Penobscot Valley Star Gazers

An Astronomical Society of Central Maine

http://www.gazers.org

May 2021

Month of little hands with daisies,
Lovers' love, and poets' praises;
O thou merry month complete,
May, thy very name is sweet!
- Leigh Hunt

Election Meeting

The May 2021 meeting of the PVSG will be held on Monday the 10th at 6:30 pm via Zoom. The doors will open a little after 6:00 if you want to arrive early for some socializing. We don't know what the program will be beyond the elections, though we do know that Alan will not be giving his book report.

Thanks for last month's program go to Dr. Doug Simons, director of the Canada France Hawaii Telescope, for his presentation about the history of and plans for that telescope. Also, thanks to Shawn for making the arrangements.

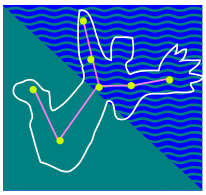
Big Scope

PVSG Monthly Meeting Minutes
April 12, 2021
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:

We have no April minutes as that month's meeting consisted only of the program.



Observe The Sky This Month

Some Selected Objects

May 2021

General sky comments – May is the middle month of galaxy season. It started last month before the arrival of our Milky Way galaxy to obscure the myriad of galaxies beyond our galactic neighborhood. Last month we considered galaxies in the constellations of Corvus, Sextans, Leo, Leo Minor, Ursa Major, Draco, and Camelopardalis. This month we will tackle the galaxies in Virgo and Como Berenices plus the galaxies we missed last month in Ursa Major and those in Canes Venatici. Galaxies are the main interest this month but there are also some double stars, planetary nebula, and globular clusters to observe.

Planets this month – Before the meeting on the 10th of May last quarter Moon was on Monday the 3rd, new Moon will be on Tuesday the 11th, and first quarter is on Wednesday May 19th. The full Moon of May is on Wednesday the 26th before the next meeting on June 14. A total eclipse happens this full Moon, the first since January 21st of 2019. Unfortunately it is only partial where we live and happens at the very early umbral stage, thus, for all practical purposes, it is not visible. This is the largest full Moon of the year. Mercury is emerging early in the month from evening twilight for the best evening appearance of the year for Northern Hemisphere observers. The waxing crescent Moon passes within 2° of Mercury to the south on the 13th when the planet is at magnitude 0.0. When Mercury is at eastern greatest elongation on the 17th, 22° from the sun, it has faded to magnitude +0.4. Thereafter as Mercury approaches the Earth it rapidly fades in magnitude because it is becoming more crescent and reflecting less and less light. This would be a good time to get out your telescope to observe Mercury becoming larger and more crescent. Venus begins the month in the evening sky 9° from the sun. By the end of the month it is 17° from the sun. When Venus is in conjunction with Mercury on the 28th Mercury will have faded to magnitude +2.3 and be difficult to observe but might make an interesting photo. Mars is in Gemini during the month between Castor and Pollux. Jupiter is in the early morning sky and by the end of the month will be in the sky for over half the night. Saturn is in Capricornus and visible for more than half the night. Uranus is only visible with difficulty in the dawn sky late in the month. Neptune is in the dawn morning sky in Aquarius. Pluto is in Sagittarius.

Constellations this month – If you want to see many galaxies or observe numerous Messier objects, this month and the next month are the times. The North and East side of Ursa Major as promised will be observed. Below Ursa Major are the constellations of Canes Venatici, the Hunting Dogs and its famous alpha star Cor Caroli. From Cor Caroli, alpha (α) Canes Venatici there are numerous observable galaxies. 4° NNW is M94 (NGC 4736) a spiral galaxy. 1¾° W of M95 is NGC 4618 (Arp 23) a barred spiral with a strange spiral arm. 1½° slightly north of W is the star beta (β) Canes Venetici. From there go ½° NW to a pair of interacting galaxies, NGC 4490 and NGC 4485 (Arp 269). Go back to Cor Caroli then 3° SE to NGC 5005 a spiral galaxy and only ¾° away SE is NGC 5033 another spiral orientated north to south. 5° NW of Cor Caroli is M63 the Sunflower Galaxy (NGC 5055) a beautiful spiral especially in a large telescope. (Discussed farther with Messier object of the month.) If you have trouble getting to the Sunflower it is located just north of a grouping of three bright stars. From M65 go 3° east and slightly south to find M94 the "Cat's Eye nebula." Also in Canes Venetici is M106. It is found easier from chi (χ) Ursa Major the next bright star below the bottom left corner star Phecda, gamma (γ) Ursa Major in the bowl of the asterism "The Big Dipper." From chi go 5° slightly south of due west to M106 a spiral galaxy observed by Méchain but added to the Messier list in 1947 by Helen Sawyer Hogg. Look below in featured Messier object to find a discussion of Messier M63. Continuing in Ursa Major we will first note M109. To find M109 start at the before mentioned Phecda and go less than 1° SW to M109 a beautiful barred spiral galaxy similar to our own barred spiral the "Milky Way." If you have never seen M40 the double star Messier placed in his catalog of objects not comets this is the time to observe it. Go to the top star of the bowl of "The Big Dipper" Megrez delta (δ) Ursa Major. From this star go 1° NW to the 5th magnitude star 70 Ursa Major then continue ¼° NW to this double star Winnecke4. There is a 12th mag. galaxy to the west of M40 but this galaxy was beyond the capability of any telescope Messier had access therefore Messier must have meant this double star to be M40. Next to observe is M101. To find it go to the stars near the end of "The Big Dipper" the double stars Mizar and Alcor plus the star at the end of the handle Alkaid. M101 is located at the tip of an equilateral triangle NW of these stars each side 5½° long. M101 is large but because it is so large it can be difficult to observe. Use low power and a wide field of view. My best view has been with a large binocular. I have also observed NGC 5473 and NGC 5474 side galaxies to M101. NGC 5473 is located ½° NNW of M101 and NGC 5474 is located ¾° SSE of M101. Coma Berenices is below Canes Venetici a constellation from ancient times known as the asterism representing the tuft on the end of the tail of Leo. It is now named for the hair of Berenices II queen of Ptolemy III Euergetes of Egypt who had sacrificed her hair to Aphrodite for the safe return of her husband from war. It was made a constellation by Tycho Brahe in 1607 and now listed as a modern constellation. To the naked eye Coma is almost void of stars. You have to go to a dark site to see very many but what stars there are can help you find your way through "The Realm of the Galaxies." This constellation along with Virgo contains well over 100 prominent galaxies and many more less prominent galaxies viewable with even modest tele-

scopes. (See below) The constellation of Virgo was the goddess of agriculture and most other people connected it with agriculture or fertility. Virgo contains the bright star Spica representing a head of grain held by Virgo. Finally we see the tail of Hydra and there is the constellation of Crater on it off to the west. Corvus is hovering above. We observed both of these last month. If you have a low observing sky the northern portion of Centaurus, the Centaur is just visible.

Featured star – Cor Caroli, Alpha (α) Canum Venaticorum is located a little over 14 degrees SW of the star at the end of the handle of the big dipper, Alkaid eta (η) Ursa Major. I will not cover who or why this star received its popular name Cor Caroli (Charles' Heart) here. You can look up the two popular theories for yourself. Cor Caroli is a double star. The two are not the same color but it is difficult to tell the difference. Most consider them white and slightly yellow. It does not take a very powerful telescope to separate this pair. The dimmer of the pair is designated as Alpha (α) 1 at mag 5.6 and the brighter Alpha (α) 2 at mag 2.8. Alpha 2 is a star with two characteristics of interest. It is both a star with a very strong magnetic field and a star with a strong abundance of rare-earth elements. Stars with strong magnetic fields show the Zeeman Effect, a splitting of spectral absorption lines. The Zeeman Effect was noticed in the europium lines at maximum magnetic intensity and when the polarity was reversed the chromium lines were at maximum intensity. The magnetic field seems to concentrate the rare-earth elements in the star but the origin of the magnetic field or the origin of the rare-earth elements is not known for certain. The current thinking is merging of neutron stars form rare-earth elements. Did this star result from a merging of neutron stars and somehow the strong magnetic field was a result? Just wondering. Did I mention both Cor Caroli Alpha 1 and Alpha 2 are also spectroscopic binaries? This is one mysterious star!

Featured Constellations – Coma and Virgo and all the galaxies they contain are quite a challenge but if taken in small sections they do not have to be overwhelming. I have found if you start with Vindemiatrix, epsilon (ε) Virgo, a third magnitude star, (and a good star chart) and go approximately 1.5° slightly north of west you will come upon a pair of galaxies NGC 4762 and NGC 4754 one an elliptical and one a spiral. These two types of galaxies are what you will see all through this area although each galaxy will have variations. Once you have found this pair you are on your way into the Realm of the Galaxies. Continue 1.5° on the same line to the Messier galaxy M60, NGC 4649 an elliptical galaxy. This galaxy is slightly interacting with its neighbor NGC 4647 to form what the astronomer Halton Arp numbered as Arp 116. Continue on less distance this time to M59, NGC 4621 another elliptical galaxy. Continue on a little farther to M58, NGC 4579 one of the barred spiral galaxies in the Messier catalog. This galaxy is located next to an 8th mag. star. From M58 we now go NW the same distance we just traveled to find M89, NGC 4552 another elliptical. A little less distance this time NNE to M90, NGC 4569 a tipped spiral galaxy. Are you lost or confused yet? I know people with a go to telescope are saying "What is the big deal?" but isn't this more challenging? From here go SW to M87, NGC 4486 another elliptical galaxy characterized by its supersize and jet although it takes a very large telescope to see the jet. Pause here and get a cup of coffee because it is going to get interesting. From M87 proceed about 1° almost NW to a pair of Messier objects M86, NGC 4406 and M84, NGC 4374 both elliptical. M84 is the smaller of the two. From this point we will follow a chain of galaxies starting at M84 called Markarian's chain named after Benjamin Markarian who discovered these galaxies all have a common motion. After M84 they are M86, NGC 4438 and NGC 4435 known as the eyes then 4461, 4473, 4477, and NGC 4459. During this time we have crossed into the constellation Coma. From NGC 4459 go less than a degree NE to M88, NGC 4501, an open face spiral, then east to M91, NGC 4548 another of the Messier barred spirals. Back track to M88. From here the galaxies are farther apart. Almost 3° west is M99, NGC 4254 a grand design galaxy I imagine our Milky Way might resemble. To get our bearings near here is the 5th magnitude star 6 Como. Less than 1° west of 6 is M98, NGC 4292 a more edge on spiral. Follow a string of 5th magnitude stars NE to M100, another grand design galaxy. Don't miss this one. Above it and slightly east almost 2° is M85 an elliptical galaxy. There are two additional Messier galaxies in Virgo and then we will stop this time. 5°south of the Markarian chain of stars is a grouping of 6 magnitude stars. Between the two most prominent western stars is found M49, NGC 4472 an elliptical galaxy. Finally there is M61, NGC 4303 the third Messier barred spiral in this area. If you have found M49, M61 is almost 5° SSW. It is almost 5° north of eta (η) Virgo a 4th magnitude star.

Featured Messier object – M63 (NGC 5055) is found by locating Cor Corelli and proceeding 5.1°NE. Known as the Sunflower Galaxy it is elongated east to west with a coarse disk, a large tight core, and a compact stellar nucleus. There is a 9th magnitude star near the western tip of the visible disk and a trio of stars off the eastern side. M43 was discovered on June 14th of 1779 by Pierre Méchain his first deep sky object and observed later by Messier and added to his list. The spiral structure of M63 was first noticed by Lord Rosse with his 72" Leviathan and included in his list of 14 "spiral or curvilinear nebula" published as a paper in *Philosophical Transactions* in 1850. M63 is categorized as a flocculent spiral due to the curdled and patchy look of its disk. This makes tracing its spiral structure more difficult than grand design galaxies. It is thought this appearance is due to star forming regions or massive concentrations of molecular gas stretched into the spiral structure by differential rotation. To some the inner disk resembles the flowering head of a sunflower thus the name.

Bill Shackelford
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