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Penobscot Valley Star Gazers

An Astronomical Society of Central Maine

September 12

1959: Luna 2 launched.

1966: Gemini XI launched.

1991: STS-48 Discovery launched.

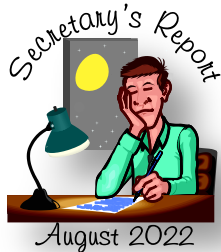
1992: STS-47 Endeavour launched.



Planetarium Invitation

Shawn has invited the PVSG to hold its September 2022 meeting at the Versant Power Astronomy Center on Monday the 12th at 6:30 pm. The meeting will also be available on Zoom. (Meeting ID 862 9984 6478 Password: PVSG.) For the program, he has offered a choice of *Forward to the Moon* or *Rising Star: A South African Astronomy Journey*.

Thanks for last month's program go to Dave for his talk "Telescope Observing Basics."



Basic Scope Optics

PVSG Monthly Meeting Minutes
August 8, 2022
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.

showed how to calculate the exit pupil (The image of an object projected by the eyepiece). Preferably 7mm for the young and 5mm for older observers. Dave showed that the exit pupil and magnification are inversely related. When one goes up, the other goes down. Dave showed that the human eye does better with dimmer views than with smaller views. Dave then discussed eye relief and its importance for those who wear eyeglasses. The eye relief is the distance behind the last eyepiece surface within which the user's eye can obtain the full viewing angle.

Alan talked about a past presentation on barlow lenses where the presenter stated that barlow lenses added to a low magnification eyepiece can give an image as good or better than buying a higher magnification eyepiece. Dave added that he felt the quality of the barlow needed to be considered for the final image quality.

Meeting:

Call to Order and Welcome to Visitors

The meeting was held by Zoom videoconference. The meeting was brought to order by Don Ferrell at approximately 6:35 PM.

Attendance:

Online:

Don Ferrell – President
Andy Brown – Vice-President
Dave Clark – Treasurer
Shawn Laatsch
Scott Burgess
Bill Shackelford
Mary-Frances Beesorchard
Alan Davenport

Guests:

None

Presentation

Dave presented "Telescope Observing Basics". Dave discussed Aperture, Telescope Focal length, Focal point, Eyepiece Focal Length, and Exit pupil. Dave showed how to calculate the f-ratio. He showed that a high focal ratio $f \geq 8$ have a narrower field of view. Telescopes with a low f-ratio have a wider field of view. Dave then showed how to calculate the magnification. Dave discussed increasing magnification with Barlow lenses. Dave also discussed the term useful magnification and what it does to the image. Dave mentioned that image quality is greatly affected by the atmospheric conditions and larger aperture scopes are more affected by atmospheric turbulence. Dave

Secretary's Report and Acceptance of Minutes

There was no secretary report this month.

Treasurer's Report

Dave stated we still have \$404.17 in the treasury. Dave still has to get up to Bangor and make a deposit.

Club Liaison Report:

None

Observing Reports:

Don F. and **Dave** joined Scott Burgess at Scott's house with one of Scott's students and saw several DSOs. **Shawn** had a star party for the Claremont Hotel in Southwest Harbor. Some haze rolled in but overall, things were good. The southern horizon was blocked by the tree line, but Saturn was observed early in the evening. **Don F.** mentioned that Dwight had success viewing the K2 comet and sent images via email to the group. **Bill** mentioned that there will be a double transit of Io and Ganymede moons across Jupiter on the 16th-17th. **Dave**

mentioned that the Aurora is supposed to be good this evening, August 8th. **Don** mentioned he saw the Aurora once in the past in Buck-sport. **Shawn** mentioned he last saw the Aurora in downtown Louisville, TN around 2001-2002. When he realized it was the Aurora, he drove out of the city to see it better. **Dave** said that he saw the Aurora then as well and the bands extended past his zenith and as far as the Orion constellation. In 1983 or 1984 **Bill** saw the best Aurora he has seen from Oklahoma. **Dave** then recounted an Aurora display at an outing with students from Carolyn Vose's class or girl scout troop. Wade Smith pointed out the Aurora and the group viewed it across a river. **Shawn** mentioned during his time in Maryland, they witnessed the Aurora after a planetarium program after someone had asked if it was ever visible that far South. **Andy** showed a photo of the Aurora. **Alan** said that sometimes you can take a 15 second picture of the North horizon and see if you can spot the Aurora. **Andy** and **Mary Frances** both recounted times they had seen the Aurora.

Old Business

None

New Business

Shawn gave the following report at the start of the meeting:

- Sunday, August 14th at 3PM – Free presentation at the dome on the Eise Eisinga Planetarium in Franeker, Netherlands.
- August 29th at 8:30AM – Artemis I Launch Party.
- Universe Explorers Club star parties using SLOOH are moving to the 1st and 3rd Thursdays each month at 7PM.
- Request for astronomers with scopes for Saturday, October 1st at 7-7:30PM at the Challenger Center. This is a JWST event and coincides with Astronomy Day and International Observe The Moon night.
- Shawn mentioned that the planetarium has received 5000 pairs of eclipse glasses and 12 copies of Pat & Fred Espenak's book "Get Eclipsed". He said the glasses would sell for \$2 a pair.

Adjournment

The meeting was adjourned at approximately 8:05 PM

Phil



Observe The Sky This Month Some Selected Objects September 2022

General sky comments – In the night sky look for the two bright red stars Aldebaran in Taurus and Betelgeuse in Orion and then join with them the red planet Mars also in Taurus. By the end of the month Mars is brighter than Aldebaran. September 23 is the fall equinox at 1:04 UT and autumn official begins. The Zodiacal Light is visible in the morning sky for the next two weeks beginning on the 23rd.

Planets this month – First quarter Moon in September was on Saturday the 3rd, the full Moon was on Saturday the 10th, before the day of our monthly meeting on the 12th. Last quarter Moon is on Sunday the 20th and new Moon (lunation 1234) is on Sunday the 25th. Mercury is visible briefly low in the western sky early in the month. It reaches inferior conjunction on the 23rd. Venus begins the month low in the eastern sky. It becomes increasingly close to the Sun during the month becoming unobservable by the end of the month. Mars rises before midnight and is in Taurus. It passes 4° north of Aldebaran on the 9th. Note it is a full magnitude brighter. The last quarter Moon passes 3° to the north on the 19th. Jupiter reaches opposition on the 26 when it is 23 light minutes away from Earth. These are the best days to observe the four largest moons (The Galilean moons) when they are their brightest and at greatest elongation from the planet. The full Moon passes 2° to the south on the 11th. Saturn is now well past opposition and in retrograde in Capricornus. The waxing gibbous moon passes by 4° to the south on the 8th-9th. Uranus (Οὐρανός) rises before midnight and can be found in extreme southeastern Aries visually (at a dark site) and with a binocular or small telescope. Neptune is at opposition on the 16th 4.0 light-hours, 28.9 au from Earth and visible all night in extreme northeastern Aquarius. 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 these new 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 Fo-

malhaut 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 found 21° south of ζ the eastern tip of the water jug. 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. At this point I realized that last month I failed to mention one of the nicest easy to recognize summer constellations in the sky located between Equuleus and Vulpecula. It is Delphinus, the Dolphin. Delphinus actually resembles a Dolphin by having a diamond shaped group of third mag. stars for the body and a fourth mag. star for the tail. One of our emeritus members Roland Cormier would always mention the nice double star at the nose of the dolphin. It consists of a deep yellow and a rare green star. It is not really green but looks that way from the contrast with the yellow star. $3\frac{1}{2}^\circ$ west of this star is a globular cluster NGC 7006. This globular cluster and globular cluster M15 located 8° SW should also be noted. M15 will be expanded upon in our Messier object of the month covered below. Going north we now come on an obscure constellation Lacerta, the Lizard. Lacerta was created by Hevelius to cover an area 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 $\frac{1}{2}^\circ$ 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 $2\frac{1}{2}^\circ$ 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 $3\frac{1}{2}^\circ$ 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 main sequence K-type main sequence star with 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 of the month – Messier 15 is a class IV globular cluster located 4° NW of Equuleus. This fine globular cluster has a sparkling bright core with many chains of stars radiating outward. It was found by Maraldi in September of 1746 while searching for the Chesaux Comet. Messier rediscovered it in 1746. The east side of the cluster is slightly less dense than the western half. In larger scopes 12" and over with 175x the 13 mag. stars in the core can be resolved along with a dark area SW of the center. This is one of the best medium size globular clusters and is fully resolvable.

Featured Constellation – Above Lacerta is Cepheus, the King. I think the constellation looks like a big head with a pointed nose wearing a pointed hat but to others it resembles a house with a pointed roof. Cepheus was the king of Ethiopia, 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

(i) 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. $5\frac{1}{2}^\circ$ 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 likely 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. $2\frac{1}{2}^\circ$ E of delta (δ) is the open cluster and emission nebula NGC 7380. It contains near

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 $5\frac{1}{2}^\circ$ 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 tonight.