

# Morning Star

## Summer 2018



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### New Members

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

Ms. Sebastian Ryder

Mr. Sebastian Ryder

### Meetings/Presentations

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). (see Map on our web site, top of Events page). 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 (work # 802-861-8640) to confirm.**

### July 9

Two Mini-Talks

**Atmospheric Phenomena,  
Some Familiar and Some Not  
By Mark Moyer**

beauty of rainbows and even double rainbows. The purpose of this talk is to take us a step further in our knowledge of atmospheric phenomena.



Several different solar arcs, photo from Wikipedia (photo credit: Joseph Thiebes)

One way we'll go further is becoming familiar with lesser known atmospheric phenomena. As one example, circumzenithal arcs are as beautiful as rainbows; although they're not rare, but people don't know about them simply because they're located where people never look — straight up! The 22 degree halo is also common, especially here in the north, but it is often mistaken for a rainbow even though in some ways it looks — and is — entirely different. Sun dogs, the green flash, the Belt of Venus, lunar coronae, and tangent arcs are a few of the other atmospheric phenomena we'll view.

A second way we'll deepen our understanding of atmospheric phenomena is looking at the science underlying these various phenomena. With only the most basic science we'll see why these sights appear the way they do and how we can better observe them.



**Jupiter, Red Spot, Io, Io's Shadow**

Taken 2018-06-15 by Paul Walker.

Io is barely visible. 10 in f/5.6 Newtonian 2" 2x Barlow, 2" 32mm eyepiece, Canon HF-21 camcorder at 15x zoom (~1200x eff), stack of 500 video frames



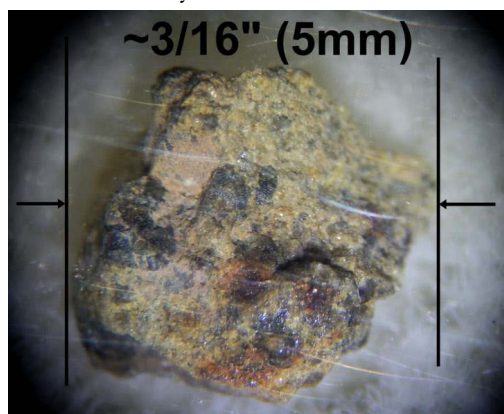
**Rainbow by Paul Walker**

We're all familiar with ordinary atmospheric phenomena. For example, we've all seen deep blue skies and orange sunsets. And we've all admired the

## Asteroids and Meteors

By Steve Grimsley

Asteroids and meteors are the left-overs of non gaseous material from the formation of the solar system. They are concentrated in the main asteroid belt between the orbits of Mars and Jupiter. Much of what we know about the early history of the solar system comes from the study of these rocky remnants that made their way to Earth.



**A Piece of the Asteroid Vesta**  
**NWA 2698 (Howardite) (Morocco 2004)**  
**Photo by Paul Walker**



**2 pieces of iron meteorite, cut & etched.**  
**Photo by Paul Walker**

There are three main categories of meteors, stony, stony iron, and iron. These types mostly are based on where in an internally melted and gravity segregated asteroid they were formed.

Stony meteors that contain chondrules are known as chondrites. Chondrules are spherical grains of silicate

### 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.**

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

We have an mail List for Member's interesting in getting a heads up when the Hinesburg Observing Site (HOS) will be opened.

If interested in being on this list contact [info@vtastro.org](mailto:info@vtastro.org)

### Public Events

We have requests from several entities for presentations and/or observing events. Members interested in helping or for more info 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)

### Member & Invited Guest Star Gazing & other events

**Picnic at the HOS**

**June 23 or 24, Starts 3 PM.** Bring a dish to share. A grill, Lemon Aid and Ice Tea will be provided by VAS. BYO item to grill. No alcoholic beverages.

**September 15 or 16, Starts 6:30.** Viewing 1<sup>st</sup> quarter Moon at the HOS and farewell to Jupiter & Mars.

**October 5, 6 or 7, Starts 6 PM.** Dark sky viewing at the HOS.

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

minerals 1 - 3 mm in size from rapidly cooled molten droplets in the primordial solar nebula. They are composed of pyroxene, olivine, plagioclase, glass, iron nickel, and sulfate minerals that have not undergone a full melt since their formation. Their bulk composition is nearly identical to the Sun without hydrogen and helium and other light volatile elements and compounds. They date to 4.55 billion years back to the earliest formation of the solar system. These are by far the most common type.

Achondrites are stony material that has undergone a full melt cooling in a differentiated asteroid.

Stony irons and irons are from the interiors of large asteroids whose interiors melted and gravity segregated.

This presentation will review these major meteor classifications with physical samples to examine and discuss in an open forum. Nine separate meteor samples, two irons, three stony irons, and four chondrites will be available. A historical chronology of the early solar system will be presented as a summary.

### August 6

#### Modifications for Improving Commercial Dobsonians

By Paul Walker



There are many affordable telescopes out there with Dobsonian type mounts. As one might expect there is often a trade-off between price and features and/or price and options. Even some of the more expensive or better designed models may have trade-offs. Some trade-offs are fairly minor and have little effect on the functionality of the telescope others are merely annoying, some can make a telescope difficult and frustrating to operate.



## "Spontaneous Night Under the Stars" July or August.

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

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

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

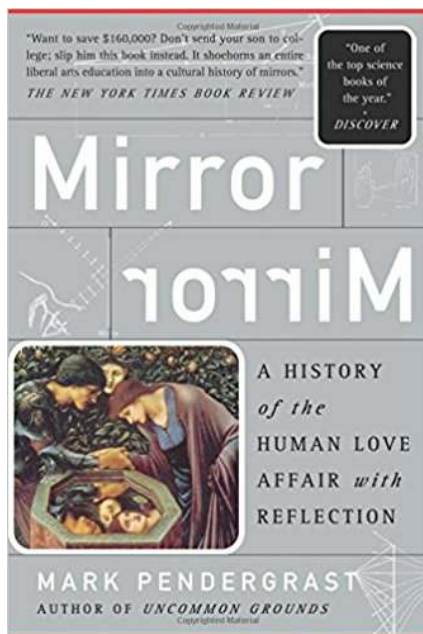
**Contact Joe at 802-238-1664 or [jkcomeau@hotmail.com](mailto:jkcomeau@hotmail.com)**



Paul will discuss some of the issues he found with a 12.5" f/4.8 Reflector he recently purchased (used) and show the modifications he did to address them. Among the issues covered are inexpensive focusers, inadequate finder scopes, tubes that are not well balanced, stiff and jumpy movements when trying to follow an object at higher magnifications. Some of the solutions were fairly easy and didn't cost much others were more involved and/or had a moderate cost.

## September 10

**Reflecting the Universe: The Role of Mirrors in Astronomy and History**



## Mars Observatory Trips Planned

Lyn Elder is organizing trips to local professional observatories to observe the coming opposition of Mars during the month surrounding the July 27 opposition. There will be reserved nights to look through two local observatory scopes for groups of up to six VAS members.

The scopes in question are the 9.6" Alvan Clark refractor at Dartmouth College, the 24" reflector at Middlebury College.

**Contact Lyn Elder at 870-7229 or [lynelder08@gmail.com](mailto:lynelder08@gmail.com)** if you are interested in these trips.

So far the observatories are not charging us for the evening's entertainment.

Lyn is a VAS Member but VAS is not directly involved with these activities so please contact Lyn directly with any questions.

Mark Pendergrast, author of *Mirror: The History of the Human Love Affair with Reflection*, will explore the history of mirrors, from ancient times to giant mirrors in modern telescopes.

Along the way he will introduce fascinating characters such as John Dee, the scientific advisor to Queen Elizabeth I, who believed in talking to angels in magic mirrors. But of course he will focus on the development of reflecting telescopes, starting with Isaac Newton, then William Herschel, George Ritchey, George Elliot Hale, Roger Angel's Mirror Lab in Tucson, and the Hubble Space Telescope.

## Green Mountain Astronomers (GMA)

**All events start about sunset.**

**Contact Ron Lewis for info**  
**802-779-5913 (cell)**  
**802-247-5913 (home)**  
**[vtpoet@gmail.com](mailto:vtpoet@gmail.com)**

**Tue, Jun 26** - Castleton University - Concert Series

**Tue, Jul 3** - Castleton University - Concert Series

**Sat, Jul 7** - Hubbardton Battlefield - Hubbardton Battlefield Reenactment (special invite)

**Tue, Jul 10** - Castleton University - Concert Series

**Sat, Jul 14** - Hubbardton Battlefield - Mars Night, Sliver of Moon sets at 9:55

**Tue, Jul 17** - Castleton University - Concert Series

**Tue, Jul 24** - Castleton University - Concert Series

**Tue, Jul 31** - Castleton University - Concert Series

**Tue, Aug 7** - Castleton University - Concert Series

**Aug 9-12** - Stellafane - Springfield, VT

**Tue, Aug 14** - Castleton University - Concert Series

**Sat, Aug 18** - Chimney Point State Park - Solar, Deep Sky and Mars Night, Moon below horizon

**Fri, Sep 7** - Shrewsbury - Russellville Road, Deep Sky  
Rain Date: Sat, Sep 8

**Sat, Sep 15** - Castleton University - Homecoming - 2:00-4:00

**Sat, Oct 6** - Hubbardton Battlefield - Solar, Deep Sky Night, Sliver of Moon sets at 5:29

## Articles

This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit [spaceplace.nasa.gov](http://spaceplace.nasa.gov) to explore space and Earth science!



### What's It Like Inside Mars? By Jessica Stoller-Conrad

Mars is Earth's neighbor in the solar system. NASA's robotic explorers have visited our neighbor quite a few times. By orbiting, landing and roving on the Red Planet, we've learned so much about Martian canyons, volcanoes, rocks and soil. However, we still don't know exactly what Mars is like on the inside. This information could give scientists some really important clues about how Mars and the rest of our solar system formed.

This spring, NASA is launching a new mission to study the inside of Mars. It's called Mars InSight. InSight—short for Interior Exploration using Seismic Investigations, Geodesy and Heat Transport—is a lander. When InSight lands on Mars later this year, it won't drive around on the surface of Mars like a rover does. Instead, InSight will land, place instruments on the ground nearby and begin collecting information.

Just like a doctor uses instruments to understand what's going on inside your body, InSight will use three science instruments to figure out what's going on inside Mars.

One of these instruments is called a seismometer. On Earth, scientists use seismometers to study the vibrations that happen during earthquakes. InSight's seismometer will measure the vibrations of earthquakes on Mars—known as marsquakes. We know that on Earth, different materials vibrate in different ways. By studying the vibrations from marsquakes, scientists hope to figure out what materials are found inside Mars.

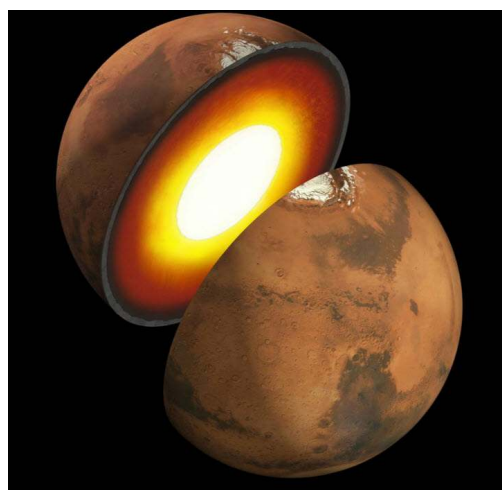
InSight will also carry a heat probe that will take the temperature on Mars. The heat probe will dig almost 16 feet below Mars' surface. After it burrows into the ground, the heat probe will measure the heat coming from the interior of Mars. These measurements can also help us understand where Mars' heat comes from in the first place. This information will help scientists figure out how Mars formed and if it's made from the same stuff as Earth and the Moon.

Scientists know that the very center of Mars, called the core, is made of iron. But what else is in there? InSight has an instrument called the Rotation and Interior Structure Experiment, or RISE, that will hopefully help us to find out.

Although the InSight lander stays in one spot on Mars, Mars wobbles around as it orbits the Sun. RISE will keep track of InSight's location so that scientists will have a way to measure these wobbles. This information will help determine what materials are in Mars' core and whether the core is liquid or solid.

InSight will collect tons of information about what Mars is like under the surface. One day, these new details from InSight will help us understand more about how planets like Mars—and our home, Earth—came to be.

For more information about earthquakes and marsquakes, visit: <https://spaceplace.nasa.gov/earthquakes>



*Caption: An artist's illustration showing a possible inner structure of Mars. Image credit: NASA/JPL-Caltech*

### What Is the Asteroid Belt? By Linda Hermans-Killiam

There are millions of pieces of rocky material left over from the formation of our solar system. These rocky chunks are called asteroids, and they can be found orbiting our Sun. Most asteroids are found between the orbits of Mars and Jupiter. They orbit the Sun in a doughnut-shaped region of space called the asteroid belt.

Asteroids come in many different sizes—from tiny rocks to giant boulders. Some can even be hundreds of miles across! Asteroids are mostly rocky, but some also have metals inside, such as iron and nickel. Almost all asteroids have irregular shapes. However, very large asteroids can have a rounder shape.

The asteroid belt is about as wide as the distance between Earth and the Sun. It's a big space, so the objects in the asteroid belt aren't very close together. That means there is plenty of room for spacecraft to safely pass through the belt. In fact, NASA has already sent several spacecraft through the asteroid belt!

The total mass of objects in the asteroid belt is only about 4 percent the mass of our Moon. Half of this mass is from the four largest objects in the belt. These objects are named Ceres, Vesta, Pallas and Hygiea.

The dwarf planet Ceres is the largest object in the asteroid belt. However, Ceres is still pretty small. It is only about 587 miles across—only a quarter the diameter of Earth's moon. In 2015, NASA's Dawn mission mapped the surface of Ceres. From Dawn, we learned that the outermost layer of Ceres—called the crust—is made up of a mixture of rock and ice.

The Dawn spacecraft also visited the asteroid Vesta. Vesta is the second largest object in the asteroid belt. It is 329 miles across, and it is the brightest asteroid in the sky. Vesta is covered with light and dark patches, and lava once flowed on its surface.

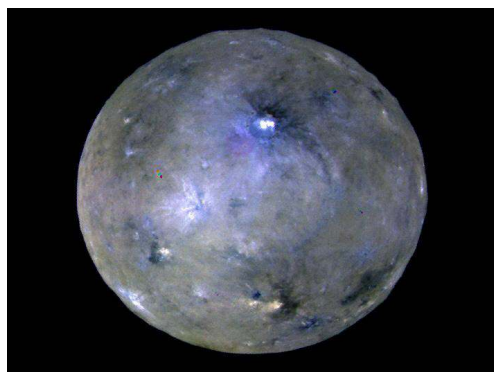
The asteroid belt is filled with objects from the dawn of our solar system. Asteroids represent the building blocks of planets and moons, and study-



ing them helps us learn about the early solar system.

For more information about asteroids, visit:

<https://spaceplace.nasa.gov/asteroid>



*Caption: This image captured by the Dawn spacecraft is an enhanced color view of Ceres, the largest object in the asteroid belt. Credit: NASA/JPL-*

*Caltech/UCLA/MPS/DLR/IDA*

## Board Talk

### April

Jack opened the meeting.

We are all set with the arrangements with St. John's Club for the Annual Banquet & Meeting. He reminded us about providing officer's reports at the Annual Meeting.

Paul will do a slide show update at the annual meeting on the new observatory progress.

We decided to update the Site Survey and hold off sending it out until July or so.

Doug updated us on the financial's. He renewed our State tax exempt number- it had expired, unbeknown to us, a few years ago. He gave an update on the new observatory construction progress. North supports for the roll-off shed rails are installed. Next will be the scope piers and deck support piers.

Keith mentioned the possibility of buying a modern (Goto mount) if we raise enough money.

Bob got a request from JFK High School to help a couple students with astronomy projects. He agreed to help them.

Joe will hold his "Spontaneous Night Under the Sky" again this summer. He received a request to help with

a boy scout event, Jack will coordinate the VAS assistance.

The 4" f/15 Baush & Lomb telescope at Grout Observatory at People's Academy, which Gary and Steve Quigley have working on, is ready to be re-assembled.

### May (Annual Meeting/Banquet)

Jack opened the meeting.

President's Report: For those who may not have known already Jack announced that we are not moving from the Hinesburg Observing Site. Jack announced that the construction of the Russell Chmela Observatory has started. Next year is our 55th anniversary. Jack read off all the presentations done at the monthly meetings and the activities VAS participated in over the last year.

Joe reported that a change in strategy (going to where the people are) for public stargazing is working well.

The positions of President, Vice President and the 4 board member at large positions were up for election this year. The voting results are; everyone was unanimously re-elected.

Secretary's Report: The total membership as of December 31, 2017 was 79, compared to 80 for the previous year. We had 17 new members in 2017.

Treasurer's Report: Doug gave a summary report that included the total revenue for 2017, total expenditures, ending balance, the value of VAS resources (tangible assets) and total net value.

Donna Lescoe asked if the club had any plans for an official goodbye to Angele (who is moving to Oregon). Paul suggested Dennis Woos talk about the plans as it was his idea. Several of us have pitched in to get her a nice eye-piece as a going away present.

Paul gave a slide show presentation on the Russell Chmela Observatory Project. This included some history of Russ with the club, the observatory design and the status of the construction.

Jack did the monthly drawing for "Brunch with the President". Gary Nowak's name was drawn.

Jack gave out the following certificates:

### Service Awards

Joe Comeau	Ron Anstey
Dennis Woos	Doug Williamson - 2
Steve Quigley - 2	Gary Nowak - 2
Keith Lawrence - 2	
Angele Mott Nickerson - 6	
Mark Moyer	Al Boudreau
Brian Johnson	Bob Williams - 2
Paul Walker - 2	Larry Garrett
Tim Connolly	Dana DeWitt
Bob Horton	Bill Wick
Peter Gillette	Paul Marino
Greg Warrington	Donna Lescoe
Stephen Scaravella	Joel Greene
Jim Bosek - 2	Ron Lewis
Scott Turnbull	Bill Banke

### Telescope Observing, Advanced

Keith Lawrence

### Recognition Plaque

Larry Garrett

For receiving the Honor of having Minor Planet 2000 CU officially designated 28475 Garrett by the International Astronomical Union February 7, 2018

### June

Jack opened the meeting and reviewed the presentations for the next few months, we are set through September [see presentations in the beginning of this newsletter].

3 people who are interested in building their own telescopes have contacted Jack. One person would like to grind and polish their own mirror.

Wake Robin [Senior Community] would like us to do an astronomy show in the Fall. Joe has been getting responses for his "Spontaneous Night Under the Sky".

Bob is almost done re-figuring the 14" mirror [from a donated Cave telescope] and is looking into places to get it re-coated.

Doug recently received updated bill for dues from the Astronomical League. VAS became a member last year and a few VAS members have gotten reduced Astronomical League memberships. Doug has contacted Keith to find out whether everyone has received the Astronomical League's newsletter, Keith is the VAS contact person for the Astronomical League memberships.

Work parties scheduled for the new observatory - June 13, spread grass seed and mulch [mostly done, need more mulch and another round of seed] - June 30/July 1, start framing the deck.

Update on the Grout Observatory at People's Academy. Gary said it is almost finished. Some teachers need to be trained on using it. The dome is not fully functional, it doesn't rotate a full 360 degrees and the shutter doesn't fully open.

### VAS Membership Committee

There were no meetings this quarter.

### Site & Russell Chmela Committees

#### June

Paul opened the meeting, read the minutes of the last meeting and the agenda items for this meeting.

Doug updated us on the fundraising status. We have had a very good response with about 50% of the membership participating and contributing an average of about \$185 each, thank you all very much. This will be enough to complete the project and give us the option of some upgrades. Doug updated us on the construction status. There will be a work party this Thursday, June 7, to finish leveling and smoothing the area under and around the new observatory. Bob will work the parking area with his tractor to fill in low areas and smooth it. Saturday, June 9, there will be a work party to lay the ground cloth and cover it with pea stone. [Both work parties were successfully completed]

Keith updated us on the roll-off sheds. The framing for one is complete and he has started framing the other.

Gary is continuing work on the primary mirror from Russell's telescope.

We covered dates that some people will not be available to work on the new observatory. Paul will not be available June 24 - July 9, Doug will not be available from July 21 to 31. No one will be available during Stellafane, August 9-12.

We have scheduled construction on the deck framing for the weekend of June 30 and July 1. This will give Doug time to order materials.

Doug has been working on drafting the thank you letters. There will be 2 versions, one for donations of <\$250 and due to tax deduction requirements, another for donations >\$250. The letters will include a question as whether the donor is OK with having their name included on a list that may be posted at the HOS and/or on the web site. And a question on how the donor would like their name to appear (spelling). The VAS Board will discuss having a list of donors posted at the site and/or on the web site.

## Observers Page

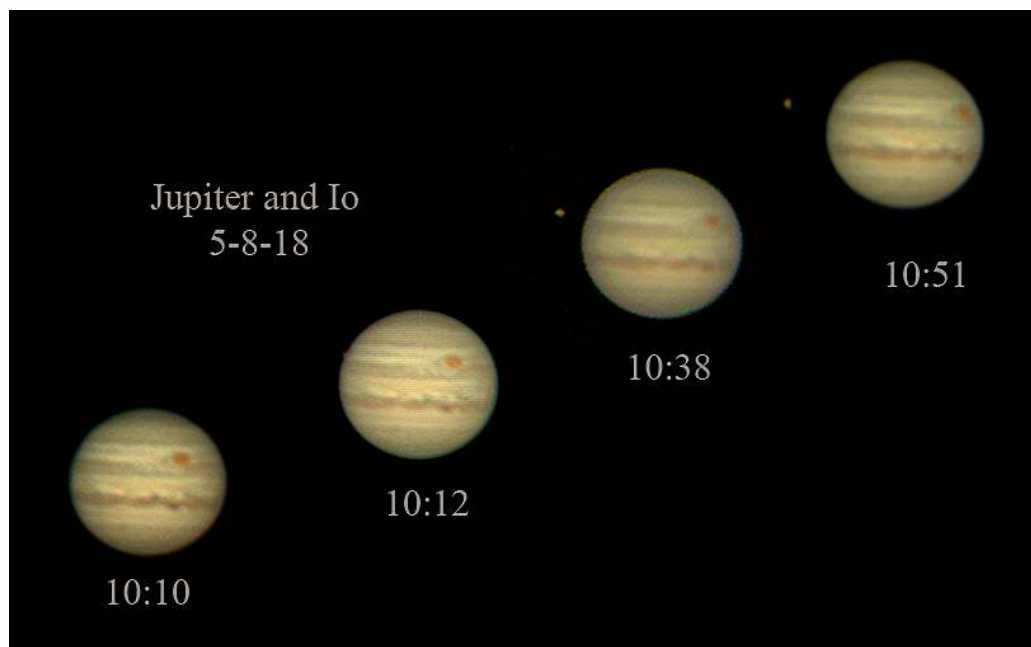
### Jupiter Observation from Hubbardton Battlefield State Park

By Paul Walker

The Green Mountain Astronomers (GMA) held a public observing event last Saturday [5/5/18] at the Hubbardton Battle Field. High thin clouds interfered some but overall it was quite successful. Probably 40ish people, maybe 50ish. Two 18" Obsessions (Cale and Ron), my 12.5" Newtonian, 10" Newtonian (Pat), 8" Newtonian (Allon), 4" semi-APO refractor (Pete). Sky Quality Meter reading was 21.7 (between clouds). We viewed globular clusters, open star clusters and galaxies. Even the 12.5" was big enough for the

it was low. The seeing improved as the night progressed.

Viewing Jupiter when it was maybe 25 degrees high with my 12.5" and using a 2 degree wedge prism we could easily see the Great Red Spot and the Red Spot Hollow (a light colored space between the Red Spot and South Equatorial Belt). Could also see a thin gray band in the middle of the light colored band (South Tropical Zone) just south of the Red Spot (see Joe's images below, South up). At first the thin gray band appeared intermittently but then became steady. The Red Spot had nice color. The best view was at 200x. 150x was not enough to see all the details and 300x made it too fuzzy. Pete's 4" , with the wedge prism, showed the Red Spot and a little bit of the hollow. Also viewed Jupiter through Cale's 18" (without the wedge prism). The Red Spot was muted compared to the 12.5" view but I was reasonably impressed with the details in such a large scope. The best view was through the 12.5". This tells me the optics in it reasonably good. I think I have sold Pete on the value of a wedge prism for viewing planets at low altitudes. The 2 degree prism actually over compensated for the atmospheric dispersion of the colors but still gave better results than without it. I did not compare it to using colored filters and did not use colored filters with it.



general public, with some guidance, to see the spiral arms in M51. People were pleased to view Jupiter even when

Joe Comeau imaged Jupiter a few nights later at opposition on 5/8/18 from Alburgh (note- South is up in these images).



**M106 and Surrounding Galaxies**

By Steve Grimsley

Taken at the Texas Star Party in Ft. Davis, Texas.

Twelve 7 minute subs (84 minutes total) using an Astro-Physics 155mm f/7 refractor. Camera is a Canon 60Da DSLR.



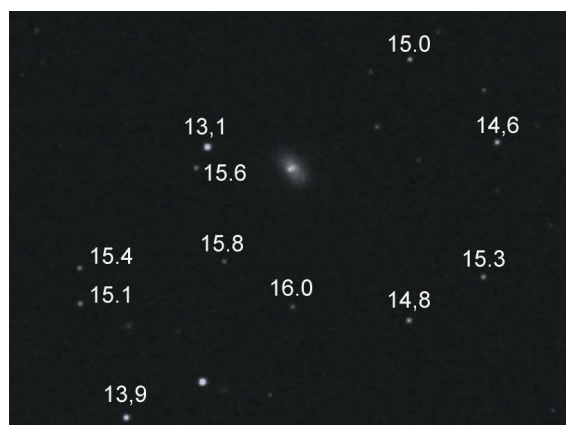
**NGC4244 Silver Needle edge on galaxy**

By Steve Grimsley

Taken at the Texas Star Party in Ft. Davis, Texas. Fourteen 7 minute subs (98 minutes total) using the same equipment and camera. Bright stellar looking center of this galaxy was captured along with a thin dust lane.

2018 was a mixed year at the Texas Star Party as only 3 nights were very good out of 7.





### **Supernova AT2018aqc in Leo 2018/04/05 By Paul Walker**

The host galaxy is NGC 3655. A 12.5 magnitude galaxy about 100 million light-years distant. The supernova is brighter than and just to the lower left of the galaxy's nucleus.

It was fairly easy to find in the triangle that makes up the hind quarters of Leo the Lion. It is  $2/3$  of a degree west of 5.6 magnitude 81 Leonis which is almost in the center of the triangle.

There is a nice group of 9<sup>th</sup> to 11<sup>th</sup> magnitude stars that show the way from 81 Leonis to the galaxy.

Visually I could not distinguish the supernova from the galaxy's center using my 12.5" f/4.8 Newtonian.

The image is a stack of ten, 4 minute exposures at ISO 1600 taken with a Canon XTi camera. North is up.

The telescope was a 10 inch f/4.0 (1000mm fl) Schmidt-Newtonian reflector (Meade LXD55)

Field of view of the original image was 0.79 X 1.21 deg. This image is about  $\frac{1}{2}$  of that.

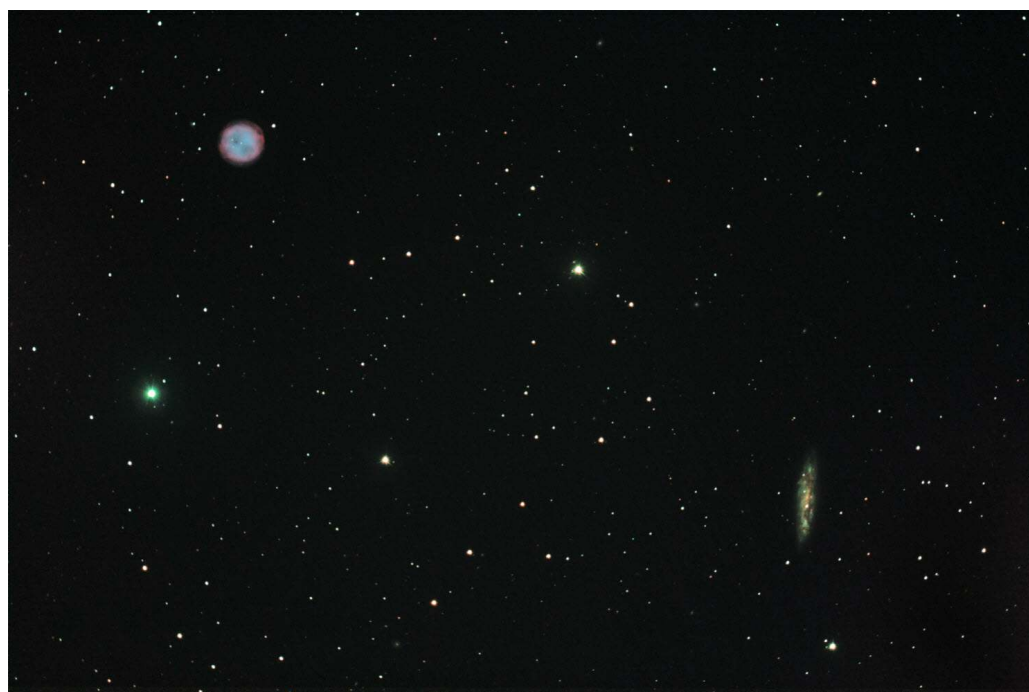
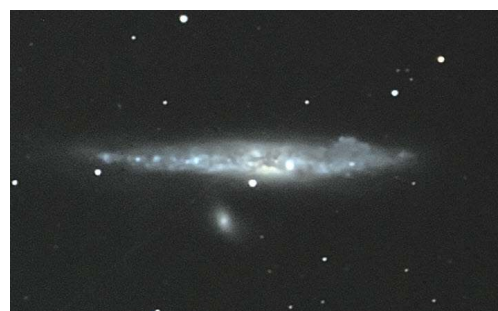
I also used a Baader Coma Corrector.

### **Two for One The Whale, NGC 4631/4627 and the Hockey Stick, 4656/4657 2018/05/09 By Paul Walker**

Two Sets of Interacting Galaxies. They are just above Coma Berenices in Canes Venatici. My 10 in f/4 Schmidt-Newtonian frames them well.

The Whale is magnitude 9.7 with it's companion, 4627, below it. The hockey Stick is a magnitude fainter at 10.7 with it's companion, 4657, at the bottom end of the stick.

Forty, 3 minute exposures (2 hours) at ISO 1600 (Canon XTi). North is down.



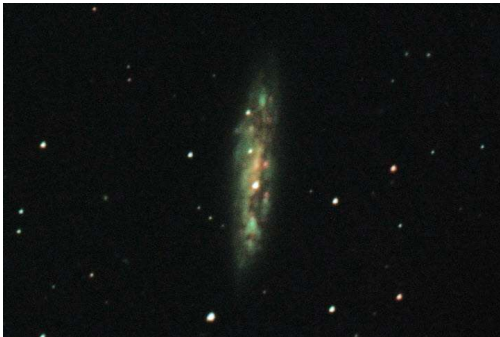
### **Another Two for One The Owl Nebula (M97) and The Surfboard (M108) 2018/06/10&11 By Paul Walker**

This time it is a planetary nebula (M97, upper left) and a galaxy (M108, lower right). While the Whale and Hockey Stick are pretty descriptive and even the Owl with it's two dark eyes,

some objects like the Surfboard, I'm not so sure about. Perhaps with the right exposure time and processing it would look like it's namesake.

They are located below the dipper of the Big Dipper (Ursa Major), 2.25 degrees (M97) and 1.5 degree (M108) ESE of Merak the southern of the 2 pointer stars, they are moderately easy





to find. However, being too dim to readily seen in most finder scopes (12.0 and 11.0 magnitude respectively) and not obvious in scopes with apertures smaller than 6-8 inch or so. They are harder to find than one may expect.

The excerpt above shows that the Owl Nebula has an outer shell with hydrogen (red) and an inner shell with a lot of oxygen (blue). The Owl is about 2,000 light-years distance, 8,000 years old and 1 light-year across. It is the end of life for a star about the size of our Sun but about 5 billion years older. The star is visible in the center of the nebula. At 14<sup>th</sup> magnitude the star is difficult to see even in a large amateur telescope. I could not see it in my 12.5" scope. The "eyes" of the Owl also require a large scope to see.

M108 is classified as a barred spiral galaxy. We are viewing it nearly edge on. In this image it appears to be quite active with large associations of young blue stars (blue patches) and areas of star formation (red areas).

The image is a stack of 31, 3 minute exposures at ISO 1600 taken with a modified Canon XT camera. 11 of the images were taken on June 10 and 20 on June 11. North is to the right.

Telescope was a 10 inch f/4.0 (1000mm fl) Schmidt-Newtonian reflector (Meade LXD55)

I used a Baader Coma Corrector and an Orion Broadband Light Pollution Filter.



### M82 (Cigar Galaxy) in Ursa Major By Paul Walker

Steve Scaravella has had a black and white Mallincam for a number of years. He recently decided it was time to upgrade so he bought a color version, a Mallincam Extreme II color camera.

It is a whole lot different to operate then his B&W camera with a whole lot more options, and not being familiar with imaging in general he asked me to check it out, learn how to operate it and teach him.

This is a 30 second integration (exposure) through my 10" f/4 Schmidt-Newtonian (picture of the monitor). He currently uses a 12" Schmidt-Cass. with an f/3.3 focal reducer so he should be able to get the same results with only a 20 second integration.

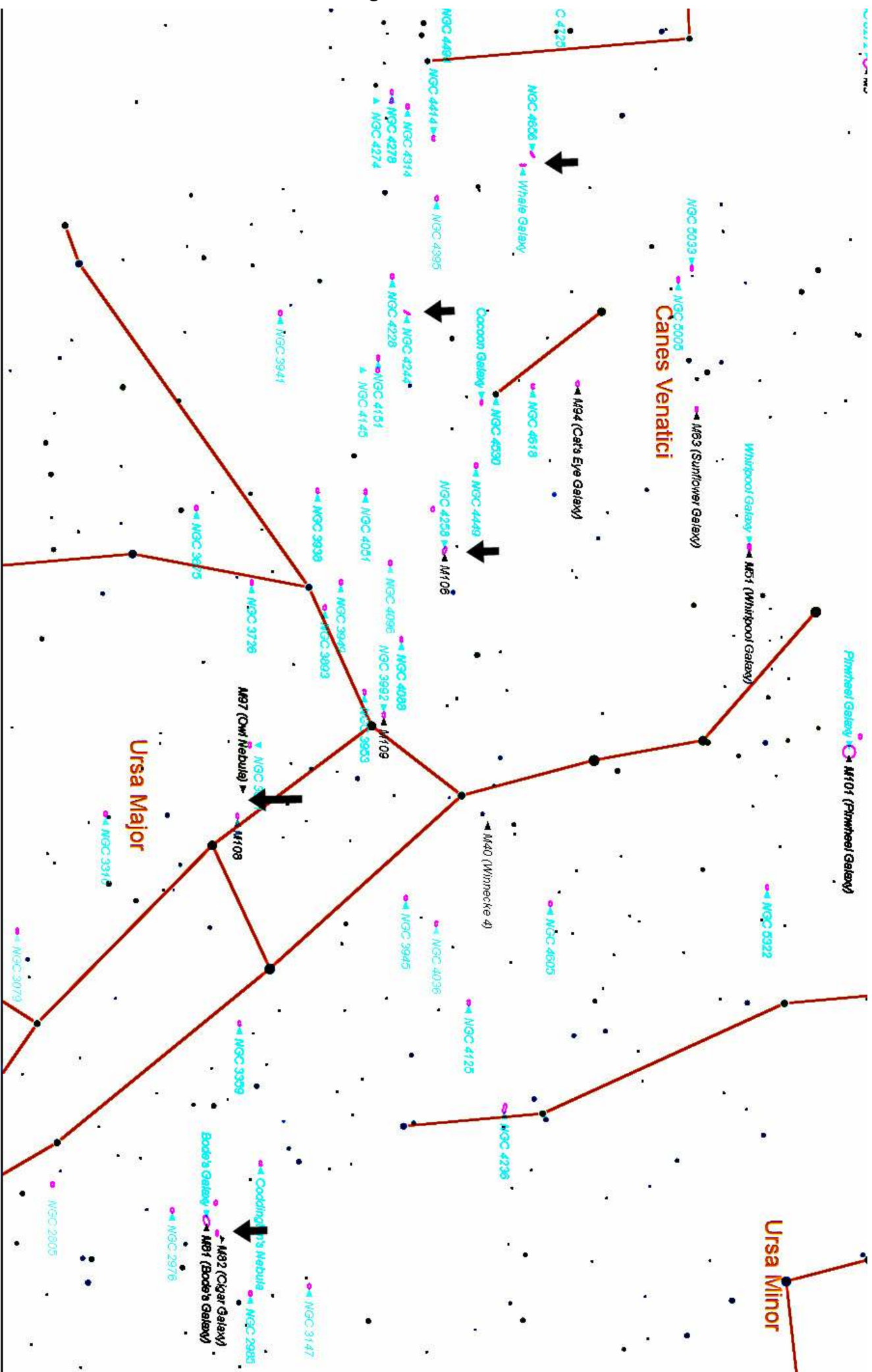
### Earth Day

Members of VAS participated in Earth Day event on April 21 by providing views of the night sky from Church

Street in Burlington. That looks like it might be Joel Green looking through a 6" Dobsonian.

The Moon picture was taken by Bob Horton by holding his cell phone up to the eyepiece on Joe Comeau's small refractor telescope.





Location Chart for the deep sky objects imaged on the previous pages (see black arrows)

Created using Starry Night Pro 7 & Picture Window Pro 7



### Gary's Astronomical Events for the Month

can be viewed via WCAX at  
[www.wcax.com/story/6330547/astro-nomical-events](http://www.wcax.com/story/6330547/astro-nomical-events)

### Jack on the Radio

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

### For Sale

#### Celestron SkyProdigy 90 mm Maksutov-Cassegrain

Computerized  
Focal length 1250 mm  
F/ratio 14

Two eyepieces: 9mm, 25 mm  
Moon filter: 1.25"

Excellent condition

Asking \$130.0

Contact: Jim, [jhwbs97@gmail.com](mailto:jhwbs97@gmail.com)  
608-695-1652

#### Celestron CGE Mount, \$1200 obo

Includes base (no tripod) with two 20lbs counterweights and AC & DC power cords.  
Mount has received a complete HyperTune by Ed Thomas at [deepspaceproducts.com](http://deepspaceproducts.com)  
I replaced the problematic Celestron RA/Dec cables with Gary Bennet 6 point midi style cable replacements.

Steve Yerby  
[syerby@gmail.com](mailto:syerby@gmail.com)

#### Explore Scientific 80mm f/6 Apo- chromatic Triplet Refractor Tele- scope (FCD100 ED). Paid - \$600.

Asking \$350.

Stephen Scaravella, 802-434-3884 or  
[englishnotation@gmail.com](mailto:englishnotation@gmail.com)

**Celestron SP-C80 refractor tele-  
scope and tripod**, rarely used.  
Comes with the original manuals, and  
3 books on astronomy and a viewing  
the universe tool.  
**Asking \$350 or best offer.**

Contact Aimee Green,  
[leftlanegreen@yahoo.com](mailto:leftlanegreen@yahoo.com)

#### 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 \$1950 - will negotiate.**

Contact Richard Cummings at  
[Rick@vsbmetal.com](mailto:Rick@vsbmetal.com)  
Or you can contact Ron Anstey  
[anstey@myfairpoint.net](mailto:anstey@myfairpoint.net)

**Celestron Astromaster 70 EQ (Ger-  
man Equatorial Mount)** Never used.  
Purchased for project, then changed  
my mind. Uses standard 1.25-in eye-  
pieces. Very well built. New it goes for  
\$170. **Asking \$50 (new price).**

Al Boudreau 802-758-2221 or  
[astromanvt@gmavt.net](mailto:astromanvt@gmavt.net)

**Celestron Power Tank** 17Amp 12  
VDC Outdoor battery (list \$115)----  
**\$50 or nearest offer**

**Meade Coronado PST Personal  
Solar Telescope** 40mm f/10 1.0 Ang-  
strom H-alpha bandpass, 20mm Kell-  
ner eyepiece, with tripod mount (but  
tripod not included) barely used, \$699  
value

**PRICE \$200 ONO**

Location South Burlington.  
Call Gary Glick at 203-247-5354

**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 alumi-  
num 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 pol-  
ished (may be saying that because of  
the scratches). From St. Michael's Col-  
lege.

**12", probably f/8, plate glass mirror**  
in **nice 18 point mirror cell.** The cell  
is worth more than the mirror. If I  
remember correctly this came from St.  
Michael's College, from the old scope  
they had in their observatory.

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 a  
slight greenish-yellow tint.

**Make an offer on any of the items.**

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

#### Meade DS-2114S (early 2000's vin- tage)

Dia. =114mm, f.l.=1000mm  
focal ratio f/8.8

Automated, computerized with Meade  
Autostar handbox

Automatic tracking, guided tours,  
many other features

Like new condition, on a tripod, three  
eyepieces, original handbook

I called the company (Meade) and  
they say it is similar to their current  
Polaris 114 (\$170-\$200), but automat-  
ed and computerized like their ETX  
90 (currently \$500. Their ETX series  
doesn't have a 114, but if they did it  
would cost more). So I am asking a  
"hybrid", used (once or twice) **price of  
\$150 (new price).**

Contact Paul Cameron at  
[paulcameron1@msn.com](mailto:paulcameron1@msn.com), 802-249-  
3595 or 802-223-2204

**Meade 6" LXD55 telescope** with the following: 26mm eye piece, Spotting Scope, Anniversary eye piece 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 \$450** with the accessories listed.

Contact Bruce Harmon, 802-876-7535 or bdhinv@t@yahoo.com.

**Orion VersaGo III alt-az mount** with slo-mo controls. 18 lb capacity. Works great. Some cosmetic damage from previous owner that doesn't affect performance. **\$120.**

Contact Paul Marino paulstevemarino@gmail.com

**AstroTech 6" Ritchey Chretien OTA only. \$250 obo**  
With Losmandy dovetail

Steve Yerby syerby@gmail.com

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

Mark will split the profits with VAS.

Contact Mark at markp508@gmail.com

## Wanted

For selling & buying also check out: [www.marketplace.skyandtelescope.com](http://www.marketplace.skyandtelescope.com)

## Outreach

### Acknowledgement Letter

To help record our broad community involvement with public star gazing events, projects and classes, we have developed an Outreach Acknowledgement 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.**

We encourage you to use it any time you interact with the public. Having a folder of proof of what we do helps when we ask for donations for events and projects. Many people have never heard of us and have no clue of the extent of the knowledge and time we freely give to the public.

Please print it out and give it to the event coordinator you are working with or fill it out yourself to record your event. Thank you for helping us document what we do.

**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)

## Hinesburg Observing Site

We have an observing site in Hinesburg, VT. (Located on town property)

Any member can obtain a gate key. Full members can also get an observatory key.

### Requirement for Gate Key:

- o Associate member for at least 3 months.
- o Recommended for key issuance by 2 or more full members.
- o Approval of the Board of Directors by a majority vote.

### Requirement for Observatory key:

- o Must be Full Member
- o Trained on and/or demonstrate competence on the observatory equipment you will be using.
- o Make entries in the Observatory Logbook.

**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 any of the above contact [info@vtastro.org](mailto:info@vtastro.org)

## Dues

**Associate Members \$15**  
**Full Members \$25**

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

Send dues and any updates to your address (or email) to  
VAS, PO Box 782, Williston, VT 05495.

Or bring to any monthly meeting.

Thanks

## Announcements

**Associate Members interested in becoming full members** make your interest known to one of the board members.

## Club Info

### 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.

### Wanted - PR person and Webmaster

If interested in either 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)

### Web Site

[www.vtastro.org](http://www.vtastro.org)  
Email: [info@vtastro.org](mailto:info@vtastro.org)  
Paul Walker is the webmaster: [webmaster@vtastro.org](mailto:webmaster@vtastro.org)

### Board Members

Jack St. Louis	Pres	658-0184
Joe Comeau	VP	238-1664
Doug Williamson	Treas	388-3482
Paul Walker	Sec'y	388-4220
Bob Horton		879-7802
Gary Nowak		879-4032
Bill Wick		485-7877
Keith Lawrence		453-5496

Editor and Publisher - Paul Walker

Contributors: Joe Comeau, Steve Grimsley, Linda Hermans-Killiam (NASA's Space Place), Bob Horton, Paul Walker.  
(My apologies if I missed anyone)