

Morning Star

Winter 2018



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Alberio, the Gold/Blue Double
3.1 & 5.1 magnitude, 35 arc sec separation. Taken by Paul Walker with a 10" f/5.6 Newt., 2X Barlow, cropped 37% (effective magnification ~ 460x), 30 sec exposure at ISO1600, stack of 5 images.

New Members

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

Peter Chapin
Karen Schoonover
Rich Gallagher

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.**

January 8

Astrophotography using Digital Single Lens Reflex Cameras
by Steve Grimsley



Digital SLR Camera on Telescope

Modified versions of commercial digital single lens reflex cameras (DSLR's) dedicated specifically for astrophotography, enable the capture of quality images of a wide variety of

astronomical objects. The moon, eclipses, transits, planets, comets, deep sky Milky Way, supernova, and galaxies can all be photographed. They can be used with a camera lens or, best of all, mounted prime focus on telescopes. Although not the absolute best cameras for every object, DSLR's are the most versatile means to acquire photos of the widest variety of astronomical targets. A welcome benefit that you will find with this method of astrophotography is the ability to alternate between visual observation and imaging quickly and with great ease. With a computerized mount and camera control constant monitoring of an imaging run isn't required freeing you to visit with friends and look through



Heart Nebula in Cassiopeia by Steve

other telescopes during star parties.

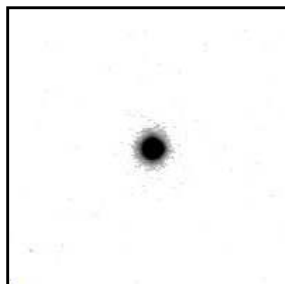
This presentation will review the procedures and processing steps that I have used for a number of years. After the capture method has been discussed a number of examples of dozens of objects will be shown both on the screen and in hardcopy mounted prints. The astro-photos are presented in a progression from nearby solar system out to distant galaxies. Hopefully, many of your favorite visual objects will be shown. The techniques presented may be useful to beginners and to those who already have experience in astrophotography.

February 5

**Collimation of a Schmidt-Cassegrain
using
"GoldFocus Plus Collimation System"
By "Rev"
(i.e. Bill Wick,
Norwich University Chaplain)**

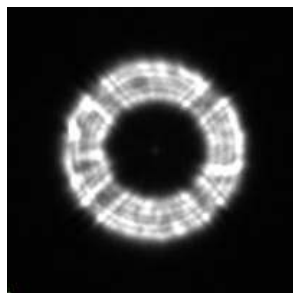
"Collimation" ("collinear" or 'in-line') means that all optical elements of a telescope are centered and square to its optical axis and its imaging system. Lenses must be accurately spaced; primary and secondary mirrors must be accurately separated and aligned; focal reducers, field-flatteners, field correctors and focus draw tubes require accurate alignment (centered/moving parallel to the optical axis); additionally, filter holders need to be well-centered. NOTE: the mirror grinding error on the Hubble Space Telescope (HST) primary mirror (later fixed and subsequently serviced by four Space Shuttle crews) was off as little as 4 micrometers (microns) at the edge of a 2.4 meter (94.5 inch) mirror.

A number of collimation options exist including (but not limited to):



1. "By Eye" or "Star Collimation" in which one relies upon experience and judgment to achieve good collimation (making a star image

as small, round, and sharp as possible. This technique is subjective with accuracy diminished by diffraction limits and atmospheric conditions.



2. "Defocused Star" or "Concentric Ring" Collimation utilizing a defocused star image is used for telescopes having a secondary mirror

obstruction (e.g. [Newtonian] reflectors or catadioptrics [Schmidt-Cassegrains]) whereby in the presence of poor collimation a severely defocused star image shows an elongation or off-center distortion. One ad-

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

Stargazing and other Events

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

Member and Invited Guest Star Gazing and other events

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)

All events start about sunset.

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

Stay tuned for the 2018 list.

justs the secondary mirror so as to make the defocused star image as round and symmetric as possible. This technique is also subjective (it can be a difficult to visually determine when the defocused star image is perfectly round and symmetric).

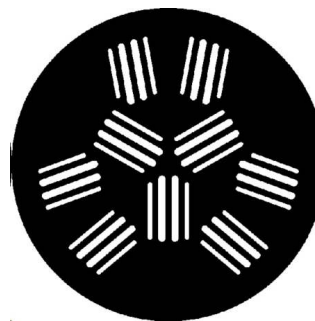
3. Cheshire (external light source) and/or Laser Collimation (built-in laser) employs instruments whose accuracy is limited to one or two millimeters and by the accuracy of alignment in the eyepiece

holder.

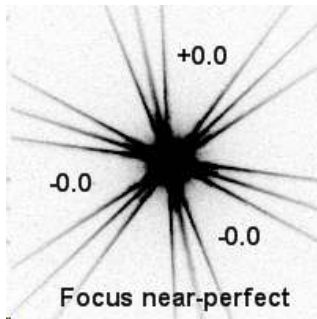
"Rev's" presentation will highlight the "GoldFocus Plus Collimation System" he uses for focusing and collimat-

ing his Celestron 11" SCT. The system involves a GoldFocus Plus Collimation

Mask and Analysis Software which measure collimation in the same way a CCD camera forms its image with the requisite accuracy for high quality digital imaging. GoldFocus Analysis Software displays the objective measure of an image's qual-



ity of focus and collimation on one's computer screen in real-time. NO GUESSWORK - focus and collimation qualities are objective and accurate - neither limited by diffraction limits nor conditions. This system (mask and software) ensures proper focus and collimation (in the exact way that one's astrophotography imager sees.



March 5

Mars - Summer Viewing 2018

(The 2018 Perihelic Opposition of Mars: One of the Top 15 Oppositions Since 1901)

Part 1 of 2

By Gary Nowak



Of all the planets visible; Mars is surely the one that has cultivated the most human imagination and interest. Every 2 years and 50 days, Mars and Earth have "close encounters" with each other. Approximately every 15.7 years, Mars has a closer than typical approach to Earth. In the summer of 2018 Mars will have one of these closer approaches called a Perihelic Opposition (described in more detail in the talk). At that time, amateur size telescopes will have some reasonable views of Martian surface features. Mars is the only planet in our Solar System (besides Earth of course) that we have a reasonable chance of seeing the actual surface features (the Moon doesn't count- it's a moon). Several major Martian surface features are readily visible in a good telescope. Mars is a dynamic planet with surface features that show subtle changes over time due to the effects of the Martian atmosphere. The Martian

atmosphere itself displays changes, such as cloud formations and the occasional dust storm. Changes to the Martian ice caps usually can be easily seen. This talk is designed for visual amateur observations through telescopes of 4" - 8" aperture and will cover all aspects of observing Mars. Observing tips and techniques will be shared to help bring out the most of your telescope observations of Mars.

Part 1 Outline:

- A. Introduction to Mars
- B. Mars Quiz (History of Mars and Mankind)
- C. Mars Orbital Characteristics
- D. Factors effecting Mars Observations: Atmospheric

Part 2 Outline (April 2018):

- A. Factors effecting Mars Observations: Instrumental
- B. Amateur Telescopes for Visual Mars Observations
- C. Filters for Mars
- D. Observing Mars: Survey of Various Visual Features
- E. Changing Mars Phenomena: Atmospheric
- F. Mars Moons
- G. Summary

The presenter; Gary T. Nowak is a long time member of the VAS and is on the board of directors. His specialty is advanced visual amateur astronomic searches with telescopes and binoculars. The presenter has built several telescopes over the years which included grinding and polishing his own telescope mirrors. His first recorded observations with a telescope were in 1968. He has been observing Mars since 1971. In 1999, he co - discovered a Nova visually with binoculars. He is a member of the Association of Lunar and Planetary Observers (ALPO).



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."

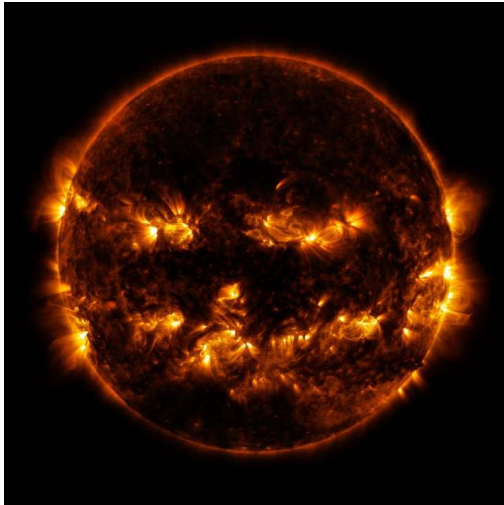


Spooky in Space: NASA Images for Halloween

By Linda Hermans-Killiam

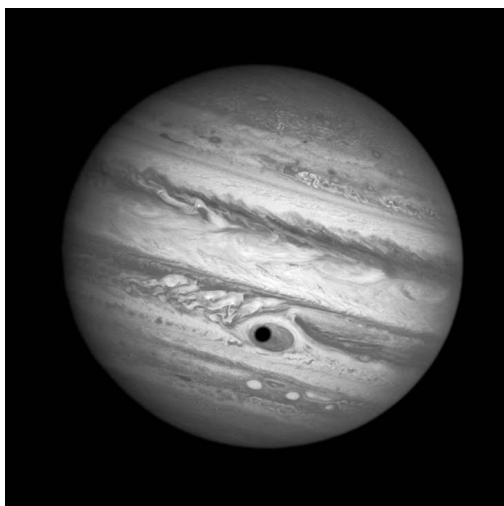
Have you ever seen a cloud that looks sort of like a rabbit? Or maybe a rock formation that looks a bit like an elephant? Although you know that a cloud isn't really a giant rabbit in the sky, it's still fun to look for patterns in

images from nature. Can you spot some familiar spooky sites in the space images below?



Credit: NASA/GSFC/SDO

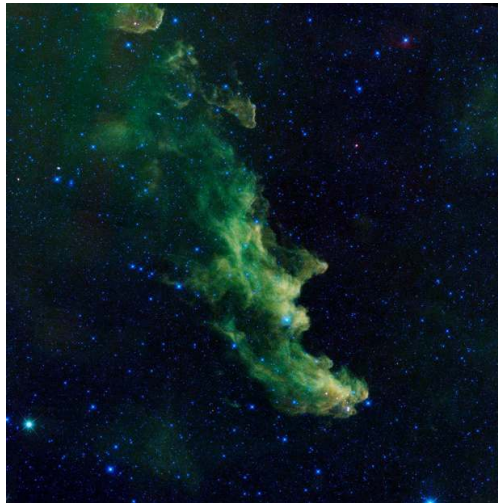
This might look like the grinning face of a jack-o'-lantern, but it's actually a picture of our Sun! In this image, taken by NASA's Solar Dynamics Observatory, the glowing eyes, nose and mouth are some of the Sun's active regions. These regions give off lots of light and energy. This causes them to appear brighter against the rest of the Sun. Active regions are constantly changing locations on the Sun. On the day this image was captured, they just happened to look like a face!



Credit: NASA/ESA/A. Simon (Goddard Space Flight Center)

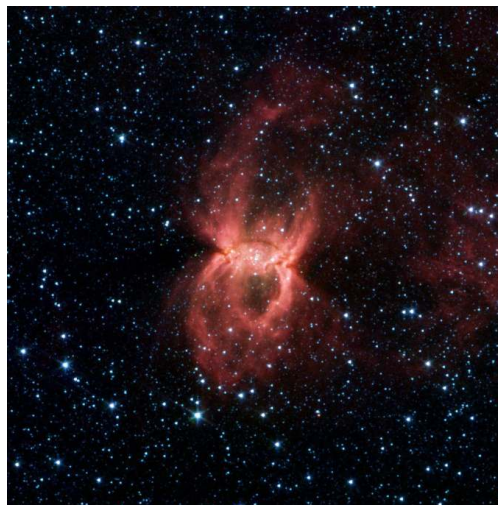
This is a Hubble Space Telescope image of Jupiter. Do you notice something that looks like a big eye peeking back at you? That's actually the shadow of Jupiter's moon Ganymede as it passed in front of the planet's Great Red Spot. Jupiter's Great Red Spot is a gigantic, oval shaped storm that is larg-

er than Earth and is shrinking. It has been on Jupiter for several hundred years, and its winds can swirl up to 400 miles per hour!



Credit: NASA/JPL-Caltech

Can you see the profile of a witch in this image? This image, from NASA's Wide-Field Infrared Survey Explorer, shows the Witch Head nebula. The nebula is made up of clouds of dust heated by starlight. These dust clouds are where new stars are born. Here, the dust clouds happen to be in the shape of an open mouth, long nose and pointy chin.



Credit: NASA/JPL-Caltech/Univ. of Wisc.

The Black Widow Nebula looks like a giant spider in space. It is a huge cloud of gas and dust containing massive young stars. Radiation and winds from these stars push the dust and gas around, creating a spider-like shape. This image is from NASA's Spitzer Space Telescope.



Credit: NASA/JPL-CALTECH/MSSS

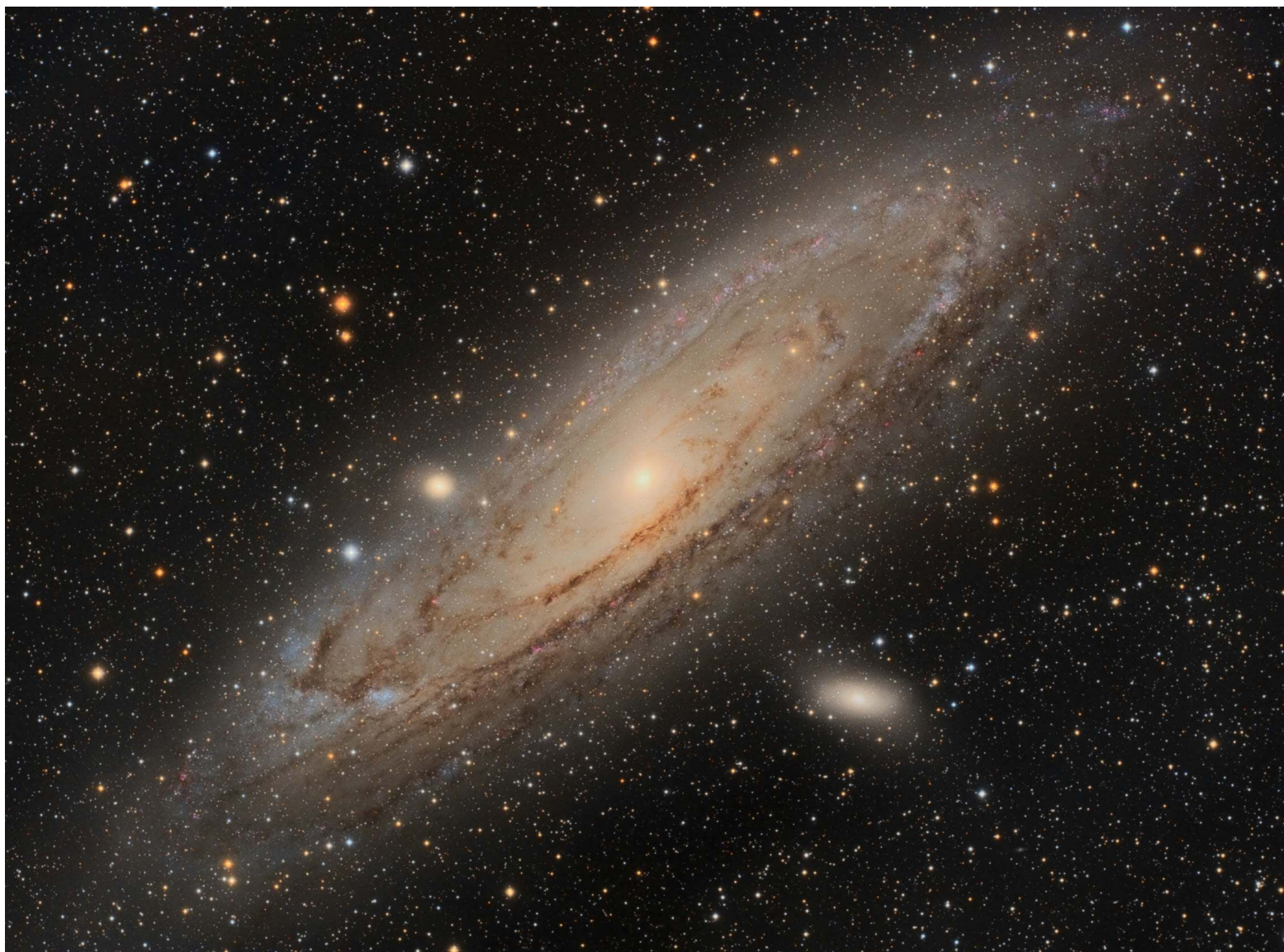
Did a skeleton lose one of its leg bones on Mars? Nope! It's just an image of a Martian rock. NASA's Curiosity rover captured this image. The rock was probably shaped to look this way over time by wind or water. If life ever existed on Mars, scientists expect that it would be small organisms called microbes. So, it isn't likely that we'll ever find a large fossil on Mars!

To learn some fun planet facts and make a planet mask, check out NASA Space Place:

<https://spaceplace.nasa.gov/planet-masks>

M31 LRGB 19hrs By Michael Stadtmauer

M31 is an object we are all familiar with, but hopefully this image will help you to fall in love with it all over again. The image benefits from 19hrs of total data collection, and some new tools in the astro-processing software I use, Pix-Insight, that allows for much better and truer color in astro images. The new tool allows for photometric color calibration. Up until this point, white balance was achieved by choosing something in the image itself and calling it 'white', and then using that value of 'white' to calibrate the color of the rest of the image. This generally worked well, but could also easily produce color that was skewed toward red, green or blue depending on the exact object or area chosen to be the white reference. Now, all of that guesswork is removed and the new tool uses known references, such as an 'average spiral galaxy' or G2V stars (which are considered white to the human eye) so that colors after calibration are much closer to what we



would see if we were floating in space looking at these objects with our eyes. The color in this image of M31 was NOT touched at all after calibration, except for a very slight saturation curve to deepen them a little. So, theoretically at least, this is how the galaxy will look in a few hundred years when we develop intergalactic travel (let's be optimists - its more fun) and can see it with our own eyes (of course, by that time we will have bionic eyes that see in various spectrums, but that's besides the point). I also tried to get some more detail out of the core by making an 'HDR' image - using both 300s and 30s subframes for the Luminance of the image.

Soon, I will re-process this image from the ground up and try to improve on the quality of the star cores and also add in about 8 hrs of H-alpha data. Enjoy!

There is a full size version on my Astrobin page, here:

<https://www.astrobin.com/full/316529/0/>

If anyone has any questions about astrophotography, please do not hesitate to reach out at drmikevt31@yahoo.com

Equipment:

Mount: Paramount MyT

Scope: Stellarvue 80mm APO triplet refractor with .8x reducer/corrector (384 FL)

Camera: QSI683wsg-8 [8.3 megapixel monochrome camera, produces the equivalent of a 25 megapixel one shot color camera]

Image details:

120x30s L

72x300s L

24x600s RGB (each)

19 hours total exposure time

IC1805 - Heart Nebula SHO 27hrs By Michael Stadtmauer

The Heart Nebula is an emission nebula in Cassiopeia. It is about 7500 light years away, residing in the Perseus arm of the Milky Way. The nebula is energized by the open cluster, Melotte 15, which lies at the center of the structure. This cluster contains a number of young stars over 50 times our Sun's mass, which accounts for its brightness. The intensity of the radiation of these stars ionizes the surrounding gasses resulting in emission of mostly Hydrogen-alpha spectral lines, but also is rich in Sulphur-III and Oxygen-II spectral emission. These three emission lines are captured using very narrow-pass filters, and the image on the next page is constructed using the standard Hubble palette which assigns S-III to 'R',

Ha to 'G' and O-II to 'B'. This allows us to create a false color image to better visualize the nebula structure. As a side effect, star color is also false - there are no magenta stars, as far as I know! In reality, if we were floating in space above this object, it would most likely appear a deep red with no other color visible. This is because the Ha spectral emission line is deep within the red part of the visual spectrum. I hope you enjoy!

Full size image:

<https://www.astrobin.com/full/316094/B/>

If anyone has any questions about astrophotography, please do not hesitate to reach out at drmikevt31@yahoo.com

Equipment:

Mount: Paramount MyT

Scope: Stellarvue 80mm APO triplet refractor with .8x reducer/corrector (384 FL)

Camera: QSI683wsg-8

Image details:

36 x 900s (15min) for each S, H, O filters

27 Hours total integration time.

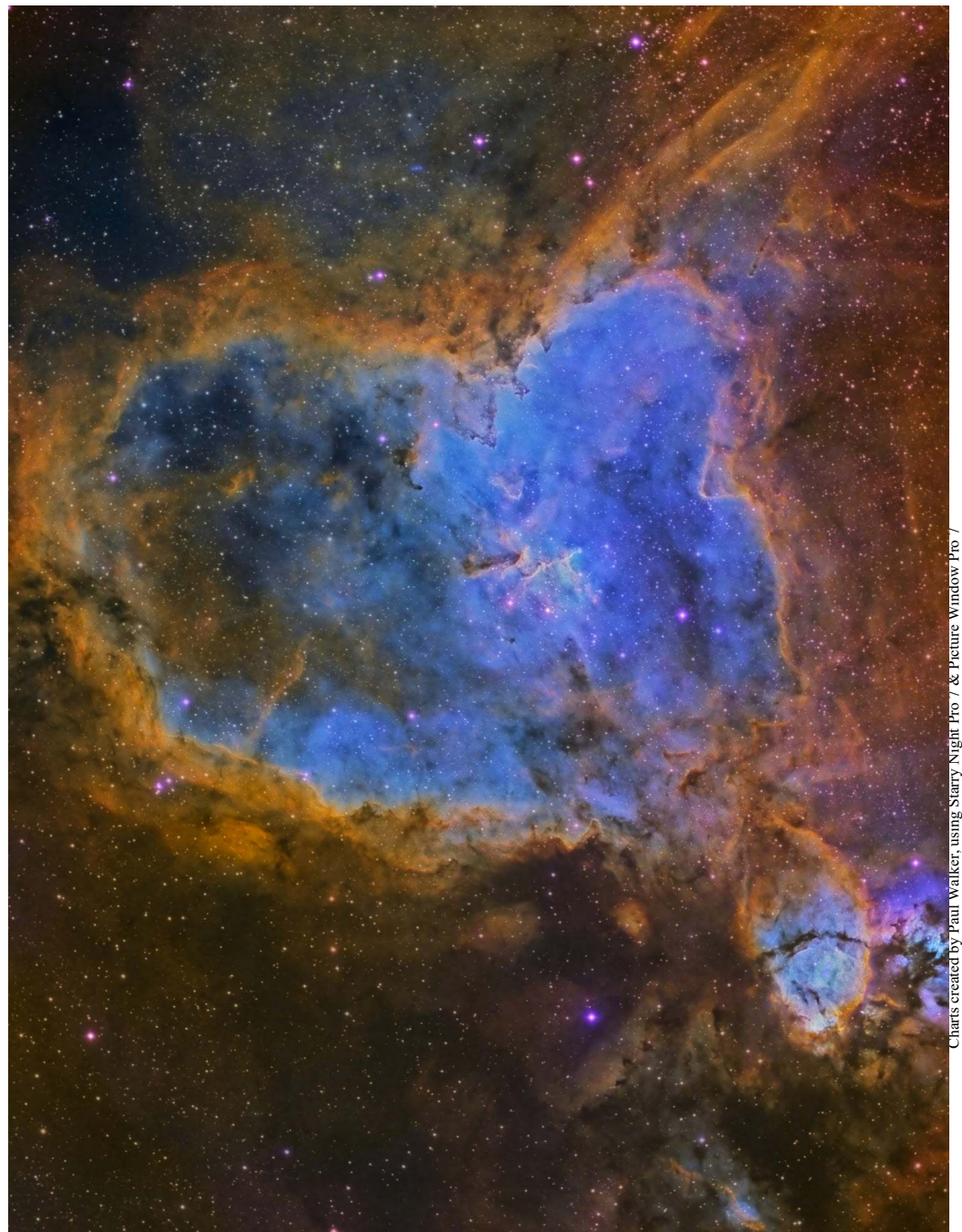
Editor's note: I highly recommend you follow the links Steve provided to the full size image files. The detail will blow your socks off. Proving you don't need a large scope or mount to get top notch images.

Eskimo Tips for Staying Comfortable While Observing in Winter

By Ron Lewis



For those of us who live in northern climes, winter astronomy is a mixed blessing. Some of the finest objects in the sky are best placed in winter time,



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

but the cold weather often keeps us from enjoying them. When autumn finally gives way to the winter nights, it's worth remembering that cold is the greatest enemy of amateur astronomers, greater than clouds, mosquitos, and even light pollution, to likely bring an observing session to an end. People forget how long they spend outside on a good night and go out in ludicrously inadequate clothing. For example, setting up a telescope and camera for imaging can take up to an hour. Add another hour for finding, focusing and imaging an object, and then another hour spent revisiting favorite clusters or galaxies. Suddenly three hours have passed. Add another hour for breakdown and finally hopping into your cold car. If it wasn't

for the love of the hobby, we'd never step out of our homes!

Ever wonder how Bigfoot stays warm while keeping one step ahead of would-be discoverers? No, he doesn't feast on a warm carcass. Instead, he follows these simple rules that I left hidden under a rock for him!

Materials to bring on a cold observing night

1. Luckily, clothing sold for other winter outdoor activities serves very well for our hobby. No cotton or polyester/cotton blends next to your skin. This includes underwear and socks. Polypropylene long johns are excellent, provided they're thick enough; arctic-weight

wool/polypropylene blend long johns are even better. Because cotton doesn't wick perspiration away from your skin, it quickly becomes moist and cold in cold weather, leading to rapid loss of body heat. The same property that makes cotton great for wearing in hot weather can contribute to hypothermia in cold conditions.

2. Dress in layers. Many thin garments with lots of dead air between layers to trap heat are better than a few thick ones. Because astronomy doesn't involve much physical movement, you should dress as if the temperature was at least 10 degrees colder than predicted. For observing in temperatures that are "painful" to you (45, 35, 25?), you should wear the following:

- Wool/polypropylene or polypropylene long johns (two pairs for subzero temperatures)
- Polypropylene sock liners
- Wool or thermal socks (one or two pairs)(no cotton!)
- Flannel or thermal shirt (a synthetic fleece shirt would be even better)
- Jeans (synthetic fleece pants would be even better, one or two sizes larger than you normally wear)
- Wool sweater or hooded sweatshirt w/ pouch for warming hands (one or two sizes larger than you normally wear; the hood string should be tied)
- Fleece layering jacket or a padded goose down jacket
- Down-filled bibs
- Down parka (rated to -40 degrees with the bibs)
- Balaclava (ski mask)
- Wool/thinsulate watchcap
- Wool fingerless gloves
- Pac boots (rated to -40 degrees when the expected low is above 20 degrees or another pair rated to -100 degrees when the low is in the teens or below or when observing on snow)

3. Always bring more layers than you think you'll need. Add or remove layers depending on air temperature, wind chill, and how much you're exerting yourself. If you're wearing enough to start feeling too warm while you're driving to the site or setting up your gear, you've probably got on too many layers and will get cold after you've stopped moving around as a result of having perspired under your cold weath-

er gear. Don't put on all of the layers you plan to wear while observing, including heavy boots and socks, until you have everything set up and are ready to observe. On the other hand, if you feel comfortable wearing all of the layers you've brought while laboring to unload equipment and set up, you've probably not brought enough and will start to get cold as soon as you stop moving around. I'm also a big fan of ski pants. Legs can radiate a lot of heat through a single pair of jeans. It's nice to wear things with pockets, where you can keep eyepieces warm in the pockets without them getting scratched. I highly recommend non-cotton outer and under-clothes. Cotton holds moisture and will chill you, thus the saying "Cotton Kills."

4. Cold feet and/or hands are a symptom of a falling core body temperature. When this happens, the brain redirects blood away from the extremities to the vital organs, and the feet and hands become cold. If your core temperature is dropping, the heaviest boots and gloves won't help you feel much warmer. Only adding layers will help. Drinking something hot will also speed recovery. If you keep your core temperature up, you can often observe in comfort without gloves.

5. Don't forget your head. Always wear at least one cap in cold conditions. An uncovered head rapidly radiates body heat away. A hood is even better, but often gets in the way. That's why I often wear a balaclava (ski mask) and a watch cap (beanie).

6. Temperature ratings for cold weather gear assume the wearer is actively exerting himself/herself. Wearing a parka rated for -40 degrees might seem excessive when it's in the twenties, but experience has demonstrated that additional layers are still needed for a sedentary activity such as astronomy. Boots rated for -100 degrees are quite comfortable when the temperature is in the teens or below, especially if you're standing on cold ground or snow, but not if they've become moist from being worn in the car on the way to the site. Always remember to take the liners out of pac boots after an observing session to allow them to dry out, especially if you plan to observe the following night.

7. Keep well hydrated but avoid caffeine. Caffeine is a diuretic and reduces blood volume, making it more difficult for the body to maintain a normal temperature. I usually take bottled water and a half-gallon of decaffeinated coffee with me on cold nights. If you use hot tea or cocoa instead of water, you can even drink it for a pick-me-up. I've never been sure whether it's physiological or psychological — and perhaps it doesn't matter. But when I drink a cup of hot cocoa in cold weather, I feel a surge of warmth spreading through me from the inside out.

8. Cold conditions are often very dry conditions. Don't forget the lip balm, etc. I often find that any exposed skin gets dried out during the winter. A little moisturizing lotion when I get back to the house usually helps to keep my hands from becoming too badly chapped.

9. Chemical hand or foot warmers are another good item to have, but aren't a substitute for wearing adequate layers of clothing. My parka has two pockets inside over the kidney area that are designed to hold hand warmers. This is a nice feature worth looking for in a heavyweight parka. Hand warmers can also be used as eyepiece case heaters. I also have some vintage and new Jon-E and Zippo metal hand warmers, which use lighter fluid; they will keep your hands warm for an entire observing session. I often light my unit BEFORE driving off to the observing site, since the unit gives so many hours of good heat. If your hands get cold anyway, warm them up in pants pockets, armpits, or on your neck; try keeping your hands lower than your heart. The perennial problem is fingers — mittens (not gloves) are best for warmth, but the worst for turning atlas pages or little screws. If you've made your hands warm, you can then remove them from your glove or mitten for a short time while you fiddle with whatever, then slip them back inside, without going into agony or thinking of frostbite. Internal organs are essential while hands and feet are dispensable, so your body cuts off circulation to the extremities as soon as its core gets cold. But even if your core is warm, it's hard to pump enough blood to your hands and feet to

keep them warm, especially when you're not moving. Since the gloves or mittens will be removed frequently to enable you to handle eyepieces, star charts, etc., it is helpful to attach a string to them, and run the string through your sleeves, as is done for small children. Don't scrimp on gloves; go to a store that specializes in backpacking and rock-climbing gear and get a pair of good ones, perhaps even rock-climbers' gloves. Remember, cold extremities may mean that you need more insulation **ON YOUR TORSO AND HEAD**, not on your extremities. And, if your torso and head are well enough insulated, your hands will stay warm in very cold temperatures indeed. By the way, the head has the least natural insulation (i.e., body fat) and a great deal of heat is lost from it. Keep that cap or mask on.

10. Keeping warm in freezing temperatures requires the body to burn calories at a high rate. Eat well before you head out to observe and bring some high-carbohydrate snacks to stoke the fire a bit during the night. Warmth can be noticeably enhanced by eating sugary foods. I expect that some of you won't believe that until you've tried it. Candy bars freeze hard as rocks, but small pieces of hard candy can be sucked on. Take something to nibble throughout the night like sandwiches, nuts, cereal bars or a warm slice of pizza (small coolers work well for keeping things like this warm) will all help. For extended observing sessions during the colder months, a thermos of hot soup can really make the difference between an enjoyable outing and a cold and miserable one.

11. In addition to making it easier to move around while wearing multiple layers, loose-fitting clothing will keep you warmer because it allows for more dead air between the layers. Also avoid tight-fitting boots. Even with a couple of pairs of wool socks on, your feet will still get cold if you've cut off the circulation to them by squeezing them into boots that are too small to accommodate the extra socks. I wear a size 10 shoe, but my Pac boots are size 11. A larger size also allows me to place an additional wool inner sole under the boots' inner liner boots. Try on boots and outer layers while wearing the inner

layers and socks you plan to wear while observing to find items with the proper fit.

12. Putting weight on your feet cuts off the blood flow; sitting is much better than standing. Use a mat or newspaper to insulate them from snow. Wiggle your toes. And taking periodic breaks for 5-minute walk works wonders all around, warming you up and getting your blood flowing. A thick, closed-cell foam pad can also be used while sitting in your observing chair, or when kneeling on the snow. I keep a large chunk of closed-cell foam padding (about 2 feet square by 3 inches thick) for such purposes. Not only does it provide excellent insulation, it's very comfortable on the knees! This accessory is useful all year round (keeps the knees dry in damp summertime observing sessions, or safe from my gravel driveway).

13. When observing in the winter, your feet are in constant contact with a huge heat sink: the frozen ground! Find or make something to stand on so that your feet are not in direct contact with the ground. Use a material that provides some form of insulation. Even a piece of plywood raised an inch above the ground is a big help. Old carpet remnants also work well.

14. If you have a warm place to retreat to warm up, by all means do so! This is the perfect place for that warm snack, or to massage your feet, or to plan the next phase of your observing session. If there are other people indoors and you can't turn off the lights, wear an eye patch to preserve dark adaptation. If you have to retire to your car to warm up, please beware of carbon monoxide poisoning. Never sit inside a stationary car with the windows rolled all the way up while the engine's running; it's almost better to drive a bit with the heater on; trouble with that is that it will harm your dark adaptation.

15. Because you will be wearing anywhere from 2 to 5 layers of clothing, you will look much fatter and movement will be somewhat restricted. Agility can be restored (relatively speaking) by making the clothing in each layer one size larger than the previous.

16. Tip: go to the bathroom **BEFORE** dressing! It's not easy to take

care of business through 3 to 4 layers of clothing!

17. I think that if you get cold despite bundling up, it's time to go indoors! Relying on exercise is a bit risky. Whatever you do, don't push yourself to stay out in the cold too long. This is especially true if you are at a lonely observing site, alone. Cold can kill. What if your car won't start....

18. Most telescopes are manufactured in parts of the world warmer than where we live. Telescopes give trouble in two specific areas: lubrication and batteries. The lubricants used in telescope mounts, focusers, etc. turn into glue at low temperatures. It's best to strip off the supplied lubricant and replace it with the lithium-based greases designed for say, snowmobiles. It's best to store your telescope in an unheated garage or shed, rather than subjecting your scope to drastic temperature changes, plus the heavy condensation which can occur when you bring the scope indoors. If you must bring a very cold scope indoors, cap it tightly while still outside to minimize internal condensation. The same applies to eyepieces and other accessories. If your scope, tripod, etc. needed a small adjustment, do it indoors, as it's a nightmare trying to make adjustments when out in the cold.

19. Batteries depend on chemical reactions to generate current, and chemical reactions go more slowly at lower temperatures. Generally, the smaller the size of the battery, the sooner it will fail at cold temperatures. I often store my telescopes in an unheated garage, shed or trailer, but I always store the batteries inside my heated house. The little AA and 9v cells used in most astro equipment are next to useless below freezing. If you're close to home or an electric socket, use an AC adapter to power your equipment. If you're in the field, look into the "power tanks" sold by many astronomical suppliers. But before spending a lot of money on one of these, check your local auto supply store for less expensive alternatives. Once again, the larger the physical size of the battery, the longer it will last, and be sure to store it indoors on a trickle charger. It may be tempting to run your equipment off your car's battery, but

you don't want to find yourself with a dead battery when you want to head home. Also, keep a couple "important" small batteries in your pocket, where they'll be warm and convenient to find.

Hope these suggestions are useful to those who had questions about how to stay comfortable in cold weather. A bit of planning can make your winter observing the best of the year!

Board Talk

October

Jack opened the meeting.

Steve Grimsley requested and has been approved by the Board for being issued a gate key to the Hinesburg Observing Site.

Jack presented some updates to the Site and Observatory key sign-out agreement. He also created a sign-out agreement for the PST and Lunt solar telescopes. Some discussion followed on both with minor changes.

Keith brought up the issue of not having a written document detailing the responsibilities of VAS members when hosting a VAS sanctioned solar observing events where white light filters are being used (H-Alpha scopes are inherently safe). This has been brought up before. No one offered to start this document at the time. Paul has since decided to write a draft document.

Doug is holding off ordering the RASC Handbooks in order to give people more time to sign up for them.

Paul brought up concerns that were recently voiced by a member about the affect that the recent brush cutting has on the quality of the observing site. With the bush trimmed down, lights from cars to the south, on North Road and Rt. 116 are now visible. This concern has been referred to the Site Committee. A few things to note about this- the bushes get trimmed about every 3 years because they get too tall and block the southern sky, this time bushes were trimmed to the ground vs the usual 4-5 feet above the ground and will take longer to form a light shield again, in the late Fall through mid Spring when there are no leaves the bushes are not very effective at block-

ing car the lights. The Site Committee will also take up site issues that were received in the 2016 Members Survey.

Paul is getting solar panels installed by SunCommon. At an informal question and answers session attended by myself and Dennis Woos, Dennis and one of their reps talked about possibly doing a joint SunCommon / Astronomy Club event where we look at the sun through our scopes and they will be available to talk to folks about solar power for their homes. At first we decided to say no, but then decided it may be worth considering. Paul will get more info on how this may work.

Keith - Mentioned the Members star parties coming up, one at the Hinesburg Observing Site on October 28 at the Hinesburg Observing Site (HOS) and one on November 11 at Steve Quigley's house.

Keith also suggested that we form a Solar Eclipse 2024 committee that would help get the word out to the State and other entities about the eclipse and provide them with info about it. It was noted that the State and VTC (Vermont Technical College) currently have a solar day each year. Joe thinks the VAS should hold a Solar Eclipse event.

Joe went to a Maker Fair with Howie Druckerman.

Joe received a few requests for events. The VT & NH Girls Scouts for an event on November 18. An Astronomy Night at Shelburne Farms (no date yet). Star Party at Milton Library this winter. He finished working with some local Boy Scouts in getting their Astronomy Badges.

November

There was no Board meeting.

December

As is tradition, there was no Board Meeting.

VAS Membership Committee

There were no meetings.

Site & Russell Chmela Committees:

November

Attendees: Paul Walker (Site Chair), Gary Nowak (Chmela Chair), Keith

Lawrence, Doug Willimason, Jim Bosek, Bill Banke, Bob Williams.

- Keith gave an update on deck & shed designs. He looked into options for doors for the sheds. He presented 2 options; a roll-up door and a garage door. The roll-up door would be about \$1,600, the garage door is stronger and cost less (~\$700). With the garage door we have options of aluminum or steel with a foam core. We chose the garage door, haven't chosen aluminum or steel. With this decision Keith can move ahead on parts of the shed design. We discussed options for other design features such as locking mechanism for the doors, rail options (the wheels have a V-groove to keep them on a raised rail) and how they may be affected by ice buildup (could go with angle iron, round stock welded to flat stock, square stock welded to flat stock, flat stock mounted vertical), how the rail options will affect the life time wear on the wheel, mechanisms for holding the shed down against the wind that would automatically engage when rolling the sheds back on (such as pins on the bottom of the shed into holes on the deck), lock down mechanism inside the building so it can't be rolled off without opening the door. One identified safety concern is a potential tripping hazard of having a gap between the deck boards for the shed rails. Paul will build a wooden mockup of the rail and deck gap to evaluate this.

- Doug gave update on footings / helical posts. The price of \$200 per footing is only approximate (~\$1600 for 8 posts). The price depends on how deep they need to go for proper load bearing which depends on the soil. Bob Williams offered an alternative. He would be happy to use his tractor with backhoe to dig holes for concrete supports. The only cost would be ~\$107 to for transport to the site. "Bigfoot" footings and Sonotube are relatively inexpensive. Bob and Doug will work up a total estimate for doing concrete. A rough estimate is \$500-\$600. Note - there could be an added benefit. With a little more effort we could pour several concrete observing pads for Dobs and tripods (a suggestion from the 2016 VAS Survey).

- Jack - Update on building permit.

Jack was not able to attend the meeting but sent an email on 11/20/17 saying that Hinesburg has approved our updated site plan (addition of an observing deck with 2 roll-off sheds, i.e, the Russel Chmela Memorial Observatory). He sent a copy of the approved site plan to the committee members. We will have to get a building permit prior to any related work at the site.

The committee has started the process of addressing concerns from the membership relating to access and the quality of the HOS (Hinesburg Observing Site). To this end, the committee will send a survey to the membership after the beginning of the new year. Paul produced a preliminary set of survey questions. We started reviewing the questions at this meeting. The goals are to increase the number of people using the site and improve the experiences at the site. The purpose of the survey is to record as many of the concerns as we can and get the information needed to do a cost/benefit analysis. We will also use some info from the larger 2016 Membership Survey. There are some things that we can already do, such as routinely inform the members of the Hinesburg Observing Site and the process for getting a gate key.

Observers Page

A Very Thin Crescent Moon

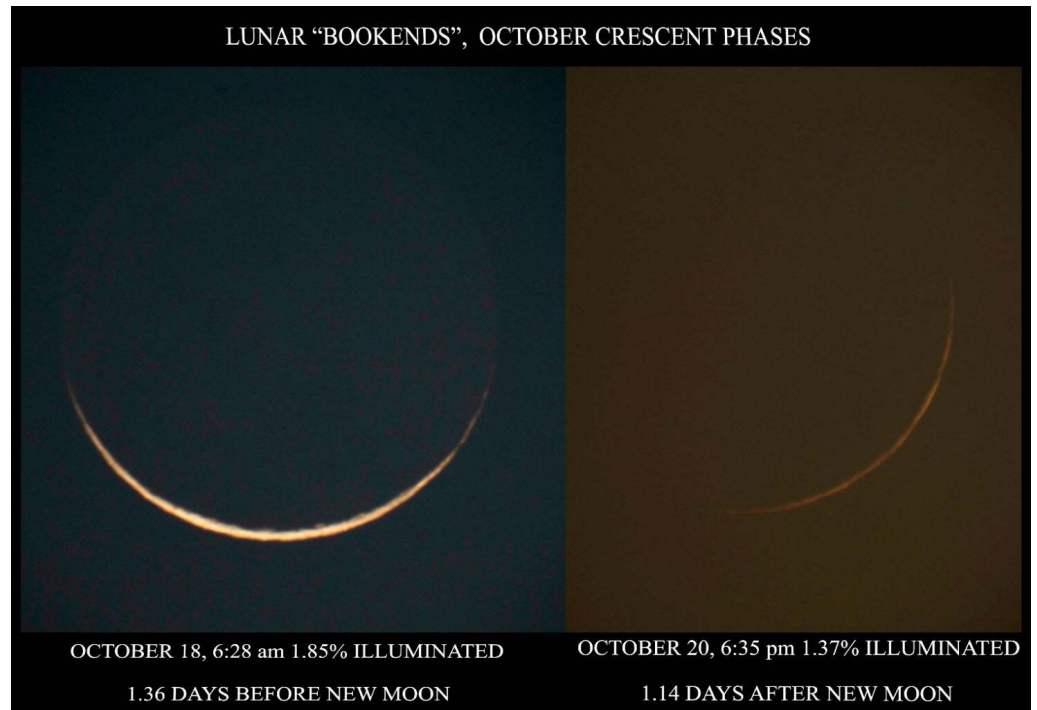
By Larry Garrett

Just getting clear skies is enough in this state, much less being able to be there for the imaging.

The earlier of the 2 images above was taken at the Sheraton in Burlington at dawn, the later was taken at the Georgia Municipal recreation park and sunset. Taken though a Meade ETX 90mm telescope at 1250mm.

The 1.37% illuminated crescent is the thinnest I have ever seen. I also used the Orion XT6 telescope for visual observations if this as well. Quite something in the twilight glow just 2 degrees up.

Since reading at Spaceweather.com, "behold, the one percent Moon", (May

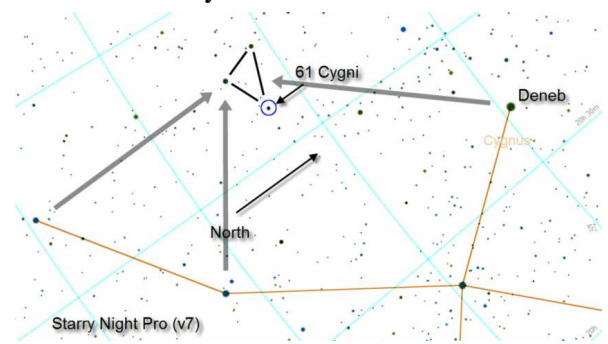


27, 2017 time machine archive) I have had a watch on the thin crescents each month hoping for a chance to spot such a small young or old Lunar sight.

Such an opportunity came on November 17, 2017 at sunrise, with a one percent moon perfectly placed above the rising Sun. But clouds had other ideas. But as they were predicted to leave just a few hours later, I looked ahead to sunset, to find a much smaller lunar crescent visible later in the day. This would be a daylight try using my 20x 80mm binoculars right after leaving work. Indeed, I used the bindery of Queen City Printers as a sunshade and had very clear cold skies for the hunt.

At 3:10 PM, I spotted the 0.57% illuminated crescent for short time. This was 8.65 degrees from the sun, 10.9 degrees high over Lake Champlain. A long faint wisp of a curved crescent, much less than the 1.37% that recently was my record. This was 15h 36m before new moon. Observations of such 15 hour crescents are not rare, as much thinner have been seen in daytime skies, but quite fun. While I had hoped to image this sight (in the morning) it is doubtful that the 40mm finder of my Orion XT6 would have been useful in finding this late day faint object. January, April, July, and December of 2018 have very small crescents to try for, and these will be featured in the Lunar Gazette in detail.

61 Cygni Update By Paul Walker

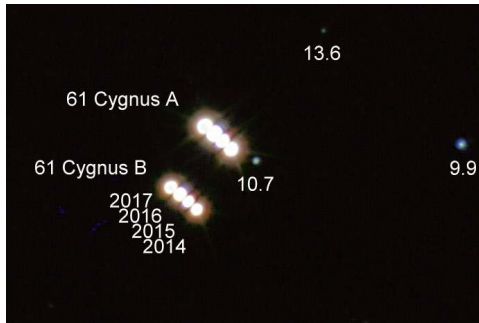


My project to image the double star 61 Cygni over several years as the pair pulls away from a 10.7 magnitude background star continues. I now have 4 years worth of images.

The binary system an orbital period of 659 years and is only 11.4 Lights away. They have the 7th largest known proper motion of any star and the highest proper motion of any stars visible with the unaided eye. It would take about 200 to 300 years to notice any movement though without optical aid.

If you want to see the double star yourself and sketch it's position relative to this 10th magnitude background star, there is still time before Cygnus drops too close to the northwestern horizon. 61 Cygni consists of 5.2 and 6.0 magnitude stars putting them in range of the unaided eye and making them easy to find. See the map. The 10.7 magnitude star is bright enough to see in small telescopes, possible a 2" scope but I would

recommend a 4" or larger. The next closest star is a 13.6 magnitude star 1' to the Northwest of the 10.7 mag star. You will need an 8" or 10" scope for that. There is a 9.9 magnitude star 1' 16" to the West of the 10.7 star. For reference 61 Cyngus A and B are approx. 32" apart.



The field of view (this is a cropped image) is 3.7 minutes by 2.5 minutes of arc. That is the equivalent of 800X in an eyepiece with a 50 degree apparent field of view. Visually 200-300X would give a good view. In another 30 years I might have enough shots for a time lapse video sequence.

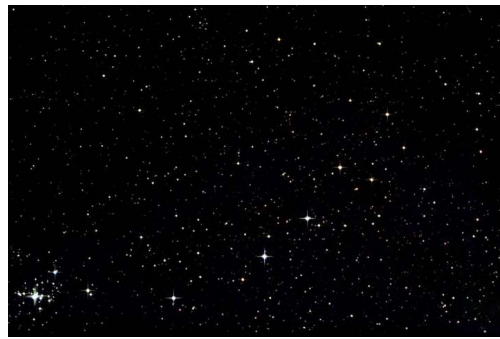
Technical Details: 5 sec x 15 images at ISO 1600, Camera- Canon Rebel XTi, North - up, 10 inch f/5.6 (1407mm fl) Newtonian with a 2 inch, 2X Barlow that gives photographic magnification factor of 2.65X (the focal plane of the camera is farther out then the focal plane of an eyepiece making the projection distance greater and hence the projection magnification greater). This gives the system a 3730 mm fl at f/14.8 and a field of view of 0.33 x 0.21 deg.

Fall Observing - Taking it to Another Level

As a way to encourage members to go out and observe both with other members and on their own and have fun, the Membership Committee made a list of 18 objects. 4 for binoculars, 5 easy telescopic, 5 intermediate telescopic and 5 challenging telescopic.

During members star gazing parties this Fall several members observed several of these objects.

Joe Comeau put together a Power-Point slide show of all 15 objects from images he took. Maybe we'll get to see them at a meeting, here are a few.



Southern part of **Kemble's Cascade** in Camelopardalis. A straight line of over 20 stars of 5th to 10th magnitude stretching for 5 Moon diameters (2.5 degrees). NGC 1502 is at on end in the lower left corner). The cascade is an easy binocular object.



Helix Nebula in Aquarius. It is magnitude 7.3 but it is a relatively large object spread over about half the Moon's diameter. Best viewed with binoculars or a telescope with low power wide field eyepiece.



M37 in Auriga, 6.1 magnitude open cluster. Visible in binoculars but best in a telescope.



Sigma Orionis, quadruple star system below the eastern star in Orion's belt. They are brightest stars in a young star cluster. The primary is magnitude 3.8, an easy telescope object.



NGC 488, Galaxy in Pisces. One source says it is magnitude 12.5 another 11.2 spread over 5.4 arc minutes. Being a face on spiral, the surface brightness is fairly low making this a difficult object in a small telescope. In a larger telescope (10-12 inch) it's not too bad.



Hercules G is an 8 mile diameter crater inside the much larger 42 mile diameter Hercules. The difficulty of finding this crater depends a lot on when you look for it. You want to have a low Sun angle which occurs about 4.5-5.5 days after New Moon and again about 17-18.5 days after the New Moon (4 days after the Full Moon). Once you get familiar with Hercules G you may be surprised when you find it when the Moon is near full.



Moon Terminator Mosaic

2017-11-27
9.52 day old Moon. 2 image mosaic, each image is a stack of 20 images.
10" f/5.6 Newtonian using 2x Barlow (3730 mm fl) and Canon XTi camera, 1/125 sec, ISO800

More Moon
By Paul Walker

To the left is a 2 image mosaic of the Moon. This is about the level of detail one would see in a telescope at 60-90 power. I think the biggest "problem" with the Moon is that there is too many details to look at. When I look at the Moon I often find myself scanning around looking at everything but not stopping for long at any particular spot.

As I view the Moon more and get more familiar with various features, I am slowly getting a list I features I like to revisit; craters like Messier and Messier B in the east, Vallis Schroteri in the west, Bessel Ray in the northeast, and now Hercules, Hercules G and Atlas in the northeast.

Close-up of Copernicus

2017-11-27
Stack of 500 high definition video frames.
This is the kind of detail you can see at 200-300x. The central peaks are just catching the first rays of the Sun. Several hills are visible lower center of the image.

For reference the double crater slightly below Copernicus are 7 and 6 miles across.

10" f/5.6 Newtonian, 32mm eyepiece Canon HF21 camcorder at 15x (~600x visual).



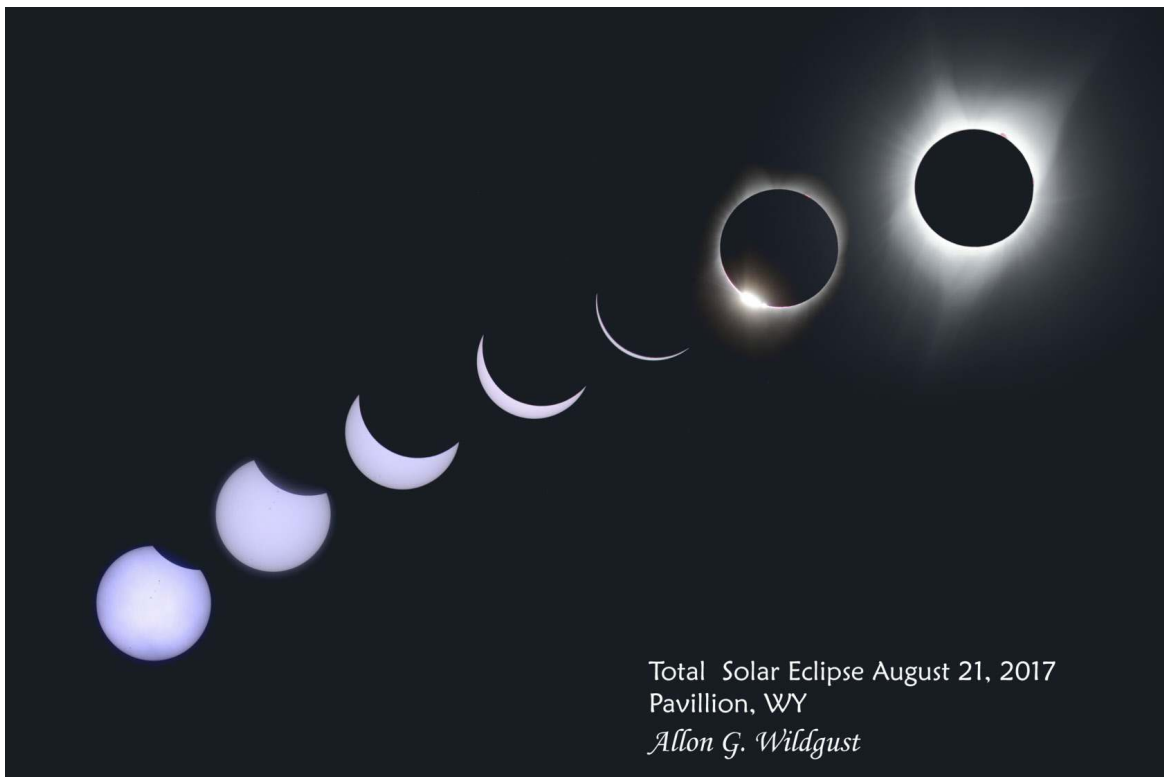
As with viewing the planets the amount of detail visible is greatly affected by the our atmospheric seeing (turbulence). On steady nights bump up the power and enjoy the details. On less steady nights back off on the power and enjoy the Moon as a whole as well as focus on crater rays, how the surface of the oceans and seas show subtle brightness variations that tell a story and other albedo (brighter / darker) features.

The Sun

By Joe Comeau



This three image composite, one of the main sun, one when a bird flew by and one of the prominences on the limb. These were all from videos taken in raw format using a black and white Orion Autoguider Pro video camera. Videos were processed in Registax and then colorized in photoshop.





Geminid Meteor in Orion

By Greg Warrington

It was clear for me from about 9:30 - midnight [evening of Dec. 13]. Saw several dozen visually with a few impressive ones. I tried to get some pictures with only marginal success.

My camera lens choices are a f/3.5 18 mm lens or an f/1.8 50 mm lens. I've tried the 18 mm in the past but it's too slow to pick up most meteors. So I went with the 50 mm even though the FOV is small. Only one capture of any note, unfortunately. I took pretty long exposures which I think was a mistake since the background got pretty bright. Above is a composite of about 20 x 90 sec exposures along with a single frame that captured a meteor. I had to crop out the rest of that single frame, though, since the meteor wasn't all that much brighter than the background.

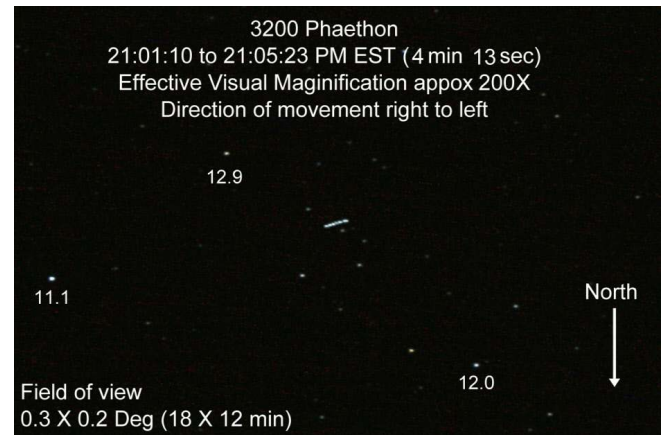
Asteroid 3200 Phaethon

By Paul Waker

Larry Garrett flagged us about 3200 Phaethon's passage by the Earth and that Phaethon is the source of the Geminid meteors (see Greg's image above).

I observed 3200 Phaethon in my 10" f/5.6 Newtonian the night of December 8th. Even though it was not too far from Beta Auriga and moderately bright it as not any too easy to locate. It didn't help that there was high clouds interfering part of the time making faint stars fade out.

I also imaged it. The image (upper right) shows the track of Phaethon. This is a stack of 6 images with exposure times of 15 sec. at ISO 1600. It is a 30% crop of the original image. I used every other image so the trail covers 4 min-



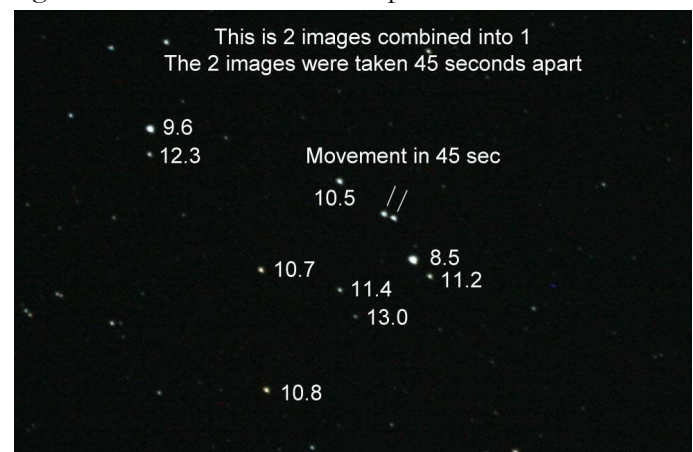
utes 13 seconds of time. Magnitudes of some stars are included for comparison.

Larry Garrett used his Orion XT6 reflector and was also surprised to find this a harder than expected find (and he is experienced in locating asteroids). He too took pictures for the Phaethon.

From Peter Gillette - I, too, was out to capture this zippy harbinger of other times and places, and had terrific success! An hour and a half time-lapse with my Powershot camera, taking 3-minute exposures scored me a really fun frame-set that I've converted to a GIF file [those subscribing to the vtastonomy list saw his time lapse file]. It was a great target for me! A first asteroid, and so distinguished! Too bad the sky crapped out by about 10:30, but it gave me time enough for Phaethon to clear my trees.

Paul Walker - I was out imaging Phaethon again the night of December 12th. This time with a 10" f/4 Schmidt-Newtonian. I used exposure times of 15, 30 and 60 seconds. I did not observe it visually this time. In the 30 and 60 second exposures the asteroid appears as a short streak due to its orbital movement. I didn't use an autoguider nor periodic error correction so on the longer exposures the periodic error of the drive adversely affected the quality of the images, in some cases making the trail of the asteroid longer, sometimes shorter.

The image below is was made from 2 of the 15 second exposures taken at 8:23 PM EST. It is cropped 36% to 0.43 deg x 0.28 deg (26 x 17 arc minutes) from the original 0.79 X 1.21 deg. Phaethon was clearly moving faster against the background stars on the 12th compared to the 8th.



On December 16 at the Member Star Gazing Party at Keith's, using the 12.5" I purchased from the club, I again

tracked down Phaethon. I should have made at least one more intermediate level detail chart and I probably should not have printed the most detailed charts rotated relative to the others. I had the darndest time keeping properly orientated between the sky view and the charts. The temperature was only about 8 Deg. F. but I was well dressed for it (see Ron Lewis's article on dressing for cold weather observing).

Angele, Keith and Matt (a guest who contacted Keith about coming) got to view Phaethon. Keith even got to see it glide past a star a little before 8:30.

I kept tabs on it for about an hour, from roughly 7:30 until 8:30 PM EST. During that time I watched it glide past a 12.7 mag star at about 7:58, pass right over a 13.6 mag star at 8:22:24, past a 10.2 magnitude star at 8:26 and finally by a 13.3 mag star at 8:27:42. During the pass over of the 13.6 and the close flyby of the 13.3 mag stars I could just barely see its movement in real time. For the others it took about 5 seconds to discern a change in position. The magnification used was 188x.

The Great List of Astrophotography Software

From Ron Lewis -

https://www.reddit.com/r/astrophotography/comments/2acnqb/the_great_list_of_astrophotography_software/

A site with a list of 44 image processing software applications for astro-images.

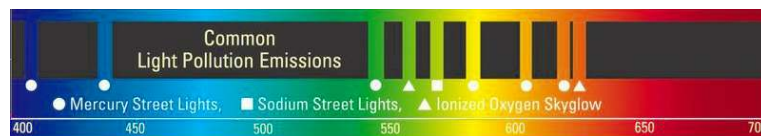
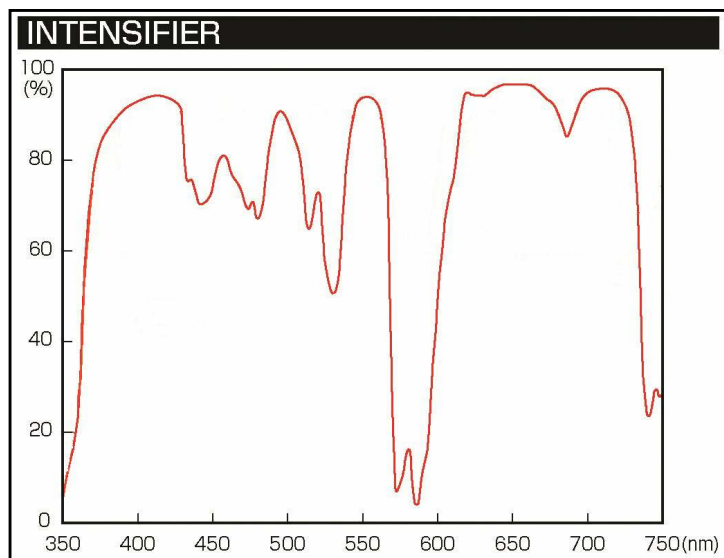
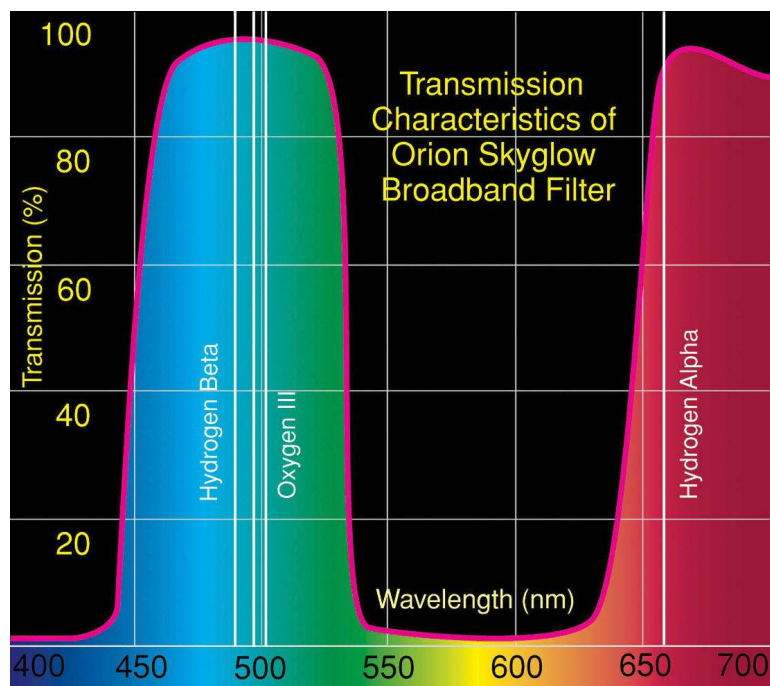
Equipment Review

The Hoya Red Intensifier: An Affordable Light Pollution Filter for Wide Angle Astrophotography

By Paul Walker

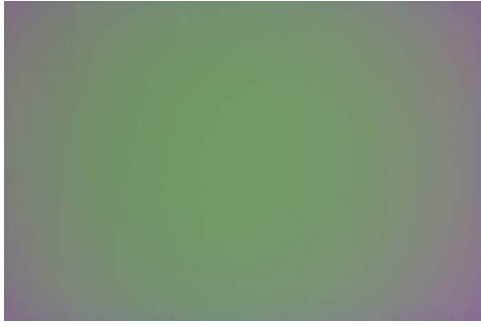
I don't remember now, where I heard about this filter for camera lenses. I'm pretty sure it was an article in either Sky & Tel or Astronomy magazine. It sounded intriguing. The price was right, I bought a 58mm diameter filter to go on my 18-55mm zoom lens for about \$35 or \$40. I can also use it on my 50mm f/1.4 or with a step down ring on my 55-200mm zoom.

For astro-images through a telescope with my DSLR camera I use an Orion Skyglow (broadband) light pollution filter (see graph, top of next column). I have also used this on the camera lenses for wide angle imaging. However, there is an issue with using typical light pollution filters on camera lenses. The issue is that they are interference filters. This means the light needs to pass straight through. If it goes through at an angle the colors shift. These filters use a combination of materials that absorb particular wavelengths (colors) of light but also use multiple very thin layers of materials that reflect and interact with certain wavelengths causing them to destructively interfere with themselves and cancel out (that's how they can be very selective of the wavelengths). The thickness and spacing between these layers



affects the wavelengths that get canceled. This destructive interference works as intended only for light going straight through the filter (at a 90 degree angle). This is because the effective distance between the layers changes. Imagine 2 boards, one spaced say a foot above the other. Image measuring the distance with a tape measure. Now hold the tape measure at a 45 degree angle and read the tape measure, it will read about 1.4 feet. Instead of blocking wavelengths from say 550-625 nm it will block them from 770-875 nm (550 x 1.4 and 625 x 1.4).

My description is probably not entirely accurate but close enough. You can see the effect for yourself with any light pollution filter. Hold it up to a light and look straight through. Now tilt the filter and see how the color of the light changes. For an even better demonstration, view a well illuminated piece of white paper or light colored wall through the filter. Move your eye back and forth and see how the color changes on the far side of the filter.

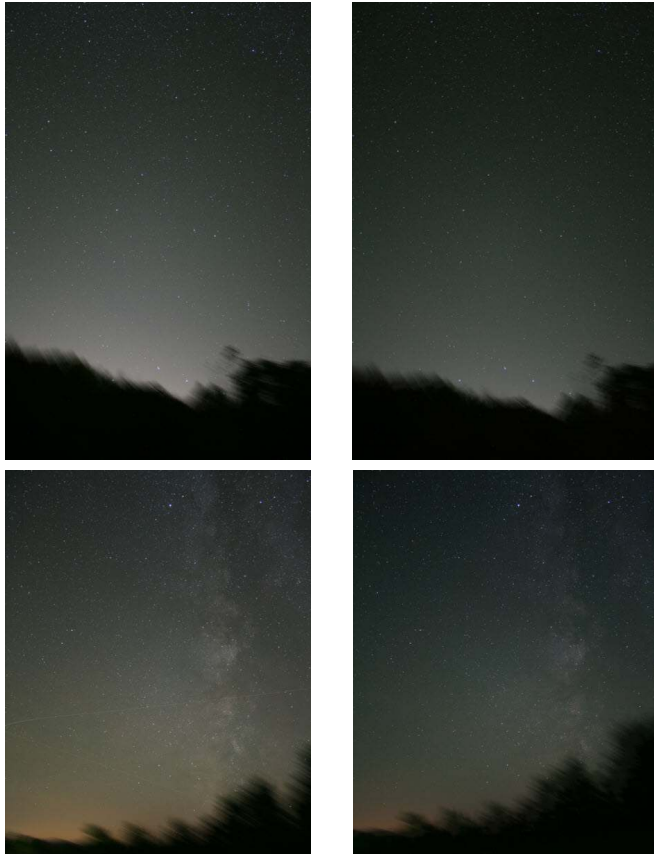


This flat field image taken through a light pollution filter on a 50mm lens shows the color shift.

When taking a wide field astro-image the middle of the image will have the proper wavelengths blocked by the filter but the sides will not. This creates a color gradient from center to edge that is difficult to correct, not to mention that it will not be blocking light pollution on the edges. One can crop the image but that at least partially defeats using a wide angle lens. A 50mm lens is not too bad but an 18mm lens does not work well.

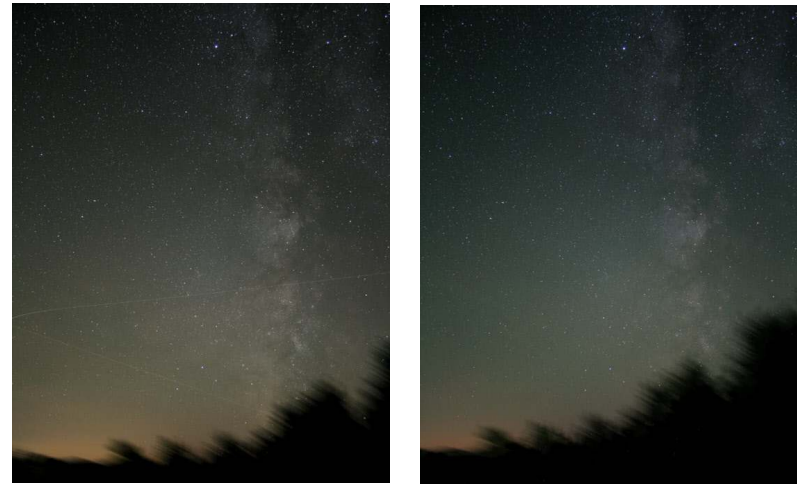
The Hoya Red Intensifier (see spectral chart of previous page) is more like a typical colored glass filter except with sharper cut-offs of wavelengths). Without interference layers the angle the light enters the filter doesn't matter. It is made with Didymium, a mixture of the 2 elements praseodymium and neodymium. It has been used for years to make safety glasses for glassblowing and blacksmithing because it blocks the yellowish light at 589 nm that is emitted by the hot sodium in the glass (and sodium vapor street lights). It also blocks infra-red light. To the eye it appears a very light shade of blue so it has virtually no effect on general vision, and little effect on star colors.

Test shots show that the Intensifier does reduce the background glow. The images below were taken at the



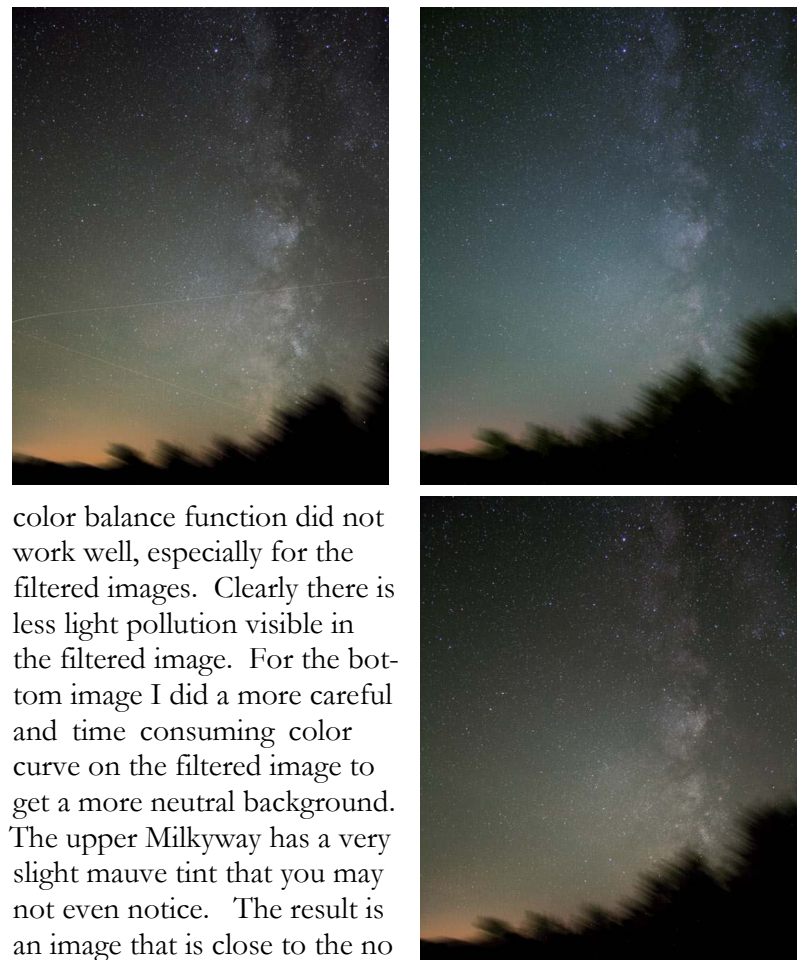
Hinesburg Observing Site. The first two looking just West of North and the second two West of South. Clearly the sky is darker and light pollution is suppressed with the Intensifier (right hand images). The filtered images also have a bluish tint. In the southern images the Milkyway is noticeably dimmer in the filtered image. The images are stacks of 5, 3 minute exposures taken with an 18mm f/3.5 lens, at ISO 800.

Below are versions of the Milkyway shots processed with a histogram stretch to increase the contrast a little. The no filter image (left) has a neutral sky background and the filtered image (right) a blue/green background. Which one



you like better is a matter of taste and/or the desired "feel".

The next set is "stretched" more. Each has also been color balance a little using a color curve function where each color channel can be "stretched" independently. An auto



color balance function did not work well, especially for the filtered images. Clearly there is less light pollution visible in the filtered image. For the bottom image I did a more careful and time consuming color curve on the filtered image to get a more neutral background. The upper Milkyway has a very slight mauve tint that you may not even notice. The result is an image that is close to the no

filter image in the previous pair but with noticeably less light pollution.

The Red Intensifier's initial use in photography was to enhance red and orange colors which increases contrast with in many images. It has a stated filter factor of 1.4x, +0.5 stop (the fact that the filter does not let 100% of the light through means the exposure time needs to be increased to get the same sky brightness). I did not compensate for the filter factor even though this would have been more of an apples to apples comparison.

I took brightness measurements of the background on the images, see tables below. The measured exposure factors are similar to the stated filter factor. The light polluted region of the Milkyway image has a higher exposure factor which is in line with what would be expected if the filter is indeed blocking more the light pollution wavelengths than other wavelengths. I did think there would be a greater difference between the color channels, but that depends on the wavelengths each channel picks up relative to the wavelengths blocked by the filter. The source of the light pollution likely has an effect (whether primarily from mercury vapor, low pressure sodium, high pressure sodium lights, incandescent or LED. Middlebury has replaced most of it's old mercury vapor street lights with LED lights. This is likely the reason the Middlebury results are the same as the filter factor. LED lighting is broad-band not narrow-band.

Near Middle of Northern Image Sky Background			
Channel	No Filter	Filter	Exp Factor
R	23.5	15.7	1.5
G	26.3	19.2	1.4
B	25.1	15.7	1.6
Avg	25.0	16.9	1.5

Near Bottom of Southern Milkyway Image Light Polluted Section			
Channel	No Filter	Filter	Exp Factor
R	39.2	23.5	1.7
G	43.1	25.9	1.7
B	40	22.7	1.8
Avg	40.8	24.0	1.7

Middlebury looking SE Heavy Light Pollution (LED street lights)			
	No Filter	Filter	Exp Factor
R	45.1	30.2	1.5
G	47.5	35.7	1.3
B	47.5	35.3	1.3
Avg	46.7	33.7	1.4

I also measured the limiting magnitude. I would expect these numbers would also be in line with the exposure factor of 1.4x. For the Southern Milkyway with no filter the limiting magnitude was about 10.6. For the filtered image it was 10.45, for a loss of 0.15 magnitude. The difference in brightness = $2.512^{0.15} = 1.15$, notably less than the exposure

factor indicating that the stars are less affected by the filter than the background. That's good news. Below are cropped sections of the northern images so you can judge for yourself. The brightest stars are the dipper stars of the Little Dipper, north is about 45 degrees to the upper right. In practice, the 0.15 magnitude loss will not be noticed in wide angle images. Note that this was not a rigorous analysis.



Bottom line, for wide angle to moderately wide angle shots this filter does block a noticeable amount of traditional light pollution without the color gradient issue of a standard broadband light pollution filter. This will improve the aesthetics of many images. Use of this filter should also help reduce or eliminate post processing in some nightscape images. There is a shift in the sky background toward blue but if you don't mind the color and especially if you find it improves the aesthetics, this would be a good filter to add to your equipment list.

The cost varies by size with a 52mm filter for about \$30.

Note: Hoya no longer makes these filters but there are still some available.

You can also go to the following site for another review with more sample pictures:

<https://www.lonelyspeck.com/hoya-intensifier-review-an-affordable-light-pollution-filter-for-astrophotography/>

Gary's Astronomical Events for the Month

can be viewed via WCAX at
www.wcax.com/story/6330547/astromical-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. Airls 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

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

Asking \$350.

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

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@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

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

Celestron EclipsSmart 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

Telescope mirrors and a couple mounting cells

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

6", probably f/8.

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

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

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

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 \$150 (new price).**

Contact Paul Cameron at
paulcameron1@msn.com, 802-249-3595 or 802-223-2204

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
anstey@myfairpoint.net

Wanted

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

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 Training and/or demonstrate competence on the observatory equipment you will be using.
- o Make entries into the Observatory Logbook.

We have an mail List for Member's interesting 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

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.

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

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(My apologies if I missed anyone)