# Penobscot Valley Star Gazers

An Astronomical Society of Central Maine

http://www.gazers.org

But sweet and joyful sound the rural talk,
And merry laugh, amidst the happy crowd.
-Thomas Francis, of harvest day

September 2020


## Disturbance in the Force

The next meeting of the PVSG will be on September 14, 2020 at 6:30 pm through Zoom. Doors will open a little after 6:00 if you want to arrive early for some socializing.

Ted Blank, past NHAS President and now resident of Fountain Hills, AZ (where he helped start the Fountain Hills Astronomy Club) will be our guest and present on gravitational waves:

> Predicted in 1915 by Albert Einstein, gravitational waves are tiny oscillations in the actual fabric of space and time. It took a collaboration of scientists and universities more than fifty years to develop the technology to reliably isolate these faintest of signals from the cosmic background.
> Known as the LIGO project, in 2015 both existing LIGO observatories nearly simultaneously detected the gravitational waves emitted from the merging of two black holes more than a billion years ago. Join NASA Solar System Ambassador Ted Blank for the inside scoop on just how this amazing feat was accomplished and how it led to its three main collaborators being awarded the 2017 Nobel Prize in Physics.

Dwight plans to delay his Leviathan of Parsonstown answered questions presentation until October to allow time for discussion of Ted's presentation and other topics.

Thanks for last month's program go to Scott for his presentation on the nature of comets.

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## Snowballs in Space

PVSG Monthly Meeting Minutes
August 10, 2020
Zoom

Note: Some of the information provided in these minutes are recorded out of order to allow for organizing them according to their normal meeting section.

**Meeting:**

**Call to Order and Welcome**

The meeting was held by video-conference and called to order by Scott Burgess at approximately 6:40PM.

Attendance:
**Dwight Lanpher – President**
**Scott Burgess – Vice President & Presenter**
**David Clark - Treasurer**
**Phil Normand – Secretary**
**Ralph Foss**
**Alan Davenport**
**Wade & Donna Smith**
**Bill Shackelford**
**Ralph Mallett**
**Don Krause**
**Don Ferrell**
**Andy Brown**
**Jill McDonald**
**Shawn Laatsch**
**Michael Harrington**
**Visitors:**
**Jon Silverman, President CMAS**
**Nimesh Patel, CMAS member**

**Program**

Scott Burgess presented an Astro Short on the Basics of Comets.

Summary: There are approximately 3000 known comets. They are often called "dirty snowballs" consisting of half rock/dust and half ice (water, methane, ammonia, CO2 and other chemicals). It is the vapors from this ice that we see when a comet nears the sun. The nucleus, or solid part of the comet is typically less than 10 kilometers across, rotates and is not very dense. The tails of the comet can be millions of kilometers long. The coma of the nucleus is typically 100,000 to approximately a million kilometers across. There are two types of comet tails: The Ion tail which points directly away from the sun; and the dust tail which points approximately away from the sun. Short period comets originate from the Kuiper Belt, and long period comets originate from the Oort Cloud. It is thought that mass extinction events could be related to long period Oort Cloud comets. Comets last from 1 to 100 orbits around the sun.

A discussion followed about comet Neowise and several photos were shown of the comet taken by members and other amateur astronomers.

**Discussion of "touchless" star parties led by Dwight**

Dwight started the discussion by asking Jon Silverman, the president of the CMAS astronomy

group, to talk about his discussions with the Maine CDC. They do not recommend getting groups together because it could turn in to a super spreader event. Dwight hopes to have a touchless star party in the near future but wanted input from the group. He said that he'd have people signup ahead of time and wear masks and social distance. Attendees would all use their own devices to view images broadcast on the Vaonis Stellina scope's wifi. Liability concerns for club officers was expressed if star parties were organized as official PVSG events.

**Secretary's Report and Acceptance of Minutes**

Minutes were accepted unanimously.

**Treasurer's Report**

Dave Clark reported that the club has $217.87 in the checking account.

**Observing Reports**

Scott asked for observations other than comet Neowise.

Wade and Donna observed Saturn and Jupiter using Binoculars, as did Dave early in the morning. Scott observed Jupiter, Saturn, Mars and the moon over a couple nights with a vintage 4 inch Edmunds refractor. Dwight has been observing with his new Vaonis Stallina telescope from the top of Mt Cadillac. Nimesh has used his camera to capture images of M51 & M27 and visually observed planets. Don Ferrell has been making use of Slooh to do observing.

**Old Business**

None

**New Business**

- Shawn informed the group that the Planetarium would be re-opening on September 9th. Shows will be limited to 11 attendees and tickets must be purchased online or on the phone. The October 4th presentation of "Big Astronomy" will be about the large telescopes located in Chile.
- Dwight is hoping to get a speaker for a large Zoom meeting this fall.
- The September meeting will also be held by video conference using ZOOM.

**Adjournment**

The meeting adjourned at approximately 9:00PM.

Phil

# Observe The Sky This Month

## Selected Objects

## September 2020

General sky comments – As were many activities this year the OkieTex Star Party I usually attend this month was canceled. Fires in Colorado and California have made an impact on my sky. High pressure has been parked to the west in New Mexico and the clockwise rotation has brought the smoke from the fires to my area. An orange moon high in the sky is certainly unusual. The star Betelgeuse is acting up once again. As we remember back to between September of 2019 and February of 2020 Betelgeuse dimmed by almost 20%. At that time Betelgeuse ejected dust from its atmosphere obscuring a portion of light from the red giant star. This is not unusual for a star of this type. This time it is at an unexpected time and amount. The dimming is not as dramatic as then but it is happening at a time when Betelgeuse should have been brightening if the expected normal cycle was happening. As we know Betelgeuse has not been visible in the night sky during this time of year and difficult but not impossible to observe. The Solar and Terrestrial Relations Observatory (STEREO) is in a trailing orbit to Earth and was able to observe this dimming except during the time Betelgeuse was in conjunction with the sun. Now Betelgeuse is once again visible in the night sky and the cause of this dimming hopefully will be determined if it is different than the last time.

Planets this month – Before the meeting on the 14th the full moon was on Wednesday the 2nd and last quarter was on Thursday the 10th. This month's new moon will be on Thursday the 17th and first quarter will be on Wednesday the 23rd. Next month before the meeting on the 12th full moon will be on Thursday the 1st and last quarter last quarter will be on Friday the 9th. Mercury will appear in the evening sky mid-month before reaching eastern elongation on October 1st. Venus continues to appear high in the morning sky. The waning crescent Moon passes 4°north on the 14th. Mars rises in the east soon after sunset and is rapidly approaching the best apparition of the 2020's. Now is the time to get outside and observe Mars as it grows from 18.9" in diameter on Sep. 1st to 21.7" in diameter on Sep 30th. Jupiter is prominent in the evening sky during the month in the constellation of Sagittarius. The waxing crescent Moon passes 2° to the south on the 25th. Saturn is 8° to the east of Jupiter in the constellation of Sagittarius. The Moon also passes 2° to the south on the 25th. Uranus rises before midnight and will visible the rest of the night all month in Ares. Neptune is at opposition on the 11th and visible all night in Aquarius. This would be a good time to also observe Neptune's largest satellite Triton. Pluto remains in Sagittarius at magnitude 14.

Constellations for the month – Last month we observed some of the last of the summer constellations and most of them remain visible and ready to be viewed if you have not done so. We will add a few

more this month and take advantage of the excellent sky conditions and weather occurring this time of the year. This month when the sky becomes completely dark known as “Astronomical Twilight” the following constellations will be visible starting with the constellation most southern for us Piscis Austrinus, the Southern Fish. I usually think of this constellation as a fish with its mouth wide open and turned up to catch the water falling through the sky from the “Water Jar” of Aquarius the constellation above. Piscis Austrinus is very simple to find. Low in the sky about 10 to 15 degrees above the horizon you will see the 1st magnitude star Fomalhaut. It will not be as bright as you might expect due to the low latitude but it marks the bottom of the mouth of the fish. Dimmer stars form the body of the fish. If it was not for Fomalhaut and a few double stars, Piscis Austrinus would not be worth observing for us. The easy double star 4.3 and 7.1 magnitude Beta (β) 6° WSW of Fomalhaut, Dunlop 241 a pair of orange stars 1° NW of Beta, and H VI 119 a triple system 1° slightly west of south of the top star of the “Fish” epsilon (ε) with a close pair of yellow stars and a more distant blue star. Above is the constellation Aquarius, the Water Bearer. Aquarius, the Water Bearer is a long constellation and covers a large segment of the sky one end of which protrudes into the summer constellations. When I look at the total constellation of Aquarius I imagine a person holding a jug under their left arm with water pouring out of a jar of water, breaking into three streams one of which pours into the mouth of the southern fish and the other two pour into a river. The jug with the water pouring out is represented by a diamond of four stars, Sadalmelik alpha (α), Sadachbia gamma (γ), zeta (ζ), and pi (π) ranging in brightness from magnitudes 2.9 to 4.4. The water coming out of the jug is represented by the 4.0 magnitude star eta (η). Arching down SW we come to a grouping of five stars where the water from the jug breaks up into streams. Three of the stars are close together and two are separated a bit. They are phi (φ), chi (χ), and 1, 2, 3 psi (ψ). Less than 1° NNW of the middle psi (2) is the galaxy NGC 7606 a spiral easily seen at 136X with some detail using my 12” telescope. From 1, 2, 3 psi (ψ) go 6° SW to a pair of galaxies, NGC 7727 and NGC 7723. NGC 7727 is a barred spiral but I could only note the center had several parts. NGC 7723 is likely a disturbed spiral galaxy as I could detect an unusual looking center. The last object I have observed in Aquarius is the Helix Nebula NGC 7293. This planetary nebula should be observed by everyone. The following are my field notes: Large, brighter than expected. Numerous stars visible inside. What appears to be the central star was just visible at 13th mag. with averted vision at 150x. This was with a 12” telescope but smaller telescopes also give a nice view of this bright planetary nebula. Above the “Water Jug” we will pass through the western third of another fall constellation, Pegasus, the Winged Horse. We will discuss it next month before coming on an obscure constellation Lacerta, the Lizard. Lacerta is another small constellation invented by Johannes Hevelius to fill a hole not otherwise covered in the sky. It contains mostly 4th and 5th magnitude stars but is not particularly difficult to observe in a reasonably dark sky. The major features of Lacerta are three open clusters. NGC 7296 is located ½° east of Beta (β) Lacerta the top star in the constellation. This will probably be the most difficult object you will observe this month. It is a collection of two to three dozen faint stars resolvable at 100X with a larger telescope. NGC 7243 is much easier to find 2½° SSW of Beta (β). This cluster is a semi-circle of stars with a tight grouping of four or five stars at the bottom center and it stands out in the field of background stars. Continue another 3½° on SSW of NGC 7243 to find NGC 7209 an open cluster of 75 to 100+ stars depending on the size of your telescope at 100X. NGC 7209 is surrounded by several brighter stars not part of the cluster. Above Lacerta is Cepheus, the King. Look for it below in Featured Constellation.

Featured star of the month – Fomalhaut, alpha (α) Piscis Austrini at mag 1.16 is the brightest star in the constellation Piscis Austrinus the southern fish. It is a main sequence Vega like star. Abbreviated as α PsA at a distance of 25.13 ± 0.09 ly. Fomalhaut has two companion stars, a K-type main sequence star and a M-type red dwarf star making it a triple system. Fomalhaut was the first star to have an exoplanet Fomalhaut b (Dagon) seen at visual wavelengths. It has been suggested from new data and examination of old data Fomalhaut b is not a planet but an expanding dust cloud resulting from an old collision. The name comes from an Arabic name *Fom al-Haut* literally “mouth of the whale”. Although Fomalhaut is listed as a southern star, it is located at a declination similar to Antares and greater than Sirius. There should be no reason not to observe Fomalhaut.

Messier object for the month – M2 is a globular cluster easily found by looking almost an equal width of the “Water Jar” directly to the west of that asterism. This was my observation of this globular. Big and bright with stars resolved well into the core. A couple of bright stars and a scattering of field stars on the right and bottom. Class II Globular. M2 was discovered in September of 1746 by Italian-French astronomer Giovanni Domenico Maraldi when he also discovered M15. He was observing Comet de Chéseaux with the son of Geovanni Cassini Jacques Cassini. He called the curious objects (globular clusters) “nebulous stars.” Fourteen years after this discovery Messier recorded it as number 2 in his list on September 11, 1760. William Herschel observed it in 1775 with his 4 inch “sweeper” telescope and recorded it as appearing as a telescope comet. In 1774 he observed it with his 7 foot 6 inch telescope and he was able to determine the nebula was a group of stars, many visible. Then in 1830 he observed it with a nine inch scope and described it as a “heap of fine sand.” Use an 8 inch telescope to resolve a fair number of stars but in a large scope it is a marvelous sight.

Featured Constellation – Above Lacerta is Cepheus, the King. The constellation to me looks like a big head with a pointed nose and pointed hat but to others it resembles a house with a pointed roof. Cepheus was the husband of Cassiopeia and father of Andromeda. The

mythology of this family we have covered before. The precession of the axis of the Earth brings the direction of the future North Pole through this constellation with Errai, gamma (γ) the top star in Cepheus the pole star in 2,000 years and the alpha (α) star Alderamin the pole star in 4,700 years. The pole also passes near Alfirk, beta (β) but not as close as the other two stars. Halfway between Alderamin and iota (ι) is the white and light yellow double star Kurhah xi (ξ) cep. This double is a true pair. At the bottom left side of Cepheus is the star delta (δ) cep the original Cepheus variable star. 5½° ESE of Alderamin is one of the deepest red stars in the sky known as Herschel's "Garnet Star." This star looks the reddest in small telescopes and near minimum magnitude. This star is similar to Betelgeuse being a pulsating red supergiant but probably brighter considering the differences in distance of the two. NGC 7160 is an open cluster 4° W of Alderamin. It contains about a dozen stars with a couple of brighter stars one being double. 4° NE of Alderamin is the open cluster NGC 7142, a large loose collection of about 100 stars. 2½° E of delta (δ) is the open cluster and emission nebula NGC 7380. It contains nearly 30 stars embedded in an emission nebula visible without aid but a UHC filter brightens it considerably.

Other objects for the month – If you have a medium to large telescope look for NGC 40 (Caldwell 2) a round planetary nebula with a bright section on one side 5½° ESE of Errai, gamma (γ) Cepheus. I found it by star hopping from Errai using a star chart. Some have said it almost looks like the planet Mars with its polar cap but without the red color. The central white dwarf star is visible at powers above 200x.

Bill Shackelford
Come view with me as we observe the sky

**Letter from Dwight to PVSG: September 4, 2020**

Hello PVSG,

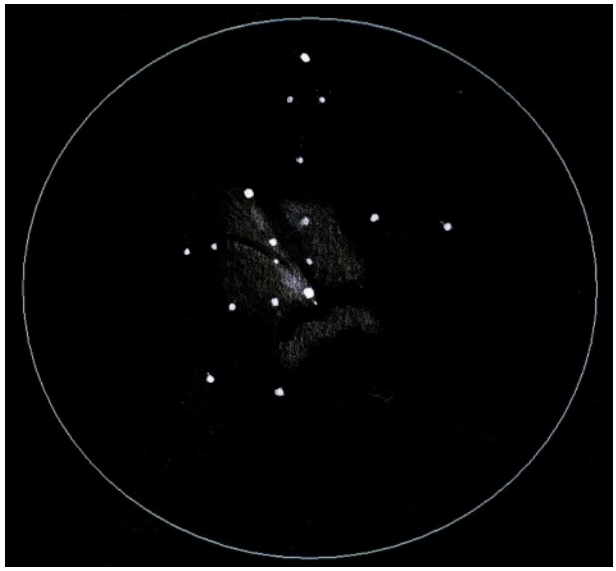
Last month I told you about a new telescope that I had purchased in July that I intend to use this year for Covid-19 safe star parties. Despite the weather, I've now had six sessions under night skies and I'm ready to report on some of the details of the Vaonis Stellina. All you accomplished astrophotographers don't need to worry about your work being obsoleted any time soon. The 80mm aperture and camera have limitations. I did just discover that there is a new way of post processing the images from .tiff output files using Affinity Photo with much improved results. And for those that really want to do advanced processing .fits files output is available. The following is an excerpt from my report for the August Observer's Challenge.

A week ago, three other Downeast Amateur Astronomers and I met at Cobscook Bay State Campground in Edmunds, Maine. We each brought our own telescope or binocular setup (unshared). This would have been the site of the 2020 annual Maine State Star Party but, due to Covid 19, this year's event was cancelled. Despite that, our small group decided to observe individually, looking forward to the Bortle class 2+ skies. It was a spectacular night, cloudless and wide open from horizon to horizon and everyone had great views all evening. I had brought my 12" SCT to sketch the Trifid nebula for the Observer's Challenge, but I also brought along the Vaonis Stellina observing station. This new smart telescope plate solves to determine where it is pointing in the sky, autofocuses and then starts taking 10 second images, stacks and processes the image in real time. The output is transmitted to up to ten tablets or smart phones. One of the other three observers also connected his smart phone during the session and I have also experimented with attaching a second iPad and an iPhone simultaneously. I had my tablet set up on a stand and the half dozen campers that did visit with us could maintain a safe distance and still view the object on the 12" iPad. With no eyepiece, it's the perfect touchless, Covid-19 safe telescope for these current times.

Because of its automation, that evening, while observing, I was still able to image the Ring Nebula (very small), the Trifid Nebula, and the Helix Nebula. All this was done while I was operating my SCT and sketching the Trifid. I purposely chose not to look at Stellina's image until after I finished sketching. I wanted to find out how much I really could see without trying to separate what I remembered from the tablet image and what I was actually seeing. I did later notice that I was not able to see any of the blue nebulosity at the eyepiece that was present in the tablet image.

M20 Trifid Nebula, August 22, 2020, (86) 10 second subs, 14 min 20 secs total exposure.

I got started late with this hobby and I feel I still have a long way to advance in developing my observing and sketching skills but I find that Stellina assists in my full appreciation of what I observe.



M20 Trifid Nebula, August 22, 2020, 12" ACF Meade LX-90 145x

Stellina is not a high-end imaging rig but I believe that it does bring a new tool to visual astronomers. Its images are not comparable to the detail that a talented astrophotographer can produce. But I do think that they are closer to what I see in my eyepiece and I'm already finding that it makes me a better visual observer.

My ultimate goal is to use Stellina in combination with my visual scope at future outreach events. I can assist visitors at my eyepiece while the nearly autonomous Stellina builds a more detailed color image of the object on a tripod mounted iPad. My hope is that the public can use the stacked image to give them a detailed hint of what they are looking at in the eyepiece and help them see more. My experience has shown that teenagers and

twenty somethings will love the technology; maybe enticing some new amateurs.

At the end of the evening I took down all of the equipment, as we were located in a field substantially away from my tent, and I then retired to sleep for a few hours. I had seen Orion was up in previous year's Maine State Star Parties during late morning trips to the outhouse and thought this would be the perfect object to test with Stellina. It nicely fills the wide 1.0° x 0.7° field of view. I got up around 3:45 am and again setup Stellina in the field; it takes about 5 minutes. Leveling the tripod with the bubble level plate takes most of the time. And then I spent another 7 or 8 minutes operating the tablet establishing a wi-fi connection, initializing the telescope, auto focusing, selecting the nebula and letting the scope find M42. A couple minutes after 4:00 am I had already started imaging the nebula. Setting up my SCT would have taken 45 minutes (plus tear down later) and I was not interested in that challenge this early in the morning… I'll wait until my traditional late winter sessions when I can observe Orion at a more reasonable, but colder, hour of the evening.

M42, Orion Nebula, (68) 10 second subs, 11 minutes 20 seconds total exposure

There are other less expensive assemblies of telescopes, cameras and software, but none with the turnkey configuration, compact size, ease of setup and essentially autonomous operation which makes it worthwhile to me. The Unistellar EVscope is another possibility but I was looking for a wider field of view, higher pixel resolution and no eyepiece or manual focusing. The cost of these will eventually come down and I am looking forward to what the future brings with larger than 80 mm aperture optics and a more sensitive camera to make it a more capable imaging rig.
But, for the moment I have the tool that I wanted to aid my visual observations.
I'm adding these two images that were not in the original report:

NGC 7293 Caldwell 63, The Helix Nebula, (189) 10 second subs, 31minutes 30 seconds total exposure.

M51, Whirlpool Galaxy, (365) 10 second subs, 61 minutes total exposure.

(It took the Earl of Rosse using a 72" reflector to see just a bit more than this. Mine is only 3".)

# Vaonis Stellina Specs:

| | |
|---|---|
| **Weight** | 11.2 kg (24.7 lb) |
| **Size** | 49 x 39 x 13 cm (19 x 15 x 4.7 in) |
| **Power supply** | USB type-C 5.1V/2.4A input |
| **Autonomy** | 5 hours of use with a 10,000mAh portable battery |
| **Water resistance** | IP53 |
| **Included accessories** | Tripod (1.3 kg / 2.2 lb), 10,000mAh portable battery, cable |
| **Control** | Smartphone/Tablet |
| **Application** | Deep-sky objects (galaxies, nebula, star clusters), the Moon |

| | |
|---|---|
| **Lens** | Apochromatic ED doublet with lanthanum glass |
| **Aperture** | 80 mm (3.15 in) |
| **Focal length** | 400 mm (15.75 in) |
| **Focal ratio** | F/5 |
| **Image sensor** | 1/1.8" CMOS Sony |
| **Resolution** | 3096 x 2080 pixels (6.4M) |
| **File formats** | JPEG ; TIFF ; FITS (16-bit raw images) |
| **Field of view** | 1° x 0.7° |
| **Magnification** | Equivalent to 50x and up to 100x with digital zoom |

| | |
|---|---|
| **Mount** | Alt-azimuth |
| **Alignement** | Automatic initialization with star field recognition |
| **Focus** | Automated |
| **Pointing** | Automated |
| **Image processing** | - Adapted to each object<br>- Real time image stacking |
| **Filter** | Light pollution (CLS) |
| **Field derotator** | Mechanical and automated |
| **Dew control** | Integrated heater |