

# Skylights

Newsletter of the Astronomical Society of Northern New England



FEB 2021



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 February

By Bernie Reim

The month of February is named after the Roman festival Februa, which are rites of purification. The second day of this month, Groundhog Day, marks the half way point of our winter season.

The Christian festival of Candlemas also occurs on this day.

The days are getting longer again at the rate of 3 extra minutes per day, which means that the days will be over an hour and 20 minutes longer by the end of this month than when it started. This happens because our northern hemisphere is slowly tilting back towards the sun again. By the end of this month, which will probably be much colder than our unusually warm January was, we will be just 3 weeks away from the vernal equinox.

There will be several interesting highlights this month. The trio of 3 planets, Jupiter, Saturn, and Mercury that formed some nice triangles in the bright evening twilight last month will once again hang out near each other this month. However, they have now switched their stage to the morning sky to continue to exhibit their ongoing celestial dance. We will lose Venus in the morning sky and Mars will be close to the moon on the 18<sup>th</sup>, and two asteroids will be at their best, 18 Melpomene and 29 Amphitrite.

See how early you can spot the recurring planetary trio in the morning sky in Capricorn this month. They should be visible by the 14<sup>th</sup>, as a nice celestial gift for Valentine's Day. They will appear low in the east southeast about 20 minutes before sunrise.

Jupiter is still 10 times brighter than Saturn and Mercury will be just a little brighter than Saturn. Then keep watching the trio as Mercury drops below the horizon again because it always has to stay close to the sun, even as Jupiter and Saturn continue to climb higher. Notice that they have traded places since that extremely rare and close conjunction we enjoyed on the winter solstice late last year.

This is a good month to take another tour of the winter hexagon since it is now at its best for the year. We will start with Capella in Auriga, located at the top of this hexagon. Think of it as

the "cap" on the sky. Located about 43 light years away, Capella is actually a binary star. Then continue clockwise to Aldebaran in Taurus, located 65 light years away. Its name means "the follower", since it seems to be following the Pleiades around the sky. At about 7 billion years of age, it is 2.5 billion years older than our sun. If there were any inhabited planets orbiting this star, they would have had that much more time to evolve than we did. Imagine where humans could be in just 50 to 100 years from now and then a few more billion years to that development.

Keep traveling to Rigel, the blue supergiant star marking the left knee of the mighty hunter, Orion, as he perpetually faces us in the sky. Located about 900 light years away, the light from this star left there at about the time that the Battle of Hastings in 1066 when William the Conqueror defeated the English. Halley's Comet was sighted during that epic battle that changed the course of history, as depicted on the Bayeux tapestry.

If you simply take the distance to each of these stars and relate them to historical events on Earth, you will review a good slice of recent history along with obtaining a more

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

three-dimensional view of this seemingly flat hexagon in nearby space.

Then you will encounter Sirius in Canis Major, the brightest star in the whole sky visible from anywhere on Earth. At only 8.8 light years away, you don't have to go very far back into history to see where you were when the light that you now perceive from this star actually left its source. Known as the Dog Star, Sirius has a white dwarf companion which completes one orbit around it every 50 years.

Then continue to the dimmest of these 8 stars, which is Procyon in Canis Minor, only a little farther away than Sirius at 11 light years. Procyon also has a white dwarf star orbiting around it every 40 years. It is 2 full magnitudes or over 6 times fainter than Sirius.

We will complete our circle or hexagon with Castor and Pollux in Gemini the twins. Each one is about 50 light years away, but Castor is a system of 6 stars and Pollux is also a multiple star system. There is much more to these two stars than meets the eye, even with a good telescope. A son of Zeus, Pollux is the immortal twin and Castor is the mortal one. We landed two humans on the moon for the first time ever 51 years ago, which is about the time the light left from that star system that you are seeing now. The moon will be very close to Pollux on the 23<sup>rd</sup>, so that will be a great connection to make as you look at both of them in the evening sky, knowing that we first set foot on the moon just when the light left the star right next to it. That will give you a much better sense of vast amount of space between these two celestial objects, even though they seem very close together in the sky from our line of sight.

Then we will land on Betelgeuse right in the center of this hexagon or winter circle. Notice its striking orange gold color. As you discovered, each star and star system is unique and very different in this circle, but Betelgeuse is by far the most intriguing and mysterious of these 8. It may not even exist anymore since it has already run out of hydrogen and is now fusing helium into carbon and may have already gone through its remaining stages as it rapidly runs out of fuel and explodes as a supernova, becoming about as bright as our entire galaxy of 300 billion stars for a brief moment before it fades out again about a month later.

Betelgeuse is about 700 times larger than our sun and located about 500 light years away. That is very similar to another red supergiant star, Antares in Scorpius. If we could place Betelgeuse where our sun is in the sky, the earth and all the planets right up to Jupiter would be orbiting inside this star.

As if that is not enough mystery for this star, Betelgeuse was acting very strange this time last year. It had faded all the way to 1.8 magnitude, which was its faintest in recorded history. It usually varies from about zero magnitude to 1.2, which is a difference of nearly 3 times in brightness. It varies on an irregular basis. It is also a double star, with a companion that is 10.4 magnitude. It spins

much faster than most other stars, which greatly distorts its shape. It spins at 3 miles per second, and our sun and most stars spin at about 1 mile per second. It may be spinning so fast because it may have captured and engulfed another star about 100,000 years ago.

Betelgeuse has now become much brighter again and has returned to its normal range. It fueled a lot of speculation last year when it got so dim that it was about to explode, especially since some gravitational waves were also detected from that area of the sky soon after it reached its faintest. We think we know what caused it to dim so much more than usual last year. The Hubble Space Telescope saw a large convection cell of superhot stellar gas that was ejected by this star and then cooled and condensed as a huge cloud of dust, obscuring its light by a considerable amount.

Betelgeuse is not ready to go supernova yet, but that could happen soon or it may take another 100,000 years. We are way overdue for a supernova to explode in our galaxy, since we should average one every 100 years. The last one was on 1604, known as Kepler's supernova in the constellation of Ophiuchus, the serpent bearer.

Feb.1. Mercury is still an evening planet for a few more days.

Feb.4. Clyde Tombaugh was born on this day in 1906. He would discover Pluto just 24 years later on Feb. 18 of 1930. I met Clyde personally after a presentation he gave about 25 years ago. Last quarter moon is at 12:38 p.m. EST.

Feb. 6. Look for a waning crescent moon near Antares in the morning sky. They will climb higher in tandem as the twilight brightens and the morning unfolds.

Feb.8. Jules Verne was born on this day in 1828.

Feb. 11. New moon is at 2:07 p.m.

Feb.14. On this day in 1990 Voyager 1 took a portrait of all the planets in the inner solar system from deep space. Only two such additional family portraits were ever taken, the last one was taken with the Cassini mission orbiting Saturn nearly a billion miles away. It was taken on July 19 of 2013 and we were told to look up and wave!

Feb. 15. Galileo was born on this day in 1564.

Feb.18. The moon will pass within 3.5 degrees of Mars this evening. Watch them both set around midnight.

Feb. 19. First quarter moon is at 1:48 p.m. Notice that it is nicely placed right between the Hyades and Pleiades star clusters in Taurus this evening, with golden-orange Mars still lurking nearby.

Feb. 23. Pioneer 11 left the solar system on this day in 1990. The waxing gibbous moon will be just 4 degrees from Pollux in Gemini, creating that nice juxtaposition of the 50 light years separating them being equivalent to the time when we first set foot on the moon.

Feb.24. The moon will be near the Beehive open star cluster in Cancer this evening.

Feb. 25. Look for the lovely trio of Mercury, Saturn, and Jupiter in the morning sky again low in the east-southeast. They will now be higher than when they first reappeared on the 14<sup>th</sup>.

Feb. 27. Full moon is at 3:18 a.m. This is also known as the Snow, Hunger, Storm, or Trapper's moon.

Moon Phases

**Feb 4**  
Last Quarter

**Feb 11**  
New

**Feb 19**  
First Quarter

**Feb 27**  
Full

Moon Data

**Feb 3**  
Moon at perigee

**Feb 10**  
Venus 3° north  
of Moon

Saturn 3° north  
of Moon

**Feb 13**  
Neptune 3° north  
of Moon

**Feb 17**  
Uranus 3° north  
of Moon

**Feb 18**  
Mars 4° north  
of Moon

Moon at apogee

## OBSERVER'S CHALLENGE\* –February, 2021

by Glenn Chaple

**NGC 1893 – Open Cluster in Auriga (Mag: 7.5, Size: 12.0')**  
**IC 410 – Emission Nebula in Auriga (Size: 40' X 30')**

This month's Observer's Challenge takes us to the emission nebula IC 410 and its embedded open cluster NGC 1893. The cluster is comprised of several dozen members, some twenty of which are magnitude 9 to 12. Most are massive O and B-type stars. They appear relatively faint because the entire system is 12,000 light years away.

It's the surrounding nebulosity that provides the real challenge. A haze surrounding NGC 1893 might be glimpsed with 6 or 8 inch scopes from remote dark-sky locations, but observers working from typical suburban environments will need as much as twice that aperture and possibly an assist from an O-III filter.

A distinctive feature of IC 410 is a pair of gaseous streamers northeast of NGC 1893 that point away from the cluster. Their similarity in appearance to larval frogs gives IC 410 the nickname the "Tadpoles Nebula." They appear in the accompanying close-up image of IC 410 taken by ATMoB member Mario Motta. For an ultimate Observer's Challenge, see if you can spot them visually.

Located at RA 5h22.7m and dec +33°24', this cluster/nebula complex is a quick star-hop from Melotte 31, a stellar group that includes the 5<sup>th</sup> magnitude star 16 Aurigae. About 20 arc-minutes west of 16 is the near-twin double star Struve 666 (magnitudes 7.85 and 7.89, separation 3.2"). Before moving on to NGC 1893/IC 410, give this little gem a look-see!

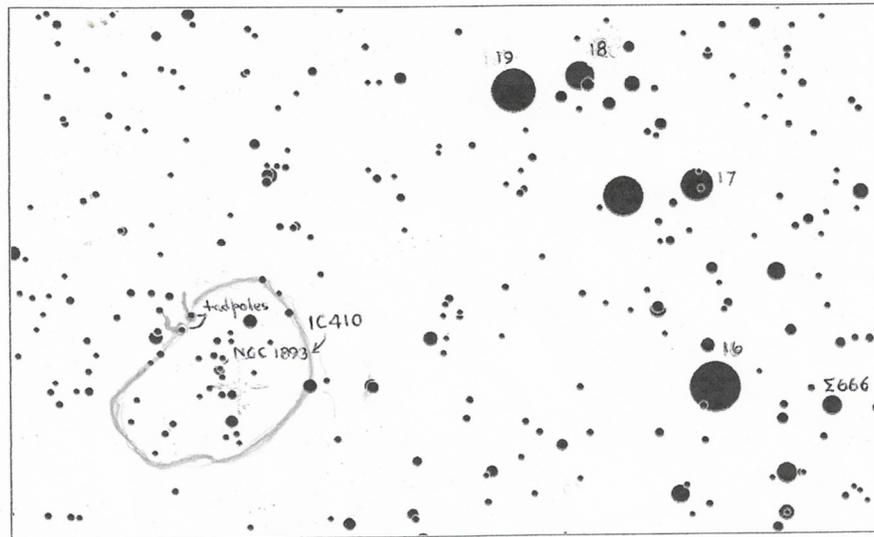
### NGC 1893/IC 410 finder charts



astronomy.com

*\*The purpose of the Observer's Challenge is to encourage the pursuit of visual observing and is open to everyone who is interested. Contributed notes, drawings, or photographs will be published in a monthly summary. Submit them to Roger Ivester (rogerivester@me.com). To access past reports, log on to rogerivester.com/category/observers-challenge-reports-complete.*

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Glenn Chaple, using the AAVSO's Variable Star Plotter. Field is  $1\frac{1}{2}^\circ$  by  $1^\circ$ , with North up.

### NGC 1893/IC 410 image



NGC 1893/IC 410 close-up image with North up. Image by Mario Motts (ATMoB) 2.5 hours H $\alpha$ , 1 hour O3, 1 hour S2.

## Principal Meteor Showers in 2021

**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

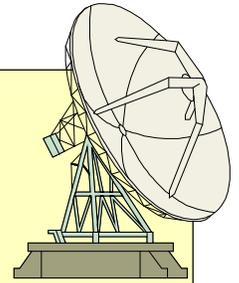
**December 14**  
Geminids

**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.***

**Our Club has Merchandise for Sale at: [www.cafepress.com/asnne](http://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](mailto:dadsnorlax@yahoo.com) for further details.**

### 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!



**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](https://nightsky.jpl.nasa.org) to find local clubs, events, and more!

## Landing On Mars: A Tricky Feat!

By David Prosper

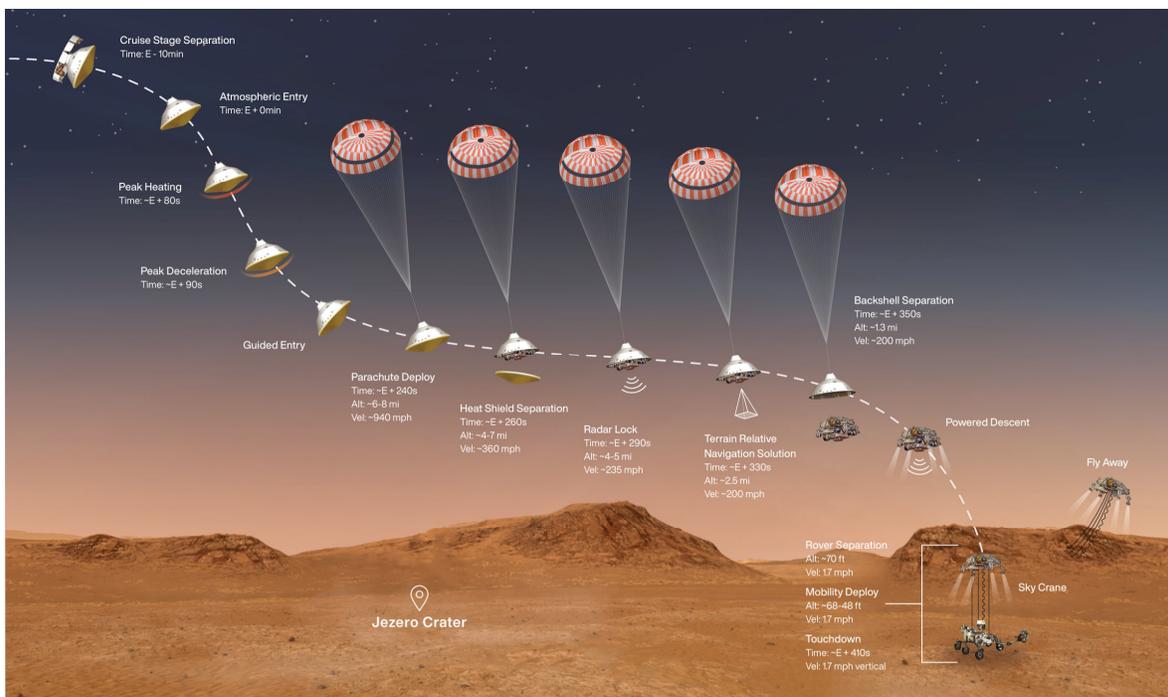
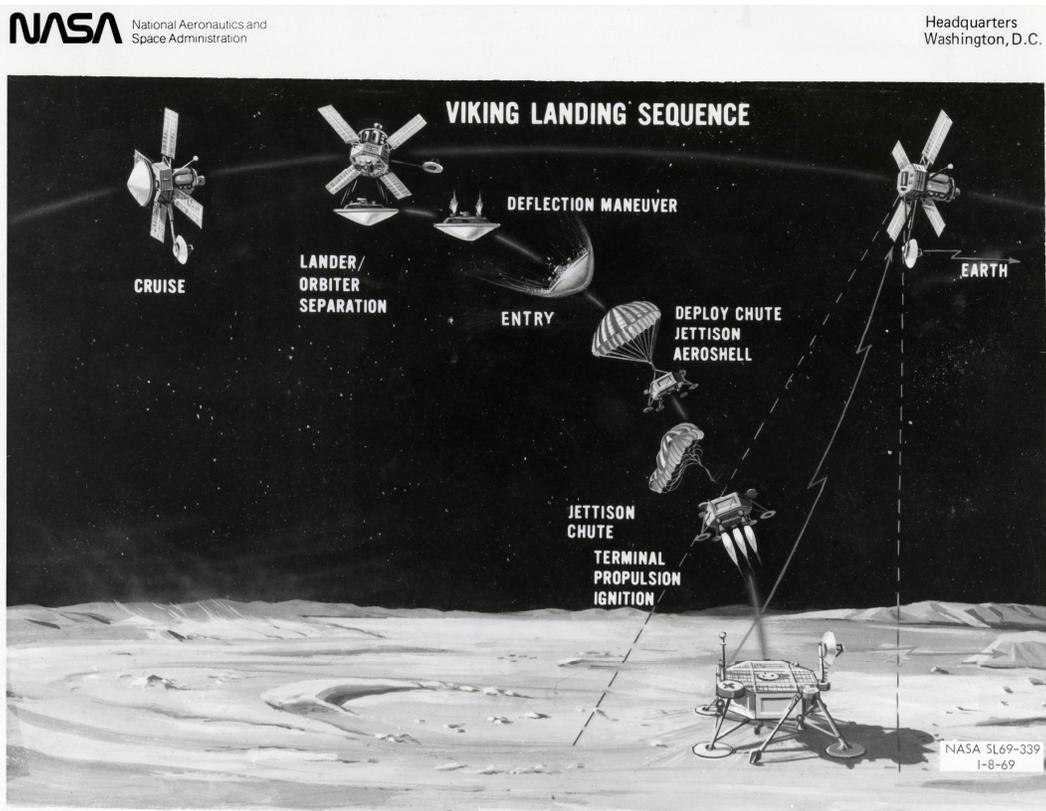
The Perseverance rover and Ingenuity helicopter will land in Mars's Jezero crater on February 18, 2021, NASA's latest mission to explore the red planet. Landing on Mars is an incredibly difficult feat that has challenged engineers for decades: while missions like Curiosity have succeeded, its surface is littered with the wreckage of many failures as well. Why is landing on Mars so difficult?

Mars presents a unique problem to potential landers as it possesses a relatively large mass and a thin, but not insubstantial, atmosphere. The atmosphere is thick enough that spacecraft are stuffed inside a streamlined aeroshell sporting a protective heat shield to prevent burning up upon entry - but that same atmosphere is not thick enough to rely on parachutes alone for a safe landing, since they can't catch sufficient air to slow down quickly enough. This is even worse for larger explorers like Perseverance, weighing in at 2,260 lbs (1,025 kg). Fortunately, engineers have crafted some ingenious landing methods over the decades to allow their spacecraft to survive what is called *Entry, Descent, and Landing (EDL)*.

The Viking landers touched down on Mars in 1976 using heat shields, parachutes, and retrorockets. Despite using large parachutes, the large Viking landers fired retrorockets at the end to land at a safe speed. This complex combination has been followed by almost every mission since, but subsequent missions have innovated in the landing segment. The 1997 Mars Pathfinder mission added airbags in conjunction with parachutes and retrorockets to safely bounce its way to a landing on the Martian surface. Then three sturdy "petals" ensured the lander was pushed into an upright position after landing on an ancient floodplain. The Opportunity and Spirit missions used a very similar method to place their rovers on the Martian surface in 2004. Phoenix (2008) and Insight (2018) actually utilized Viking-style landings. The large and heavy Curiosity rover required extra power at the end to safely land the car-sized rover, and so the daring "Sky Crane" deployment system was successfully used in 2012. After an initial descent using a massive heat shield and parachute, powerful retrorockets finished slowing down the spacecraft to about 2 miles per hour. The Sky Crane then safely lowered the rover down to the Martian surface using a strong cable. Its job done, the Sky Crane then flew off and crash-landed a safe distance away. Having proved the efficacy of the Sky Crane system, NASA will use this same method to attempt a safe landing for Perseverance this month!

You can watch coverage of the Mars Perseverance landing starting at 11:00 AM PST (2:00 PM EST) on February 18 at [nasa.gov/nasalive](https://nasa.gov/nasalive). Touchdown is expected around 12:55 PM PST (3:55 PM EST). NASA has great resources about the Perseverance Rover and accompanying Ingenuity helicopter on [mars.nasa.gov/mars2020](https://mars.nasa.gov/mars2020). And of course, find out how we plan to land on many different worlds at [nasa.gov](https://nasa.gov).

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*Illustrations of the Entry, Descent, and Landing (EDL) sequences for Viking in 1976, and Perseverance in 2021. Despite the wide gap between these missions in terms of technology, they both performed their landing maneuvers automatically, since our planets are too far apart to allow Earth-based engineers to control them in real time! (NASA/JPL/Caltech)*

## Point and Shoot Camera Astroimaging (no telescope)

### Canon Powershot SX50 HS

*Image & write-up submitted by Paul Kursewicz*

### Christmas Tree Cluster & Cone Nebula

Specs: RAW, f/3.5, FL 1200mm, ISO 1600, 1-1/2 min, 1-10-21



The **Christmas Tree Cluster** is a young open cluster 1 to 4 million years old and contains about 600 stars. It's located in the constellation Monoceros. It was named for its triangular shape. The bright star in the lower middle of my picture is the trunk of the tree. The apex of the tree is the bright star near the middle center of my image which represents an angel ornament. Just above the angel ornament is the **Cone Nebula**. It's too faint to see in this single exposure. But it can be seen [on the following page](#) in my 32 stacked image. The Christmas Tree Cluster is visible to the naked eye in good conditions and appears quite striking in binoculars. The Tree's shape can be seen in small telescopes at low power (beautiful in my scope). The cluster can be found using the bright stars of Orion and following a line drawn from Bellatrix to Betelgeuse to the east and a little bit north. Keep in mind that, depending on the optics you're using, the tree may appear sideways or upside-down (I rotated my image 90° CCW).

*“Continued on page 9”*

### Christmas Tree Cluster & Cone Nebula

Specs: RAW, f/3.5, FL 1200mm, ISO 1600, 32 x 1 min 30 sec, 1-10-21



The **Cone Nebula** (a dark conical silhouette against a red backdrop) is seen in my picture just above and slightly to the right of the angel ornament. It is a very faint object. The distance to the Cone is about 2200 light years and is about 7 light years in length. This triangular shaped nebula is probably caused by gas flowing outwards from young stars located near to the apex of the cone. The Blue Reflection Nebula is seen detached from the Cone Nebula, but it may be part of the same molecular cloud. The dust in this nebula scatters light from stars within the nebula and makes the nebula shine with a blue glow. To see the Cone Nebula a 10-inch or larger scope will be needed and dark skies.

## [Astronomical Society of Northern New England \(ASNNE\) Online Meeting Notes of 8 January 2021](#)

### [Submitted by Carl Gurtman](#)

**Record Note:** Because of the coronavirus crisis (COVID-19), the Regular Meeting of 8 January 2021, was not held in person. Rather, the meeting was held via the teleconferencing application, "Zoom". Ian Durham hosted these meetings. (Thank you Ian!). The first Friday in January was 1 January, but the meeting was shifted to the 8th to accommodate anyone who had New Year's Eve or New Year's Day plans. The following Notes are provided. They are not meant to take the place of regular Minutes, which were not taken, but rather to serve as documentation.

### [Zoom Teleconferencing Meetings of Friday, 8 January 2021](#)

**Business Meeting:** There was a no business Meeting. We started the Regular Meeting shortly after 7:30 pm.

**Regular Meeting:** There were 12 participants via Zoom.

### [Items Related to ASNNE Business:](#)

**Officer Rotation:** Previously, at our December Zoom meeting, Ron stated he has served long enough as ASNNE President. As an example of the stresses of the position, all mail ASNNE gets is forwarded to him. Tonight, Carl asked Ron, that if some people would take on the more onerous functions that Ron, as President, now performs, would Ron then agree to stay on as President? Ron answered that he would prefer to enjoy ASNNE as a regular member.

**Social Media Vehicle:** Because Yahoo will be no longer supporting our e-mails and document storage, we have had to move to a new provider. We are in the process of changing over to ".io". In December, we discussed that we have started out on the lowest tier of this provider, the free version. The middle tier, which would cost us \$220 per year, seems to be better suited to our needs. The very high end version, which is about \$20,000 per year (!!), is clearly beyond us, but the free level we are currently on does not provide us with sufficient memory. After discussion, a vote was taken, and we will move to the \$220/year tier.

Ian reported that he will soon be moving ASNNE to that level.

**"What's Up?":** Bernie gave his usual thorough, comprehensive, and complete discussion of what's in store for us in the skies of January. The major meteor shower, the **Quadrantids**, is now past. For trivia, the shower is named for an obsolete constellation, Quadrans Muralis, named for an obsolete stellar measuring device.

Bernie described the opening distance between Jupiter & Saturn as the 'Great Conjunction' fades. Carl noted his disappointment that more emphasis had not been placed on the naked-eye aspects of the conjunction. Other members contributed their experiences in observing the Great Conjunction; unfortunately, at closest approach ( 1/10 of a degree!), many experiences could be summed up in one word - cloud!

Bernie also described an upcoming unmanned mission to Mercury, and the aspects of the solar system's orbital mechanics that make the trip of much longer duration than the distances involved would seem to imply. Blame the sun and its gravity.

Bernie covered the names of this month's moons, and what happened on this day in . . . It was remarked that there seems to be a dearth of famous astronomers born in January. Someone put forward that Stephen Hawking was born in January, and (I just looked this up), so was Neil deGrasse Tyson.

**The Top Five Physics Stories of 2020:** Every year Ian gives a podcast for his organization, FQXi, the Foundational Questions Institute, on the stories that he has selected as the top five physics stories of the year just past. Ian also described the several stories that did not make the top five, and the reasons why. The podcast comes in two parts, and can be accessed at the FQXi site, <https://fqxi.org/>

Several of the stories appeared to challenge some of the concepts associated with classical quantum mechanics, such as the instantaneous collapse of the wave function, or the instantaneous shift of an electron between differing energy levels. So, there was quite a bit of discussion.

**Astroshorts:** The discussions of the few Astroshorts took place during Bernie's & Ian's presentations.

We will hold our next Meeting, via Zoom, on Friday, 5 February

Respectfully submitted,

Carl Gurtman

## Club Meeting & Star Party Dates

| Date              | Subject   | Location   |
|-------------------|---|--|
| <u>Feb 5</u>      | <p><b><u>ASNNE Club Meeting:</u></b></p> <p><b>Our Feb Club meeting at The New School has been cancelled due to the Coronavirus.</b></p> <p><b>In all likelihood the plan for the February meeting is to have our Club Meeting while staying at home by using ZOOM.</b></p> <p>So, a computer or a phone will be required. Ian Durham will likely organize all of this. And as we get closer to the 5th, Ian will post a connection link to join Zoom.</p> <p><b><u>Topic: TBD.</u></b><br/>Bernie Reim will do "What's Up."<br/>Astro Shorts</p> | <u>The New School, Kennebunk, Me.</u>                |
| <u>Last Month</u> | <p>At last month's Zoom meeting Bernie Reim did "What's Up." Club members also participated in Astro Shorts. The main presentation of the evening was Ian Durham's annual top five physics stories of 2020. He began by talking about some stories that did not make his top five. Each year Ian does a podcast with FQXi where he selects his top five physic stories of the year. The podcast can be accessed at <a href="https://fqxi.org/">https://fqxi.org/</a></p>  |  |
| <u>TBD</u>        | <b>Club/Public Star Party: TBD</b>  | Talmage Observatory at Starfield West Kennebunk, Me. |

### Directions to ASNNE event locations

**Directions to The New School in Kennebunk** [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](http://nightsky.jpl.nasa.gov/club-view.cfm?Club_ID=137)

**Directions to Talmage Observatory at Starfield** [Alewife 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.

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

**2021 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 \_\_\_\_\_

