, Magnitude +2.4, P.A. (Positional Angle) Dust Tail 0°, P.A. Ion Tail 320°. Length of Ion Tail about 4.4°, Length of Dust Tail 8.8°, Size of Coma 15'. Some yellowish color seen in coma area. The Ion tail was hard to see; it was faint, ex-

tremely thin and ghostly. The Dust tail had a curve to it and was fairly uniform looking. Stars were seen shining through the dust tail. Nucleus was circular and uniform with no jets seen shooting out of it. Comet magnitude estimation was a straight visual estimation without any attempts to put in a factor for atmospheric extinction. Comet brightness and tails appearance was affected by; haze, high humidity, light pollution and low altitude. It's too bad that this comet was observed in this July's high humidity sky instead of a much drier autumn sky. I believe that the observed tail length would have been longer if not for the high humidity and haze... Extremely high humidity produced a large amount of "dew" on tripod and binoculars. The high humidity was also well appreciated by the biting insects (black flies and "no see ums"). Observed comet until 02:45 UT when it set behind some trees. Also observed comet in 25 X 100 binoculars but the 15 X 70 binoculars gave more of a "vista" with its wider field view of the comet's tail. C/2020 F3 (NEOWISE) reminded me of C/1995 O1 (Hale Bopp) with its similar brightness and tails appearance. However, C/1975 V1 (West) was much more impressive and brighter comet than either C/2020 F3 (NEOWISE) or C/1995 O1 (Hale Bopp) was. Let's hope that C/2020 F3 (NEOWISE) can hold on to its brightness and tails and not start fading fast especially when it gets more altitude at its closest approach to Earth (23 July, 2020). There was also a few Eastern Coyotes that were howling their approval of the comet in the distant West from my position.

22 July 2020 UT

Seeing 6.0, Transparency 5.2, Temperature +60 degrees F, Barometer 29.56", Wind 0, Humidity 91%.

01:30 UT Cloud pieces in NW, can't see C/2020 F3 (NEOWISE), Many fireflies are out.

01:45 UT, C/2020 F3 (NEOWISE) seen in 10 X 50 Binoculars despite thin cloud pieces.

02:00 UT Comet seen by unaided eye, also observed in 20 X 80 Binoculars.



NEOWISE - 2020-07-09, 3:53 AM

This image of Paul's shows the shadow in the tail. The 20x90's view was similar to this only the inner coma and a star-like "false nucleus" was visible. ~30% crop of 300mm at f/5.6, 20sec, iso400.



NEOWISE - 2020-07-09, 3:52 AM

This is a shorter exposure (same scale) showing the bright inner coma and the inner coma's shadow, though still not the star-like "false nucleus". ~30% crop of 300mm at f/5.6, 5sec, iso400.

02:15 UT Big white clouds masses cover up comet, unable to see comet for the rest of the night. Tiny black flies are biting, Thin white clouds slowly spread over whole sky.

Comet Visual Observations in 20 X 80: Nucleus Condensation 7.0, Magnitude +3.5, P.A. (Positional Angle) Dust Tail 315°, P.A. Ion Tail 300°. Length of Ion Tail about 4.4°, Length of Dust Tail 8.8°, Size of Coma 17'. Some yellowish color seen in coma area. The Ion tail was hard to see; it was faint, extremely thin and ghostly. The Dust tail had a curve to it and was fairly uniform looking. Stars were seen shining through the dust tail. Nucleus was circular and uniform with no jets seen shooting out of it. Comet magnitude estimation was a straight visual estimation without any attempts to put in a factor for atmospheric extinction. Comet brightness and tails appearance was affected by; haze, high humidity, light pollution and altitude. Extremely high humidity produced a large amount of "dewing" on tripod and binoculars. The high humidity was also well appreciated by the biting insects (black flies and "no see ums").

25 July 2020 UT

Seeing 4.0, Transparency 5.2, Temperature + 70° F, Barometer 29.57", Wind 0, Humidity 70%, 4 Day Old Crescent Moon.

01:30 UT C/2020 F3 (NEOWISE) seen in 8 X 42 and 20 X 80 Binoculars. 01:45 UT Comet seen in 25 X 100 binoculars, a few thin cloud pieces are in the North.

01:50 UT Thin elongated clouds moving over NW sky. Observing Comet between cloud strips.

Comet Visual Observations in 25 X 100: Nucleus Condensation 5.0, Magnitude +4.4, P.A. (Positional Angle) 310°, Length of Dust Tail 5.5°, Coma Size 12'. No Ion Tail seen in 25 X 100. Color in the comet is gone (none). Stars seen shining through Dust Tail. Nucleus is less star like and seems to be spreading out. Coma is smaller. Comet seen with unaided eye. Comet has faded some and tail length has shortened. Comet was visible to unaided eye after moonset. Comet now looks like a ghostly stain of light. Tiny black flies are about and they

are hungry. Heavy dew on mounted binoculars.

7 August 2020 UT

Seeing 4.0, Transparency 5.2, Temperature +63° F, Barometer 29.62", Wind 0, Humidity 81%.

01:15 UT Comet C/2020 F3 (NEOWISE) located and first seen in 11 X 56 binoculars. 20 X 80 binoculars were then used for observations.

Comet Visual Observations in 20 X 80: Nucleus Condensation 4.0, Magnitude +5.3, P.A. (Positional Angle) 315°, Length of Dust Tail 3.5°, Coma Size 8'. No Ion Tail seen in 20 X 80. Dust Tail is very thin and faint and hard to see in 20 X 80. Round shape Nucleus and Coma are blending together. Comet not visible to the unaided eye. Dust Tail is hard to see in 11 X 56 binoculars. Comet is getting smaller.

15 August 2020 UT

Seeing 4.0, Transparency 5.3, Temperature +65°, Barometer 29.59", Wind 0, Humidity 82%.

01:30 UT Comet C/2020 F3 (NEOWISE) seen in 10 x 50 and 11 X 56 Binoculars.

Comet Visual Observations in 10 X 50 and 11 X 56. Nucleus Condensation 2.0, Magnitude +6.5, No Dust Tail seen in either binoculars. Coma Size 6'. Coma and Nucleus have almost totally blended together. Coma is getting fainter and less distinct. Comet now is a faint smear of light. Comet appears rather ghostly appearance. Comet can't be seen with unaided eye and needs binoculars to be found. No details seen in the Coma or Nucleus. There are a few biting black flies about. Barred Owls are heard hooting in the East.

Paul's NEOWISE notes.

2020-07-10

Location: Middlebury, VT, off of Seminary St. Ext in a field ~400 feet North of our house .

Did imaging and visual.

Comet NEOWISE cleared the trees ~3:10 AM EDT (seen in images on Canon T7i).

3:26 AM EDT: It was not visible to the naked eye.

3:44 AM EDT: Just detectable with direct vision. 2 degree tail visible in 20x90 binoculars.

4:01 AM EDT: With 12.5" f/4.8 Dob. false nucleus visible and a hood around the front side of the coma and the shadow of the coma was obvious.

4:13 AM EDT: Still visible naked eye with averted vision in strong twilight.

4:20 AM EDT: In 12.5" Dob. the core and short bit of the tail still detectable with direct vision at 63x, 84x and 190x.

Observed Mars as well. At 190x in the 12.5" the South Polar Cap and a dark area adjacent to it were visible [Mars was 12 arc sec in diameter at the time].



NEOWISE - 2020-07-10, 3:49 to 3:55 AM

By Paul Walker

Taken in strong twilight (astronomical twilight started at 3:02). The gas tail was just barely visible in processed 30 sec. single images at this time but it required stacking several to bring it out reasonably well.

140mm at f/5.0, 30sec X 7 (3.5 min.), iso400.

2020-07-12

Location: Dennis Woos house, New Haven, VT. Unsuccessful due to clouds. Saw and imaged only fireflies.

2020-07-14

Location: Dennis Woos house, New Haven, VT.

Did imaging and visual.

9:55 PM EDT: Comet visible with naked eye.

9:59 PM EST: Getting easy to see. ~3 degrees of tail visible.

10:19 PM EDT: In 20x90 binoculars ~6 degrees of tail visible. I later refined the estimate as 6.6 degree. [I made a sketch of the comet with a field star. I had a question mark for the distance between the comet's head and the field star and 3 degrees from the star to the end of the visible tail, the binoculars have a 3 degree field. Using planetarium software I determined the head to star distance was 3.7 degrees]. 5 degrees now visible naked eye.

10:31 PM EDT: 7 degrees visible naked eye. ~10 degrees visible in 2.3x40 "ultra wide" binoculars.

10:39 PM EDT: ~8-9 degrees visible naked eye.



NEOWISE - 2020-07-14, 10:34 to 10:43 PM

By Paul Walker

Taken about 10 minutes before the end of astronomical twilight. Field of view 5.7 x 8.8 degrees. 140mm at f/5.0, 60sec X 9 (9 min.), iso1600.

Note: Astronomical twilight ended about 10:47 PM so the tail slowly became more visible as the evening progressed. Also the comet was circumpolar at this time so it only slower got lower in the sky where atmospheric extinction dimmed it.



NEOWISE - 2020-07-14

By Paul Walker

The 2 images above are close-up views of the comet's head. Both are from the same stack of 15 images just with different levels of processing. The field of view is 0.5 x 0.8 degrees, cropped from the original 2.7 x 4.1 degree image. The shadow of the inner coma is still faintly visible down the middle of the tail. The outer coma is clearly offset from the inner coma which is condensed and very bright. I had to do some tweaking of the colors so they are certainly not exactly correct.

300mm at f/5.6, 5sec X 15 (1 m 15s), iso1600.

2020-07-17

Location: Middlebury, VT, my front lawn.

Sky Quality Meter Readings: 20.68 magnitude / sq. arc. sec. near Polaris. Limiting magnitude near Polaris 5.3. Did imaging and visual.

12.5" f/4.8 at 40x- The head is more diffuse now with the inner coma still very concentrated and the false nucleus star-like.

10:52 PM EDT: 12.5" at 190x. No shadow from the inner coma visible in the tail. False nucleus appears star-like at this magnification. There are 2 stars dimmer than the false nucleus very near the head for comparison.

10:55 PM EDT: One of the stars is now in the coma and the closest to the nucleus. This star now appears the about the same brightness as the false nucleus.

Follow up using Starry Night Pro:

The stars are magnitude 9.3 and 7.9. It is interesting that the brighter of the stars appeared dimmer than the false nucleus when outside the coma



but nearly equal when in the coma. I would have expected the opposite.

On the previous page is a graphic created from the software showing the the stars relative to NEOWISE. Below that is a image I took at 30 mm f.l. at 10:39 PM, 60sec, iso200, cropped 20%.

10:58 PM EDT: 10x50 binoculars. The core looks star-like. About 5 degrees of the dust tail visible.

11:02 PM EDT: 20x90 binoculars. About 6 degrees of the dust tail visible.

2020-07-20

Location: A little North of Brandon, VT on private property that the Green Mountain Astronomers sometimes observe from. I joined Ron Lewis and Allon Wildgust there.

Mostly did imaging. This site is notably darker than at my house in Middlebury. ~8.5 degrees of the dust tail was visible with 20x90 binoculars.

2020-07-21

Location: Middlebury, VT, my front yard.

Did imaging and visual.

11:00 PM EDT: 12.5" f/4.8 Newtonian. Core looks star-like even at 300x though it is very faint so averted vision is required. There are thin clouds present.

2020-07-24

Location: A little North of Brandon, VT on private property that the Green Mountain Astronomers sometimes observe from.

I joined Allon Wildgust there. Mostly did imaging.

Sky Quality Meter readings: 20.6 mag. / sq arc sec at comet, 21.0 at Big Dipper, 21.25 at zenith.

Not so good tonight. Clouds interfered early on, cleared for a bit than interfered again.

In all, I imaged and observed NEOWISE on a total of 14 occasions, the first 2 in the morning. An additional time I was unsuccessful due to too many cloud only managing to observe and image fireflies. I took approximately 750 images of the comet from 50mm to a 10" f/4 telescope.



NEOWISE - 2020-07-20, 10:34 PM

By Paul Walker

Location: A little North of Brandon, VT on private property from which the Green Mountain Astronomers sometimes observe. The owner has this horse stable that made a great foreground. I took several other shots. Some with red lighting from Allon Wildgust's light as he was lighting the front for images he took. Others with no lighting. Then Ron drove in and lit the scene with his headlights while I happened to be exposing this image.

The green-blue of the head is visible as is the blue gas tail. Single image but I applied a flat field by stacking a copy of the original with the original image while applying the flat.

Field of view 15.9 x 24.3 degrees.

Canon T7i (modified) 50mm f/1.8, 30sec, iso1600



NEOWISE - 2020-07-14 from New Haven, VT

By Paul Walker

Gas tail is faintly visible. Field of view 15.9 x 24.3 degrees. 50mm at f/1.8, 30 sec, iso400. Slightly out of focus.



NEOWISE - 2020-07-15 from Middlebury, VT

By Paul Walker

Chipman Hill is in the background with the radio/cell tower in center. Field of view 15.9 x 24.3 degrees. 50mm at f/1.8, 20 sec, iso400.



NEOWISE - 2020-07-19 from Middlebury, VT

By Paul Walker

Taken from my front yard. The horizon is Chipman Hill at the north end of town. The streak though NEOWISE's tail is either a meteor, satellite or more likely a spent booster rocket. No known satellites show up in Starry Night Pro in the area going in the right direction and location to have made the streak. The green-blue of the coma, the broad dust tail and narrow gas tail are visible. The green in the foreground are tree branches. Distance from the comet's head to the top of the image is 13 degrees.

Canon T7i (modified) 50mm at f/1.8, 2 min., iso100. Start time of exposure: 10:50:30 PM EDT, end time: 10:52:32



NEOWISE - 2020-07-20, Brandon, VT

By Paul Walker

The length of the gas tail from the head to where it goes off the frame is 18.5 degrees (the 2 bright stars up there are the pointer stars in the Big Dipper with a separation of 5.3 degrees). The dust tail is visible out to 18 degrees or more, to the frame edge is 20.3 degrees. This is a stack of 13, 2 minutes exposures. Registered on the stars, so the comet is slightly smeared. Looks better then the one where I registered on the comet's head.

Field of view 15.9 x 24.3 degrees. Canon T7i (modified) 50mm f/1.8, 2mX13, iso400



“Headlight in the Fog” NEOWISE - 2020-07-28, Middlebury, VT.

By Paul Walker, NEOWISE finally moved into a gap between the trees where I could catch it with my 10” f/4. Processed to maintain detail in the coma and to bring out detail in the gas tail.

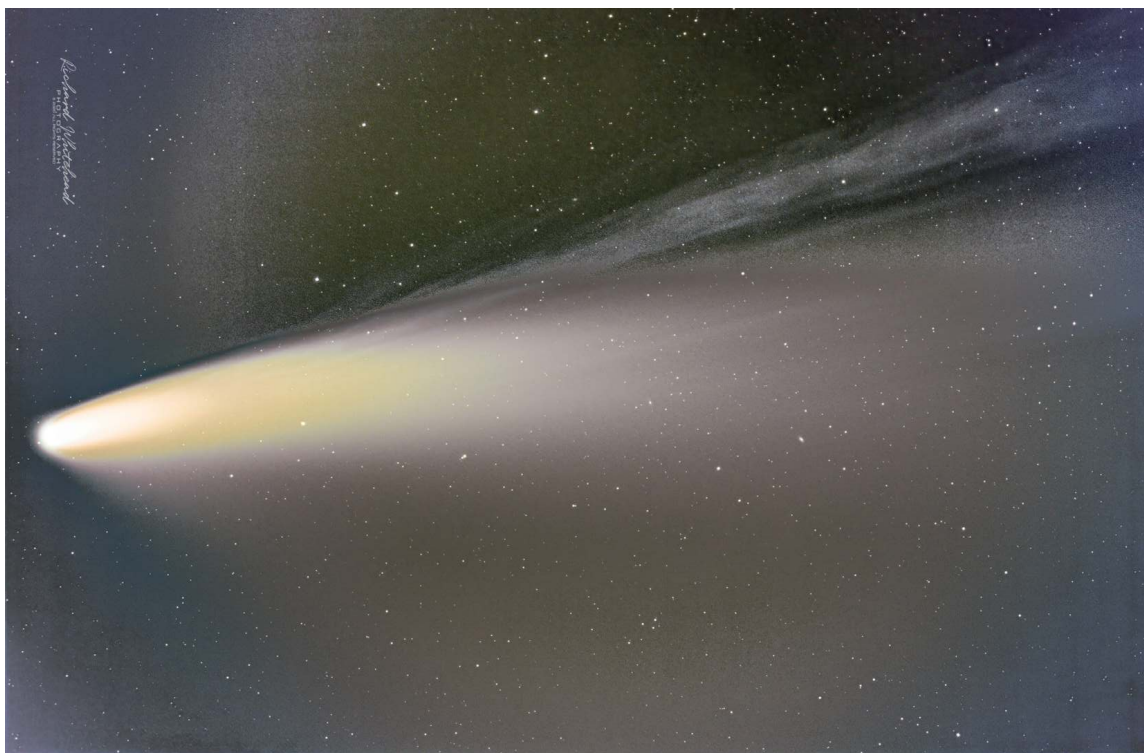
Field of view 1.1 x 0.75 degrees. Meade 10” f/4 Schmidt-Newt., Canon T7i (modified), 1mX12, iso800



NEOWISE - 2020-07-17

By Greg Warrington

Here's one with the comet, the ISS (International Space Station) and an unknown satellite. I don't have a fast wide angle; I took it with an 18mm at f/3.5, I think for 45 sec and a Nikon D5600 camera. I forgot the battery for my barn-door tracker so just turned the gear by hand. The lighting is rather eerie due to the emergency lights from a fender bender about 200 yards away.



NEOWISE - 2020-07-17

By Richard Whitehead

I thought I'd wasted my time the other night when all my equipment decided to quit. I'm so glad someone invented Photoshop. I was able at least to pull something out of what looked like an orange mess on the subs.

Here's one I did to enhance the ion tail.

Celestron RASA 11" f2.2 , 620mm focal length, CGX Mount, ZWO ASI 6200MCPro



NEOWISE - 2020-07-14

By Allon Wildgust

Last night I went out at 10 PM to see clear skies. The comet was clearly visible to the naked eye and higher than anticipated. I took this photo of Tracy Holden's barn with a 40 mm lens off a tripod; f/4.5 iso 800 for 10 sec at 10:12 PM.



Ptolemy Cluster (M7)



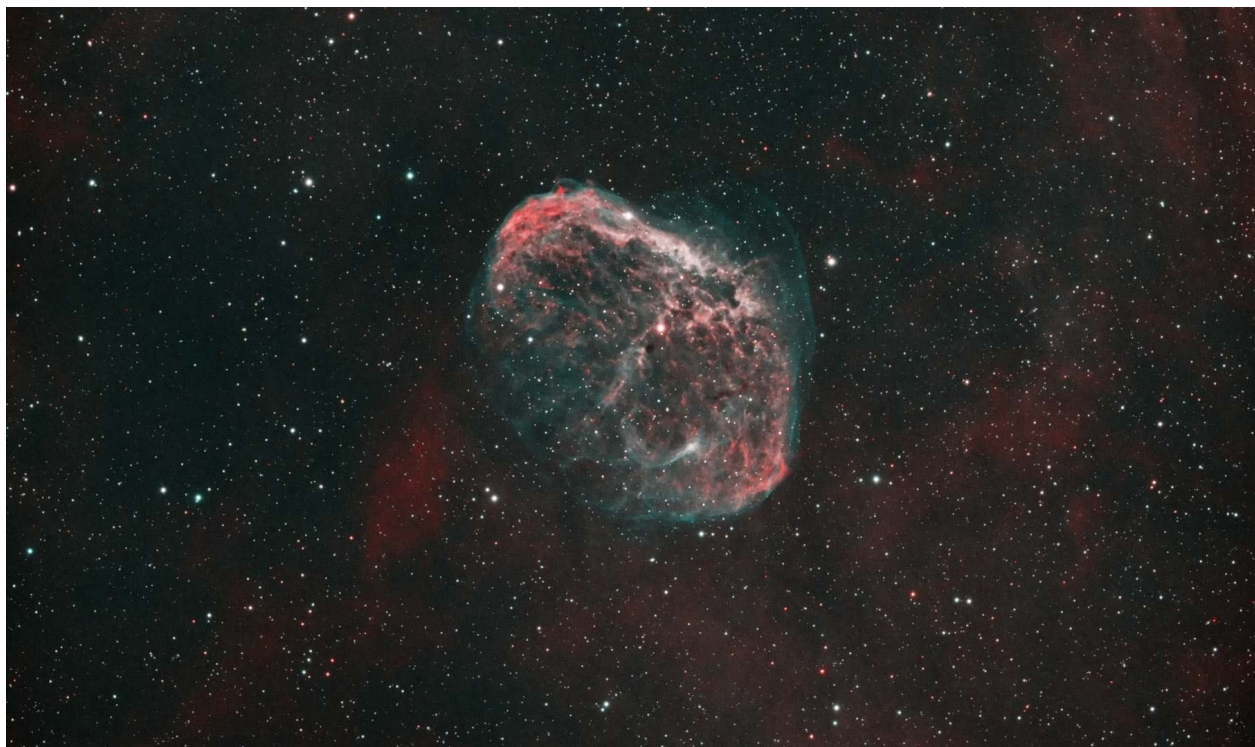
Butterfly Cluster (M6)

"From the observatory ~"

By Maura Kelley

These 2 open star clusters were difficult to image, as they are both located in Scorpius, a southern constellation and close to our horizon. Ptolemy Cluster (M7) was taken over 2 nights in June with an unmodded DSLR - (116) 25sec. subs = 48.33 min. integrated exposure time. Last week as I was trying to chase it again for more data, I found its close neighbor, the Butterfly Cluster (M6) a bit to its northwest, but the weather was not so cooperative. This image of the Butterfly Cluster was again taken with an unmodded DSLR - (101) 15sec. subs = 25.25 min. integrated exposure time. It was so nice to see other VAS astro friends up at our HOS working!"

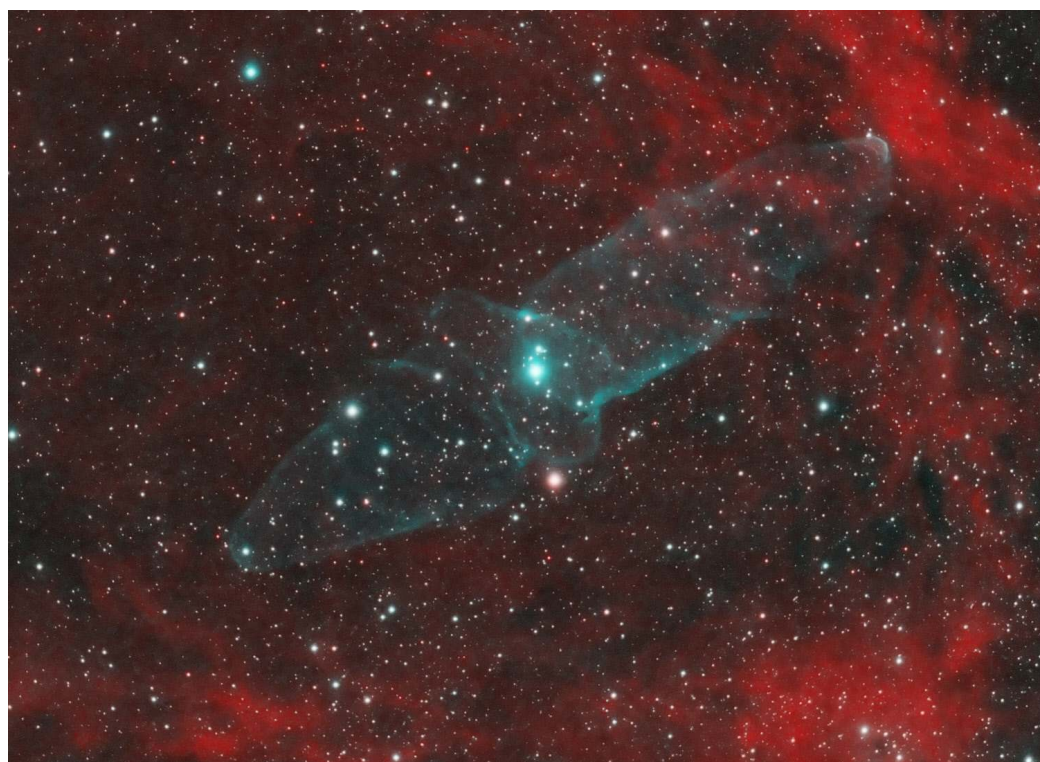
Equipment used: Explore Scientific 80mm f/6 air-spaced triplet ED apochromatic refractor in carbon fiber and Explore Scientific EXOS2-GT equatorial mount with PMC-Eight GoTo System, and Olympus OM-D E-M1 Mark II Mirrorless Micro Four Thirds camera



The Crescent Nebula (NGC 6888)

By Terri Zittritsch

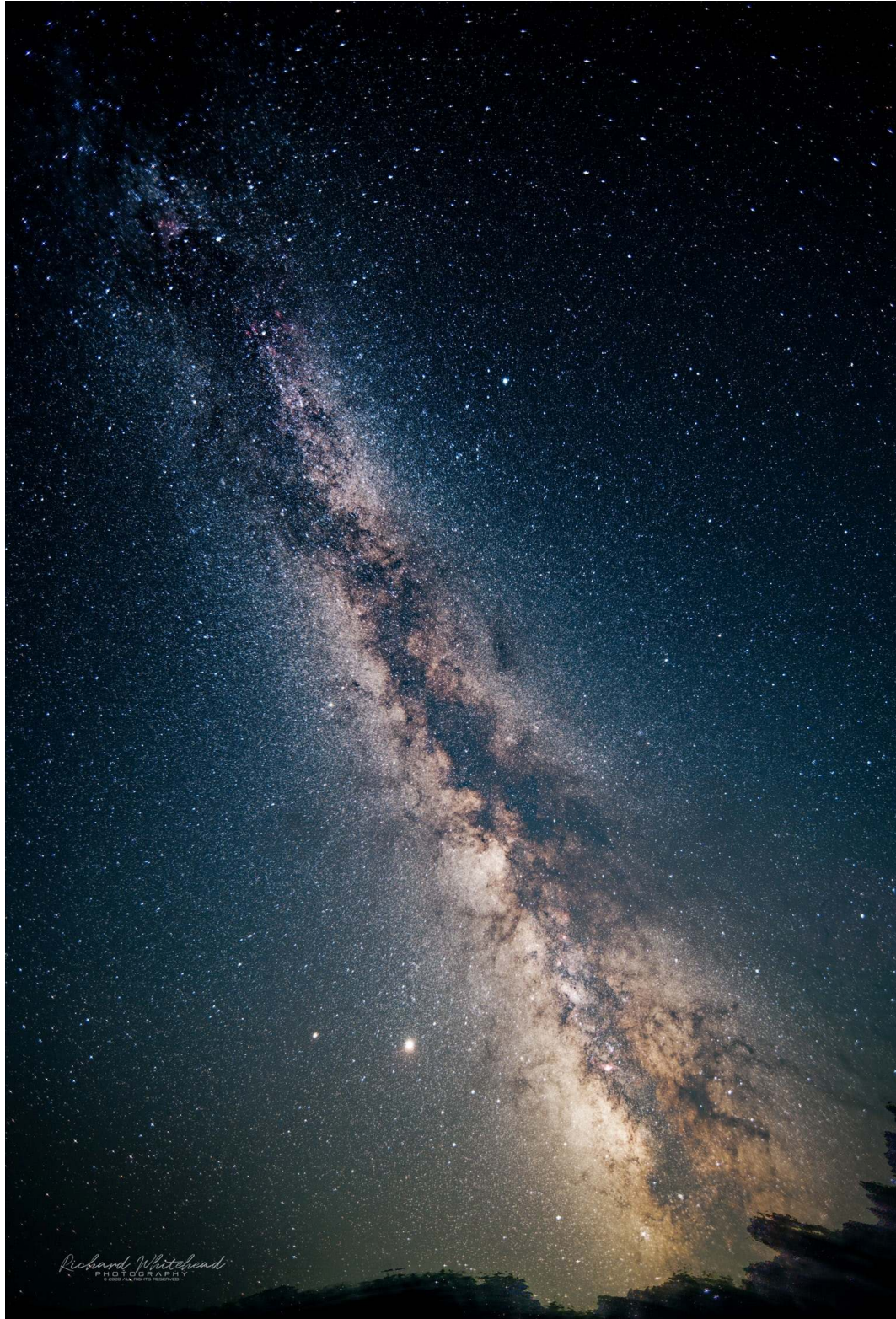
NGC 6888 is a faint emission nebula located in the constellation Cygnus. The nebula is approximately 25 light years across and 5000 light years from Earth. Even though NGC 6888 shines at magnitude 7.4, its low surface brightness requires large optics and transparent skies or filters to see it. NGC 6888 is made of a large shell of gas energized by strong solar winds emitted by a Wolf-Rayet star, WR136 at its center. Wolf-Rayet stars are very hot massive stars blowing off their outer layers. I shot NGC 6888 through 3nm narrowband Ha and OIII filters with 3 hours of total integration time.



The Squid Nebula

By Terri Zittritsch

OU4, or the Squid nebula is a large emission nebula in the constellation Cepheus and only recently discovered in 2011. There are actually 2 nebula in the picture, Sharpless Sh2-129, or the flying bat nebula, is the outer nebula characterized by hydrogen alpha red emissions while the Giant Squid, OU4, is characterized by its blue-green doubly ionized oxygen emissions in the center. The Giant Squid nebula is approximately 50 light years across and 2300 light years from earth. The Squid is the faintest object I've ever imaged, with 20 minute high gain sub frames barely capturing any visible signal, I shot a total of 11 hours through 3nm filters to make this image. The image only became visible after stacking.



Milkyway from Our Hinesburg Observing Site

By Richard Whitehead

I came with the small Tripod, Canon EOS Ra (Steve, I agree it's a great camera!) and used Backyard EOS and a laptop to capture. Jupiter and Saturn are the bright "stars" left of center near the bottom.

23 x 2 min subs at 800 ISO using a Canon 14mm lens.

Not a bad result - the Milkyway core is just sliding over the horizon at this time of year.

Still a thing of beauty though.

Mars Time

By Paul Walker

As Gary told us in his Mars presentations, now is the time to observe Mars. When you receive this newsletter we will be right in the prime time for observing Mars this year (beginning of September to the end of October). Mars will appear largest on October 6 so now's the time to get out and view Mars.

I have been observing and imaging Mars with my 10" f/5.6 Newtonian and Mark Moyer has been observing Mars with the club's 18" telescope. I shared an observation of Mars which prompted a question from Mark about a feature he saw and drew. The first email below I shared on the vtastonomy@list.

Paul - 9/22/20

After seeing Joe's detailed image of Mars I decided it would be a good night to view Mars in the morning when it would be high in the sky.

I napped from about 10:30 to 1:00 than went out to the backyard where my "big" 10" f/5.6 Newtonian awaited (same scope I took the ISS image with). I was not disappointed. The best views of Mars I have ever had. I was able to detect the fingers of Aurorae Sinus. It was the first time I have been able to identify Solar Lactus (the eye of Mars). Though the view was not as sharp at the highest magnifications, I did most of my viewing at 480x. For those who saw Gary's Mars presentation the exit pupil on this scope at that magnification is just over 0.5 mm (250mm/480=0.52mm). At lower power, even 350x I found that the smallest features were a little harder to make out. At 480x the surface of Mars was still bright enough in the 10" scope for me to see color. Even though Mars is relatively big right now at ~21.8 arc seconds, it is still only about the size of Saturn's disk and therefore needs a fair bit of magnification.

I was using a 2x Barlow, Atmospheric Dispersion Corrector and a Celestron 24-8mm zoom eyepiece (~160-480x). With Mars so high very little correction was needed but I could see a little color fringing before correct-

ing for it. I use fans mounted to the tube assembly and blowing across the face of the mirror to keep it very close to ambient temperature (helps prevent the mirror from creating warm air currents in the tube and ruining the view).

I took some high magnification HD video but I don't think they will stack into as good an image as Joe's.

I tried some of my filters. The most pleasing view was with a Salmon filter (Wratten 85B). I have a Celestron "Mars" filter. That also enhanced the contrast some but the red/blue color was not as pleasing for casual viewing. I finished about 3:30 when the seeing got a little worse.

Hi Paul,

I had some very nice views of Mars a little earlier (around 12:30) from HOS. And one feature I drew on my sketch is maybe what you mean by a finger of Aurorae Sinus. If you did make a sketch, or if you do process the image, I'd be interested in seeing them as a comparison and for confirmation (or disconfirmation) of what I thought I was seeing.

I've been seeing Maura, Terri, and Richard at the site a good amount lately and I keep mentioning Mars to them, but so far I don't think any of them have tried to image it. (As I see it, even if you're not into planets, this is such a unique opportunity, short of waiting 15+ years!)

-Mark

Just finish up a couple from one of the videos.

This image is about the level of detail [and contrast] I could see. Image from 1:36 AM video. Solar Lactus is just left of center with Aurorae Sinus left of that.



-Paul

I have to admit I'm pretty excited right now. I'm convinced I saw Valles Marineris last night!

Last night I finished up, like any other, by observing Mars. I was planning to stay fairly late, but transparency wasn't at all as good as forecast, making galaxy hunting tough, and I was getting somewhat cold, so while I did observe Mars for a while, I didn't spend very long on it (30 min.?), and I didn't experiment with filters at all as I have done on other nights. Anyway, I've been seeing Mare Sirenum each night and over to the left (from my Dobsonian view) Solis Lacus and Mare Erythaeum and Aurorae Sinus, though these last three weren't really separated in my views and sketches. But last night I did see some fleeting faint stuff, and so I drew one of those features, which was a long 'finger' as you say. (I actually drew more of a thumb and thought about re-drawing it since what I saw was much narrower and longer. But I'd already re-drawn one part of my sketch, so due to laziness I left it looking like a thumb.) I don't know of any really good comparison maps, so I've been using the Sky&Telescope profiler

(https://skyandtelescope.org/wp-content/plugins/observing-tools/mars_profiler/mars.html), which orients the planet for your observing time and labels the big features. But nothing on that map really corresponded to my sketched finger, so I figured I was imagining it. Or, actually, there is a faint feature on that map that corresponds, but because it's faint there's no way I was seeing that thing.

But after your email mentioning you saw fingers, my curiosity was piqued so I hunted around for other maps and found one (<https://i.redd.it/sji7lxopbq901.jpg>) where that feature was darker. So I'm now convinced I did see it after all! And on that map the feature was called Coprates which, after some hunting, is actually Valles Marineris. Does it sound reasonable to you that I would have actually seen it?

-Mark

I would say yes. I see on my topo Mars globe that Coprates Chasma and

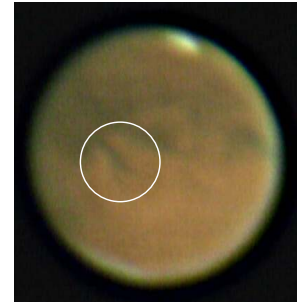
Malis Chasma (Coprates and Malis Lacus on the map you found, bottom link) are part of (Valles Marineris) and are on the lower left edge of the light area surrounding Solar Lactus. The Sky & Tel map is not detailed enough, OK for identifying the large features. Keep in mind that the extent of the dark and light areas change over time with the movement of dust via dust storms so old maps are not going to accurate on the finer details. They also don't necessarily correspond with topographic features.

Based on my image, the map you found and my topo globe, the fingers I mentioned are in fact Ius Chasma and Candor Chasm which connect to Coprates Chasms via Mela Chasma. The image kind of shows Candor Chasm and Mela Chasma as a lump but does not show Ius Chasma, though I am pretty sure I glimpsed Ius Chasma as 1 of the 2 "fingers" with Candor Chasm the more prominent of the 2.

—Paul

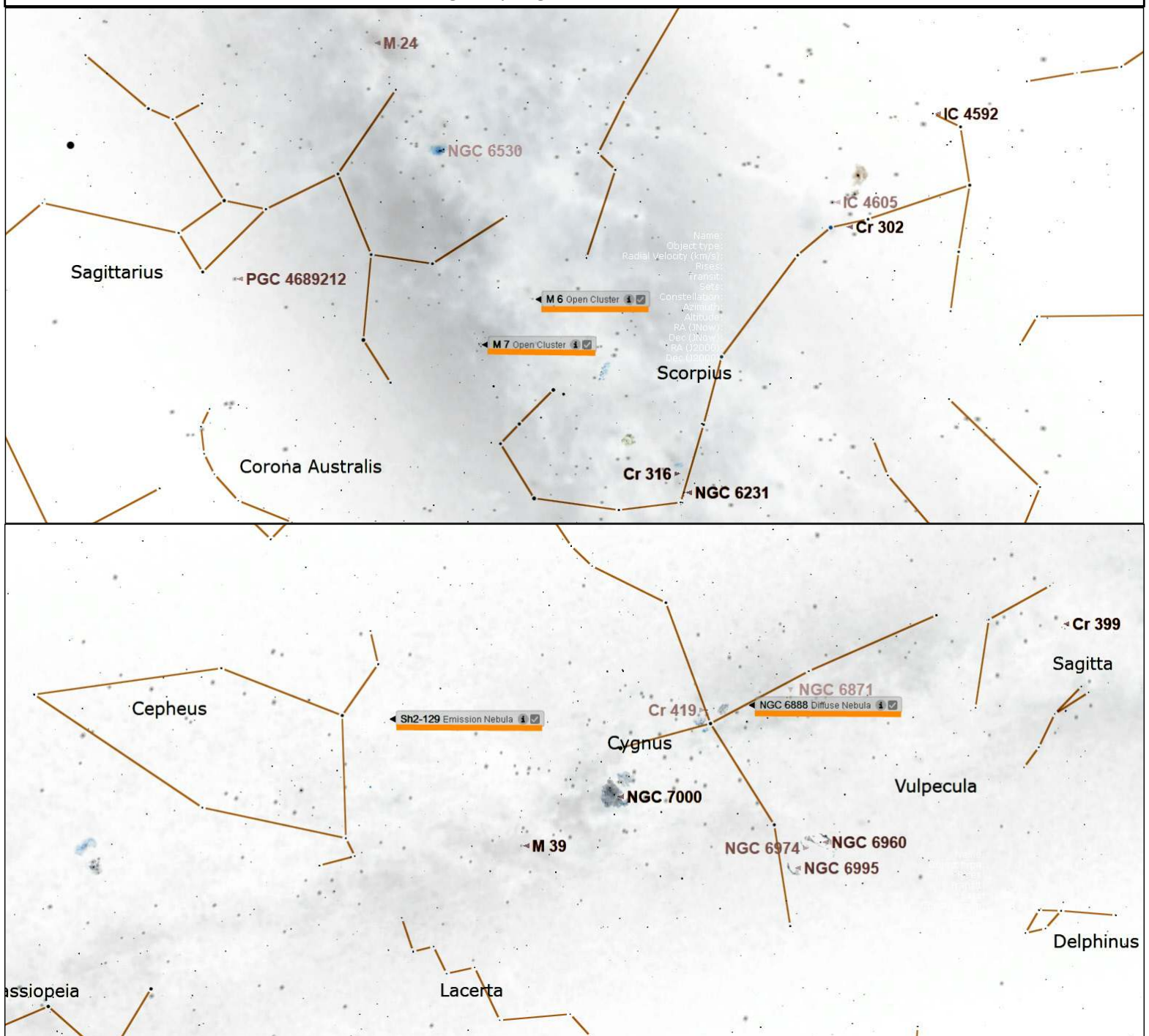
Here's an image that was taken closer to when you observed Mars and

when I observed the 2 "fingers". This is from a video clip taken at 1:35 AM. The first image I sent was taken at 3:05 AM when Valles Marineris (circled) was rotated toward the left limb.



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

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





Graphic credit: National Geographic Society

The 2 "fingers" are clearly visible here and were detected by myself. The dark area to the right of the South Polar Cap was readily seen. I could see the North Polar Hood most of the time and occasionally thought I could see a bright area on the right-hand limb. This image would indicate it was real. One has to be careful about processing artifacts masquerading as features but looking around the limb there is only subtle brightening inside the limb on the left and only 2 notable areas of brightness elsewhere, the North Polar Hood and a section of the limb on the right. This gives me some confidence that the brightening on the right is real and indicates there was morning clouds there. The previous images (taken 1.5 hours later) shows brightening on the right hand limb as well but mostly farther north (down) and the North Polar Hood was much less prominent if not non-existent on the previous image.

We clearly were seeing features of Valles Marineris.

—Paul

Compare Joe's image (center) with the map (it's not in Greek just upside down) and Mark's description. Joe's image- Good seeing with the C14 and a 3X barlow. 2005 frames with a Sen-tech video camera stacked in Registax 6. Note the volcanoes in his image.



Image by Joe Comeau

Wanted

Wanted - old 4 1/2" Newtonian telescopes with or without mount. Also 1 1/4" rack and pinions and eyepieces for my "VAS First Telescope Program". I will renovate and sell to new club members for a starter telescope.

Contact Keith Lawrence, 802-453-5496, 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

For Sale

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

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

Observing chair: Enjoy longer observing sessions. Adjustable seat height for comfort and better viewing. Made of solid wood with an easy carry handle. **Starting at \$90.00.**

Contact Keith Lawrence, 802-453-5496, sleepingbearwoodworking@yahoo.com

Binocular parallelogram mounts.

Raise or lower the binoculars and still have the same object in the field of view. Work well for use with lounge chair for looking at higher elevations or for multiple observers of different heights. I will fit your binoculars to the mount for optimum performance.

\$195

Contact Keith Lawrence, 802-453-5496, sleepingbearwoodworking@yahoo.com

Binocular mount for your tripod.

Replace the bracket with a system that keeps the binoculars in balance. Find your object, release the binoculars and they keep on pointing at your field.

Starting at \$50.00.

Contact Keith Lawrence, 802-453-5496, 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 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

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

Light duty machining and custom hardware for astronomy. Simple adapter plates and other custom made or custom modified hardware for VAS members.

I have a moderate amount of scrap aluminum, mostly flat stock. **For a nominal fee (~\$10 - \$50 depending on size and complexity)** I will consider making custom mounting brackets and adapters. I can also do some custom modifications to existing brackets and hardware. Dependant on availability of material and my time.

I now have a have mini milling machine. This will not affect the prices. It will reduce the time it takes to make things and allow me to make things I couldn't on the drill press with 2-way cross vise. And I have a light duty mini-lathe (for round stock).

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

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

Mark will split the profits with VAS.

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

Telescope mirrors and a couple mounting cells

3.5" f/10 with 3/4" diagonal.

6", probably f/8.

8", probably f/8, in nice **cast aluminum cell**.

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

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

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

Make an offer on any of the items.

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

Orion 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

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.