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ABELL 45 BY M. J. POST

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Next LAS Meeting Thursday September 18 at 7 pm

“The Voyagers: Half a Century of Exploration”

By Dr. Fran Bagenal

Dept. Astrophysics & Space Science, Univ. of Colo.

NASA's Voyager 1 and 2 spacecraft were launched in 1977 and flew past Jupiter, Saturn, Uranus and Neptune. Nearly half a century later, they are now about 5 times farther than Pluto from the Sun and are in the interstellar medium, having left the sphere of influence of the Sun – the Heliosphere. The Voyager mission opened our eyes to many different new worlds. This talk will present the glories of Voyager and discuss current and future exploration of the outer solar system.

Fran Bagenal Biography

Dr. Fran Bagenal is a research scientist and professor emerita at the University of Colorado, Boulder and is co-investigator on NASA's New Horizons mission to Pluto and the Juno mission to Jupiter. Her main area of expertise is the study of charged particles trapped in planetary magnetic fields and the interaction of plasmas with the atmospheres of planetary objects, particularly in the outer solar system.

Born and raised in the UK, Dr. Bagenal received her bachelor degree from the University of Lancaster, England, and her doctorate degree in Earth and Planetary Sciences from MIT (Cambridge, Mass) in 1981. She has participated in several of NASA's planetary exploration missions, including Voyager 1 and 2, Galileo, Cassini, New Horizons and Juno.



https://lasp.colorado.edu/home/mop/home/people/fran_bagenal/
https://www.imdb.com/name/nm3293128/bio?ref=nm_ov_bio_sm

Location

The meeting will be at 7pm in the First Evangelical Lutheran Church, 803 Third Avenue, Longmont, CO 80501.

About LAS

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Front Cover: Abell 45 by M.J. Post

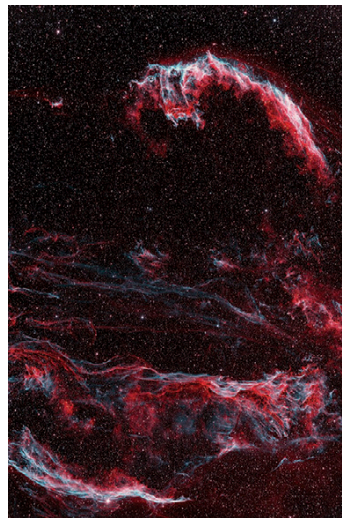


A few weeks ago I posted this same image rendered as H-alpha only, with RGB stars. Marty pointed out that, despite claims to the contrary in the literature, some OIII is present. In fact, the literature says that the red emissions of Abell 45 are from nitrogen, not hydrogen. I'm beginning to doubt that, based on others' images and knowledge of my filter characteristics. I

should not get NII's 658.4 nm light through my 656.3 nm H-alpha filter that is 3 nm wide and that is blue-shifted by RASA's f/2.2 rays.

So last night I acquired 2 hours of OIII data and produced this new rendition - HOO plus RGB stars. It looks a bit more natural to me, and illustrates the small amount of OIII emissions that are indeed present in this "Wagon Wheel" planetary.

Back Cover: Veil Nebula by Tally O'Donnell



This is an HOO image of the Veil Nebula in Cygnus from New Mexico and is one hour each of Ha and OIII. This one makes me want a bigger field of view.

If you can see only one celestial event in the morning this September, see this one!

View to the east on September 19 60 minutes before sunrise

View through binoculars

Crescent moon meets brilliant Venus and the star Regulus

On the morning of September 19, the crescent moon, full with earthshine, joins brilliant Venus and the brightest star in Leo, Regulus, for a dramatic sight. Look low in the east-northeast 60 minutes before sunrise.

Be sure to use binoculars to cleanly separate this celestial trio!

Above them all shines bright Jupiter, itself forming an attractive isosceles triangle with the twin stars of Gemini, Castor and Pollux. To their lower right shines the bright star Procyon.

Planets in September

Mercury

Mercury is not visible without optical aid in September.

Venus

Venus is visible in the eastern sky before sunrise; it is about magnitude -3.9 in brightness and its disc is about 12 arc sec across.

Mars

Mars is no longer visible without optical aid. It may be seen using binoculars until about mid month.

Jupiter

Jupiter is around magnitude -2.1 this month; its disc increases from 35 to 37 arc sec across this month. The following are good times to view the Great Red Spot at mid transit this month:

Date	Time	Altitude	Date	Time	Altitude
Sept 3	4:37 am	28°	Sept 20	3:43 am	28°
Sept 5	6:16 am	48°	Sept 22	5:22 am	48°
Sept 8	3:46 am	22°	Sept 25	2:52 am	22°
Sept 10	5:25 am	42°	Sept 27	4:31 am	42°
Sept 15	4:34 am	35°	Sept 29	6:09 am	61°
Sept 17	6:13 am	55°			

Saturn

Saturn is visible in the evening sky in constellation Pisces. It is at opposition on Sept 20 at 11:30 pm. Saturn is about magnitude +0.6 in brightness and the disc is 19 arc sec across.

Uranus

Uranus is visible in the morning sky in constellation Taurus. It is magnitude +5.7 in brightness and the disk is 3.7 arc sec across.

Neptune

Neptune is visible in the morning sky in constellation Pisces. It is magnitude +7.8 in brightness and the disk is 2.3 arc sec across.

Lunar Phases in September

- Full Moon is September 7 at 12:10 pm
- Third Quarter is September 14 at 4:34 am
- New Moon is on September 21 at 1:55 pm
- First Quarter is on September 29 at 5:55 pm

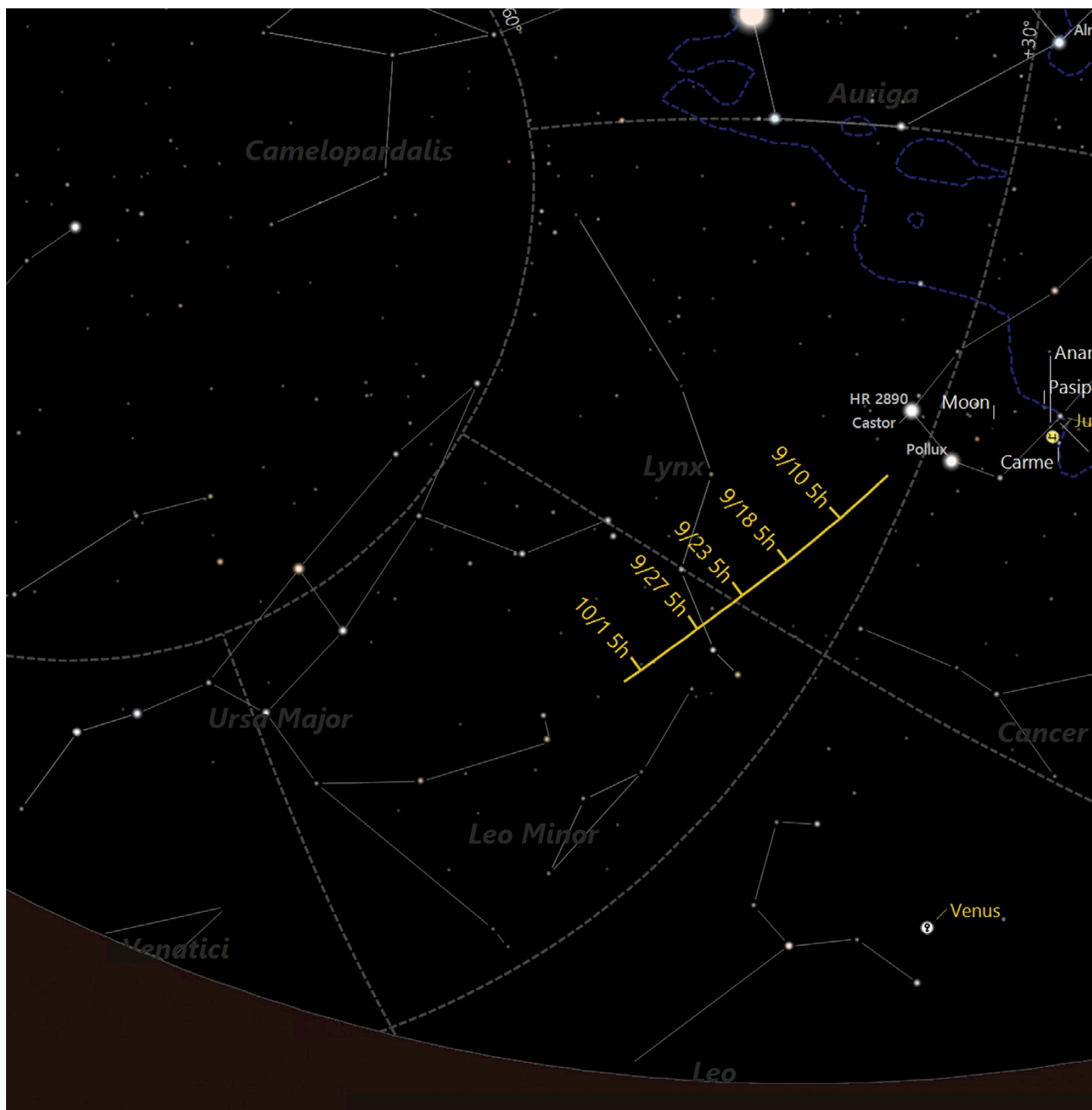
Meteor Showers in September

There are no major (class 1) meteor showers in September.

Early evening objects for September

Catalogue	Name	Constellation	Mag
NGC 6210	Turtle Nebula	Hercules	9.3
NGC 6543	Cat's Eye Nebula	Draco	8.3
NGC 6572	Blue Racquetball Nebula	Ophiuchus	8.0
NGC 6826	Blinking Planetary Nebula	Cygnus	8.8
NGC 6888	Crescent Nebula	Cygnus	10.0
NGC 6960	Veil Nebula West	Cygnus	7.0
NGC 6992	Veil Nebula East	Cygnus	7.0
NGC 7027	Jewel Bug Nebula	Cygnus	9.7
NGC 7026	Cheeseburger Nebula	Cygnus	12.0
NGC 7331	Spiral galaxy	Pegasus	10.2
NGC 7662	Blue Snowball	Andromeda	8.6
M57	Ring Nebula	Lyra	9.4
M27	Dumbbell Nebula	Vulpecula	7.3
NGC 7651	Galaxy pair	Aquila	12.0
IC 5217	Little Saturn Nebula	Lacerta	12.6
NGC 7000	North America Nebula	Cygnus	4.0

Comet C/2025 A6 (Lemmon)

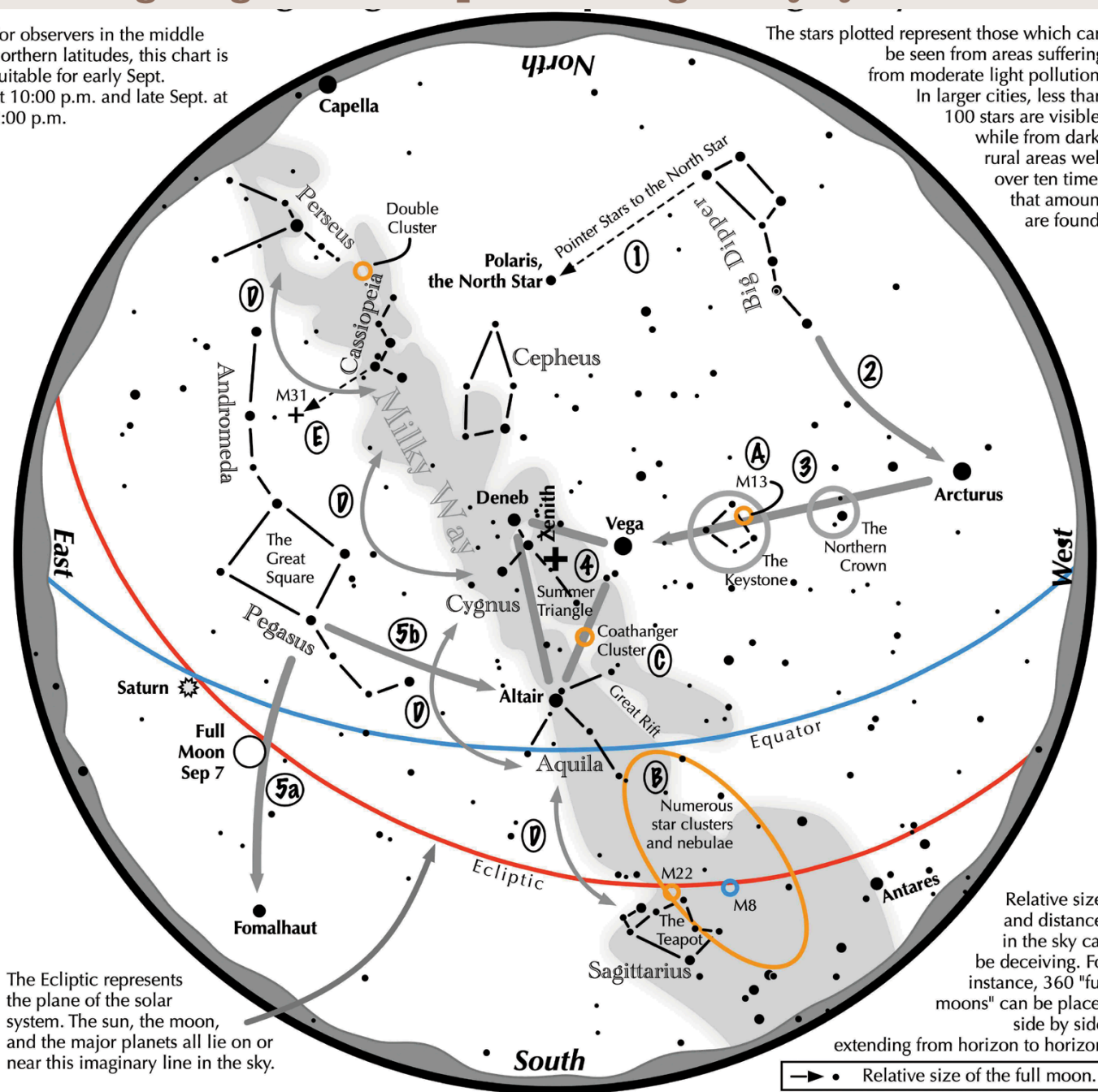


Date	Optimal time	RA	Dec	Constellation	Magnitude	Size (arc min)
Sept 1	4:59 am	08h02m39.1s	+32°01'41"	Gemini	10.5	2.5
Sept 8	5:07 am	08h16m39.9s	+33°19'24"	Lynx	9.9	2.9
Sept 15	5:13 am	08h34m23.6s	+34°57'22"	Lynx	9.2	3.3
Sept 22	5:21 am	08h58m35.9s	+37°01'27"	Lynx	8.4	3.9
Sept 30	5:30 am	09h41m49.7s	+39°55'05"	Lynx	7.3	4.8

Navigating the mid September Night Sky by John Goss

For observers in the middle northern latitudes, this chart is suitable for early Sept. at 10:00 p.m. and late Sept. at 9:00 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.



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

- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the September evening sky.
- 3 Nearly overhead shines a star of similar brightness as Arcturus, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
- 4 The stars of the summer triangle, Vega, Altair, and Deneb, shine overhead.
- 5 The westernmost two stars of the Great Square, which lies high in the east, point south to Fomalhaut. The southernmost two stars point west to Altair.

Binocular Highlights

- A: On the western side of the Keystone glows the Great Hercules Cluster.
- B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
- C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
- D: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.
- E: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.

Astronomical League www.astroleague.org/outreach; duplication is allowed and encouraged for all free distribution.

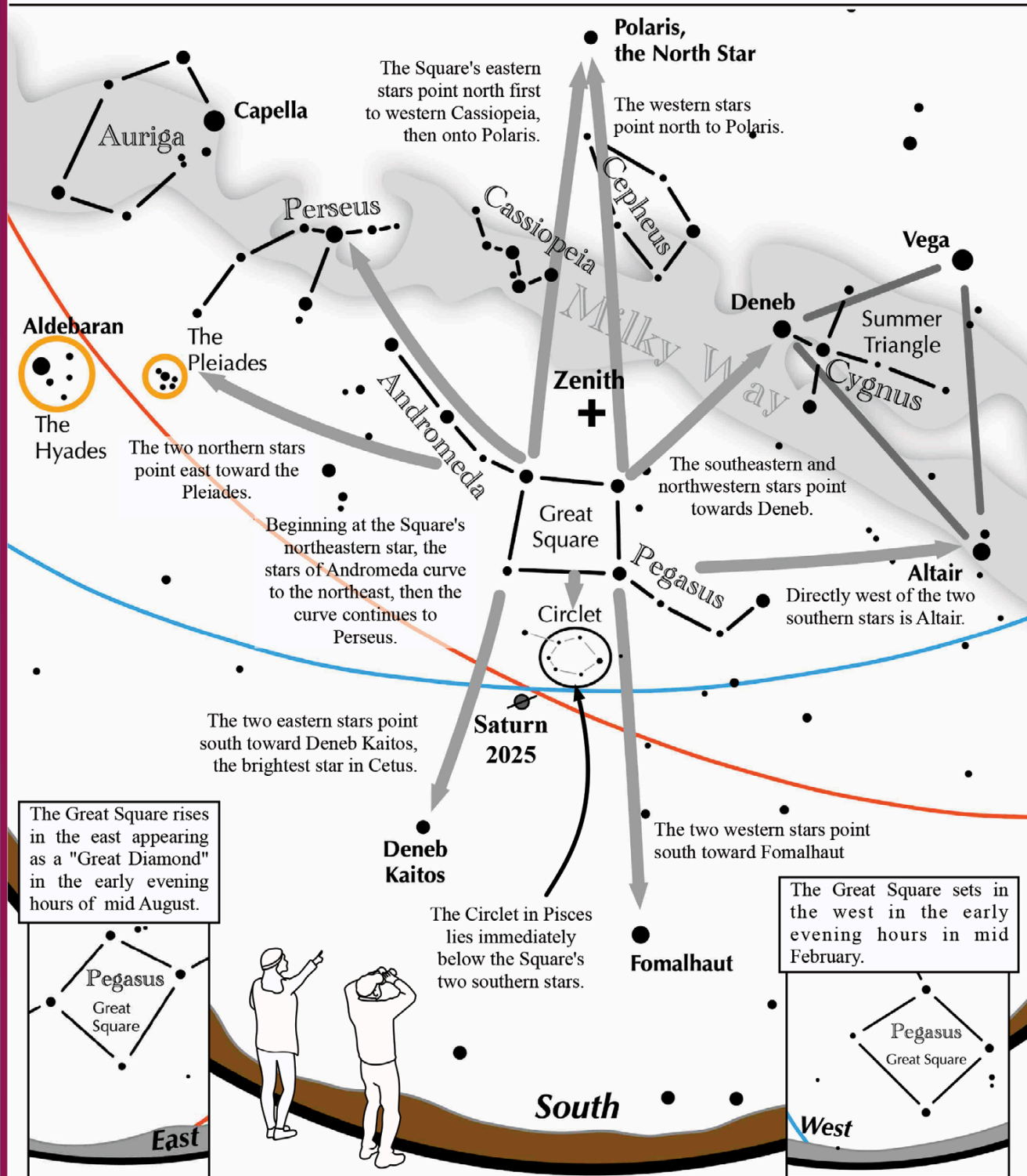




Navigating the mid Autumn Night Sky: Great Square Guide



Befriend these four stars, slightly dimmer than those of the more famous Big Dipper, and they'll guide you on a tour of the Autumn sky.



LAS Meeting Notes for August 21 by Eileen Hall-McKim

I. Introduction

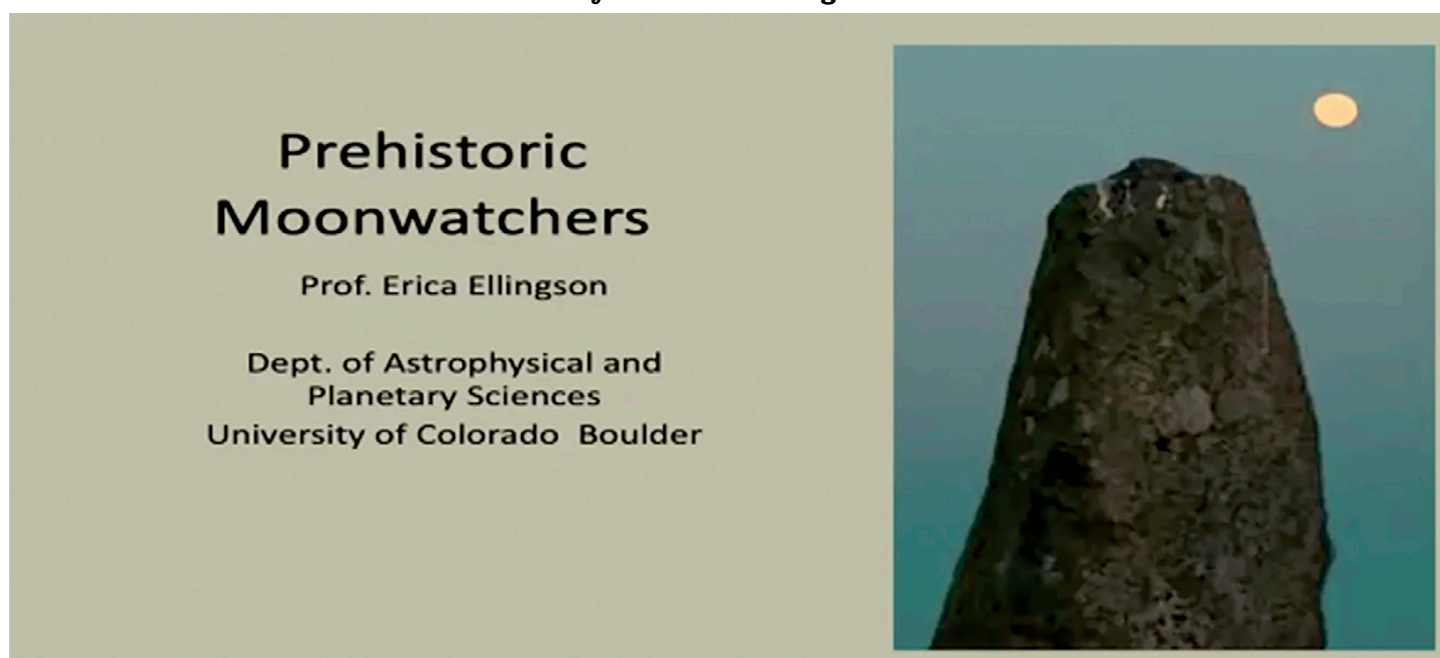
The August LAS monthly meeting was held in-person and by zoom on August 21st at the Longmont Evangelical Lutheran Church, 803 Third Ave. President, Vern Raben began the meeting with self-introductions of those attending in person and on-line. Twenty-three attended in person, 5 attended on-line.

II. Main Presentation

Our guest speaker for the evening is Dr. Erica Ellingson from the Department of Astrophysical and Planetary Sciences at the University of Colorado, Boulder. Dr. Ellingson is an astrophysicist who delights in using telescopes large and small, in space and at observatories around the world. Her work includes investigating galaxy clusters, the evolution of galaxies, black holes, and the mysterious cosmological forces of dark matter and dark energy.

Her research also includes historical and archaeoastronomy and she is an editor with the International Journal of Sky-scape Archaeology. She also teaches and produces educational programs at the Fiske Planetarium at the University of Colorado and is an astronomical consultant with the US National Park Service. Her presentation tonight will be about “Ancient Moon Watchers”.

“Prehistoric Moon Watchers” By Dr. Erica Ellingson



There is an interface between astronomy and archaeology, cultural astronomy, archaeo-astronomy or something we are now trying to incorporate, sky scape archaeology. The idea that archeology is the study of how people in history on the planet moved and lived on Earth and what we can tell about this by looking at things today with the landscape and the sky scape as well. Archeology is something that Erica has always had an interest in and archaeoastronomy a great fit with her background and finally is finding more time available to explore further in later retirement years. She will talk tonight about topics in Sky-scape Archeology in particular, the Moon.

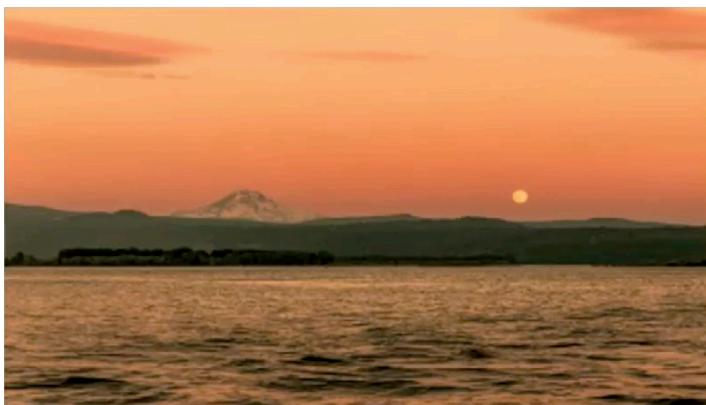
As a dark sky observer and researcher of galaxy clusters, dark matter and dark energy, the last thing Erica thought she would be observing was the Moon, as she spent most of her observing time as an astrophysicist time trying to avoid it. The Moon, the second brightest object in the sky after the Sun is a point of power, a point of interest and fascination and has been for all of human history, so will talk about prehistoric Moon watchers and a little bit about what we are doing these day.

Is Moon watching for practical use?

- Hunter's calendar – Lunar calendars are especially useful for tracking and hunting
- Early Romans and some Native Americans counted moons to track the seasons, some on pieces of bone, associating them with specific natural occurrences (weather, plants, migrations, animal births)
- Whenever we see 28 or 29 we say Moon! Some sort of Moon tally made several thousand years ago also could be menstrual calendar, women used to keep track of their cycles to see if they are pregnant
- Know that through recorded history the Moon shown to be a very important sky entity



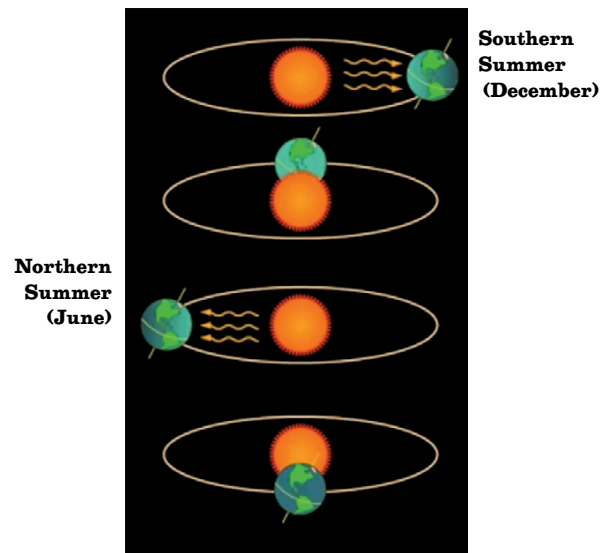
The Moons Dance with the Sun



Full Moon rise at Sunset Credit: Cascadia Art

- The full Moon is always opposite the Sun, so as Sun goes north and south in its path, the Moon also goes north and south in its path. When the Sun is ascended, long days is the summer, the full Moon has a shorter arc, similar to what the winter Sun would do

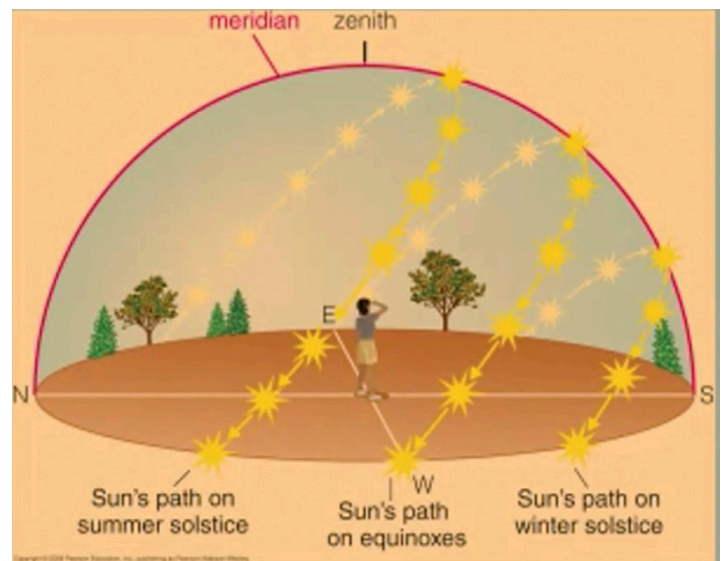
The Reasons for the Seasons



Credit: NASA

- Northing and Southing determined by the Earth's tilt of its rotational axis with respect to its orbital motion around the Sun
- Earth's axis always pointed towards distant star Polaris (at least currently)
- Why the Sun appears more prominent in the northern sky in June and then moves south for December

What we see on different days of the year



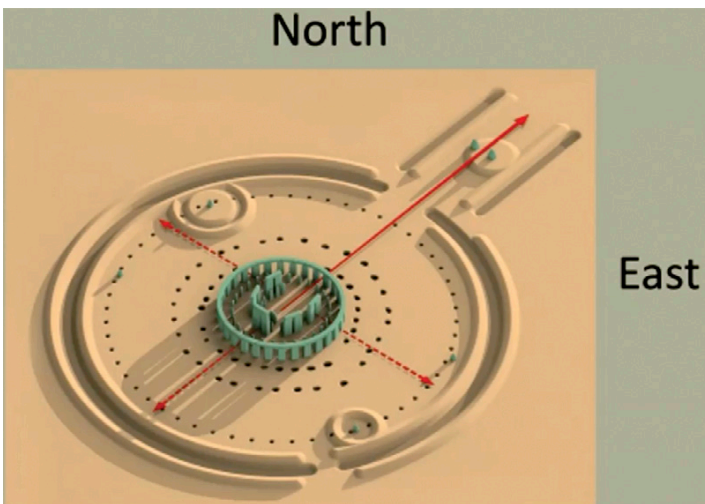
(Cosmic Perspectives, Bennet et al.)

- Longer days and higher Sun in June = warmer weather
- Look at the sunrise horizon, too
- Note the "northern bias" where the Summer Solstice happens in June



Most famous prehistoric astronomical site – Stonehenge;
English Heritage Historical Site

- Neolithic England c. 3500-1500 BCE
- Massive concentric circles of stones, innermost point along a banked “causeway” to the Northeast
- Famous Summer Solstice gathering annually at Stonehenge



Credit: English Heritage

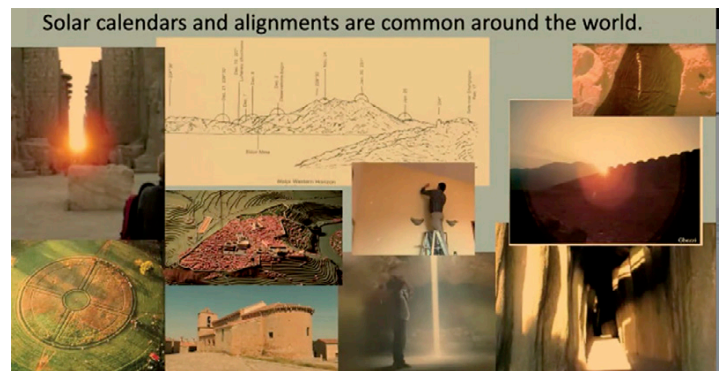
- Sun comes up higher each day when it stops, this is called the Solstice. It stays a couple days rises in that position; when it comes up it coasts over one of the “heel stones”

Sunrise on Summer Solstice

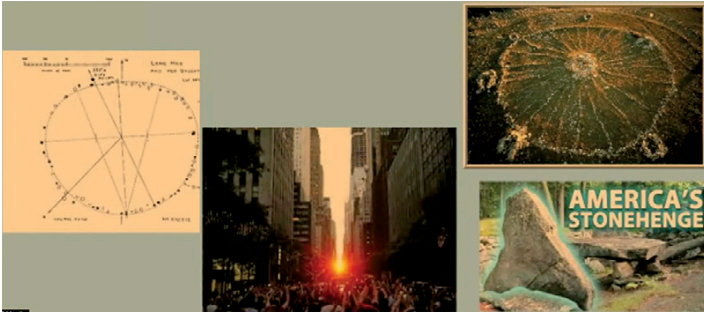


Photo Credit: Emily Schneider, 21 June, 2019

- See the Heel stone in center poking up through peoples heads
- Stonehenge is a very special place where we image and relate to stories about past and current connections to the sky
- Can think about Neolithic people and how they may have built this, but also a very current thing of people coming together to watch the sunrise together

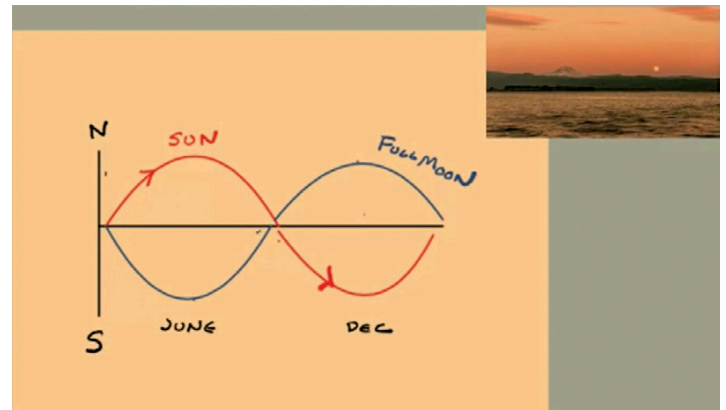


Solar calendars and alignments are common around the world and there are places all over the world where solstices are tracked.

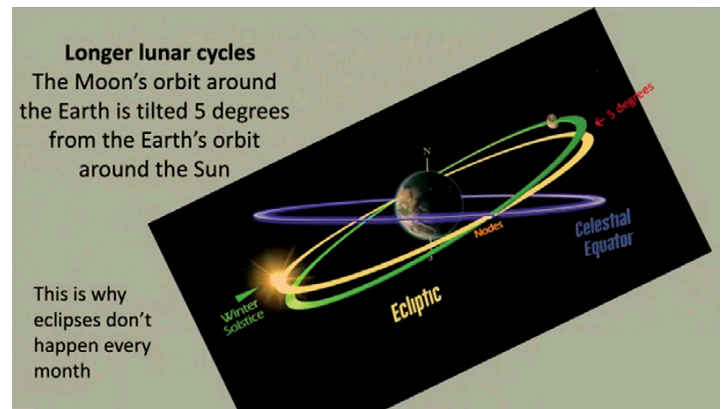


Not all claims are believable and not necessarily true, some things interpreted wrong

- Street in Manhattan built on alignment to get sunset on May 18th
- Approach with critical thinking; need to ask why are these place suggested, have cynicism; some things have been suggested but not really evidence for it
- America's Stonehenge not likely ancient observing site

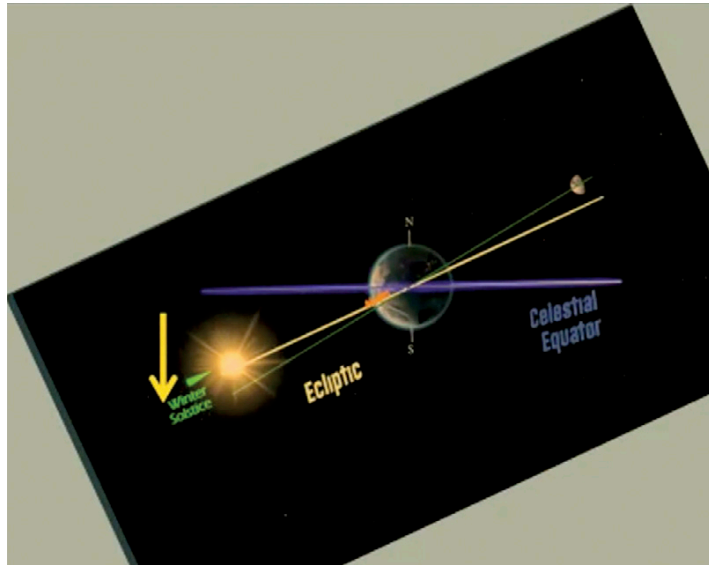


The Full Moon and Sun go in opposite order

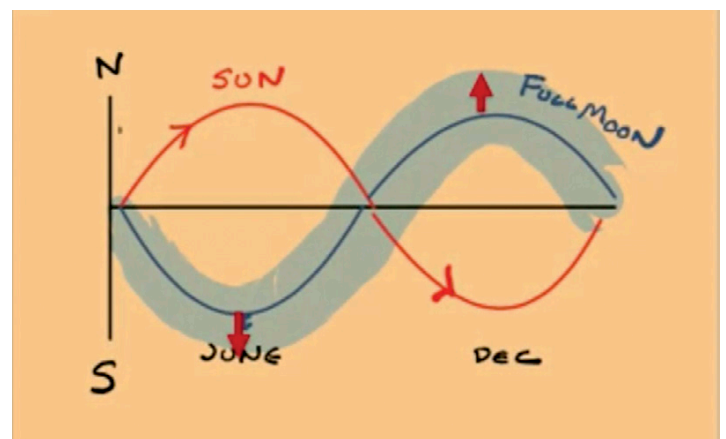


Longer Lunar cycles – Called Lunar Standstill

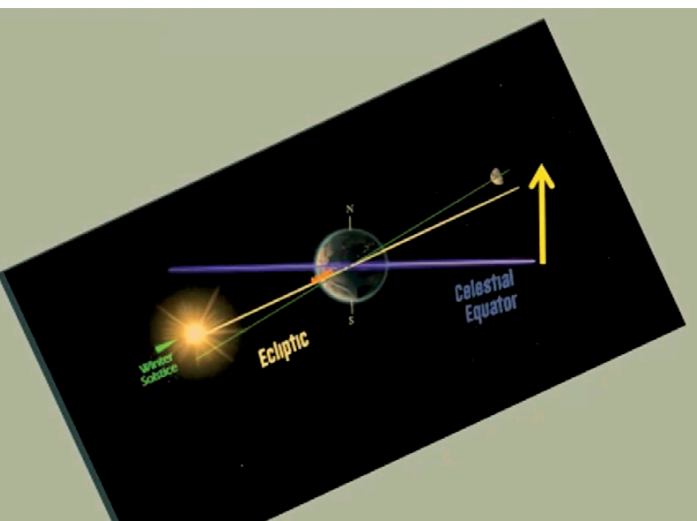
- Diagram shows Sun going around the Earth in order to understand paths
- Yellow Sun path, green moon path, 5° variation, why we don't get eclipse each month, moon either a little north or little south of sun
- Sun is at Winter solstice at its southern most point; Moon tilted 5°



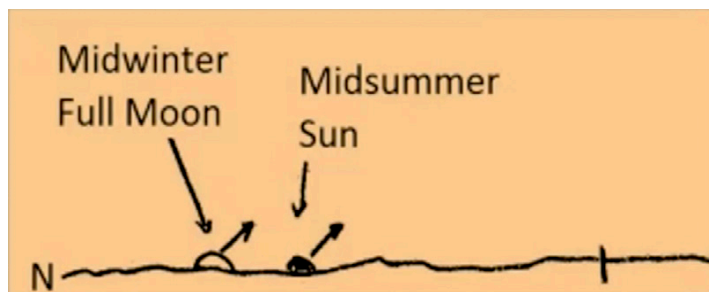
The Moon and Sun dance together: the Moon is Full when it is opposite the Sun. At winter solstice, when the sun is south the Midwinter Full Moon is north!



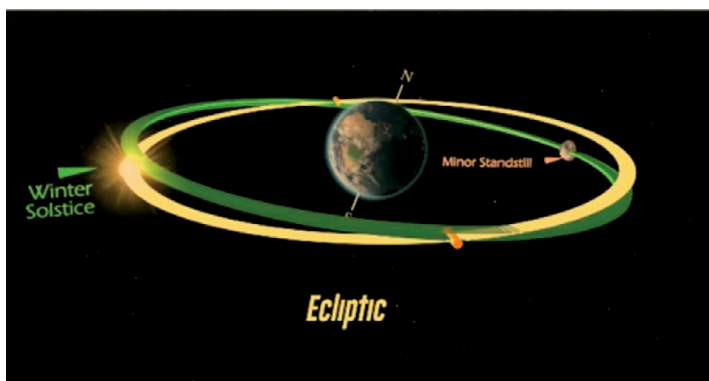
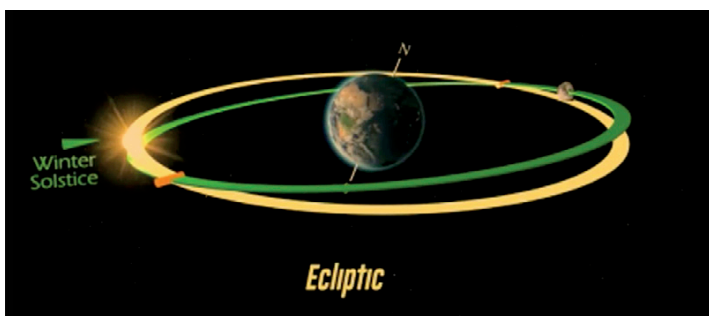
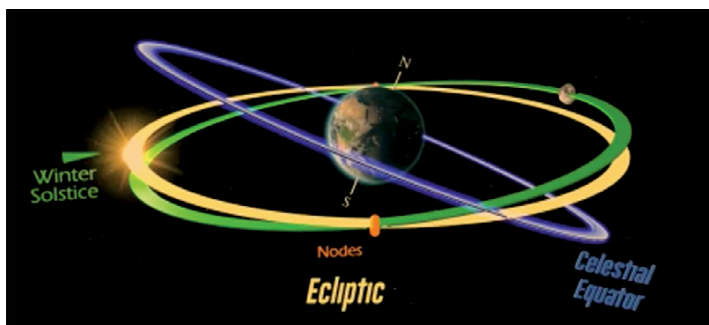
- The Full Moon can be seen in a wider range of positions than just opposite the Sun
- Near the solstices, Moon can rise even beyond the limits of the Sun's movement (small red arrows)



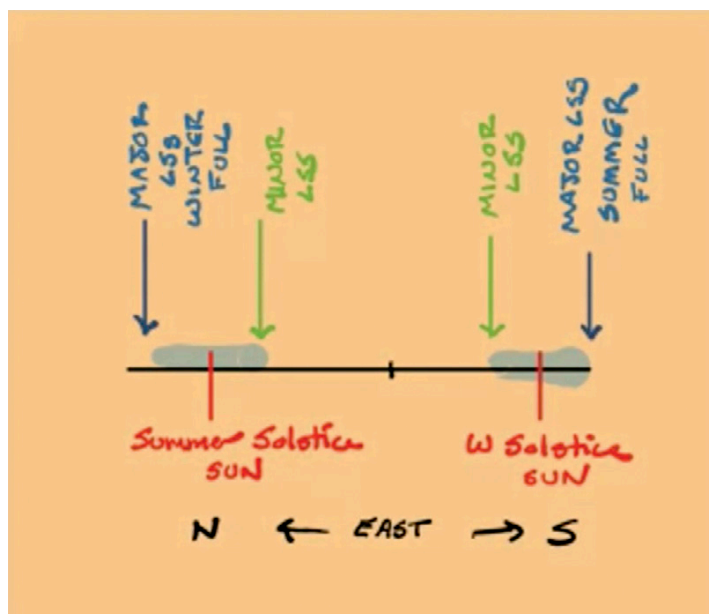
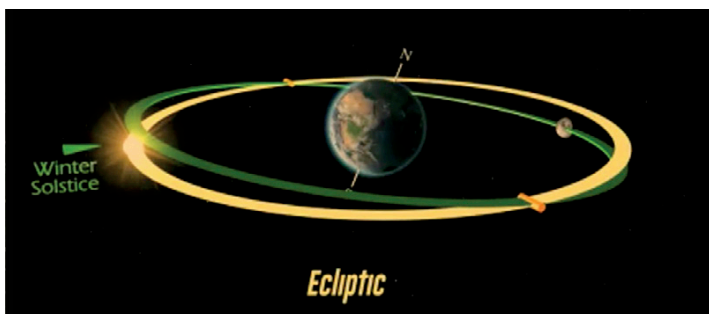
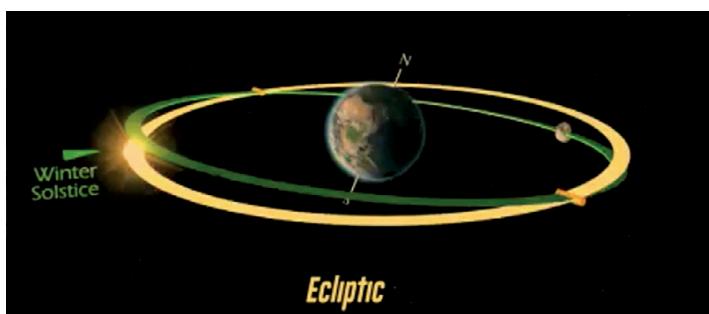
But not every year...the geometry of the Sun/Moon orbits drifts slowly over 18.6 years: “regression of the nodes” as points of nodes are twisting backwards in an 18.6 year cycle - The Major and Minor Standstill. Over 18.6 years the Winter Moon can be up to 5° higher or 5° lower than the Sun.



- The Full Moon will rise outside of the Sun’s realm ONLY every 18-19 years, in the years near the “major lunar standstills”
- The effect is small, but would be notable to long-time sky-watchers as the Moon transgresses the limits of the Sun

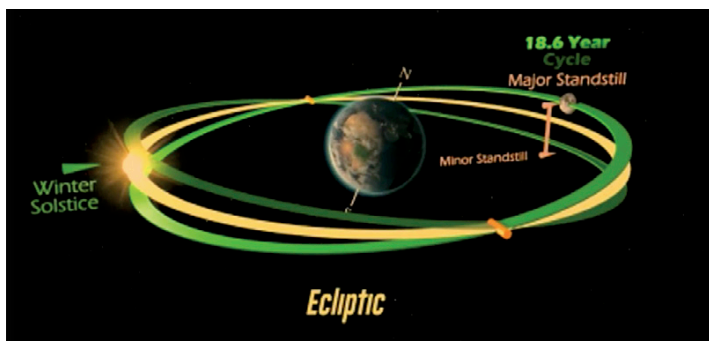


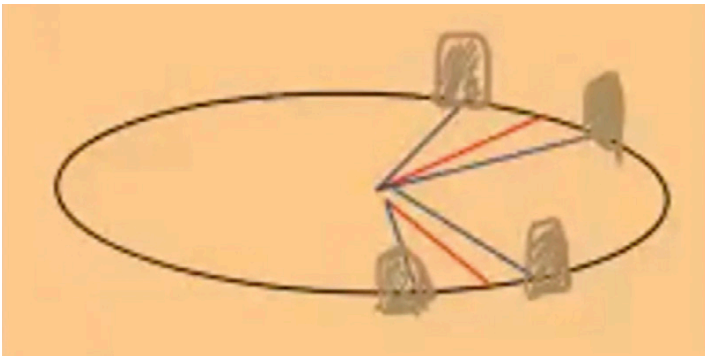
9 years later, the solstice Full Moon is on the opposite side (inside) on the Sun’s extreme, at the Minor Lunar Standstill position



On the horizon, the solstice full moon rises swing around two solstice positions every 18 years

- Minor standstills are inside the solar realm
- Major standstills are outside the solar realm (transgresses the Sun path)



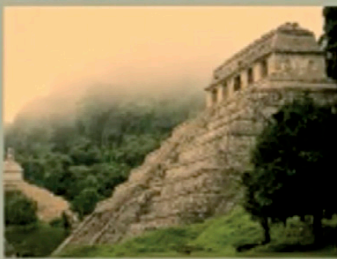
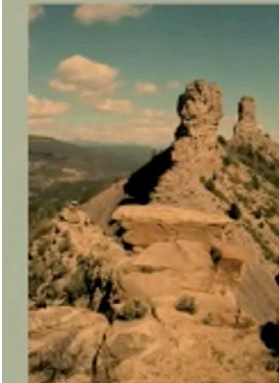
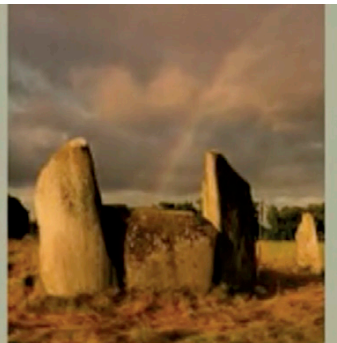
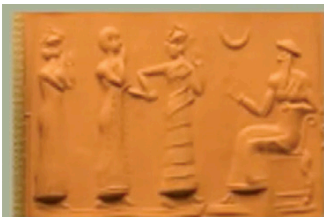


If you wanted to build a Stonehenge for Moon rise:

- Markers outside of the solstice range mark the Major LSS
- Only visited by the moon in “seasons” every 18-19 years
- Markers inside the solstice range mark the Minor LSS
- The moon travels through these positions every month, so may have been less notable?

Lunar standstill alignments are not as easily determined as solstice alignments

- The Sunrise position is effectively the same for several days near each solstice; these extreme positions do not change and can be determined over the course of several years
- The Moon rise position jumps several moon diameters from day to day and the moon may never rise exactly at the standstill limit; extreme rise/set positions slowly increase and decrease over decades, finding the limit could take many generations



Did ancient people leave any signs that these longer lunar cycles were meaningful to them?

We will travel to three sites reported as lunar observation or alignment to the Major Standstill in Mesopotamia,

Scotland and Colorado and answer the following questions about each one:

The Scorecard:

Look for:

- Is what we find consistent with observations of the moon?
- Could there be other explanations (including it's just random?)
- Did the people care about other celestial matters, so including the moon seems natural?
- Is there additional indication that the moon is specifically associated?

Keep in Mind:

- These are long cycles, requiring many years/generations of careful observation
- Practical use is limited, so probably a long-term activity of devotion or to gain power
- We have just seen a geometric Western Science approach, this is probably not the way ancient cultures approached what they saw, may have approached very differently
- A precise abstract “model” or predictive ability may not have been a goal, think “reactive” (we saw the moon do something different we hadn't expected so we commemorated that) rather than “predictive”

The Great Ziggurat of Ur: “The House of Great Light” (present day Iraq)





Scottish Recumbent (lying down) Stones - Midmar Kirk Repurposed in a Christian graveyard

70+ Neolithic recumbent stones in NE Scotland 3000-1500 BCE, contemporary with Stonehenge

- Large horizontal stone with leveled surface flanked by two taller stones, often a circle
- People often moved large stone, and not all had to do with astronomy
- Often with a clean view to a distant S/SW horizon
- Winter Sunset: or Summer Full Moon set:
- Measure inside of stones, outside, middle?

- 2000 BCE Sumerians were excellent astronomers! Kept records of the Sun, Moon and Planets to great precision and wrote it down so have generations of that information
- Building took great resources to build, is still there!
- Orientation to the North $\sim 5^\circ$ north of the Solstice (Gonzales-Garcia 2015)
- Dedicated to the Moon god, Nanna
- Oriented north of solstice, towards the major lunar standstill position

Looking at scorecard:

Find this site is consistent with observations of the Moon and possible acknowledgment of the Major Lunar Standstill:

- People cared about other celestial matters and were excellent astronomers
- Kept records and wrote down
- Dedicated to the moon goddess, Nanna
- Seems to be probable this is a site indicating interest in the Moon



Sites of Scottish Recumbents – often in beautiful very rural places with beautiful views often to the Southwest these are found with these massive stones



Callanish Stones in the Outer Hebrides – Far North-western British Isles

Old Keig, Aberdeen shire, Scotland: (Ruggles 2015)

- Flanking stones may show the range of the summer full moon set during the swing from major to minor lunar standstills. Statistical studies suggest some sites support this interpretation for some, but not all.
- Lunar Alignments at some recumbent stones? White quartz fragments found at many sites – common in Neolithic sites and may evoke the Moon; Circular “cup” carvings are sun/moon disks?



Built c. 2700 BCE, similar culture to Stonehenge (late Neolithic). Although remote, this likely a community of inter-connectiveness in contact with others in Britain, and throughout Europe during the megalithic craze.

Looking at Scorecard:

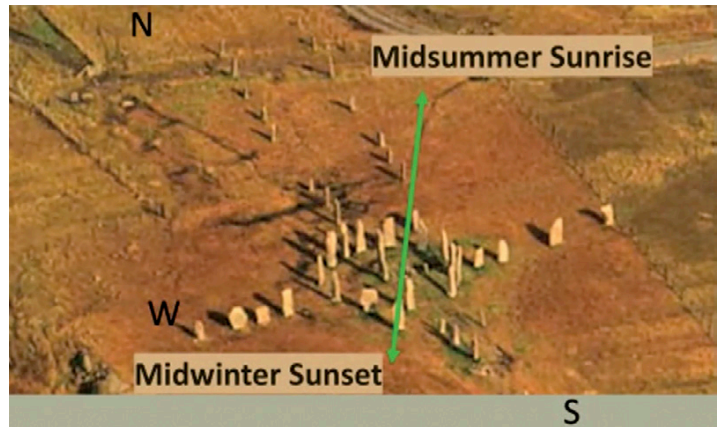
Some consistence with observations of the Suns, possible Moon, Stonehenge people had interest in Sun/Moon; some of Erica's colleagues believe something going on but we don't understand yet, other run statistical analysis – say no



Callanish where Pytheas is believed to have visited – a stone circle in the Moors of Scotland



Callanish stones in Outer Hebrides: N/E and E/W alignment- the Cardinal directions



- The rounded corners of the slightly squared circle mark the solstices
- They knew their stuff and were thinking about the sky

Earliest written description?

- Pytheas the Greek c. 330 BC, explorer/merchant from Massalia (Marseille) traveled up the west coast of Europe, likely through the Hebrides and possible even to Iceland
- Kept rigorous astronomical observation records - tell us latitude he was at
- His account “On the Ocean” has not survived but others who read it were impressed by his factual accounts of recognizable places and people
- Though the book is lost was a best seller for centuries and many others have referred to the writing. Diodoros, c. 50 BC cited Hecateus’ paraphrases and wrote about the “Hyperboreans,” beyond the north wind, “under the Bear” refers to the north people
- Account is also given that god visits the island every 19 years, the period in which the stars return to the same place in the heavens; and for this reason the 19-yr period is called by the Greeks the “year of Meton.”
- There is another solar/lunar period called the metonic period – the when you have a full moon on a calendar day how long it takes to be on that date again – 19 years



Pytheas said the Moon appears very close to the Earth at this location (does not get high in the sky)

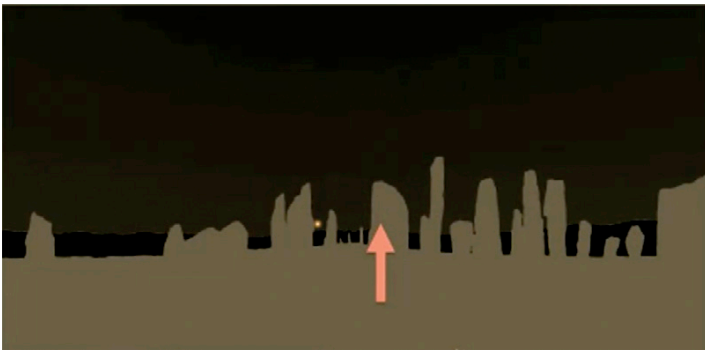


Today people still gather and celebrate the moon rise over the mountains, very low in sky

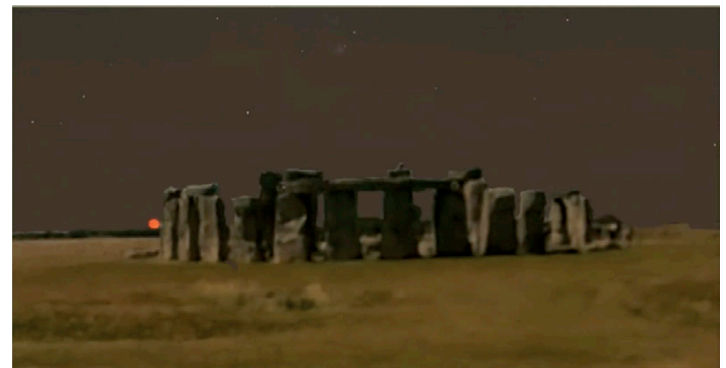
Looking at Scorecard:

This appears to be consistent with observations, could be other explanation could be random, culture was very experienced in astronomy, including the moon seems natural. Moon is specifically associated, Pytheas said it's a special place where the moon appears very close to the Earth....an intriguing example.

- An avenue going in a weird direction, closer to south than solstice
- View to the southwest horizon, a little more extreme than solar positions
- Full moon is south when the Sun is north in June



A model looking along the avenue at Full Moon in Summer – is this corridor something to do with Lunar Standstill but not at Winter Full Moon but at Summer Full Moon? The Full Moon passes just over the horizon on that day; when it sets a brief flash along the avenue.



Stonehenge

Looking at Scorecard:

Hard to say with Stonehenge, lines between “stations stones” point to SE/NW Major lunar standstill directions, but these are also right angles for this latitude. The best alignment you may have would have the moon rising in one corner.



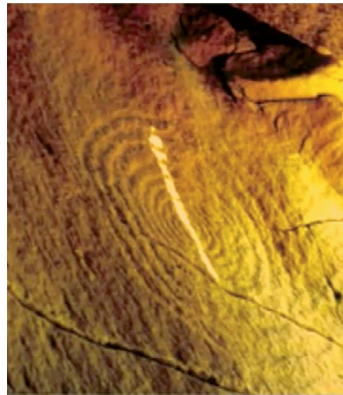
Local saying from Callanish area “When the cuckoo calls the shining one will walk along the stones” is this a reference to Summer solstice? Does it imply the Moon? Pytheas

**Chimney Rock National Monument,
Southwest Colorado**



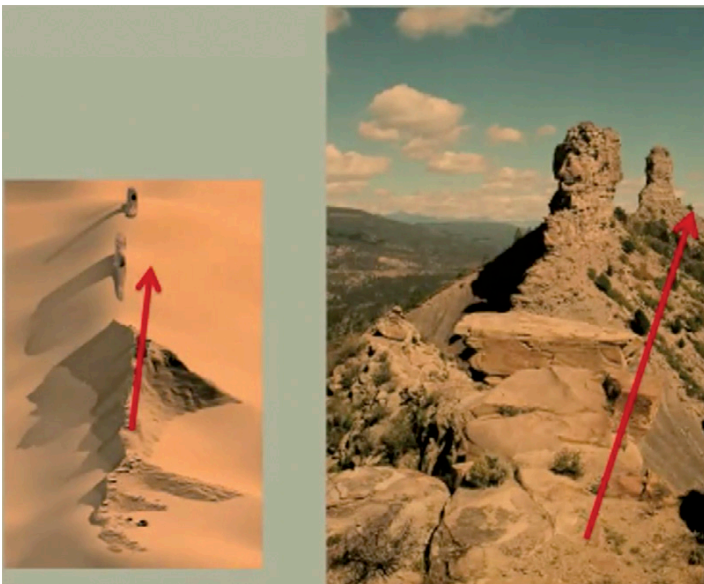
Chimney Rock is a gorgeous place; a knife-edge ridge that goes up to the northeast, at the end of these two rock pillars, along that ridge several kivas

- We see the Great House, Great Kiva, one Kiva at most narrow part of ridge
- Took a lot of energy to build, no water, would have to be hauled or have a catchment
- Not 100% clear people lived there all the time, it may have been some sort of a ceremonial center



Chimney Rock at Lunar Standstill (Lekson, 2011, Photo from 2006)

- Every standstill season for about 2 years, every month the moon rises between the spires, did people build the site to celebrate the standstill of the Moon?
- Tree-ring data of the building up there show that the Great House was built and renovated on an eighteen year time-scale associated with the dates of the Lunar Standstill, so have specific date to correlate the association
- Tree-ring dating shows major building phases at Chimney Rock on the major lunar standstill years 1076 and 1094 CE



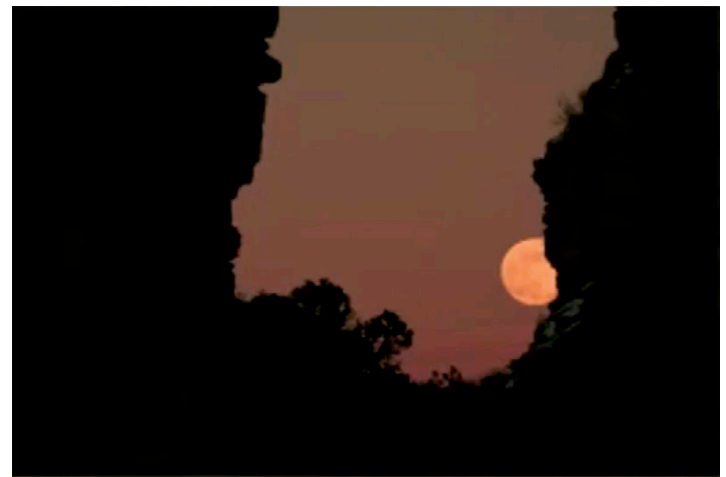
- Looking from the kiva along the ridge, will never see a sunset there
- You are looking too far northeast for it to be the summer solstice sunrise, the ridge is too narrow to find a place to see sunrise through the rocks from there, though there are other possible solstice sight lines nearby (Architectural model by Dennis Holloway)

Looking at Scorecard:

We find this site is consistent with observations of the Moon though there could be other explanations, it lines up with the Moon and not the Sun, people cared about other celestial matters and recorded movements and solstice positions of the Sun, the tree-ring data association of building and renovation and the Lunar Standstill dates is compelling indication that the Moon is specifically associated.

Standstills reconsidered

- Fundamentally the rapid jump of the moon across the sky night-to-night makes human-built alignments very difficult – it's extrapolation, not observation
- Chimney Rock seems to have the most visual drama and physical evidence; geology has framed the phenomenon and made us notice it
- Extremely low positions of the Moon (e.g. Callanish) might also cause notice
- Other sites are controversial, with some researchers seeing an "excess" or orientations near directions of the standstill-rise/set limits over random expectations
- Others cite the lack of historical or ethnographic corroboration in any culture



The Major Lunar Standstill Season 2024-2025

- We are in a Lunar Standstill right now, it started in 2023 till end of 2025
- We are collaborating with the USFS/San Juan National Forest, the Chimney Rock Interpretive Associations & Griffith Observatory
- Last year we have 3 very successful events and having 3 this year, if anyone wants to see it there is still time this year
- Access to the upper mesa is restricted for safety/space reasons it is a very dangerous pathway with cliff on both sides
- We pack a Starlink up and have a full film recording up there
- We have events in the accessible amphitheater at the Visitor Center (150 people)
- Will have star gazing, telescopes, talks, stories, demos, music, film and a live stream of the northern extreme and watch the moon rise through the Chimneys

Sept 13th 2025,
10:30pm-midnight
Sept 14th 2025, 11:30pm-1am
Oct 11th 2025, 9:30pm-11:00pm

- Event reservations available on recreation.gov
- Live stream available online via Griffith Observatory



If you would like to join us...

- We can't allow more people on the upper mesa but would love to have more telescopes and help with like parking, ushering at the amphitheater
- Saturday is sold out, but we can get you in if you can help out before/after
- It's a chilly, late night event -ends after midnight Saturday, after 1am Sunday
- If you would like to come, I'll get you in – you need to cover own transportation, lodging etc. There is nearby Ute Campground for those hardy folks, in September, not sure about October, but very cold at 8,000 ft, so be prepared, also motels in Pagosa and area

Contact: Erica.Ellingson@Colorado.edu

Questions:

Given the backward wobble wouldn't it take several 18-yr generations to find this cycle?

Is there any evidence that the limestones were moved beyond the maximum point at Stonehenge?

Can you tell us a little bit more about your work with the National Park Service?

You talked about historical calendars, have you even been to "The Snake" in Utah?

Acknowledgment

Would like to make special acknowledgment to Dr. J. McKim Malville, Astronomer, Solar Scientist, Professor Emeritus University of Colorado, who pioneered much of the work worldwide in archaeoastronomy and particularly Chimney Rock. His book "Prehistoric Astronomy In The Southwest, 1989" covers detailed information of Chimney Rock and other associated sites. He has analyzed astronomy and archaeology at sites throughout the world including Machu Pichu, Egypt and England.

III. Business Meeting - Treasurer Report by Bruce Lamoreaux



Longmont Astronomical Society

P.O. Box 806
Longmont, CO 80502-0806

LAS Treasurer's Report - Bruce Lamoreaux

8/21/2025

Main Checking Account (xxx-1587)

Begin Balance:	\$ 6,690.00	7/2/2025
Deposits:	\$ -	
Expenses:	\$ (630.00)	Bank Charges, AL Dues
Current Balance:	\$ 6,060.00	8/5/2025

2-Year Savings Account (xxx-1478) (matures 10/23/23)

Past Balance:	\$ 8,275.00	3/31/2025
Interest:	\$ 15.00	
Balance:	\$ 8,290.00	6/30/2025

Telescope Fund (xxx-0165)

Past Balance:	\$ 1,100.00	6/27/2025
Deposits:	\$ -	
Expenses:	\$ -	
Balance	\$ 1,100.00	7/30/2025

Petty Cash

Past Balance:	\$ 50.00
Deposits:	\$ -
Expenses:	\$ -
Balance	\$ 50.00

<u>Total Assets</u>	\$ 15,500.00	\$ (550.00) Down from July
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Active Membership:	102
Student Membership:	2
Total	104 Active

IV. Upcoming Events

Star Party August 22: City of Boulder Open Space and Mountain Parks (OSMP)

Presentation: "Dark Skies and Deep Space: A New Moon Astronomy Night"

Friday, August 22, 7:30 to 10:30

Beech Shelter (north of Boulder off Neva Road)

Star Party August 26: With Boulder County Parks and Recreation

Presentation: "Astronomy: A Planetary Lineup"

Friday, August 29 at 7:00-9:30 pm

Ron Stewart Preserve at Rabbit Mountain

Next LAS Meeting: Thursday, September 18 at 7:00 pm

Presentation by Dr Fran Bagenal "Exploration of the Outer Solar System: Celebrating Voyager's 50 years!"

1st Evangelical Lutheran Church, Longmont

Star Party September 21 at Beech Shelter north of Boulder

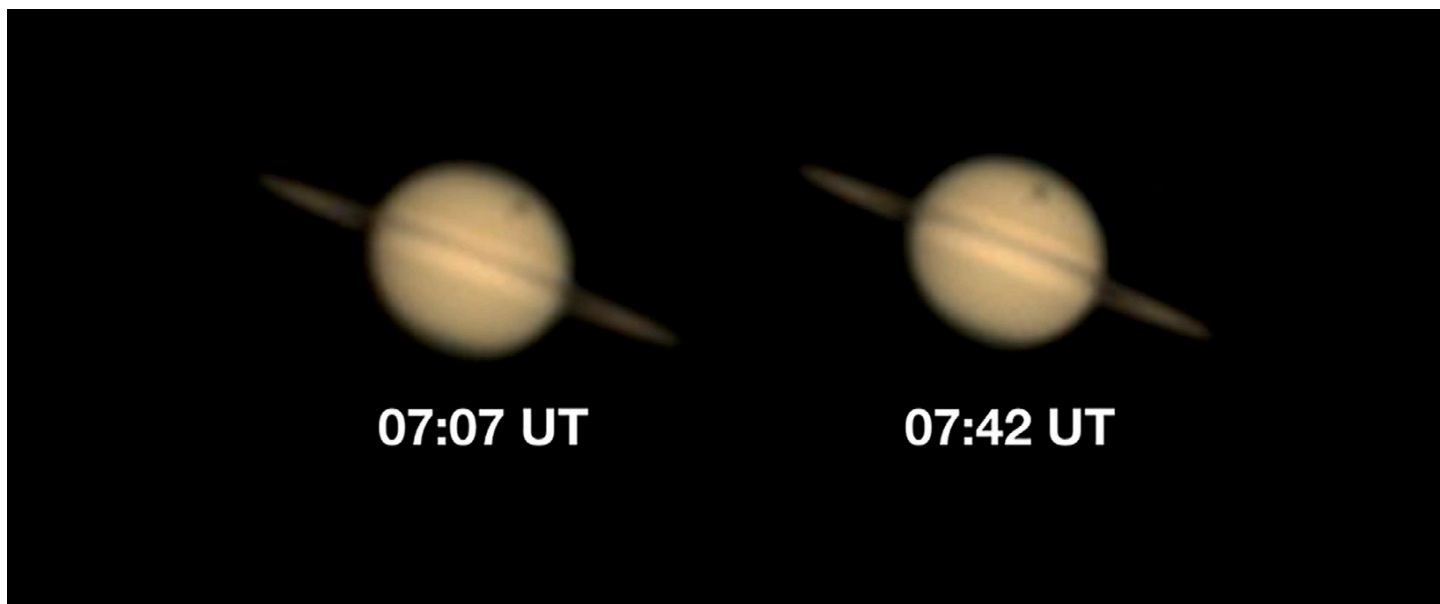
Star Party September 26 at Rabbit Mountain.

Boulder County naturalists will give a talk at 6:15 pm "Nebulas to Star Clusters".

School group on October 1st at the YMCA of the Rockies in Estes Park.



Full arch rainbow at Brockman Campground, Colorado State Park by Gary Garzone



“Titan’s Shadow moves across Saturn on August 19 ” by Tim Brown

Images of Saturn taken with the f/18 Schiefspiegler from my driveway in pretty good seeing. The timing was pure luck, I was unaware that this rather rare event was to occur. Next opportunity I read will be half a Saturn orbital period hence in the 2040s. When I went to look at Saturn the shadow was immediately obvious so I started the camera and took 30 sec bursts at about 100 fps until I lost the planet behind my front yard tree. Shown here are the first and last bursts, about 35 min apart. Titan itself was easily visible through the eyepiece and can be seen in the images above and to the right of its shadow. But for some reason it gets lost in the image stacking process.

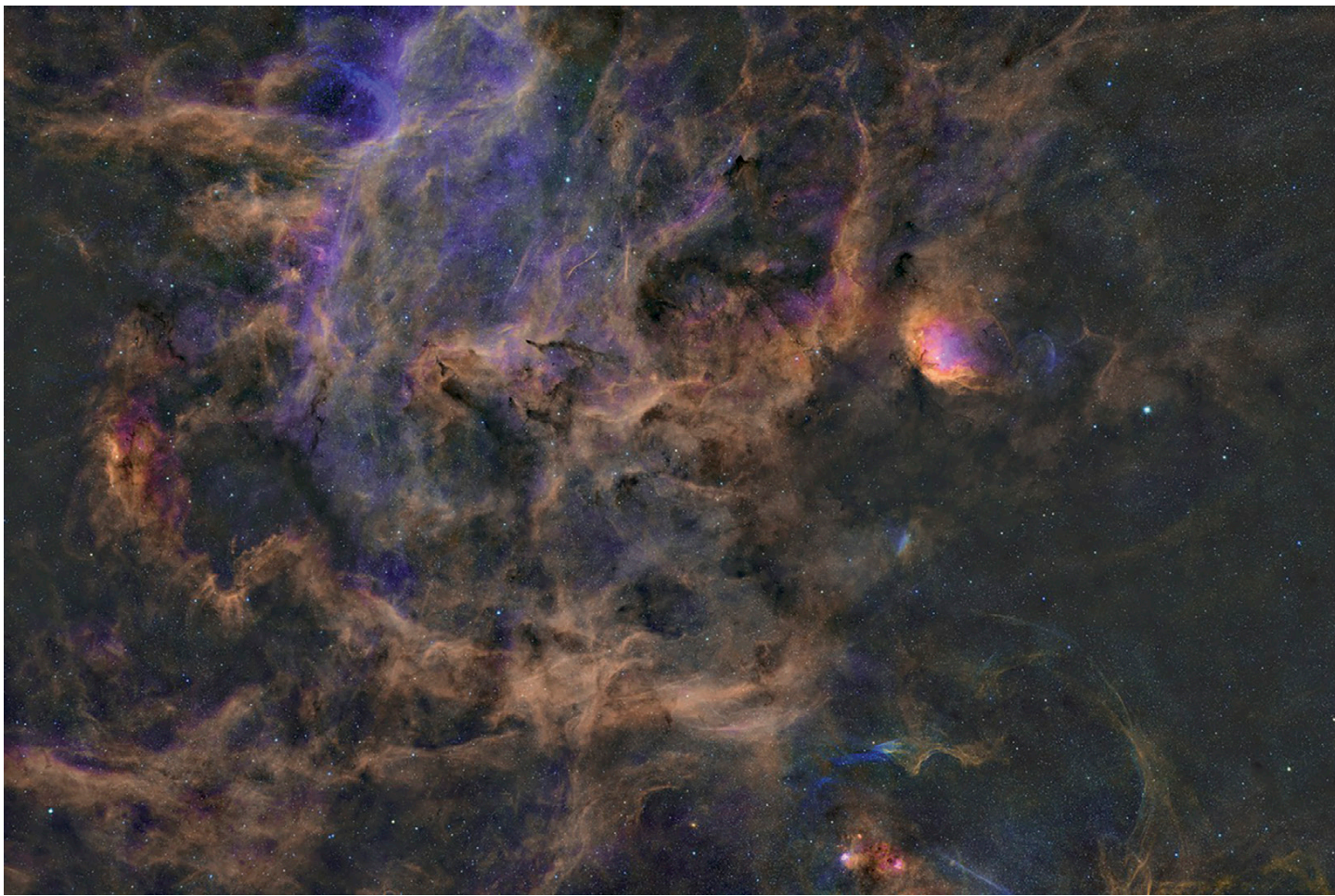


Gary Garzone’s 30 inch Telekit Dobsonian at Brockman Campground, Colorado State Park



M8, Lagoon Nebula by Aref Nammari

Clear skies last night for more than 10 minutes and no playing hide-and-seek !! Managed to get my Seestar S50 out and take 30 minutes total integration (10 second subs) of M8. Processed in siril, gimp and seti-astro (cosmic clarity). Up-scaled with upscayl.



Sh 2-99, 2-100, and 2-101 by David Elmore

This is a large section of the middle of the constellation Cygnus showing some star forming regions, mostly red, and a lot of debris from exploded stars.

There is a nice blueish shell around Wolf-Rayet 134 (top left), a young star that will not too long in the future, in astronomical terms, explode.

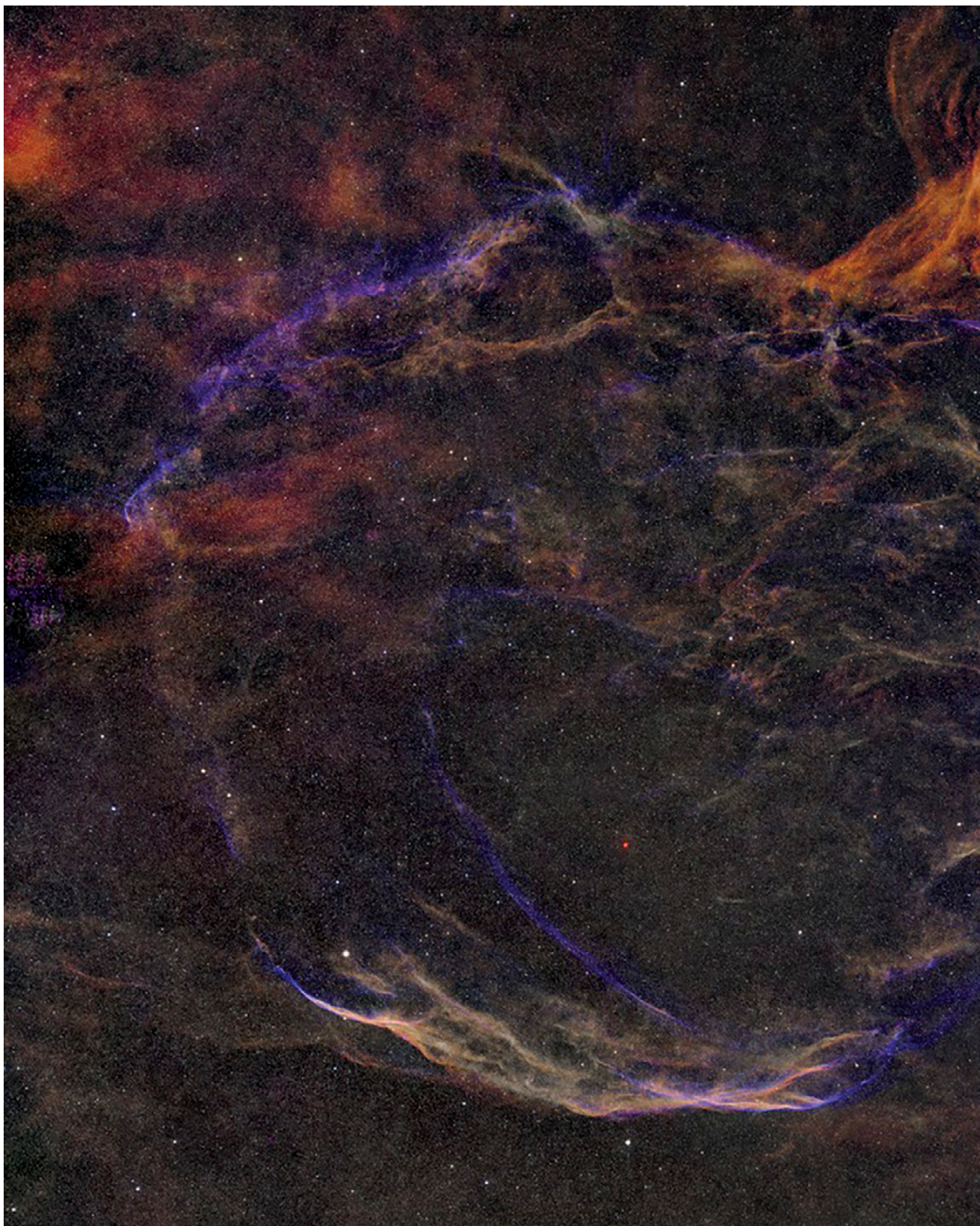
A project of mine is to record all 300+ objects in the Sharpless catalogue. Missing were the two tiny red star forming regions at the bottom. Since this telescope has a huge field of view, I decided to frame them at the side to pick up all the other interesting features in this field.

Red is hydrogen-alpha, teal is oxygen III, and yellow is sulfur II.

2-1/2 hours of exposure in each Ha, OIII, and SII. Borg107 refractor. ASI6200MM camera. iOptron CEM70 mount. From my little observatory at Dark Sky New Mexico.

For more detail head to Astrobin.

<https://app.astrobin.com/i/a069nk>

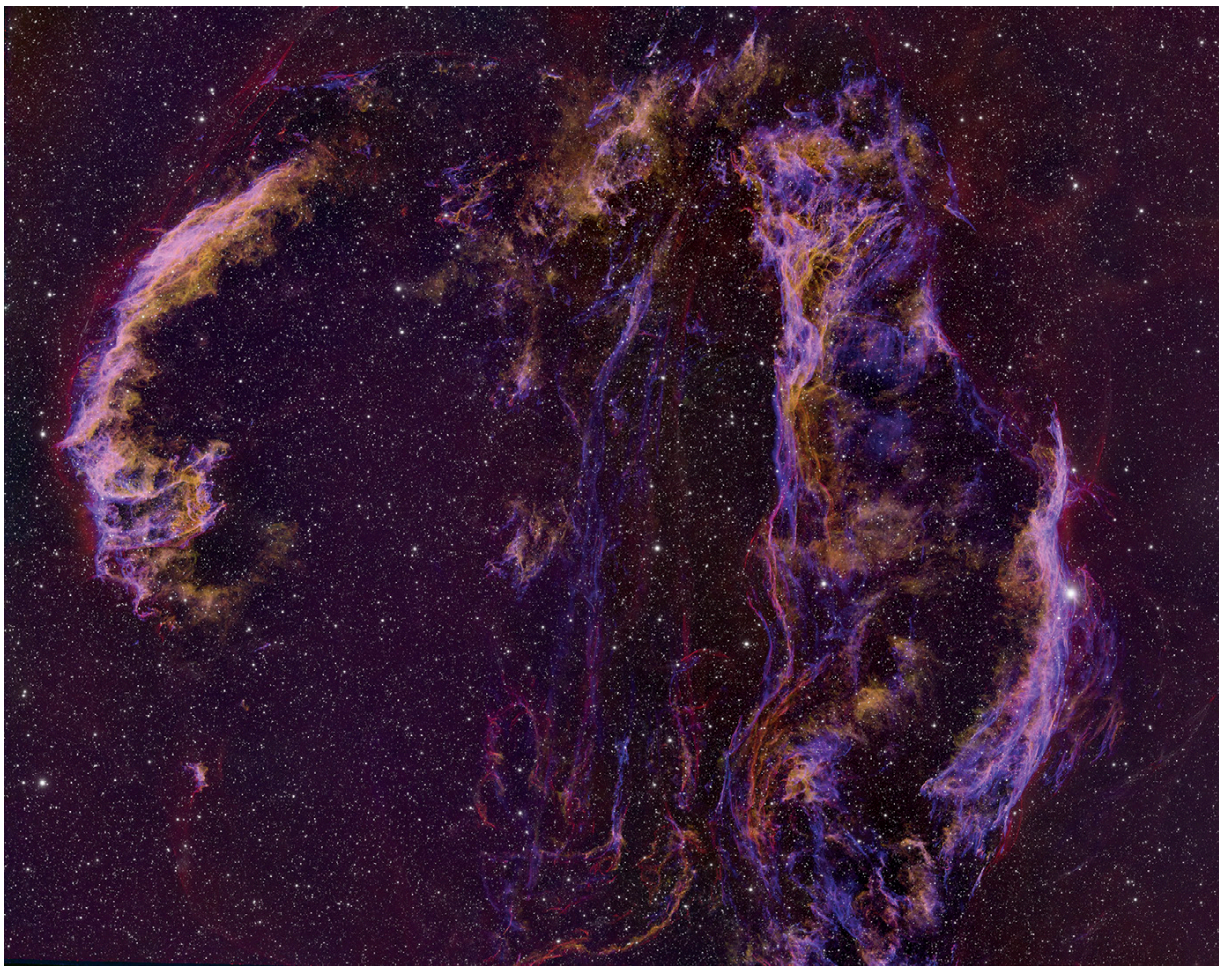


SNR G065.2+05.7 by David Elmore

SNR G065.2+05.7 is a supernova remnant (SNR) located in Cygnus just up the neck of the swan from the double star Albireo. This SNR is comparable in size to the recently imaged Veil Nebula, also within Cygnus. Unlike the Veil Nebula, SNR G065.2+05.7 is situated within the band of the Milky Way, making it heavily obscured by stars.

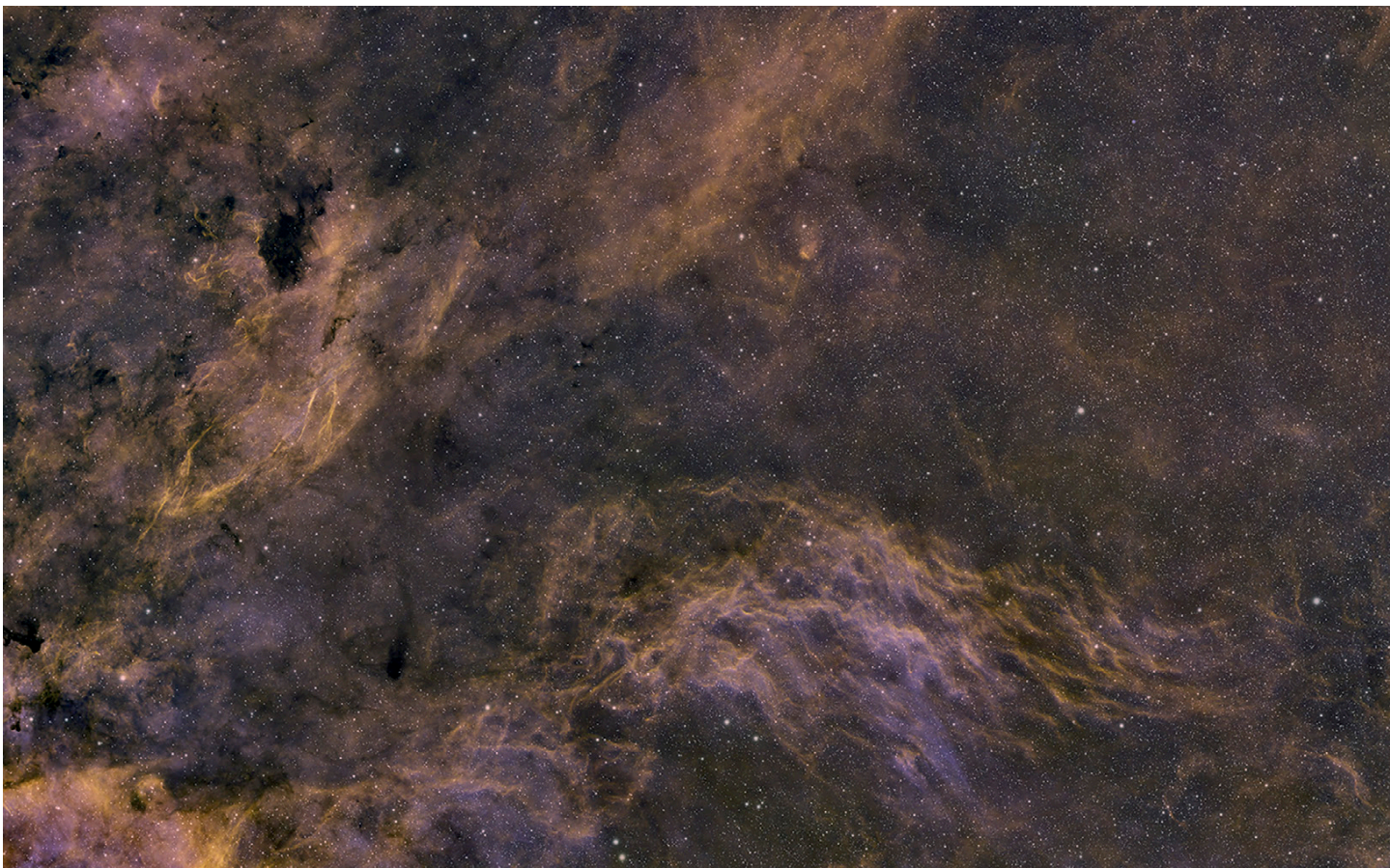
During processing, I attempted to reduce the stellar component to enhance the visibility of the nebula. This narrowband image utilizes Hydrogen-alpha as the red channel, Sulfur II as the green channel, and Oxygen III as the blue channel. Two panels taken with a 420mm focal length Borg107 telescope and an ASI6200MM camera, were employed to capture this approximately $5^\circ \times 7^\circ$ field. The total exposure time was approximately 10 hours, captured under nearly full moon conditions. This was taken from my small observatory at Dark Sky New Mexico.

Parts of SNR G065.2+05.7 were noted by Stewart Sharpless and subsequently cataloged as Sh2-091 (the arc at the bottom), Sh2-094 (the spike on the right), and Sh2-096 (the shock of corn stalks in the upper right). One colleague interprets the image as the face of a fat cat gazing out of the sky. Well, maybe.

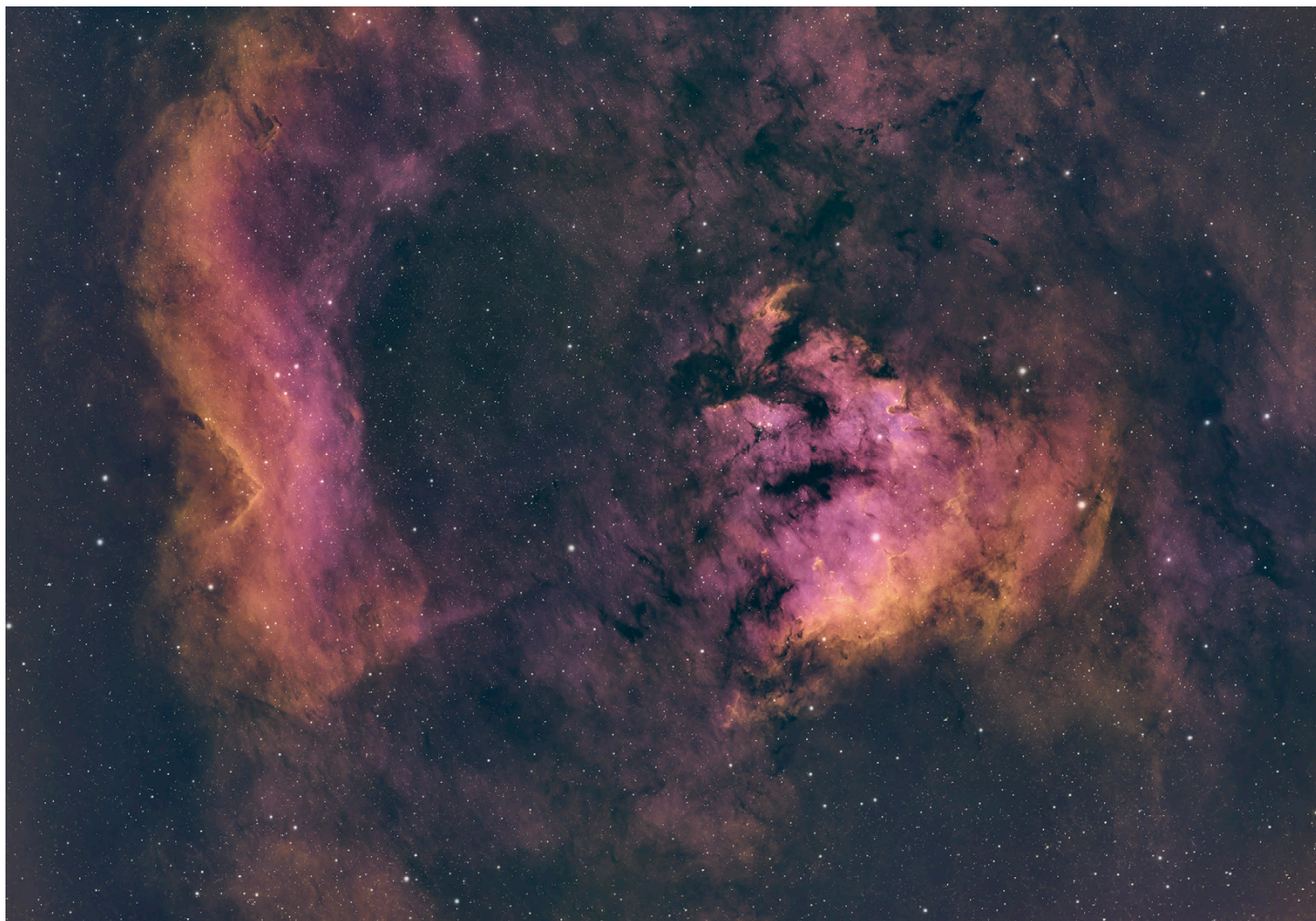


Cygnus loop,
2 panel mosaic
with an FSQ-
106EDX4
and an
ASI26000mm
camera. 4 hours
each of SHO for
each panel.

Cygnus Loop by Jim Pollock



SAO 69523 by Stephen Garretson



NGC 7822 by Stephen Garretson

Bright nebula in Cepheus, I imaged this a few years back and wanted to re-shoot it with the current B107 & S71/2600MM combo, and use the NBColourMapper script in PixInsight. In this rendition Ha is a solid red, OIII is teal, and SII is yellow [for contrast to show that species].

[18] 600s guided Ha subs
 [19] 600s guided OIII subs
 [13] 600s guided SII subs

Total integration: 8 hours, 20 minutes

ZWO 2600MM Pro
 Borg FL 107 6 element f/3.9 APO
 Primalucelab Esatto Robotic Focuser
 ZWO EFW
 Chroma 3nm filters
 Wanderer Astro V2 Rotator
 WandererBox Lite V3
 Bahtinov mask modified Wanderer Astro Eclipse

ZWO 2600MM Pro
 William Optics Star 71 Gen II f/4.9 Petzval Astrograph
 Optec TCF Leo robotic focuser
 ZWO EFW
 Chroma 3nm filters
 Baader H-Beta filter
 Wanderer Astro V2 Rotator
 WandererBox Lite V3
 Bahtinov mask modified Wanderer Astro Eclipse

Paramount MX+

TheSkyX, SGP, Wanderer Empire, PHD2
 PixInsight, Mac OS Photos, Preview

from the Beevo Dome



Cave Nebula to Wizard Nebula by Stephen Garretson

I imaged this field previously but only had Ha data, so I elected to go back and get all three NB channels. The previous FOV was pleasing so stuck with the center star, GSC 4278: 669. This is the first project for my recently re-installed Borg 55FL Triplets. They now have the addition of modified Wanderer Astro Eclipse Bahtinov masks, just like the Borg 107/Star 71 combo. I needed to construct cheat sheets to remember which device is connected to which scope. And shooting and then processing data for darks, flat-darks, and flats for three scopes was a task, actually several tasks. I added a Wanderer Astro mini powerbox to feed the Bahtinov devices and avoid overly excessive power cabling. The other change is I am using the William Optics Uniguide Scope, small but effective at 30mm aperture and 130mm focal length; it's performing quite well with the 200mm FL Borks. This replaces the WO 50x200 guide scope of the first triplet setup.

The wonderful thing about the triplets is that I can collect [4] 600s subs from each scope and within 40 minutes [plus download time] I have 2 hours of data...very efficient. Of course there is the challenge of positioning the shutter opening of the dome so everyone can see out properly; one must pay attention!

[20] guided 600s Ha subs

[23] guided 600s OIII subs

[12] guided 600s SII subs

9 hours, 10 minutes total integration

Capture:

Borg 55 Triplets: Each of the three scopes/image trains has the following elements

Borg 55FL Astrograph

ASI 2600MM Pro

Wanderer Astro Eclipse Cover modified with Bahtinov mask

Gerd Neuman Camera Tilt Adjuster

ZWO EAF

ZWO EFW

Chroma 3nm narrowband filters

guiding:

William Optics UniGuide Scope 30x130

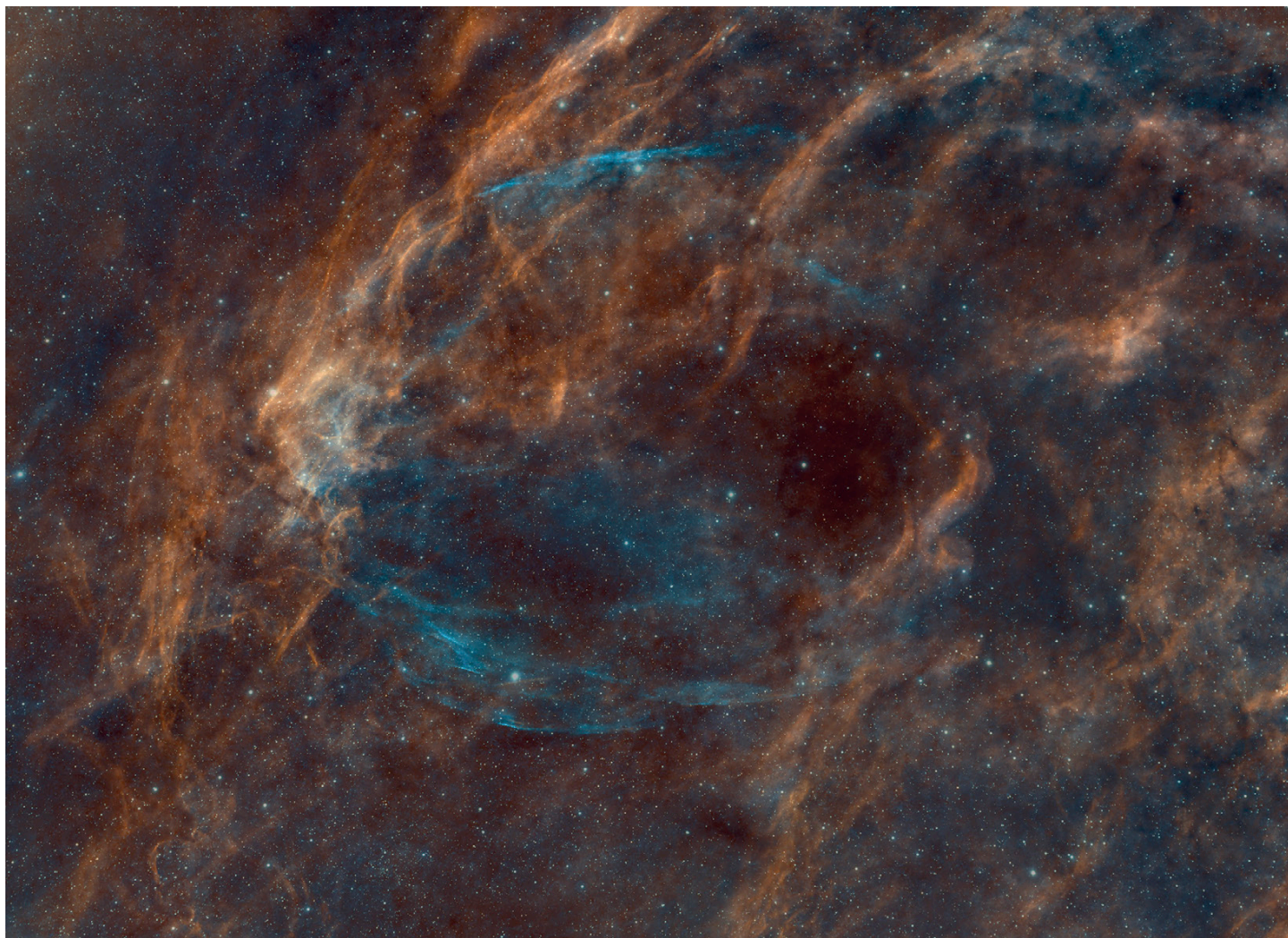
ASI 220M Mini guide camera

Paramount MX+

TheSkyX, SGP, Wanderer Empire, PHD2

PixInsight, Mac OS Photos, Preview

from the Beevo Dome

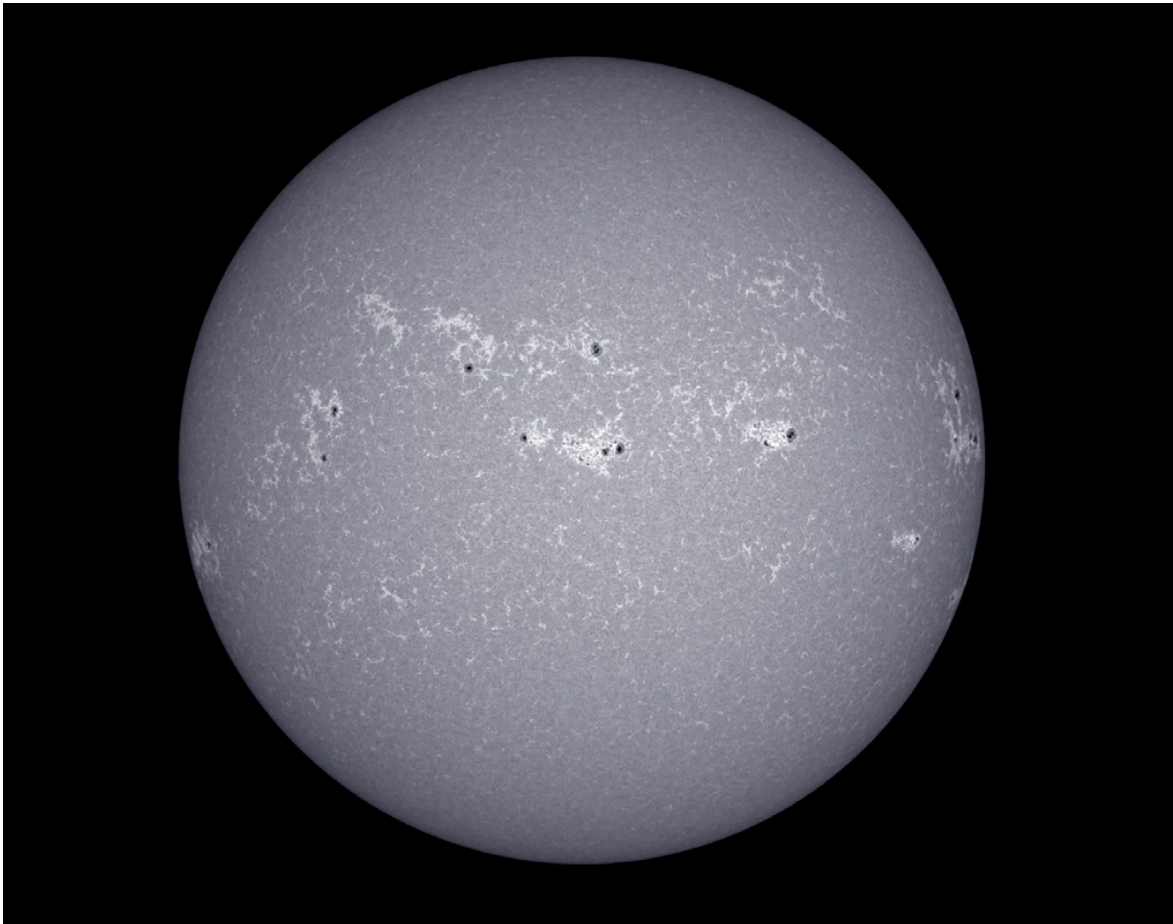


SNR G82.2 + 5.3 by Stephen Garretson

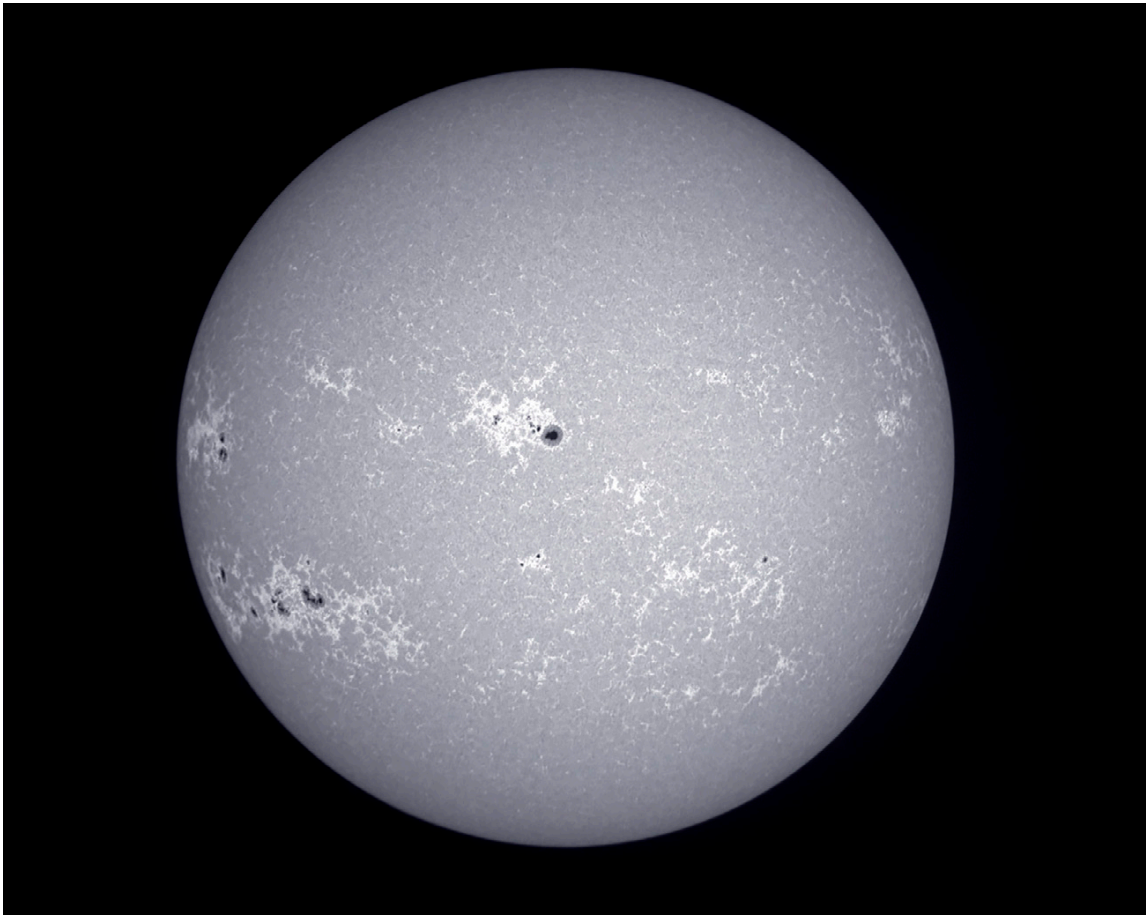
This target was imaged in July 2023 and I posted it as HOO. Recently I came across another imager's shot that had SII included. So last night, despite a bright Moon and high clouds, I was able to gather 3 hours of SII. I did not have the original HOO component data so worked from the HOO image. I did have the original centering star noted so was able to shoot very close to the same FOV, making aligning simple. I used NBColourMapper in PixInsight to colorize the SII master as yellow, my typical color selection for that species to distinguish it from Ha. The registered HOO and SII masters were combined in PixelMath, rendered starless, tweaked in Mac OS Photos, and then saved in Preview.

The 2023 HOO was pretty scarce on data, just [3] hours integration, [1] Ha and [2] OIII, all on the Borg 107; I'd never do that little today. And I added [3] hours SII, but only combined it at 45%. SII data was the dual system of Borg 107 and WO Star 71.

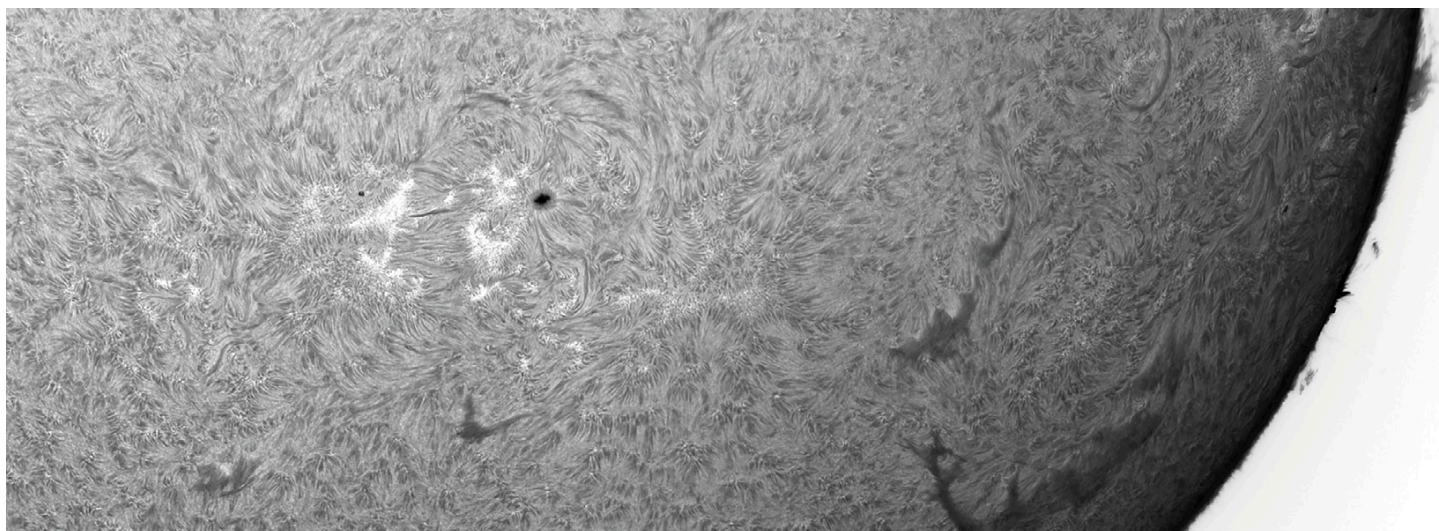
This SNR is in Cygnus, very near Deneb. I like the way the SII adds to the complexity of the original HOO, but did elect to crop off some of the nebulosity on the right to concentrate on the main target.



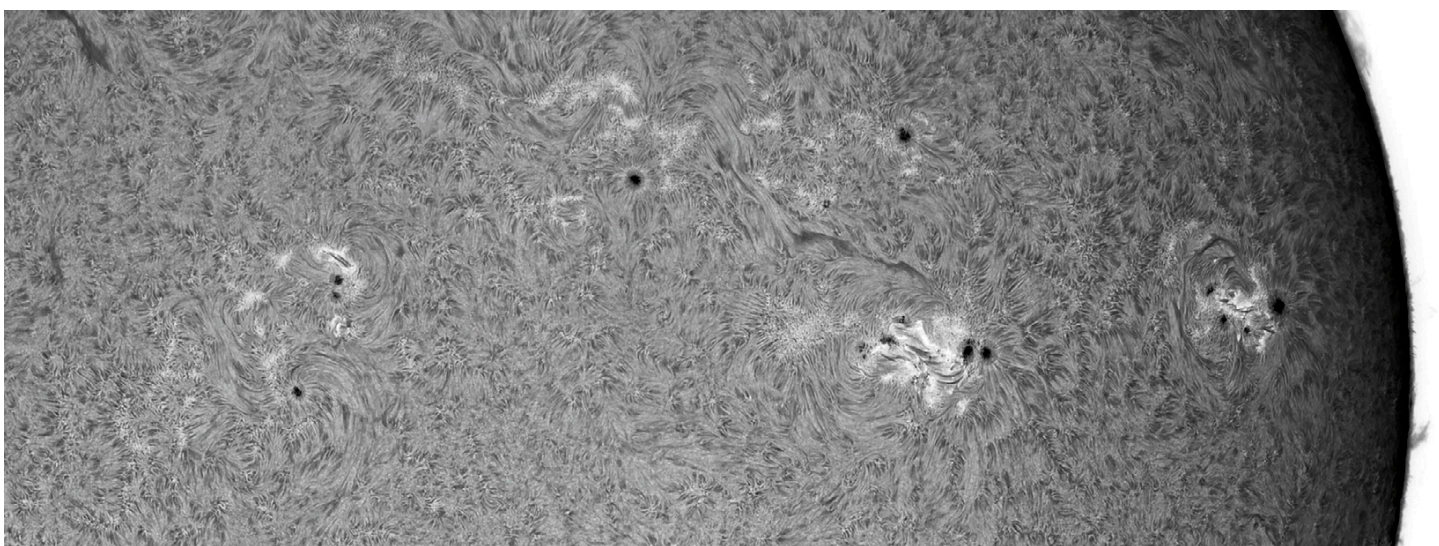
Sun full disk in H-Alpha on August 10 by Brian Kimball



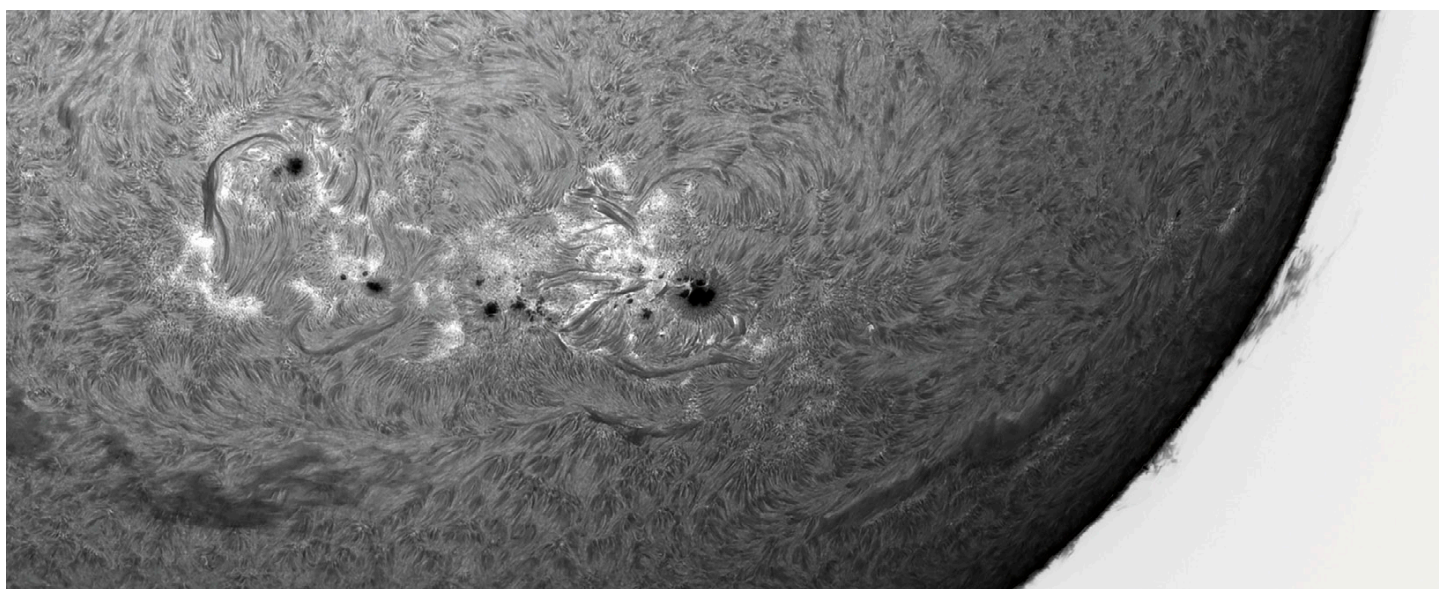
Sun full disk in Calcium-K on August 26 by Brian Kimball



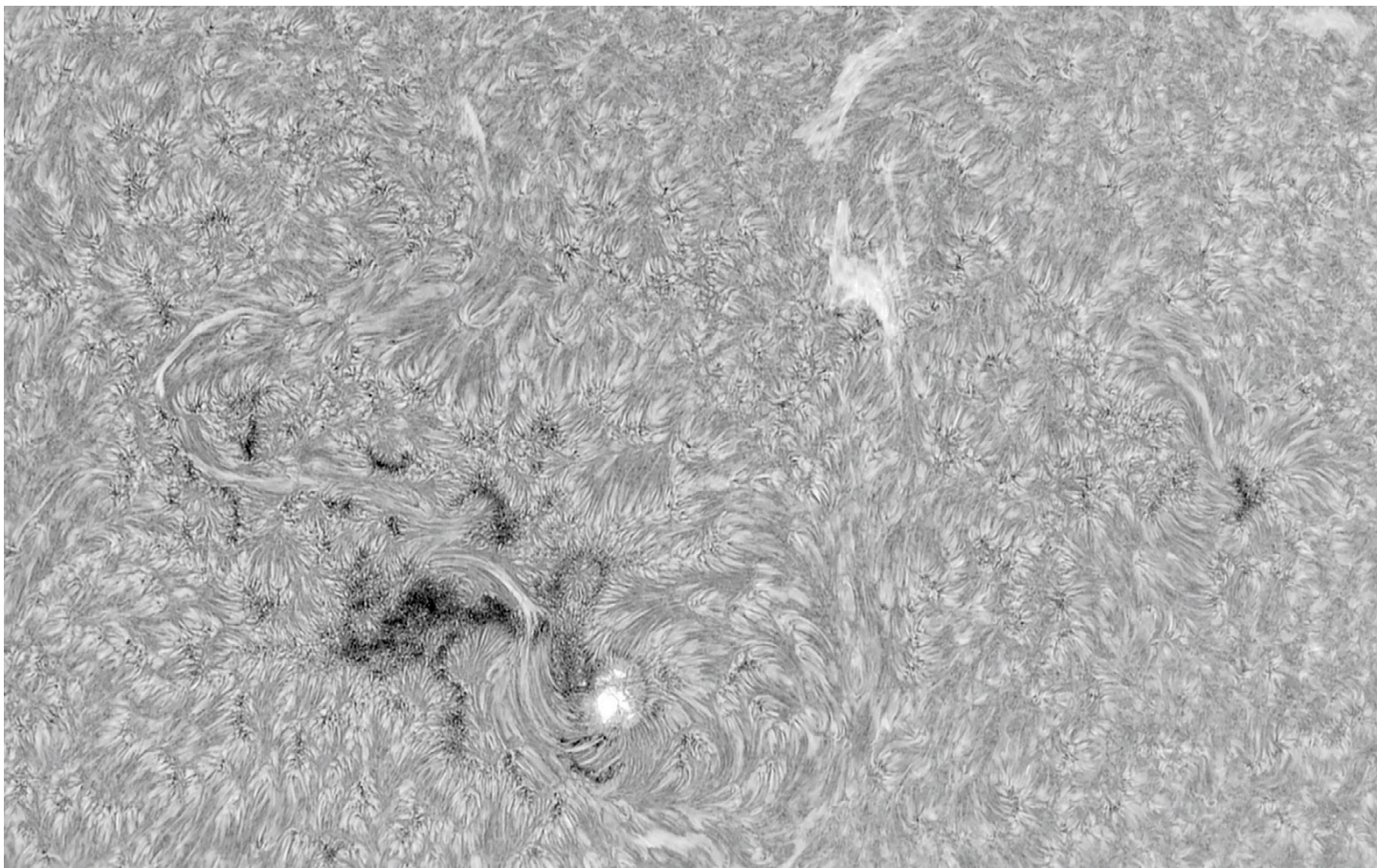
Solar active region AR 4161 on August 2 by Brian Kimball



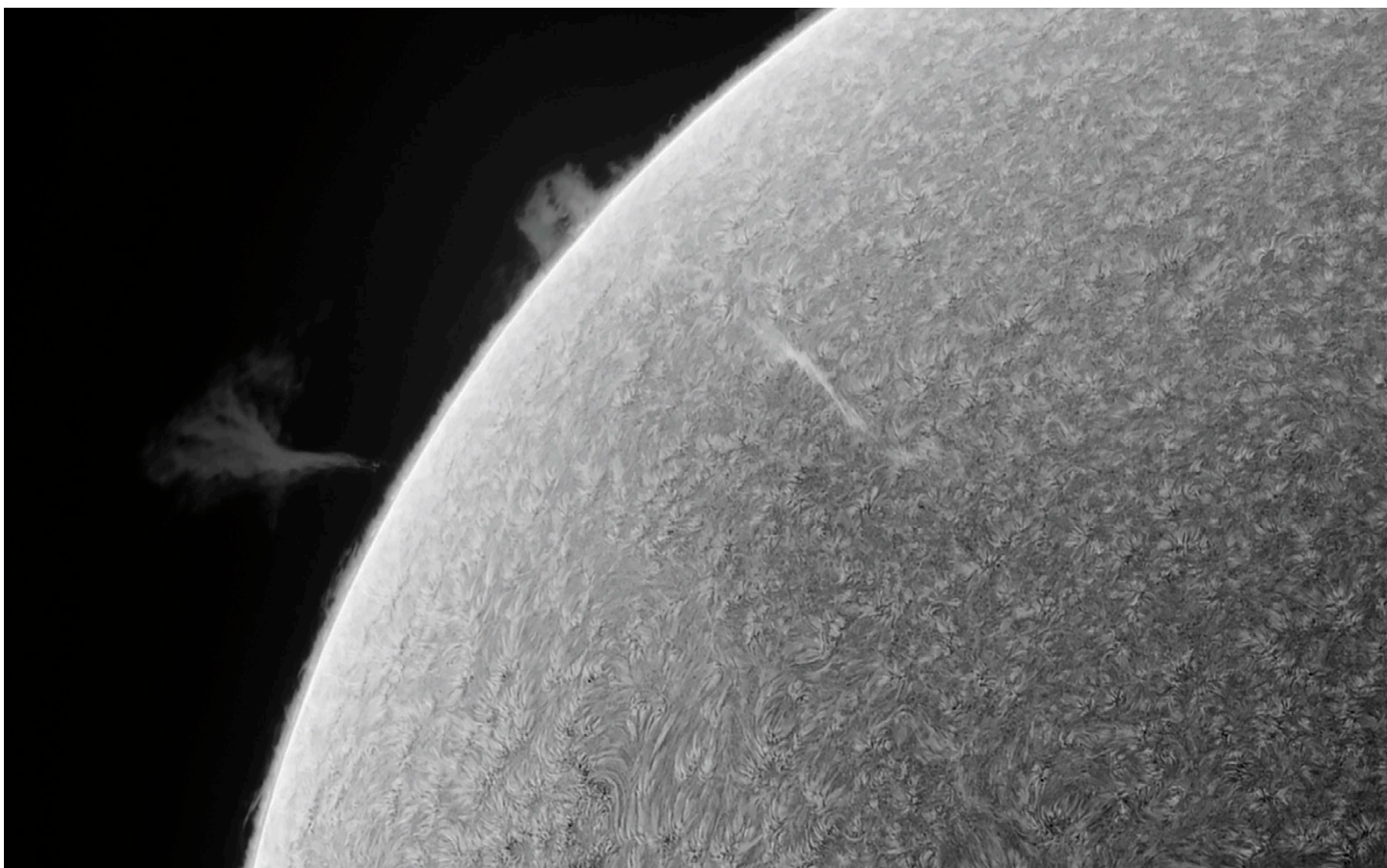
Solar active regions 4161, 4171, 4172, 4175, 4177, and 4178 on August 12 by Brian Kimball



Solar active regions 4197, 4201, and 4202 on August 31 by Brian Kimball



Solar active region AR 4199 on August 31 by Brian Kimball



Prominence in H-Alpha on August 17 by Brian Kimball

Newsletter Archives by Eileen Hall-McKim

30 Years Ago: September 1995

Thom Peck opened the meeting with general discussion; Vice President report by Randy Cunningham, Randy gave out some excess Teflon and showed information on Astro-Systems new mill. Secretary/treasurer report was given by Bob Ross. We have \$709.81

- ALCOR, Bob Spohn, handed out information and software with all the Astronomical League's observing programs, see Bob for details.
- Hewlett-Packard star party, Sept 1-2, 1995
- The September meeting of the LAS is on the 21st, the scheduled speaker will be Tom Melshiemer, Tom will be speaking about mounts and drives for telescopes
- The LAS will be hosting a FRASC star party at Deadman from Sept 22nd through the 23rd
- The October star party will be held at Woodrow on the 21st

Presentation: Terry Herin, a member of the ARC Sciences Simulations team, gave us a very informative and enjoyable demonstration of the "Dance of the Planets" software written by ARC Sciences Simulations. This software is very strong in realistically showing solar system dynamics. We watched the SL9 collision, Hale-Bopp, found asteroids, and looked forward and backward in time to watch events. The software is very impressive and is for sale. Thanks to Terry for his enjoyable presentation.

20 Years Ago: September 2005

The CU Mountain Research Station Labor day weekend was a big success again. Julie Carmen gets lots of credit for helping put this BASS and LAS weekend event together. We are getting LAS and BASS families and friends to star gaze in dark skies with this close in dark sky site like the MRS. One of the reasons we live in Colorado is places like this, a slice of heaven and we get to play there. It's good to see lots of Astronomers actually getting some great views in. Some reports from attendees:

- The holiday weekend up at the CU MRS was unseasonably warm for this high altitude facility. At over 9,000 ft, we were expecting bitter cold evenings for observing, but instead, it was light jacket weather! We had 3 fantastic nights for observing with Sunday being the darkest night of the three.
- Friday evening started off pot luck dinner around 6 and was followed with an introduction by our host, Dr. Alan Kiplinger. Brian Hyneck gave a fascinating presentation on the exploration of Mars with some amazing pictures from the rovers, and information on planned future missions.
- At the observatory there were 9 telescopes in use including the Alpine Observatory 12" Mead, SCT. There was an interesting twilight in the skies on Friday night. It was near New Moon, but was not exactly dark. The Milky Way was in half fullness for Friday, and many deep space objects were viewed. Although bears had been spotted in the vicinity, we had no problems with bears for this event. Alan Kiplinger kept a Bull Horn in the dome for observers, especially those that were walking between buildings.
- A lot of folks took advantage of the dark skies (in twilight) to practice their Naked-Eye Astronomy. The Blinking Eye of Medusa, was pointed out, showing Perseus holding up her head and the star that is her eye, fades out every 3rd day? Or something to that rate. The Veiled Nebula looked especially nice this night.
- Saturday morning we got a great view of the sun through Andrew's h-alpha scope. During the rest of the day some of us hiked, napped, or ran home to pick up equipment we'd forgotten. That evening after dinner, Andrew Plank entertained us with an Australian aborigine story about creation of the Milky Way. Josh Walawender gave a very interesting presentation showing images of the observatories he has worked at in Chile, Hawaii, and New Mexico. Some of the kids got into the act too with star wars character impressions. This was followed by some beautiful Irish folk singing, spoon playing, and a poetry reading. The sky cleared around 11:00 pm and we got in some nice views till about 2 am.
- Late Sunday morning Mike Luckow and Vern Raben set up scopes for solar viewing in white light and h-alpha. Not a lot going on the sun, just one spot visible in white light and a few prominences and plage regions visible in h-alpha. Later that evening we all gathered outside to see if we could spot a daytime Iridium satellite predicted by Heav-

ens-Above.com from a printout that Alan provided. We weren't disappointed -- the flash was on time and wasn't just visible, it was an amazing brilliant white flash.

- Steve Hartung had arrived on Sunday and gave us a report that we would have clouds, but that by midnight it should clear up. Sure enough, we had clear skies, the darkest night of the three, and some folks stayed up till dawn observing and imaging. It was a fantastic night. The twilight was gone and the light pollution from Boulder looked as if it was all but gone. We saw the Blue Snow Ball, Veiled Nebula, The Blinking Nebula, Mars, Neptune, just to name a few. It was wonderful.

The Home Planet Stellar Views have been awesome for those who ventured out this month. Plenty of new events coming up like Erica Ellingson Lyons Elementary school astronomy night Oct 7th. Ray Warren field trip to Nelson road radio astronomy dish tour. The Pawnee grasslands director wants to have us volunteer to do Crow Valley campground on Oct 9th Saturday night for bus group of astronomers from Rely, Natural History Museum. I did it last year and could use some more help. It's in campground by Briggsdale, just 6 miles past where we normally meet. Let me know if you can help.

Auroras by Gary Garzone: Our lucky group of dark sky astronomers got the show of the year with awesome northern lights Aurora. First it started out with white light band across horizon to north, then turned bright green in color then spikes started to pop up. Soon after that red above bands of greens, so good in darkness of night with no Moon up. Here are a few good shots, Aurora was way better in real life but pictures do show how big. Check out big dipper stars in background. I used a Fuji 3 mega pixels camera 800 ISO, 15 seconds only each frame, not stacked. We all enjoyed the show, what a great treat for those who made it to Pawnee for such an awesome display of Nature. I would have driven there just for this, way cool.



Aurora at Pawnee Grasslands by Gary Garzone

10 Years Ago: September 2015

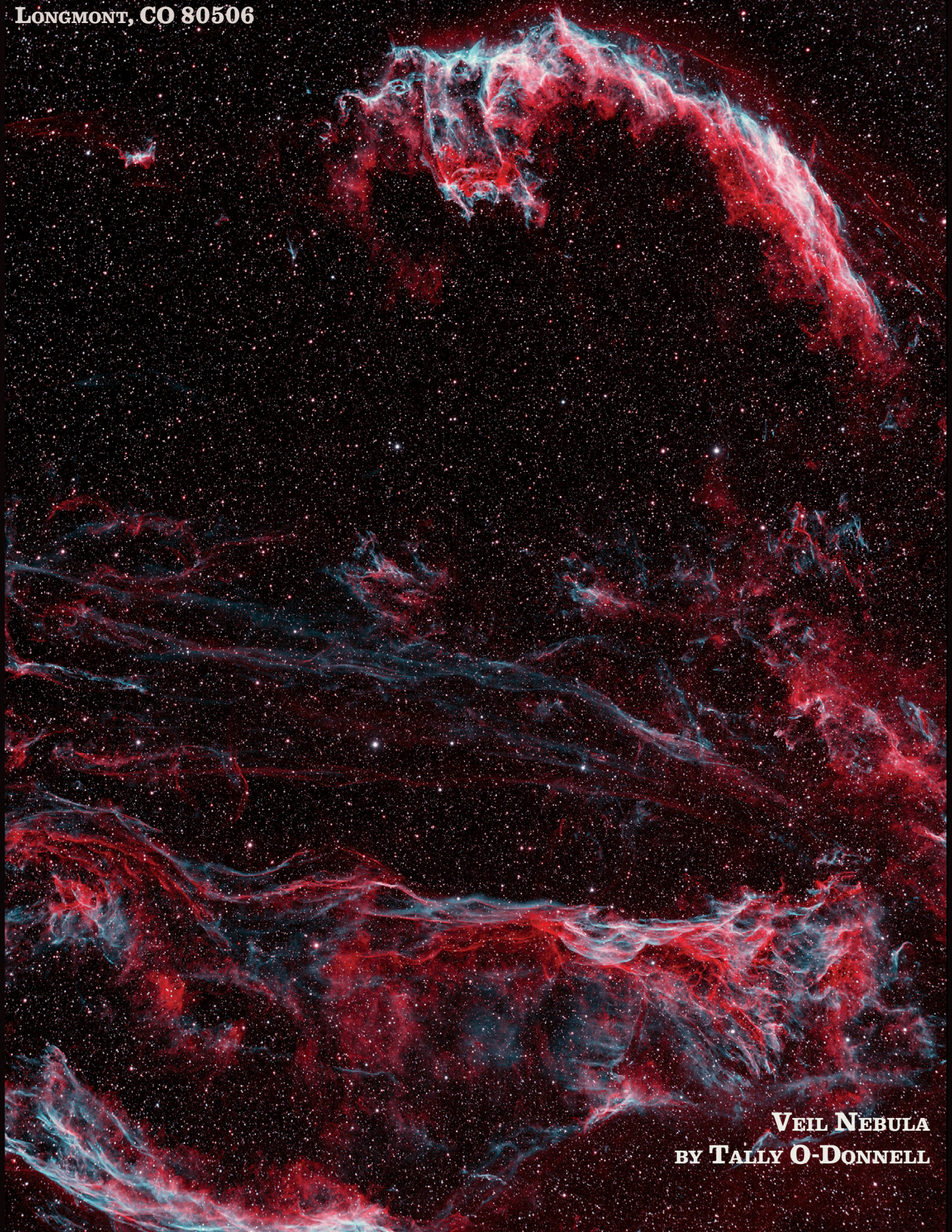
Vern Raben opened and moderated the meeting. Club officers were introduced: Gary Garzone as vice president, Mike Fellows treasurer (absent), Brian Kimball board, Jim Elkins board, Tally O'Donnell board, and Joe Hudson secretary. Agenda for the meeting was announced as well as upcoming events:

- Aug 21 Longmont Library kick-off event (7:30 to 9:30) 4 scopes 72 people signed up (expect 80-100) 10-20 per scope, need 3 more assist and scopes
- Aug 22 City of Superior Recreation Star Party (same as prior location - Colton, Vern will send map)
- Sept 11 Longmont LDS Boy Scouts Star Party at Union Res
- Sept 18 LAS September meeting Suzanne Metlay, Speaker, topic 'Time and Astronomy'
- Sept 27 Total Lunar eclipse 7pm "Watch the Moon Disappear" at Beach Shelter
- Oct 16 City of Louisville Library Star Party
- Nov 7 City of Louisville Library Solar party



Presentation "Beginners Spectroscopy" by Vern Raben: Vern gave a brief outline of some of the discoveries in the development of astronomical spectroscopy. He talked about the "Star Analyzer" a "low cost" way for amateurs to explore spectroscopy with their own scopes.

LONGMONT ASTRONOMICAL SOCIETY
P. O. Box 806
LONGMONT, CO 80506



VEIL NEBULA
BY TALLY O-DONNELL