

Skylights

Newsletter of the Astronomical Society of Northern New England



MAR 2017



Member of NASA's



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 March

By Bernie Reim

The month of March is named for the planet Mars, which stood for the Roman god of war. March used to be the first month of the year back in the early Roman calendar over 2500 years ago.

March always marks the return of spring for us in the northern hemisphere. This year that will happen at exactly 6:29 a.m. on Monday morning the twentieth of March. That is also called the vernal equinox and can be farther defined by the sun on the ecliptic crossing over the celestial equator on an upward path. When the sun crosses back over the celestial equator on a downward path half a year later that is called the autumnal equinox. Those are the only two days each year that the sun actually rises due east and sets due west. As we head towards winter the sun rises more and more south of east and sets more and more south of west and as we are heading into summer now as soon as spring starts, the sun will be rising farther and farther north of east and setting farther and farther north of west, creating the longer days and its higher path through our sky. All of this is simply the effect of the tilt of the earth which is currently 23.5 degrees and that defines the tropic of Cancer and the tropic of Capricorn.

Within a few days of both equinoxes are also the only days that are exactly 12 hours long everywhere on earth except for the poles. That can be seen as a very unifying factor from a scientific and celestial viewpoint. The sun rising and setting due east and due west on those 2 days also happens everywhere on Earth except for the poles. The reason that the equal nights and days don't fall exactly on the equinoxes is that the earth orbits in a slight ellipse around the sun and not a perfect circle as was believed for about a thousand years before Kepler came along and proved that it wasn't true.

Now that it is warming up and the days are getting longer, it is a good time to head outside under the night sky and enjoy and assimilate just a tiny bit of the great beauty that always

surrounds us. There are several good highlights to look for, but every clear night is a great night to get outside regardless of the season. Venus will put on a great show towards the end of the month as it will appear in both the evening and morning sky and its huge thin crescent may even be visible without binoculars. Then Mercury makes its best appearance for the year in the evening sky and Jupiter gets closer and higher and brighter approaching its opposition in early April. The best occultation of the year will occur on the 4th, but unfortunately the Northeast will be the only part of our whole country that will not be able to see any part of this great occultation of the moon and Aldebaran in Taurus. There will be a line cutting through Hartford, CT and the northern United States along which this will be a very rare graze occultation, meaning that the star Aldebaran will blink on and off several times as its light gets covered and uncovered by the mountains and the valleys on the moon right along the edge of its northern limb. This is the same cause for Bailey's beads, which happens right before and right after totality

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during a total solar eclipse, like the one the entire country will enjoy this summer on August 21.

Brilliant Venus was at its very best and brightest in 5 years during the middle of last month. Now you can watch its dramatic decline from 32 degrees high in the western sky at sunset to 0 degrees just over 3 weeks later as our sister planet disappears below our western horizon. It will reach inferior conjunction on Saturday the 25th. That is the closest it gets to earth for each cycle of 1.6 years. Its crescent will be very thin and huge and you may even be able to see it without binoculars or a telescope that evening and a few evenings before that. Its huge crescent will cover almost one minute of arc of the sky, or just 30 times less than the full moon covers at half a degree or 30 minutes of arc.

Look for something even more unusual this time around. Since Venus will pass more than 8 degrees north of the sun during this inferior conjunction, which is much farther north of the sun than it usually gets at this time, you will actually be able to see this planet both in the evening sky after sunset and in the morning sky before sunrise. This will happen for more than a week around the 25th. Start looking for Venus before sunrise as early as March 15th. By March 22nd, Venus sets 30 minutes after the sun, but already rises 33 minutes before the sun the next morning. That time will extend to 40 minutes by the 25th. Try to look at Venus with a telescope during this time and look for wispy cusp extensions of its thin crescent. These are caused by the back scattering of sunlight through the thick atmosphere of Venus. The only time this is more dramatic would be right before or after a transit of Venus, which happens 8 years apart and then not again for another 121.5 years as the earth, sun, Venus plane doesn't align very often. I saw both of the last two transits in June of 2004 and June of 2012.

Venus is a very strange planet. Its surface temperature is almost 900 degrees Fahrenheit, hot enough to melt some metals like lead and tin. At its surface, its air pressure is almost 100 times more than ours on Earth. At about 40 miles above the surface of Venus, its pressure equals ours on the surface of Earth. The enormous pressure on Venus is similar to being 3,000 feet under the ocean on Earth. Its atmosphere has high levels of carbon dioxide since infrared light from the sun can get through its atmosphere but then some of those rays can no longer escape back out into space. That is what makes a greenhouse on Earth work, but there is way too much carbon dioxide in the atmosphere of Venus. Its atmosphere is over 96% carbon dioxide and only about 3% nitrogen. Ours is about 78% nitrogen and 21% oxygen and a few other trace elements. We only have about 400 parts per million of carbon dioxide.

One year on Venus equals 225 days, but one single day is equal to 243 earth days. Venus also spins in the opposite direction of most planets, so the sun actually rises in the west each morning, but that is not very often. Even more interesting than that, Venus makes 13 trips around the sun every 8 years and reaches an inferior conjunction with Earth 5 times in those 8 years, or every 1.6 years. That is the famous golden ratio, also known as phi. The other 3 numbers are all Fibonacci numbers. That is the famous sequence that you get by simply adding the two previous numbers to get the next number. The ratio of any two of these numbers is 1.618. Many things in nature grow this way including sunflowers and galaxies and twigs on a branch.

Look for orange Mars about 15 degrees up and to the left of Venus. Mars continues to fade slowly, but it is still brighter than any nearby stars. The red planet sets a little earlier each night, but we will not lose it completely until early July. After that it will just show up again in the morning sky. It is about as far away from Earth now as it can get. Saturn continues to rise a little earlier each night in Scorpius. The ringed planet now rises soon after 1 in the morning. It will not reach opposition until the middle of June, just before summer starts.

March 1. Mars and Venus are near the moon this evening.

March 4. The moon in the Hyades in Taurus occults Aldebaran tonight.

March 5. First quarter moon is at 6:33 a.m. EST.

March 12. Full moon is at 10:55 a.m. EST. This is also called the Worm, Crow, Sap, or Lenten Moon. Daylight-saving time starts at 2 am this Sunday.

March 13. On this day in 1781 William Herschel discovered the planet Uranus.

March 14. Albert Einstein was born on this day in the year 1879. Jupiter, Spica, and the waning gibbous moon form a nice triangle in the east around 10 pm.

March 20. Last quarter moon is at 11:59 a.m. EDT. Saturn will be near the moon this morning.

Spring starts at 6:29 a.m. EDT this Monday morning.

March 22. On this day in 1997, Comet Hale-Bopp made it closest approach to Earth.

March 25. Venus reaches inferior conjunction with the sun tonight.

March 27. New moon is at 10:58 p.m.

March 29. Mars is near the slender waxing crescent moon this evening and the next.

Moon Phases

Mar 5
First Quarter

Mar 12
Full

Mar 20
Last Quarter

Mar 27
New

Moon Data

Mar 1
Uranus 4° north
of Moon

Mars 4° north
of Moon

Mar 3
Moon at perigee

Mar 4
Aldebaran 0.2°
south of Moon

Mar 10
Regulus 0.8° north
of Moon

Mar 14
Jupiter 2° south
of Moon

Mar 18
Moon at apogee

Mar 20
Saturn 3° south
of Moon

Mar 26
Neptune 0.005°
north of Moon

Submitted by Glenn Chaple



Sky Object of the Month – March 2017 (Courtesy LVAS Observer’s Challenge*) M67 – Open Cluster in Cancer (Mag. 6.9; Size 25’)

Cancer is home to a pair of Messier open clusters. The first, M44, is the large naked eye group that became one of Galileo’s first telescopic targets. The second, M67, is our LVAS Observer’s Challenge for March.

Discovered by the German astronomer Johann Gottfried Koehler in 1779 (some sources say he encountered it a few years earlier), M67 is located a little less than 2 degrees west of Acubens (alpha [a] Cancri). Its faintness when compared to M44 is illusory, as its calculated distance of 2600 light years is five times greater than that of the Beehive.

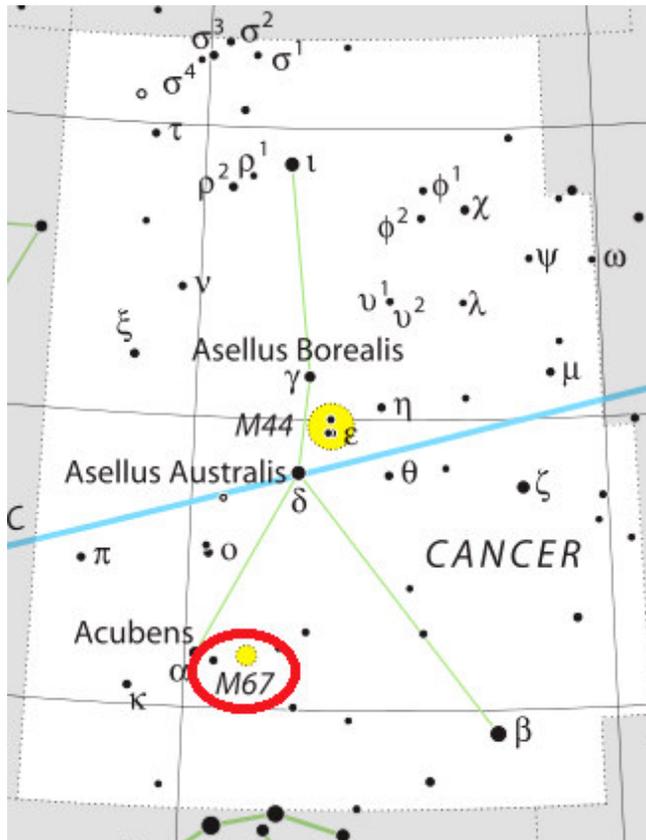
My first encounter with M67 was on the night of January 11, 1978, when I viewed it with a 3-inch f/10 reflector at 30X. I wrote in my log book, “Faint, ghostly, beautiful; Reminds me of M11. Contains three visible stars attended by a soft glow. Glow bursts into speckles of light with averted vision. General funnel shape.” More recently, I re-observed M67 with the same scope and a higher magnification of 60X. The cluster was better resolved; with a half dozen faint stars surrounded by another dozen or so averted vision stars.

M67 is visible in binoculars as a hazy patch of light, not unlike the naked eye appearance of M44. As already noted, a small-aperture telescope will reveal a handful of cluster members. Scopes in the 8 to 12-inch range will capture up to 100 of the cluster’s 500-plus stars.

Being one of the oldest known open star clusters with a calculated age of 4 billion years, M67 is of particular interest to professional astronomers. Along with the Hyades, it’s the most-studied of any open star cluster.

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www.messier-objects.com



Mario Motta M.D.

*The purpose of the LVAS Observer's Challenge is to encourage the pursuit of visual observing. It is open to everyone that is interested, and if you are able to contribute notes, drawings, or photographs, the LVAS will be happy to include them in our monthly summary. If you would like to contribute material, submit your observing notes, sketches, and/or images to either [Roger Ivester \(rogerivester@me.com\)](mailto:rogerivester@me.com) or [Fred Rayworth \(fred@fredrayworth.com\)](mailto:fred@fredrayworth.com). To find out more about the LVAS Observer's Challenge or access past reports, log on to lvastronomy.com/observing-challenge.

Principal Meteor Showers in 2017

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



The latest issue of the Space Place Newsletter: News and Notes for Formal and Informal Educators can be found at: <http://spaceplace.nasa.gov/en/educators> .

Space Place is a NASA website for elementary school-aged kids, their teachers, and their parents.

Check out our great sites for kids:



The Space Place website (<http://spaceplace.nasa.gov>)



The *SciJinks Weather Laboratory* at <http://scijinks.gov>



NASA Climate Kids at <http://climate.nasa.gov/kids>

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.
Just let our club member, David Bianchi, know.***

This article is provided by NASA Space Place.

With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!



Solar Eclipse Provides Coronal Glimpse

By Marcus Woo

On August 21, 2017, North Americans will enjoy a rare treat: The first total solar eclipse visible from the continent since 1979. The sky will darken and the temperature will drop, in one of the most dramatic cosmic events on Earth. It could be a once-in-a-lifetime show indeed. But it will also be an opportunity to do some science.

Only during an eclipse, when the moon blocks the light from the sun's surface, does the sun's corona fully reveal itself. The corona is the hot and wispy atmosphere of the sun, extending far beyond the solar disk. But it's relatively dim, merely as bright as the full moon at night. The glaring sun, about a million times brighter, renders the corona invisible.

"The beauty of eclipse observations is that they are, at present, the only opportunity where one can observe the corona [in visible light] starting from the solar surface out to several solar radii," says Shadia Habbal, an astronomer at the University of Hawaii. To study the corona, she's traveled the world having experienced 14 total eclipses (she missed only five due to weather). This summer, she and her team will set up identical imaging systems and spectrometers at five locations along the path of totality, collecting data that's normally impossible to get.

Ground-based coronagraphs, instruments designed to study the corona by blocking the sun, can't view the full extent of the corona. Solar space-based telescopes don't have the spectrographs needed to measure how the temperatures vary throughout the corona. These temperature variations show how the sun's chemical composition is distributed—crucial information for solving one of long-standing mysteries about the corona: how it gets so hot.

While the sun's surface is ~9980 Farenheit (~5800 Kelvin), the corona can reach several millions of degrees Farenheit. Researchers have proposed many explanations involving magneto-acoustic waves and the dissipation of magnetic fields, but none can account for the wide-ranging temperature distribution in the corona, Habbal says.

You too can contribute to science through one of several citizen science projects. For example, you can also help study the corona through the Citizen CATE experiment; help produce a high definition, time-expanded video of the eclipse; use your ham radio to probe how an eclipse affects the propagation of radio waves in the ionosphere; or even observe how wildlife responds to such a unique event.

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Otherwise, Habbal still encourages everyone to experience the eclipse. Never look directly at the sun, of course (find more safety guidelines here: <https://eclipse2017.nasa.gov/safety>). But during the approximately 2.5 minutes of totality, you may remove your safety glasses and watch the eclipse directly—only then can you see the glorious corona. So enjoy the show. The next one visible from North America won't be until 2024.

For more information about the upcoming eclipse, please see:

NASA Eclipse citizen science page

<https://eclipse2017.nasa.gov/citizen-science>

NASA Eclipse safety guidelines

<https://eclipse2017.nasa.gov/safety>

Want to teach kids about eclipses? Go to the NASA Space Place and see our article on solar and lunar eclipses! <http://spaceplace.nasa.gov/eclipses/>

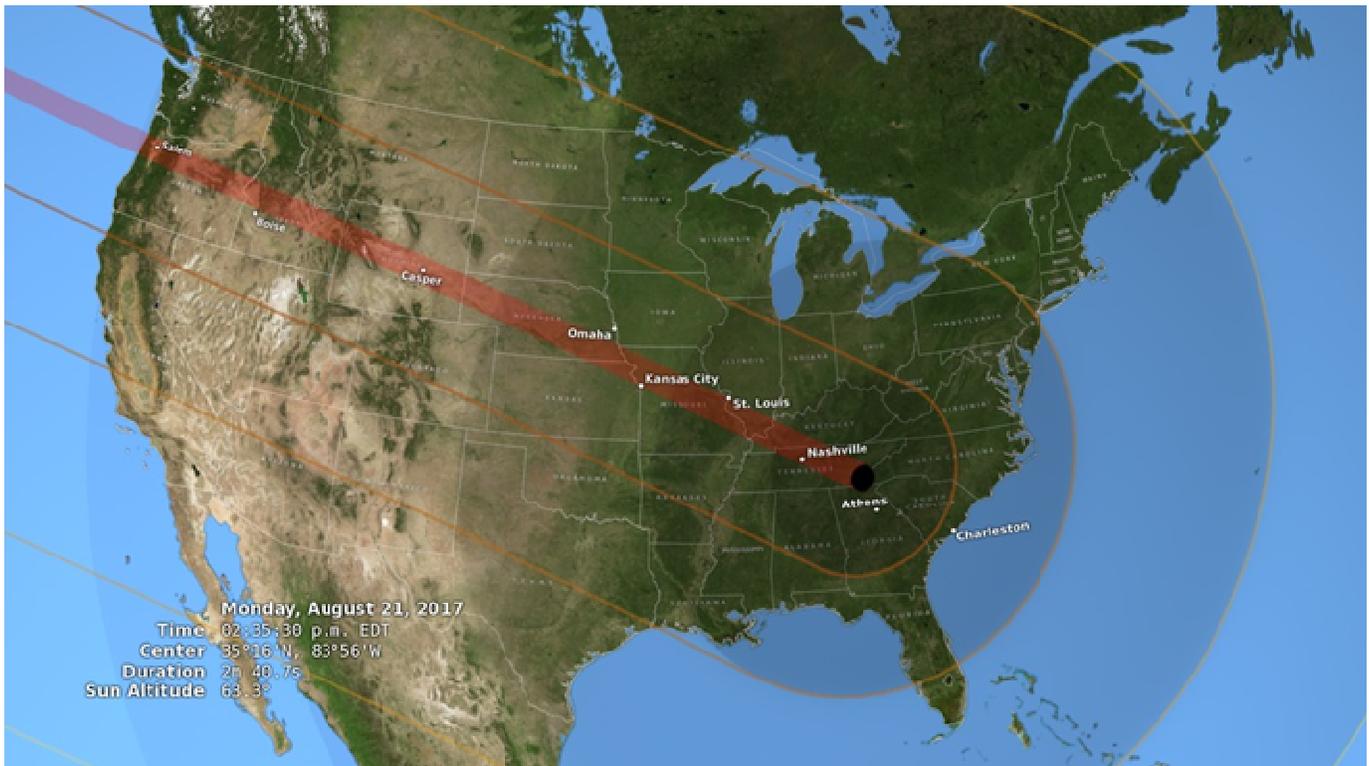


Illustration showing the United States during the total solar eclipse of August 21, 2017, with the umbra (black oval), penumbra (concentric shaded ovals), and path of totality (red) through or very near several major cities. Credit: Goddard Science Visualization Studio, NASA

Astro Photos

Photos Submitted by Editor

Sundog

Taken with my Cell Phone



24 hour Young Moon — 1% illuminated

Canon PowerShot SX50 HS



Club Meeting & Star Party Dates

Date	Subject	Location
March 3rd	ASNNE Club Meeting: 7:30-9:30PM <u>Meeting Agenda</u> Guest Speaker: TBD. Bernie Reim - What's UP Astro Shorts - (news, stories, jokes, reports, questions, photos, observations etc.) Next month — Gary Asperschlager - astronomy software.	The New School, Kennebunk, Me.
TBD	Club/Public Star Party (<i>Check List-serve / website for updates or cancellations</i>)	Starfield Observatory, 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

Directions to Starfield Observatory [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

2017 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 _____

