

# LONGMONT ASTRONOMICAL SOCIETY

NOVEMBER 2021

**“WIZARD NEBULA”**  
BY M. J. POST

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# LAS Meeting November 18 at 7 pm

## “Star-Struck: Space Weather for Humans and Technology” by Dr. Delores Knipp

### Abstract:

The visual manifestations of extreme space weather are terrifying and awe-inspiring: Blood-red aurora filling the skies, and in the days of the telegraph, sparks flying from terminals. The non-visual impacts of space weather in today’s technology-driven world can be pervasive, especially for spacecraft and any system relying on precise position, navigation, and timing. This presentation will touch on the “best of the worst” space weather storms, including an event in 1967 that nearly triggered World War III and the little-discussed storm of December 2006 that shut down the GPS system on the Sun-facing side of Earth.

### Bio:



Professor Delores Knipp is a Research Professor at the Smead Aerospace Engineering Sciences Department at the University of Colorado Boulder (CU Boulder). She earned a Ph D in Atmospheric and Space Physics from the University of California, Los Angeles in 1989. Her career spans more than 30 years as an active-duty Air Force Officer and civilian professor at the US Air Force Academy where she taught physics, meteorol-

ogy and astronomy, followed by more than a decade at CU Boulder. During that time, she wrote the first space weather textbook for upper division undergraduates entitled ‘Understanding Space Weather and the Physics Behind It.’ From 2014-2019 Professor Knipp was the Editor in Chief for the American Geophysical Union’s (AGU) Space Weather Journal.

Prof. Knipp’s research focuses on the space environment and the atmospheric and solar events that disturb it. She works with students to investigate methods for: 1) specifying satellite drag; 2) describing how structures on the Sun produce disturbances in near-Earth space; 3) improving scientific use of space environment measurements from DoD, NASA and international space missions; 4) inter-comparing measurements from research and commercial satellites with an eye toward making broader use of commercial satellite ‘housekeeping’ data to monitor environmental conditions in near-Earth space; 5) describing the effects of extreme space weather at Earth; and 6) developing educational material related to space weather. She also studies historical space weather events to understand the impacts these events have had on society and the US military.

In 2019 she joined the ranks of Fellows at the American Meteorological Society. Later that year she was awarded the 2019 International Marcel Nicolet Medal for Space Weather and Space Climate.

## About LAS

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## LAS Officers and Board Members in 2021



- Stephen Garretson, President
- M. J. Post, Vice President
- Sven Schmidt, Secretary
- Bruce Lamoreaux, Treasurer

- Board Members:
- David Elmore, Gary Garzone,
  - Mike Hotka, Brian Kimball,
  - Vern Raben

### Appointed Positions 2021

- Paul Kammermeier, Webmaster
- Bruce Lamoreaux, Library Telescope Coordinator
- Vern Raben, Newsletter Editor

# The Planets in November by Vern Raben

## Mercury

Mercury is visible in the evening sky around 6:20 pm until about the 5th. It magnitude -0.9 in brightness and its disk is 5.5 arc sec across.

## Venus

Venus is the brightest object in the southwest in the evening around 6 pm. It is around magnitude -4.4 to -4.7 in brightness and increases in apparent diameter from 26 arc sec across to 42 arc sec this month.

## Mars

Mars re-appears very low in the ESE around 6 am at the end of this month in constellation Libra. It will be magnitude +1.6 in brightness and its disk will be 3.7 arc sec across. It is not great to view this month but it will be by Nov. 2022 when it will be 70° above the horizon. Next Mars opposition is Dec. 7, 2022. At closest approach it will be 17.1 arc sec across. That is 5.1 arc sec less than in Oct. 2020 but it will be so much higher up this time!

## Jupiter

Jupiter is in constellation Capricornus in the south during the early evening. It decreases in brightness from magnitude -2.5 to -2.3 and decreases in size from 42 to 38 arc sec across. The Great Red Spot crosses the center of its disk at the following times this month:

Nov 1 at 8:28 pm at altitude 36°

Nov 3 at 10:07 pm at 28°

Nov 4 at 5:58 pm at 31°

Nov 6 at 7:37 pm at 37°

Nov 8 at 8:16 pm at 31°

Nov 11 at 5:47 pm at 36°

Nov 13 at 7:25 pm at 34°

Nov 15 at 9:05 pm at 24°

Nov 18 at 6:36 pm at 36°

Nov 20 at 8:15 pm at 27°

Nov 23 at 5:46 pm at 37°

Nov 25 at 7:25 pm at 31°

Nov 28 at 4:56 pm at 37°

Nov 30 at 6:35 pm at 34°

## Saturn

Saturn is also visible in constellation Capricornus during early evenings. It about magnitude +0.7 in brightness and its disk is 16 arc sec across.



“Saturn on Sept. 22” by Vern Raben

## Uranus

Uranus is in the constellation Aries. It is magnitude 5.7 in brightness and the disk is 3.7 arc sec across. It is at opposition on Nov. 4.

## Neptune

Neptune is visible in the constellation Aquarius. It is magnitude 7.8 in brightness and its disk is 2.3 arc sec across.

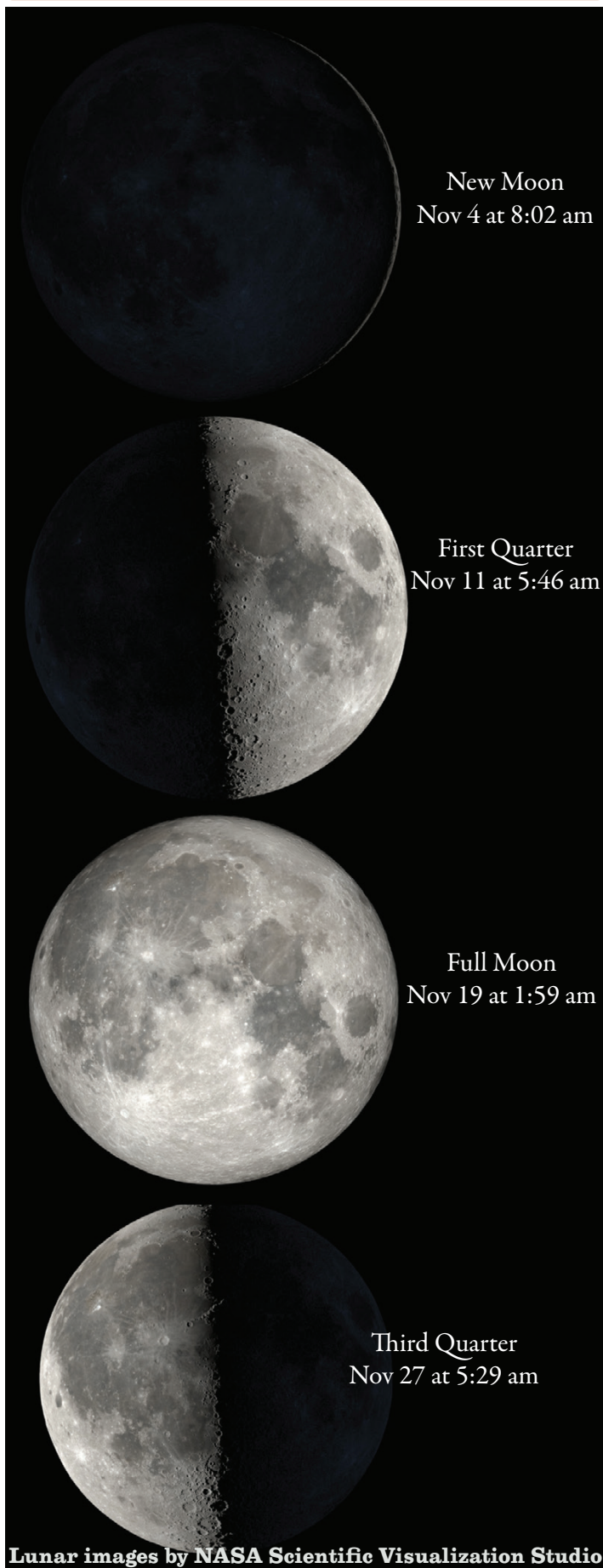
## Meteor Showers

Leonid meteor shower will peak on the 17th. That is only a couple of days before the full moon so only the brightest will be visible.



“Jupiter, GRS, and Europa on Sept. 22” by Vern Raben

## Lunar Phases in November



## Star Party Targets for Nov. 12

On Friday, November 12 sunset is at 4:47 pm; it will be fairly dark by 5:30 pm. Moon is at lunation 8.9.

### Galaxies

- M31 - "Great Andromeda Galaxy", magnitude +3.3
- M33 - "Pinwheel Galaxy" in Triangulum, mag. +5.8
- M101 - spiral galaxy in Ursa Major, mag +7.8
- M32 - elliptical Galaxy in Andromeda, mag +7.9
- M32 - elliptical galaxy in Triangulum, mag. 7.9
- M110 - elliptical galaxy in Andromeda, mag +8.1
- NGC 2403 - spiral galaxy in Camelopardais, mag 8.2
- IC 342 - spiral galaxy in Camelopardais, mag 8.6
- NGC 1023 - elliptical galaxy in Perseus, mag 8.6
- "Stephen's Quintet" - galaxy group in Pegasus, mag 12.6

### Globular Clusters

- M13 - globular cluster in Hercules, mag 5.8
- M92 - globular cluster in Hercules, mag 6.4
- M2 globular cluster in Aquarius, mag +6.5
- M15 globular cluster in Pegasus, mag +6.2
- M56 - globular cluster in Lyra, mag 8.3
- M71 globular cluster in Sagitta, mag +8.2
- NGC 6934 - globular cluster in Delphinus, mag 8.8
- NGC 6760 - globular cluster in Aquila, mag 8.9

### Planetary Nebula

- M27 - "Dumbbell Nebula" in Vulpecula, mag 7.1
- NGC 7009 - "Saturn Nebula" in Aquarius, mag 7.8
- NGC 6543 - "Cat's Eye Nebula" in Draco, mag 8.1
- NGC 7662 - "Blue Snowball" in Andromeda
- NGC 7027 - planetary Nebula in Cygnus, mag 8.5
- M57 - "Ring Nebula" in Lyra mag 8.8
- NGC 6826 - "Blinking planetary" in Andromeda, mag 8.9

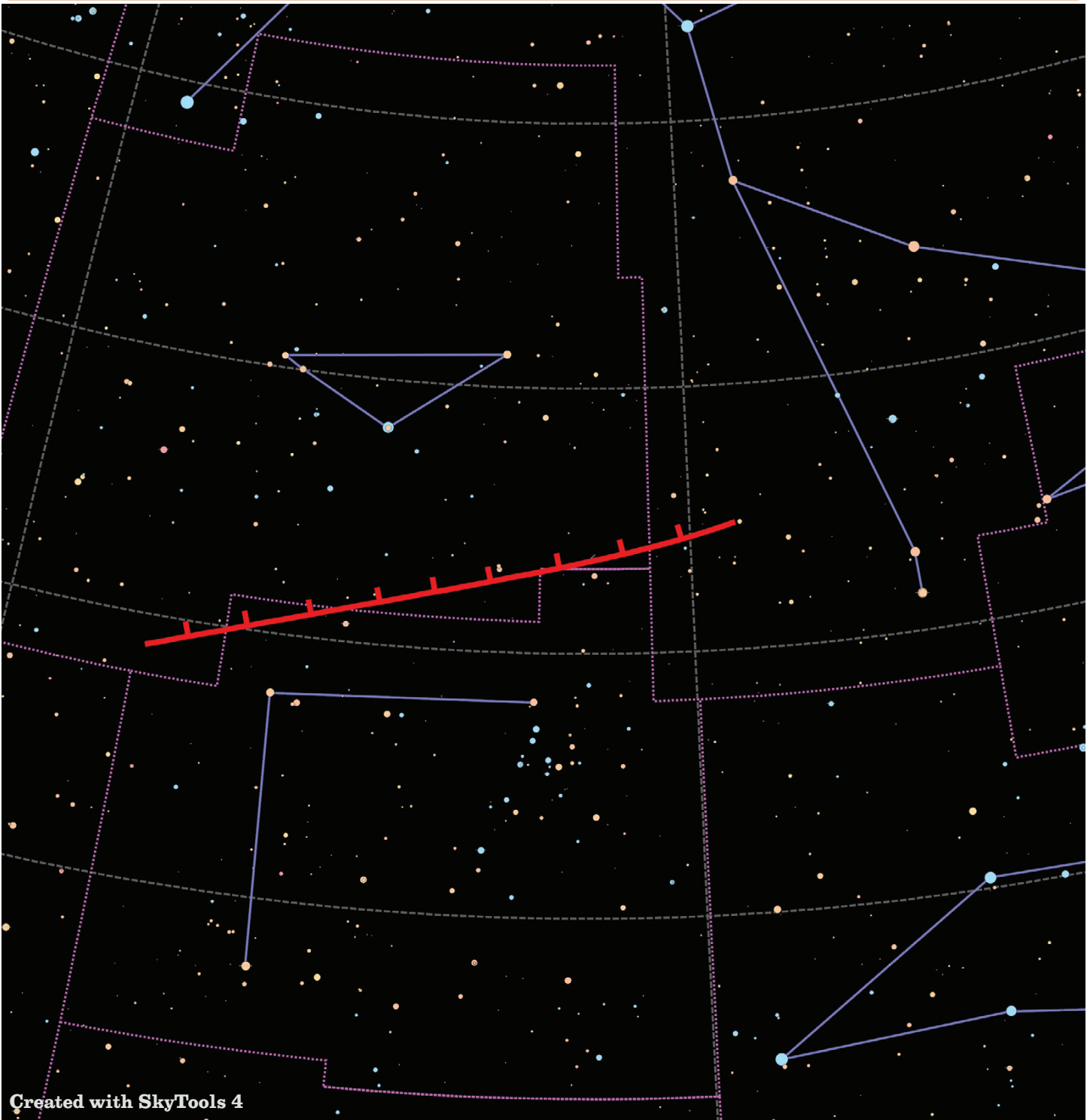
### Bright Nebula

- NGC 1432 - "Maia Nebula" in Taurus, mag 3.9
- Cederblad 19 - bright nebulas in Taurus mag 4.3-5.4
- NGC 1435 - "Merope Nebula" in Taurus, mag 5.0
- NGC 7000-North America Nebula in Cygnus, mag 4
- NGC 1499 - "California Nebula" in Pegasus, mag 5
- NGC 6960 - "Western Veil Nebula" in Cygnus, mag 5
- NGC 6974 - bright nebula in Cygnus, mag 5
- NGC 6995 - "Eastern Veil" in Cygnus, mag 4

### Planets

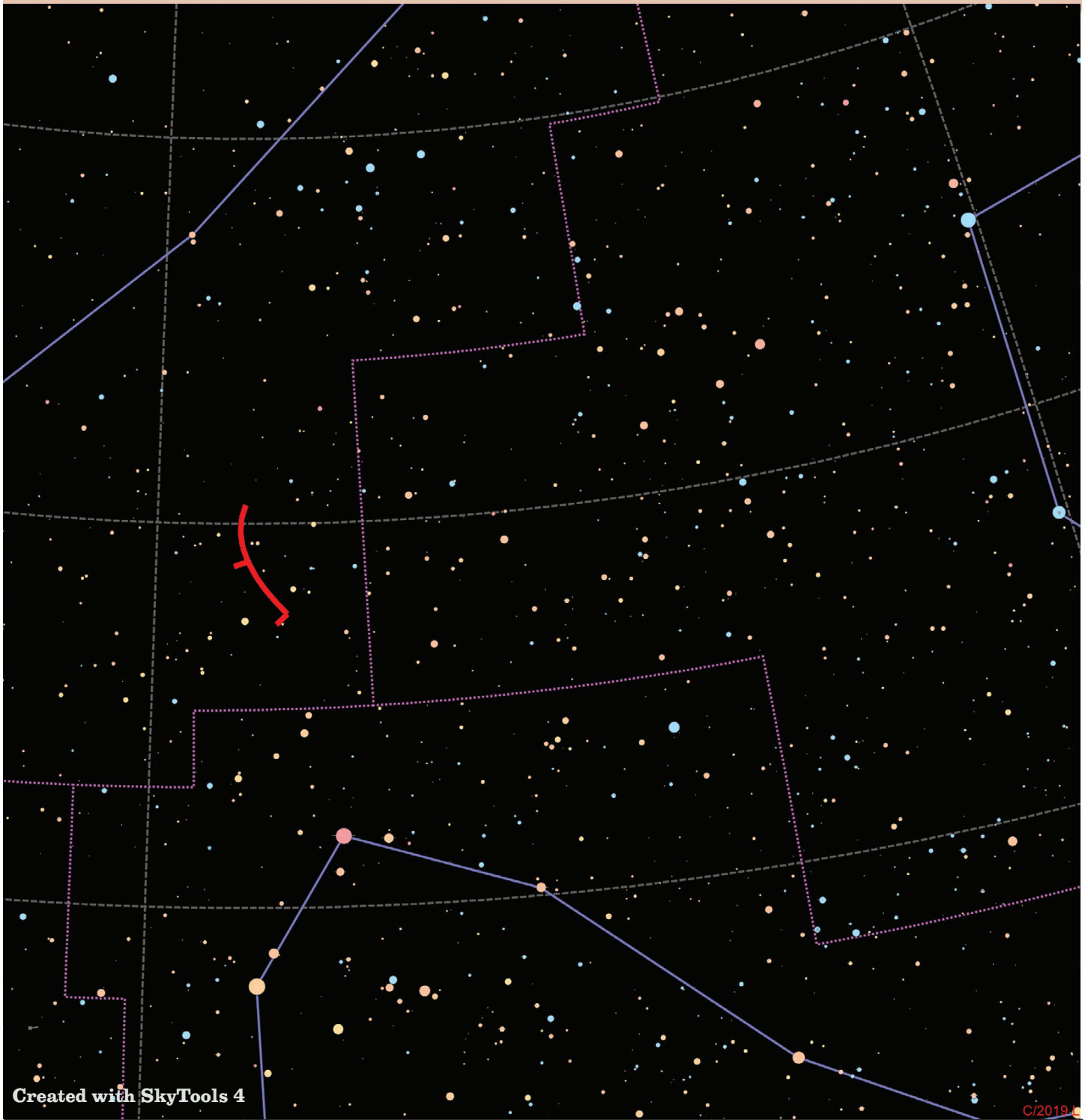
- Jupiter in constellation Capricornus, mag -2.5
- Saturn in constellation Capricornus, mag +0.7
- Neptune in constellation Aquarius, mag +7.8

## Comet 2021 A1 (Leonard)



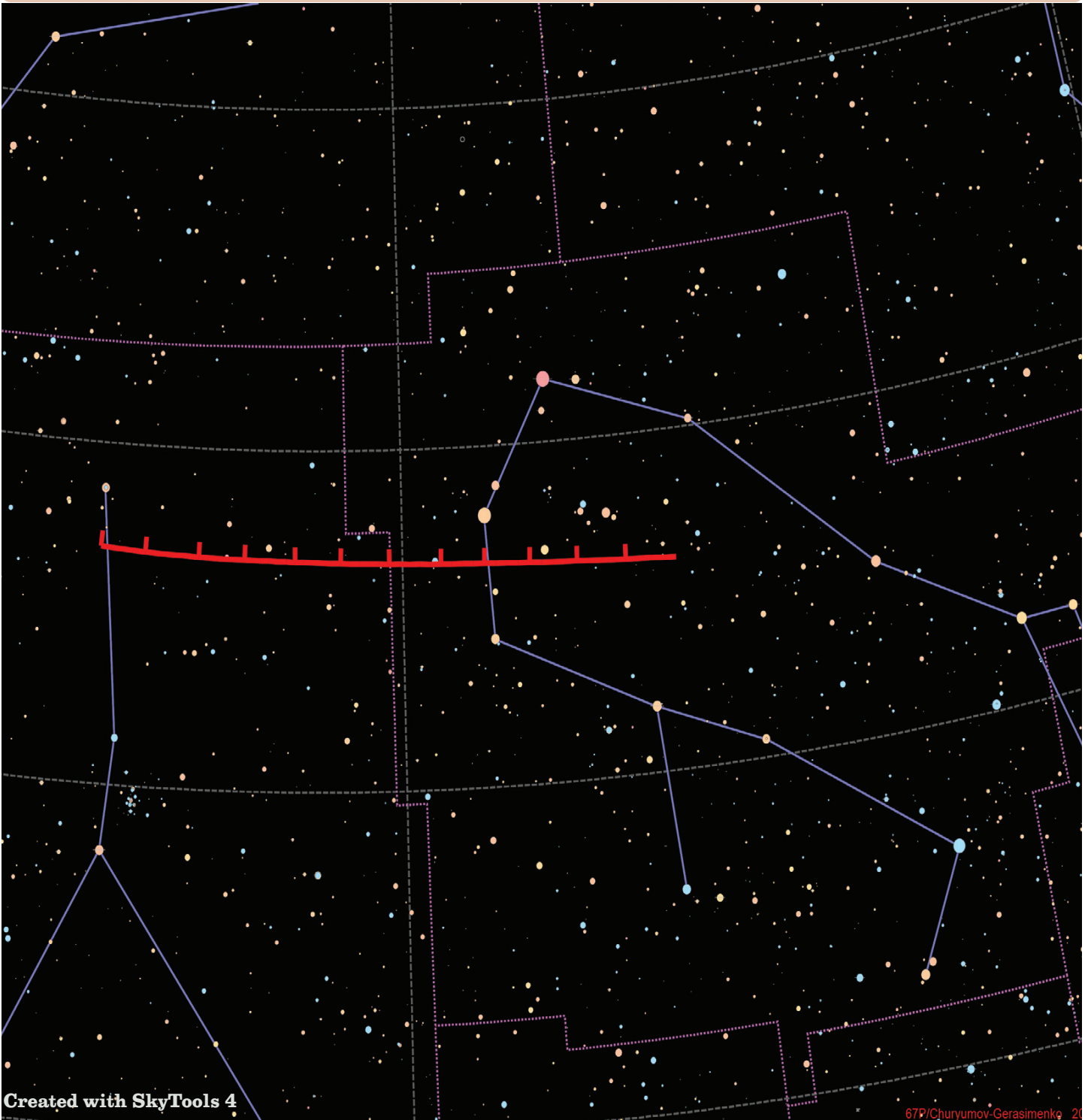
Date	Optimal time	RA	Dec	Constellation	Magnitude	Size (arc min)
Nov 1	6:03 am	11h54m14.7s	+34°38'23"	Ursa Major	10.5	4.2
Nov 7	5:09 am	12h03m13.1s	+34°10'00"	Ursa Major	9.9	4.7
Nov 13	5:15 am	12h14m22.8s	+33°38'59"	Canes Venatici	9.2	5.7
Nov 19	5:23 am	12h29m35.3s	+32°57'54"	Canes Venatici	8.4	7.0
Nov 25	5:28 am	12h53m05.7s`	+31°45'33"	Canes Venatici	7.4	9.2
Nov 30	5:33 am	13h26m44.3s	+29°30'46"	Canes Venatici	6.4	12.5

# Comet C/2019 L3 (ATLAS) in November 2021



Date	Optimal time	RA	Dec	Constellation	Magnitude	Size (arc min)
Nov 1	5:59 am	07h48m18.9s	+40°18'36"	Lynx	10.1	8.5
Nov 7	4:38 am	07h48m40.3s	+39°46'07"	Lynx	10.0	8.7
Nov 13	4:13 am	07h48m05.3s	+39°12'17"	Lynx	10.0	9.0
Nov 19	5:18 am	07h46m32.2s	+38°36'14"	Lynx	9.9	9.2
Nov 25	3:26 am	07h44m05.2s	+37°58'33"	Lynx	9.8	9.5
Nov 30	3:00 am	07h41m19.9s	+37°24'37"	Lynx	9.8	9.6

# Comet 67P/Churyumov-Gerasimenko



Created with SkyTools 4

67P/Churyumov-Gerasimenko 20

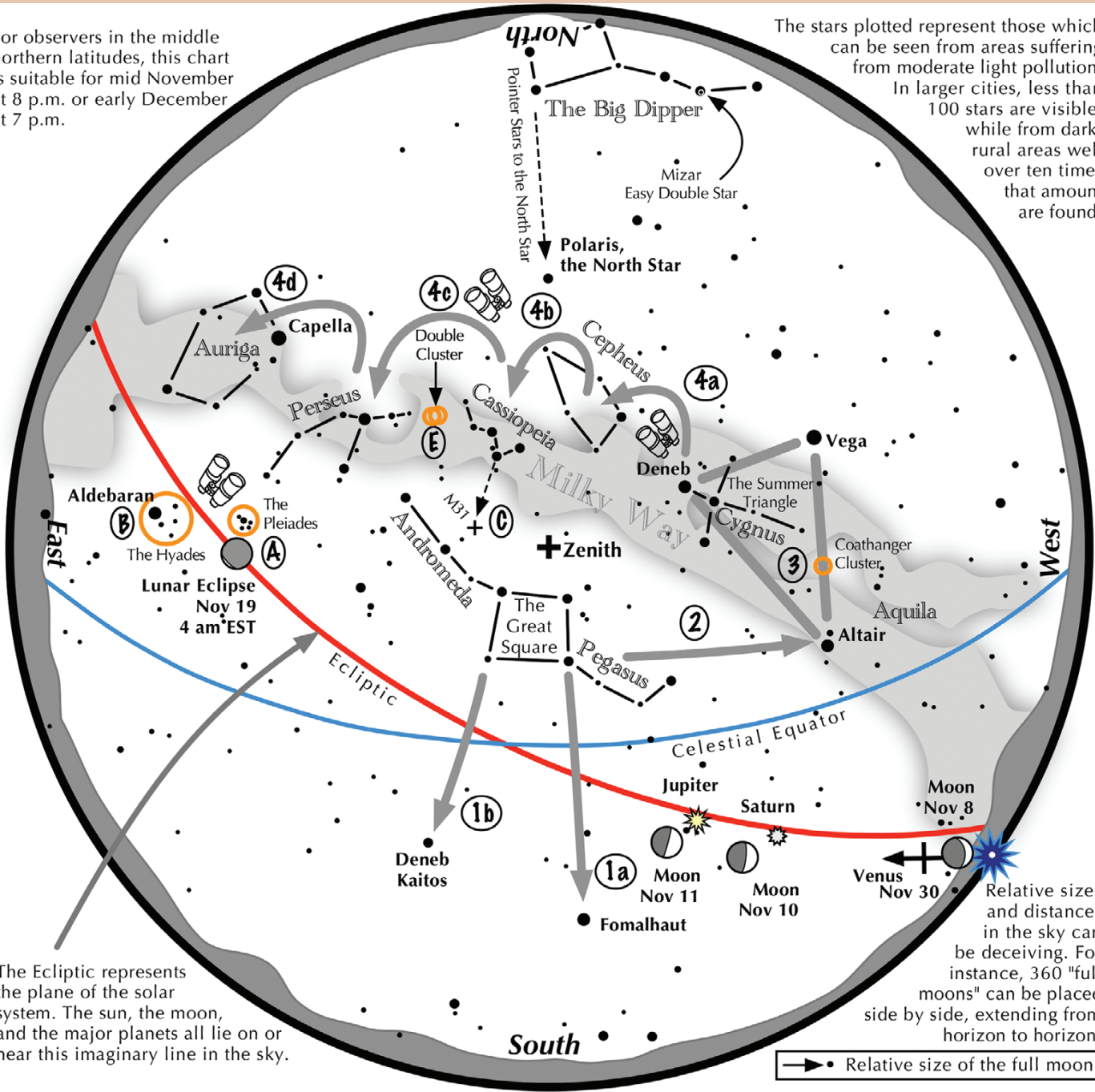
Date	Optimal time	RA	Dec	Constellation	Magnitude	Size (arc min)
Nov 1	5:37 am	07h24m28.5s	+26°20'06"	Gemini	10.3	3.4
Nov 7	4:36 am	07h46m56.9s	+26°34'09"	Gemini	10.3	3.4
Nov 13	4:32 am	08h06m50.5s	+26°41'47"	Cancer	10.3	3.4
Nov 19	5:19 am	08h24m00.2s	+26°46'30"	Cancer	10.3	3.4
Nov 25	4:30 am	08h38m00.9s	+26°51'22"	Cancer	10.4	3.4
Nov 30	4:04 am	08h47m22.2s	+26°57'26"	Cancer	10.5	3.4



# Navigating the mid November Night Sky by John Goss

For observers in the middle northern latitudes, this chart is suitable for mid November at 8 p.m. or early December at 7 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→ • Relative size of the full moon.

## Navigating the November night sky: Simply start with what you know or with what you can easily find.

- 1 Face south. Almost overhead lies the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend a line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the south. A line extending southward from the two easternmost stars, passes Deneb Kaitos, the second brightest star in the south.
- 2 Draw a line westward following the southern edge of the Square until it strikes Altair, part of the "Summer Triangle."
- 3 Locate Vega and Deneb, the other two stars of the Summer Triangle. Vega is its brightest member, while Deneb sits in the middle of the Milky Way.
- 4 Jump along the Milky Way from Deneb to Cepheus, which resembles the outline of a house. Continue jumping to the "W" of Cassiopeia, then to Perseus, and finally to Auriga with its bright star Capella.

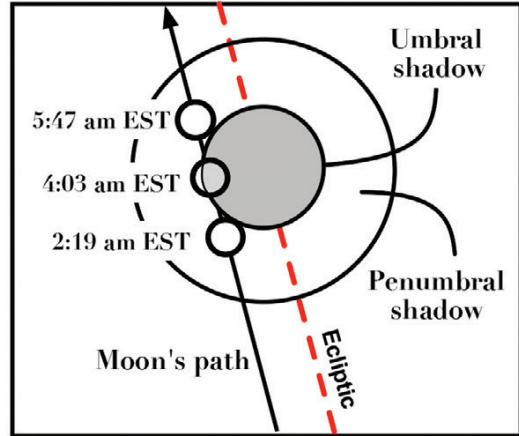
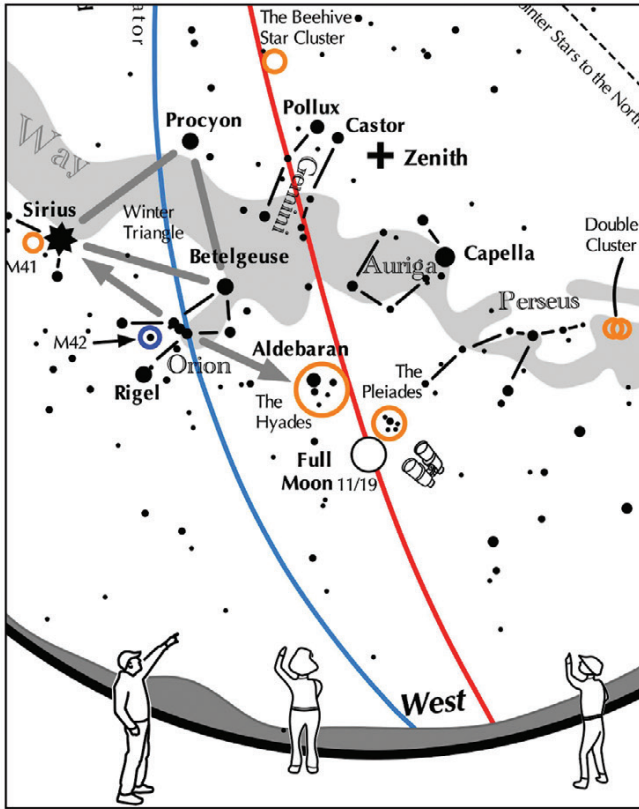
### Binocular Highlights

**A and B:** Examine the stars of the Pleiades and Hyades, two naked eye star clusters. **C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **D:** Sweep along the Milky Way from Altair, past Deneb, through Cepheus, Cassiopeia and Perseus, then to Auriga for many intriguing star clusters and nebulous areas. **E:** The Double Cluster.



Astronomical League [www.astroleague.org/outreach](http://www.astroleague.org/outreach); duplication is allowed and encouraged for all free distribution.

## In the early morning of November 19, try this challenge:



### The Moon slides through an almost total eclipse

In the early morning hours of Nov. 19 for east coasters, and after 11 p.m. on the 18th for west coasters, the brilliant full moon slides into Earth's shadow. But the moon's surface isn't completely covered, just 97% of it at maximum eclipse.

- Even though the partial umbral eclipse begins at 2:19 EST, darkening may not be noticed for another 5 minutes.
- At mid eclipse, can you see that the southern limb of the moon is not in full darkness?
- At mid eclipse, what color is the moon? How red is it?
- Before the eclipse begins, the moon's sky glow blocks viewing the Pleiades star cluster. How close to mid eclipse are the Pleiades still visible?

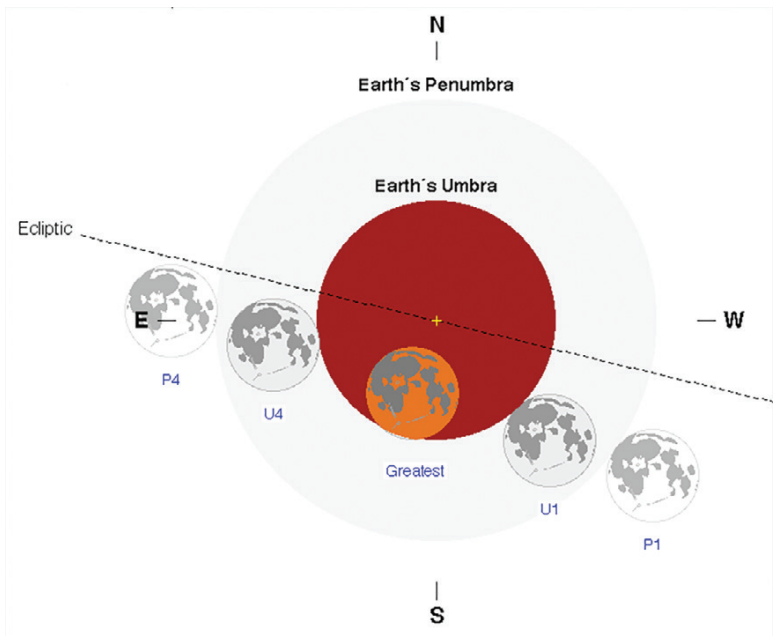


View to the west  
on November 19  
at 4 am EST,  
1 am PST



### Partial Eclipse Times for Mountain Time Zone

- U1 - Partial eclipse begins Nov. 19 at 12:19 am MST
- Greatest eclipse occurs on Nov. 19 at 2:03 am MST
- U4 - Partial eclipse ends on Nov. 19 at 3:47 am MST



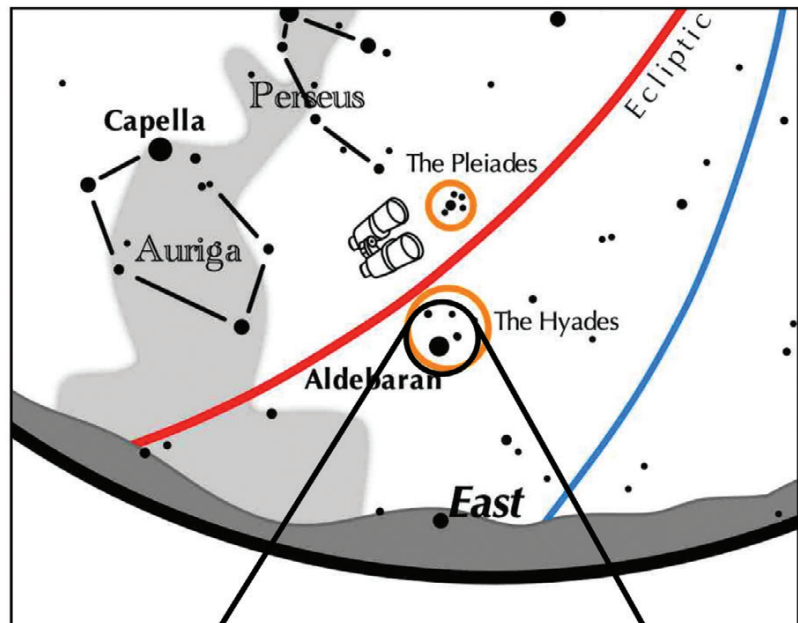
# Have you ever seen the dwarf planet Ceres?

*end of October brings a good opportunity ...*

If you observe in a dark suburban (or darker) area, use binoculars to spot the tiny, rocky world.

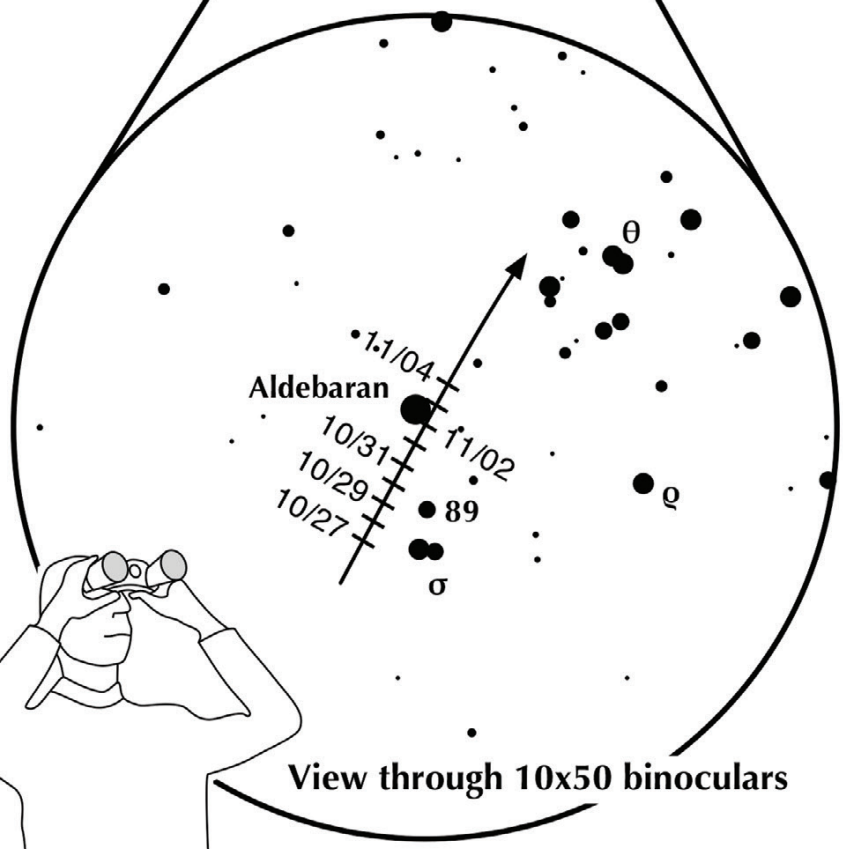
## First, find Aldebaran:

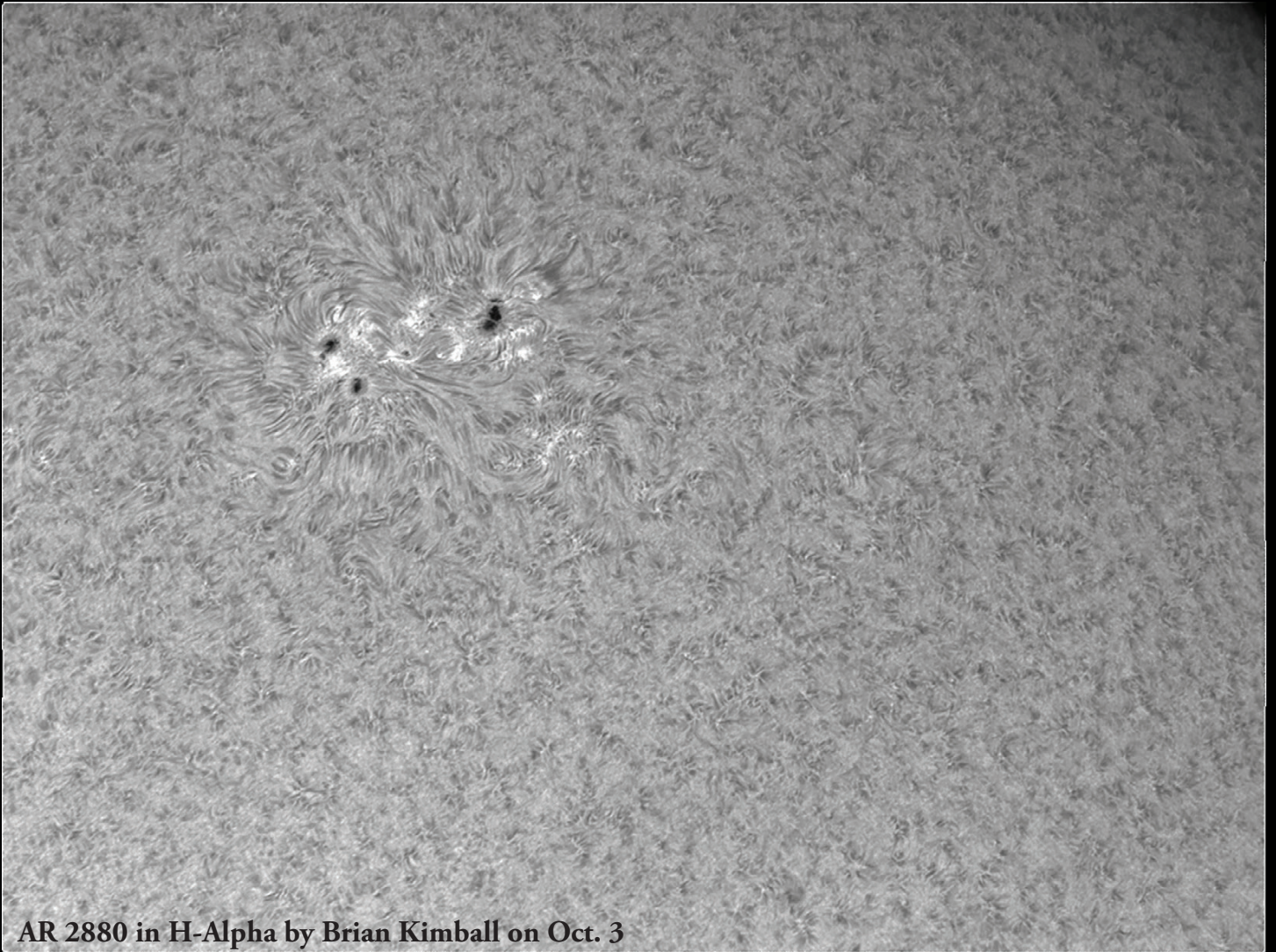
- at 10 p.m. EDT after October 27, face east.
- Look for the distinctive star cluster the Pleiades.
- Just below it is the bright, red star Aldebaran.
- Aldebaran is surrounded by the the loose star cluster, the Hyades.



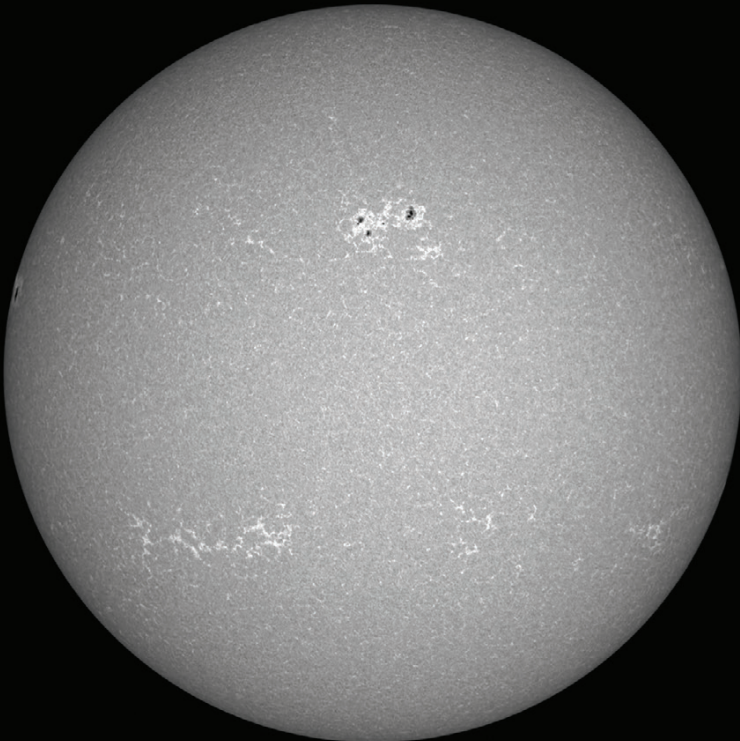
## Next, find Ceres:

- Aim binoculars at Aldebaran.
- Use the accompanying binocular chart.
- Identify Sigma and 89 Tauri.
- Ceres will be the dim starlike object in the plotted location.
- At a magnitude of 6.9, it will not be bright, but one of the dimmer points.
- Plot its location.
- Look the next evening to see how much it has moved.
- Ceres is closest to Aldebaran on the evenings of Nov. 2 & 3. However, the star's glare may obscure the dim dwarf planet.





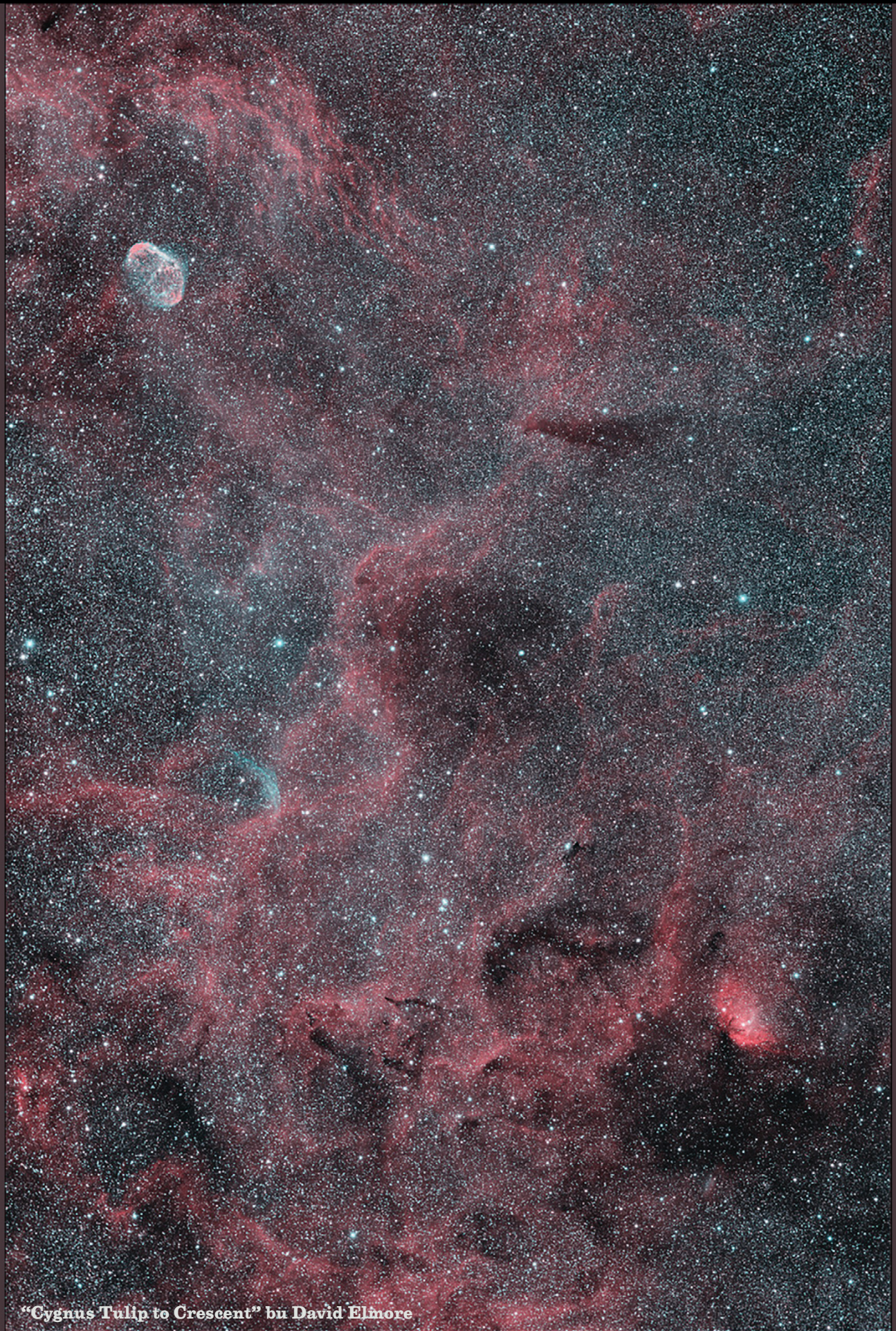
**AR 2880 in H-Alpha by Brian Kimball on Oct. 3**



**"Sun in Calcium K" by Brian Kimball on Oct. 3**



**"Sharpless 2-190, Heart Nebula" by David Elmore**



**"Cygnus Tulip to Crescent" by David Elmore**



**“NGC 1275, Perseus Galaxy Group” by Eddie Hunnell**



**“NGC 1514, Crystal Ball Nebula” by Eddie Hunnell**

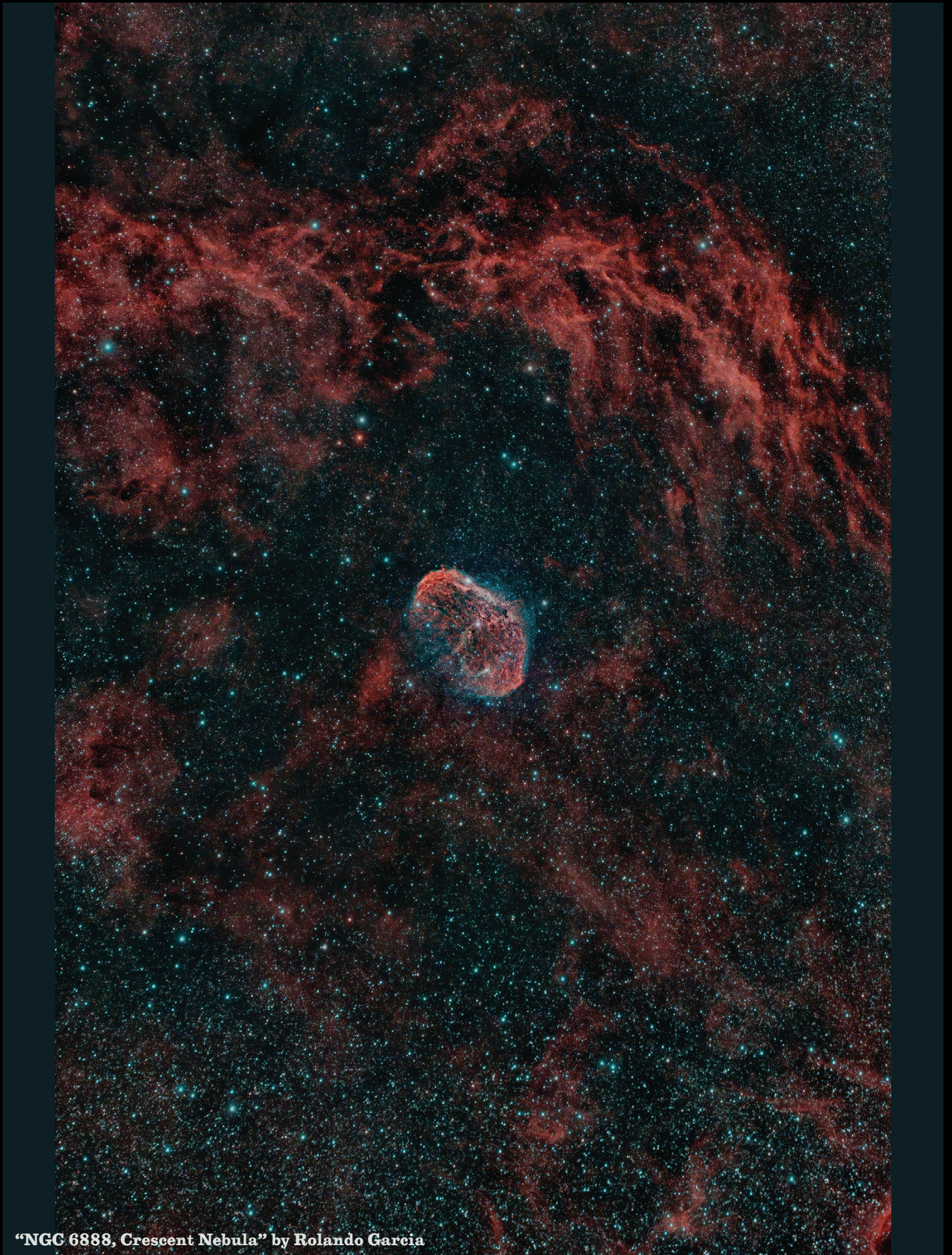




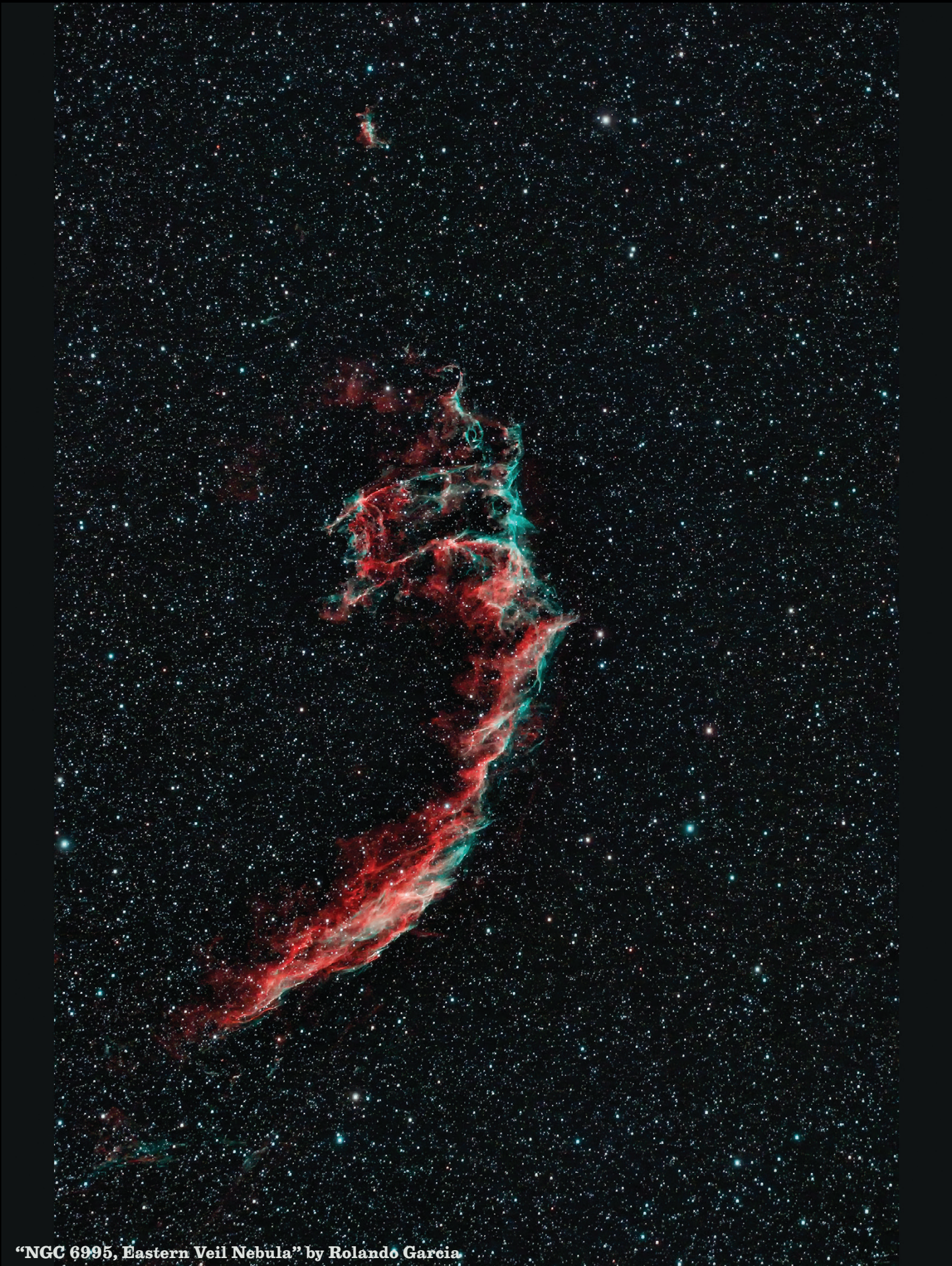
**"M15" by Gary Garzone**



**"NGC 253" by Gary Garzone**



**“NGC 6888, Crescent Nebula” by Rolando Garcia**



**“NGC 6995, Eastern Veil Nebula” by Rolando Garcia**



**“M33” by Martin Butley**



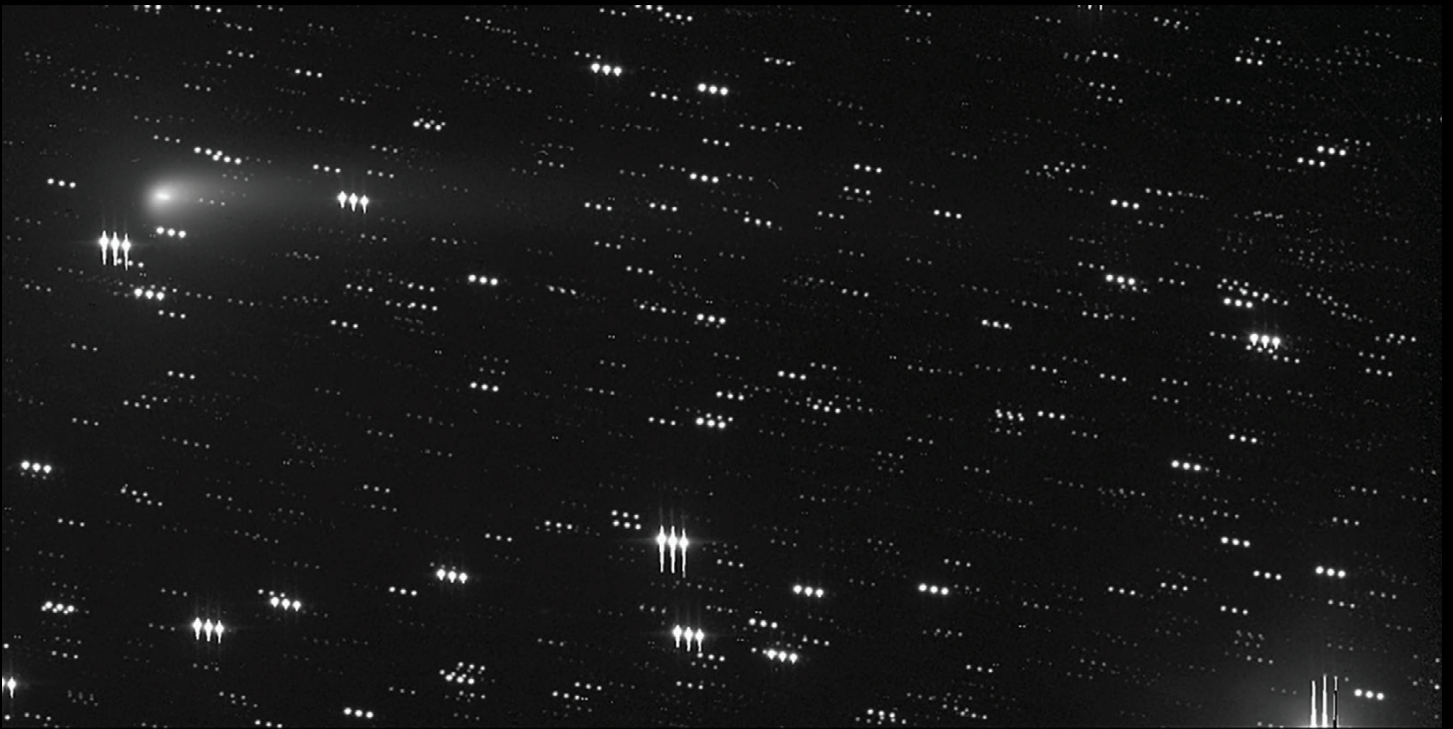
**“NGC 7814” by Martin Butley**



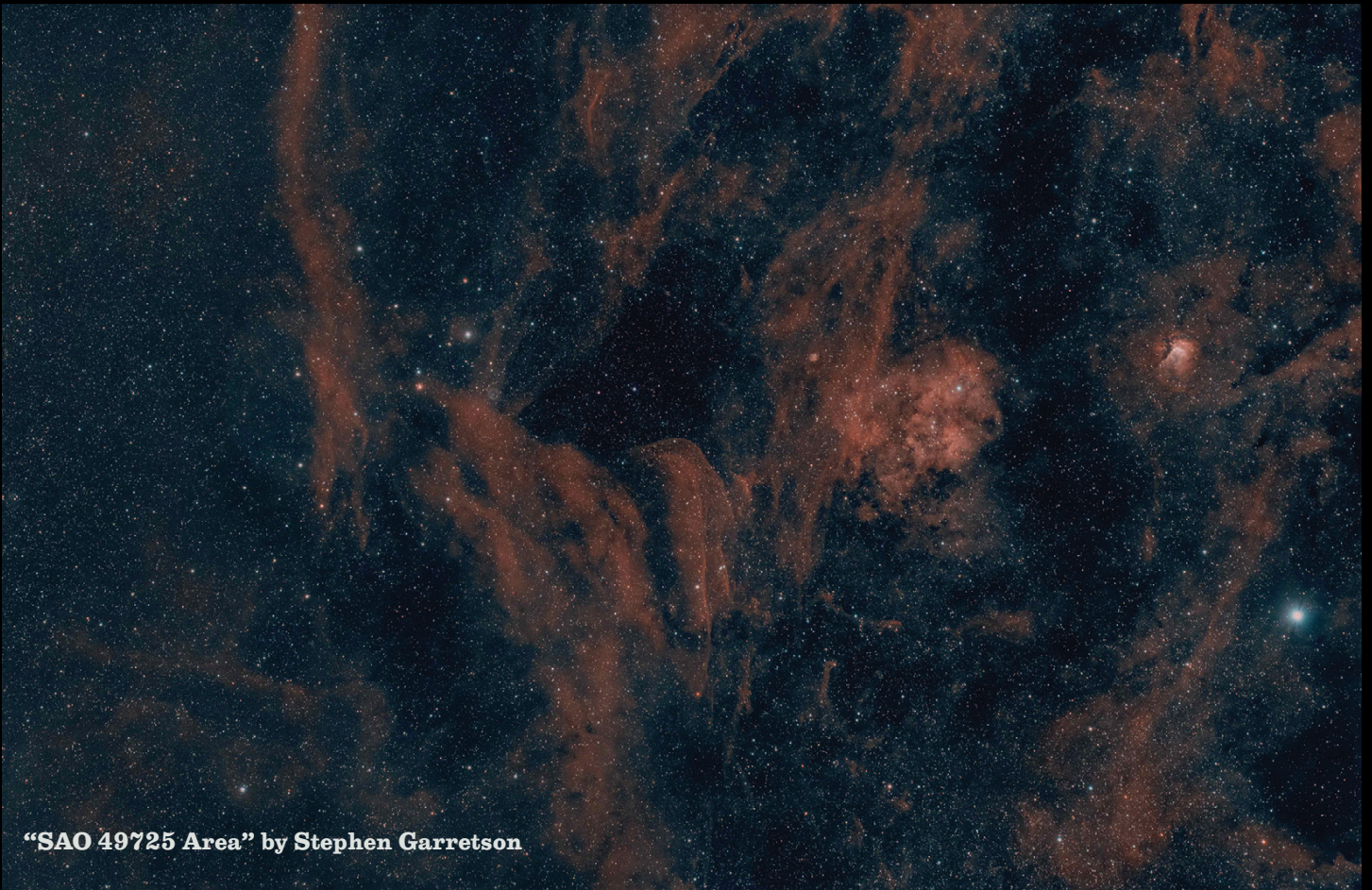
**“NGC 7822, Calf and Horse” by M. J. Post**



**“NGC 281, PacMan” by M. J. Post**



**Comet 67P/Churyumov-Gerasimenko 2021 Oct. 10 07:10 UT.**  
By Paul Robinson remotely using iTelescope "T21", Planewave CDK 431mm (17") f4.5  
in New Mexico, USA. 3x300 sec luminance tracking on stars, stacked on comet.



**"SAO 49725 Area" by Stephen Garretson**

# Notes for Thurs. Sept. 16 meeting by Vern Raben

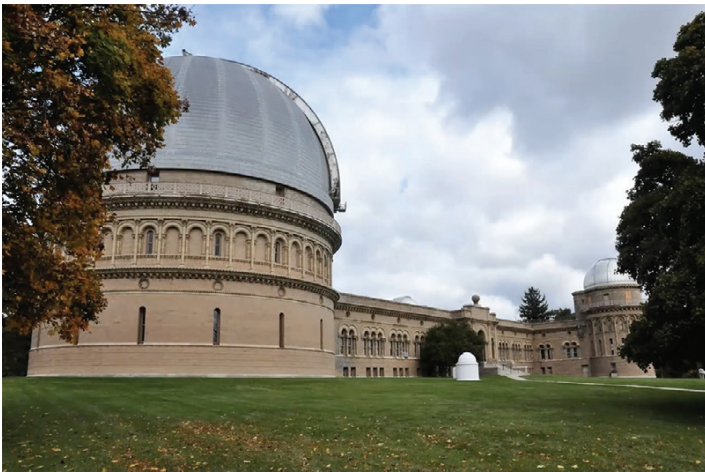
## I. Call to Order

Stephen Garretson opened the meeting via Zoom and welcomed everyone. Officers present were Stephen Garretson - president, M. J. Post - vice president, and Bruce Lamoreaux - treasurer. Board members present were Gary Garzone, Brian Kimball, Tally O'Donnell, David Elmore, and Vern Raben. Paul Kammermeier - webmaster was present. There were 27 members attending.

## II. New Members and Visitors

Unfortunately I missed recording this. VR

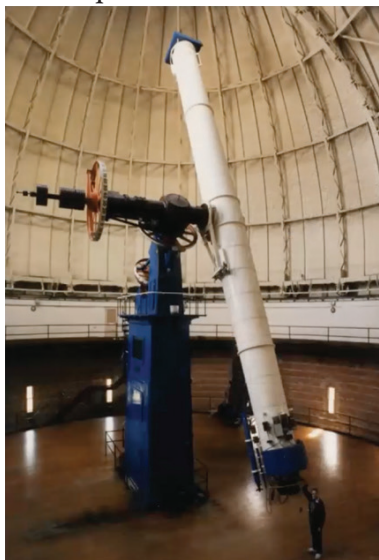
## III. September Astronomical History Note by Stephen Garretson



Yerkes Observatory in Williams Bay, Wisconsin.

Yerkes Observatory has the largest refractor ever built. It completed on Oct 21 in 1897. Scope and mount was on exhibition in Chicago Worlds Fair in 1890. It is a 40 inch Clarke doublet. The telescope tube is all steel construction. The dome to house the refractor is 90 ft in diameter.

It was operated by the University of Chicago Department of Astrophysics until 2020 when ownership was transferred to the Yerkes Future Foundation in 2020. The foundation is renovating and restoring the building and grounds. Date hasn't been announced yet but it should re-open to the public sometime next year. Yerkes is known



as the birthplace of modern astrophysics. Prior to construction of the Yerkes, telescopes were used for observing only. There wasn't facilities for astrophysicists, chemists and others to work together and utilize the information that gathered by the scope. It was financed by businessman Charles T. Yerkes. One of the founders was George Hale who was responsible for 200 inch Hale telescope at Mt. Palomar, 60 inch telescope at Mt Wilson.

## IV. Presentation "(Moons &) Small Bodies in our Solar System" by Dr. Amanda Hendrix, Planetary Science Institute

Stephen introduced the Dr. Hendrix and gave brief summary of her background and space missions she has been part of.

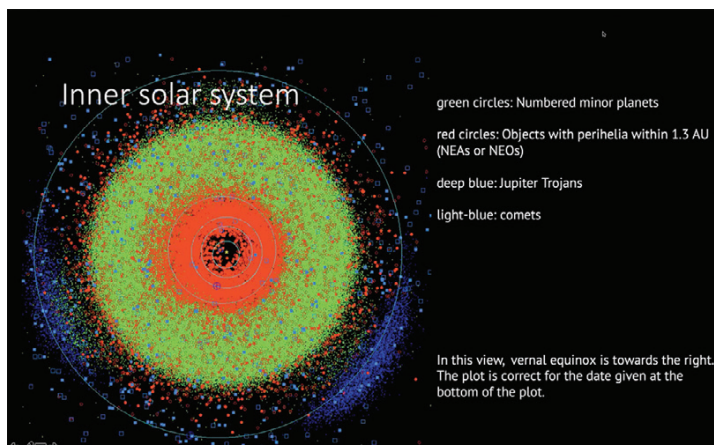
In preparing her talk Dr. Hendrix decided to concentrate mostly on small bodies in the solar system. There are different classes of small bodies:

- *Near earth object (NEOs)* such as Bennu and Ryugu which have recently been visited by spacecraft. NEAR mission visited a couple of asteroids (Eros and Mathilda); the Hayabusa-1 space craft visited asteroid Itokawa.
- *Main belt asteroids* are interesting because they are categorized by different taxonomic classes from ground based observations of colors. She is interested in getting UV spectra mainly using HST (since we can't use ground based) to see what these different taxonomic classes are doing in the shorter wavelengths to tell us about composition and the evolution and history of these small bodies. The more we learn, the more the groups start to merge and become more blurred. Some of the missions going to main belt asteroids are Psyche, Galileo, Dawn, and Hayabusa
- *Trojans* are a different class of small bodies which orbit the sun in big clusters at the L4 and L5 Lagrangian points which are 60 degrees ahead of and behind Jupiter. Other planets have Trojans as well (such as the Earth), though they are not as obvious.
- We also have *comets* and *Kuiper belt objects or trans-Neptunian Objects*.

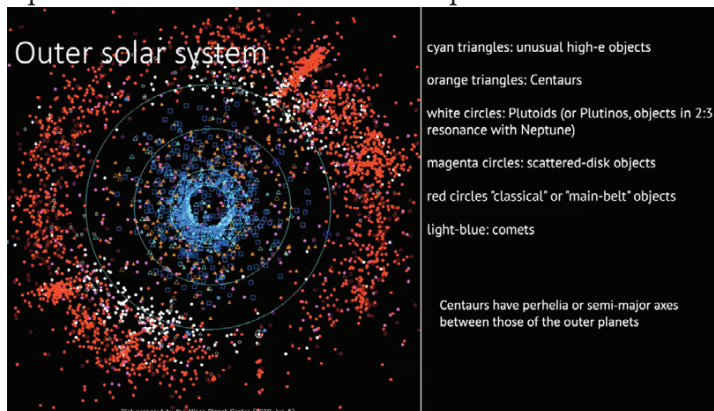
The minor planet center has all kinds of information. (See <https://www.minorplanetcenter.net>) They track



everything that has been detected. Diagram shows there are large numbers. There are different ways of classifying



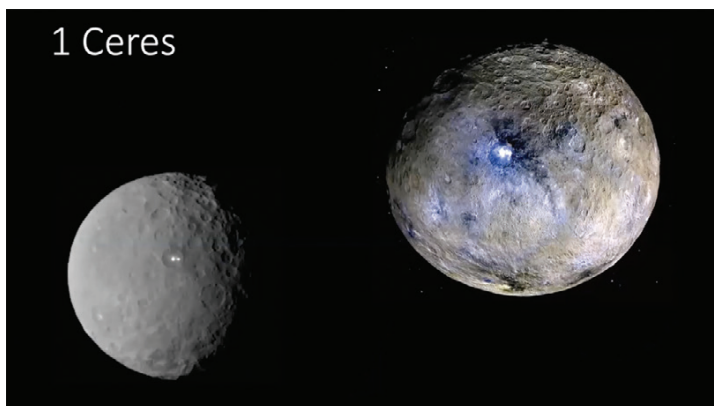
NEAs (near Earth Asteroids). Planetary defense systems are concerned with Earth crossing NEAs such as the Apollos and Atens. Below is another plot but for the outer



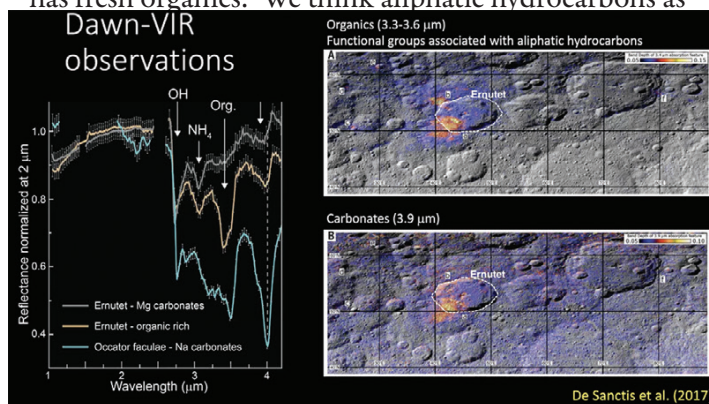
solar system. Running tallies of NEOs: 212 have been discovered this month (Oct 2021); 2368 this year, 27,198 all time. Minor planets: 216 this month, 16843 this year, 1130224 all time. Comets: 4 this month, 63 this year, all time 4584. The discoveries have been made by ground based facilities both amateur and professional.

Lets talk about the largest of the small bodies:

- 1 Ceres was the first asteroid ever discovered in 1801; it was initially thought to be a planet. It is almost a 1000



km in size. It is large enough to have its own self gravity and collapsed into a fairly spherical shape. It is not a full planet as it hasn't cleared out its own orbit. It was visited by the Dawn mission and has been targeted often by the HST. It is mostly grayish in color. If you look at spectra from meteorites and compare them to spectra from asteroids you can kind of tell the origin. Although Ceres is the largest asteroid it would be expected to have lots of matches, but surprisingly there aren't any. Ceres is very water rich but does not have a subsurface ocean. Some of its craters which have bright material associated with them. These bright spots are carbonates. Crater Ernutet has fresh organics. We think aliphatic hydrocarbons as

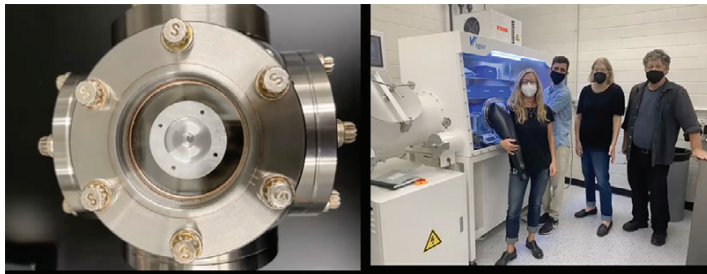


fresher than aromatic hydrocarbons. It is thought that there is an evolution from aliphatic to aromatics. The fact that we see aliphatics in the crater Ernutet region is interesting. A model of Ceres suggests the interior is that it probably is kind of rocky, volatile rich, partially differentiated, and that liquid is present. There is evidence of salt evaporites and organic matter. In proposals for future missions to Ceres can make the argument that it is an astrobiological target.

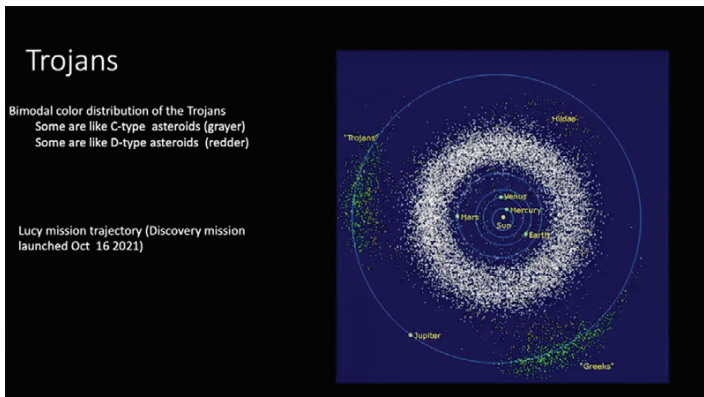
- 4 Vesta was discovered in 1807. It was orbited during the Dawn spacecraft in 2011. It is unique as it is probably the remnant of a large differentiated body. It seems very similar to molten lava material.
- The NEAR Shoemaker mission orbited and touched down on 433 Eros and then did a flyby of 253 Mathilde.



- Galileo mission flew by Gaspra and then flew by Ida and discovered the first moon of an asteroid, Dactyl. We know now about 1/6 of the asteroids are binary. Dr. Hendrix went to work at JPL over the summer with the navigation team to plan the flyby of Ida. On Ida the meteorites haven't been spaceweathered over eons like on other asteroids as it is reddish in color. Our own moon is slightly reddish due to the nano phase iron from weathering. Similar thing happens on S class asteroids.
- JAXA missions Hayabusa visited NEA 25143 Itokawa and returned samples to Earth. Hayabusa-2 visited NEA 162173 Ryugua and returned samples to Earth. Dr. Hendrix and colleagues are working on some of the samples. We want to measure UV spectra before they are exposed to atmosphere. We normally have a measurement and then compare them to lab measurements which has been exposed to air. We will make a whole series of measurements of material that has never been exposed to air.
- OSIRIS-REx orbited NEO asteroid 101955 Bennu and touched down and grabbed samples (to be returned in 2023).



- The Lucy mission will visit some Trojan asteroids which are clustered 60 degrees ahead and behind Jupiter. They seem to be bi-modally distributed in color. Some are like C-type asteroids, others are more like D-type which are redder. Dr. Hendrix showed a video from the [whereis-](#)



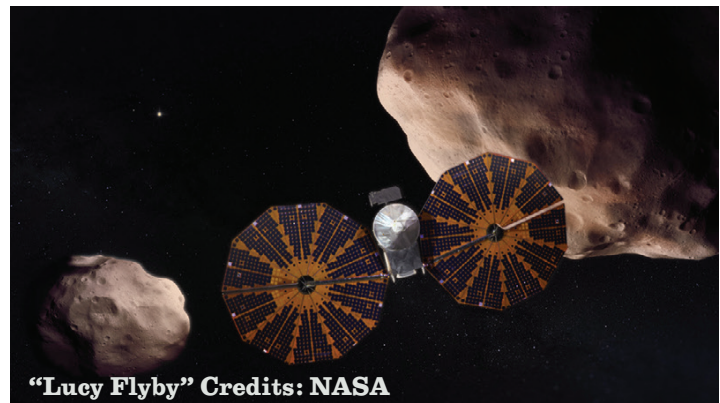
[lucy.space](http://lucy.space) website which has an animation showing

were the Lucy space craft is located in its complex orbit. The reason that Lucy is going to Trojans is that they haven't be processed as have near earth objects which have been highly processed -- they are mostly just rubble piles. Outer asteroids seem to be relatively pristine.

- Psyche mission is supposed to launch Aug 2022. Psyche is an M-type asteroid which is rich in metal.
- The DART mission is more of a planetary defense mission but it will get some cool data. It will crash into asteroid Didymos and see how the orbit will be changed.

### Conclusion:

Small bodies are a wonderland of clues about our early solar system!



"Lucy Flyby" Credits: NASA

### V. Business Meeting

Treasurer report by Bruce Lamareux. LAS total assets are approximately \$16.1K with \$6.8K in checking, \$8.1K in savings, and \$1.1K in telescope fund. There are currently 96 regular members and 3 student members.

### VI. New Business

- Time to think about being an officer in 2022
- Gilpin County library request for library telescope assistance
- Calendar meeting Saturday to select images for 2022 calendar. Zoom invitation will be sent out later this evening.

### VI. Old Business

None

# Newsletter Archives

## 10 Years Ago - Nov. 2011



NGC 2214 (The Rosette Nebula) by LAS member Gary Garzone  
Longmont Astronomy Society Newsletter  
November 2011

Next LAS meeting is at IHop Restaurant at 7pm on Nov 17th. The speaker this month is Robert Arn

who is an award-winning astrophotographer. His presentation is about "Nightscape Photography". He has dozens of astro-imaging publications from sources such as NASA's APOD, NASA's EPOD, Sky & Telescope POD, AAPOD, and several others. During the daytime, Robert is pursuing a Ph.D. at CSU in Mathematics. His current professional research interests include computer vision, signal processing, and large-scale data analysis. Early this June Robert published an e-book, "Photography at Night: An Introduction to Astrophotography on a Budget".

Next will be discussion about possible construction of an observatory. Last evening the city of Longmont Parks & Rec Director Jeff Freisner, Larry Mills, Golf Operations Manager for the City, Dan Davis, Gary Garzone, and Vern Raben met to discuss using a location on city land near the Sunset Golf Course club house for an observatory built and operated by LAS. They seem generally supportive of the idea but of course want to know more details about what we might propose. We need to decide if we indeed want to do this and if so begin writing proposal to the city.

## 20 Years Ago - Nov. 2001



Oct 18, 2001 Meeting:  
The roster was signed by 28 folks this month, including 4 visitors. The autumnal swap meet was to occur

but unfortunately there was only one swapper with one item to swap. Oops! The normal officer's reports were given and the meeting was primarily given over to a time of general talking and visiting!

Things to see in the sky this month: Comet C/2000WM LINEAR will move from Aries to Pisces, then to Cetus, and to Sculptor this month. On Nov 30 the Moon will occult Saturn for about 26 minutes starting at 5:45 pm. This will occur again on Dec 28 at 1:36 am. The Geminid meteors reach maximum on the 13th. Expect to about 60 bright, slow yellow meteors per hour.

If you are in a mind to recycle and would like to make a small contribution the LAS telescope making fund, bring your recycled aluminum cans to the meeting each month for collection. Proceeds from this activity will help fund a telescope for a local school or other worthy recipient.

Cactus flat, November 9:  
Good night out at the "flats". Transparency was better than average with most deep sky objects giving a nice contrasty images. The seeing was its usual unstable self with brief moments of fair/good steadiness. Stephan's Quintet was one of the best views of the night.

## 30 Years Ago - Nov. 1991



Comet Shoemaker-Levy is 7th magnitude and can be observed all night as it is circumpolar.

Our unusual sunsets are being caused by volcanic aerosols in the Philippines. They are lasting about an hour after sunset and are purple well into twilight. The rays are caused by patchy clouds or mountain shadows ten miles up.

A group from NIST has formed to get the two 10 meter disks activated at Table Mountain. They are calling themselves the Deep Space Exploration Society. The big dish is moving after 15 years of Department of Commerce disuse. Most in the group are ham radio operators.

Dave Street spoke about enhancing negatives. Labs used were Amaranth, Photocraft, and Custom Color Labs. Dave took a slide had it blown up to enlarge an eclipse picture. Photocraft and Custom Color both printed the negative backwards but had better color than Amaranth.

Tim Leslie spoke on astrophotography. Tim has six years experience and spoke on personal goals, equipment and references needed to get started with astrophotography. He feels equipment is the limiting factor, and highly recommends books by Ansel Adams, "The Print" and "The Negative". Observing and photographing the solar system is a good way to get started.

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**“M45, PLEIADES” BY STEPHEN GARRETSON**