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CALIFORNIA NEBULA
BY TALLY O'DONNELL

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Next LAS Meeting January 18 at 7 pm

The Hunt for the Pale Blue Dot: Science, Technology, and People for NASA's Search for Habitable Planets by Dr. Kevin France

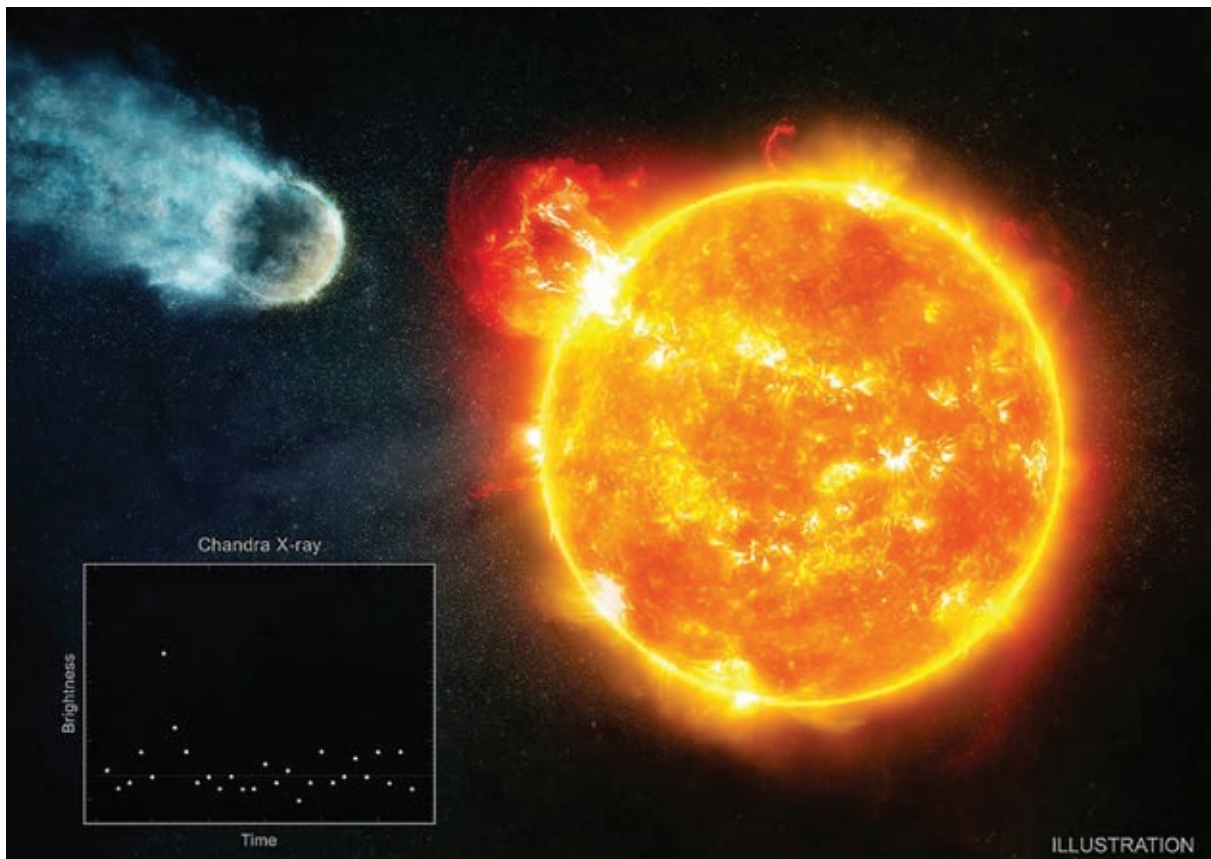
Abstract

In the past three decades, astronomers have discovered more than 5,000 extra-solar planets, changing our understanding of Earth's place in the Universe. We are now poised to begin the search for Earth-like planets orbiting Sun-like stars, our first true attempt to find "Earth 2.0" and to conduct a census of nearby stars to understand how common life is beyond the solar system. In this talk, I will discuss work ongoing at NASA and at the University of Colorado's Laboratory for Atmospheric and Space Physics to advance this search. I will talk about NASA's upcoming "life finder" mission, the Habitable Worlds Observatory, and talk about the projects CU is undertaking today to enable this mission. As examples, I will focus on the CUTE small satellite that is studying evaporating planets around nearby stars, how CU rocket missions are advancing instrument technology, and how we incorporate students into these activities to train and mentor the scientists and engineers that will lead NASA's search for habitable planets over the next two decades.

Bio

Kevin France is an astrophysicist and assistant professor in the Department of Astrophysical and Planetary Sciences at the University of Colorado. Dr. France's research focuses on exoplanets and their host stars, protoplanetary disks, and the development of instrumentation for ultraviolet astrophysics. He is the Principal Investigator of the ESCAPE Small Explorer mission concept, the CUTE small satellite mission, and a NASA-supported sounding rocket to study exoplanet atmospheres and flight-test critical path hardware for future UV/optical astrophysics missions. He is a regular guest observer with the Hubble Space Telescope and serves on numerous science and technical advisory groups for NASA. He was a member of the HST-COS instrument and science teams and the study PI for the LUVOIR ultraviolet spectrograph.

The presentation will be in-person at 7 pm in the First Evangelical Church, 803 3rd Avenue, Longmont, CO. If you can not attend in-person you may view on Zoom.



Contents

Front Cover	California Nebula by Tally O'Donnell
2	LAS Meeting January 18: "Habitable Planets and Missions" by Dr. Kevin France
3	Contents / About LAS
4	Planets, Lunar Phases, Meteor Showers in January
5	Comet 12P/Pons-Brooks in January
6	Comet 62P/Tsuchinshan
7	Comet C/2021 S3 (PANSTARRS)
8	Navigating the mid-January Night Skies by John Goss
9	Crescent Moon, Antares, Venus, & Mercury in morning twilight Other Suns: Delta Orionis
10 - 11	Newsletter Archive by Eileen Hall-McKim
12 -15	Personal Goal Verification by Mike Hotka
16 - 17	HB3 by Martin Butley
18	Heart Nebula by Clarke Yeager
19	Cygnus by David Elmore
20	SH 2-136 by David Elmore
21	Horsehead Nebula and Veil Nebula by Gary Garzone
22	California Nebula and Horsehead Nebula by Jim Pollock
23	NGC 2264, Christmas Tree Nebula by Jim Pollock
24	M76, Little Dumbbell by M. J. Post
25	WR 134 by M. J. Post Comet C12P/Pons-Brooks by Paul Robinson
26	M45 by Rolando Garcia
27	SH 2-170 Little Rosette Nebula by Rolando Garcia NGC 7635 by Rolando Garcia
28	SNR 179.0+2.6 by Stephen Garretson
29	Equipment by Stephen Garretson
30	IC 2177 by Stephen Garretson
31	Witch Head Nebula by Tally O'Donnell
Back Cover	LBN 777, Baby Eagle by M. J. Post

About LAS

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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.



Planets in January

Mercury

Mercury may be observed before sunrise very low in the ESE. After the 12th it will be easier to see at magnitude -0.2 in apparent brightness; the disk will be about 6 arc sec across.

Venus

Venus is easy to see just before sunrise in the low in the ESE above Mercury. It is brilliant at magnitude -4 in apparent brightness and about 13 arc sec across.

Mars

Mars re-appears in the morning sky about the 12th in the ESE below Mercury. It is much dimmer at magnitude +0.4 and the disk is about 4 arc sec across. Mars opposition is about a year from now on January 15, 2025.

Jupiter

Best time to view Jupiter is around 5:30 pm. It is magnitude -2.5 in brightness and the disk is about 42 arc seconds across. The following are favorable times to view the Great Red Spot at mid transit this month (above 20° altitude):

- Jan 1 at 8:54 pm at altitude 58°
- Jan 3 at 10:32 pm alt 41°
- Jan 4 at 6:21 pm alt 61°
- Jan 6 at 12:11 am alt 21°
- Jan 6 at 8:03 pm alt 61°
- Jan 8 at 9:42 pm alt 47°
- Jan 9 at 5:33 pm alt 58°
- Jan 10 at 11:21 pm alt 27°
- Jan 11 at 7:12 pm alt 63°
- Jan 13 at 8:51 pm alt 52°
- Jan 15 at 10:30 pm alt 33°
- Jan 16 at 6:22 pm alt 64°
- Jan 18 at 8:01 pm alt 57°
- Jan 20 at 9:40 pm alt 39°
- Jan 21 at 5:31 pm alt 62°
- Jan 23 at 7:10 pm alt 61°
- Jan 25 at 8:49 pm alt 45°
- Jan 27 at 10:28 pm alt 26°
- Jan 27 at 6:20 pm alt 63°
- Jan 30 at 7:59 pm alt 51°

Saturn

Saturn is visible low in the WSW after sunset. It is magnitude +1.0 in apparent brightness and the disk is 16 arc sec across.

Uranus

Uranus is high up in the south after sunset in constellation Aries. It is magnitude 5.7 in apparent brightness and the disk is around 3.7 arc sec across.

Neptune

Neptune is visible in the SW after sunset in the constellation Pisces. It is magnitude 7.9 in apparent brightness and the disk is only 2.2 arc sec across.

Lunar Phases in January

- Third quarter: January 3 at 8:32 pm
- New moon: January 11 at 4:59 am
- First quarter: January 17 at 8:54 pm
- Full moon: January 25 at 10:55 am

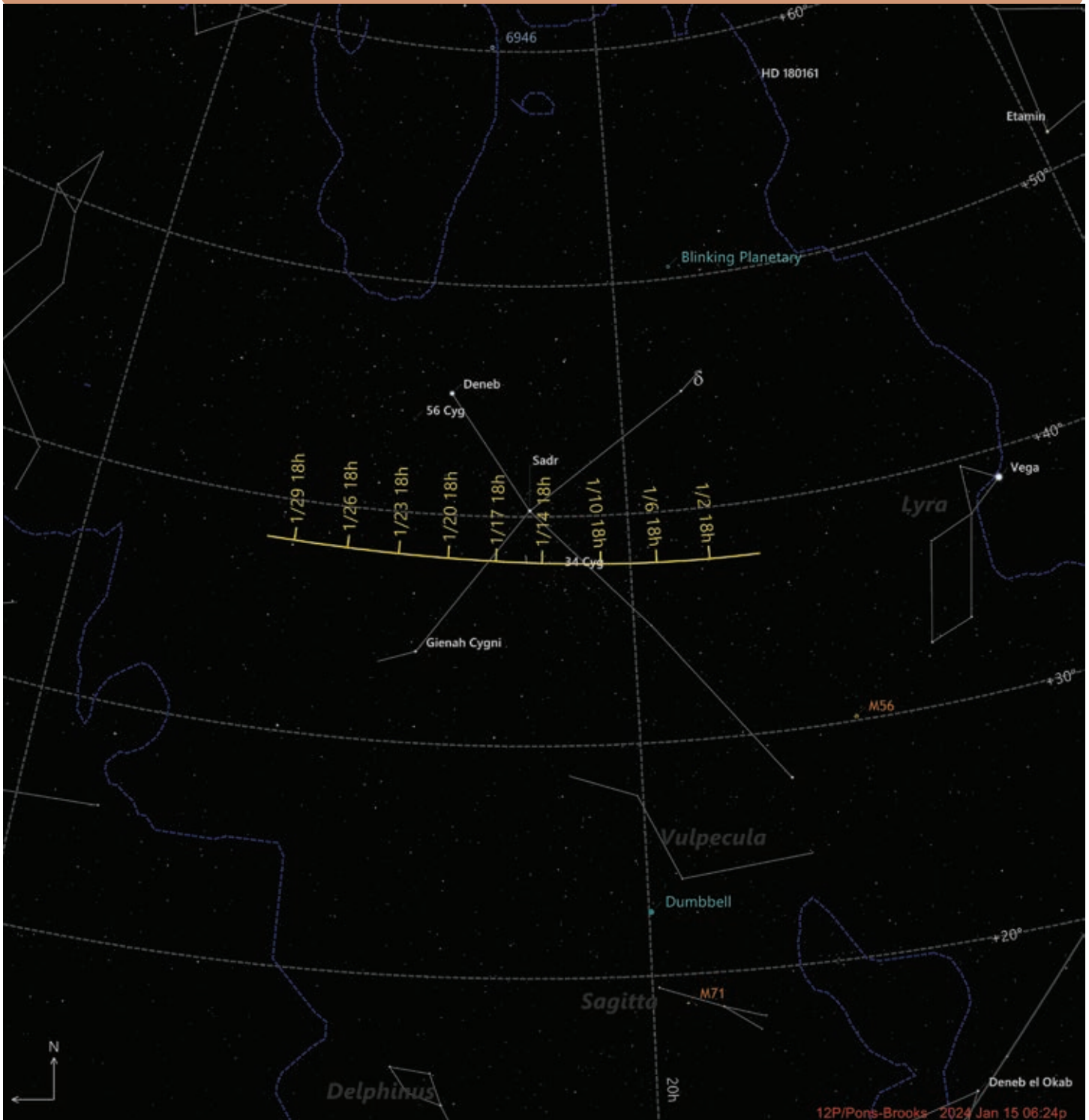
Meteor Showers in January

The Quadrantids meteor shower peaks in the early morning hours of January 4 between 2 am to dawn. Moon rise is at 12:22 am which will interfere somewhat. At the peak times 20 to 100 per hour may be seen -- probably less this year because of the moon.

Moon Occults Antares Jan 8 at 6:42 am

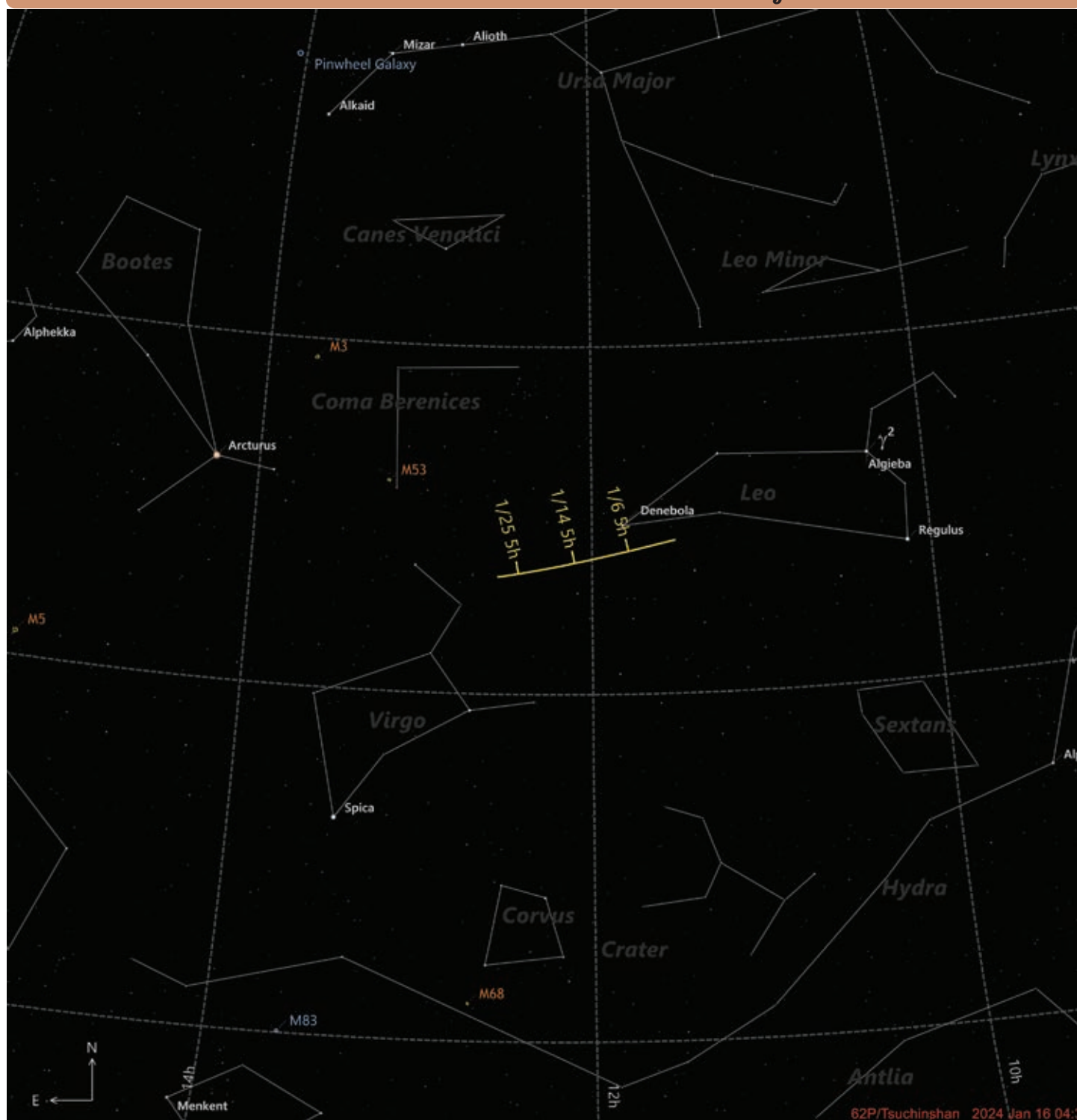


Comet 12P/Pons-Brooks in December



Date	Optimal time	RA	Dec	Constellation	Magnitude	Size (arc min)
Jan 1	6:14 pm	19h40m27.8s	+37°48'29"	Cygnus	7.8	3.7
Jan 7	6:18 pm	19h58m02.9s	+37°53'33"	Cygnus	7.5	3.8
Jan 13	6:22 pm	20h17m04.1s	+38°01'20"	Cygnus	7.2	3.9
Jan 19	6:27 pm	20h37m37.3s	+38°10'14"	Cygnus	6.8	4.0
Jan 24	6:30 pm	20h55m58.8s	+38°16'56"	Cygnus	6.6	4.2
Jan 31	6:30 pm	21h23m39.1s	+38°22'00"	Cygnus	6.3	4.3

Comet 62P/Tsuchinshan in January



62P/Tsuchinshan 2024 Jan 16 04:1

Date	Optimal time	RA	Dec	Constellation	Magnitude	Size (arc min)
Jan 1	5:12 am	11h37m27.8s	+12°47'13"	Leo	8.5	4.9
Jan 7	4:43 am	11h53m27.4s	+11°55'49"	Leo	8.6	4.9
Jan 13	4:33 am	12h07m23.7	+11°12'24"	Virgo	8.6	5.0
Jan 19	4:21 am	12h19m05.9s	+10°37'58"	Virgo	8.7	5.0
Jan 24	5:41 am	12h27m09.8s	+10°16'06"	Virgo	8.8	5.1
Jan 31	3:53 am	12h35m28.0s	+09°56'48"	Virgo	9.0	5.1

Comet C/2021 S3 (PANSTARRS) in January



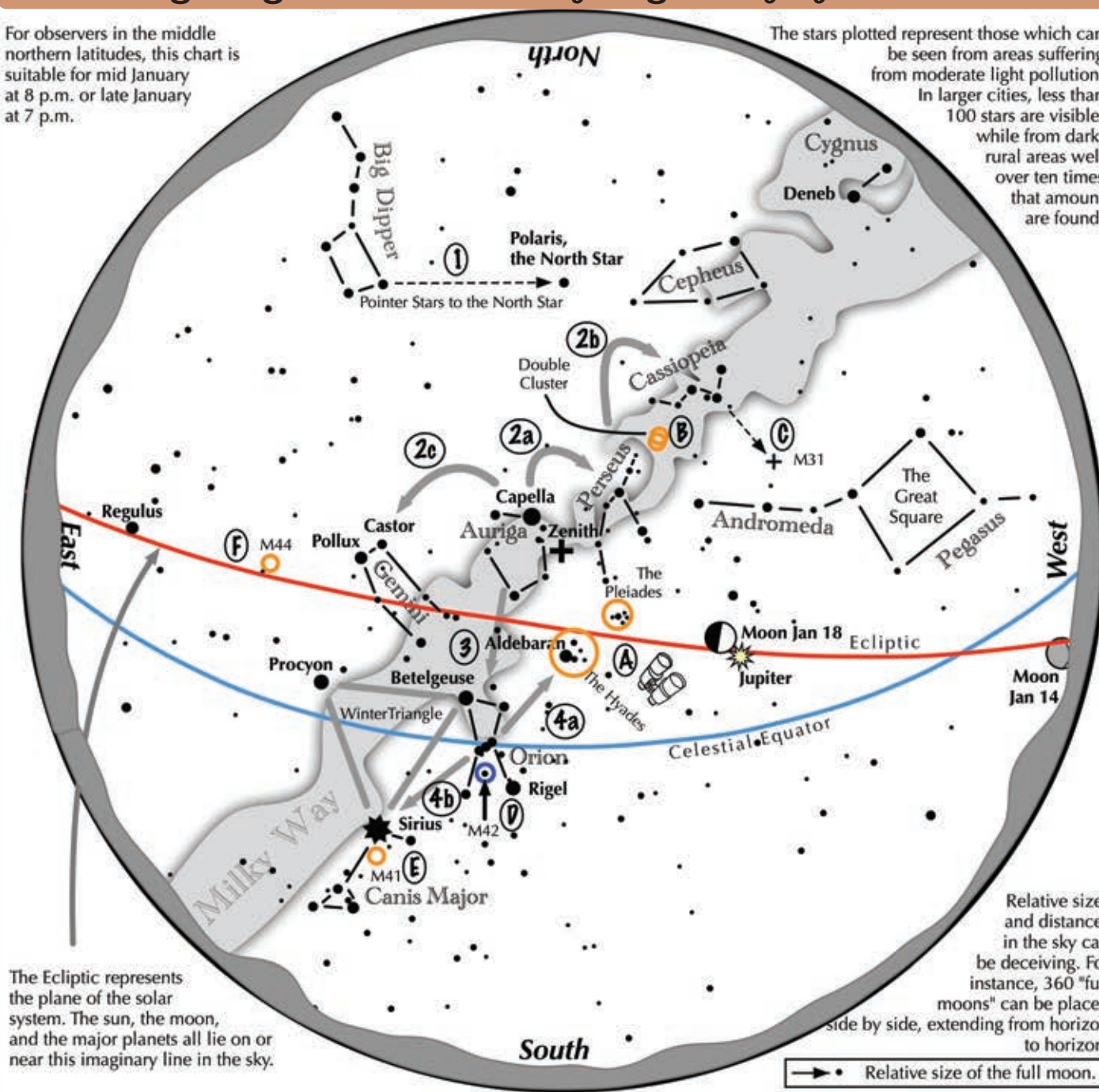
C/2021 S3 (PANSTARRS) - 2024 Jan 16 05:5

Date	Optimal time	RA	Dec	Constellation	Magnitude	Size (arc min)
Jan 1	6:01 am	14h57m34.4s	-37°27'14"	Centaurus	10.5	1.1
Jan 7	6:02 am	15h19m17.8s	-35°59'27"	Lupus	10.3	1.2
Jan 13	6:00 am	15h40m49.8	-34°09'09"	Lupus	10.2	1.2
Jan 19	5:56 am	16h02m03.5s	-31°54'44"	Lupus	10.1	1.2
Jan 24	5:53 am	16h19m27.4s	-29°43'20"	Scorpio	10.0	1.3
Jan 31	5:47 am	16h43m15.8s	-26°08'43"	Scorpio	9.9	1.3

Navigating the mid January Night Sky by John Goss

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

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



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

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

→ • Relative size of the full moon.

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

- 1 Above the northeast horizon rises the Big Dipper. Draw a line from its two end bowl stars upwards to the North Star.
- 2 Face south. Overhead twinkles the bright star Capella in Auriga. Jump northwestward along the Milky Way first to Perseus, then to the "W" of Cassiopeia. Next Jump southeastward from Capella to the twin stars Castor and Pollux of Gemini.
- 3 Directly south of Capella stands the constellation of Orion with its three Belt Stars, its bright red star Betelgeuse, and its bright blue-white star, Rigel.
- 4 Use Orion's three Belt stars to point to the red star Aldebaran, then to the Hyades, and the Pleiades star clusters. Travel southeast from the Belt stars to the brightest star in the night sky, Sirius.

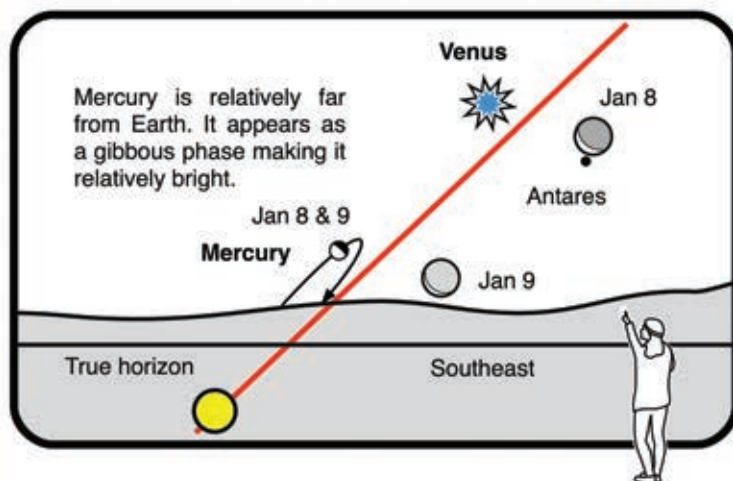
Binocular Highlights

A: Examine the stars of the Pleiades and Hyades, two naked eye star clusters. **B:** Between the "W" of Cassiopeia and Perseus lies the Double Cluster. **C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **D:** M42 in Orion is a star forming nebula. **E:** Look south of Sirius for the star cluster M41. **F:** M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux.

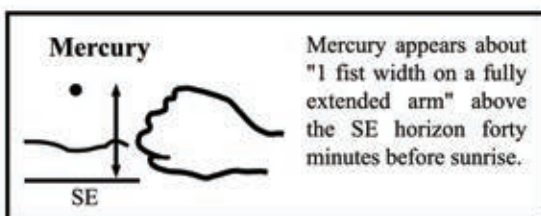
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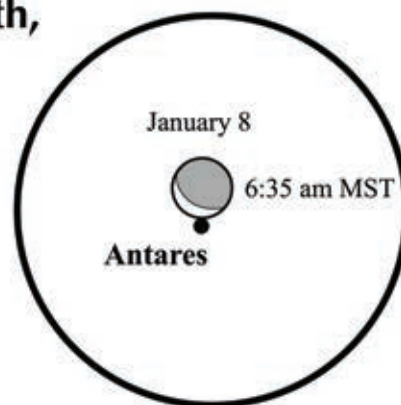
If you can observe only one celestial event this month, see this one:



January 8 and 9, 2024: Mercury, Venus, and the moon forty minutes before sunrise in the southeast



View through
10x50 binoculars
on January 8



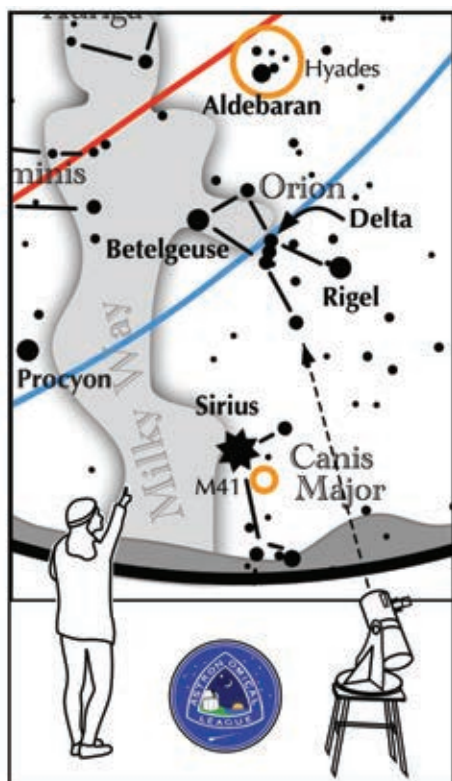
The Scene:

The crescent moon, Antares, Venus, and Mercury in the morning twilight

On January 8, the crescent moon approaches Antares low in the southeast 90 minutes before sunrise.

- The moon occults Antares for viewers living in the southwestern portion of the US. (NM, UT, AZ, and So CA.)
- The event begins at 6:39AM MST, location dependent.
- Use common household binoculars to watch the occultation and begin viewing at 6:35 MST.
- * The very bright object to the moon's left is Venus.
- 40 minutes before sunrise, look for Mercury low in the southeast to the far lower left of Venus.

On January 9, an even thinner crescent moon lies right of Mercury and below brilliant Venus.



Other Suns: Delta Orionis (Mintaka)

How to find Delta Orionis on a January evening

Face southeast. Look at Orion above Sirius. Orion's Belt is the three stars of equal brightness between bright Rigel and Betelgeuse. Delta Orionis is the western star of the Belt.

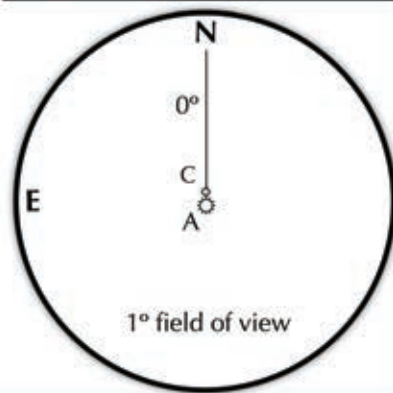
Delta Orionis

A-C separation: 53 sec
A magnitude: 2.4
C magnitude: 6.8
Position Angle: 0°
Colors:

yellow-white
blue-white

Component B is a 14th magnitude star, not visible in most small telescopes.

Suggested magnification: >20x
Suggested aperture: >3 inches



Newsletter Archive by Eileen Hall-McKim

30 years ago - January 1994



From the Editor, Kevin Brose

“Starting with this issue of the Journal, you will notice a few changes to its structure. First, the cover has been redesigned to perform the additional function of “mail page”, while previously the back page had performed this function (the mail page is used for a mailing address and stamp when we need to mail off copy of the Journal). The back page now consists of the calendar of events on one side and a monthly sky chart on the other. I decided to make this change based on the input of some club members; to have the calendar more visible as a reminder of club events. By placing the calendar on the back page it is now easy to simply pull it off and place it on your refrigerator, bulletin board etc. I decided to throw in the monthly sky chart as an added resource. I hope these changes make the Journal more functional for you!”

20 years ago - January 2004

“Banquet was awesome! I could tell David Levy was feeling at ease and was just like us amateur astronomers, with that old zeal that seems to drive us to hang out thru cold nights just to see some faint little fuzzies. He signed my telescope mirror cell along with Randy C. with date, I will cherish the scope, with some stories to tell at star parties now. Thanks Karen for all you have shared with us and I will look forward to hearing more tales of your Solar Eclipse from down under at next LAS meeting. The new 30” scope will be a comet chaser with new energy from David Levy, the comet finding days are not over by any means, Keep it cosmic!”
Gary Garzone

People in the photo at right:

Top Left: Bob Spohn and David Levy

Top Right: David Levy and Gary Garzone

Middle Left: David Levy and ??

Middle Right: Marc Wiley, David Levy and Julie Carmen,

Bottom Left: ??

Bottom Right Karen Mendenhal



10 years ago - January 2014

The December LAS meeting was at Lefty's Gourmet Pizzeria in Niwot. A big thanks to Lefty for hosting all of us and serving his delicious pizzas! This was an informal, mostly social meeting. Bill Tschumy announced that, the company he is associated with, Southern Stars, has been acquired by Simulation Curriculum (they are the folks that publish Starry Night). He also announced that Sky Safari 4 for the iPhone, the iPad, and the iPod Touch has been released. Gary Garzone showed us his new SBIG Sti Guide camera and reported some problems getting it to track consistently.



Credit: M38 by Brian Kimball

Messier 38 (also known as M38 or NGC 1912) is an open cluster in the Auriga constellation. It was discovered by Giovanni Batista Hodierna before 1654 and independently found by Le Gentil in 1749. M36 and M37, also discovered by Hodierna, are grouped together with M38 at a distance of about 3,420 light years away from Earth. The cluster's brightest stars form a pattern resembling the Greek letter Pi or, according to Webb, an "oblique cross." At its distance of 4,200 light years, its angular diameter of about 20' corresponds to about 25 light years, similar to that of its more distant neighbor M37. It is of intermediate age (about 220 million

years, according to Sky Catalog 2000) and features a yellow giant of apparent magnitude +7.9 and spectral type G0 as its brightest member. This corresponds to an absolute magnitude of 1.5, or a luminosity of 900 suns. For comparison, the Sun would appear as a faint magnitude +15.3 star from the distance of M38.

Near the leftmost star in the belt of Orion, Alnitak, is the Flame Nebula NGC 2024. The Flame is an emission nebula caused by ultraviolet light from Alnitak knocking electrons from great clouds of hydrogen. The glow results when ionized hydrogen and free electrons recombine.

South (to lower left) of the star Alnitak is the Horsehead Nebula aka Barnard 33. The profile of the horse's head is an extremely dense dark dust cloud that is in front of an emission nebula excited by light from star Sigma Orionis.



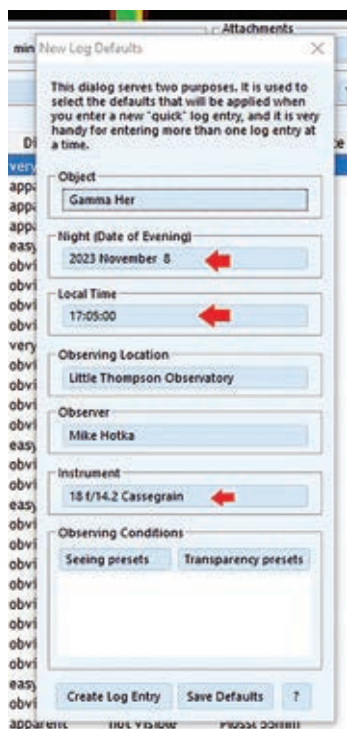
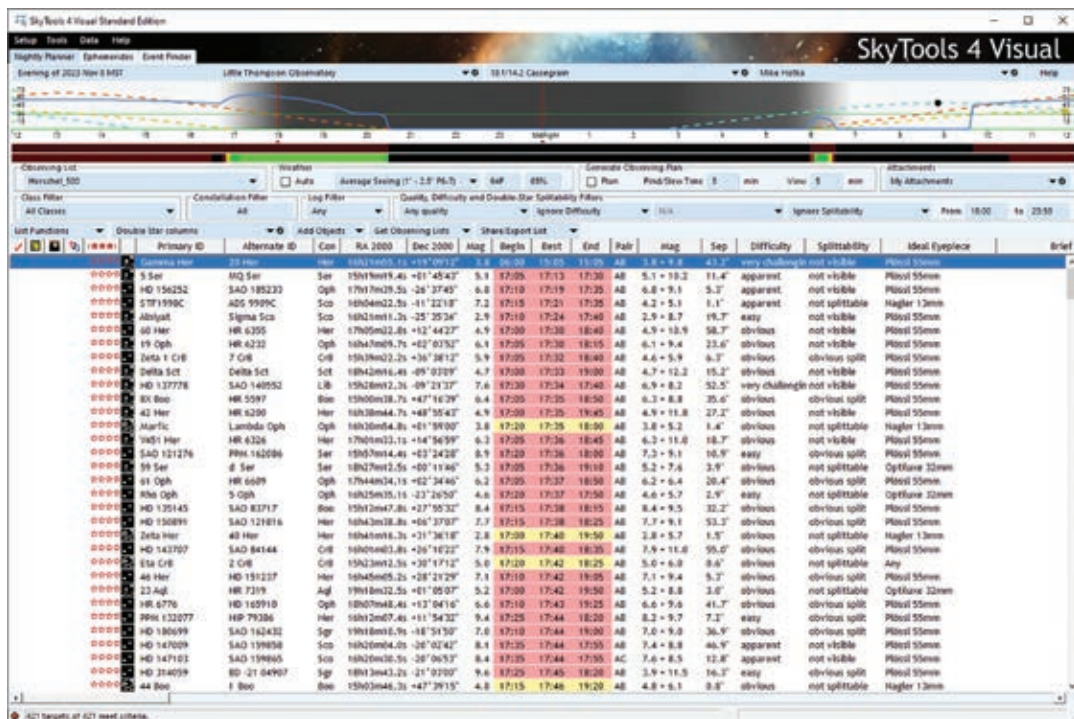
Credit: Horsehead and Flame Nebulas by Gary Garzone

Personal Observing Goal Verification

By Mike Hotka

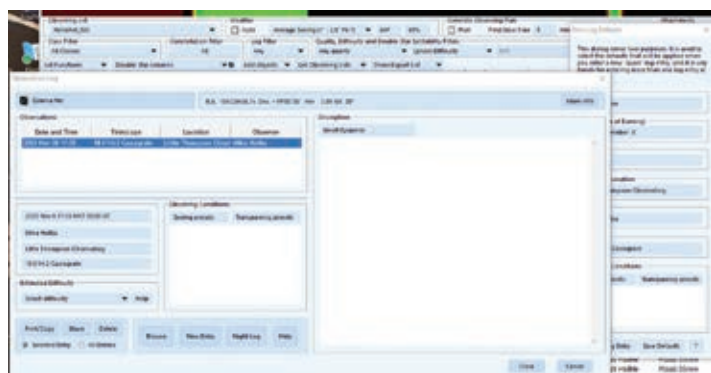
At the end of last month's article, I left you driving home from your observing location after a successful night of observing. Now I'll discuss what I do after I get home. I have a few more tasks to do before I consider this observing session complete.

The first thing I do is to log all my outing's observed objects into my Standard Edition of SkyTools 4 (ST4) (SkyTools 4 Standard Edition (skyhound.com)) database. First, I open the observing list I was working on during the outing in the main ST4 display:



I highlight an object I observed during the outing (the blue highlighted area). In this example, the double star Gamma Her is selected. I can either, hover the cursor over this blue, highlighted area, and click the right mouse button to select the Create Log Entry choice in the pull-down menu, or I can just press the hotkey m to add a new log entry. In either case, the following input dialogue window will be displayed:

I then verify/adjust the fields of the Date, Local Time and Instrument (arrowed) to match the Gamma Her observation's data and click the Create Log Entry button at the bottom of this window. The following window will pop-up, allowing me to verify a log entry was properly created for this object:




Close the Observation Log window and the New Log Defaults window and this object is now in the ST4's database as observed. I repeat these steps until all the objects I recorded in my field logbook are logged.

Then I open a blank Microsoft Word document and transpose all the text notes from my field logbook into this MS Word document. An example page from my logbook is displayed below:

3/28/14

6:50P Clear. Brisk breeze from NE. Put Blue Locktite on Threads of AZ bolt of #749 (#737 doesn't have locktite). Will see how that works. Preliminary tests this afternoon didn't see missed counts. Blue tape down threads just didn't do it. Slipped Right after setup.

Sunset 7:54P. 61° Still breezy from NE. Clouds/fog low along western horizon.

9:05 SC workings - M42 Awesome. 6 stars seen in top arm. G205 STARS 9:10 Cool. Thick filaments in a loop. w/03. on Bottom. on top is a much dimmer  that thickens at top. 2 FOV of 17mm wide • 3 FOV tall

N2532 9:37 A small round dim glow. can see mottling of glow, maybe ² few arcs. in center of glow is tiny hb core.

N2649 9:42 A small round very dim v.l. glow has brighter FS on upper ~~part~~ part of halo glow

N2604 9:46 A very faint fat oval v.l. glow

N2577 9:49 A ^{very} small, tilted oval. dim. has larger brighter core. Then above • 2. left • near • under • Bright FS is this smaller roundish v.l. very faint glow

N224 9:54 A small, long thin ^{vertical} glow w/ large, linear arc that is brightest • small bright core in center. core faint but easy to see w/4x

Once I am done entering all the text from every logbook page of this outing into the MS Word document, I print a hard copy of these observing notes. I then can add any sketches I did in the field logbook to the corresponding printed pages. The below example is the finished, printed page of the above logbook example:

Friday, March 28, 2014

Cady Alverado brought Blue Locktite to *lock* the AZ bold to the ground board of scope #749 (#737 doesn't have Locktite for the threads grabbed by themselves and there is no AZ slippage). Preliminary tests showed this solved the slippage issue (didn't see missed counts) and I used the Sky Commander the rest of the night. The blue masking tape down the threads from the night before just didn't do it. It slipped right after the setup steps.

6:50 PM. Clear, Brisk breeze from NE. Sunset at 7:54 PM. 61 degrees. Smoke low along western horizon.

9:05 PM. Sky Commander works. M42 awesome. 6 stars seen in trapezium. Slew between M41 and M42 twice and object in FOV both times.

G205.5+00.5	9:10 PM	17mm – Cool. This. Easy to see with O3. Thick filaments in a loop on bottom and arc that thickens at top. 2 FOV wide and 3 FOV tall.
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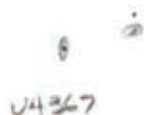


NGC 2532	9:37 PM	17mm – A small, round, dim glow. Can see mottling of glow, maybe 2 CCW arms. In center of glow is a tiny, hare brighter core.
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NGC 2649	9:42 PM	17mm – A small, round, very dim, uniformly lit glow. Has brighter field star on upper part of halo glow.
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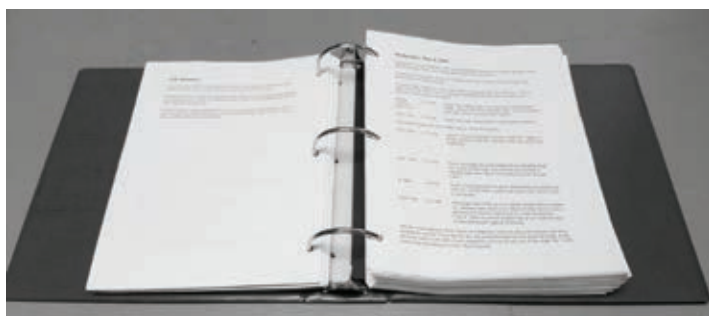
NGC 2604	9:46 PM	17mm – A <u>very</u> faint, fat oval, uniformly lit glow.
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NGC 2577 UGC 4367	9:49 PM	17mm – A very small, tilted oval. Dim. Has larger, brighter core. Then above and to right and near and under a bright field star is this smaller, roundish, uniformly lit, very faint glow of U4367.
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NGC 2764	9:54 PM	17mm – A small, long thin, very dim glow with larger, linear core that is brighter with small, bright core in center. Core faint but easy to see w/AV.
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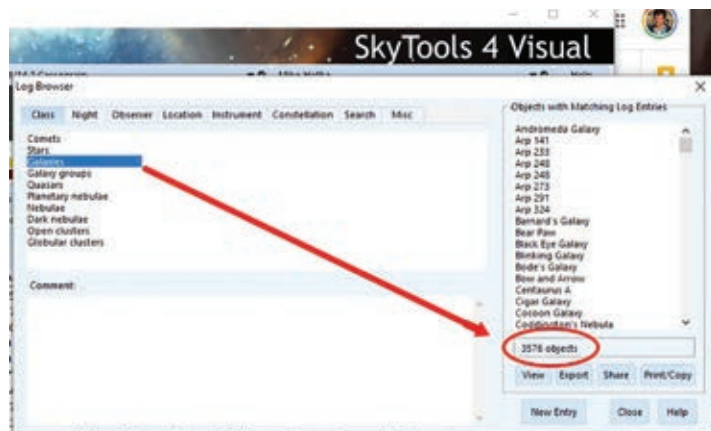
I punch 3 holes in these pages and put the pages in a 3-ring notebook for future reference:



A few years ago, I started a second 2-inch binder of these printed logbook pages.

Remember my goal of observing 10,000 unique celestial objects?

With all my observed objects now recorded in ST4's database, I can measure the progress I have made towards completing my observation goal. I use ST4's ability to count the different class of objects. I click each class of object and enter the number of observed objects into an Excel spreadsheet I use to support my observing goal.



Once I am done with entering all these class object counts into the corresponding cells of the spreadsheet, it automatically calculates the current number of unique celestial objects observed (count circle in red on the right):

I can easily see the progress I have made towards completing my observation goal. Now I am done with this

most recent observing session. With all these observations logged in the ST4's database, I can start planning my next

	A	B
1	Class of Objects	Count
2	Galaxies	3576
3	Galaxy Clusters	88
4	Nebulas	206
5	Planetary Nebulas	176
6	Clusters+Nebula	36
7	Dark Nebulas	120
8	Reflection Nebula	206
9	Globular Clusters	148
10	Open Clusters	541
11	Knots	4
12	Super Nova Remnants	14
13	Super Novae	10
14	Novae	3
15	Unknown & Other	100
16	Comets	49
17	Double Stars	426
18	Triple Star	6
19	Solar Neighborhood Stars	196
20	Carbon Stars	101
21	Variable Stars	107
22	Quasars	4
23	Star Asterisms	37
24	Solar System	1037
25	Meteor Showers	38
26	Total Objects Seen	7725

outing of objects I have yet to see.

This process I describe in last month's and this month's articles is a process I've developed over the years. I described it in detail so that you might adjust my process, or create a process of your own, that will work for you. Regardless, you need an automated way to keep track of what you have observed, and depending on your astronomical goal(s), to summarize these observed objects in a way that you can see the progress towards completing your goal(s).

An alternative to using ST4 to record your observed objects is to use an Excel spreadsheet. This kind of spreadsheet can contain all the objects you wish to observe and with embedded equations, can easily calculate the number of objects observed.

My current observing project is to view double stars. I have accumulated a total of 3965 double stars I will observe. I still use ST4 to log a record of my observed stars, but I also keep a separate Excel spreadsheet of the many double star lists I have accumulated over the years. The bottom of this Excel spreadsheet double star list is as follows:

A screenshot of an Excel spreadsheet titled 'Mitsky Double Star List'. It contains a table with columns: Date, Time, Class, RA, Dec, Name, Other Name, and several columns for observation metrics (Mitsky, Star, Alt, Az, Mag, etc.). The spreadsheet lists numerous double stars, with summary rows at the bottom showing totals for different categories.

From the above spreadsheet image, you can see an equation for the number found in cell B3970. Almost all the numbers in the summary lines 3970 to 3977 are driven by counting whether there is a date value in column A and whether there is a Y in columns H to M. In this one spreadsheet, I can monitor the progress of the Mitsky Double Star List, the Astronomical League's Binocular, Advanced and Telescopic Double Star observing programs, the Multiple Star observing program, and the 500 best William Herschel double stars he monitored in the late 18-th century.

I added this Double Star Excel spreadsheet example to illustrate how an Excel spreadsheet might be used to record your observed objects instead of a program like ST4.

I am sure there are other alternatives to ST4 or an Excel spreadsheet to keep track of what you have observed. Whatever you chose, I think it is important to know what celestial objects you have observed over the years.

HB3 is a very large supernova remnant in constellation Cassiopeia - it is adjacent to and similar in size to the Heart Nebula.

Marty rendered it here in SHO.

This remnant has a lot of emission in SII, which he mapped to red.

OIII appears as a blue envelope at the edges of the remnant.

A small planetary nebula is visible slightly above and left of center.



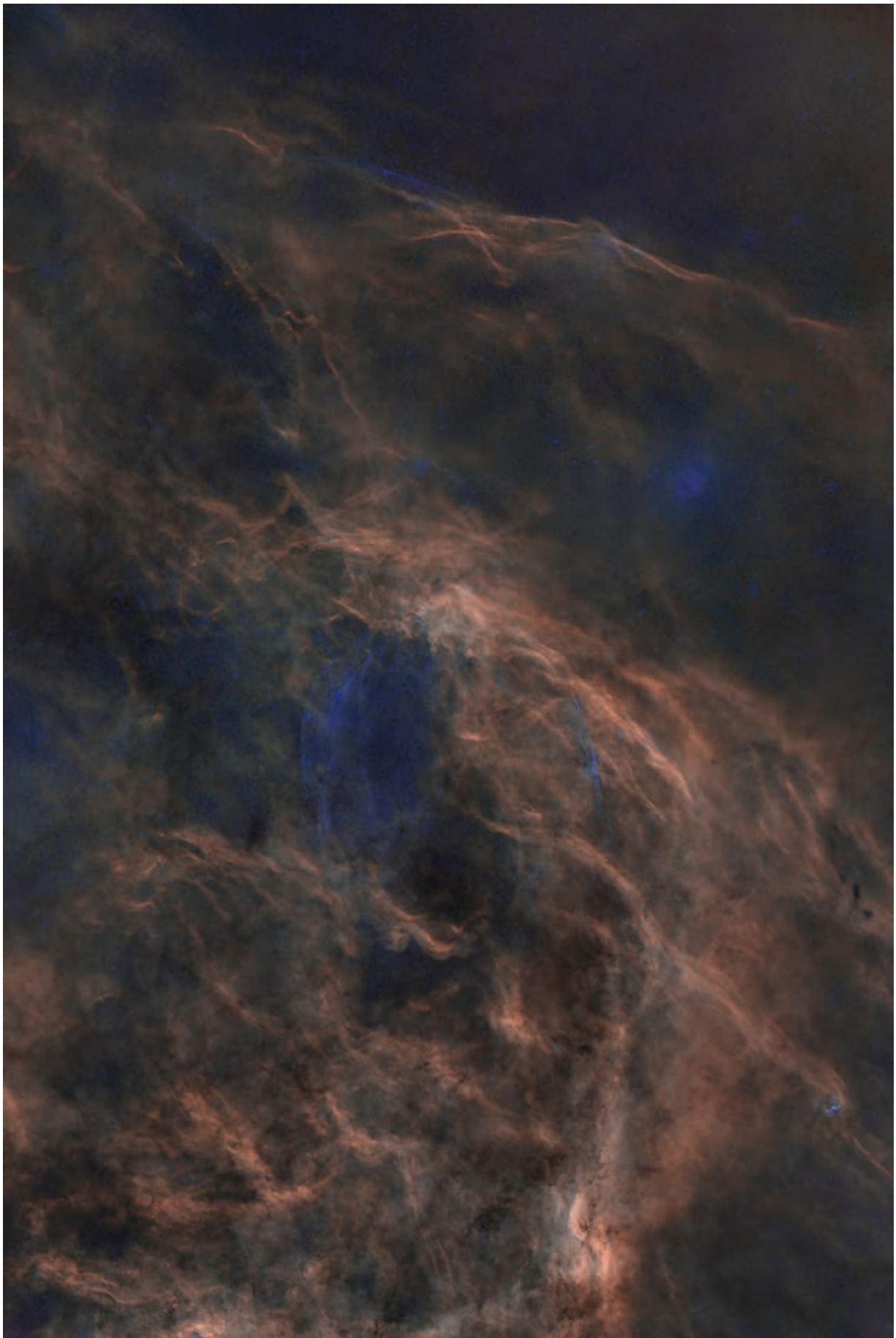
HB3 by Martin Butley on Dec 8





Heart Nebula by Clarke Yeager on Dec 1

Heart nebula is an emission nebula located 7500 light years away from Earth. This was shot at Marty's place in Hygiene. The night was just about perfect -- the seeing was great, no moon, no clouds, and pretty stable temperatures so very little refocusing. 60 - 60 sec. each: Ha, OIII, SII total integration: 3 hours Non guided capture: 11-inch RASA f/2.2 615FL ASI 1600MM Pro Astro Physics 900GPO mount TheSkyX Processed in PixInsight/Photoshop



Cygnus by David Elmore on Dec 7

Interesting looking blue colored cloud around Cygnus. This 5.5° wide field is a 'close-up' showing the emission is the remnants of a Super Nova. Vixen VSD100 F/3.8 refractor, ASI 2400MC Pro camera, Antlia Ha/OIII and Antlia SII/Hb dual narrow band filters.



SH 2-136 by David Elmore on Dec 31

Sharpless objects are supposed to be red Hydrogen-alpha emitting objects so I chose to image in narrow band. But Sh2-136 is not an HII region but rather a reflection nebula. The molecular clouds and nebula, especially the gorgeous blue reflection of the Iris would have shown up better in RGB. Recorded 17/18 and 30/31 December 2023 from Cosmos Siding, my observatory at Dark Sky New Mexico. Vixen VSD100 F/3.8 Apochromat, ASI 2400MC Pro camera, Antlia Ha/OIII and SII/Hb dual band filters. 17xHaOIII, 13xSIIHb each 10 minutes for a total of 5 hours exposure time. Processed in PixInsight utilizing blurXTerminator and noiseXTerminator processes.



IC434, Horsehead Nebula by Gary Garzone on Dec 19



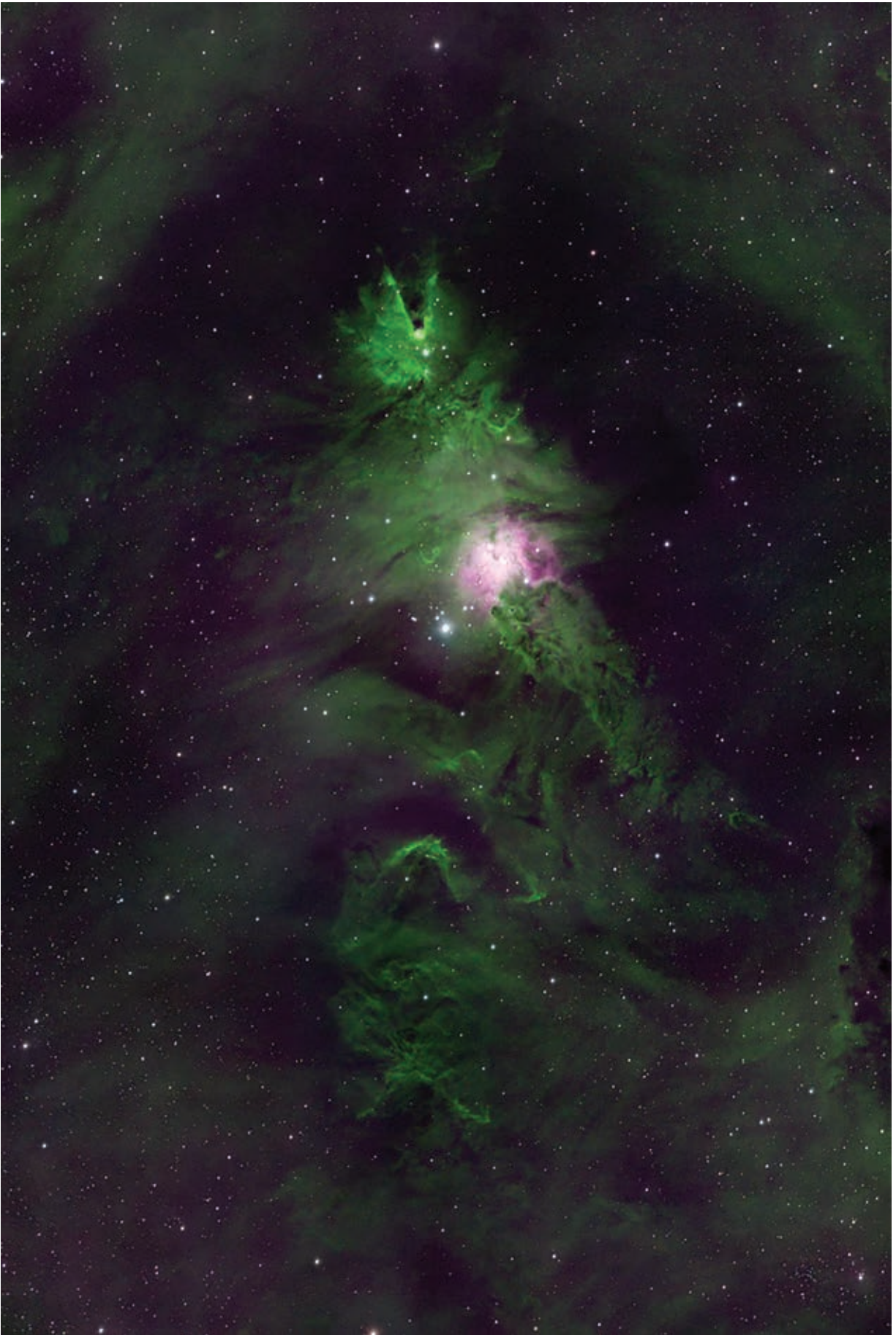
Veil Nebula by Gary Garzone on Dec 22



NGC 1499 California Nebula by Jim Pollock on Dec 7, C14Edge f2-6200mc-LExt-G100-18x 300s



IC 434 Horsehead Nebula by Jim Pollock on Dec 18 C14Edge f2-6200mc-LExt-G100-44x 300s

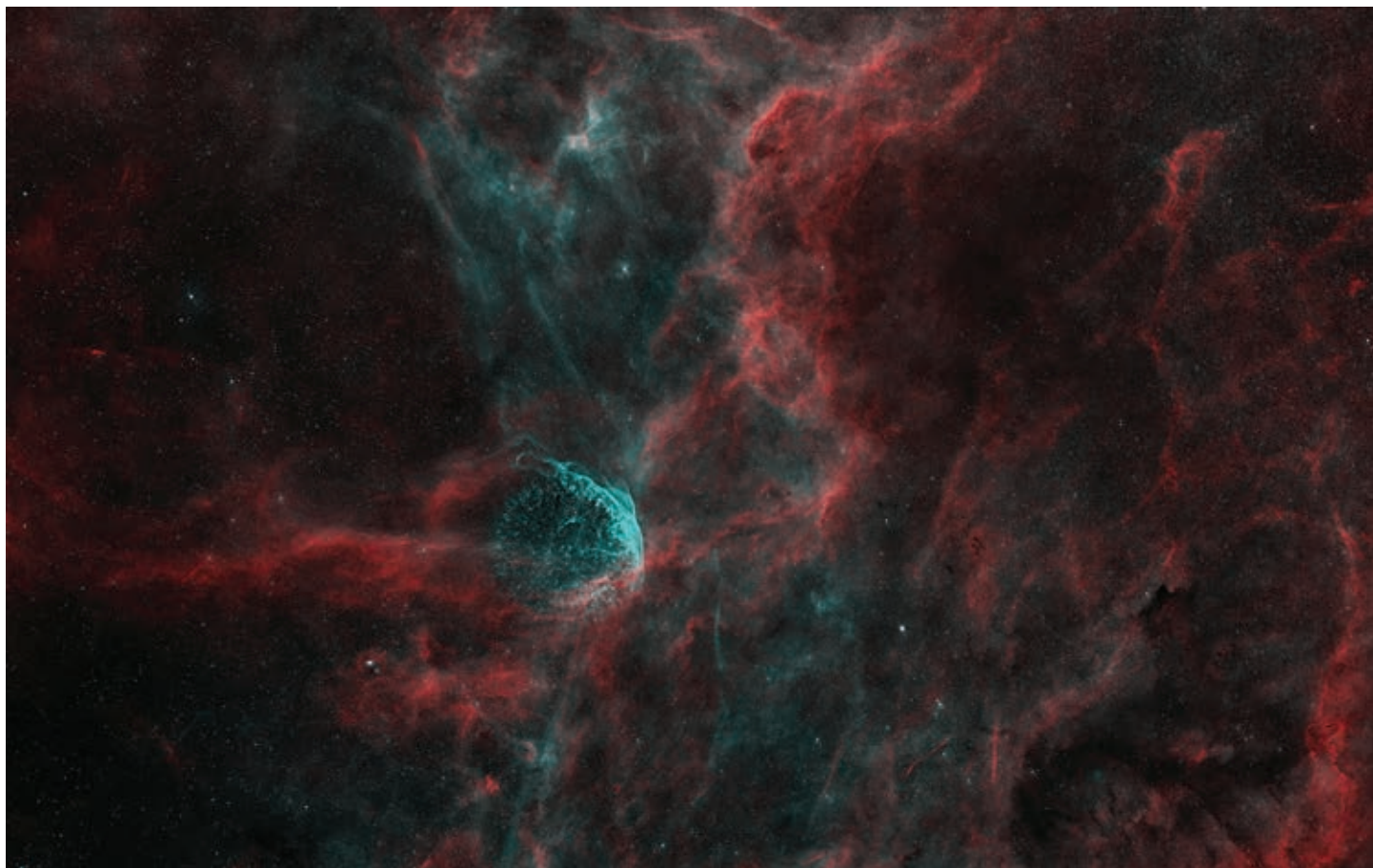


NGC 2264, Christmas Tree Cluster by Jim Pollock on Dec 36 C11Edge f2-2600mc-LExt-G100-83x 300s



M76, Little Dumbbell by MJ Post on Dec 14

Here's a close-up view from New Mexico of a planetary nebula that Pierre Mechain discovered in 1780, and that Messier included on his list of non-comets as entry #76. It lies in Perseus, about 2800 l.y. away. It was not recognized as a planetary nebula until 1918. Now we know that a binary star system at its core is what caused its bipolar shape. The progenitor "stars" - a neutron star and a white dwarf - are now quite dead but glow as white-hot embers, bathing their expelled gases with strong UV radiation. M76 was originally cataloged in the New General Catalog as two separate reflection nebulae, NGC 650 and 651. 2.5 hours exposure on ASI 6200MC camera, CDK14 scope. FOV is about 21 x 14 arc minutes.



WR134 in HSOOS1 by MJ Post on Dec 16



Comet 12P/Pons-Brooks by Paul Robinson on Dec 7



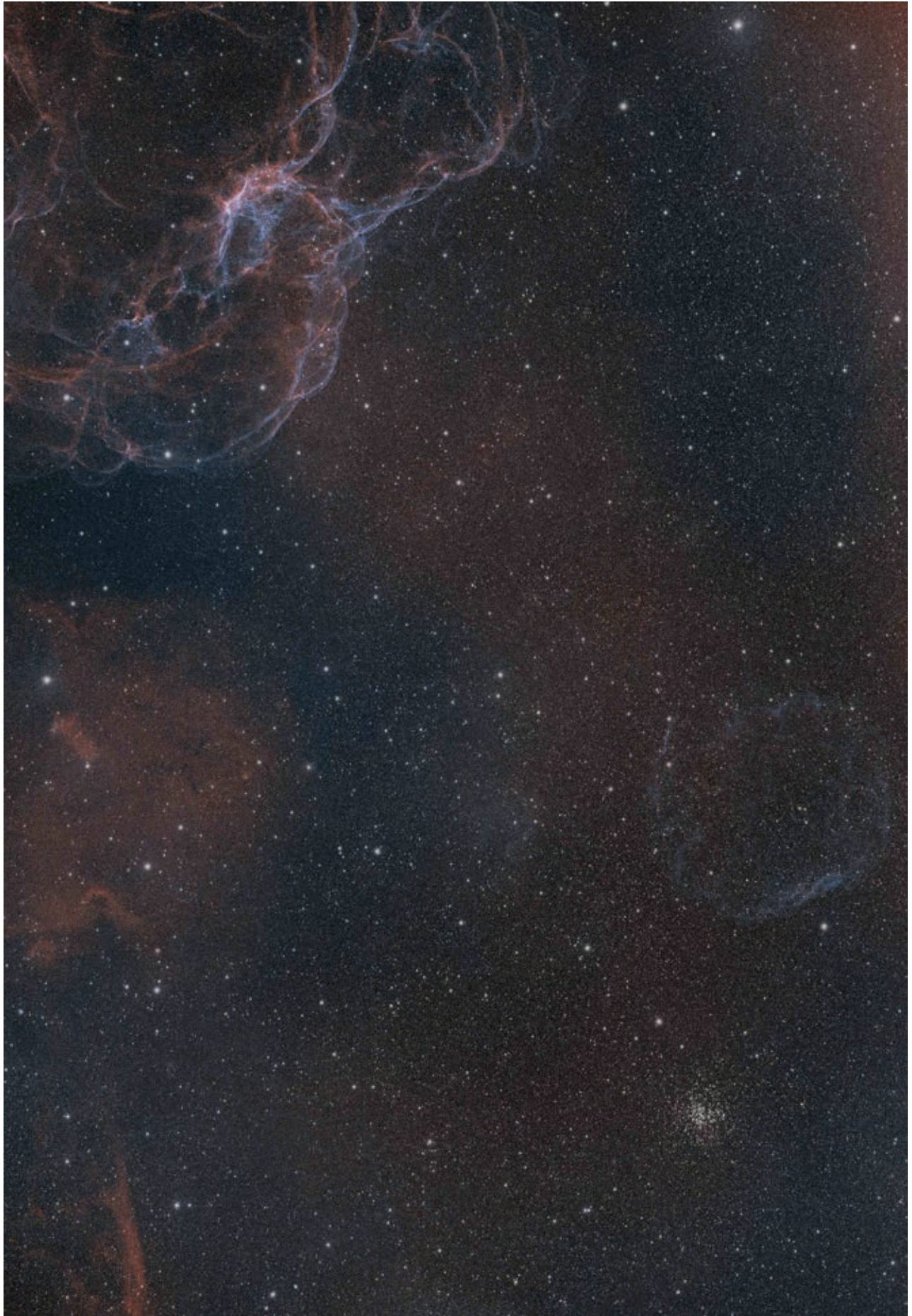
M45 by Rolando Garcia on Dec 8
80 minutes total exposure (2 min x 40 at ISO 200). Color by SPCC in PixInsight



SH 2-170, Little Rosette Nebula by Rolando Garcia on Dec 5



NGC 7635 by Rolando Garcia on Dec 28



SNR.179.0+2.6. in HOO by Stephen Garretson on Dec 19

Re: image on previous page (28): The target supernova remnant [SNR] is the very faint bluish circle just above of M 37 in the lower right; The prominent feature in the upper left is part of Sh2-240, the Spaghetti Nebula.

- [138] guided 600s OIII subs
- [72] guided 600s Ha subs
- total integration: 35 hours

Capture:

- ZWO EFW
- Chroma 3nm Ha filter
- Chroma 3nm OIII filter
- ADM Aimer

Guiding:

- William Optics UniGuide 34x130 Guide Scope [for last session switched over to William Optics 50x200 Guide Scope]
- ASI 290M Mini
- Paramount MX+

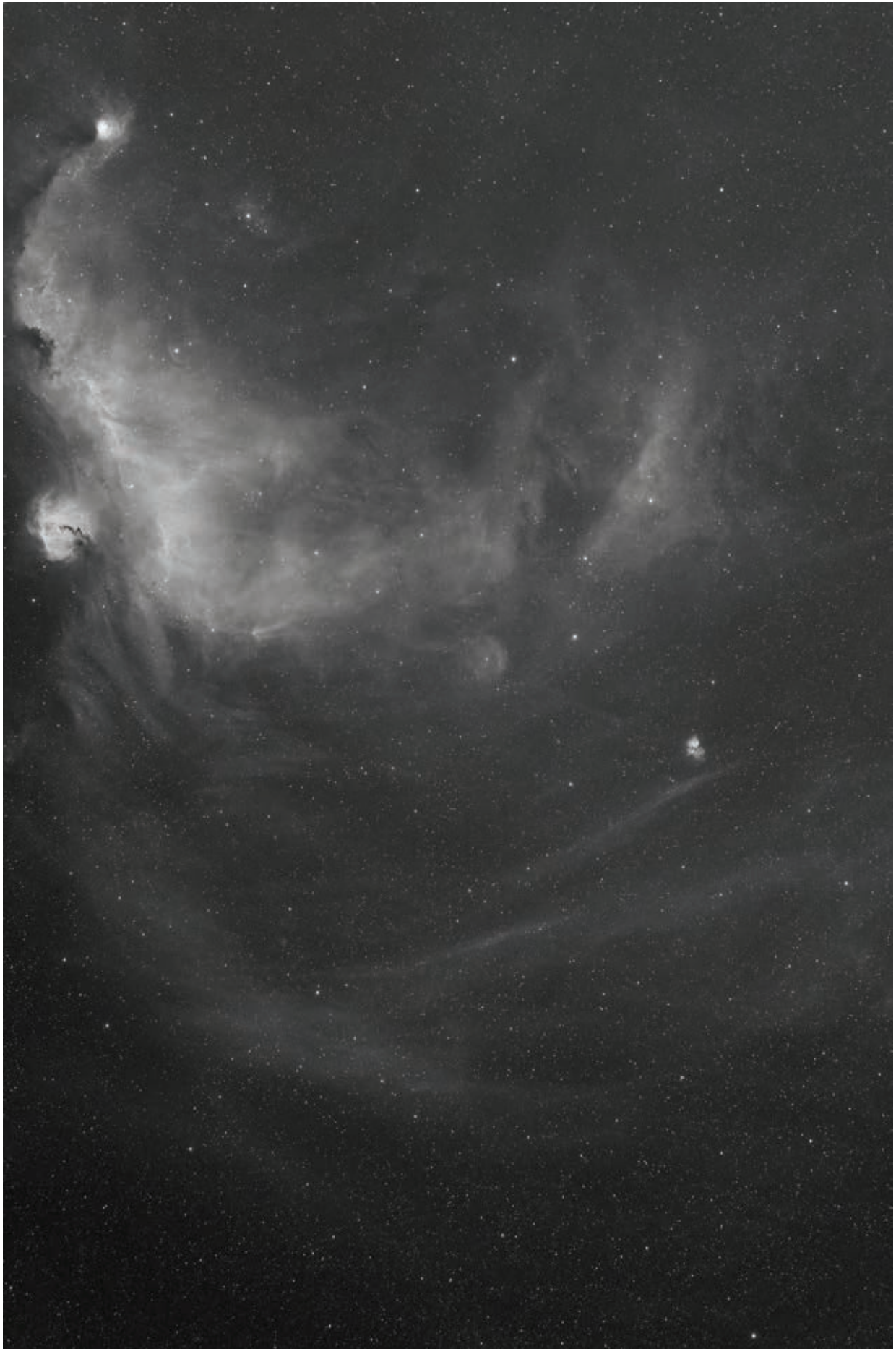
From the Beevo Dome

TheSkyX, SGP, PHD2



The huge amount of data gathered is made possible by using the Borg 55FL Triplets shown above. For this image each of the three imaging setups is composed of:

- Borg 55FL f/3.6, 6 element Petzval Astrograph
- ASI 2600MM Pro
- Gerd Neumann Camera Tilt Adjuster
- ZWO EAF



IC 2177 in H-Alpha by Stephen Garretson on Dec 15



Witch Head Nebula by Tally O'Donnell on Dec 9

This is an RGB image of IC 2118 the Witch Head Nebula and is one hour each of Red, Green, and Blue. The artifact in the lower left corner is from Rigel which is just out of the frame

LONGMONT ASTRONOMICAL SOCIETY
PO Box 806, LONGMONT, CO
[HTTPS://WWW.LONGMONTASTRO.ORG](https://www.longmontastro.org)

LBN 777, BABY EAGLE
BY M. J. POST

