Skylights

Newsletter of the Astronomical Society of Northern New England

MAY 2023

Member of NASA's Night Sky Network

Astronomical League

ASNNE MISSION

ASNNE is an incorporated, non-profit, scientific and educational organization with three primary goals:

1) To have fun sharing our knowledge and interest with others.

2) To provide basic education in astronomy and related sciences to all who are interested.

3) To promote the science of Astronomy.

What's Up In May

By Bernie Reim

The month of May is named for the Roman goddess Maia, who was the mother of Mercury and a daughter of Atlas. May Day, also known as Beltane in Gaelic, marks the half-way point of spring, so it is one of our four cross-quarter days along with our four seasons. The other ones are Lammas on August 1, Halloween on October 31, and Ground Hog Day or Candlemas on February 2.

We have had a cool spring so far following an unusually warm winter. This part of the earth will really start to transform itself this month as the tender young green leaves appear once again on our trees, and cherry and apple trees and magnolias along with many kinds of shrubbery will blossom in all of their glory. Many birds are returning from the south and the spring peepers and other frogs are already singing up a storm to add an audible component to the visual beauty of renewal during spring.

The sky above us is also transforming as we lose Orion and most of the Winter Hexagon with only Gemini and Auriga hanging on for another month. All three members of the Summer Triangle, Lyra, Cygnus, and Aquila, will be up in the northeastern sky by 11 pm by the middle of May.

As the days and nights get consistently warmer now, this is a great time to venture outside more often and enjoy some of the many celestial and terrestrial highlights being offered during this season. Venus is still catching up with Mars in Gemini as the evening planets, and Jupiter, Saturn, and Mercury are the morning planets this month. There will be a penumbral lunar eclipse during the full moon this month on the 5th, but that will not be visible in the U.S. The Eta Aquarid meteor shower peaks on Saturday morning the 6th, but the moon will be very close to full to wash out most of these meteors. The most exciting highlight this month will be an occultation of Jupiter by the moon, but you will need a telescope to see it since it will happen at 7:45 am, which is well after sunrise.

Watch brilliant Venus slowly catch up with Mars all month long. They are both in their direct or eastward motion through the sky now against the fixed background of stars. Notice that Venus is just over 100 times as bright as the Red Planet, which is slowly getting dimmer and falling farther behind the earth's orbit around the sun even as the faster moving Venus is catching up with us and getting brighter. By the end of May, Mars will be just one degree shy of the Beehive open star cluster in Cancer, which is similar to the Pleiades in Taurus, where Mars was a few months ago. Venus will be just 11 degrees to the west of Mars near Castor and Pollux in Gemini. Watch the waxing crescent moon pass near Venus and then Mars on the 23rd and 24th. Venus reaches it maximum northern declination of 26 degrees this month and its highest point above the ecliptic.

Saturn rises at 3:30 am at the beginning of May and two hours earlier by the end of this month. The ringed planet has moved into Aquarius now after spending the last couple of years in Capricorn. Since it takes 29 years to orbit the sun, it spends just over two years in each zodiac constellation.

Jupiter rises about an hour later in Aries the Ram. Both Jupiter and Saturn are also in direct or prograde motion now. Jupiter ended its last retrograde on Valentine's Day of this year. Jupiter only takes 12 years to orbit once, so it spends one year in each of the 12 zodiac constellations. The King of the Planets also undergoes its retrograde loop for 4 months out of each year. If you have access to a telescope (many libraries have 4.5 inch reflecting telescopes that you can check out like a book) you can see Jupiter being occulted or covered up by a thin waning crescent moon at 7:45 am on the morning of Wednesday, May 17. Both the moon and Jupiter will rise around 4:30 that morning and continue to get closer after that. The moon will pass right in front of Jupiter at 7:45 am for about an hour. That is two and a half hours after sunrise, so it will be too bright to see the planet without a telescope.

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What's Up "*Continued from page 1*"

I have seen several nice daytime occultations of the moon by Venus, but I needed a telescope to see them.

Mercury is slowly moving into our morning sky this month, but it won't be visible until the last week of May. On May 23rd, it will be just 7 degrees due east of the much brighter Jupiter in the eastern morning sky about an hour before sunrise. Our first planet will reach its greatest western elongation from the sun at 25 degrees on May 29.

We are in an eclipse season again, which happens twice every year. Since the moon orbits the earth up to 5 degrees above the plane and down to 5 degrees below this plane, we don't get a nice eclipse twice every month. They only line up twice a year, and even then it will not always be a total solar or lunar eclipse. This time it will be a deep penumbral lunar eclipse at full moon on May 5, so it will not even be a partial since the moon will not enter any part of our deeper and darker umbral shadow.

The moon also has an umbral and a penumbral shadow. You have to be right in a very narrow path on the earth in the umbral or deeper shadow of the moon to see the total solar eclipse. The next one here in the U.S. is less than one year away, April 8 of 2024. That one will start on Mexico, go from Texas to Maine in the U.S., and end over Newfoundland. I will write much more about this great natural event in the coming months. It is not too early to start planning exactly where you want to be to experience this memorable event and record it also.

The penumbral lunar eclipse at full moon this month is only visible over Africa, Asia, Australia, and New Zealand. It would be hard to even notice it unless had binoculars or a good camera lens since the lighter penumbral shadow of the earth. I remember seeing a penumbral eclipse here in southern Maine about 5 years ago that was faintly discernible and looked good through binoculars.

We just had a very rare hybrid solar eclipse over Australia and Indonesia just over a week ago on April 20 at the last new moon. That is part total and part annular. I watched a live feed of it put on by MIT and the Perth Observatory in Western Australia, a few hundred miles south of Exmouth at the very western tip of Australia, which was the only place over land that this eclipse was total. It only lasted 58 seconds, shorter even than the two and a half minutes that I experienced during the Great American Total Solar eclipse on August 21 of 2017. It was still extremely beautiful since there were 10 or 12 huge solar prominences that were clearly visible above the photosphere and chromosphere of the sun.

Then Bailey's beads which look like a string of luminous pearls unfolded much slower than usual as the last rays of sunlight were channeled through the valleys between the mountains of the moon, culminating in a blindingly brilliant flash called the diamond ring. Then the tenuous and ephemeral corona blossomed to life for a mere 58 seconds before the normal brilliant sun returned once more as if nothing unusual had happened. Even the seasoned eclipse veterans that commentated during this whole 3-hour event said they had never seen anything like this before in all of their previous total solar eclipses. Every eclipse is always unique even though some elements of it will be similar. They also gave a lot of good tips on what to look for during an eclipse and how to photograph it and when the next ones will be happening.

There will also be an annular solar eclipse over the U.S. on October 14 of this year, when we enter our next eclipse season.

The last highlight for this month will be the Eta Aquarid meteor shower which peaks on Saturday morning the 6th. It is caused by that most famous of all comets, Halley's. This comet also causes our October 21 Orionids as we pass through the tail of this comet twice each year.

You can normally expect up to 50 meteors per hour from a dark sky site, but the full moon occurs the day before, so it will wash out over 90% of the meteors, leaving only the most brilliant ones to become visible. It will still be worth trying to catch some of them if it is clear. They last for several weeks, so you could also look for them before and after their peak. This comet dust is about the size of a grain of sand and even less dense. So just as the comet itself can become very impressive and easily visible by sprouting a huge coma around it the size of the earth (the nucleus of the comet is less than 10 miles in diameter), and a tail stretching up to 100 million miles through space, these tiny individual pieces of this famous comet are also very impressive as they crash into our atmosphere right at the limit of space, which is about 60 miles high. That is about the distance from Portland to Augusta, but straight up.

These brilliant streaks of light are created by their great speed of 40 miles per second as they get ionized as they start encountering some more air molecules at that height, similar to the 5,000 degree temperatures that a space capsule like Orion endured upon reentry.

May 5. Full moon is at 1:34 p.m. EDT. This is also called the Milk, Flower, or Planting Moon. On this day in 1961 Alan Shepard made the first suborbital flight on the Mercury Freedom 7 spacecraft. Yuri Gagarin completed one orbit of Earth just before that on April 12 of 1961.

May 6. The Eta Aquarid Meteor Shower peaks this morning.

May 10. Cecilia Payne-Gaposchkin was born on this day in 1900. She was one of the famous group of women astronomers called the Harvard Computers that developed the spectral classification system for stars along with many other amazing discoveries.

May 11. The fifth and final servicing mission to the Hubble Space Telescope took place on this day in 2009. The last shuttle, STS-135, would be launched just two years later on July 8 of 2011.

May 12. The Adler Planetarium in Chicago became the first planetarium in the Western hemisphere on this day in 1930.

May 13. The moon passes near Saturn this morning.

May 14. On this day in 1973 our first orbiting space station, Skylab was launched into orbit. It only lasted until July 11 of 1979 and it was only occupied by 3 crews for a total of 171 days. By contrast, the ISS was launched in November of 1998 and has been continuously occupied since November of 2000, nearly 23 years.

May 15. Williamina Flemming was born on this day in 1857. She was another important member of the Harvard Computers.

May 17. The moon passes near Jupiter this morning. Jupiter will be occulted by the moon at 7:45 this morning, two and a half hours after sunrise. The moon also passes just north of Mercury this morning.

May 19. New moon is at 11:53 a.m.

May 27. First quarter moon is at 11:22 a.m.

May 28. Frank Drake was born on this day in 1930.

May 30. Mars is at aphelion or farthest from the sun today 155 million miles. ★

Moon Phases

May 5
Full

May 12
Last Quarter

May 19
New

May 27
First Quarter

Moon Data

May 11
Moon at perigee

May 13
Saturn 3° north of Moon

May 14
Neptune 2° north of Moon

May 17
Jupiter 0.8° south of Moon

Mercury 4° south of Moon

May 23
Venus 2° south of Moon

May 24
Mars 4° south of Moon

May 25
Moon at apogee

OBSERVER'S CHALLENGE* – May, 2023

by Glenn Chaple

NGC 4088 Galaxy in Ursa Major (Magnitude 11.2, Size 5.8' X 2.2')

On the evening of March 9, 1788, William Herschel came across a nebulous object which he described as "Bright, considerably large, extended 55 degrees, little brighter in the middle." He entered it in his Catalogue of Nebulae and Clusters of Stars as H I-206 (H206[1]), his 206th Class I (Bright Nebulae) object. Its modern-day New General Catalog designation is NGC 4088.

Categorized as a grand design spiral galaxy, NGC 4088 is located at the 2000.0 coordinates $12^h5^m34.2^s$ RA and $+50^o32'21"$ dec. It's a 3½° star-hop from Phecda (gamma [γ] Ursae Majoris), as shown in the accompanying finder charts. Despite this relatively star-poor journey, I had little trouble locating NGC 4088 with a 10-inch f/5 reflector. At 80X, the galaxy was readily seen. A magnitude 5 limiting magnitude made it difficult to detect any detail, although I sensed a mottled appearance.

I was unable to spot NGC 4085, a 12th magnitude nearly edge-on spiral 12 arc-minutes south of NGC 4088. Herschel missed it on the night he discovered NGC 4088, but picked it up during another sweep the next year. Though it's fainter and smaller than NGC 4088, he still categorized it as a Class I object, giving it the designation H I-224. The two galaxies apparently form a physical pair and are part of a galaxy group that includes Messier 109.

Distance calculations to NGC 4088 range between 37 and 55 million light years. Assuming a middle value, the Universe Guide website calculates that NGC 4088 would have a true diameter of some 74.3 million light years – about ¾ the size of the Milky Way. If we were to freeze the expansion of space, the Universe Guide figures that a non-stop 4 mile per hour stroll to NGC 4088 would take some 7.6 quadrillion years!

*The purpose of the Observer's Challenge is to encourage the pursuit of visual observing. It is open to anyone who is interested. If you'd like to contribute notes, drawings, or photographs, we'd be happy to include them in our monthly summary. Submit your observing notes, sketches, and/or images to Roger Ivester (rogerivester@me.com). To find out more about the Observer's Challenge, log on to rogerivester.com/category/observers-challenge-reports-complete.

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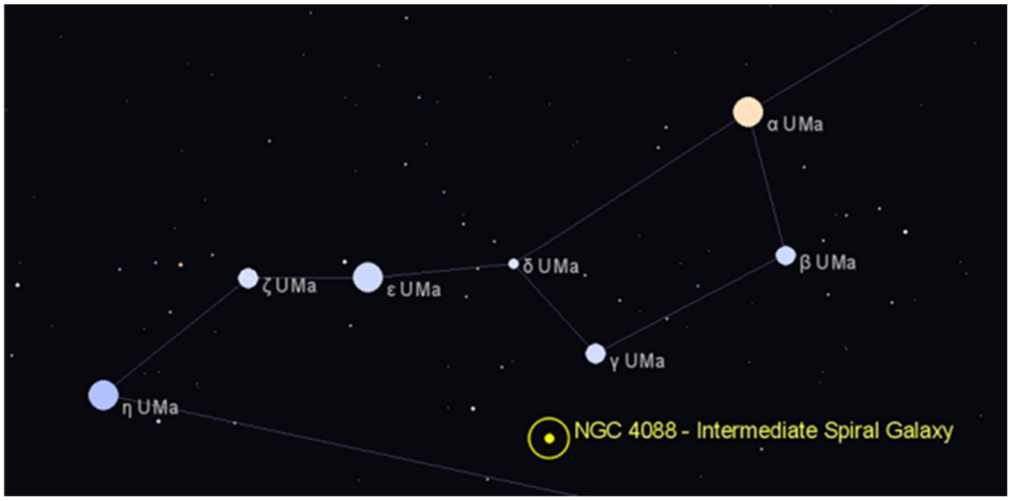
NGC 4088 Finder Charts



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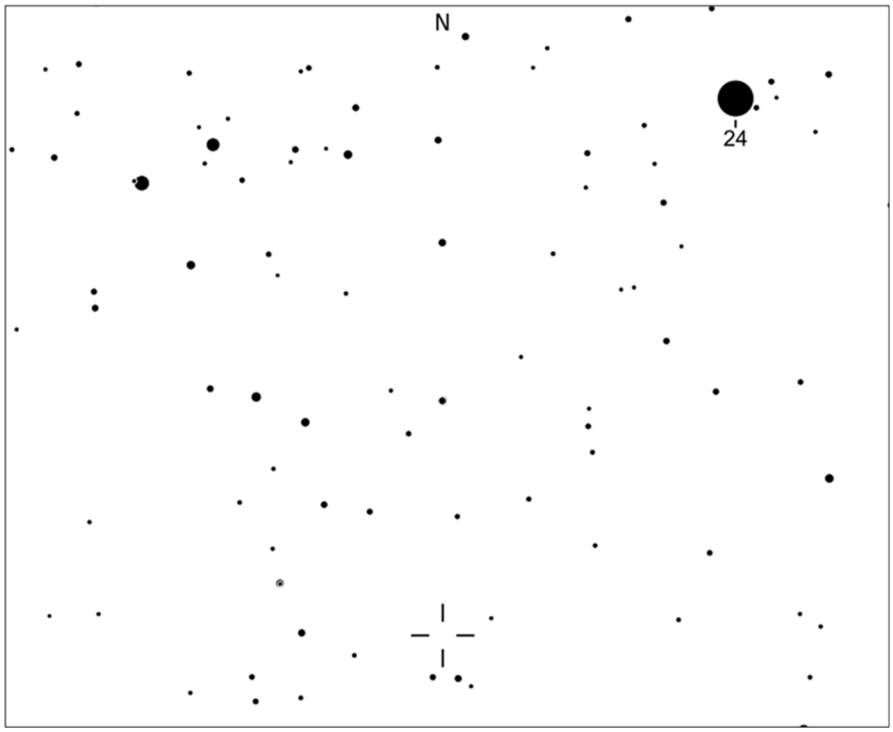


Chart from AAVSO Variable Star Plotter (VSP). The magnitude 2.4 star near upper right is gamma (γ) Ursae Majoris. Stars shown to 10th magnitude in this 7 by 4 degree field.

"Continued on page 5 "

NGC 4088 Image

NGC4088, a galaxy about 51 MLY away, may be a barred spiral tilted to our line of sight. It took 2 nights to collect the subs due to intermittent clouds. I used RGB (1.5 hours), and LUM filters 75 minutes), then added Ha (30 minutes) as well for Ha nebulae regions. All taken with my 32 inch F6.5 telescope from Gloucester MA, and with ZWO-ASI 6200 camera. Processed in Pixinsight. — Mario Motta, MD

Principal Meteor Showers in 2023

January 4
Quadrantids

April 22
Lyrids

May 6
Eta Aquarids

July 30
Delta Aquarids

August 12
Perseids

October 9
Draconid

October 21
Orionids

November 9
Taurids

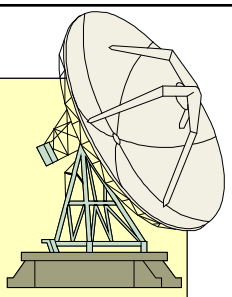
November 18
Leonids

November 26
Andromedids

December 14
Geminids

December 22
Ursids

Note: Dates are for maximum



Got any News?

Skylights Welcomes Your Input.

Here are some suggestions:

Book reviews -- Items for sale -- New equipment -- Ramblings -- Star parties -- Observing -- Photos.

Benefits of Membership

- Attend our monthly meetings and club star parties
- Our Monthly Newsletter: *Skylights*
- Discounts on *Sky & Telescope. and Astronomy magazine subscriptions*
- Automatic subscription to the Astronomical League's quarterly newsletter, *The Reflector*
- With proper training, access to the equipment at ASNNE's Talmage Observatory at Starfield.
- By special arrangement, free admission to the Southworth Planetarium at USM in Portland

Enjoy sharing your interest and have fun learning about Astronomy!

Our Club has Merchandise for Sale at: www.cafepress.com/asnne

All money raised goes to our operating fund.
Any design can be put on any item.

Contact David Bianchi dadsnorlax@yahoo.com for further details.

This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.org to find local clubs, events, and more!

Watching the Late Spring Skies

By David Prosper

Late spring brings warmer nights, making it more comfortable to observe a good showing of the **Eta Aquarids** meteor shower. Skywatchers can also look for the delicate **Coma Star Cluster**The **Eta Aquarids** meteor shower should make a good showing this year, peaking the morning of May 6. This meteor shower has an unusual "soft peak," meaning that many meteors can be spotted several days before and after the 6th; many may find it convenient to schedule meteor watching for the weekend, a night or two before the peak. You may be able to spot a couple dozen meteors an hour from areas with clear dark skies. Meteors can appear in any part of the sky and you don't need any special equipment to view them; just find an area away from lights, lie down on a comfy lawn chair or blanket, relax, and patiently look up. These brief bright streaks are caused by Earth moving through the stream of fine dust particles left by the passage of Comet Halley. While we have to wait another 43 years for the famous comet grace our skies once more, we are treated to this beautiful cosmic postcard every year.

While you're up meteor watching, try to find a delightful naked eye star cluster: the **Coma Star Cluster** (aka Melotte 111) in the small constellation of Coma Berenices. It can be spotted after sunset in the east and for almost the entire night during the month of May. Look for it inside the area of the sky roughly framed between the constellations of Leo, Boötes, and Ursa Major. The cluster's sparkly members are also known as "Berenice's Hair" in honor of Egyptian Queen Berenices II's sacrifice of her lovely tresses. Binoculars will bring out even more stars in this large young cluster.

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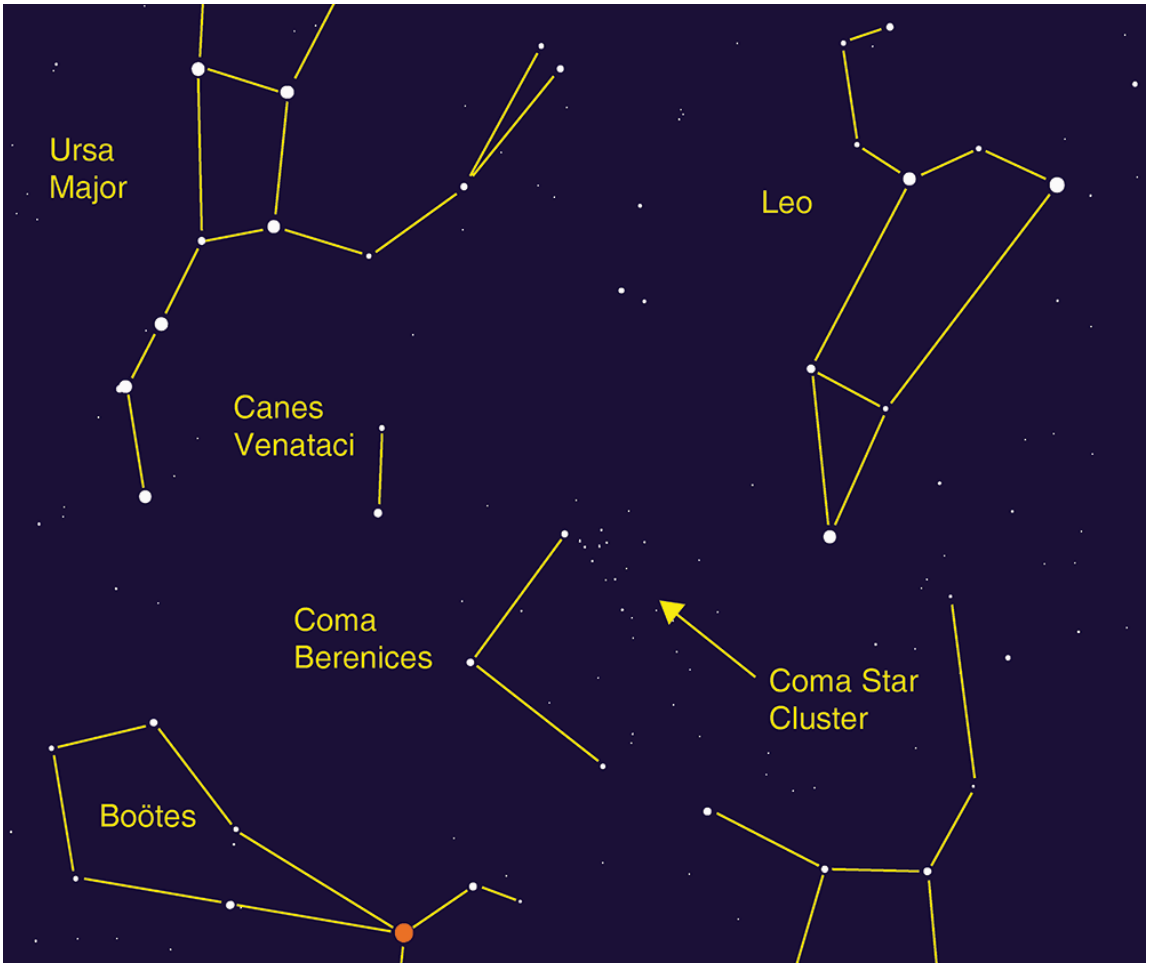


Try to spot the Coma Star Cluster! Image created with assistance from Stellarium

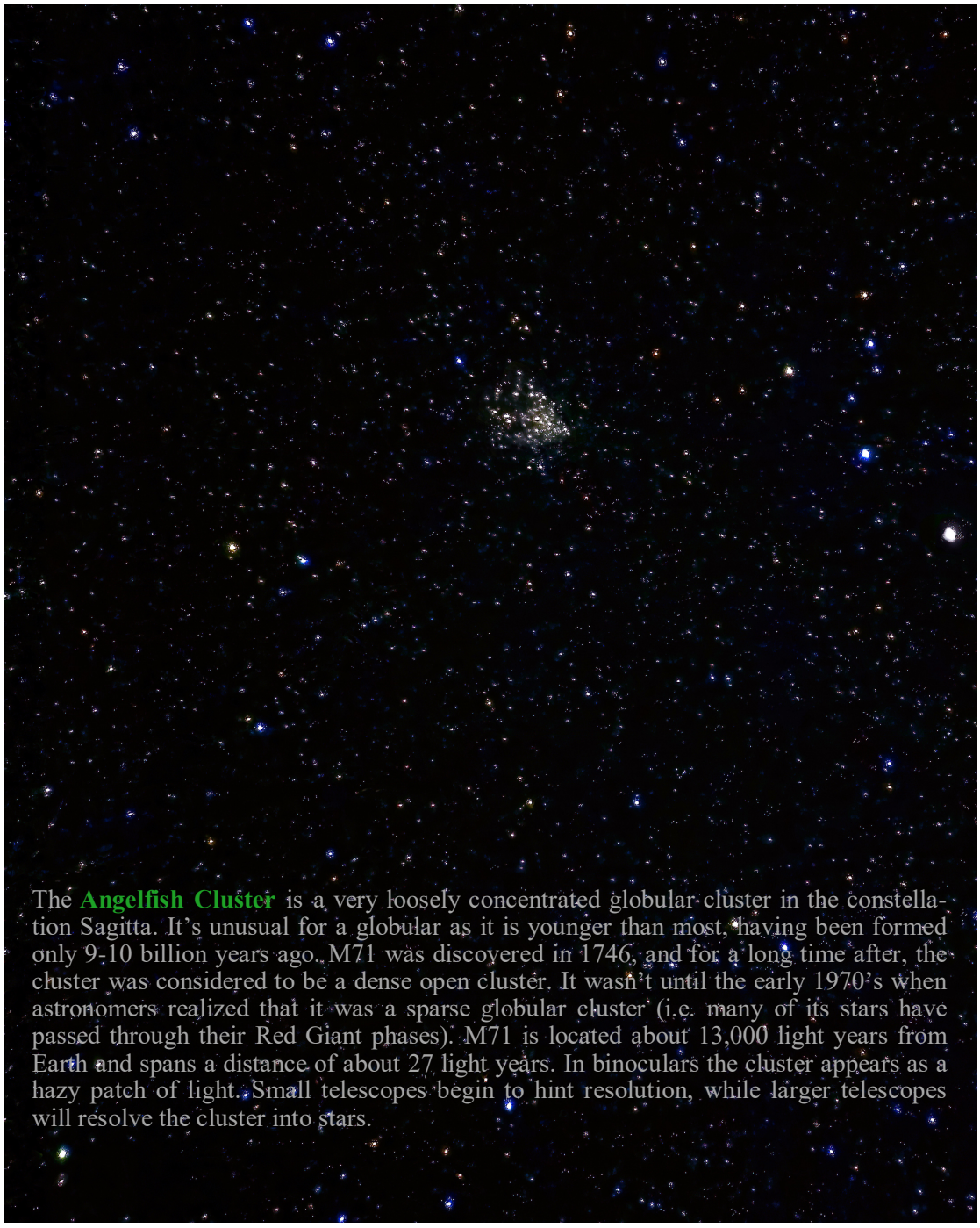
Point and Shoot Camera Astroimaging (no telescope)

Canon Powershot SX50 HS

Image & write-up submitted by Paul Kursewicz

Angelfish Cluster (M71)

JPEG mode, FL 1800mm, f/3.5, ISO 1600, 55 x 45 seconds, 8-31-22



The **Angelfish Cluster** is a very loosely concentrated globular cluster in the constellation Sagitta. It's unusual for a globular as it is younger than most, having been formed only 9-10 billion years ago. M71 was discovered in 1746, and for a long time after, the cluster was considered to be a dense open cluster. It wasn't until the early 1970's when astronomers realized that it was a sparse globular cluster (i.e. many of its stars have passed through their Red Giant phases). M71 is located about 13,000 light years from Earth and spans a distance of about 27 light years. In binoculars the cluster appears as a hazy patch of light. Small telescopes begin to hint resolution, while larger telescopes will resolve the cluster into stars.

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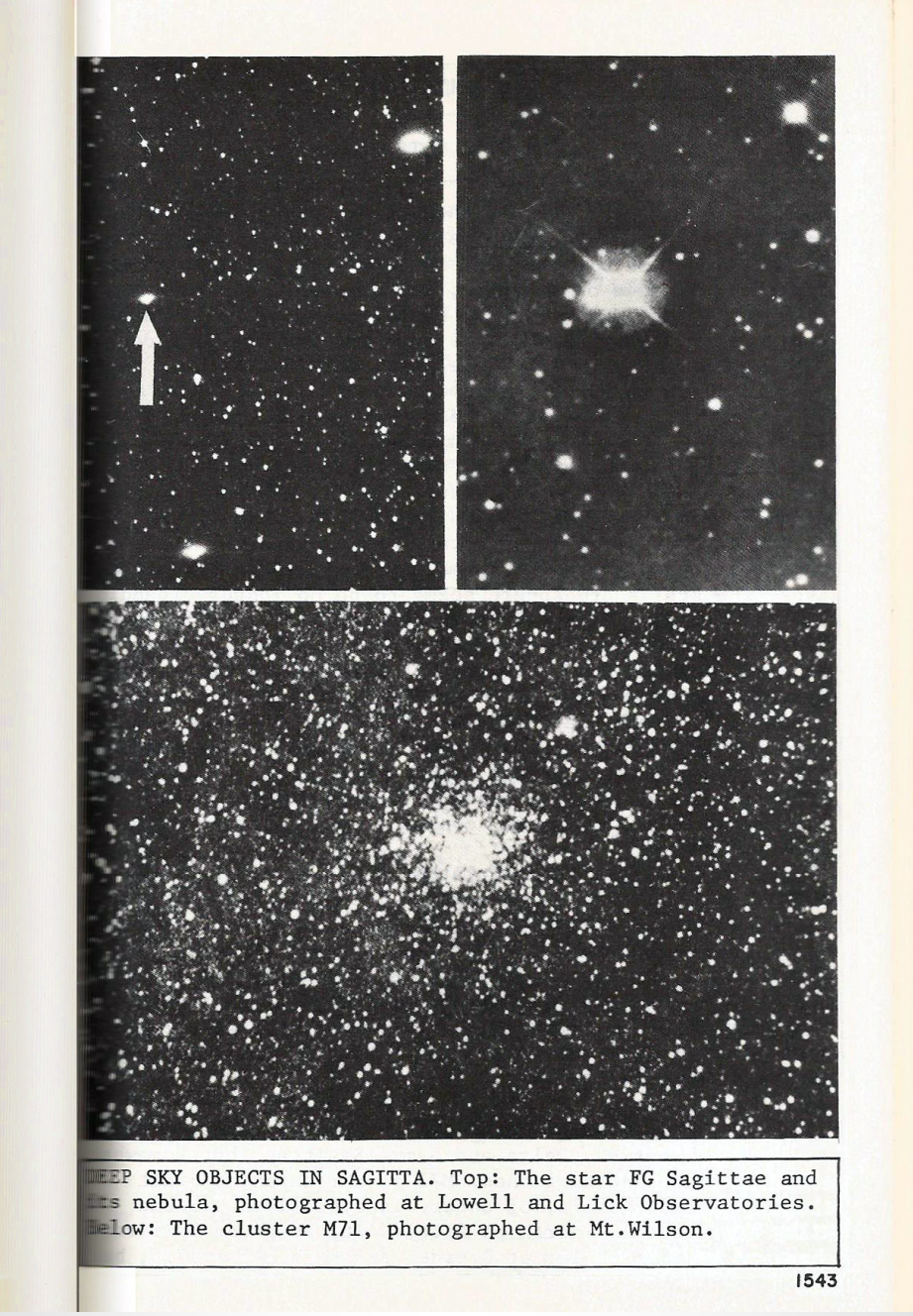
From the pages of "Burnham's Celestial Handbook" copyright 1978

Angelfish Cluster (M71)



DEEP SKY OBJECTS IN SAGITTA. Top: The star FG Sagittae and its nebula, photographed at Lowell and Lick Observatories. Below: The cluster M71, photographed at Mt.Wilson.

1543

The bottom photograph of M71 was taken at Mt. Wilson Observatory. The **Angelfish** is greatly over exposed only rendering its bright outline in the center of the cluster. When Charles Messier searched for M71 he wrote, "very faint...it contains no star...The least light extinguishes it...diameter of 3 1/2'...it was reported on the chart of the comet of 1779…" M71 lies in the Milky way 10 degrees North of Altair.

Astronomical Society of Northern New England (ASNNE) Membership

Meeting Minutes of 7 April 2023

Business Meeting: The Business Meeting was called to order at 7:00 pm by Vice-President Bernie Reim.

Directors Present: Bernie Reim, Vice-President
Carl Gurtman, Secretary
Bern Valliere, Director

Plus: David Bianchi, ASNNE E-Mail Manager

Others Present: There were an additional three people present at the Business Meeting.

Treasurer's Report: There was no Treasurer's Report.

Secretary's Report: A date error had been noted and corrected. The Secretary's Minutes of the March Meeting were accepted.

Old Business:

Presentations:

David had been in receipt of a request for ASNNE to offer a Star Party at the Talmage Observatory at Starfield, as an auction item for fundraising for the Ocean Avenue Elementary School Parent-Teacher Organization (PTO). After Board approval, he wrote a letter offering the Star Party (reviewed by the Board). The PTO contact person is Jessica Russell.

On Friday, March 24th, Carl gave a talk for the Biddeford Pool Community Center (BPCC), and Gary led an observing session there with one of his telescopes. Members Bernie, Bern, Chuck and his wife Shawna, helped. Carl and Gary reported that the night turned out wonderful with the addition of clear skies. Gary estimated that around 30 – 40 people attended the presentation. Also, Carl and Gary would like to thank Diane Nobel of the BPCC for organizing this event. There was no fee for the event, but ASNNE received $180 in donations.

"Continued on page 12"

New Business:

Speaker Request Approval Required: Carl noted that for an ordinary Speaker, he did not consider he needed Board approval; just arrange setting up a mutually acceptable time. However, acting upon a suggestion by April, he wishes for Board approval to invite an Astrologer to speak to us. Bernie stated that he had arranged for an astrologer to make a presentation to ASNNE in the past. Ian (on Zoom) stated that he once might have disapproved, but no longer did. One dissenting Board Member was invited to e-mail Carl with his objections, and Carl would answer them by e-mail. That however was a moot point, as the approval was granted by a three-to-one vote. Astrologer(s) will be contacted. Action: Carl

Internship Request: George Grech, an undergraduate at the University of Massachusetts, Amherst, would like to gain experience in astronomy this summer, and asked if we had anything in the way of internships. It was pointed out that we didn't know if George was looking for academic credit, or not, or if an internship, even if just for experience, had to meet certain requirements. David will contact George, (ggrech@umass.edu) find out more details, and see if the University needs to be involved: Action: David.

Presentation Suggestion: Via e-mail, our Member Dwight Lanpher has offered to give a presentation on the Deep Sky Eye Observatory in Quinan, Nova Scotia that he visited last June, during a trip to Nova Scotia and New Brunswick. The program is about ten minutes long and includes information about the camping facilities and astronomy outreach program run by Tim Doucette at his observatory under Bortle Class 2 skies. Dwight's contact information:

(groupasnne@lanpherassociates.com). Action: David.

Astronomy Teaching Aids Offered: Ray Fowler offered, for free, a Moon photographic poster, and a battery-operated solar system, with a Celestial Globe. The Board was interested, for sure about the photographic poster, but the solar-system acceptance depends upon dimensions and space available. Roy's contact information: (rfowler400@roadrunner.com). Action: David.

ASNNE Sign: Bern reported that our ASNNE sign at the road end of our Observatory Driveway was on the ground.

The Business Meeting was adjourned at 7:30 pm.

"Continued on page 13"

Regular Meeting:

Regular Meeting: The Regular Meeting was called to order at 7:40 pm by Vice-President Bernie Reim.

Directors Present: Ian Durham, President (on Zoom)
Bernie Reim, Vice-President
Carl Gurtman, Secretary
Bern Valliere, Director

Plus: David Bianchi, ASNNE E-Mail Manager
Paul Kursewicz, *Skylights* Editor

Others Present: There were an additional twelve people physically present. An additional six people participated on Zoom.

Introductions: Bernie had everyone present, whether in person, or on Zoom, introduce themselves. People shared their backgrounds, astronomical history, and interests. Interestingly many people, regardless of their current involvement with astronomy, revealed a long-term interest in the subject.

Presentation: Our presenter tonight is our President, Ian Durham. Dr. Durham is a Professor, and Chair of Physics at Saint Anselm College. Dr. Durham is also a member of the Foundational Questions Institute (FQxI), and is the member they turn to pick the five most important physics stories of the year. Ian talks through his selections in an FQXi podcast series, always including a few runners-up, and sometimes there is a mathematical selection. Tonight, Ian gave us an abbreviated, less technical, run-through of the top five. No runners-up, but as always, explaining his reasons for his selections. An even more abbreviated version follows:

Ian prefaced his Presentation, by describing the organization he is a member of, the Foundational Questions Institute, FQxI. FQxI's mission is to explore issues basic to science, reaching a deeper understanding of reality: and other issues unlikely to be supported by conventional funding sources. Ian spent some time describing the importance of these issues.

"Continued on page 14"

The Fifth-Most Important Story: A tie here for Number Five.

The Tetraneutron. There are nuclei of one proton; one proton plus one neutron, and so on up. Since the protons, of positive electrical charge, repel each other, the neutrons, also subject to the strong nuclear force, but electrically neutral, serve as the "glue" that holds the nucleus together. The tetraneutron is a four-neutron particle. Known to be theoretically possible, but not previously observed, this exotic particle has the brief lifetime of ten-to-the-minus twenty-two seconds.

The other tying fifth story is the discovery of a proton containing a "charmed" quark. Protons are known to be (usually) composed of three quarks; two "up" quarks, and one "down" quark. Although quarks cannot exist alone, their nature is found by high-energy scattering experiments. Scattering experiments found protons - very rarely; which contained a "charmed" quark. Though rare, they had been theoretically postulated to exist, so the discovery was not unexpected. What is interesting, is that the measured mass of the "charmed" quark, is greater than the mass of the proton it is a constituent of. The "charmed" quark must therefore emit energy (=mass), to become part of the proton.

The Fourth Most Important Story:

High temperature super-conductivity. Resistance to an electric current flowing through it is a basic property of matter. Low resistance materials are known as conductors; high resistance materials insulators; and intermediate resistance materials known as semi-conductors (which have a high utility in electronics.) A quantum-mechanical effect, is that, if the temperature is lowered enough, typically to 4° Kelvin (four degrees Celsius, or centigrade, above Absolute Zero), resistance goes to zero. There are many uses for super-conductive materials, but maintaining such a low temperature to exceedingly difficult. So, there has been a great push to develop high-temperature super-conducting materials. A recent development is a super-conducting material which works at 130° K. Still a very low temperature, but an improvement. Additionally, this development brings about greater knowledge of new materials to use, and a better understanding of the details of super-conductivity.

"***Continued on page 15***

The Third Most Important Story:

The gravitational equivalent of the Aharonov-Bohm Effect. There are four known forces: The Strong Force, the Weak Force, Electromagnetic Force, and the Gravitational Force. Gravity is in some ways similar to the other forces, but if can also be described as the Einsteinian bending of space-time. For the Electromagnetic Force, there is a quantum-mechanical effect, in that an

electrically-charged particle can be affected by an electromagnetic potential, despite being confined to a region where both the electric field and the magnetic field are zero. This year (2022), experimenters found a gravitational equivalent of the Aharonov-Bohm Effect. This is noteworthy for two reasons: First, unlike electromagnetic fields, which can be shielded, the gravitational field cannot. So, some sophisticated experimental arrangements were necessary. While the gravitational field cannot be shielded, a known gravitational potential was introduced, and different particle pathways followed, so that the effects of the gravitational field could be calculated, and accounted for. Another important result was, in Ian's words; "This nudged the gravitational force in the direction of the other known forces."

The Second Most Important Story:

The DART Mission. DART is an acronym for Double Asteroid Redirection Test. Many people have seen one of the movies where the Earth is threatened by an approaching asteroid on a collision course. Mankind, not wishing to face extinction, like the dinosaurs, must find a way to deal with the threat. This story is not really a science story, but an applied science, or engineering, story. (Yeah!). A space mission was sent to an asteroid - not one on a collision course. A mass was shot into the asteroid. Its orbit was changed. The asteroid is one of a pair in orbit around each other, wherefore the Double in the acronym. The change in the orbit was 32 minutes, way above the minimum criteria established for a successful test. This was the first, and so far only, case where humankind has changed the orbit of an object in space.

The Most Important Story:

Again, not pure science, but engineering. (Yeah, again!). Nuclear power can be generated by breaking down - fission - of heavy nuclei, like uranium nuclei, with a release of the power of the binding energy, or the building up of light elements - fusion - of elements such as hydrogen or deuterium, with a release of the power of the binding energy. (Iron, in the middle, cannot do either). For the first time ever, fusion power was achieved with the power output being greater than the amount of power that had to be input to the experiment; the "break-even point".. Engineers have been trying to reach this goal ever since I was in college, and I'm 80 years old (on the 7th).

"***Continued on page 16***

The experimental parameters were such that they cannot be scaled up to produce useful power, but it is an important step in the right direction! The fusion is both ignited, and inertially contained, by very, very, powerful lasers. Fusion fuel is limitless, there are no radioactive wastes produced, and there is no greenhouse gas released. So, a very, very, important future power source.

For those people who would like to hear all three podcasts by Dr. Durham, and Zeeya Marali, the links are provided below.

Ian's FQxI Podcast - Part 1 - https://qspace.fqxi.org/podcasts/106/2022.12.28

Ian's FQxI Podcast - Part 2 - https://qspace.fqxi.org/podcasts/107/2022.12.30

Ian's FQxI Podcast - Part 3 - https://qspace.fqxi.org/podcasts/108/2022.12.31

Refreshments: After Ian's Presentation, quite a few people left. Carl provided Refreshments; pre-packaged packets of snacks, and coke, ginger ale, and apple cider. Carl considers that a refreshment break be a part of every Meeting. The Board needs to consider if providing Refreshments should be rotated, or if ASNNE's Treasury should bear the cost.

"What's Up?" and Astroshorts: As there were only a few people left, we omitted both Bernie's "What's Up?", and Astroshorts.

Next Meeting:

ASNNE's next Meeting will be on Friday, 5 May, 2023 at 7:30 pm at the New School in Kennebunk, Maine. There will be a short Business Meeting prior to the Regular Meeting, at 7:00 pm, at the same location. As always, all Members are always welcome at the Business Meeting.

Respectfully submitted,

Carl Gurtman

Club Meeting & Star Party Dates

Date	Subject	Location
May 5	**ASNNE Club Meeting:** **Business Meeting starts prior to Club meeting.** **Club Meeting (in house & on Zoom): 7:30-9:30PM** **Guest Speaker:** Club member **Paul Kursewicz** will be our guest speaker. Paul and his wife took a vacation last May. While in West Virginia they visited Green Bank Observatory. Paul will highlight their experience there. While in Kentucky, they visited the Creation Museum. Paul will share several astro related items there. Two of which are historical, with one of them being directly related to an astronomy project Paul took part in back in 1994 with the Association of Lunar & Planetary Observers. **Bernie Reim** - What's UP **Astro Shorts:** (news, stories, jokes, reports, questions, photos, observations etc.)	**The New School, Kennebunk, Me.**
Last Month	**Last month we met at The New School and had several members attending via Zoom. Our guest speaker was Ian Durham. Ian is also a member of FQxI, and gave us his top 5 physics story picks of the year.**	
TBD	**Club/Public Star Party:** Dependent on the weather and if there is any interest in Winter (cold nights) observing.	**Talmage Observatory at Starfield West Kennebunk, Me.**

Directions to ASNNE event locations

Directions to The New School in Kennebunck [38 York Street (Rt1) Kennebunk, ME]

For directions to The New School you can use this link to the ASNNE NSN page and then click on "get directions" from the meeting location. Enter your starting location to generate a road map with complete directions. It works great. http://nightsky.jpl.nasa.gov/club-view.cfm?Club_ID=137

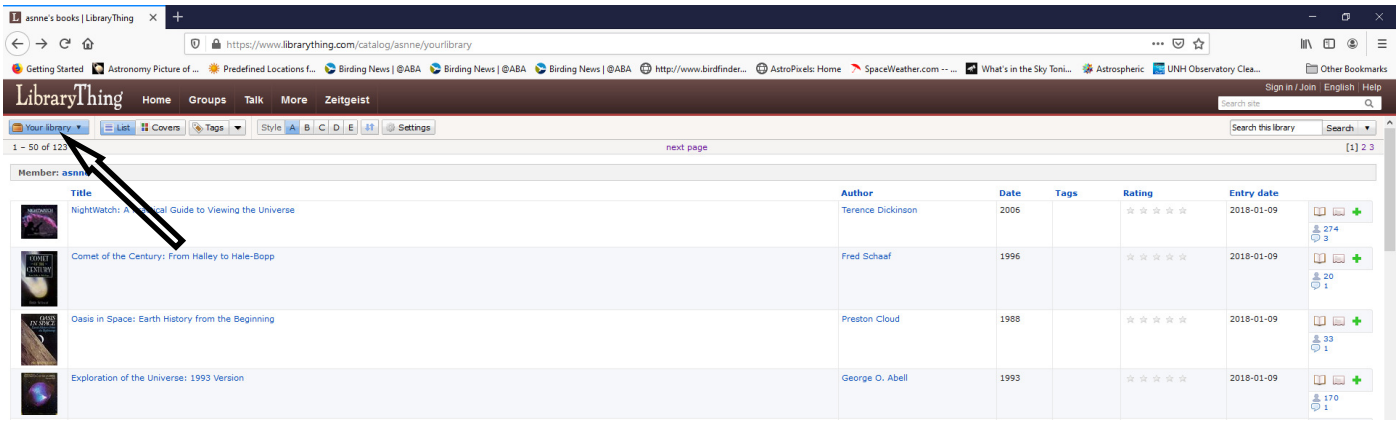
Directions to Talmage Observatory at Starfield [Alewive Road, Kennebunk, ME]

From North:
Get off turnpike at exit 32, (Biddeford) turn right on Rt 111. Go 5 miles and turn left on Rt 35. Go 2 miles on Rt 35 over Kennebunk River to very sharp 90 degree left turn. The entrance to the Starfield Observatory site is at the telephone pole at the beginning of the large field on the left. Look for the ASNNE sign on the pole.

From South:
Get off the turnpike at exit 25 in Kennebunk. After toll both turn right on Rt 35. Go up over the turnpike and immediately turn right on Rt 35. About 4 miles along you will crest a hill and see a large field on your right. Continue until you reach the end of the field. Turn right into the Starfield Observatory site at the last telephone pole along the field. Look for the ASNNE sign on the pole. If you come to a very sharp 90 degree right turn you have just passed the field.

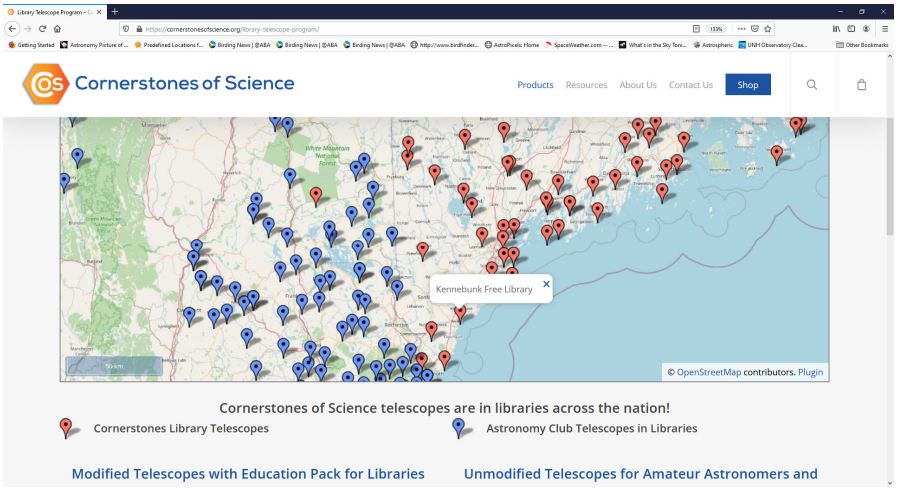
Astronomy Club & Library Resources

Our club has a library of astronomy books which are stored at The New School in Kennebunk, Maine (our monthly club meeting location). To request a book(s), contact one of the club officers. A listing of books is provided here: https://www.librarything.com/profile/asnne . After clicking on the link, a window will open. Click on “Your library” near the upper left corner (as shown by the arrow below). Then scroll down to the end of the page to go to the next page.



Would you like to borrow a telescope? While many astronomy clubs may have a scope to lend out, there are also many libraries which have telescopes for their guests to use. Here are a couple of links.

The following link will bring up an active map (see screen shot below) of the USA showing the libraries which have telescopes to lend out: https://cornerstonesofscience.org/library-telescope-program/



The below link will show a list of known participating library locations for the state of Maine.
https://www.librarytelescope.org/locations/usa/maine

To join **ASNNE**, please fill out the below membership form. *Checks should be made payable to: Astronomical Society of Northern New England (A.S.N.N.E).* For more details, please visit our website: **http://www.asnne.org**

Astronomical Society of Northern New England
P.O. Box 1338
Kennebunk, ME 04043-1338

2023 Membership Registration Form

(Print, fill out and mail to address above)

Name(s for family): _____

Address: _____
City/State: _____ Zip code: _____

Telephone # _____

E-mail: _____

Membership (check one):
Individual $35 _____ Family $ 40 _____ Student under 21 years of age $10 _____ Donation_____

Total Enclosed_____

Tell us about yourself:
1. Experience level: Beginner____ Some Experience ____ Advanced_____

2. Do you own any equipment? (Y/N) And if so, what types?

_____
3. Do you have any special interests in Astronomy?

_____
4. What do you hope to gain by joining ASNNE?

_____
5. How could ASNNE best help you pursue your interest in Astronomy?

_____
6. ASNNE's principal mission is public education. We hold many star parties for schools and the general public for which we need volunteers for a variety of tasks, from operating telescopes to registering guests to parking cars. Would you be interested in helping?
Yes_____ No_____

7. ASNNE maintains a members-only section of its web site for names, addresses and interests of members as a way for members to contact each other. Your information will not be used for any other purpose. Can we add your information to that portion of our web site?

Yes_____ No_____