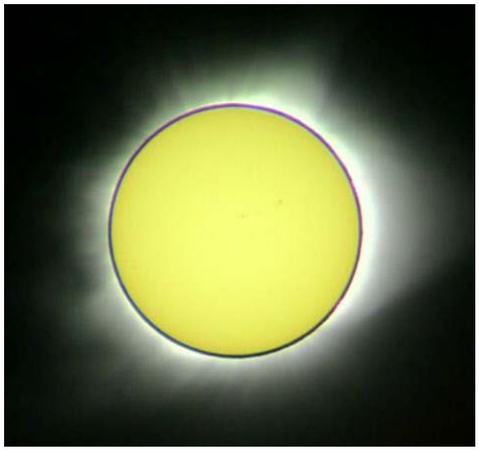
Morning Star

Fall 2017

Contents



An image of the Sun from shortly after the eclipse superimposed on an image of the eclipsed Sun showing apparent size of the Sun relative to the Moon during the eclipse. From HD video. Image by Paul Walker

New Members

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

Brian Drourr

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.**

October 2

Fall Observing -
Taking it to Anther Level
By
Angele Mott-Nickerson
Dennis Woos
Keith Lawrence
Mark Moyer
Bob Williams

This presentation will of 5 segments as follows:

1) Angele and Dennis will talk about 15 objects in the fall sky visible in a 6" telescope (5 easy, 5 intermediate, 5 challenging) for members to try to find. We will highlight these at our October star party (see page 2 and 3) and give a certificate to those who succeed in finding them. This will require some type of record keeping. Keith will have clipboards and lights for those who want to try sketching.

2) Keith will cover limiting visual magnitude, seeing conditions and an Observing Primer he has assembled.

3) Mark will talk about using observing lists.

4) Bob Williams will do a piece about fall sky orientation.

November 6

Stories from the 2017 Solar Eclipse

Image by Paul Walker

Some members of the Vermont Astronomical Society traveled to locations spread across the US to view the total eclipse of the Sun. Those that couldn't, viewed the partial phases from Vermont and many set up equipment to help the public view the partial eclipse.

Image by Joe Comeau

Solar Crescents created by leaves.

Come hear the stories, both of the people who traveled far away and those who stayed home as they share their experiences and pictures.

Image by Joe Comeau

Total Eclipse showing the Corona

Stargazing and other Events

<u>All observing events -are weather Permitting unless otherwise stated.</u> Bring extra clothes. Even a summer evening can be chilly after standing still for a couple hours in damp air.

Last minute cancellations may occur even if the weather is good, so please check the web site (www.vtastro.org) Events page.

You are welcome and encouraged to bring your own scope if you have one.

Contact: info@vtastro.org

New Email List for Member Use of the Hinesburg Observing Site (HOS)
100 Observatory Road, Hinesburg, VT

For impromptu star gazing we now have an email account, observing@vtastro.org, for members interested in observing from the the Hinesburg site. This will make it easier for members to coordinate going to the Hinesburg Site (and possibly other sites).

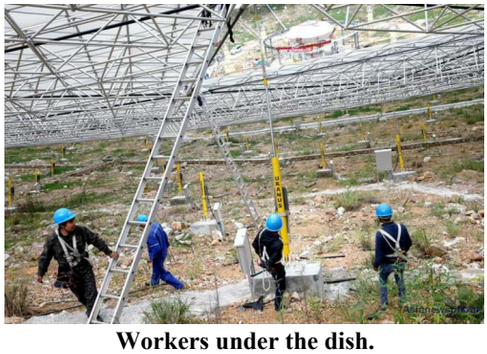
If interested in being on this list contact **info@vtastro.org**

See details below and on the following pages

<u>December 4</u>
FAST Radio Telescope in China (500-meter Aperture Spherical Telescope)
By Al Boudreau

The completed FAST Radio Telescope

China is making moves to become a world leader in astronomy. The latest example is their enormous FAST radio telescope (the world's largest at a mile in circumference). This talk describes the construction, operation, and astronomical data it will reveal, including the search for ET.



Workers under the dish. The yellow shafts are the actuators for fine tuning the shape of the dish.

Member and Invited Guest Star Gazing and other events

Oct. 8th (Sunday) Work Party at Hinesburg Observing Site
Oct. 14th weekend (13, 14, 15) at Angele's house
Oct 28th weekend (27, 28, 29) at the Hinesburg Observing Site
Nov 11th weekend (10, 11, 12) at Steve Quigley's
Dec 9th weekend (8, 9, 10) at Keith Lawrence's
Jan 13th weekend (12, 13, 14) at Keith Lawrence's
Feb 24th weekend (23, 24, 25) at Dennis Woos
March 17th weekend (16, 17, 18) at the Hinesburg Observing Site (Messier Marathon)

Astrophotography workshop - Date to be determined - A continuation of the workshop of last spring concentrating on processing of images.

Contact 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**

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**

Green Mountain Astronomers (GMA)

<u>All events start about sunset.</u>

Contact Ron Lewis for info
802-779-5913 (cell)
802-247-5913 (home)
vtpoet@gmail.com

Sat, Sep 23 - Hubbardton Battlefield - Solar, Deep Sky Night

Sat, Oct 14 - Hubbardton Battlefield - Solar, Deep Sky Night

Articles

We are partnering with NASA's Space Place (spaceplace.nasa.gov/). We have added the site to our Astro Links page under "Kids Astronomy and Space Sites". For those who do presentations for local schools, you can get

small quantities of NASA's Space Place items (bookmarks, stickers, temporary tattoos) to hand out.

"The mission of NASA's Space Place is to engage kids' interest in Space and Earth science, as well as the technologies that scientists use. Our site offers interactive games and demonstrations, hands-on projects, fun facts and short videos. It is a U.S. government-sponsored website; there are no advertisements or pop-up windows, and NASA's Space Place does not link to any commercial websites. It is a safe place for kids of all ages to visit.

Essentially we provide a free article each month for inclusion your club's newsletter (or posted on your club's website, depending upon the organization's preferred distribution method) and regular mailings of printed materials for sharing with the club's membership. In return, we ask for a copy of the newsletter using our article and a link to our websites be added to your club's web page."

Twenty Years Ago on Mars…
By Linda Hermans-Killiam

On July 4, 1997, NASA's Mars Pathfinder landed on the surface of Mars. It landed in an ancient flood plain that is now dry and covered with rocks. Pathfinder's mission was to study the Martian climate, atmosphere and geology. At the same time, the mission was also testing lots of new technologies.

For example, the Pathfinder mission tried a brand-new way of landing on Mars. After speeding into the Martian atmosphere, Pathfinder used a parachute to slow down and drift toward the surface of the Red Planet. Before landing, Pathfinder inflated huge airbags around itself. The spacecraft released its parachute and dropped to the ground, bouncing on its airbags about 15 times. After Pathfinder came to a stop, the airbags deflated.

Before Pathfinder, spacecraft had to use lots of fuel to slow down for a safe landing on another planet. Pathfinder's airbags allowed engineers to use and store less fuel for the landing. This made the mission less expensive. After seeing the successful Pathfinder landing, future missions used this airbag technique, too!

Pathfinder had two parts: a lander that stayed in one place, and a wheeled rover that could move around. The Pathfinder lander had special instruments to study Martian weather. These instruments measured air temperature, pressure and winds. The measurements helped us better understand the climate of Mars.

The lander also had a camera for taking images of the Martian landscape. The lander sent back more than 16,000 pictures of Mars. Its last signal was sent to Earth on Sept. 27, 1997. The Pathfinder lander was renamed the Carl Sagan Memorial Station. Carl Sagan was a well-known astronomer and science educator.

Pathfinder also carried the very first rover to Mars. This remotely-controlled rover was about the size of a microwave oven and was called Sojourner. It was named to honor Sojourner Truth, who fought for African-American and women's rights. Two days after Pathfinder landed, Sojourner rolled onto the surface of Mars. Sojourner gathered data on Martian rocks and soil. The rover also carried cameras. In the three months that Sojourner operated on Mars, the rover took more than 550 photos!

Pathfinder helped us learn how to better design missions to Mars. It gave us valuable new information on the Martian climate and surface. Together, these things helped lay the groundwork for future missions to Mars.

Learn more about the Sojourner rover at the NASA Space Place: https://spaceplace.nasa.gov/mars-sojourner

Caption: The Mars Pathfinder lander took this photo of its small rover, called Sojourner. Here, Sojourner is investigating a rock on Mars. Image credit: NASA/JPL-Caltech

NGC 6888, Narrowband
By Michael Stadtmauer

This image is the sum of 30 hours of data gathered across 3 narrowband wavelengths, Hydrogen alpha, Sulphur II, and Oxygen III. These wavelengths represent very tight bands of radiation emitted from the excited gases in nebula structures. Nebulas can be made up of many types of gases, of course, but these 3 usually dominate most nebula in our galaxy and their emissions can therefore be used to gather a lot of information on the structure of nebulas, which are often invisible to the naked eye. In order to visually represent that structure, these lines of radiation have

to be assigned to different colors so that we can create an image that serves to separate, blend and contrast the different gases. The most common way of doing this is to use what is called the Hubble palette.

In the Hubble palette, we create and RGB image by assigning Sii to R, Ha to green and OIII to blue. This results in an interesting, but not quite visually pleasing, image which is usually very green because the Ha signal tends to be the strongest and it dominates most narrowband images. To create something more pleasing to look at, various modifications are made to the color palette of the image using various color editing tools, until the colors are nicer to look at while still conveying information about the role of the various gases in the structure of the nebula. Many people, myself included, will blend the channels in order to create a better image. So, for instance, Red might be made from a blend of 80% SII and 20% Ha. This gives greater control over color balance.

In narrowband images, there is no right or wrong when it comes to color. All color is false color and only serves to help visualize the gaseous structures that we are trying to examine. Some people prefer a very colorful image, and others like to create a more muted image, which can look more 'realistic'. Its just a matter of taste.

Beyond the Hubble palette, there are others which are often used. One is called HOO. This palette assigns Ha to Red and Oiii to both Green and Blue. There can be many reasons for using this palette over the Hubble palette. In the case of the image in question, the HOO palette provides for much better contrast in the Crescent nebula and an SHO (Hubble) palette. However, the surrounding nebula structures are much more interesting in Hubble then in the HOO palette.

In order to explore this, I created 2 images. The first (top) is a modified Hubble palette image. In the second image (bottom), using a mask I separated the Crescent from the surrounding nebula and applied the Hubble palette to the background while assigning an HOO palette to the Crescent itself. Even though the surrounding nebula of the 2 images look different, they started from the exact same palette, but were processed differently. Which is your favorite? Mine, too.

NGC 6888, the Crescent nebula, is a very interesting structure located in Cygnus and is right next door at about 5400 light years away. The structure is due to a multistage stellar ejection process. There is a very large star at the center which ejected its outer shell about 400,000 years ago when it became a red giant. This gaseous shell slowly moved out from the star and expanded. More recently, the star is shedding its outer shell again and is ejecting massive amounts of material in the process. This fast moving solar wind is catching up to and colliding with the earlier shell and energizing it, resulting in a shell of highly excited gases about 25 light years across. The rest of the structure in the image are just random installer gas and dust clouds. Cygnus, which lies over the Milky Way, is an area particularly rich in excited interstellar gas clouds.

Technical info:
40 x 900second (15 min) exposures for each of the 3 channels, Ha, Sii and Oiii.
Scope: Stellarvue 80mm triplet refractor with a 0.8x reducer/flattener
Mount: Paramount MyT
Camera: QSI 683wsg-8

Board Talk

July

Jack opened the meeting

The Hinesburg site is still up in the air as to whether we will have to move (the issue is now resolved and we will not be moving).

1 or 2 people asked Jack about allowing the membership to post to the VAS News email. There has been very few requests for this and the board decided to leave it as is (only board members or those with a need to communicate with the membership can post at this time).

A 12.5" f/5 Meade Dobsonian was donated to the club. We will likely auction it off to the membership (Auction will be ending about when you receive this newsletter, contact Jack, see last page).

Jack listed off 10 pending request from libraries for help with pre-eclipse events and eclipse day events.

Gary gave an update on the Grout Observatory at People's Academy in Morrisville. They are looking for more help in restoring the telescope and building. The have a 6" f/15 Edmunds Refractor for sale. There is a 4" f/15 Baush & Lomb in the observatory.

With the hard drive space used by our web site filling up Paul suggested we increase the available space by upgrading the web hosting to the next level. This would increase our web site cost from about $110 per year to $138 (see motions below).

Doug relayed a suggestion made by Brian Johnson that we register with Amazon Smile (an Amazon.com program) as a way to bring a extra money into VAS (see motions below).

Motions:

Paul Walker made the motion that we upgrade our web hosting site to the next level of disk space and monthly bandwidth. 2nd by Keith Lawrence. Vote was unanimous in favor.

Doug Williamson made the motion that we signup with Amazon Smile. 2nd by Joe Comeau. Vote was unanimous in favor.

August

Due to eclipse preparations there was no Board meeting in August.

September

Jack opened the meeting.

Jack picked up a long f/ratio 6" reflector that was donated to the club. The coating on mirror appears to be in rough shape.

The (Hinesburg Observing) Site Plan needs updating (see the "Site Committee and Russell Chmela Committee update:"). Paul will update the Site Plan. Jack has the application for proposed addition to the site and will present it to Hinesburg.

Joe - Wake Robin (retirement home) wants another observing event for the residents. Angele has asked Joe to do an astrophotography workshop on image processing basics. Paul will help Joe with the workshop.

Paul - Meeting topics are covered through January 2018 as well as for March and April 2018. Since the presentation the "Rev" was going to do needs to be rescheduled we are likely covered for February as well.

Paul - Upgraded our web site account - more space for files and images.

Keith - Reported that the Membership Committee has scheduled star gazing parties through March 2018.

Keith and Dennis will be going to Fairfax Library to give the Loaner Scope Program presentation.

Jack - Has arranged to do another Adult Astronomy Class at CVU (Angele and he will be presenting the class).

We will be trying out a new format for the Monthly Meetings with the featured presentation starting at 7:30 and the club business starting about 8:30. This idea has previously been discussed by board but not approved. In this case Jack made a executive decision.

VAS Membership Committee notes September 6th, 2017

In attendance; Jack St. Louis, Angele Mott Nickerson, Dennis Woos, Keith Lawrence, Steve Quigley

The meeting opened around 7:15pm.

Angele suggested we present a short observing list and focus our October star party on these objects. We settled on 15 objects visible in October; 5 easy, 5 intermediate and 5 challenging. Dennis and Angele will work on the list.

We discussed ideas of what gets members excited to go out and observe and what discourages them. Dennis felt one notable problem is the difficulty people have operating their equipment. Perhaps another telescope clinic could help here. Another discouragement is being unable to find targets.

Dennis suggested we committee members could come to star parties without our own telescopes and focus on working with members and their telescopes.

Steve suggested that if we develop a list of experienced members and what their area of expertise is.

Angele brought up the idea of having a star party specifically for the CVU class. She and Jack went on to brainstorm how we might publicize a public star party. One idea is to have members in different communities list this on Front Porch Forum.

Keith told the committee that the VAS Board gave approval for the club to join the Astronomical League so we will have access to their observing lists and awards. The club will pay an annual fee to join and each club member wanting to join will pay a fee through the club.

Angele will talk with Joe about setting up another astrophotography workshop, probably in January. This will be a follow up on the course from last fall.

Dennis wondered what might be required for the club to get set up to do research level work. He will talk with Middlebury College as well as Joe Comeau about this.

October meeting presentation "Fall Observing - taking it to another level". It was decided that we would like to have the entire meeting for this presentation. (see the October meeting presentation)

We set up a list of star parties for the Fall and Winter. (See listing on page 2)

The meeting ended at about 9pm. Respectfully, Keith Lawrence

Site Committee and Russell Chmela Committee update:

Attendees: Paul Walker (Site Chair), Gary Nowak (Chmela Chair), Keith Lawrence, Jack St. Louis, Doug Willimason, Jim Bosek, Bill Banke, Bob Williams.

We will not be moving the observing site in the foreseeable future. CSWD has no interest in moving their transfer station from their current site to our site.

The town of Hinesburg has signed a new agreement with the VAS. We can proceed with the next step on the new building. We will need to confirm whether or not we will need to get a building permit. At the very least we will need to provide an updated site plan.

The new building will actually be a large raised deck (14'x24')with 2 roll-off sheds. This will keep costs down and make it easier to maximize sky coverage with the scope(s). We may be able to start work on the site this Fall.

Keith presented his currents plans and ideas for the deck. Current estimate, for the deck only, is $2300. This includes using plastic deck boards There will be additional costs for the footings and roll-off sheds.

Gary provided Keith with the weight of the primary mirror in Russ's scope. Keith will install an equivalent weight in the scope to check the scope on the planned mount to look for any issues.

We are considering using Helical Piles (screw-in metal posts) rather than concrete footings and pillars to support the deck. These are moderately expense (~$200 apiece) but will save a lot of time and our backs.

Keith is looking into the possibility of using small roll up doors (similar to garage doors) on the roll-off sheds.

Solar Glasses for Astronomers Without Borders:

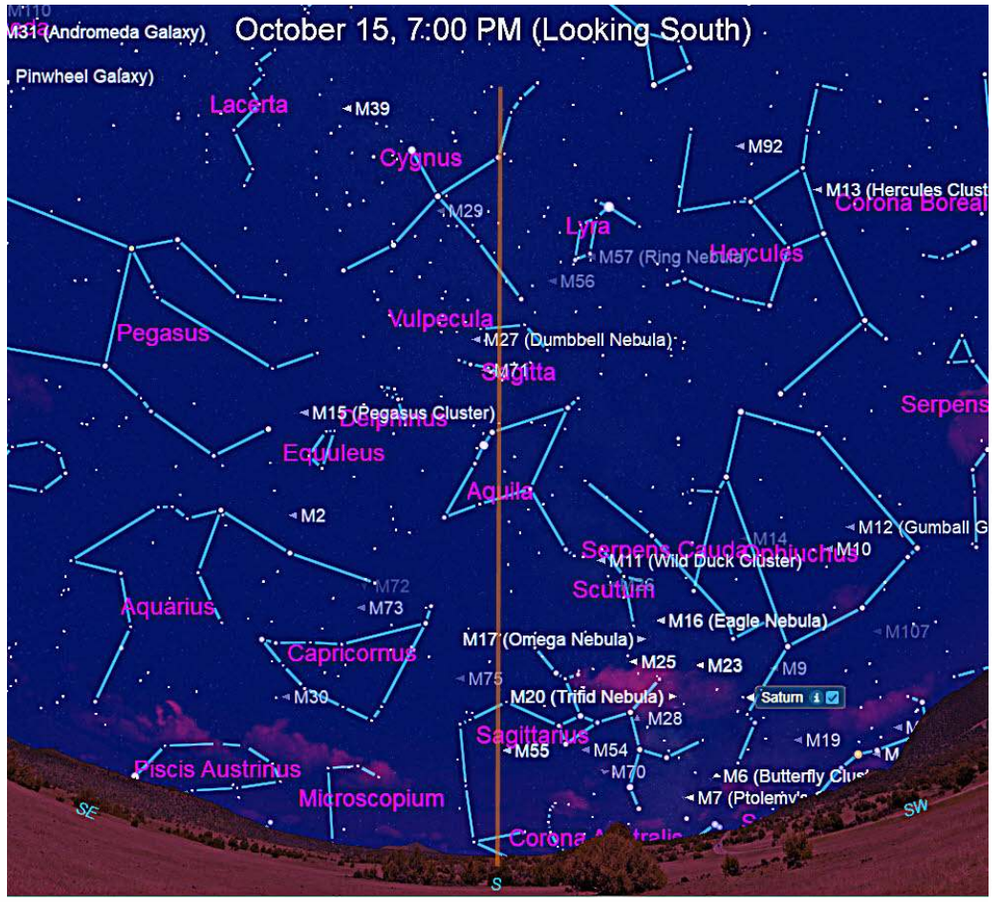
Joel Greene and Angele collected "leftover" solar eclipse glasses from around the area and from members to be donated to Astronomers Without Borders. They recently packed up 225 eclipse glasses and mailed them to Astronomers Without Borders. People can still send in their glasses on their own to AWB.

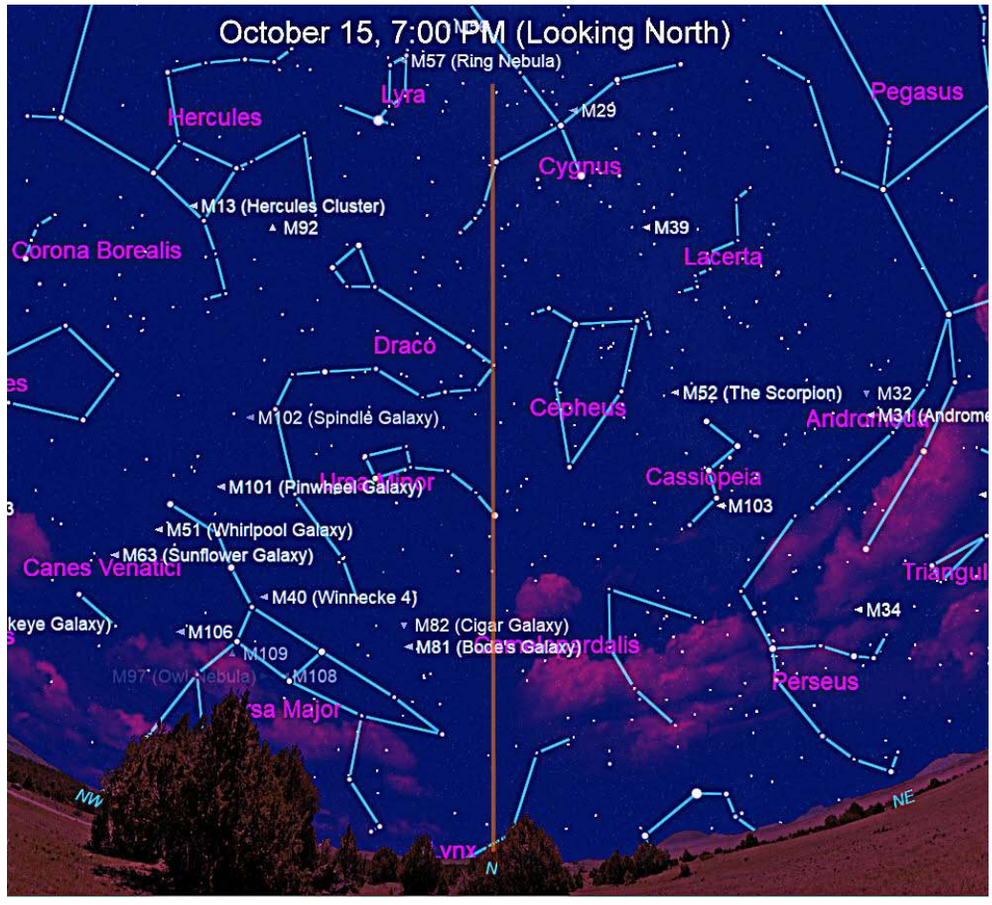
Observers Page

Along the Meridian - Fall

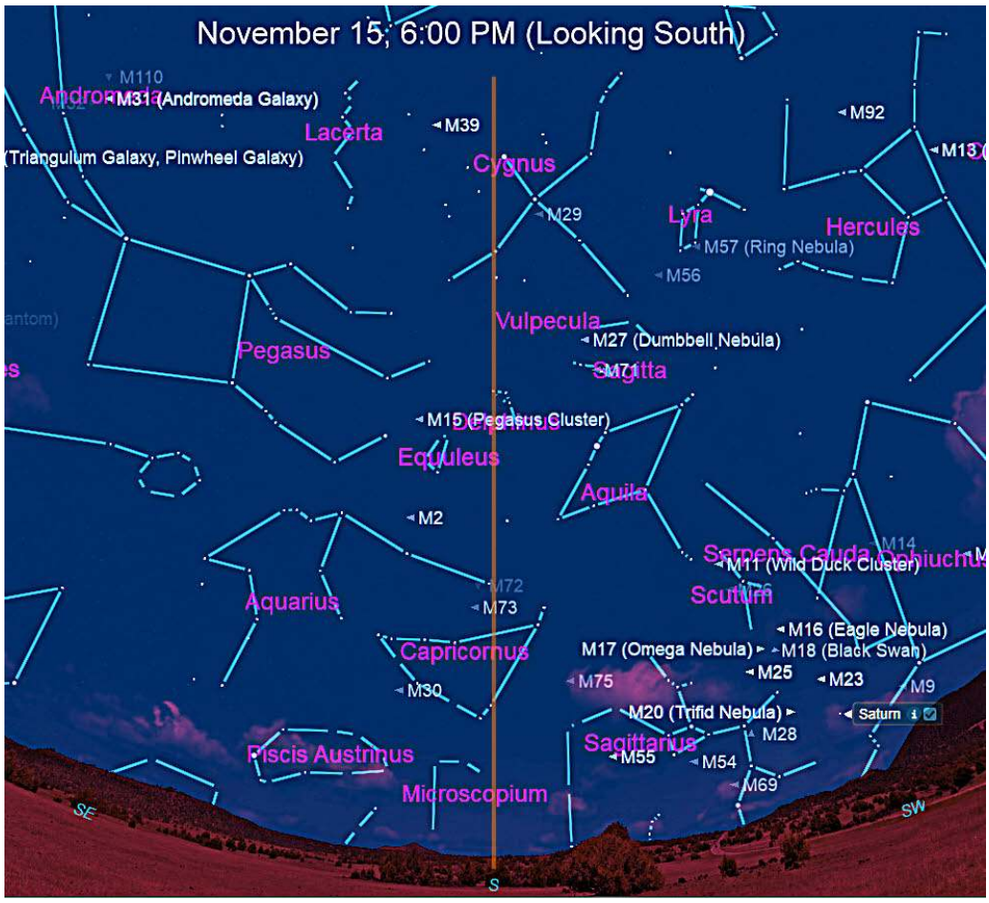
By Jack St. Louis

The Meridian is an imaginary line (orange line in charts), part of a 'Great Circle' running from the North Celestial Pole, through the point directly overhead - the Zenith - continuing to the South Celestial Pole, through the point directly under your feet - the Nadir - and back to the NCP.



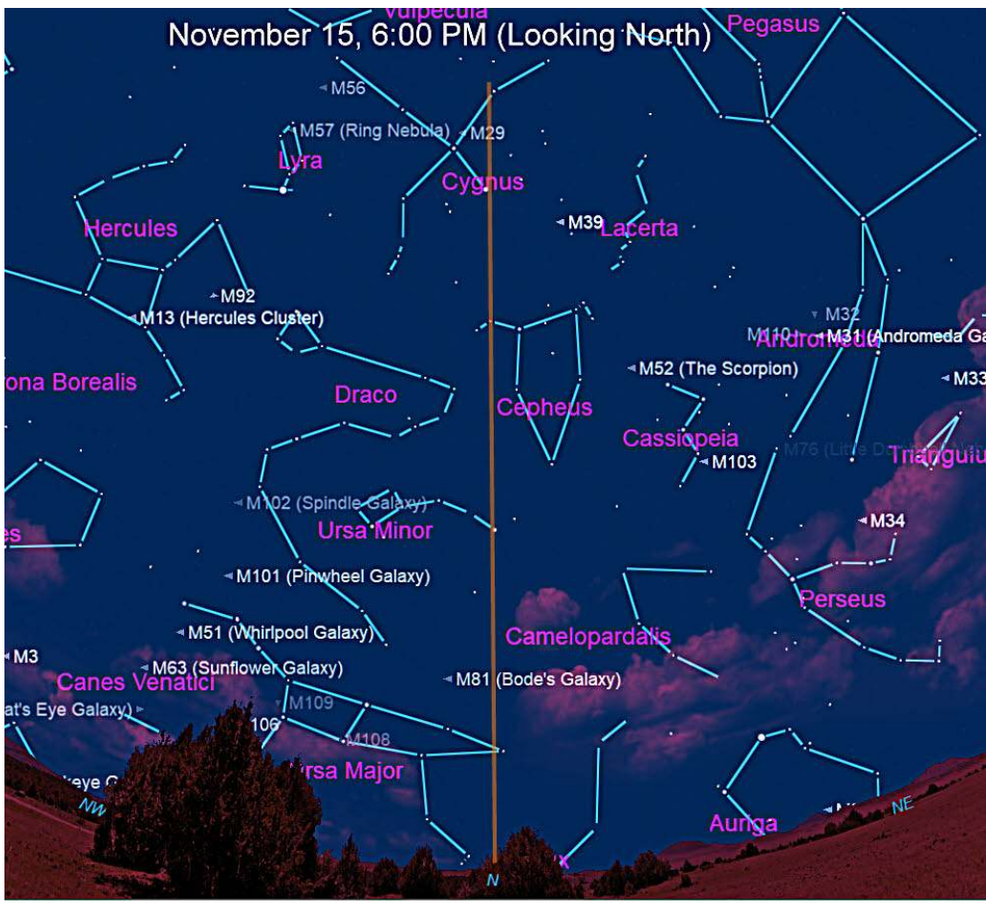


Charts created by Paul Walker, using Starry Night Pro 7 & Picture Window Pro 7



The time & location when an object is highest in the sky, providing the best view, is along the Meridian.

I used Stellarium, and set the date to October 15th and the time to 7:00 PM:



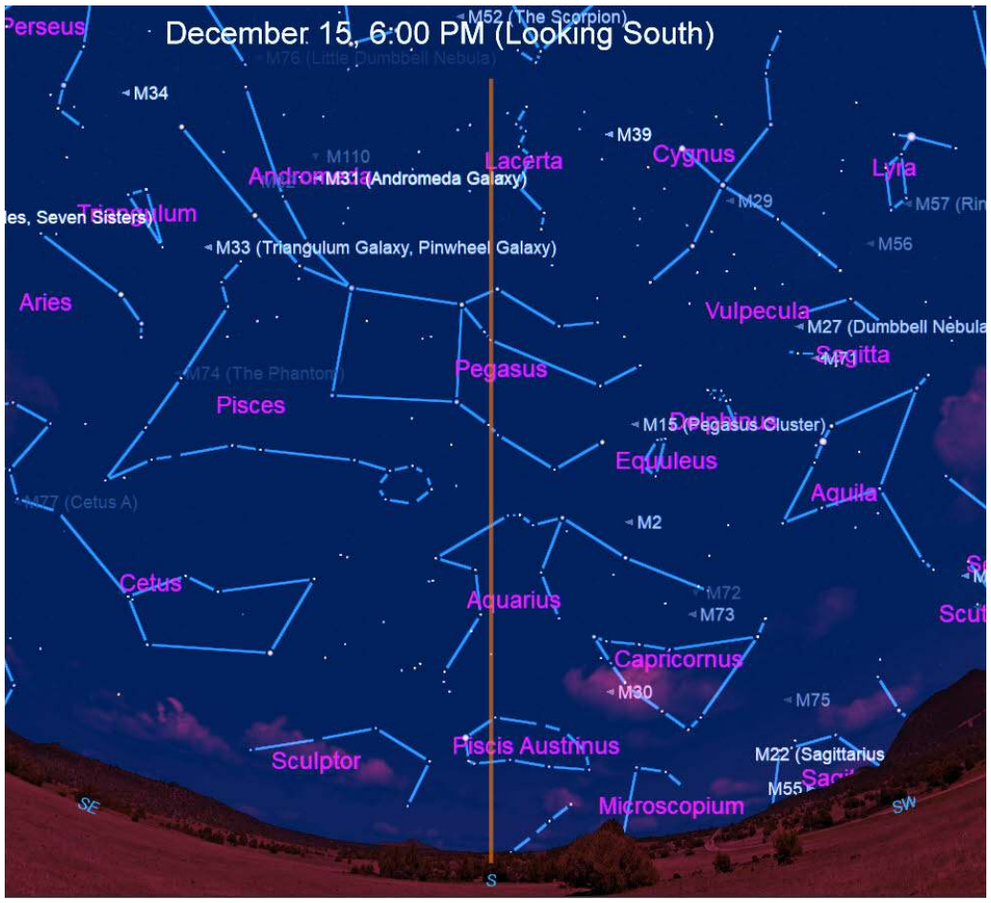
Looking directly South, Saturn is to the West of the meridian, less than 20 degrees above the horizon. Altair, the brightest star in Aquila, the Eagle, is slightly East of the Meridian. Almost overhead, Cygnus the Swan straddles the Meridian line. Changing the time to 8:00 PM clears sunlight from the sky revealing the constellations. Now looking along the meridian, Capricornus is a bit to the West, just above the horizon; in the lower half of Capricornus - to the West of the Meridian is M75, just outside the limits of Capricornus, located in Sagittarius, to the East of the Meridian is M30; above Capricornus, within Aquarius, are M72, M73 and the Saturn Nebula. Deneb, the tail star in Cygnus, is along the Meridian as is the tiny constellation Delphinus, the Dolphin. Looking at the Eastern most star in the diamond of Delphinus, you can see what I call the 'eyes of the Dolphin', a nice double of white stars.

Looking East of and approaching the Meridian is Aquarius the Water Bearer, containing M2, and Pegasus the Winged Horse, with M15.

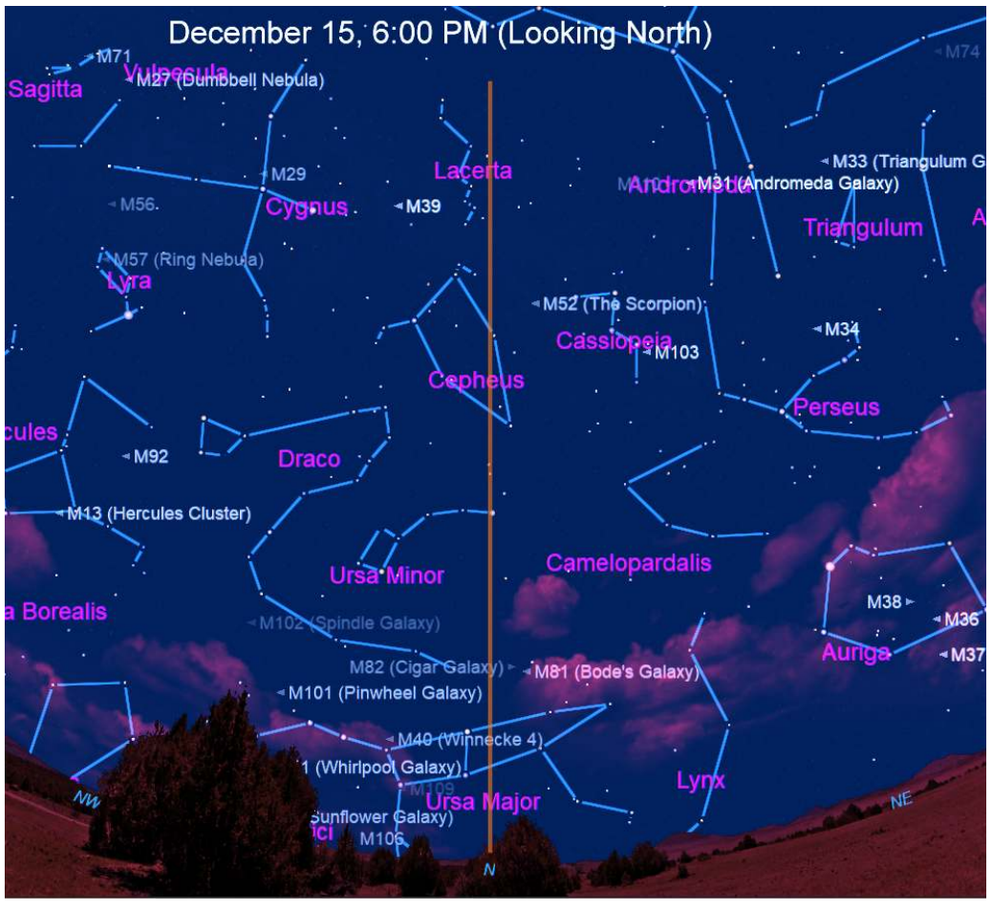
Looking to the North, Usra Major the Great Bear, containing the Big Dipper asterism, can be seen running along the horizon towards the East. Above the Bear's head, approaching the Meridian, are M81 & M82. Ursa Minor, with Polaris the Pole Star, a double, is very close to the Meridian, as always.

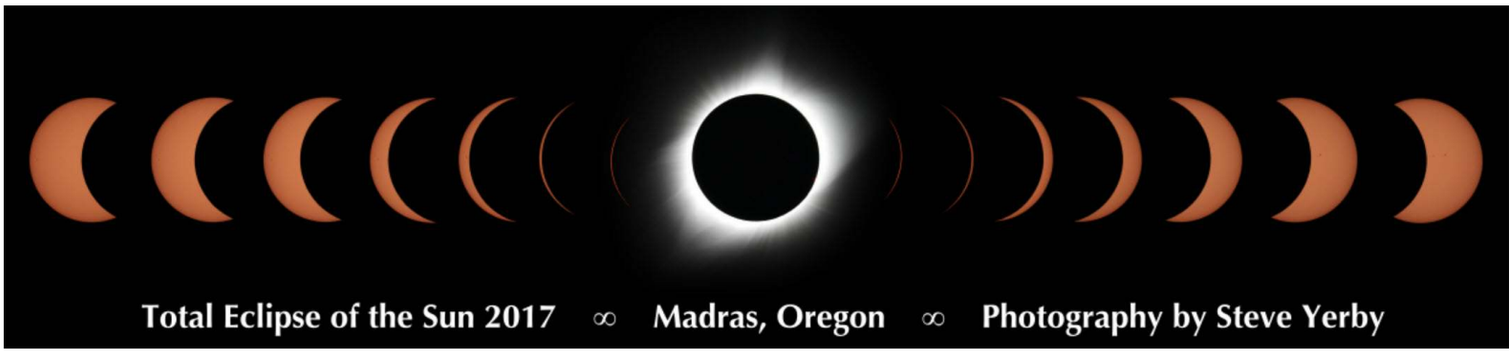
Changing the date to November 15, the sky is already dark by 6:00 PM, showing Saturn ready to set in the West if you have a low horizon. M30, M2 and M15 are now slightly West of the Meridian, in good locations for viewing. Overhead is M39 in Cygnus, located in the Milky Way, many NGC objects and good star fields can be seen. In the North, M81 & M82 are along the Meridian, but at their lowest altitude in the sky so will be a challenge to find.

On December 15th, the stars come out by 5:00 PM, with the sky dark for observing by 6 PM Pegasus is flying across the Meridian followed closely by Andromeda with M31, M32 and M110 approaching their highest point in the sky. M33 in Triangulum, M34 in Perseus and the Double Cluster will be along the Meridian around 8:30 PM



Along the Meridian is where you will have the best view of any sky object, day or night, but moving away from the Meridian should not degrade you view too much.
Clear skies and Happy Viewing !





By far, the highlight event of this year was the August 21, 2017 total solar eclipse. The path of totality went from coast to coast across the middle of the United States. Members of the Vermont Astronomical Society were also positioned coast to coast. I got word from 11 of us but I'm sure there were a few more who went. There were at least 3 from the Green Mountain Astronomers (Ron Lewis's group).

Back at home, Jack and Dennis sent me an estimate of "well over 1000 people" viewing the partial eclipse at locations set up by members and libraries. Ron Lewis (Green Mountain Astronomers) said "Down here, we had over 1,000 in Brandon, and 350-500 in Castleton". So in total the 2 clubs served in the neighborhood of 3,000 people.

Reports from the path of totality:

Just wanted to say hello to all of you and hope your travels have been safe and easy. Plus, had to share a picture of where I'm at in eastern Oregon.

Even with some local forest fires viewing looks to be good both at night and for the eclipse.

Take care and have fun!

Angele Mott-Nickerson

In West Yellowstone right now. We will drive down to SE Idaho first thing Monday morning. Weather looks promising. Traffic is a great unknown.

I'm looking forward to hearing everyone's reports.

Greg Warrington

I am in Lebanon, Tennessee and things are looking good here too. I am looking for a good site to set up.

Joe Comeau

Jody and I are in Powell Butte OR, just south of the band of totality. I just tested my equip and we're making plans for Monday! Good luck everyone!

Steve Yerby

Did some site seeing on the way down to Crossville, TN. On 2017-08-16, Day 2, Thursday, we got up about 5 AM and drove to Presque Isle State Park (Erie, PA) before sunrise to take some sunrise pictures of on of the lighthouses (we stayed at the Clarion Motel about ¼ mile from the entrance). After missing the turnoff to the lighthouse and looping back to the entrance of the park we went back in, found the turn and got to the lighthouse about ½ hour before sunrise. Got some beautiful shots.

Drove from Erie, PA to Mammoth Caves, KY, about 1 ½ hours NNE of Nashville, TN.

We drove past Cleveland, OH, through Columbus and bad traffic, though Cincinnati where it rained hard and the I 71 bridge over the Ohio River was closed requiring us to detour over the I 475 bridge with everyone else. We reconnected with I 71 in Kentucky after a slow drive. Hit heavy rain in Kentucky a couple of times before arriving a Mammoth Caves Hotel.

Went on a cave tour on Friday and another on Saturday morning before continuing to our final destination of Crossville.

Paul Walker

The Ritzer-Davenport Astronomical Observatory [Bill's home observatory] will have signs from campus leading to the observatory.

I'm made 5 "pin-hole box cameras" for safe viewing and have 5 sets of solar glasses. Cables run from my upstairs observatory to projectors in my darkened garage so folks can see a live feed from my scope. I'll also the NASA Live Eclipse feed to a 2nd screen.

Depending upon numbers, and one's ability to climb my "pull down stairs" some may be able to view the eclipse through the eyepiece on my Celestron 11"SCT but that depends upon numbers and whether or not I have student/cadet help to manage my guests.

I'll have guests use the pinhole box "cameras" and solar glasses outside of the garage and observatory.

Projected (on screen) viewing will be inside our garage (2 screens – one from my scope and one from the NASA feed).

For safely, only able-bodied folks will be allowed to climb the stairs to the observatory.

Rev. Bill Wick

Robert Horton and I observed it from the grounds of Fort de Chartres, in Southern Illinois on the Mississippi's flood plain near Prairie du Rocher. We got 2 min 38 sec...

Brian S. Johnson

We had perfect conditions here in Clarksville [TN]. A field across the street from the apartment offered clear viewing and had a shade tree. Two guys from Belgium joined us and we had a little eclipse party. Totality was great.

We snapped a few pictures, but we were more interested in feeling the experience.

Al Boudreau

We had perfect conditions in Lebanon as well. I photographed the entire eclipse sequence and got the diamond ring and baileys beads. I took multiple exposures of the corona and will process them to bring out faint details. I plan to make a stop frame video but it

will take time with nearly 400 images to process. It looks like everyone was successful. We are driving back today. Only 1000 miles left.

Joe Comeau

We were in Rexburg, Idaho as it was conveniently located near Yellowstone, where we went for a family vacation. About 2m 17s of totality. Had a nice chat with the mayor. The town did a great job.

Greg Warrington

We lucked out with the clouds. Had partial clouds at the beginning and off and for the duration, more of an enhancement to the images than a detraction. The duration here was 2 min 37 sec.

In spite of the focus of the telescope changing with temperature and my messing up the re-focusing process, I got some decent pictures. I'll send some later. I also got some good video footage from which I can get some stills.

Paul Walker

The sky cleared moments before totality, after I found a four leaf clover! [Brian posted a video at] https://1drv.ms/f/s!AkDyuNoxUfrKyStPpGqBiAvs8Bon The video is minimally edited. Shaky bits during filter removal/replacement were removed. I'll post the 1.16 GB original when I can. Feel free to download and enhance it if possible... Robert Horton and I were able to find each other in southern Illinois at Fort de Chartres. I also randomly parked next to a couple that drove from Massachusetts too. Turned out to be a wonderful site!

Brian S. Johnson

Great video Brian , it "solves" one of my images. The red limb recorded in your video (left) right after totality confirms a still I have of this also. I thought it might be some sort of "error" caused by bad seeing.

We were caught in the traffic jam back to Louisville [KY] on the 21st, 3.5 hours down, 11.75 back with less then 1 hour of rest stops.

Lawrence Garrett

Yeah, there were prominences in those locations. We could see them with binos. Too bad they got blown out in the video...

Brian S. Johnson

I was amazed at the number of prominences I could see with my 80 mm short-tube scope during totality.

Al Boudreau

Add me to the list of people who traveled. Here's my synopsis...

I arrived in Beaufort, SC on Saturday night, at the end of a two-day drive. Spent Sunday doing a reconnoiter of the area north-east of Charleston, and found my eclipse-site, a small state park called Buck's Hall, just south of McClellanville.

I got enough good weather to get some decent photos, audio, and a video that, I think, shows pronounced shadow-banding just as the sun is coming back out. Pretty wild!

Peter Gillette

Seeing all of them that I could see with 7x35 binoculars made me wish I'd had my ST80 available for observing, rather than having it dedicated to projection with the Sun Funnel.

In 2024 I'll have a smaller scope doing Sun Funnel duties and use the ST80, at around 25x I think, for viewing proms and the corona.

Brian S. Johnson

Had about 200 people at my Ritzer-Davenport Astronomical Observatory yesterday.

Had solar glasses, pin hole box viewers and also projected the image from my Celestron 11" SCT on to two screens in our garage.

The "Rev"

At the All Souls Interfaith Center in Shelburne I provided eclipse viewing for 150 people.

Dennis Woos

Eclipse Observations

by Al Boudreau

Joan and I traveled to Clarksville Tennessee where we rented an AirBnB apartment. An open field across the street from the apartment afforded us a perfect spot for observation since it featured a nice shade tree and clear views. We were joined by my grandson Parker and two guys from Belgium. I set up my 80mm short-tube refractor on a table and we were able to observe sunspots before totality and numerous prominences during totality.

Al observing the Sun with the apartments in the background

Setup by the Shade Tree

My grandson Parker observing with 80mm scope.

New friends from Belgium who joined us.

****

Mission Accomplished!
Traveled 1,000 miles and Saw the 2017 Total Solar Eclipse

By Jan and Paul Walker

It was a nail-biter in Crossville, Tennessee as the sun in the clear blue sky began showing signs of being covered by the Moon. We tried to con-

vince ourselves that it was great just to have seen a partial eclipse as the Moon slowly ate up the Sun. However, there was still an hour to go until the total eclipse that we had driven a 1,000 miles to see and there were threatening clouds not that far away.

From time to time clouds covered the partial eclipse but then we were in luck when the flash of the first diamond ring appeared and Paul shouted, "Glasses off!" I was stunned that the diamond of the diamond ring was so brilliant and beautiful to see with the naked eye. The diamond ring is an aptly named celestial event. A diamond ring occurs two times during a total eclipse; first just before the last bit of the Sun disappears and then again when the Sun begins to emerge from behind the Moon.

The small group of family and neighbors gathered to witness the eclipse reacted enthusiastically throughout the 2 1/2 minutes of totality. Reactions ranged from shouts of; "Just look at that!!!" to screaming repeatedly, "Isn't it just so beautiful! Paul, take pictures!!!" This was usually followed by, "I am...I am" supplemented by, "He is.... he is...."

People were amazed by the beauty of the eclipse. The incredibly intense diamonds of the diamond rings were surprising, and I also came to more fully appreciate many details of the event including the Sun's outer layer, the corona. The corona's light appears circling the black moon during a total eclipse. This bright, yet ethereal, coronal light also reminded me of the northern lights.

The intense thin red line of the chromosphere, the inner part of the corona, was shocking to see. Three bright red dots appearing on the right side of the Moon, prominences on the Sun, were also a cool surprise. These unexpected features also resulted in additional exhortations of, "Paul, take pictures!"

We were all enlightened and enriched for having seen this eclipse and I am looking forward to the next total eclipse which will cross northern Vermont in 2024. In the mean time, I and others may want to view some photos of this year's eclipse taken by Paul and other members of the Vermont Astro-

nomical Society (VAS) that will soon be posted on the group's Facebook page: www.facebook.com/VTAstroSociety/

Jan wrote this piece as a follow-up to a pre-eclipse article she wrote and sent to Lou Varricchio of The Eagle. Paul was her consultant. It ran in the September 2, 2017 issue. Eclipse pictures were taken by Paul Walker, the cloud and general scene by Jan Walker.

The partial phase, mid eclipse and 2nd Diamond Ring shots- 4.25" f/4, Canon XTi at ISO100, 1/800 sec, 1/5s &1/30s HDR stack, 1/200 sec. Others are frames from HD video (600mm efl). My images look best small.

Joe and Molly's Eclipse Adventure in Lebanon Tennessee

By Joe Comeau

Molly and I traveled to the Nashville area for the eclipse. Several months ago, she reserved four nights at a Comfort inn in Lebanon, Tennessee. I brought a video camera with a 400 mm lens and an equatorial mounted 100 mm f/6 white light scope. With backup mounts, scopes and accessories, we had too much equipment to fly so we loaded up the Toyota RAV 4 and drove the 18.5 hours to our destination. We arrived on the 18th and explored the area. On the 19th, we took a showboat river cruise on the Cumberland river and saw Crystal Gayle and Vince Gill at the Grand Ole Opry.

Cedars of Lebanon State park was just seven miles south of us and they planned a big eclipse event. I bought an eclipse shirt there and familiarized myself with the park. They anticipated thousands and said the park would be open at 8 AM on the 21st. I was concerned about the crowds so we continued exploring and found a wonderful community park right in Lebanon. It was only 5 minutes from our hotel and was really nice. We checked it out after dark and found that there were some streetlights. Molly called the city and left a message asking if lights could be turned off for the eclipse.

Taking pictures though solar filters

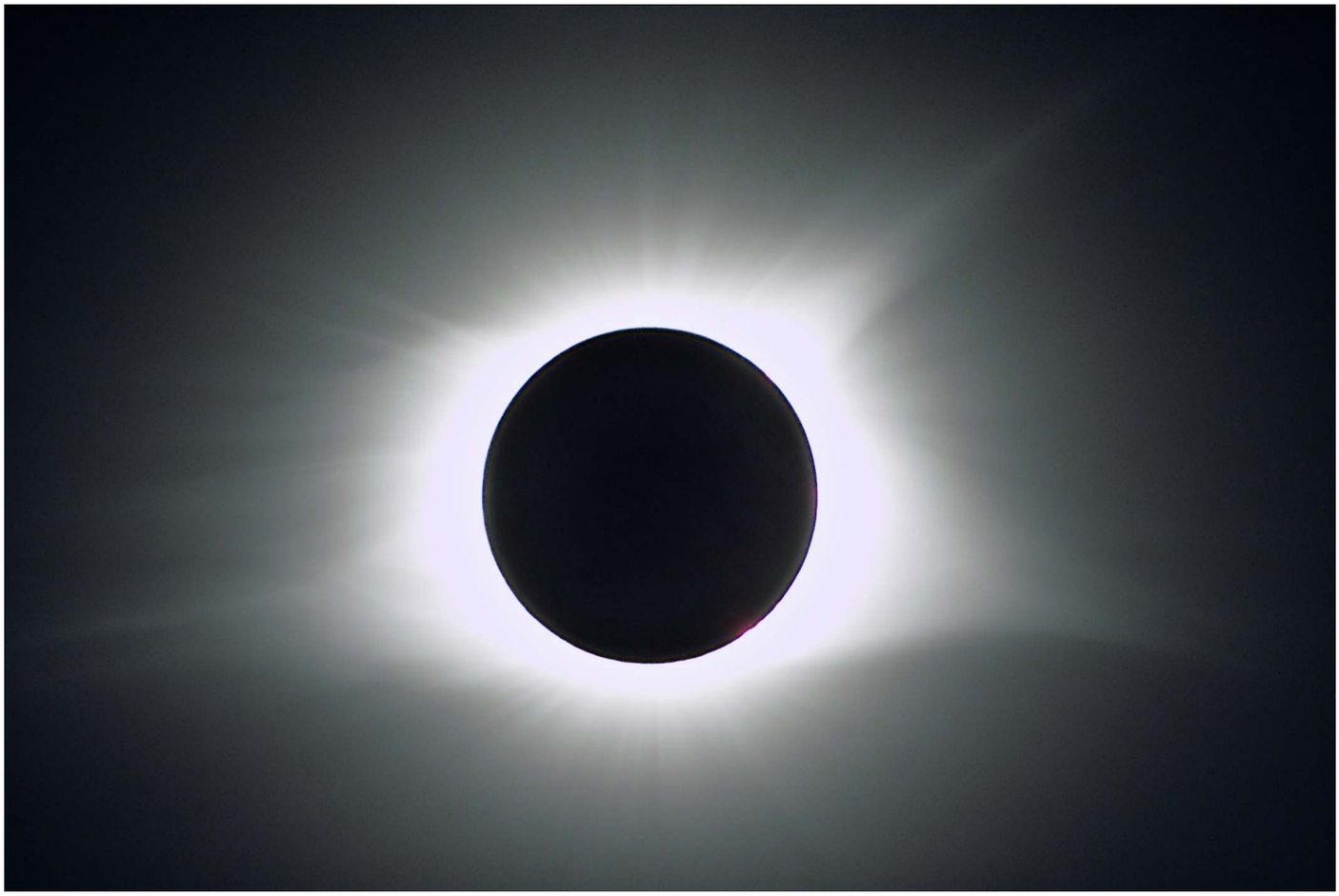
I set up hydrogen alpha and white light scopes in the hotel parking lot on the 20th and quickly attracted a large crowd. After resetting the software on the mount, I had no more equipment problems.

Other eclipse watchers started checking out their equipment. One was disappointed to find out that his mount that he had since childhood was broken. He was hoping to find a replacement but when I saw him later, he reported no luck.

We joined my first cousin and his family for dinner on Sunday and learned more about the area.

At 5:30 on Monday morning, I drove to the Don Fox Community Park and selected a viewing site. My only companion was a skunk. We respectfully allowed each other about a 25 foot radius for personal space. I polar aligned my mount with the north star. I was hoping to set up automatic imaging with the telescope and the video cameras. After setting up, I picked up Molly and she took the car to find a hammock and pillow. By the time she returned at 8 AM, the park was full.

Molly practicing safe "viewing"?



A composite of six different exposures. Image By Joe Comeau.

People were from everywhere in the USA. The sky was nearly perfect. Viewing equipment ranged from kitchen colanders projecting on envelopes to big scopes on Astrophysics mounts. Several people were set up to record videos of shadow bands on white screens.

During the eclipse, the lights were off in the park. It was truly amazing. Traffic on the nearby interstate highway stopped. The crowd went wild. The eclipse duration was 2 minutes and 34.8 seconds.

Crescent Suns

I uploaded a video of totality on youtube: https://www.youtube.com/watch?v=GKD7Z92yxAc

****

Preparing for the Eclipse

By Paul Walker

For me the planning started more than 5 years ago when I visited an Aunt and Uncle who are living in Crossville, TN. I realized their place could be good place to view the 2017 eclipse as the centerline of the Moon's shadow would be only 6.7 miles south of their house.

Inner Corona and Promenences
Image by Joe Comeau

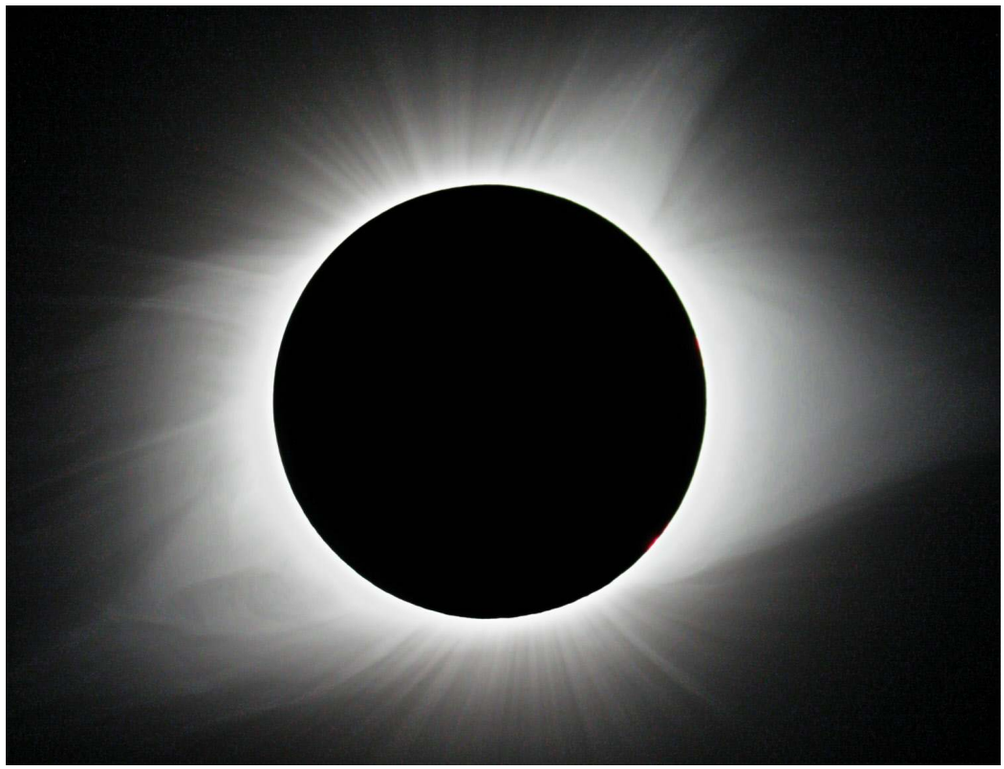
Pinhole Camera Image.
Image by Greg Warrington
Five-hour exposure from Rexburg, Idaho during the total solar eclipse on Aug. 21. Image was created using black & white photo paper inside a pinhole camera made from a 16oz can. The exposed paper was scanned on a flatbed scanner.

The next step in the planning occurred almost 2 years ago on 11/21/15 when I booked a timeshare in Crossville. 5 years ago we stayed in a place north of town. Not only was I surprised to be able to book a timeshare almost 2 years out but the centerline was only 5.7 miles south of this place. An added bonus it was only 1.5 miles from there to my Aunt and Uncle's.

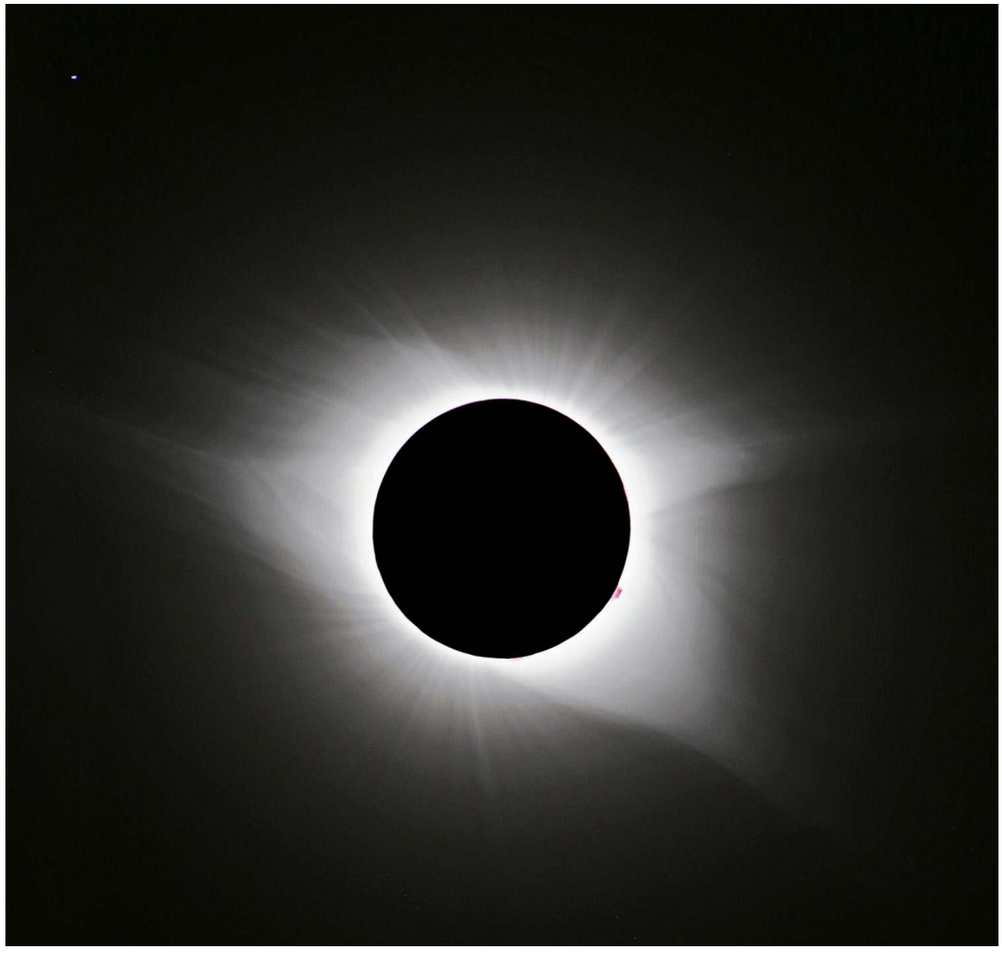
There was a lot involved with planning for this event starting with to image or not to image. Being an astro-imager I couldn't bring myself to consider not imaging.

A year ago I started to really think about equipment. I wasn't going to wait until the last minute and find out I didn't have or needed to replace a critical piece. Initially I was going to use an 8" f/4 Newtonian on a Celestron Advanced GT mount (30 lb payload, Goto equatorial). But with Regulus only about 1 degree from the Sun I changed

(Cont. on page 17)



Coronal Streamers
Image by Steve Yerby
Cropped image. Scope: ED 80 f/6. Camera: Canon 700D. Mount: iOptron alt az.



Coronal Streamers, Prominences and the star Regulus
Image by Allon Wildgust (Green Mountain Astronomers)
4 picture composite, cropped. Pentax camera on a tripod with a 300mm lens and a 1.4 tele-converter.

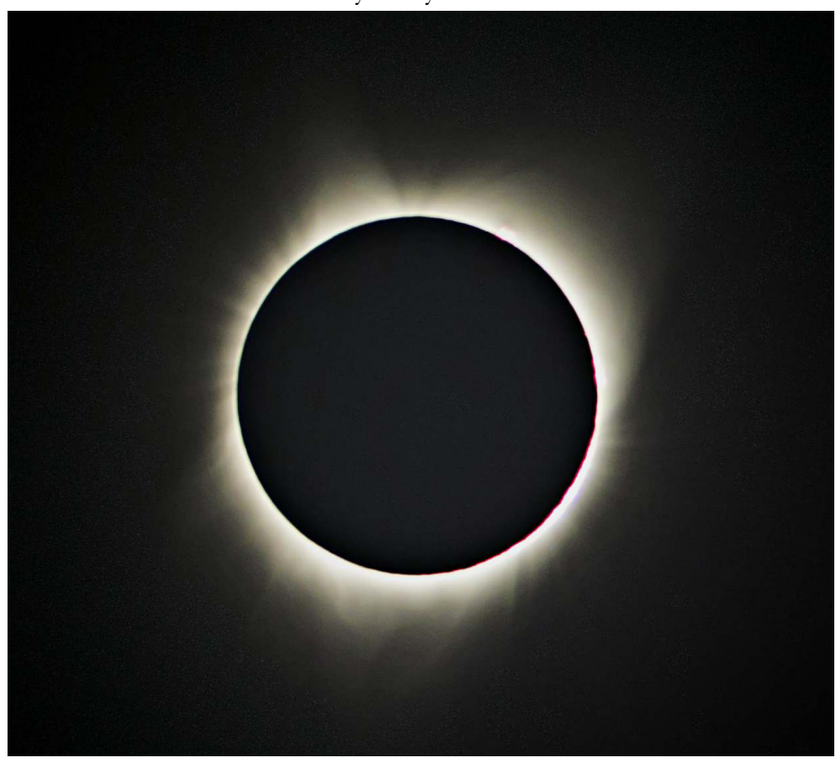
After setting up my umbrella protection as seen in the image above, I noticed three others in the area around me, decide to "protect" their cameras and lens as well, they had been cooking under the sun when I arrived. They wrapped them up in BLACK CLOTH, one using a pair of black socks! At temperatures approaching 100 how well did this work?

Our 11.75 hour ride back to Louisville included seeing a man outside his car by the side of the road, light flashing's, playing his accordion at 11:15 PM on the interstate. The almost 90 mile back up, at a crawl of 0-5 MPH at times, was really too much.

We were at the Hopkinsville Western Kentucky Fairgrounds.

Larry Garrett

Diamond Ring
By Larry Garrett

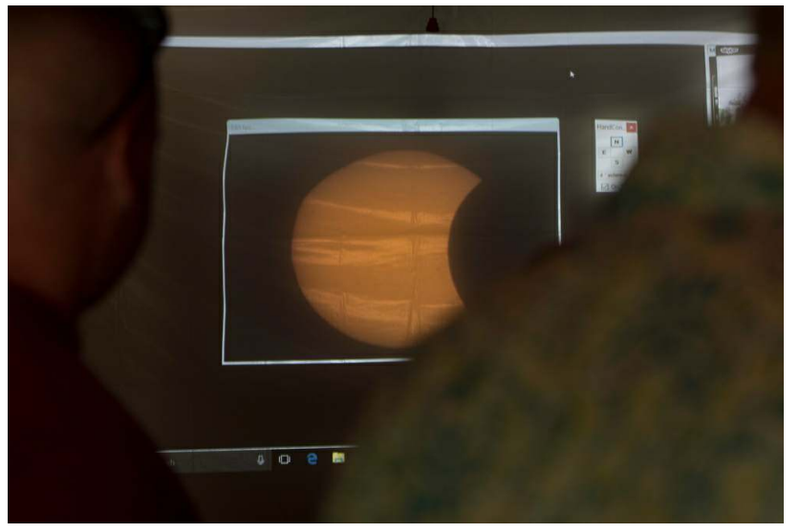


We watched the eclipse from an oceanfront beach in Newport, Oregon. Early morning Pacific fog lifted in time to have perfect viewing of the entire event. Totality started at 10:16 A.M. PDT and lasted for 2 min 0 sec.

The photo was taken by Dorothy Cutter, a member of our tour group. She used a Panasonic Lumix 200 camera with three f stops underexposed. The lens was at 600 mm and no filters.

Laura Williams

Bill in his observatory



Visitors viewing 1 of 2 projected images piped down from his rooftop observatory

Report from Rev. Bill Wick in Northfield, VT

Had about 200 people at my Ritzer-Davenport Astronomical Observatory yesterday. Had solar glasses, pin hole box viewers and also projected the image from my Celestron 11" SCT on to two screens in our garage. Had lots of fun and shot digital pictures.

From Bill Banke's brother, Rick, from Houston, TX - We traveled to eastern Oregon for the eclipse. The above image is a stacking of 9 photos at different shutter speeds to capture the dynamic range of the corona. Speeds ranged from 1/2000s to 1/4 seconds in roughly 1 stop increments. I imported them as layers into Adobe Photoshop and aligned them manually. I then combined the layers as a smart object and used the Photoshop "mean stacking" algorithm for the base image. I then opened the file in Adobe Lightroom to make the final adjustments. I used a radial filter to bring out the "earthshine" on the lunar disk. The images were shot with a Canon 5D Mark III camera, Canon 100-400mm f/4.5-f/5.6 L lens plus a Canon 1.4X teleconverter. The lens was set a 400mm, giving a focal length of 560mm with the teleconverter. The aperture was set wide open at f/8 (I lose a stop by using the teleconverter). ISO was set to 400. The camera was mounted on a Manfrotto 3021 tri-pod and a Giottos MH 652 ball head. Note the star Regulus to the lower left.

(Cont. from page 13)

to a 4.25" f/4 Newtonian. The smaller scope also would be easier to use and would ensure complete coverage of the Corona.

I decided to do video as well. I had an "old" Canon digital camcorder with a built-in 15x optical zoom. With a 1.9x teleconverter (from an older digital still camera) I had an effective focal length of about 600mm (compared to 420mm for the 4.25" scope). Years ago I made a white light solar filter for the teleconverter. Initially I planned to put the camcorder on a tripod but opted to piggy-back it on the 4.25".

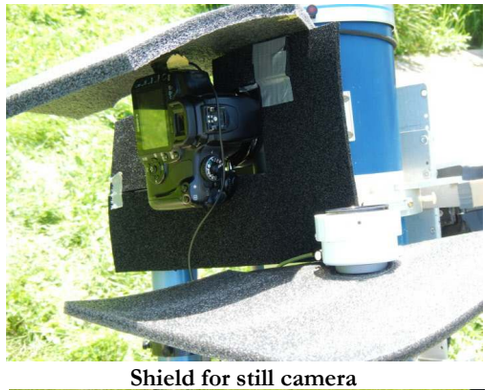
Good thing I started out early with planning. The battery for the camcorder was no longer any good so I got a replacement. Only I couldn't charge the replacement- the old battery got charged in the camera via the AC adapter, for some reason this didn't work with the new battery- so I had to order a separate battery charger. Could have run the camcorder on the AC adapter but I wanted to minimize the number of cables and wanted 2 power options.

For a visual scope I opted for my 4" f/5 "China" scope on an old Super Polaris equatorial mount. For the low powers I was going to use it was good enough and I already had a solar filter for it. For eyepieces I read a piece in Sky &Tel or Astronomy that recommended about 1 degree field of view leading up to totality and 2 degrees during totality (60x and 30x respectively). Running the numbers I realized my 8-24mm zoom eyepiece would fit the bill and save changing eyepieces (not that I had any time to change magnification).

Preparations included looking up sources for suggested exposure times for the various features that would be visible during the eclipse. Using estimates and actual timings I wrote a fairly detailed timeline for setting up and observing the eclipse. Everything always takes longer than you imagine (except for the eclipse itself).

In setting up the scopes for trial runs I was thinking I would have to move between scopes (and would have time to do so). Looking at the scopes I realized positioning them close together I could sit on my observing chair and by just swiveling around a little, look through the visual scope, operate the still camera on the 4.25" and operate the piggybacked camcorder. (Thanks go to Keith Lawrence and Dennis Woos for the observing chair assembly workshop earlier the year.) Moving between scopes would have eaten up precious seconds.

It was clear that for the partial phases sun shields would be very helpful for seeing the camera view screens.



Shield for still camera

Shield for camcorder

Shields for visual scope

In Astronomy Magazine, I think, I read a piece where for an eclipse the author of the article had made an audio recording to follow. I thought that was a great idea. So, with some of the money my co-worker put into an Amazon gift card as a retirement present for me, I bought a digital voice recorder.

I didn't need to cover doing the whole setting up, just the moments before, through and shortly after totality. I started at 3 minutes (T+3 min) before 2nd contact and wrote a detailed script to be started at precisely 1:27:59 PM (based on trial runs, actually had to start the recording at 1:27:58 PM to compensate for a 1 sec delay). So that I could tell how accurately I started the recording, I counted 58, 59, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. During the event I compared this count to the time piece (an old GPS device). This would allow me to mentally compensate if needed.

At T+2 minutes the recording told me to watch for shadow bands (didn't see any).

At T+1 min I said "1/500 sec" (to set the camera exposure in prep for the first Diamond Ring).

T+40 sec "Ready filters".

T+ 30 sec "Filters off".

T+10 sec, countdown through the first Diamond Ring- "10, 9, 8, 7, 6, 5, Glasses off, 3, 2, 1, 0, 1,2, 3, 4, End", "1/4000 sec, 11 frames" [11 shots in 3 stop increments from 1/4000s to 1/4s]

T-30 "Eyes only, Focus on Sun"

T-45 "Mars right 8 deg, Mercury left 8 deg - dim, Venus 34 deg right, Look around horizon"

T-1 m 13 s "Half way point"

T-1 m 16 s "Left 1/4 to 1/1000 sec, 2 stops, 13 frames

T-1 m 46 s "1/800 sec, Remove visual filter, View through 4" refractor"

T-2 m 27 s, "Diamond Ring in 5, 4, 3, 2, 1, 0, 1, 2, 3, Glasses on"

T-2 m 40 s "Filters on, Camcorder, Photo, Visual."

I practiced this routine several time at home (revised it 3 more times after I thought I had it the way I wanted). I had not planned to adjust the camcorder but ended up doing so which of course messed up my plan some. The clouds also put a monkey wrench in the plan as I had to deviate from my

planned exposure times. However, it definitely helped a lot to use a recording like this. A critical part was choreographing the sequence accurately. This meant double and triple checking event times to recording time calculations and verifying how long tasks like the image sequences would take. Another was starting the recording within a second or so of the planned time. This I also practiced which helped me come up with the idea of the counting the seconds at the beginning of the recording. I practiced a few more times the morning of the eclipse.

Final Prep and the Big Event:

Sunday, August 20:

I set up the scopes near my Aunt and Uncle's place in late afternoon. Went back about 8 PM to show Aunt Ellie and Uncle Spud (Harold's his real name) Saturn through the 4.25" f/4 scope. I then took the opportunity to fine tune the polar alignment on both scopes using the drift method. I was surprised how close I had gotten using a compass and adjustable bubble level. Removed the telescopes from the mounts.

Monday, August 21 (Eclipse Day):

Arrived at Spud and Ellie's about 9 AM. Reinstalled the scopes, focused camera. Set up point-n-shoot for HD video of general scene. Ran through the audio sequence a few more times.

Aunt Ellie fixed us a delicious lunch of roasted chicken, potato salad and cooked apple (like an apple pie without the crust). For desert we had some delicious home-made cookies.

15 minutes before 2nd contact I started the general scene video camera and still camera doing a shot every 20 seconds.

I realized about 10 minutes before show time that I forgot to re-check the focus of the 4.25" f/4 imaging scope. It was way off due to the change in temperature since focusing it earlier in the morning (the PVC tubing used for the scope body has a high thermal coefficient of expansion). Ran through 3 sequences of the focusing process but unfortunately forgot to set the focus after the last round. In retrospect I should have simply used the little finder scope I use to magnify the viewfinder image and get it in the ballpark.

I did manage to get the audio recorded instructions started right on time but it was close.

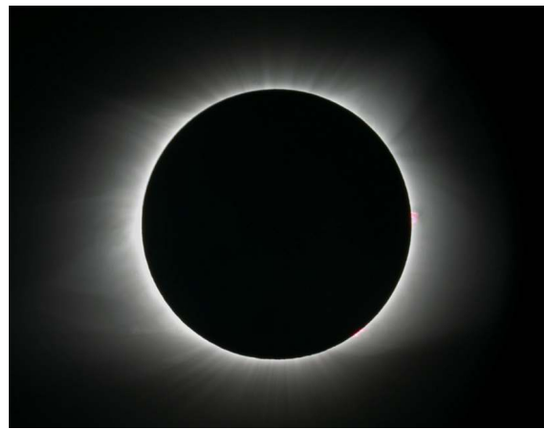
I watched through the 4" f/5 refractor (with the solar filter installed) as 2nd contact approached. When my audio recording said "glasses off" at 3 seconds until 2nd contact I repeated the words to the others and looked up in time to see about 2 seconds of the diamond ring, absolutely breath taking!

Definitely lucky as there were clouds that completely covered the Sun from time to time leading up to the eclipse and could have done so during totality (I heard of some people only a few miles south who missed the whole thing due to clouds). There were some thin clouds during the total eclipse but only enough to add to the experience.

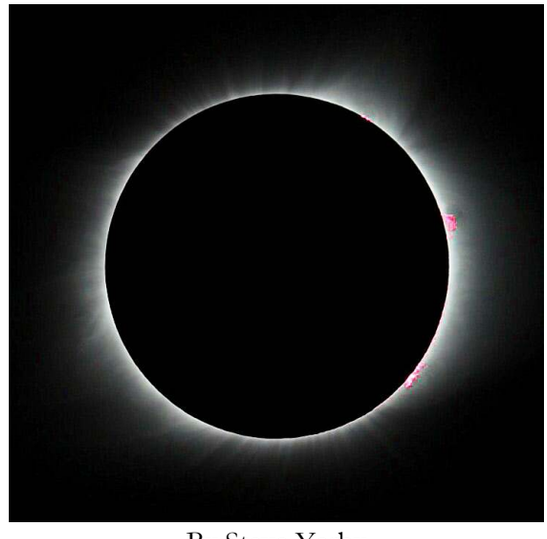
It was very busy during totality. My planned amount time for viewing visually was compromised some (by clouds and my unplanned attention to the camcorder) but the audio recording helped to keep it somewhat on track and saved me precious time by keeping track of the time for me. Without the recording I expect I would not have been ready for 3rd contact. Something else that took away from visual observing and was unanticipated was sweaty fingers in the heat. In practice sessions at home I could change the camera shutter speed without looking at the camera to verify the setting, freeing my eyes to view the eclipse. In the practice sessions that morning my sweaty finger was slipping a lot on the little wheel for changing exposures requiring me to look at the exposure setting.

In spite of the focus snafu, a very successful event. The few seconds of viewing the diamond ring at 2nd and 3rd contacts was just incredible! It was 5 or 6 seconds at 3rd contact. Not to mention seeing the red Chromosphere and Prominences with the unaided eye. The intensity of the diamond of the diamond ring is way beyond the ability of any picture or video to do justice. It wa most intense light yet I could comfortably look at it.

As a bonus I saw Shadow Bands about 2 minutes after the 2nd Diamond Ring.



By Larry Garrett



By Steve Yerby

By Allon Wildgust

Aldebaran Occultation

The Total Eclipse of the Sun isn't the only action the Moon has been involved with, the most exciting but not the only.

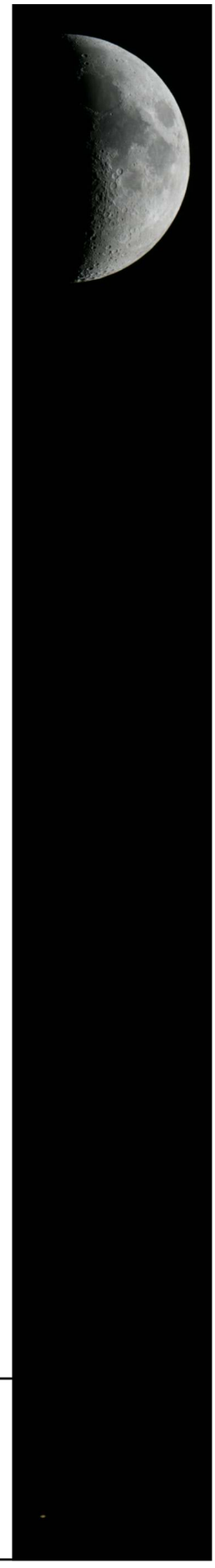
The occultation of Aldebaran, Taurus the bull's eye occurred during the daytime the morning of September 12, 2017. The disappearance on the sunlit side occurred a few minutes before 9 AM. Re-appearance was on the dark side a little after 10 AM. Aldebaran has a visual magnitude of 0.8.

I watched the occultation through my 10" f/4 Schmidt-Newtonian, triggering the camera that was 30' away on the 10" f/5.6 Newtonian, via a wired remote and a couple stereo extension cables (sound equipment type). Visually it disappeared instantly, no steps, no gradient, just puff and it was gone.

Because the daytime sky reduces the contrast considerably I set the camera to record the images in RAW format. If I had 2" polarized filter I would have used that to increase contrast as well (I have one now for next time).

Technical Details:
10 inch f/5.6 (1407mm fl) Newtonian wtih 2", 2X Barlow which with the cameara provides 2.65X magnification for 3730 mm fl at f/14.8. Images are cropped.
Camera: Canon Rebel XTi
Exp 1/30 sec at ISO 100

Moon/Saturn Conjunction



Moon/Saturn Conjunction - September 26, 2017
This was a rather wide conjunction with Saturn 2.6 degrees from the center of the Moon. Saturn is in the lower left corner just big enough in this image to see the oval of the rings. Mosaic of 4 images. I moved the scope 1 field of view (0.9 deg) between shots.
10 inch f/5.6 scope, Canon Rebel Xti camera at ISO 400, Exp 1/160 sec for Moon, 1/40 sec for Saturn. Final image is cropped slightly.

Gary's Astronomical Events for the Month
can be viewed via WCAX at www.wcax.com/story/6330547/astronomical-events

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

For Sale

Celestron SP-C80 refractor telescope 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

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

Celestron EclipSmart Solar Binoculars 10x42 (list $70)----**$30 or nearest offer**

Bower Binoculars/Camera Tripod 59" (list $30) ---**$15** or nearest offer

All the above are in excellent condition

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

Explore Scientific 80mm f/6 Apochromatic Triplet Refractor Telescope (FCD100 ED). Paid - $600.

Asking $400.

Stephen Scaravella, 802-434-3884 or englishnotation@gmail.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
Or you can contact Ron Anstey anstyer@myfairpoint.net

Homemade 10" F/4.975 Newtonian on Dobsonian mount. Both mirrors have enhanced 96% reflective coatings. Newtonian has JMI 2" Reverse Crayford focuser. Telescope has Pyrex primary mirror. This scope is good for low power deep sky objects. **$500.00**

Sears (ca. 1968) 3" F/15 Refractor OTA only. Does have focuser upgrade to accept 1.25" eyepieces. Doublet Lens is actually an F/16. Includes finder. **$100.00**

Oberwerk Lightweight 15 X 70 Binoculars, F.O.V. 4.3 degrees, Eye Relief 16 mm, Great for sweeping the Milky Way. **$70.00**

Oberwerk Lightweight 9 X 60 Binoculars, F.O.V. 5.0 degrees, Eye Relief 14 mm, Can be hand held. **$50.00**

For more information please contact; Gary Nowak, Tel 802-879-4032, gtnowak@surfglobal.net

Feather-touch focuser for a Schmidt-Cassigrain. Brand new, hardly used. For specs go to http://starlightinstruments.com/store/index.php?route=product/product&product_id=51. **Asking $200** for it.

Stephen Scaravella, 802-434-3884 or englishnotation@gmail.com

Meade DS-2114S (early 2000's vintage)
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 automated 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 $160 (new price)**.
Contact Paul Cameron at 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 bdhinvt@yahoo.com.

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

Al Boudreau 802-758-2221 or astromanvt@gmavt.net

Wanted

For selling & buying also check out: www.marketplace.skyandtelescope.com

Dues

Associate Members $15
Full Members $25

Contact Paul Walker
802-388-4220
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

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

Looking for 5-10 minute product reviews for the monthly meetings.

Moving or Changing Email?

Please send changes to Paul Walker, 53 Valley View, Middlebury, VT 05753, paulwaav@together.net

Web Site

www.vtastro.org
Email: info@vtastro.org
Paul Marino is the webmaster:
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: Bill Banke's brother, Rick, Al Boudreau, Joe Comeau, Larry Garrett, Peter Gillette, Linda Hermans-Killiam (NASA's Space Place), Brian Johnson, Jack St. Louis, Anele Mott-Nickerson, Mike Stadtmauer, Paul Walker, Greg Warrington, Rev. Bill Wick, Allon Wildgust, Laura Williams, Dennis Woos, Steve Yerby
(My apologies if I missed anyone)