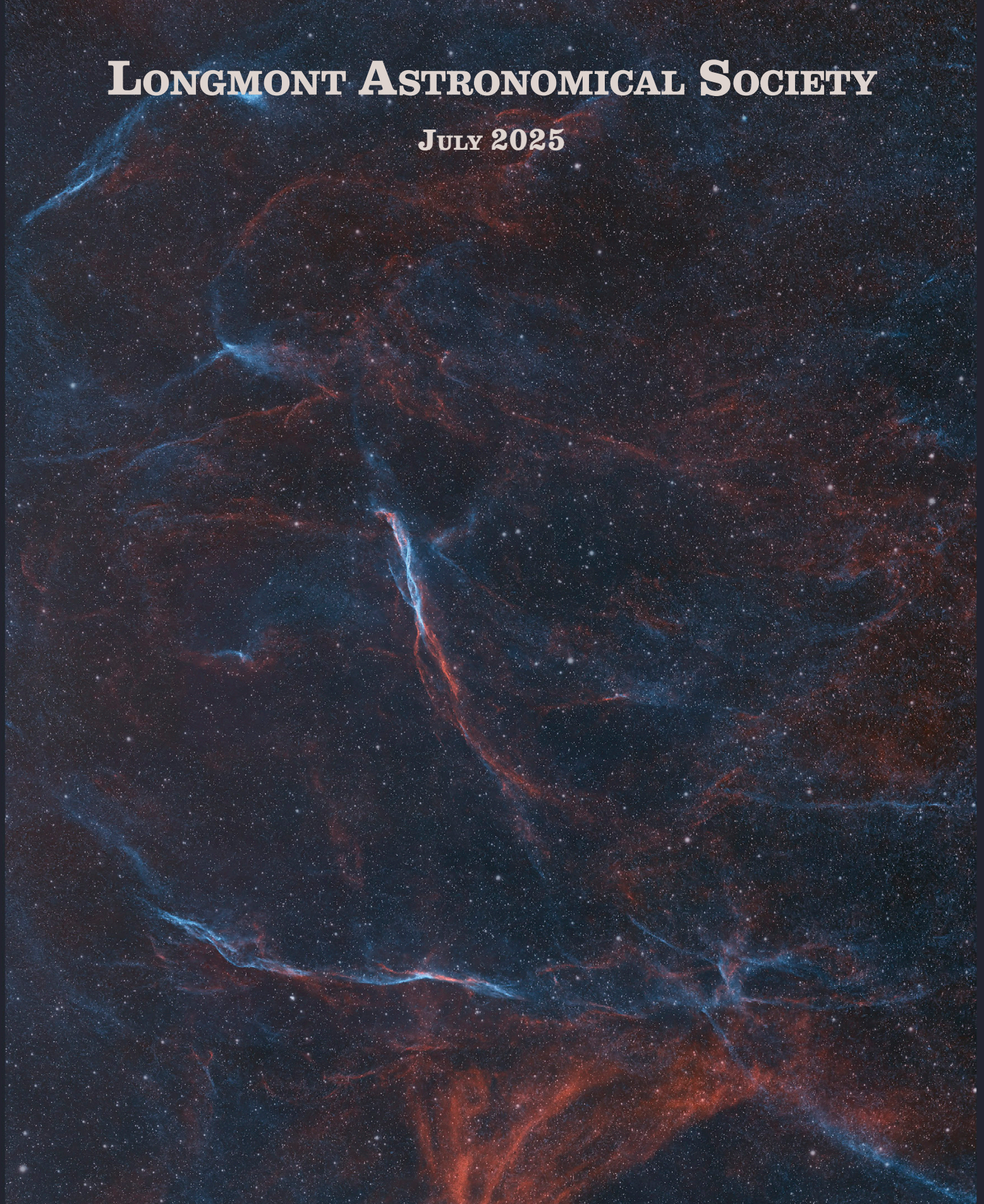
Longmont Astronomical Society

July 2025



Sh 2-294, Sh 2-296 Area
by Stephen Garretson

Volume 38, No 7, 2025
ISSN 2641-8886 (web)
ISSN 2641-8908 (print)

Next LAS Meeting Thursday July 17 at 7 pm

"Impact experiments at NASA's Ames Vertical Gun Range"

by Dr. Dan Durda, SWRI

Abstract

The Origins, Spectral Interpretation, Resource Identification, and Security-Regolith Explorer (OSIRIS-REx) sample return mission to the near-Earth asteroid (NEA) (101955) Bennu and the Hayabusa2 mission to (162173) Ryugu offer unprecedented opportunities to gain fundamental new knowledge about the processes governing regolith formation and redistribution on small bodies. Both asteroids display unexpected examples of small crater and boulder morphologies that raise new questions about the properties of coarse regoliths on small, primitive NEAs and processes governing the evolution of their surfaces. Experimentally documenting the range in morphology of fracture patterns of boulders in coarse regoliths and the form of small craters in coarse regoliths as a function of parameters like impact energy, depth of burial, and mechanical strength is a crucial step in the process of relating these amazing spacecraft images to the actual physical properties of these asteroids surfaces. I will share some of my results from my impact experiments at NASA's Ames Vertical Gun Range.

Bio

Dr. Dan Durda is a principal scientist in the Department of Space Studies at Southwest Research Institute (SwRI) in Boulder, Colorado. He has more than 20 years' experience researching the collisional and dynamical evolution of main-belt and near-Earth asteroids, Vulcanoids, Kuiper belt comets, and interplanetary dust. Dr. Durda is one of three SwRI payload specialists who fly on multiple spaceflights on commercial reusable suborbital vehicles.

Location

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

About LAS

The Longmont Astronomical Society Newsletter ISSN 2641-8886 (web) and ISSN 2641-8908 (print) is published monthly by the Longmont Astronomical Society, P. O. Box 806, Longmont, Colorado. Newsletter Editor is Vern Raben. Our website URL is https://www.longmontastro.org and the webmaster is Mike Hotka. The Longmont Astronomical Society is a 501 c(3), non-profit corporation which was established in 1987.

The Longmont Astronomical Society is affiliated with the Astronomical League (https://www.astroleague.org). The Astronomical League is an umbrella organization of amateur astronomy societies in the United States.

Contents

Front Cover: Sh 2-294, Sh 2-296 Area by Stephen Garretson

These two Sharpless objects, really part of the Sh2-91 SNR complex lie to the northwest of 91. The stars seem so dense in this area of the sky that I had to drop their percentage significantly so as not to overwhelm the Ha and OIII dance. Both channels are pretty faint, but 4 hours each produced decent levels that revealed the shape of both atomic species.

[24] 600s guided Ha subs
[24] 600s guided OIII subs
total integration: 8hours

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

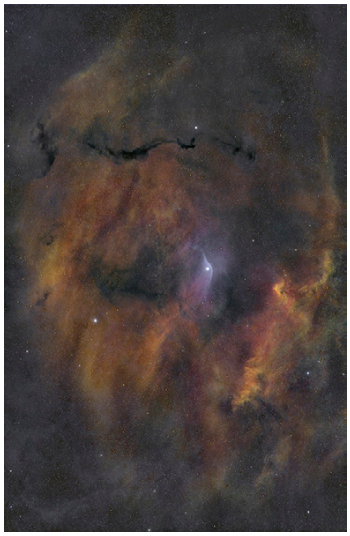
William Optics Star 71 Gen II f/4.9 Petzval Astrograph
Optec TCF Leo robotic focuser
ZWO EFW
Chroma 3nm filters
Baader H-Beta filter
Wanderer Astro V2 Rotator
WandererBox Lite V3
Bahtinov mask modified Wanderer Astro Eclipse

Paramount MX+

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

from the Beevo Dome

Back Cover:Sh 2-27 Zeta Ophiuchi Nebula by David Elmore



The Zeta Ophiuchi Nebula, located approximately 440 light-years away in the Milky Way, presents a striking appearance of immense size, spanning 12 degrees. Its primary emission emanates from hydrogen, a result of the excitation of hydrogen atoms by its central star, Zeta Ophiuchi. This colossal, luminous, and high-temperature star is actively traversing the interstellar medium, creating a bow shock. With a mass 20 times that of our Sun, Zeta Ophiuchi is rapidly consuming its hydrogen supply. According to Wikipedia, within a few million years, it will transform into a red supergiant star, eventually concluding its life in a supernova explosion. The aftermath of this supernova will likely leave behind a neutron star or pulsar.

This narrowband image captures the nebula's Hydrogen-alpha red, Oxygen III teal, and Sulfur II yellow components. The imaging equipment utilized was a William Optics Mini SpaceCat 51, a mere 2-inch diameter refractor, an ASI2400MC camera, and Antlia Ha/OII and SII filters. The total exposure duration was 5 hours and 30 minutes, captured during the night of June 22-23 from my observatory situated at Dark Sky New Mexico.

My own preferred name is the 'Great Pumpkin Nebula'.

Planets in July

Mercury

Mercury is not visible this month without optical aid. Even with a telescope larger than about 50 mm it is only visible for the first week in July.

Venus

Venus is visible in the low in the east before sunrise. It is about magnitude -4.1 in brightness and appears as a waning crescent in a telescope.

Mars

Mars is still visible low in the west during evening twilight. It is about magnitude +1.6 in brightness and its disc shrinks from 4.8 arc sec across to 4.4 arc sec.

Jupiter

Jupiter reappears very low in the NE an hour before sunrise after the 3rd week of July. It is magnitude -1.9 in brightness and the disk is 32 arc sec across.

Saturn

Saturn may be seen in the southeastern morning sky in constellation Pisces. It is magnitude +0.9 in brightness and the disk is 18 arc sec across.

Uranus

Uranus reappears in the eastern sky before sunrise after the first week of the month. It is magnitude +5.8 in brightness and the disk is 3.8 arc sec across.

Neptune

Neptune is also visible in the SE in constellation Pisces. It is magnitude 7.9 in brightness and the disk is 2.3 arc sec across.

Lunar Phases in July

- First Quarter July 2 at 1:31 pm
- Full Moon July 10 at 2:38 pm
- Third Quarter on July 17 at 6:39 pm
- New Moon July 24 at 1:12 pm

Meteor Showers in July

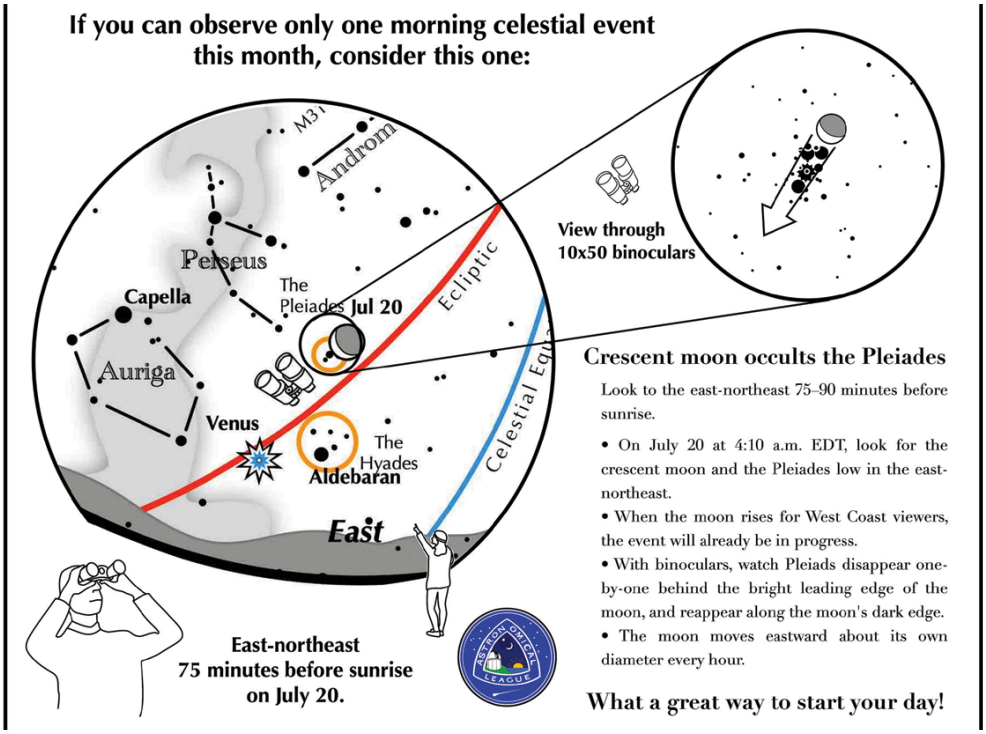
There are no major meteor showers in July.

Comets in July

There aren't any comets brighter than magnitude +13 this month.

Early evening objects for July

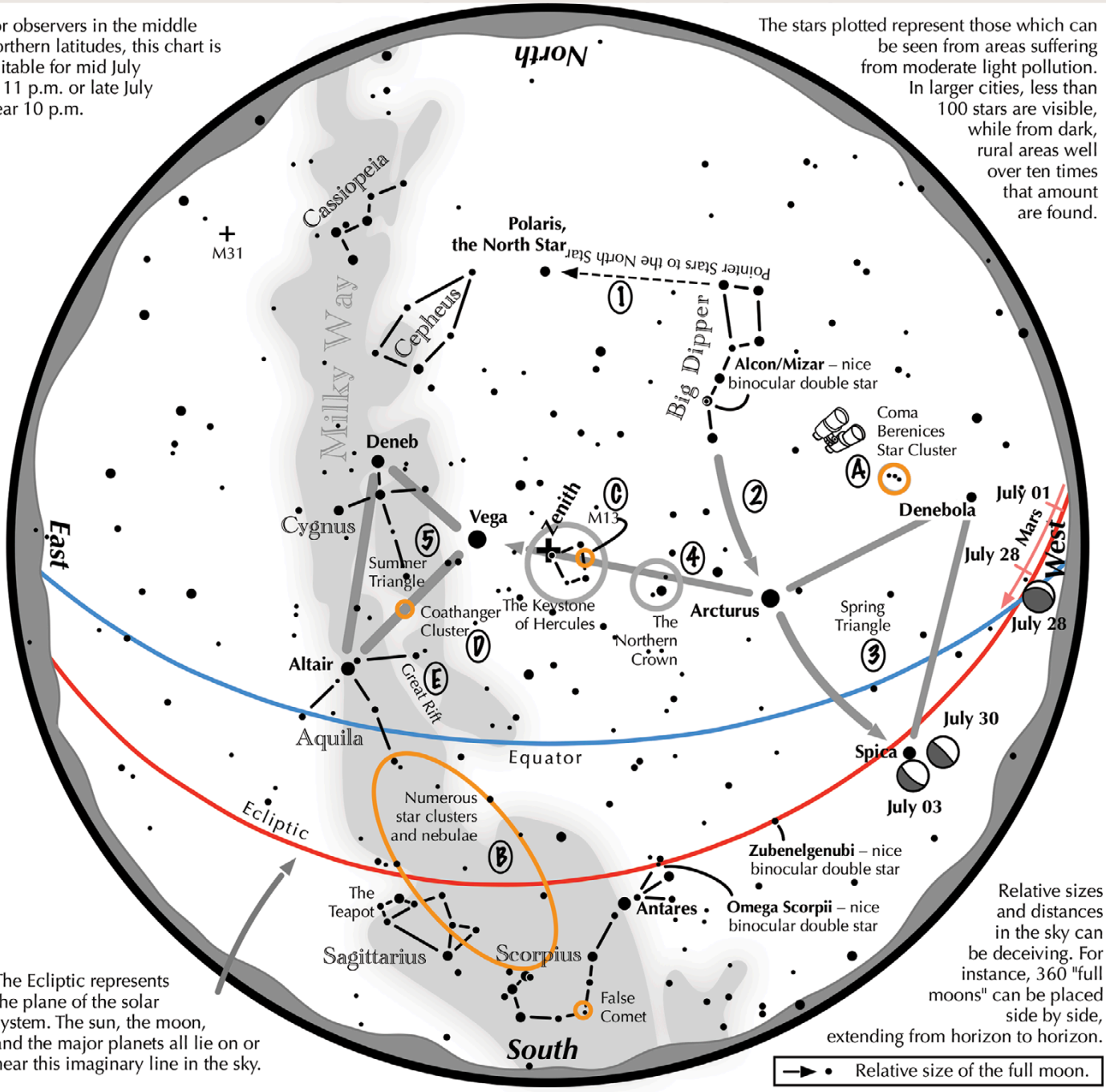
- Abel 39 planetary neb in Hercules, mag 13.7
- NGC 6572, "Blue Racquetball" planetary nebula in Ophiuchus, mag 8
- NGC 4490, "Cocoon" spiral galaxy in Canes Venatici, mag 9.8
- NGC 6888, "Crescent" nebula in constellation Cygnus, mag 10
- M27, "Dumbbell" nebula in constellation Vulpecula, mag 7.3
- M16, "Eagle" nebula in constellation Serpens, mag 6
- M13, "Hercules" globular cluster in Hercules, mag 5.8
- M8, "Lagoon" nebula in Sagittarius, mag 5
- NGC 6207, spiral galaxy in Hercules, mag 11.9
- M101, "Pinwheel" spiral galaxy in Ursa Major, mag 8.4
- M57, "Ring" planetary nebula in Lyra, mag 9.4



Navigating the mid-July Night Sky by John Goss

For observers in the middle northern latitudes, this chart is suitable for mid July at 11 p.m. or late July near 10 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 mid July 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 first intersects Arcturus, the brightest star in the July evening sky, then continues to Spica. Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
3. To the northeast of Arcturus shines another star of similar brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The
4. Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
5. High in the East lies the Summer Triangle stars of Vega, Altair, and Deneb.

Binocular Highlights

A: Between Denebola and the tip of the Big Dipper's handle, lie the stars of the Coma Berenices Star Cluster.
B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
C: On the western side of the Keystone glows the Great Hercules Cluster, containing nearly 1 million stars.
D: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
E: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.

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

The Astronomical League
OC
Open Cluster Program

M6 & M7

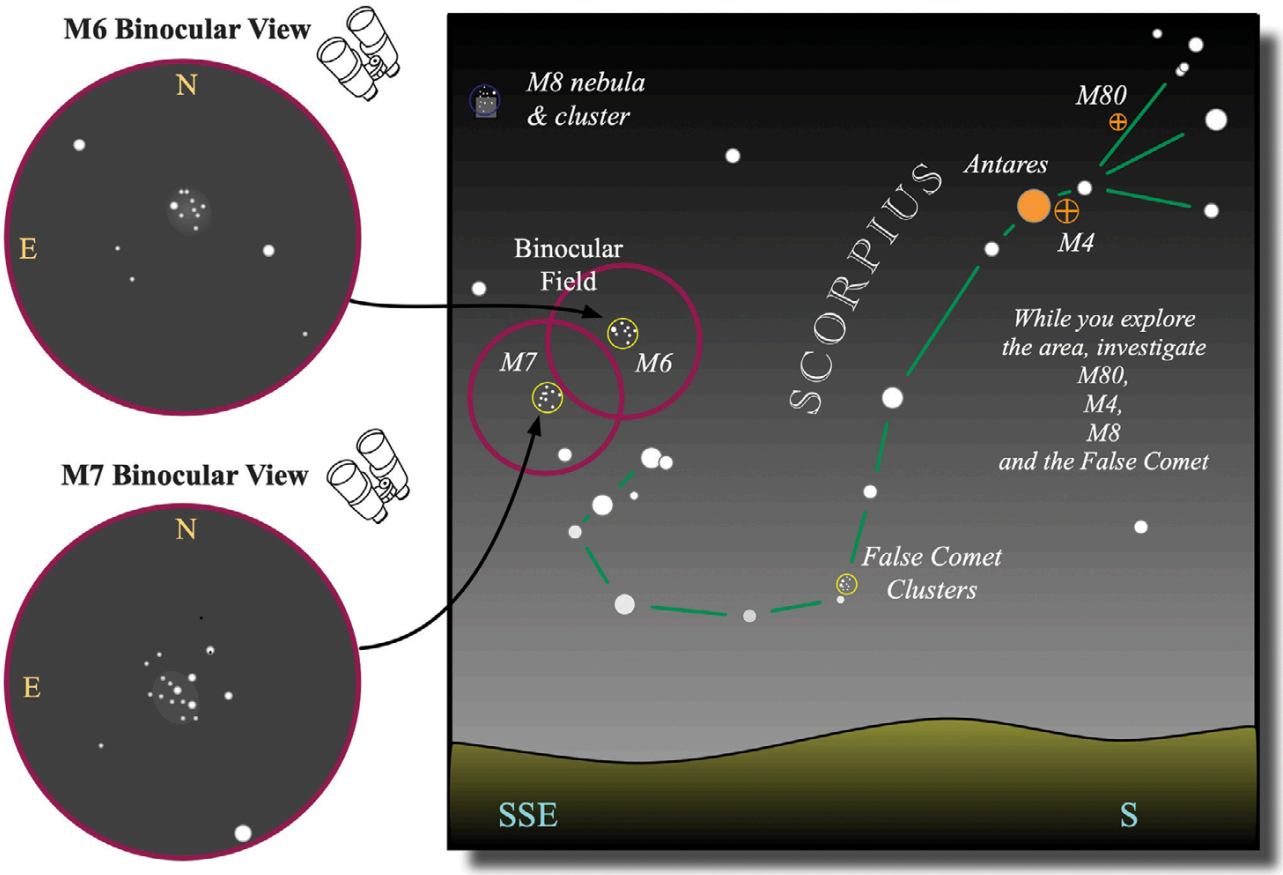
When these two big, bright, and beautiful open star clusters appear in the early evening in mid June, summer is not far behind.

If you have recently begun your journey under the stars, why not whet your appetite by exploring southeastern Scorpius and its two wonderful open star clusters, M6 & M7. You will return to them year after year!

While they are visible to the unaided eye from a dark location, binoculars help greatly.
1. Identify Scorpius standing low in the south-southeast on a late spring or early summer evening. As summer proceeds, it is found low in the south, then low in the southwest in the early fall.
2. From red Antares, direct your gaze southward down the scorpion's back, then turn eastward.
3. When its tail hooks northward, continue the length of that hook.
4. M6 and M7 should be plainly visible in the binocular field.

M6:
A faint hazy glow is seen by the unaided eye from a dark, clear site. Two dozen stellar lights can be discerned with 10x50 binoculars.

M7:
A glittery glow is easily spotted off the scorpion's tail by the unaided eye. Binoculars reveal many faint stars.



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LAS Meeting Notes for June 19 by Eileen Hall-McKim

I. Introduction

The June LAS monthly meeting was held in-person and by zoom on June 19th at the Longmont Lutheran Church, 803 Third Ave. President, Vern Raben began the meeting with self-introductions of members attending in person and on-line. Seventeen members attended in person, 11 attended on-line.

II. Main Presentation

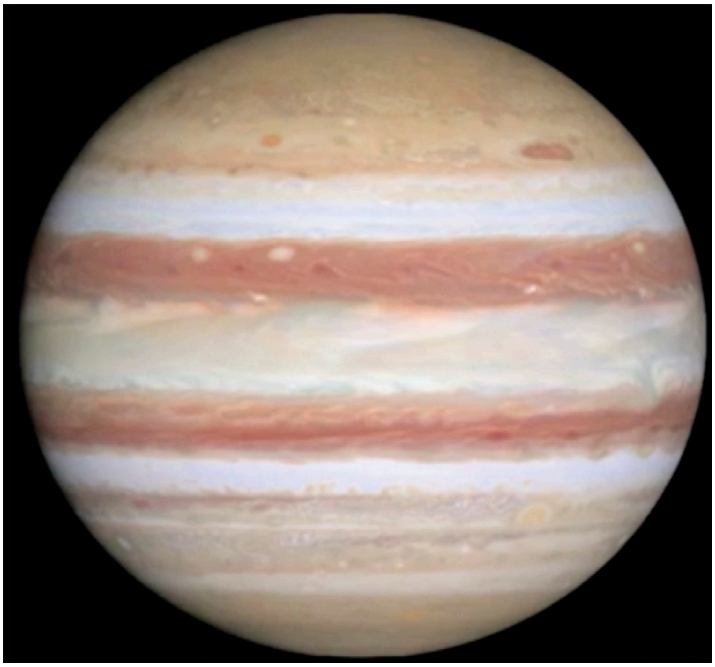
Our guest speaker for the evening is Dr. Steven Hill. Steven is an amateur astronomer living in Denver where he enjoys the 300 sunny days and clear nights per year we get here in Colorado. Light pollution in the city of Denver led him to focus on bright objects like the planets. He recently retired from his day job at NOAA working on space weather observations. Steve has a Ph.D. in astrophysics, which helps him in all his space-related pursuits. With this background he likes to push the boundaries of what can be accomplished with his backyard telescope equipment. These factors all came together, leading him to investigate ammonia on Jupiter.

"Amateur Observations of Jupiter's Clouds, Hazes and Composition"
by Dr. Steven Hill

Jupiter displays multiple colorful cloud types, with regional variations that change over time. For more than a century amateurs have observed and tracked these features, first visually, and now with sophisticated color cameras. These observations have provided the basis for understanding the circulation and wind patterns of the atmosphere, along with periodic regional and global upheavals.

Amateurs now peer into the near-infrared (NIR), including the 889nm methane band, and near ultraviolet (NUV) revealing details of upper-level hazes. Use of other methane filters can probe different cloud levels below the hazes. My recent work has added another twist: the ability to detect not just cloud height, but ammonia concentration.

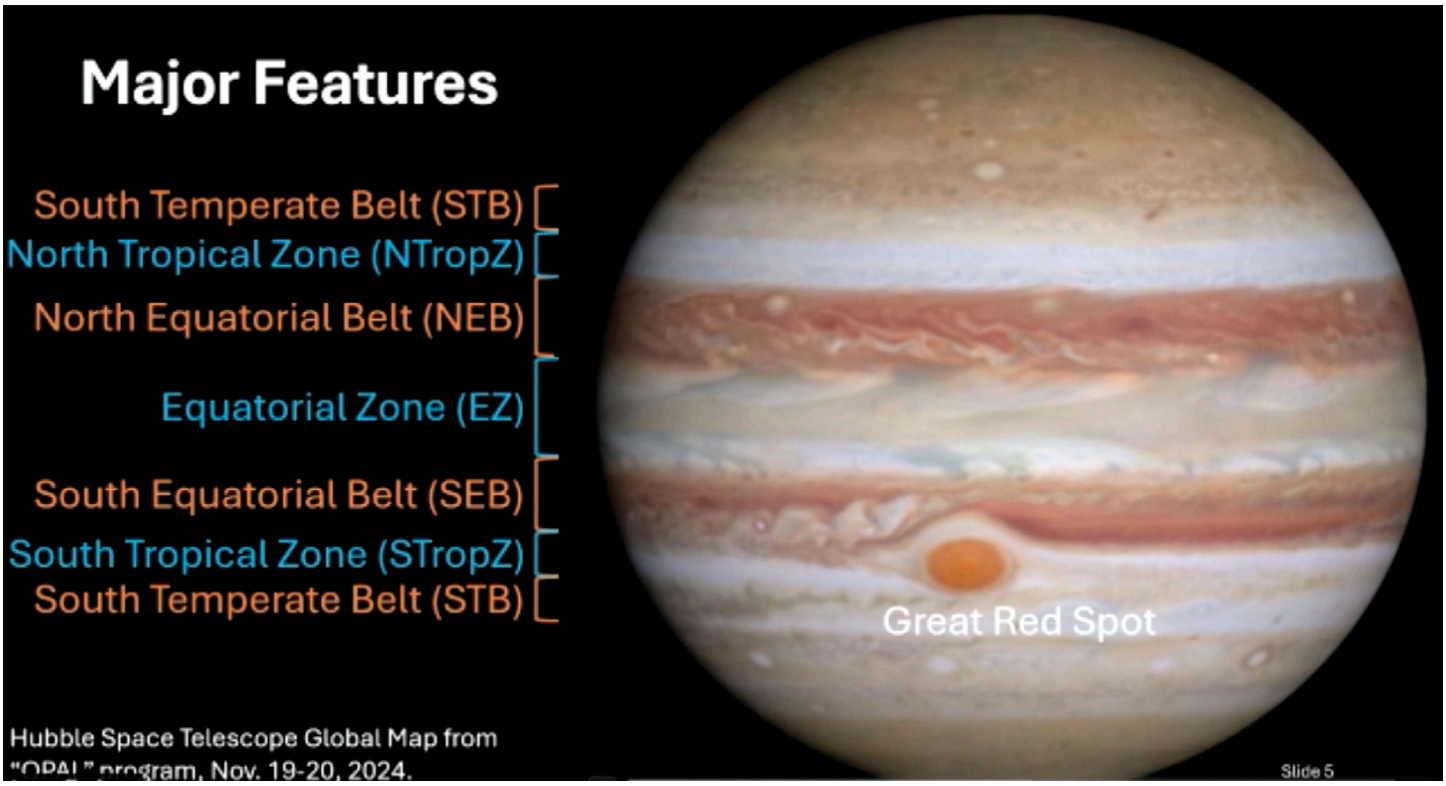
The question arises: How can amateurs contribute objective measurements of Jupiter's clouds and their changes? By applying calibration to existing and new filter bands that are readily available from optical companies, amateurs can make quantitative measures of color, cloud height, and ammonia distribution. This talk provides background on Jupiter's cloud layers, then describes these low-cost, accessible observing techniques, some of the results they've generated, and how they relate to and support professional planetary research.



Jupiter's Atmosphere (Hubble Space Telescope Global Map from OPAL program)

Every year there is OPAL (Outer Planet's Atmosphere Legacy) program where Hubble does a complete mapping of each of the outer planets a couple times a year and this map of Jupiter is one of those.

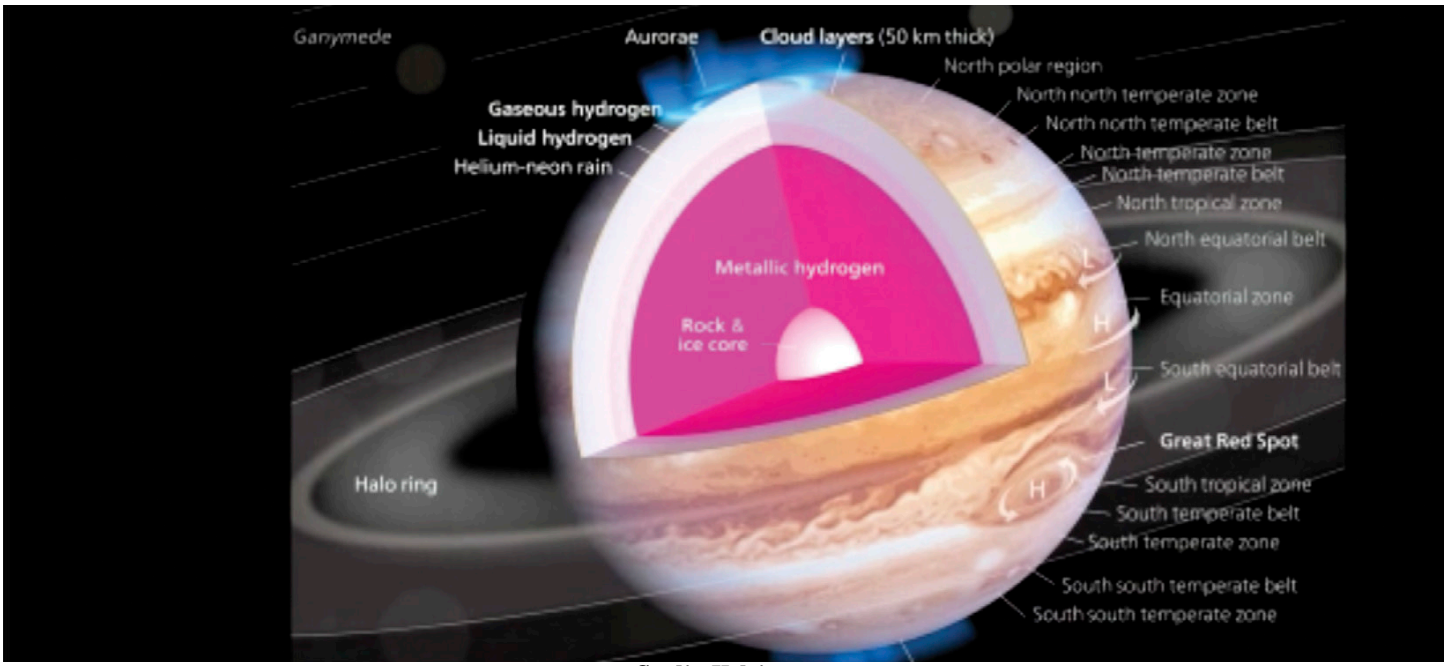
- Jupiter is a popular target with high contrast cloud features
- Large-scale bands, tiny scale spots
- Something for every capability telescope or camera that you have
- Changes on timescales of hours to years
- Reveals tons of science on gas giants, solar system formation, how planets migrated, what their composition was, convection and storms and how they develop on Jupiter as well as other gas giants and exoplanets and much more....



Major Features (Hubble Space Telescope Global Map from OPAL program)

- Major belts and zones
- Convective storm – pop up
- White ovals – which are cyclones
- Great Red Spot- been shrinking for many years, but still 2x the size of Earth
- Barge – Hot Spot – NEZ Dark Feature – where seeing deeper into the clouds
- Oval BA
- Can zoom in on any feature and pixel scale is amazingly fine
- Jupiter has lots of features, lots of details, very interesting!

What's the inside of Jupiter Like?



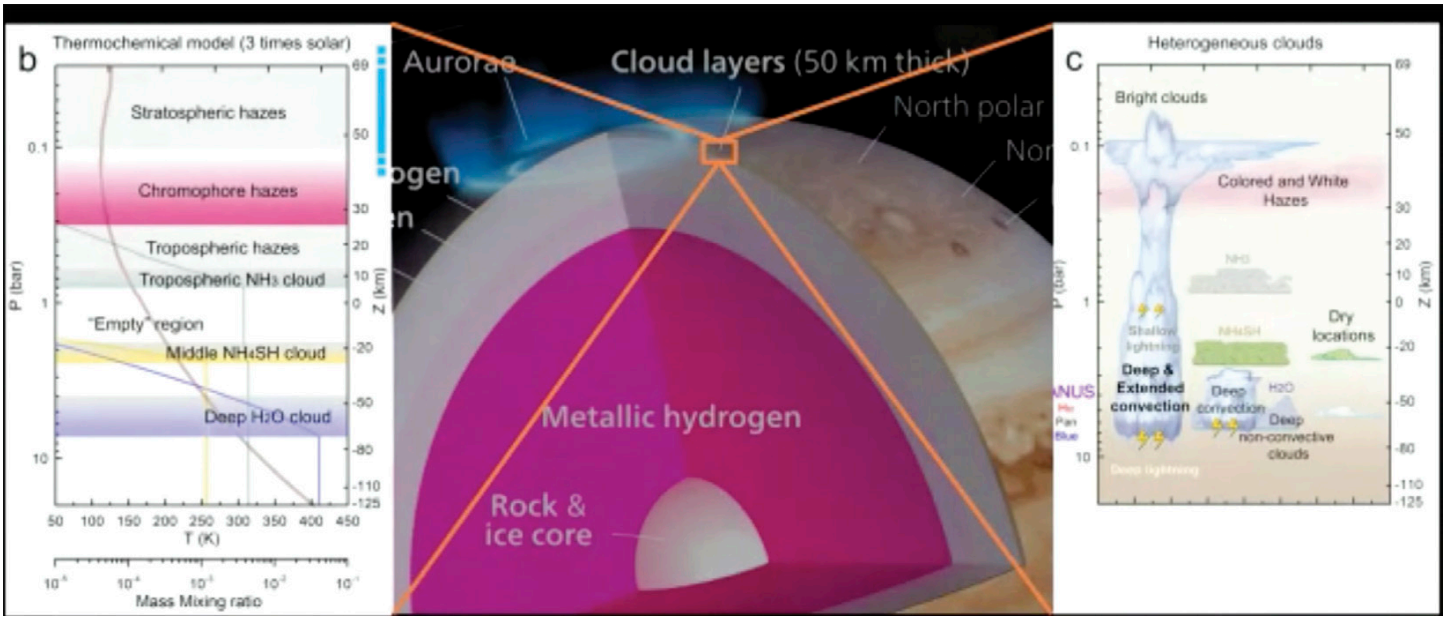
Credit: Kelvinsong

(Credit for previous image by Kevinsong – Own work, CCBY-SA 3.0.https://commons. Wikimedia.org/w.index.php?curid)

There is a very thin layer of clouds, the weather and clouds we see on Jupiter is just like an onion skin, layers like we see in Earth's atmosphere.

- Underneath gaseous hydrogen; it turns liquid when it gets deep enough
- Get helium and neon rain; turns into metallic hydrogen
- We are interested in the clouds in thin top layer in upper atmosphere ~50km thick

What do we think it looks like?



Fletcher et al., 2023, https://doi.org/10.1007/s11214-023-00996-6

Left side: set of models that show different clouds and hazes according to depth. Stratospheric hazes, chromosphere hazes – what gives color to the clouds of Jupiter: tropospheric hazes, ammonia clouds, hydro-sulfide clouds?

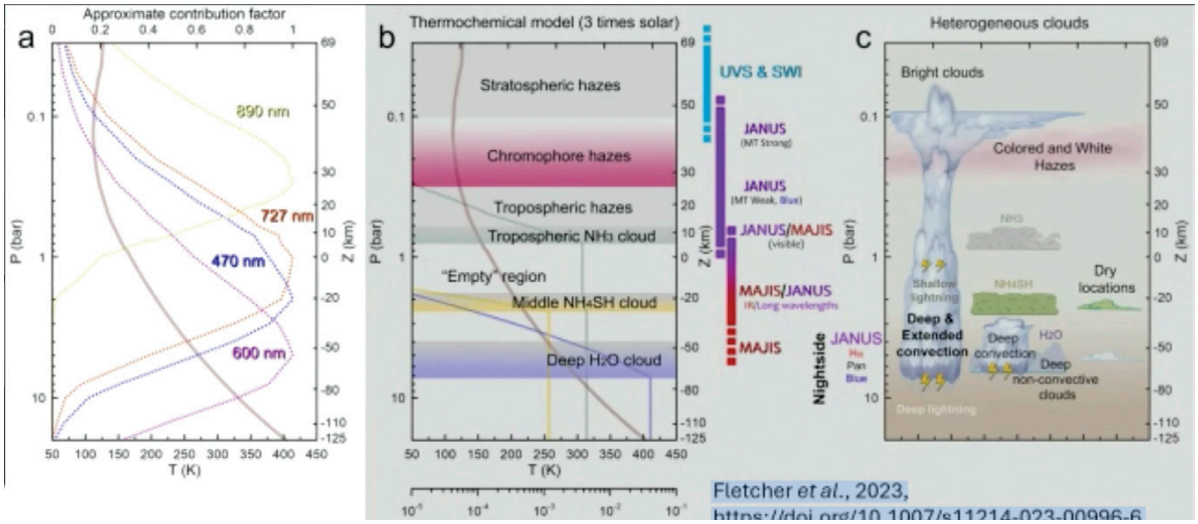
- Very deep – get water clouds
- Has two different molecules – water and ammonia that condense to form clouds

Right side: what the heterogeneous clouds actually look like

- Giant thunderheads, punch though hazes, bright white storm clouds
- Where dry locations, see very deeply into Jupiter; dark spots – Rayleigh scattering

How do we learn what's real?

- By using different wavelengths of light penetrate different depths into Jupiter's atmosphere



What are Amateurs Contributions?

- Amateurs use “Lucky Imaging” to ‘freeze’ seeing
- Videos with very short individual exposures
- Only the best frames are stacked
- Software includes Registax and AutoStakkert

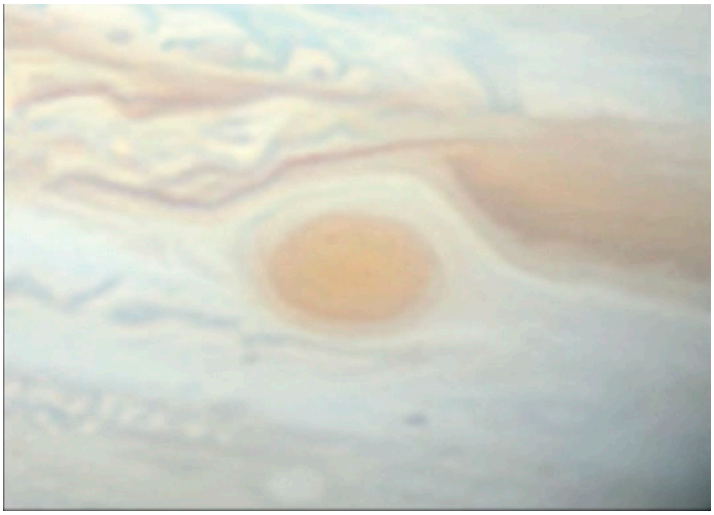


Image credit: Damean Peach Nov 29, 2024

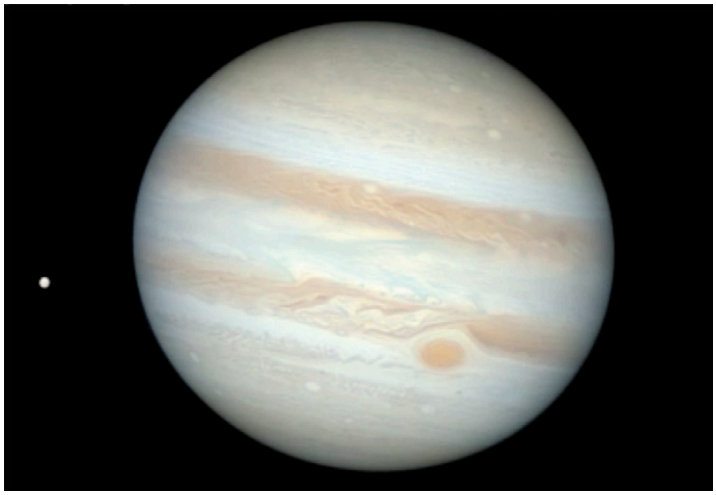


Image credit: Damean Peach Nov 29, 2024

Images from (Damien Peach, 2024) showing amazing detail in the Great Red Spot, he and others have tracked little clouds and the circulation of the Red Spot itself consistently

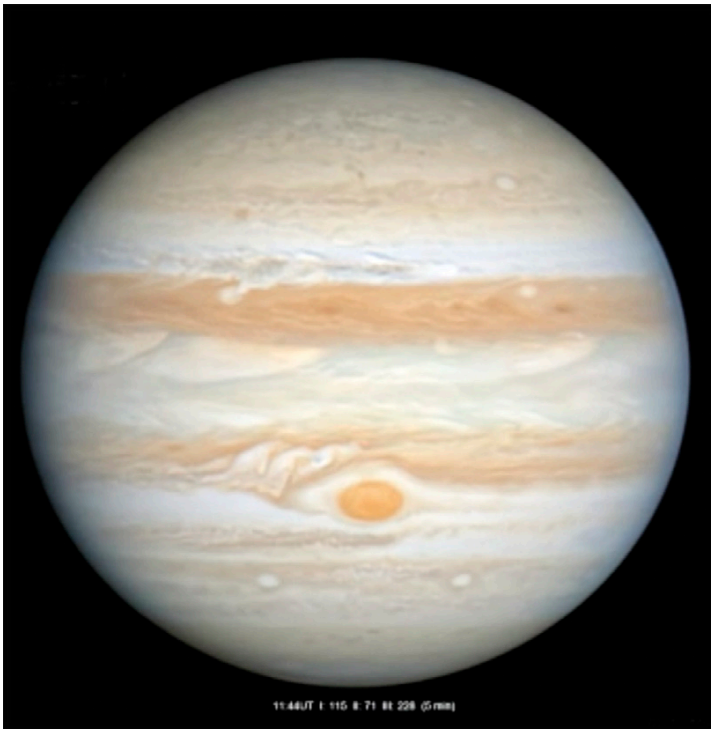


Image credit: Christopher Go, 2025

Image credit: Christopher Go, 2025

Providing Early Warning

- Amateur astronomers provide early detection of new activity; large convective storms can erupt with little warning and is important to notify professional astronomers.
- Data provided such in storm of January 2025, (credit Christopher Go)- image zoom of bright white spot (storm) in the center storm trailing a wake, as soon as sited, alerts went out worldwide and to professionals

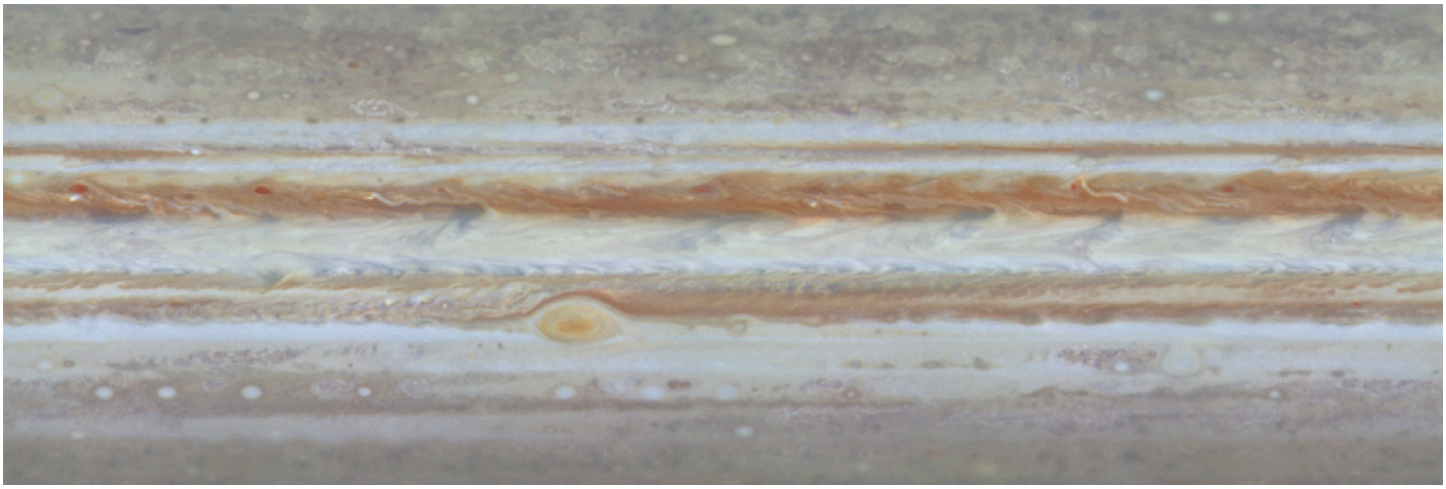
Collections of Amateur Jupiter Observations

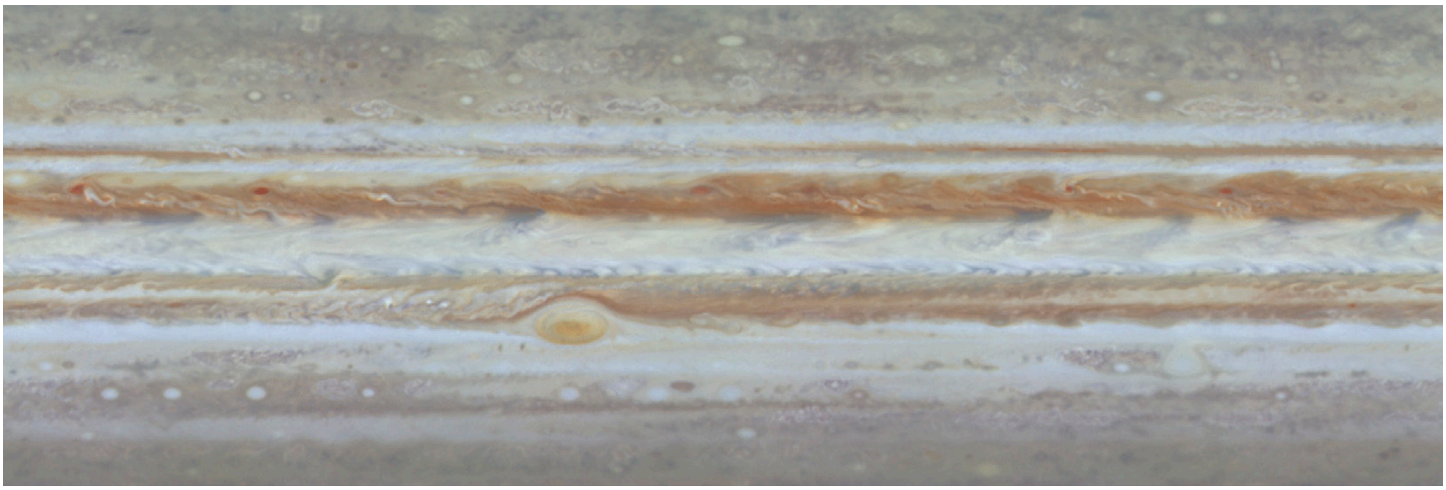
Professional astronomers may get to use the large telescopes a few times a year but they want to know what is going on the rest of the time so they come to these sites of collections of amateur Jupiter observations.

- British Astronomical Association
  - Data file lists, image displays, search capability, web service.
  - Detailed reports on Jupiter weather phenomena.
- Association of Lunar and Planetary Observers- Japan
  - Simple index by date with links to ALPO- Japan
- Association of Lunar and Planetary Observers in Japan
  - Simple index by date with links to Jupiter image pages
  - No search capability
  - Some additional sections for reports and details
- Planetary Virtual Observatory and laboratory (PVOL)
  - Data file lists, image displays, search capability,

Science Contribution: Zonal Winds

- Jupiter has very strong zonal (east-west) winds
- Cloudscape shifts rapidly shown over about 10 Earth days by Cassini
- Features are tracked by algorithms similar to those used in weather imagery





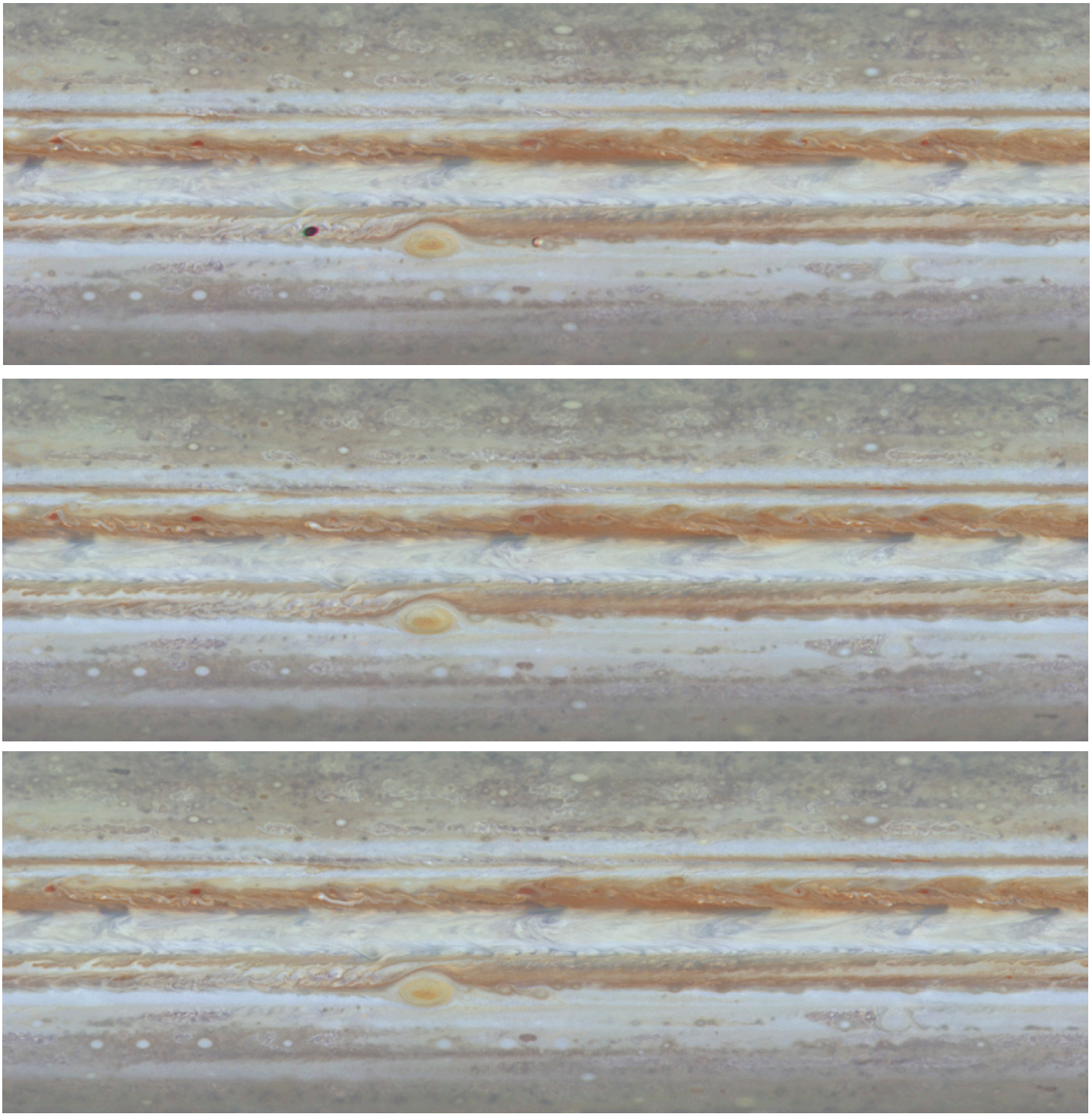
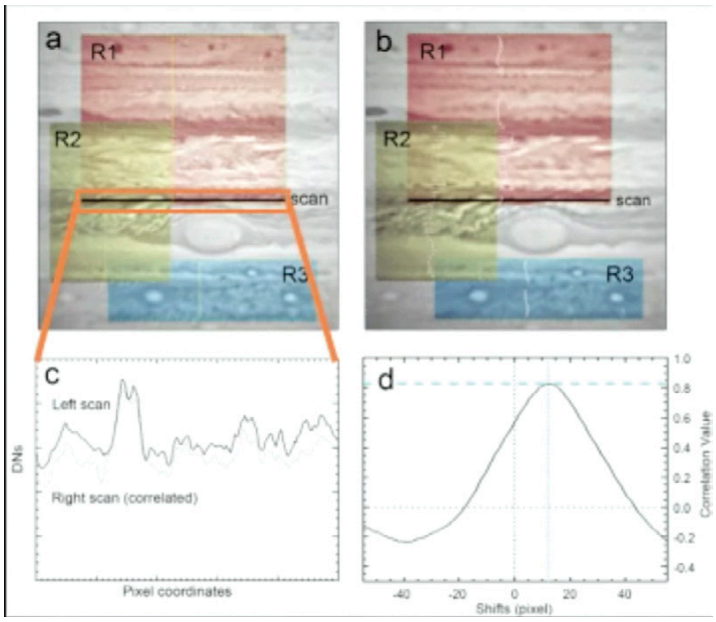
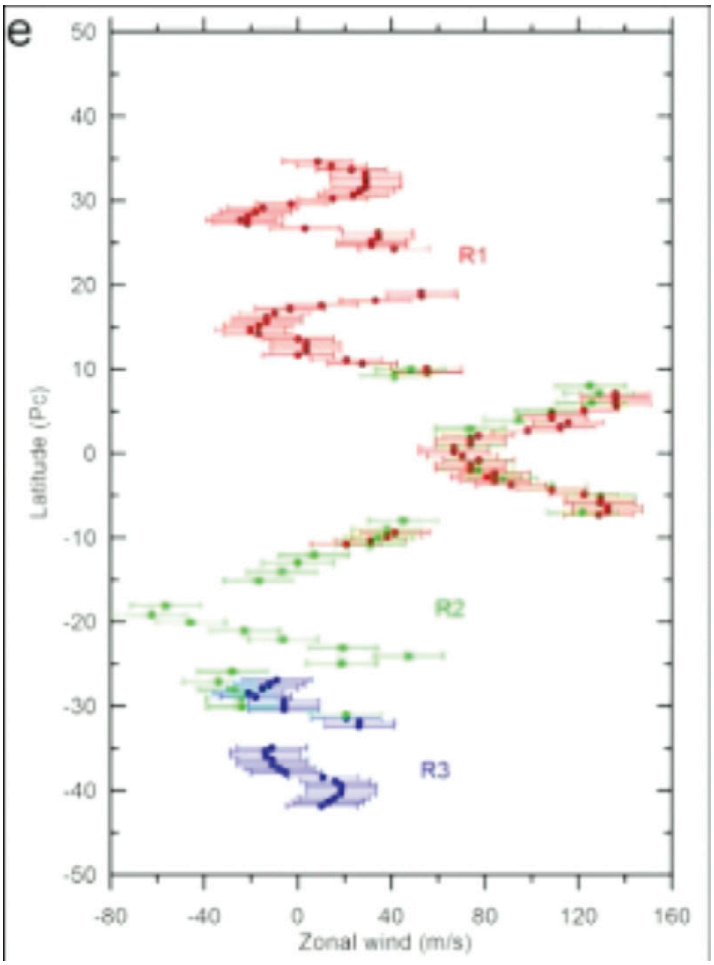


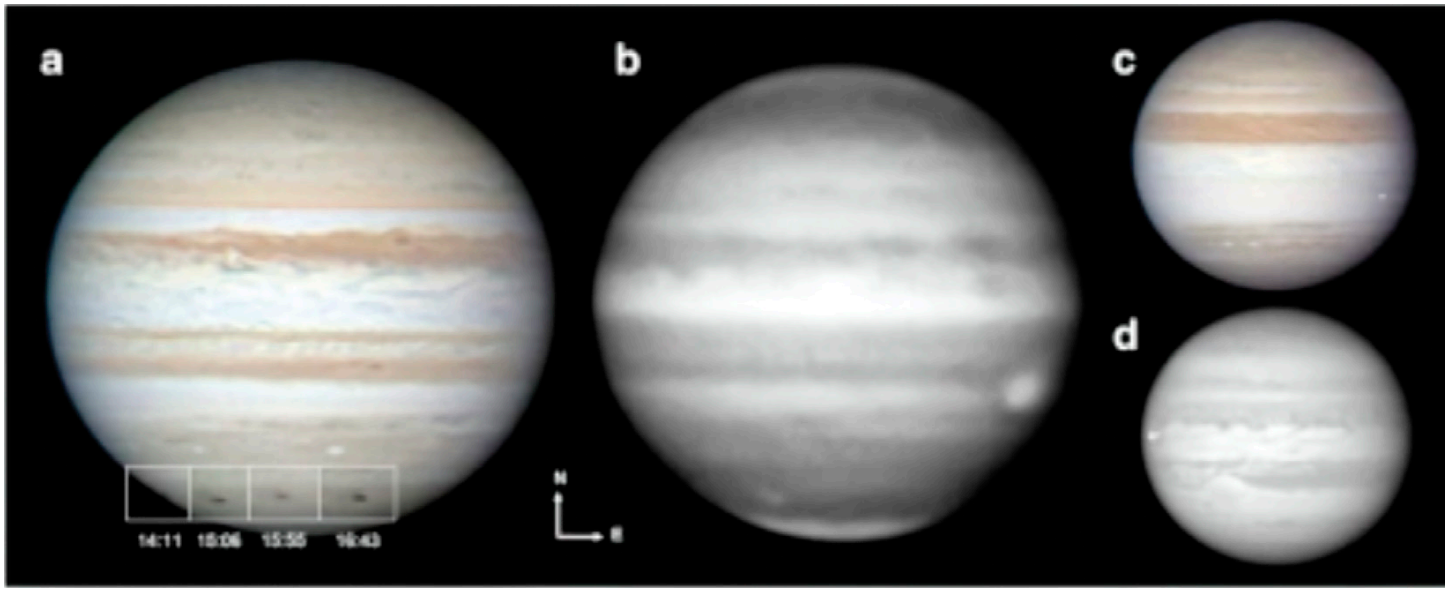
Image credit: NASA/JPL/University of Arizona. To view animation see http://photojournal.jpl.nasa.gov/catalog/PIA02863





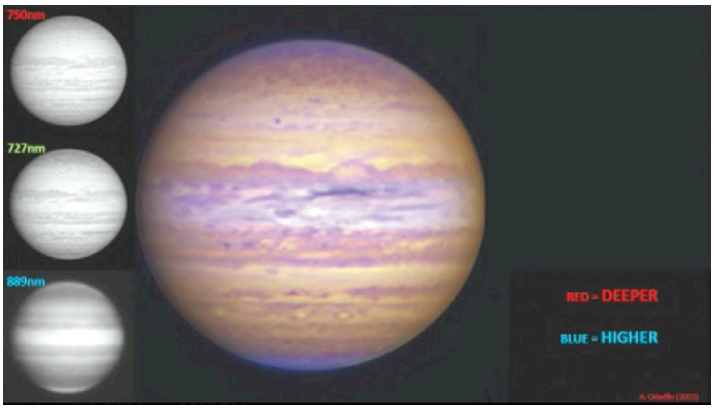
Zonal Winds (Barrado-Izagirre et al., 2013)

- Collaboration using multiple amateur images
- Two sets of images taken by amateurs; separated in time- 2-3 Jupiter rotations
- East-west scans show shift over time that give zonal wind speed for that latitude
- Done over multiple images, end up with an amateur zonal wind profile



Impacts

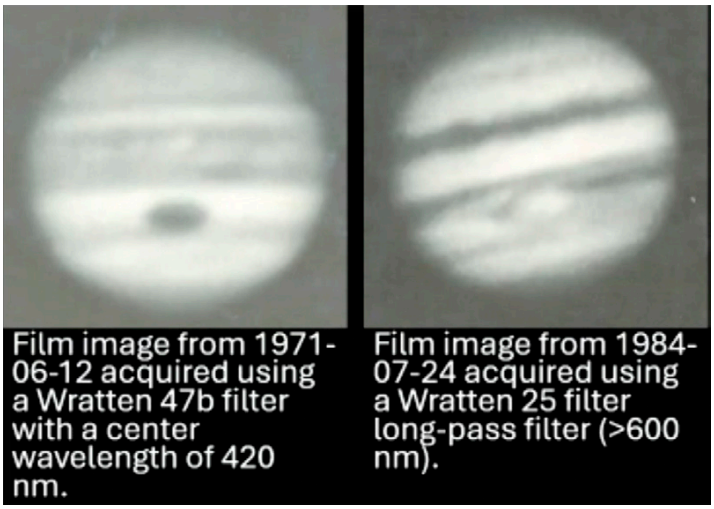
- Impacts and their after effects can be studied on Jupiter
- Most noticeable are dark spots left over from a large impact
- Also can detect impact flashes; the actual bolide strike can be seen, often in one or more video frames (see circled white spots)
- Marc Delcroix provides 'DeTeCt' software to scan video files for frames of impact flashes



Wong et.al. 2023

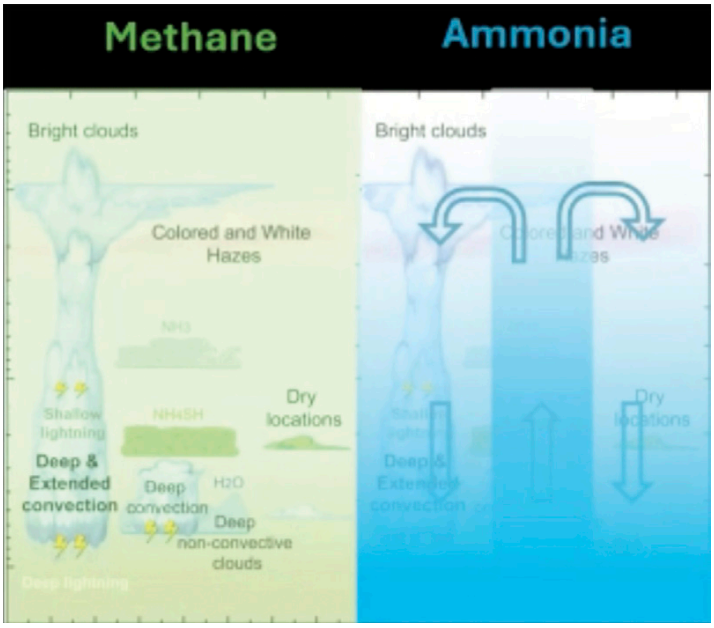
Finding Detail Vertically in the Atmosphere

- False color imagery using 750, 727, and 889 nm data by Antonio Cidadao, following work by Mike Wong, looking deeper into Jupiter's atmosphere; separating the layers and using different methane band filters
- When put together in color composite: Red=deeper in clouds - Blue=clouds are higher; Hubble Space Telescope image (Wong et al, 2023) shows similar detail at right insert
- Can see how close an amateur can come from providing professional looking results and results that can be used by professionals



Barry Adcock has been imaging Jupiter in the ultraviolet and infrared since the early 1970s, producing a decades-long record. Note the longitudinal extent of the Great Red Spot!

- Long term images and tracking of these bands very useful when studying the evolution of these spots, early images show a much larger Red Spot

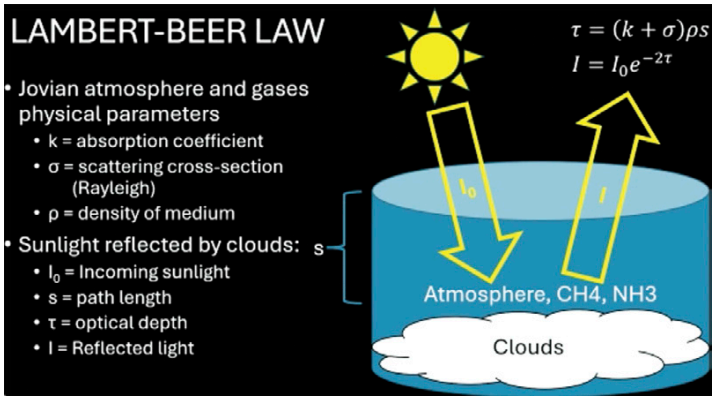


Methane and Ammonia Distribution

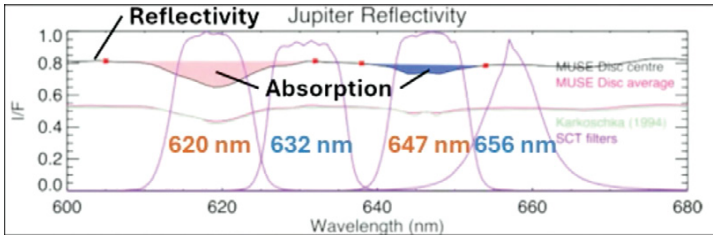
How I came to look 'inside' Jupiter

With more time during Covid, became curious over methane and ammonia distribution

- Light in weak absorption bands penetrate to the main cloud-tops
- Methane is uniformly distributed in the atmosphere, can use as a measuring stick
- Ammonia condenses out with altitude and varies with location, more of it the deeper you go, spatially variable also

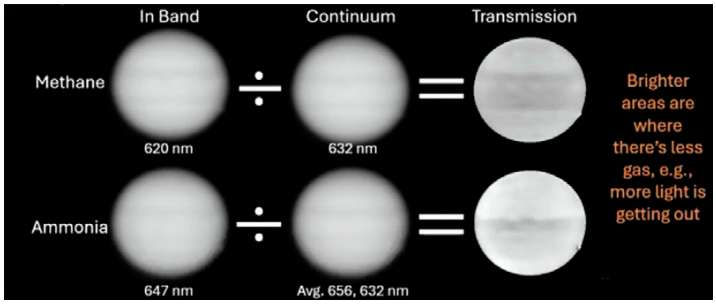


Lambert-Beer Law- Basically with some math can determine how much light should be absorbed based on how deep the clouds are – you can figure out how deep the clouds are by knowing the basic parameters of the atmosphere and knowing how much sunlight is coming out vs how much is coming in.

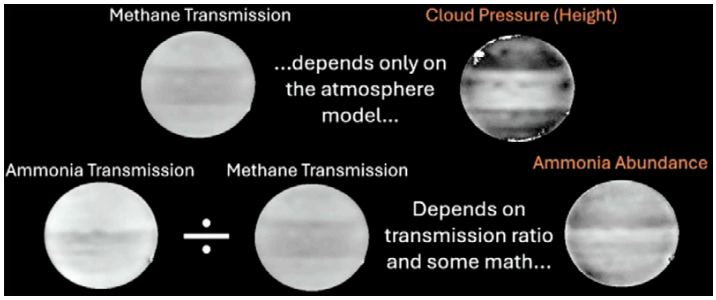


Measuring Transmission – from paper by Pat Irwin and Steven Hill. Jupiter's reflectivity (albedo)

- In-band filters
- Continuum (out-of-band) filters
- Ratio of reflectivity (in-band over continuum) gives transmission
- Diagram pink and blue are methane and ammonia, these are measurement we are making

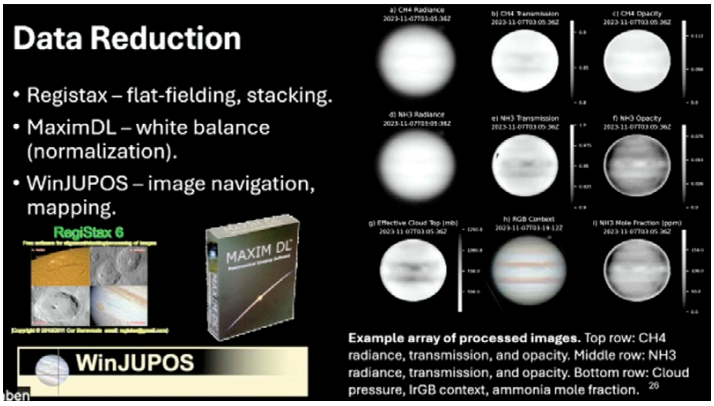


Calculating Transmission in Images



Cloud Pressure and Ammonia Abundance

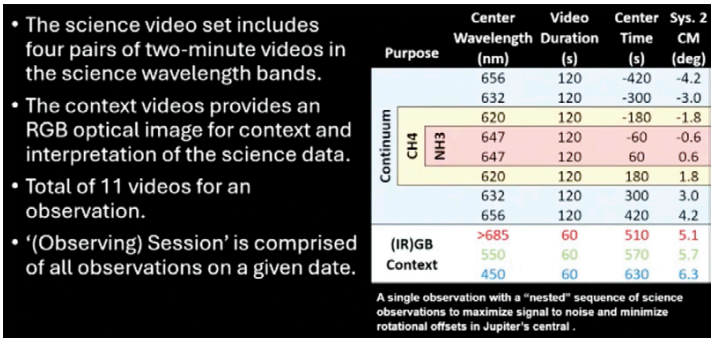
Commercial Equipment – Here is equipment used



Data Reduction

Left: Products used

Right: Example array of processed images

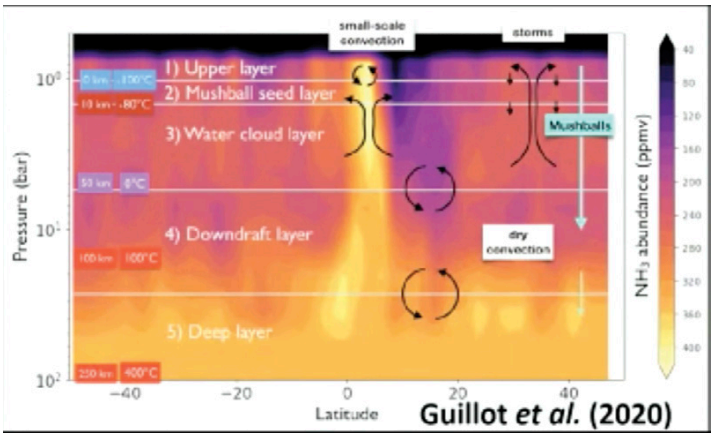


What comprises an 'Observation'

My Results and Collaborations

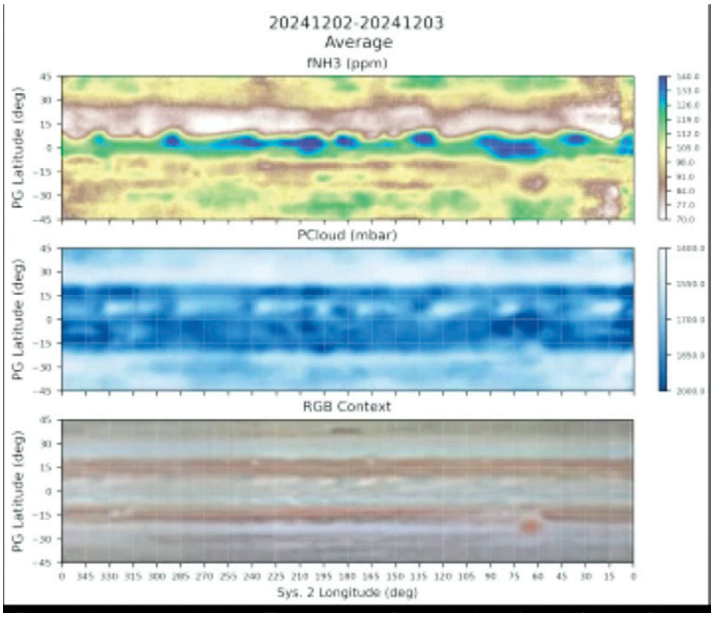
Steven needed a way to confirm what results he was finding and began looking for Independent Verifications. Looking for a different instrument system to compare results, different processing codes, would we get same results? And it would be nice to use a bigger telescope

- Enter John Rogers (BAA) and Pat Irwin (Oxford)
- And...we got a bigger telescope...Pat Irwin had time on the VLT Unit Telescope 1
- VTL/MUSE Aperture: 8m – MUSE: 0.2sec-pix -1 – 3722 spectral bands!
- Created synthetic images in my four filters
- Pat Irwin calculated differently, but when comparison made, got very similar results



Science Questions?

This is slice across Jupiter latitudinally. A lot of things happening on larger scales and deeper scales we have questions on.



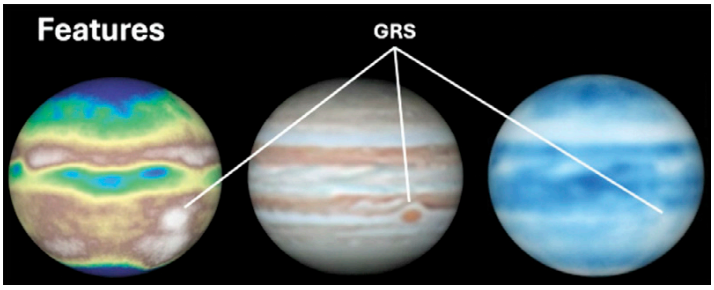
Steven's Analysis

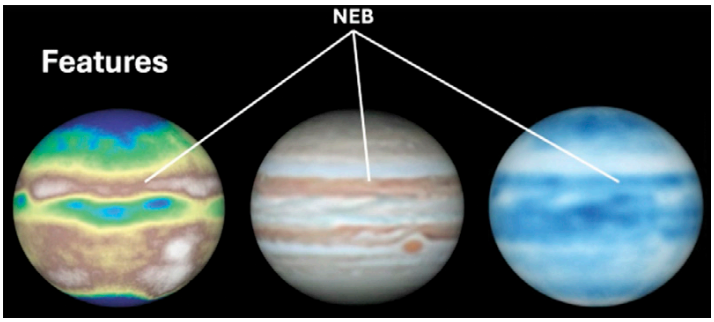
Top: methane abundance, blue is wetter – more methane; brown – dry regions

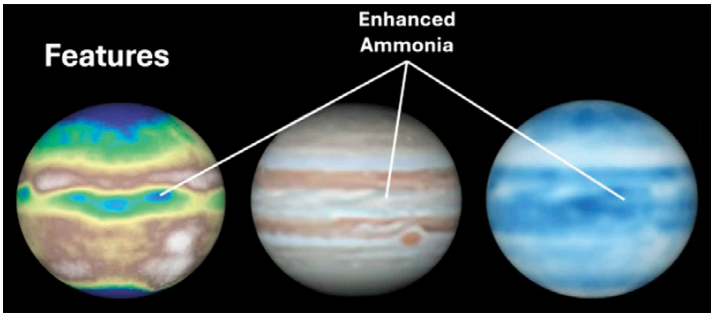
Middle: Cloud pressure, whiter clouds up higher in atmosphere

Bottom: Context image

Features – Maps are projected onto Jupiter's globe and then rotated, can see Great Red Spot, dark spots are areas where see deeper into atmosphere. As it rotates, can see GRS, hot





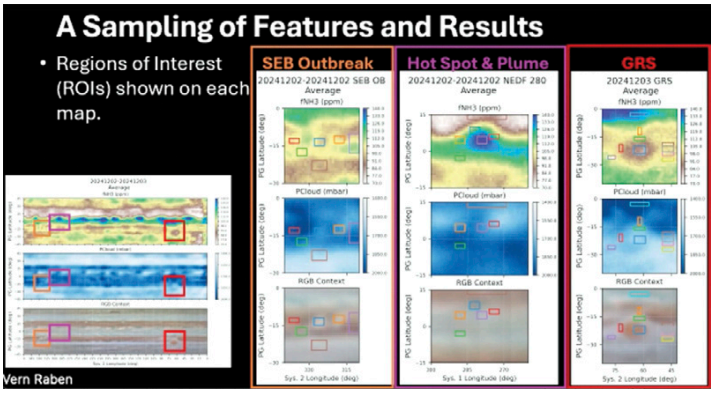


spots, dark features, light areas, festoons, cloud plumes

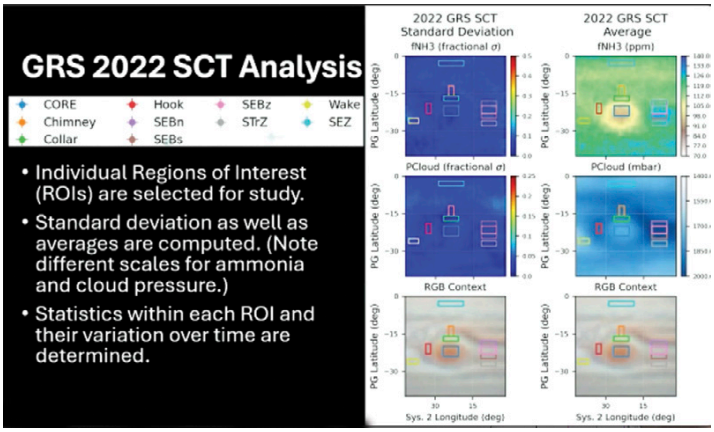
Left: Ammonia

Middle: Context

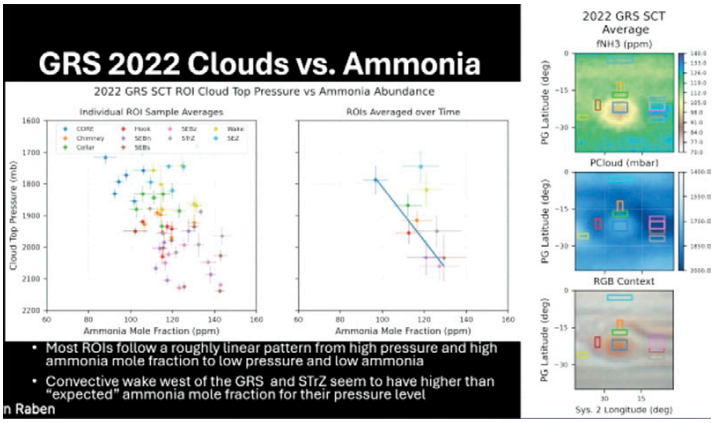
Right: Cloud Pressure



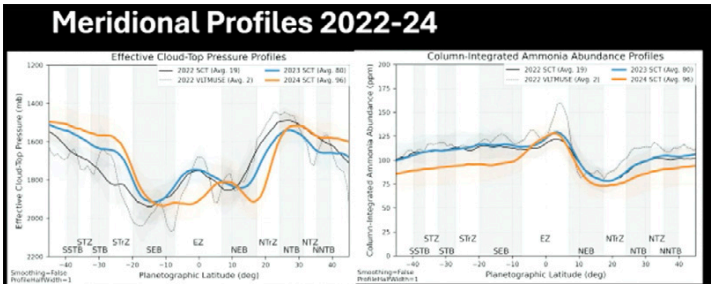
A Sampling of Features and Results

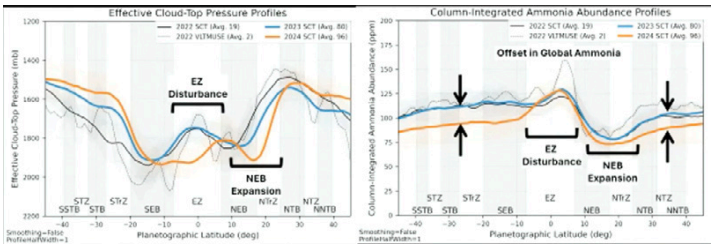


Great Red Spot 2022 SCT Analysis

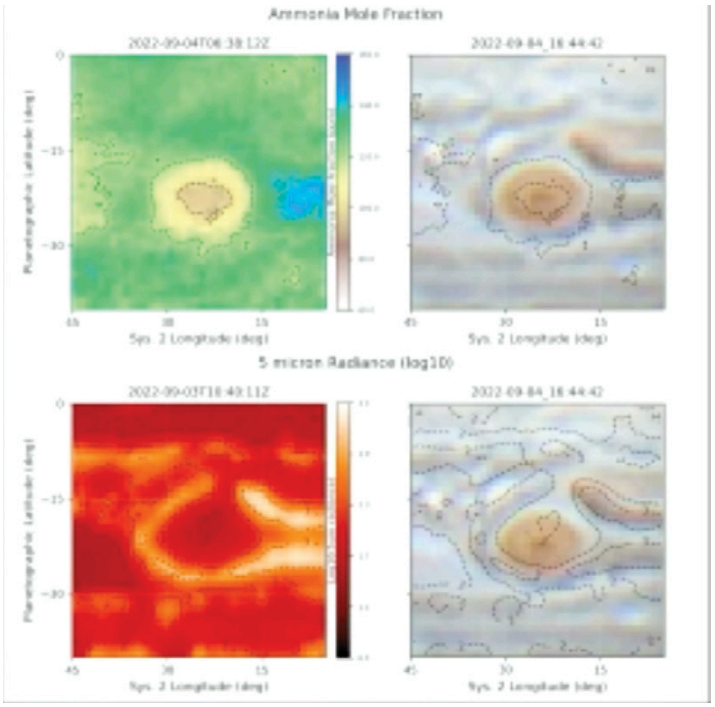


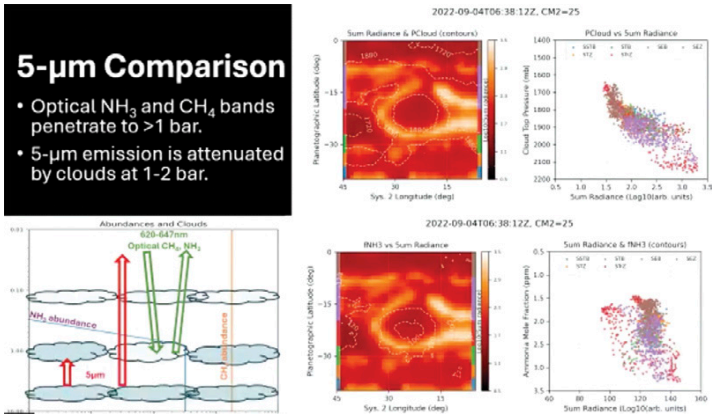
Great Red Spot 2022 Clouds vs Ammonia





Meridional Profiles 2022-24 (Changes over time)





- There is a lot to be gained by looking at different bands far away from where we are currently looking as a way of getting more independent confirmation
- Comparisons of Stevens work with others

Conclusions

- Band average method provides a new view of clouds and ammonia
- Affordable, accessible, and effective for backyard astronomers
- Provides a rich data set, especially when combined with other spectral domains and targeted observations
- Automation and amateur participation could greatly expand coverage
- This is a terrific opportunity for professional-amateur collaboration

Questions?
Do you see absorption in these band in the terrestrial atmosphere over Denver?
Is there an optimum band with that you want to use, is it better to have a very wide band width or a very narrow?
Using these methods how deep into the atmosphere do you go?
I'm thinking about what you are really learning here, mostly what the clear air is composed of or what the clouds are composed of, your giving some evidence that things are different with the clouds. I'm just making observations and working on similar (cloud composition) myself; maybe some maps of what cloud is made of and its altitudes to gain a better intuitive understanding of the atmosphere.
How many years of observations do you have at this point?
Have you seen any variations or correlations in regard to solar cycles?
Are there other molecules in Jupiter's upper atmosphere that you could use this same technique, that haven't been looked at yet? Many thanks to Dr. Steven Hill for great presentation!

IV. Upcoming Events

- Star Party with Boulder County Parks and Open Space
  Rabbit Mountain
  Friday, June 27 at 8:30 pm – 10:30 pm
- LAS July Meeting
  1st Evangelical Lutheran Church
  Thursday, July 17 at 7:00 pm

III. Treasurer Report by Bruce Lamoreaux

Longmont
Astronomical Society

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

LAS Treasurer's Report - Bruce Lamoreaux **6/19/2025**

Main Checking Account (xxx-1587)

Begin Balance:	$ 6,630.00	**5/2/2025**	
Deposits:	$ 65.00	Magazine Subscription	
Expenses:	$ (70.00)	Bank Charges, Magazine Subscription, Stripe	
Current Balance:	**$ 6,625.00**	**6/3/2025**	

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

Past Balance:	$ 8,260.00	**12/31/2024**
Interest:	$ 15.00	
Balance:	**$ 8,275.00**	**3/31/2025**

Telescope Fund (xxx-0165)

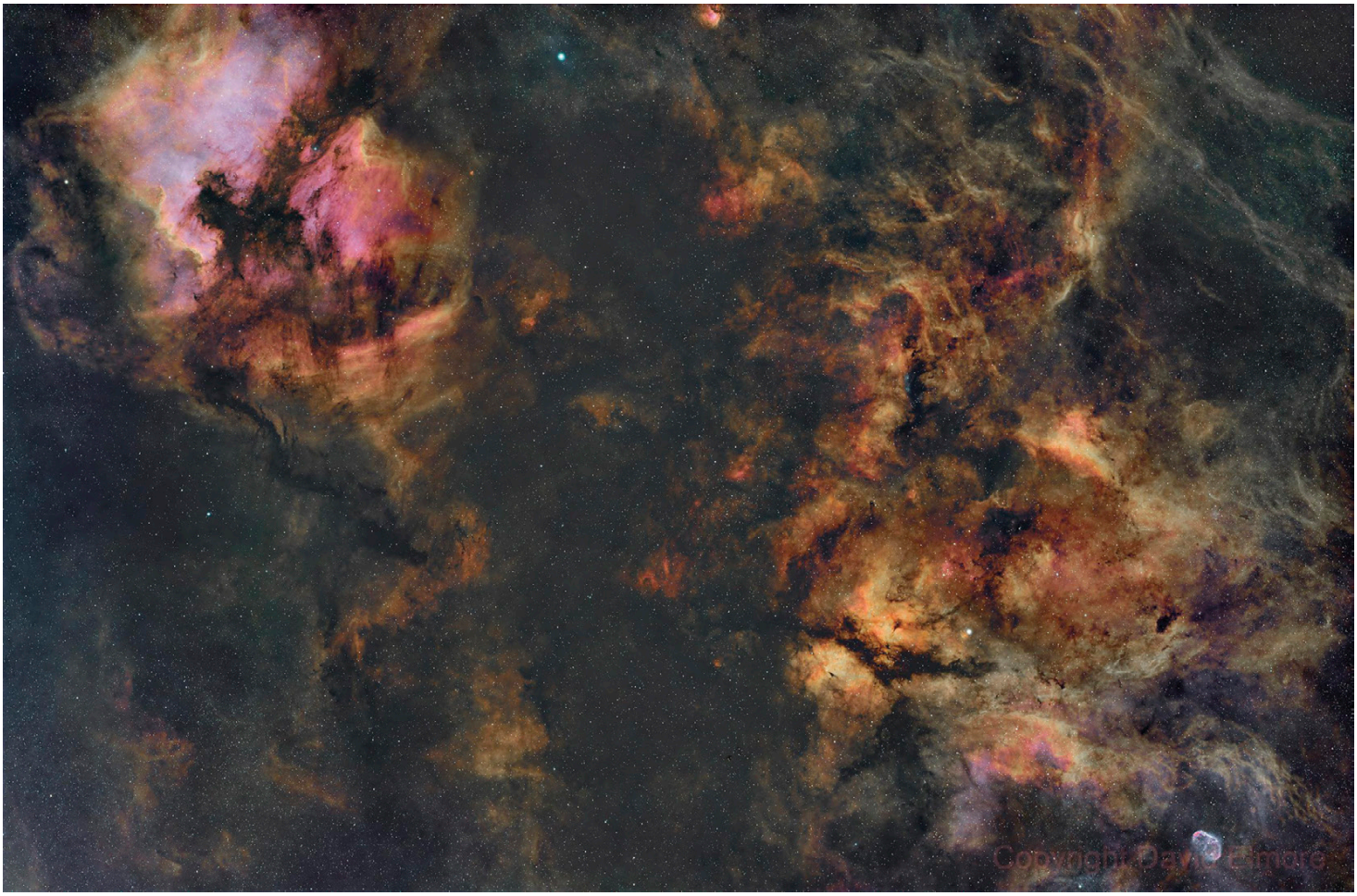
Past Balance:	$ 1,100.00	**4/29/2025**
Deposits:	$ -	
Expenses:	$ -	
Balance	**$ 1,100.00**	**5/29/2025**

Petty Cash

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

Total Assets **$ 16,050.00** $ (5.00) Down from May

Active Membership:	**101**	
Student Membership:	**2**	
Total	**103**	Active

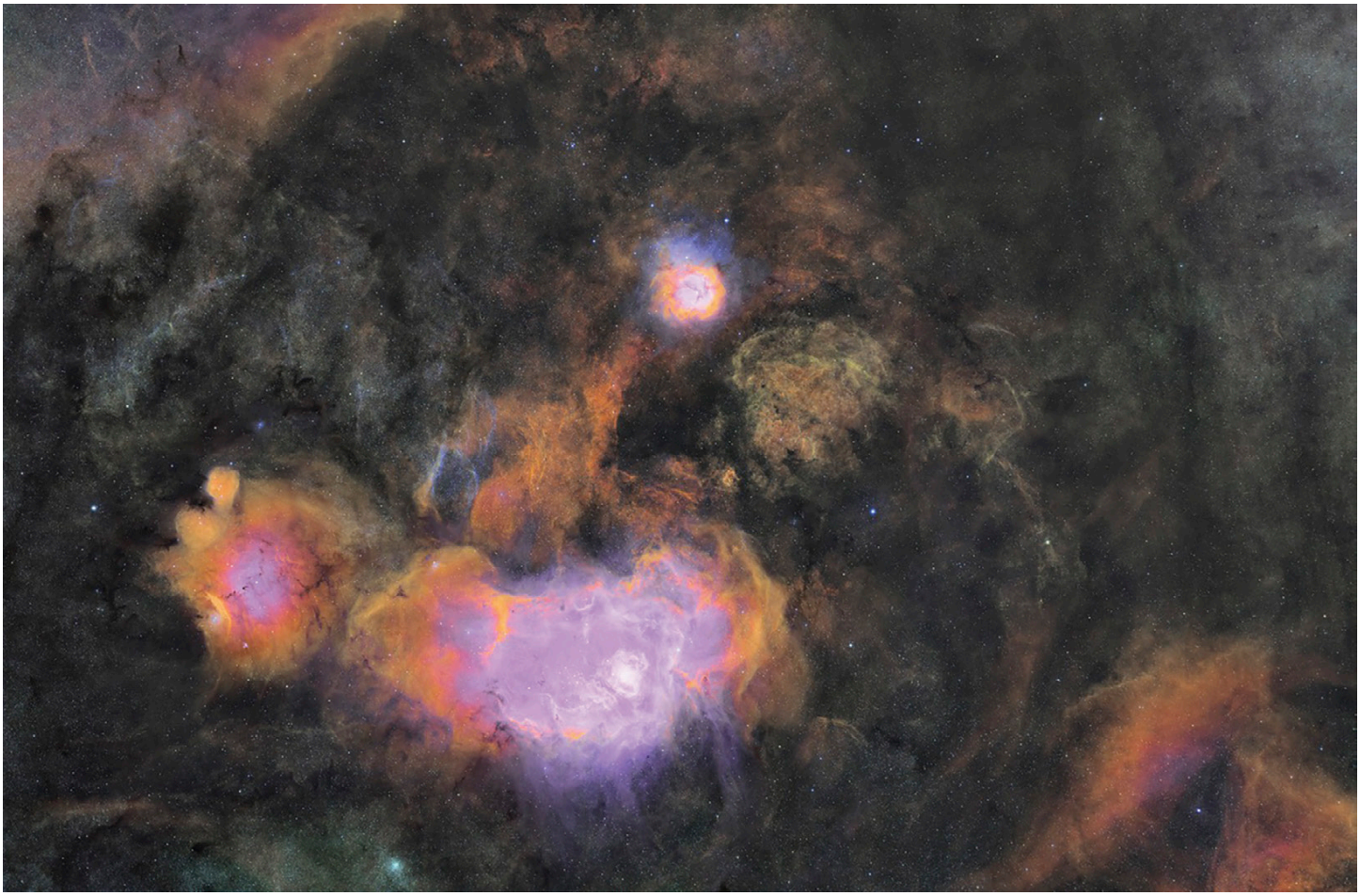


"Cygnus: North America to Crescent Nebulae" by David Emore

Under a nearly full moon here is much of the constellation of Cygnus recorded with a William Optics Mini SpaceCat 51, newly installed Antlia fast filters for Ha/OIII and SII, and replaced mount. This 4 hour 20 minute run provided tests of filter drift vs. temperature and guiding of the iOptron CEM70G mount as well as a colorful field of view that extends from the North America Nebula to the Crescent.

This narrowband image expresses H-alpha as red, Oxygen III blue, and SII yellow. Stars are reduced in brightness. Background correction was a challenge for this 11.5° x 7.5° field of view under a bright sky but it turned out OK.

For a higher resolution version here is the Astrobin link: https://app.astrobin.com/i/hslxq2



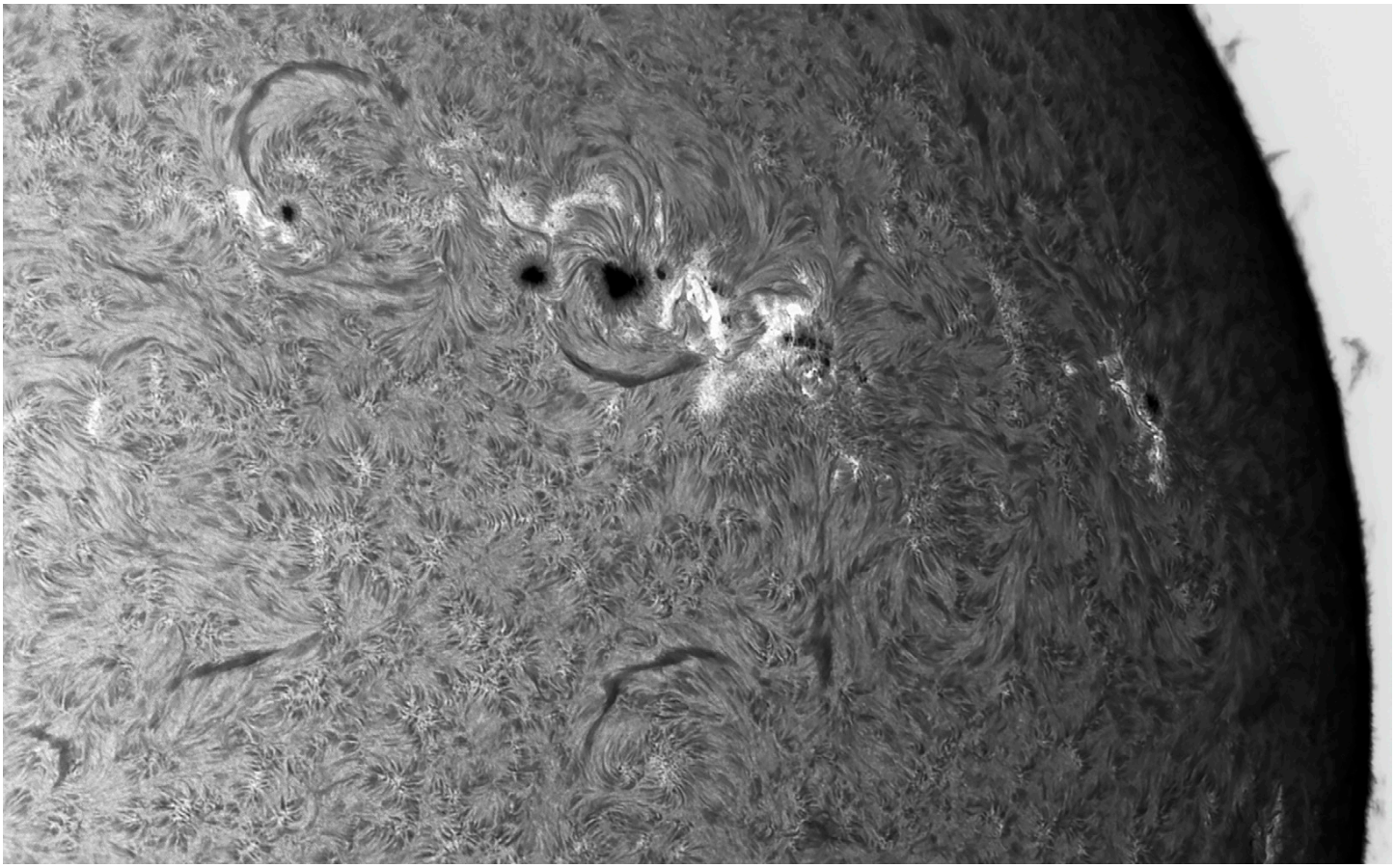
“Lagoon Nebula and friends in narrowband” by David Elmore

The Lagoon Nebula (M8, Sh2-025) is a star-forming region located in Sagittarius. It is approximately 4,100 light-years distant within the Milky Way galaxy, which spans approximately 100,000 light-years. This region is characterized by a wealth of celestial objects, including seven Sharpless objects, with the Trifid Nebula being the prominent feature above the Lagoon Nebula.

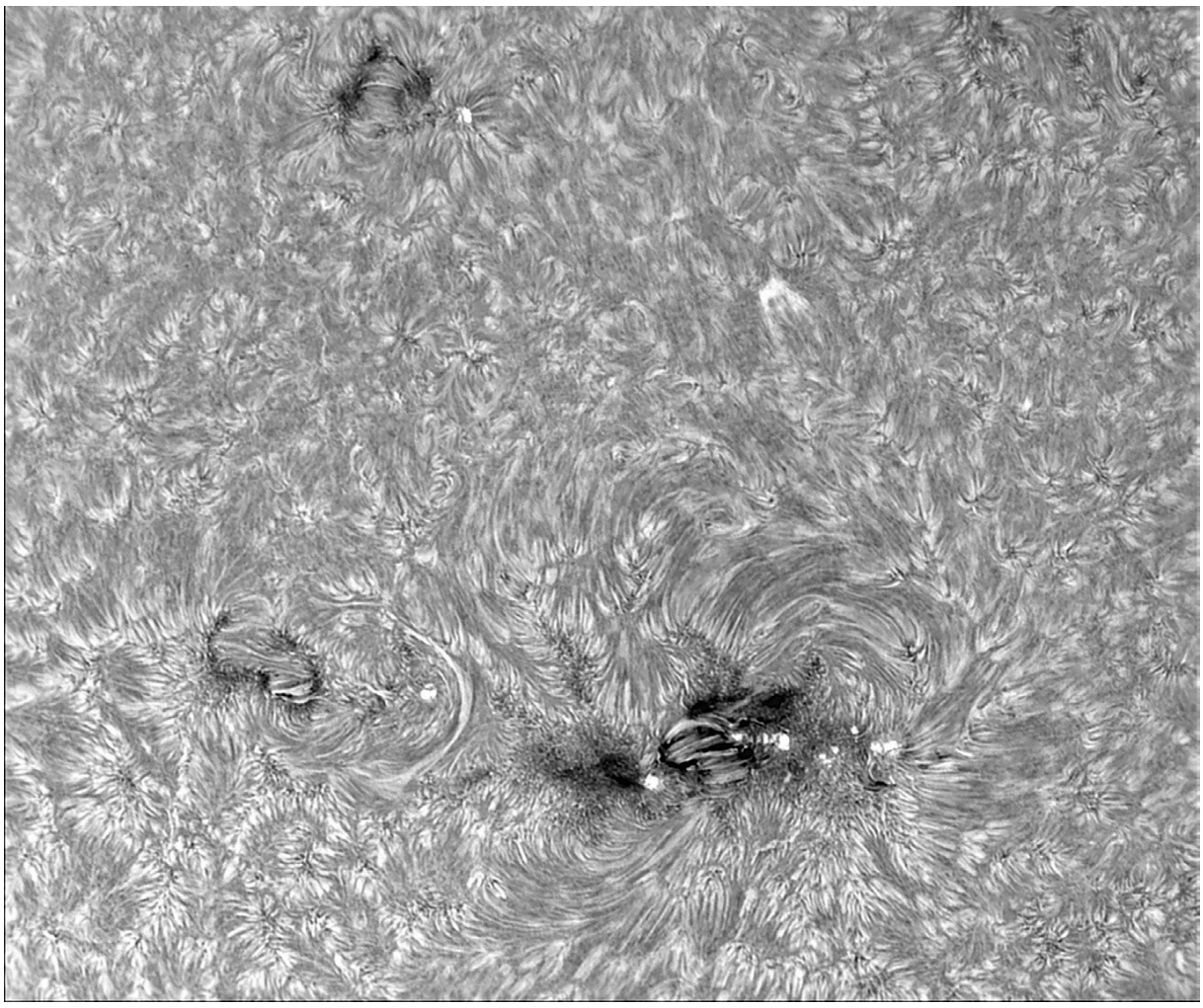
The images captured were taken using an H-alpha red filter, a Sulphur II yellow filter, and an Oxygen III blue filter. While these filters do not effectively reveal the reflection surrounding the Trifid Nebula, they do illuminate a multitude of other details, particularly the intricate fine Oxygen strands within the region.

The imaging was conducted using a Borg107FL refractor, an ASI6200MM camera, and Chroma filters. The total exposure time was 4 hours and 20 minutes, captured from my observatory located at Dark Sky New Mexico. The stars have been subsequently reduced to bring out nebulosity.

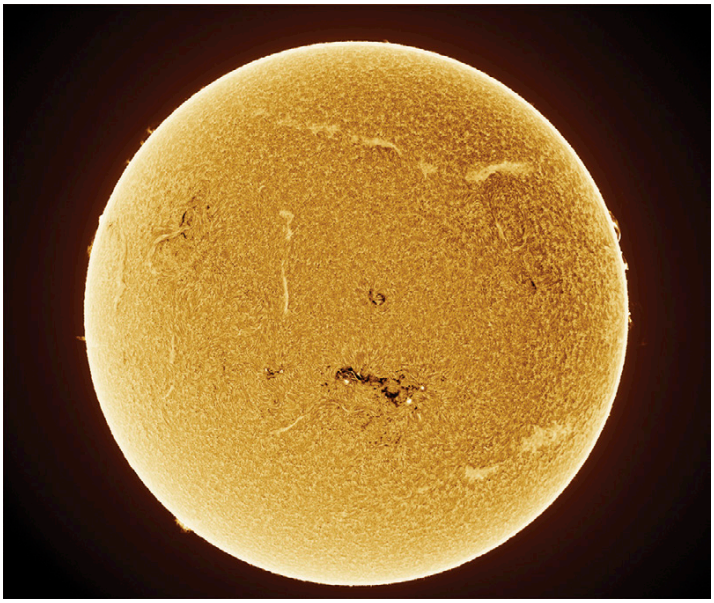
For a higher-resolution version of the images, please visit Astrobin at the following link: https://app.astrobin.com/i/g1sh6l



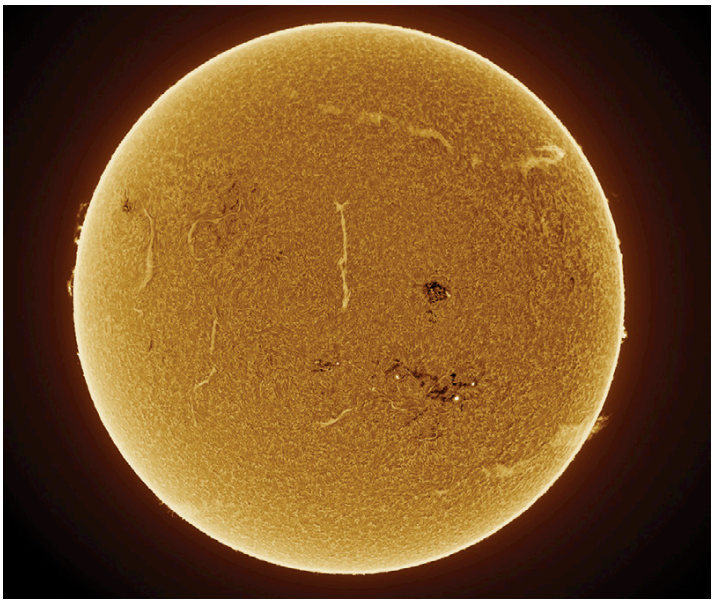
Above: Solar active regions AR4111, 4113, 4114, and 4115 in H-Alpha on June 19 by Brian Kimball



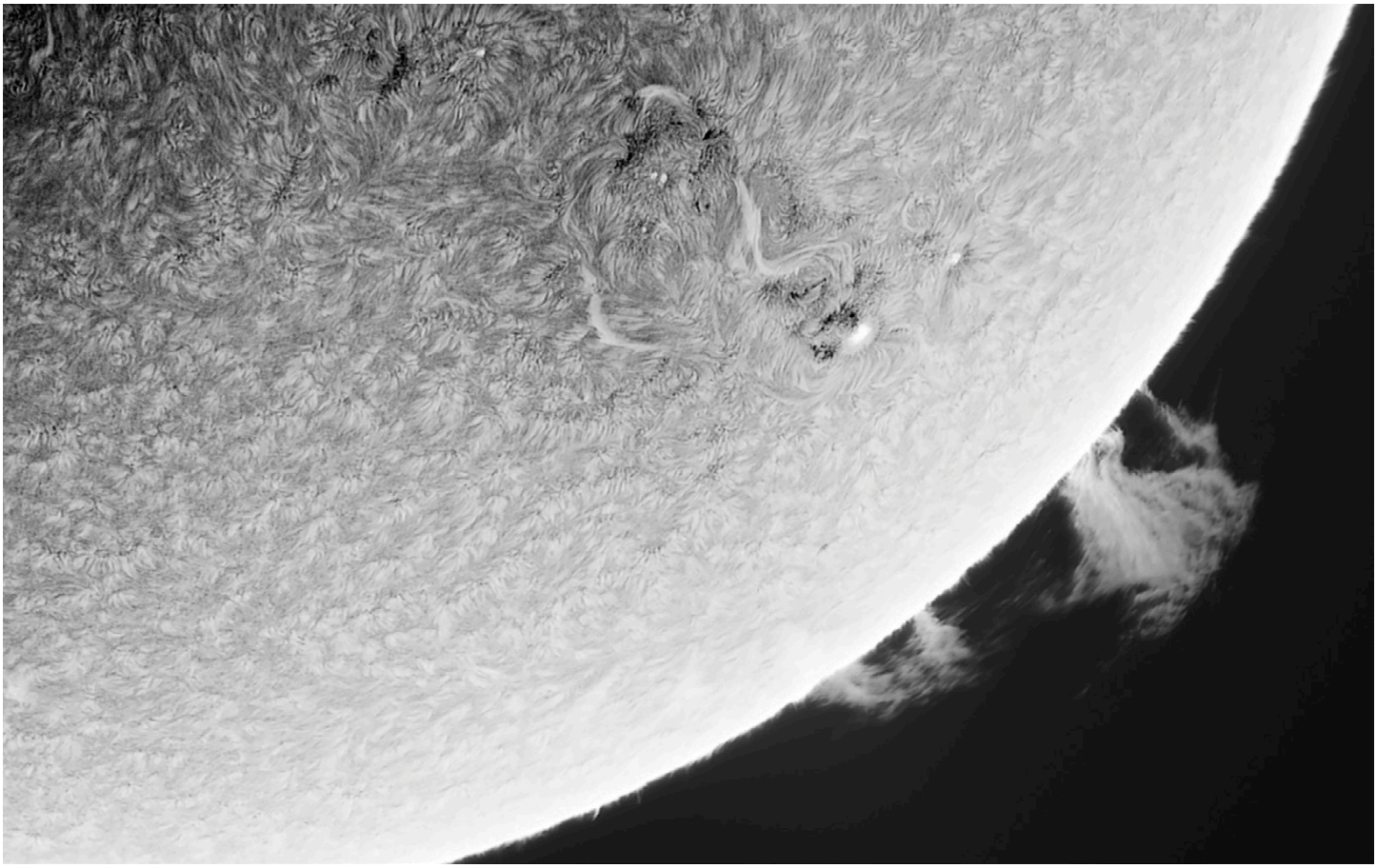
Left: Solar active region AR4105 and 4109 in H-Alpha on June 9 by Brian Kimball



Sun in H-Alpha on June 24 by Brian Kimball

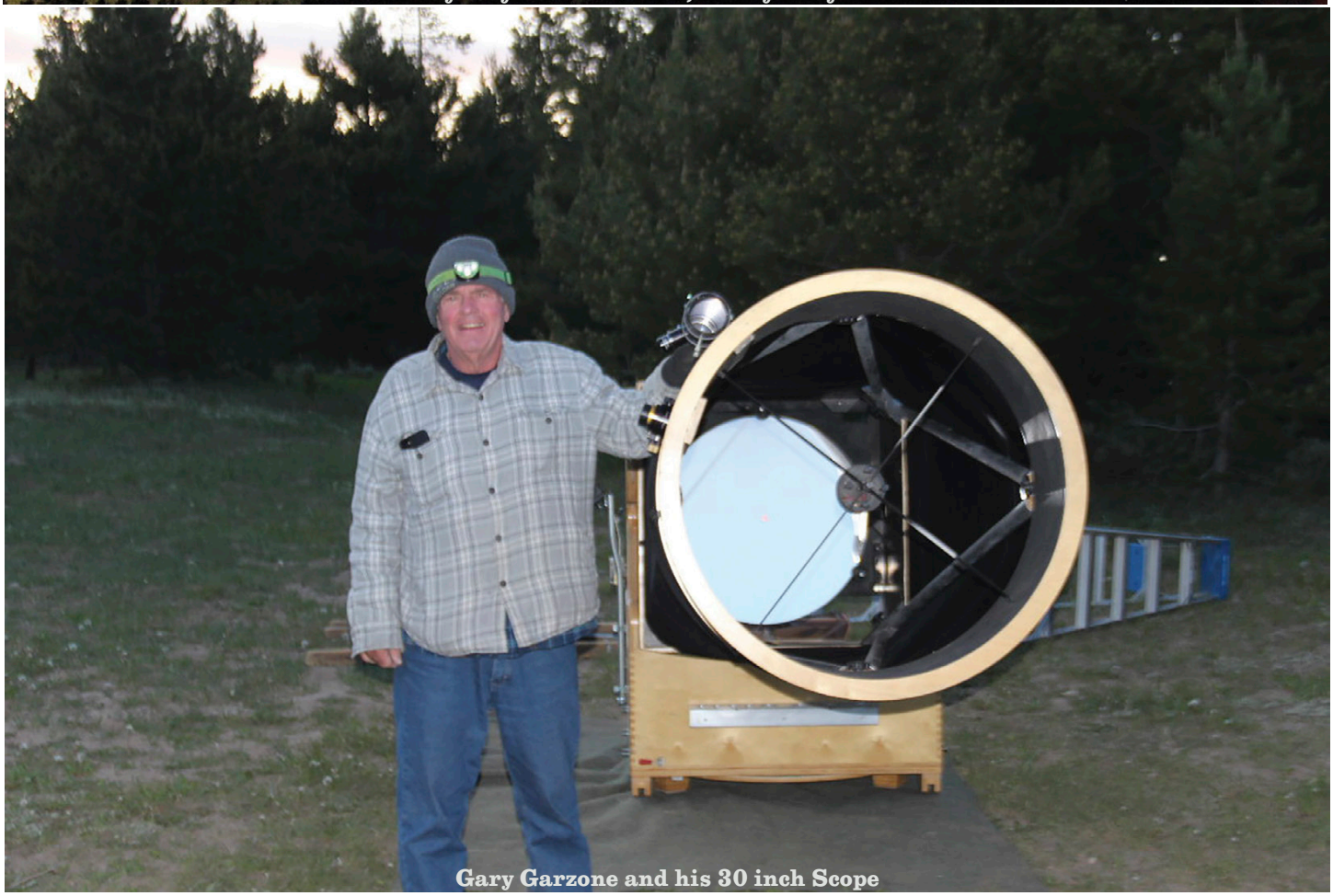


Sun in H-Alpha on June 25 by Brian Kimball



Solar active regions AR 4117 and 4118 and prominences on June 27 by Brian Kimball

Milky Way from Fox Park, WY by Gary Garzone



Gary Garzone and his 30 inch Scope

NGC 7000, "North America" Nebula by Eddie Hunnell (processed to emphasize nebula)

NGC 7000, "North America" Nebula by Eddie Hunnell (original)

“Some four-legged visitors to the June 27 Rabbit Mountain Star Party” by David Elmore

“M100 at June 30 Rabbit Mountain Star Party on June 27” by Aref Namari

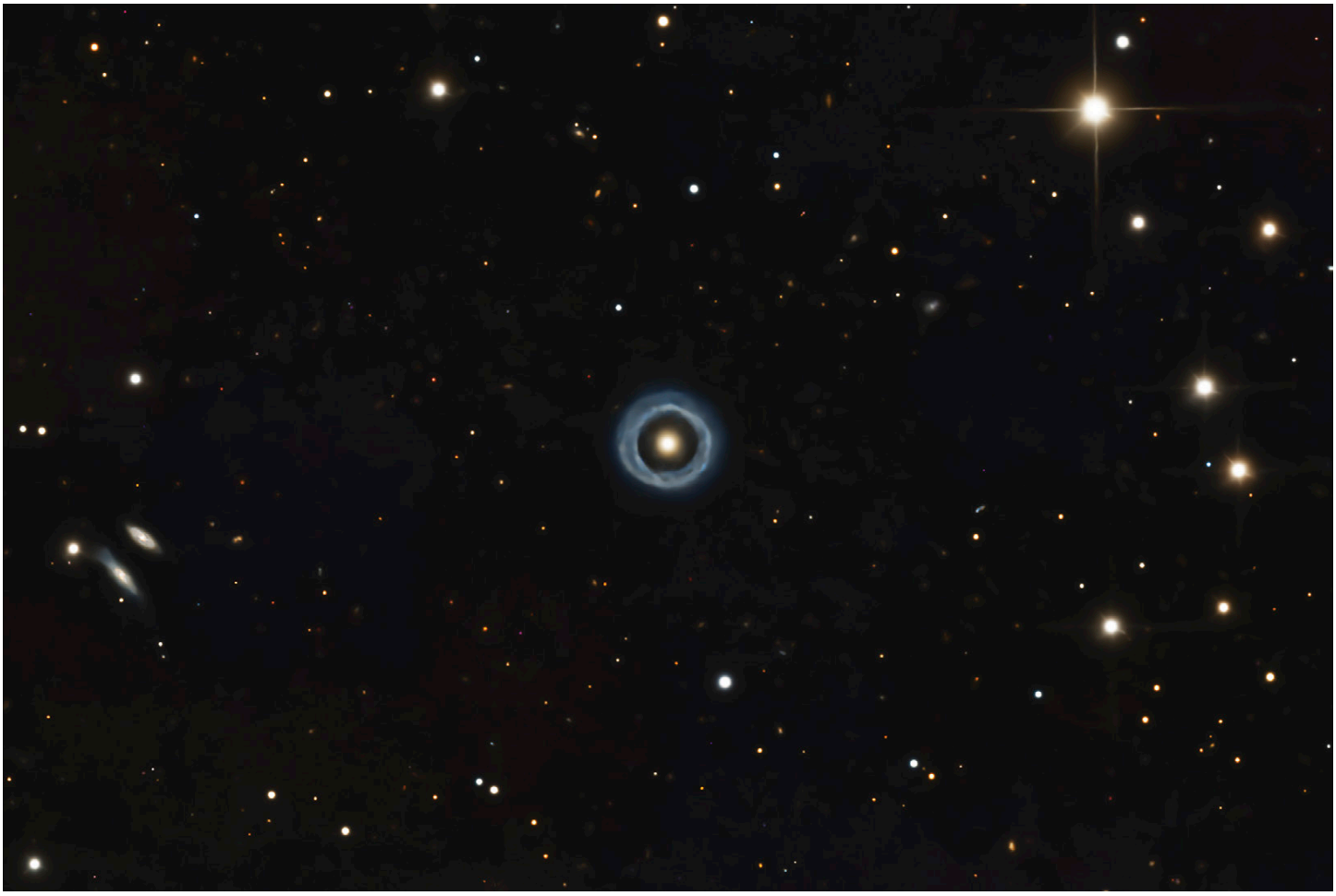
Thanks to all volunteers who participated in the star party on June, 27. We had nine telescopes setup. We did not have a big crowd most likely because of the sky not getting dark until late. However, we had a few who lingered, chatted about astronomy, and looked through telescopes. Overall it was a very successful event and looking forward to the next event in July. Here is a picture of M100 I took with the seestar S50 during the event 45minute total integration 10 seconds subs.

Hickson 61 "The Box Galaxies" by M. J. Post

The CDK14 apparently isn't long enough focal length for this target, so I cut down to half frame and then cropped that result, still keeping enough real estate to include another significant galaxy in the bottom right corner.

The four main galaxies left center are (CW from the top) NGC 4173, 4168, 4174, and 4175. The newbie bottom right is UGC 7190. Numerous others hang out in the background.

From DSNM, 36-six 5-minute subframes, luminance filter, ASI 6200MC camera. FOV is about 21 x 14 arc minutes.



PGC 54559, "Hoag's Object" by M. J. Post

This object has confounded astronomers for 75 years, ever since it was discovered in 1950 by Arthur Hoag. He originally thought it might be an undiscovered planetary nebula. Even gravitational lensing was proposed by others. But it was soon learned that it consists of a nearly perfect ring of hot, young blue stars and a core of 1-2 billion-year-old yellow stars. It's now classified as a ring galaxy, but it cannot have evolved from the collision of a barred spiral and another galaxy (as other classic ring galaxies have) because of the perfect spherical shape of the core, and the ages of the stars. It remains a mystery seeking an explanation, to theorists and modelers alike.

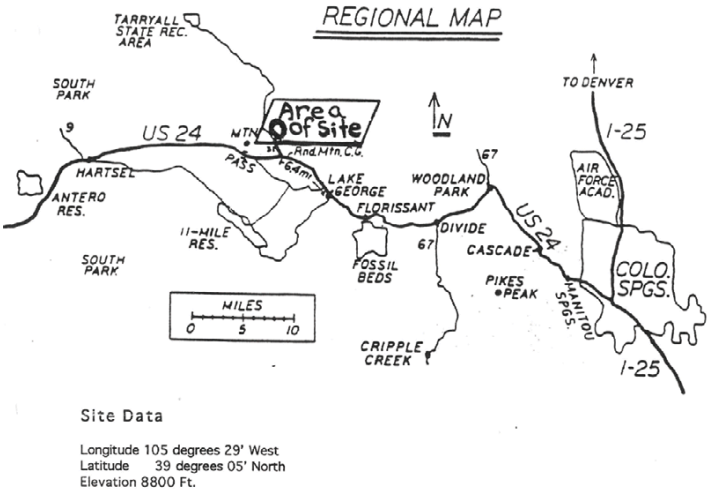
Hoag's Object lies 600 million light years away in Serpens, and it is similar in breadth and star content to our Milky Way. But because of its distance, it's tiny as viewed from planet Earth! This image is about 1/18 frame on my CDK14 scope (2653 mm focal length) and ASI 6200MC camera. Thankfully it passes close to the zenith and the forest fire smoke that has been blanketing our scopes at DSNM has minimal effect. Data for this image were taken over three nights, 3.5 total time on target. FOV is about 24 x 16 arc minutes.

A professional image of Hoag's Object was taken by the Hubble team in 2001: See https://hubblesite.org/contents/media/images/2002/21/1241-Image.html (slightly better resolution)

Newsletter Archives by Eileen Hall-McKim

30 Years Ago: July 1995

- This month we had a visitor from Australia – Andrew Peters. Andrew showed us some of his fantastic astro-photos and discussed life and astronomy "down under"
- Jerry Wilkinson noted it was reported the Hubble Space Telescope has imaged the Kuiper belt and a brown dwarf star. Fred Lacy, donated a fantastic book to the club virtual library titled "The International Halley Watch Atlas". Randy Cunningham handed out "giveaway" materials from his recent trip to the Texas Star Party
- The Colorado Springs Astronomical Society (CSAS) is hosting the annual Star Stare on the weekend of the 29th, extending from the 27th to the 30th. A map of the new Tarryall Flats site is printed in this issue of the Journal. Cost is $7.00 per adult and $2.00 per child



LAS Member Recognized:

- LAS Member Bob Ross will have the results of his lunar dome research published in the fall publication of the Assoc. of Lunar and Planetary Observers (ALPO). The article will include observing information and several drawings of lunar dome formations achieved while observing with the 20" Alvan Clark refractor at Chamberlain Observatory
- July event: new moon star party at Deadman on the 29th

20 Years Ago: July 2005

Hello astronomy lovers,

You just got to love it to do what we do just for some fuzzy view of a comet. Astronomy in the extreme it was with the extreme team visit to the summit of Mount Evans at 14,250 feet. Wobble Meyer twin 28 inch scope with Dr. Bob Stencel from DU. The extreme team for this adventure was Ron, Nancy Crispe, Vern Raben, Ken O'Toole, Mark Wiley, Mike Hotka, Jim Crane, Emily Haynes, Ray Warren, Dick Mallot, Mike Luckow and myself. Beautiful place to visit before dark, so high you can see across the vastness of colorful Colorado. It is indeed a privilege to live here.


Ken O'Toole (left), Vern Raben (center)

- We hiked to the top and took pictures from the summit looking east toward Denver with dome in foreground. Great place for lots of pictures, so I was in hog heaven, pictures I got to share with group. Air is very thin up there, so Ken O'Toole brought some oxygen for test of eye seeing of Milky Way. I think lack of oxygen for several hours on top does get to you some. I breathed it for several minutes then went outside to see if it looked better, and I think it was.
- Most think, it to be not so dark because of being so close to Denver, but if you look to South, West or North and straight up very dark, as naked eye views 6 to 7 magnitude maybe. Driving down is a little hairy at 2 am in total darkness of night, black road, no guard rails, you better not miss your hairpin turns. I got home after 3AM for an extreme night that I will remember for sometime. Gary

Dr. Bob Stencil (left), Gary Garzone (right)

- Publicity/Fundraising report by Ray Warren (a.k.a Monte Hall). I went to these last two outings at Calwood and CU Research Station, they were great! Star party for Twin Peaks Charter Academy 3rd grade classes at Flanders Park last month, was much fun, sold $35 of planispheres! Need to make more planispheres!

- ALCOR report by Bob Spohn. A Tour of the Messier Catalog, Episode Five: Great Balls of Fire. You can download the whole presentation and slides from our web site.
- Just returned from Arizona, saw Vatican observatory with adaptive optics, infrared and fm bands, and nearing completion the large binocular telescope with two 8.4m mirrors! Great tour started in Safford AZ, Science center and 20" scope. All day tour, best $40 I've spent in a long time!
- Andrew Planck – report on weekend above Jamestown. "I had organized starting with my students at Platte Middle School. I was a teacher there, but as of Friday I am now retired! We had 21 kids and parents signed up. Event was at Calwood Center, absolutely beautiful 1000 acres. At start it rained hard (showers!) I was afraid everyone was going to go home! We had classes on Saturday, cleared up a bit for some solar viewing, with white light filters and HA filters. Then, at midnight, a magical thing, it totally cleared up! Not a cloud in the sky! We had to wake up all of the students and parents, but they were an enthusiastic crew! We had two solid hours of clear, dark sky viewing, then at 2:15 not a piece of sky to be seen anywhere! Got a lot of good reports back from parents and kids, they had a great time, it blew them away!"
- Dave Dunn, Steve Lynch, Dan Lafaive, Mike Roos, Vern Raben and I who were at Fox Park drove to the Deadman dark sky site. Wow! The views from there! Bob Spohn said it was 10,600 feet elevation. I took some pictures that I sent out already. It is a pretty bad road to get there so that is why I have never taken my motor home and big scope there. I would have to use Explorer car to tow trailer. A slice of Heaven up there, very green and snow cap views of peaks to south west are awesome. I will have to try it out one night, September maybe?

10 Years Ago: July 2015

Twenty-six people attended our June 18th meeting. The speaker was Dr. Fran Bagenal who gave a talk on the New Horizons Mission to Pluto. Fran talked about why the mission was important and what it may discover. She described the spacecraft instruments and showed us a movie of the launch and its trajectory. She showed comparison photos from ground based telescopes, from the Hubble Space Telescope, and recent images from New Horizons. Fran is fascinating to listen to and her presentation at the meeting was great as always. She has been involved with the New Horizons mission to Pluto since it began and her perspective was interesting to hear.

- At the business meeting Mike Fellows presented the financial statement and reported that we now have 68 members
- Gary Garzone gave us an update on the club telescope project. Four mirrors were tested by Jerry Wilkins; three were found to be excellent. Mike Hotka has delivered the mirrors to Optical Mechanics, Inc.
- Bill Fierra completed modification of the three library telescopes that the club will donate to the library. Leonard Sitongia completed review of the manual. Vern will assemble manuals and align scopes. Target date for completion is our next meeting.
- Upcoming Events:
  - City of Longmont Recreation Services and Rim Valley FFA star party at Sandstone Ranch visitor center parking area on July 24
  - LAS Meeting Aug 20th "Beginner Spectroscopy" by Vern Raben
  - City of Superior Recreation star party Aug 22nd

Ring Nebula by Tally O'Donnell July 2015

M13 Globular Cluster in Hercules by Gary Garzone, July 2015

Longmont Astronomical Society
P. O. Box 806
Longmont, CO 80506

Sh 2-27, Great Pumpkin Nebula by David Elmore