# Longmont Astronomical Society

December 2022

"Soul Nebula"
by Martin Butley

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ISSN 2641-8908 (print)

## There is no Meeting in December

There is no LAS meeting this month but there will be two astrophotography tutorials.

## Upcoming Astrophotography Tutorials

**December 6 at 7 pm - One Shot Color (OSC) processing in PixInsight by M. J. Post**

MJ will present a session on how to handle data from an OSC camera in PixInsight. The tutorial will last approximately 20 minutes. Participants are asked to hold your questions until the end; keep a pad of paper handy and jot down your questions. Following his presentation MJ will entertain questions generally in the order in which the information was presented; i.e., image calibration will be discussed before post-processing, so questions about calibration should be posed earlier.

**December 15 at 8 to 9 pm - Planetary Imaging by Vern Raben**

Vern will present a live session on how to capture and process planetary data (weather permitting). You'll be able to see in real time the techniques Vern uses to gather data and process planetary images.


The LAS 2023 calendars have arrived and are now available for sale. You may purchase the calendars for $10.00 each on the LAS Store, https://www.longmontastro.org/Store and it will be sent to you by USPS mail. If you don't mind paying with cash or check they are $7.50 each and you will have to come to Erie to pick them up. Contact vern@raben.com to arrange a date/time.

## 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 Sarah Detty. 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.

  

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**LAS Officers and Board Members in 2022**

- Stephen Garretson, President
- M. J. Post, Vice President
- Vern Raben, Secretary
- Bruce Lamoreaux, Treasurer

Board Members:
David Elmore, Gary Garzone, Mike Hotka, Brian Kimball, and Tally O'Donnell

**Appointed Positions 2022**

Sarah Detty, Webmaster; Bruce Lamoreaux, Library Telescope Coordinator; Vern Raben, Newsletter Editor

## The Planets in December

**Mercury**

Mercury appears about mid month very low in the southwest after sunset; the apparent brightens is magnitude -0.6 and the disc is 5.5 arc sec across. By the end of the month it increases to 8.2 arc sec across but dims to 0.3 magnitude.

**Venus**

Venus becomes visible around the 15th in the southwest after sunset below Mercury. It will be -3.9 magnitude in apparent brightness and 10 arc sec across.

**Mars**

Mars is visible in the constellation Taurus. On the 1st it will at its largest apparent diameter of 17 arc sec this year. It is at opposition (directly opposite the Sun as seen from Earth) on Dec. 7 at 11:30 pm. It will then be -1.9 magnitude in brightness. By the end of the month it will have decreased to 14 arc sec and dimmed to -1.2 magnitude.

**Jupiter**

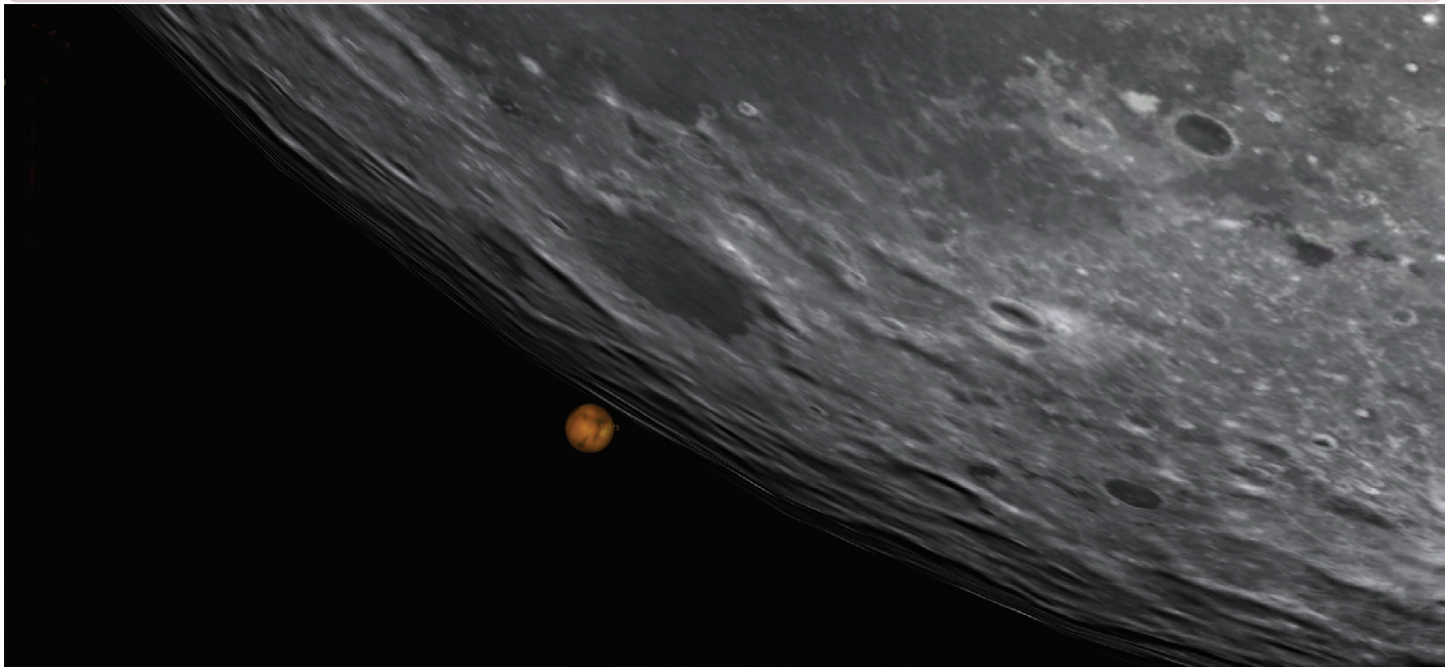
Jupiter is midway up in the sky in the South after sunset. Its apparent brightness decreases in magnitude from -2.6 to -2.4 and the disc decreases from 43 to 39 arc sec across this month. Good times to view the Great Red Spot (GRS) at mid transit this month are:

- Dec 1, 11:20 pm at 32° altitude
- Dec 2, 7:11 pm at 47° altitude
- Dec 4, 8:50 pm at 48° altitude
- Dec 5, 4:42 pm at 30° altitude
- Dec 6, 10:29 pm at 37° altitude
- Dec 7, 6:21 pm at 45° altitude
- Dec 9, 8:00 pm at 50° altitude
- Dec 11, 9:39 pm at 41° altitude
- Dec 12, 5:30 pm at 41° altitude
- Dec 13, 11:18 pm at 25° altitude
- Dec 14, 7:09 pm at 50° altitude
- Dec 16, 8:48 pm at 45° altitude
- Dec 17, 4:40 pm at 37° altitude
- Dec 18, 10:27 pm at 30° altitude
- Dec 19, 6:19 pm at 49° altitude
- Dec 21, 7:58 pm at 48° altitude
- Dec 23, 9:37 pm at 36° altitude
- Dec 24, 5:29 pm at 46° altitude
- Dec 26, 7:08 pm at 50° altitude
- Dec 28, 8:47 pm at 41° altitude
- Dec 30, 10:26 pm at 24° altitude
- Dec 31, 6:18 pm at 51° altitude

**Saturn**

Saturn is in constellation Capricornus which is getting lower in the southwest after sunset. It's magnitude is 0.8 in apparent brightness and the disc is 16 arc sec across.

## Mars Occultation



On Dec. 7 at approximately 7:44:45 pm the planet Mars will begin to disappear behind the east limb of the full Moon. It will completely disappear about 38 seconds later. At about 8:48 pm Mars will re-appear on the southwest limb; it should be completely visible about 43 seconds later.

**Uranus**

Uranus is in constellation Aries. It is magnitude +5.7 in brightness and its disc is 3.7 arc sec across.

**Neptune**

Neptune is in constellation Aquarius. It is magnitude 7.9 in brightness and its disc is 2.2 arc sec across.

## Lunar Phases in December

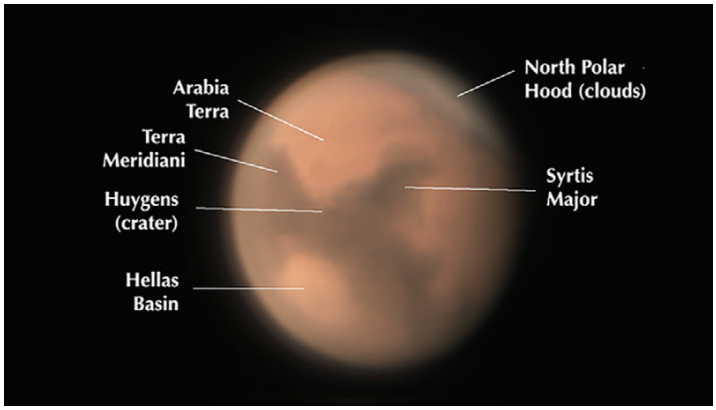
- Full moon: December 7 at 10:09 pm
- Third quarter: December 16 at 2:57 am
- New moon: December 23 at 4:18 am
- First quarter:  December 29at 7:22 pm

## Meteor Showers in December

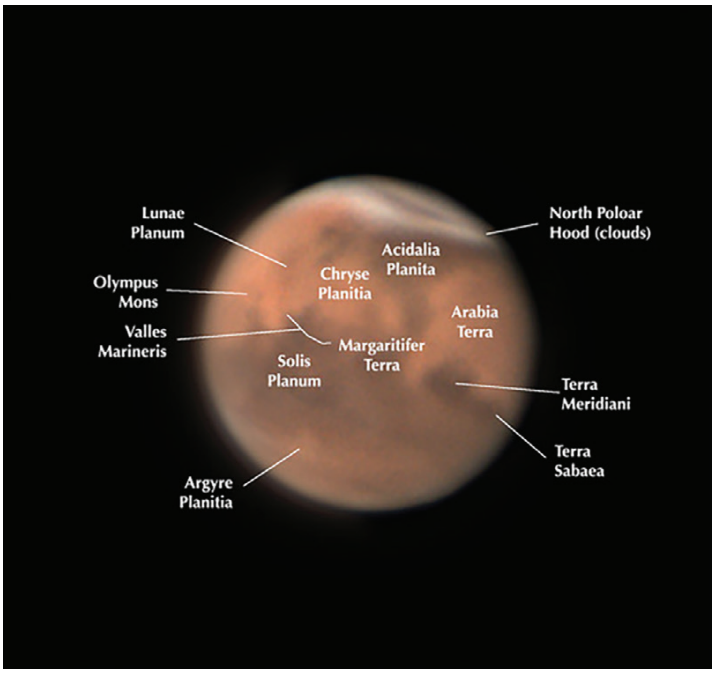
The Geminids meteor shower peaks in the evening of Dec. 13.  This is one of the best meteor showers of the year with peak rate up to 120 per hour.  Best time to view is from astronomical darkness at 6:13 pm until the Moon rises at 9:38 pm.  These meteors are debris from asteroid 3200 Phaethon. Radiant is at RA=07h 24m Decl = +32.3°.

Mars on Nov 21 by Vern Raben

Mars on Nov 1 by Vern Raben

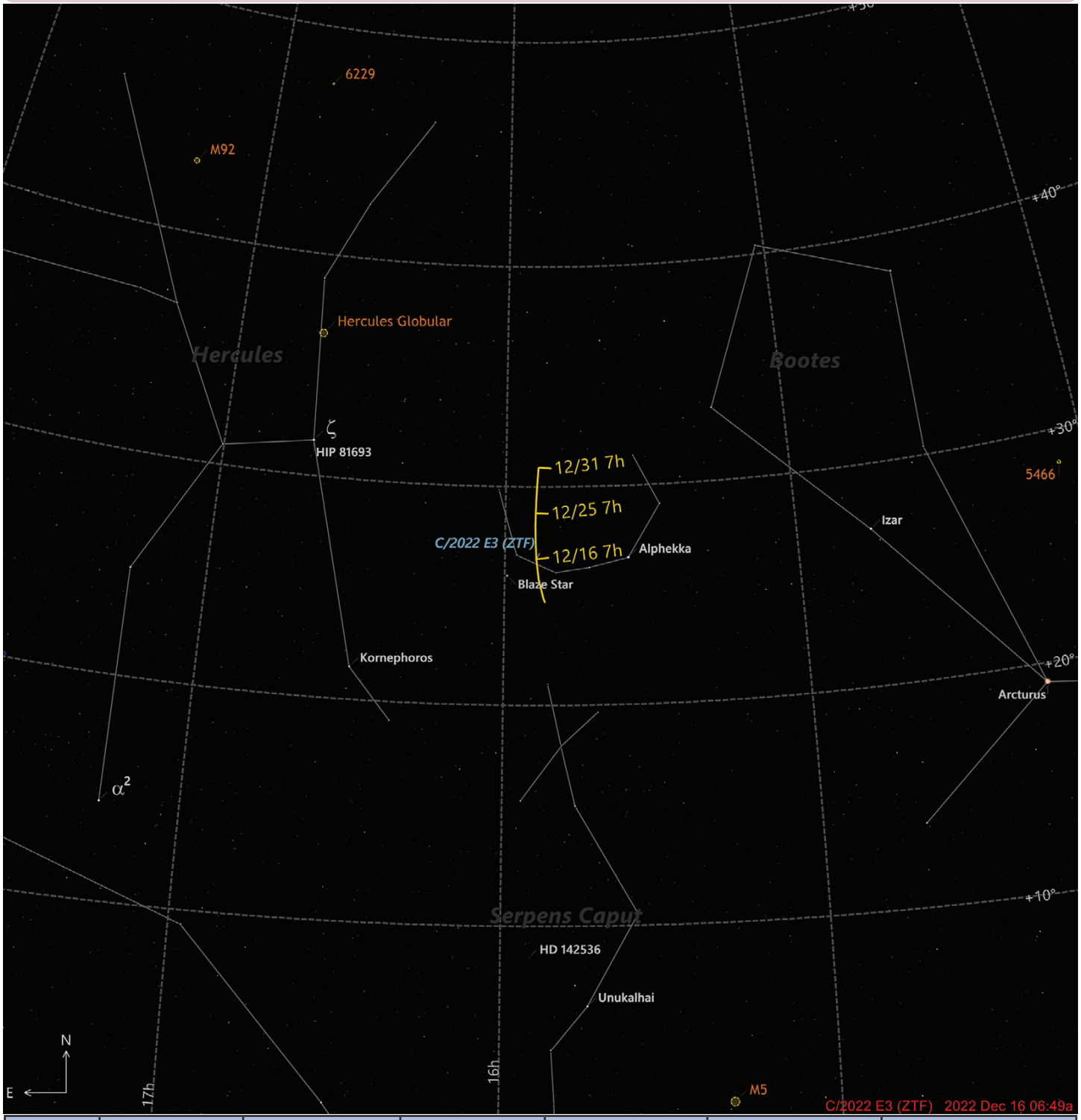



Mars on Nov 26 by Vern Raben



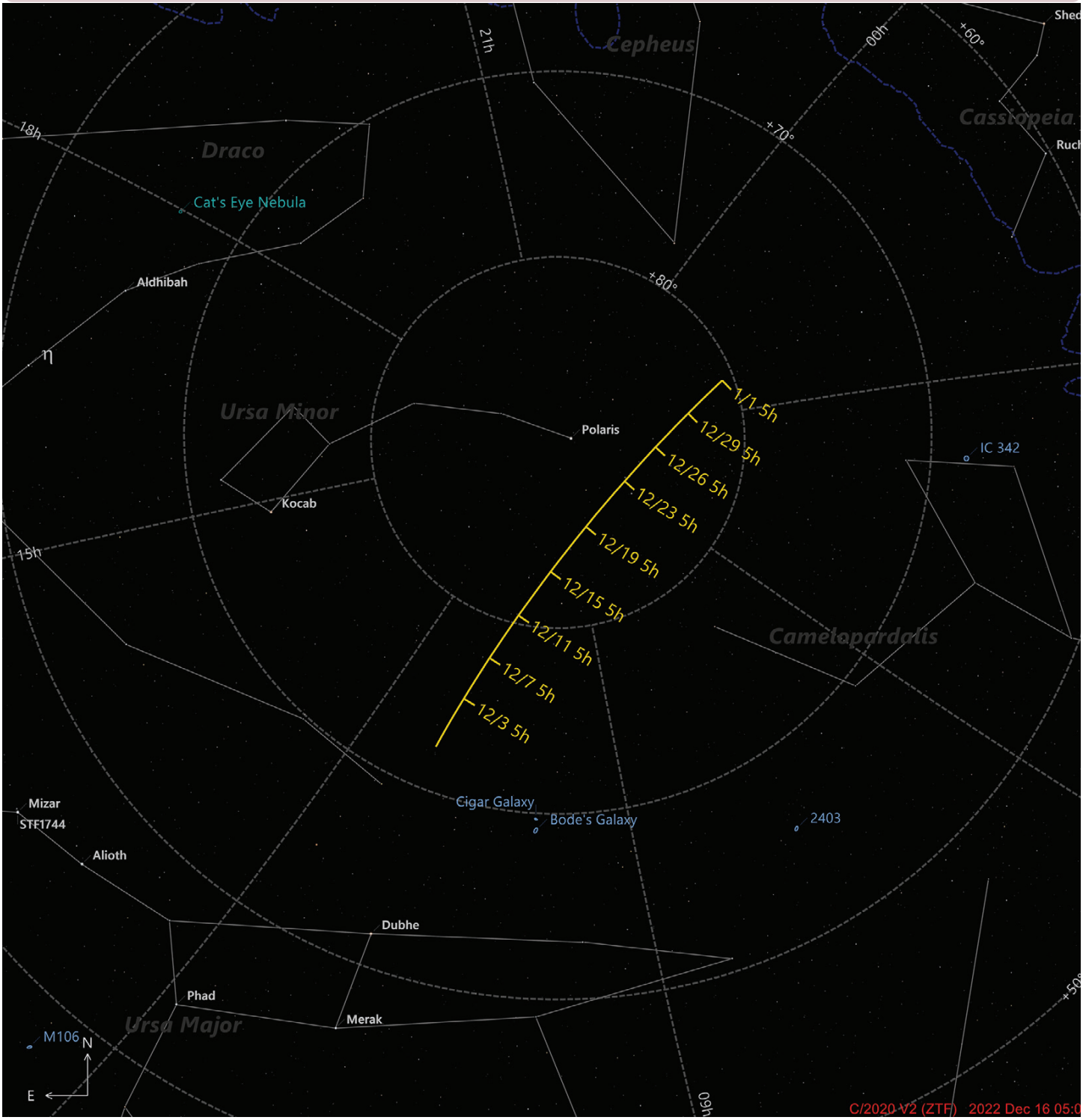
# Comet C/2022 E3 (ZTF)




| Date | Optimal time | RA | Dec | Constellation | Magnitude | Size (arc min) |
|---|---|---|---|---|---|---|
| Dec 1 | 6:41 am | 15h53m10.8s | +24°53'24" | Serpens | 8.7 | 1.2 |
| Dec 6 | 6:46 am | 15h53m43.9s | +25°20'51" | Serpens | 8.4 | 1.3 |
| Dec 13 | 6:48 am | 15h54m21.1s | +26°16'38" | Corona Borealis | 8.0 | 1.4 |
| Dec 19 | 6:50 am | 15h54m39.6s | +27°39'01" | Corona Borealis | 7.5 | 1.5 |
| Dec 25 | 6:52 am | 15h54m36.5s | +28°42'19" | Corona Borealis | 7.3 | 1.7 |
| Dec 31 | 6:53 am | 15h53m51.2s | +31°14'34" | Corona Borealis | 6.8 | 2.0 |

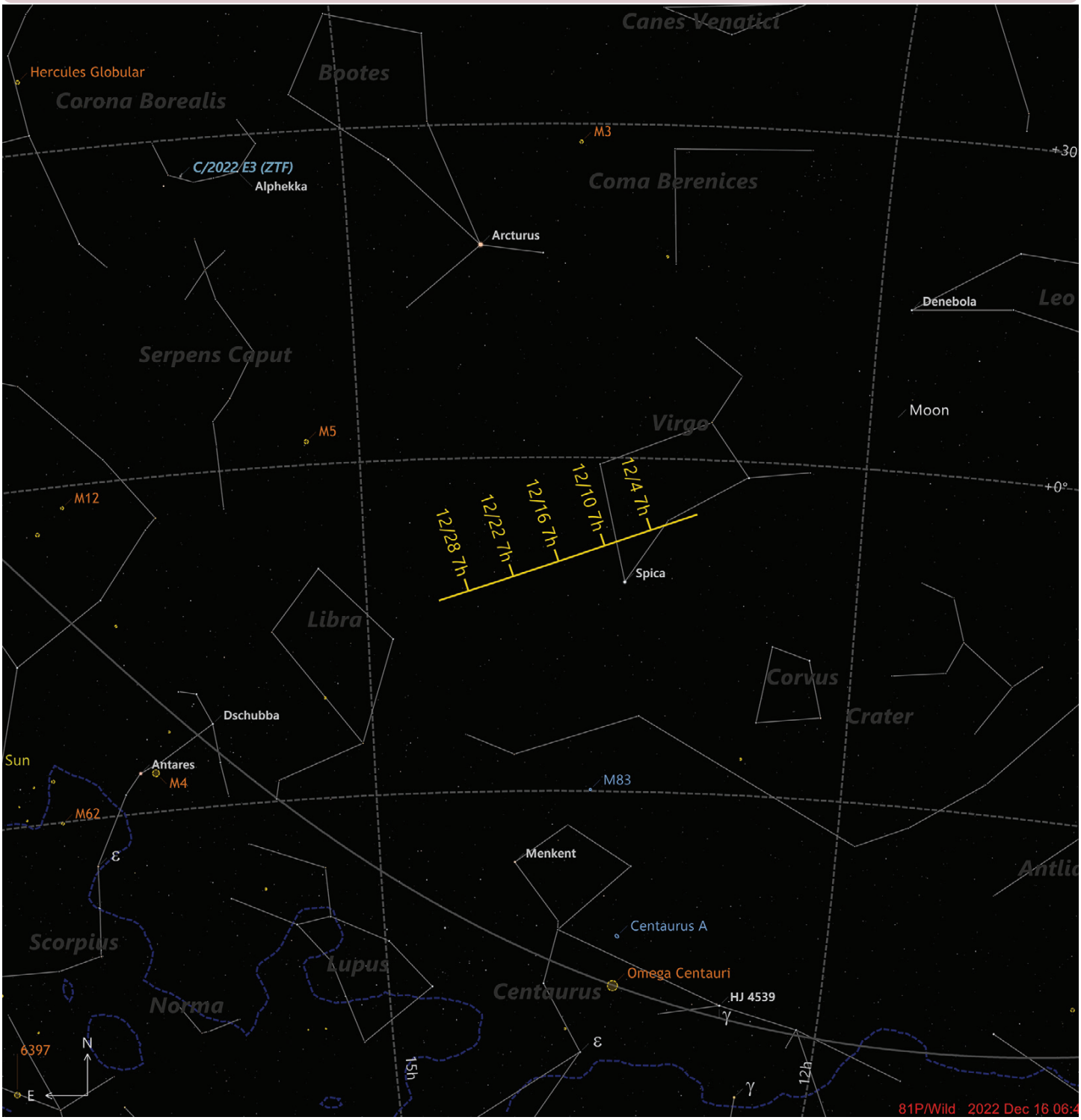
# Comet C/2020 V2 (ZTF)




| Date | Optimal time | RA | Dec | Constellation | Magnitude | Size (arc min) |
|---|---|---|---|---|---|---|
| Dec 1 | 6:32 am | 11h06m36.0s | +74°36'16" | Draco | 10.5 | 2.0 |
| Dec 6 | 6:40 am | 10h54m45.0s | +77°44'44" | Draco | 10.4 | 2.1 |
| Dec 13 | 6:02 am | 10h10m26.6s | +82°18'56" | Camelopardalis | 10.2 | 2.2 |
| Dec 19 | 3:06 am | 08h03m22.2s | +85°30'00" | Cepheus | 10.1 | 2.2 |
| Dec 25 | 10:54 pm | 04h06m03.1s | +84°57'34" | Cepheus | 10.0 | 2.3 |
| Dec 31 | 8:22 pm | 02h22m51.5s | +81°00'24" | Cepheus | 9.9 | 2.3 |

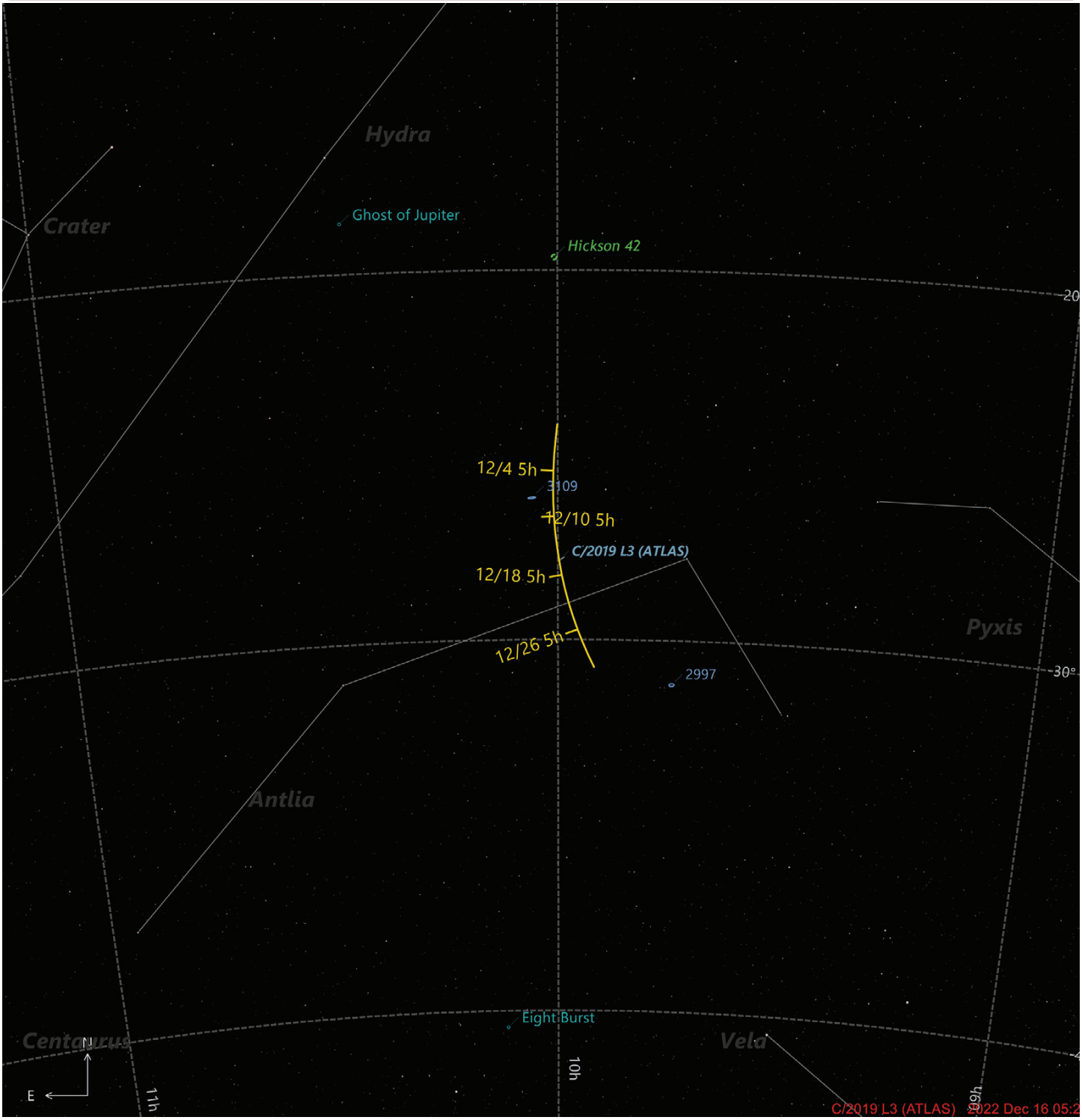
# Comet 81P/Wild




| Date | Optimal time | RA | Dec | Constellation | Magnitude | Size (arc min) |
|---|---|---|---|---|---|---|
| Dec 1 | 6:31 am | 13h11m43.7s | -06°03'47" | Virgo | 11.4 | 1.3 |
| Dec 6 | 6:39 am | 13h25m36.6s | -07°18'51" | Virgo | 11.4 | 1.3 |
| Dec 13 | 6:40 am | 13h45m02.4s | -08°59'41" | Virgo | 11.3 | 1.3 |
| Dec 19 | 6:43 am | 14h01m40.5s | -10°21'31" | Virgo | 11.3 | 1.3` |
| Dec 25 | 6:46 am | 14h18m14.6s | -11°38'24" | Virgo | 11.3 | 1.3 |
| Dec 31 | 6:47 am | 14h34m41.4s | -12°49'43" | Libra | 11.3 | 1.4 |

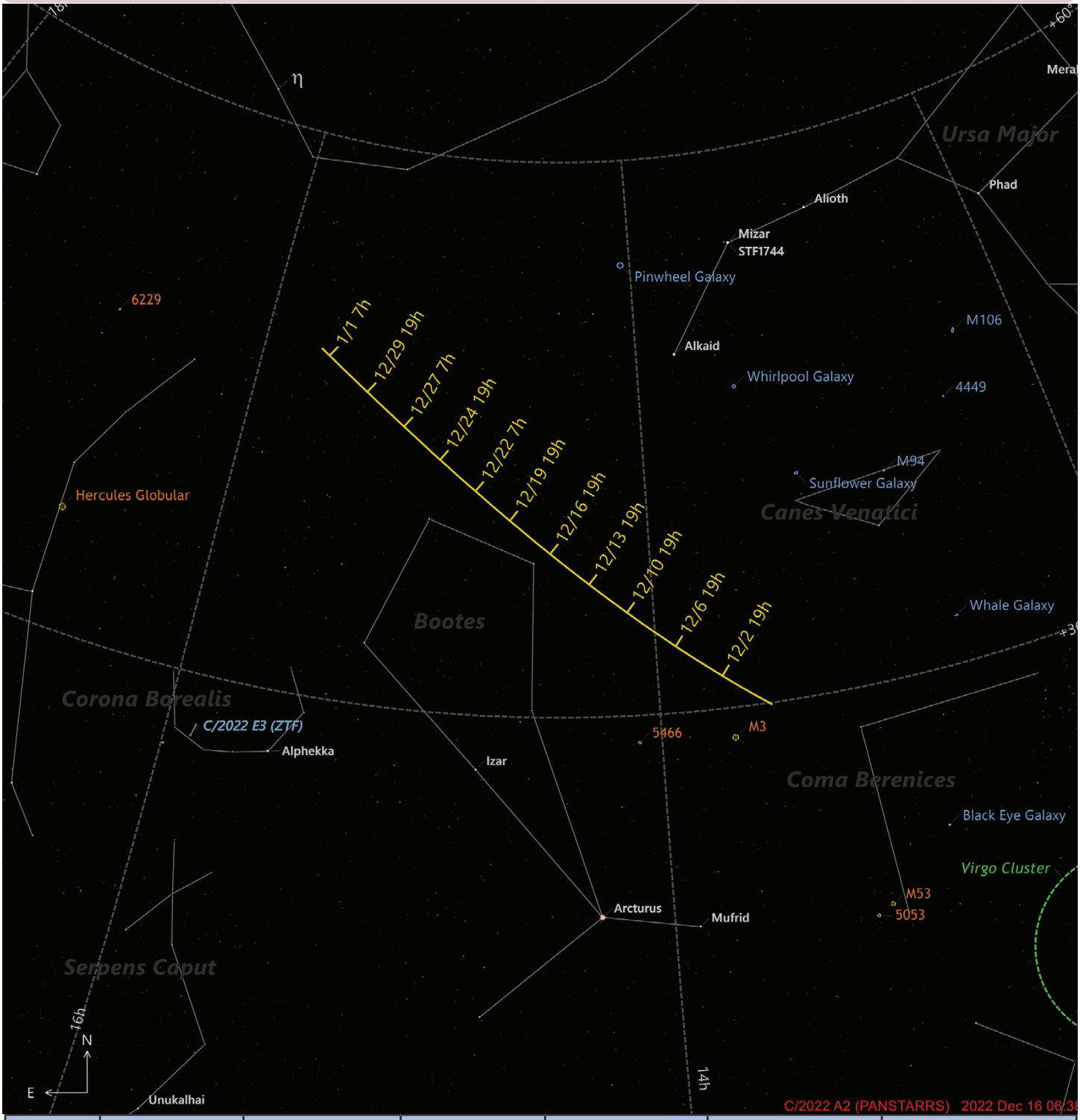
# Comet C/2019 L3 (ATLAS)




| Date | Optimal time | RA | Dec | Constellation | Magnitude | Size (arc min) |
|---|---|---|---|---|---|---|
| Dec 1 | 6:17 am | 10h01m27.7s | -25°06'58" | Hydra | 11.3 | 1.5 |
| Dec 6 | 6:03 am | 10h01m35.0s | -26°21'57" | Hydra | 11.3 | 1.5 |
| Dec 13 | 5:29 am | 10h01m09.3s | -27°34'23" | Antlia | 11.4 | 1.5 |
| Dec 19 | 5:04 am | 10h00m09.5s | -28°43'56" | Antlia | 11.4 | 1.5 |
| Dec 25 | 4:39 am | 09h58m35.5s | -29°49'49" | Antlia | 11.4 | 1.6 |
| Dec 31 | 4:13 am | 09h56m28.1s | -30°51'19" | Antlia | 11.4 | 1.6 |

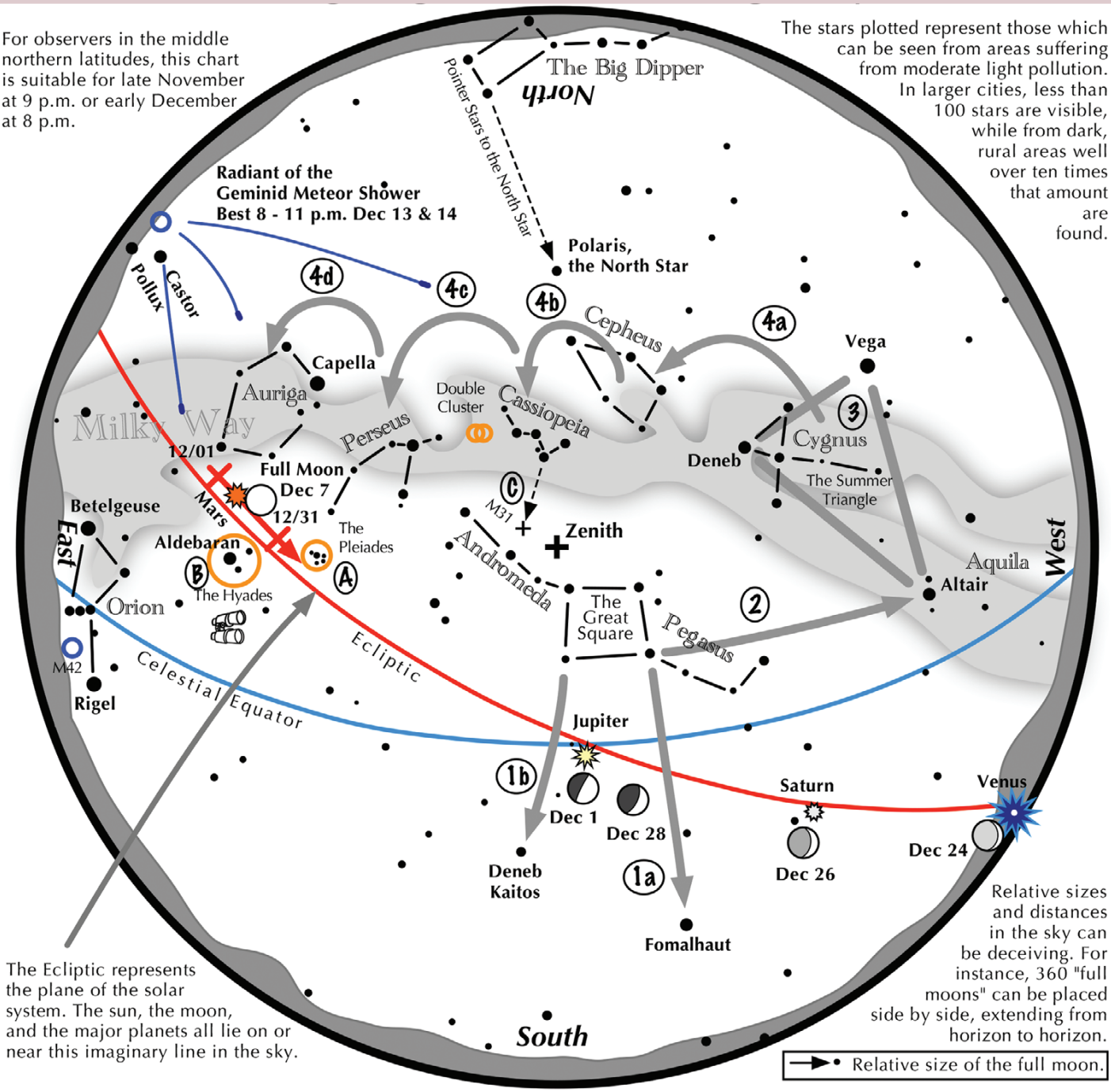
 

# Comet C/2022 A2 (PANSTARRS)




| Date | Optimal time | RA | Dec | Constellation | Magnitude | Size (arc min) |
|---|---|---|---|---|---|---|
| Dec 1 | 6:28 am | 13h43m22.8s | +31°25'38" | Canes Venatici | 11.7 | 2.2 |
| Dec 6 | 6:39 am | 13h57m18.3s | +33°43'29" | Canes Venatici | 11.5 | 2.3 |
| Dec 13 | 6:37 am | 14h19m33.9s | +37°20'19" | Bootes | 11.2 | 2.5 |
| Dec 19 | 6:40 am | 14h41m59.3s | +40°47'13" | Bootes | 10.9 | 2.6 |
| Dec 25 | 6:43 am | 15h08m24.0s | +44°28'39" | Bootes | 10.7 | 2.7 |
| Dec 31 | 6:45 am | 15h39m48.7s | +48°15'15" | Bootes | 10.5 | 2.9 |

# Navigating the December Night Sky by John Goss




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

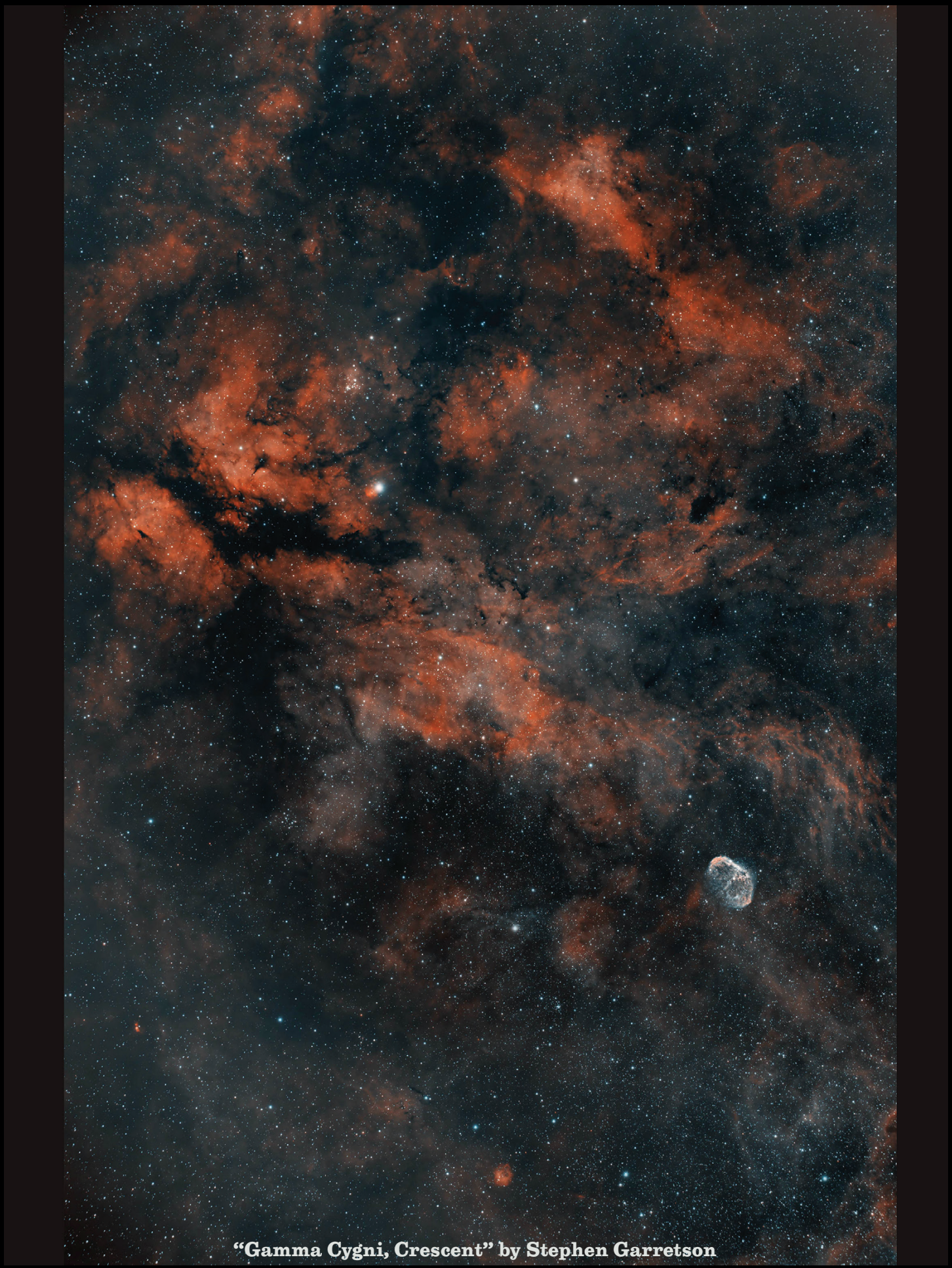
1. Face south. Almost overhead is the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend an imaginary line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the southwest. A line extending southward from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

**Binocular Highlights**

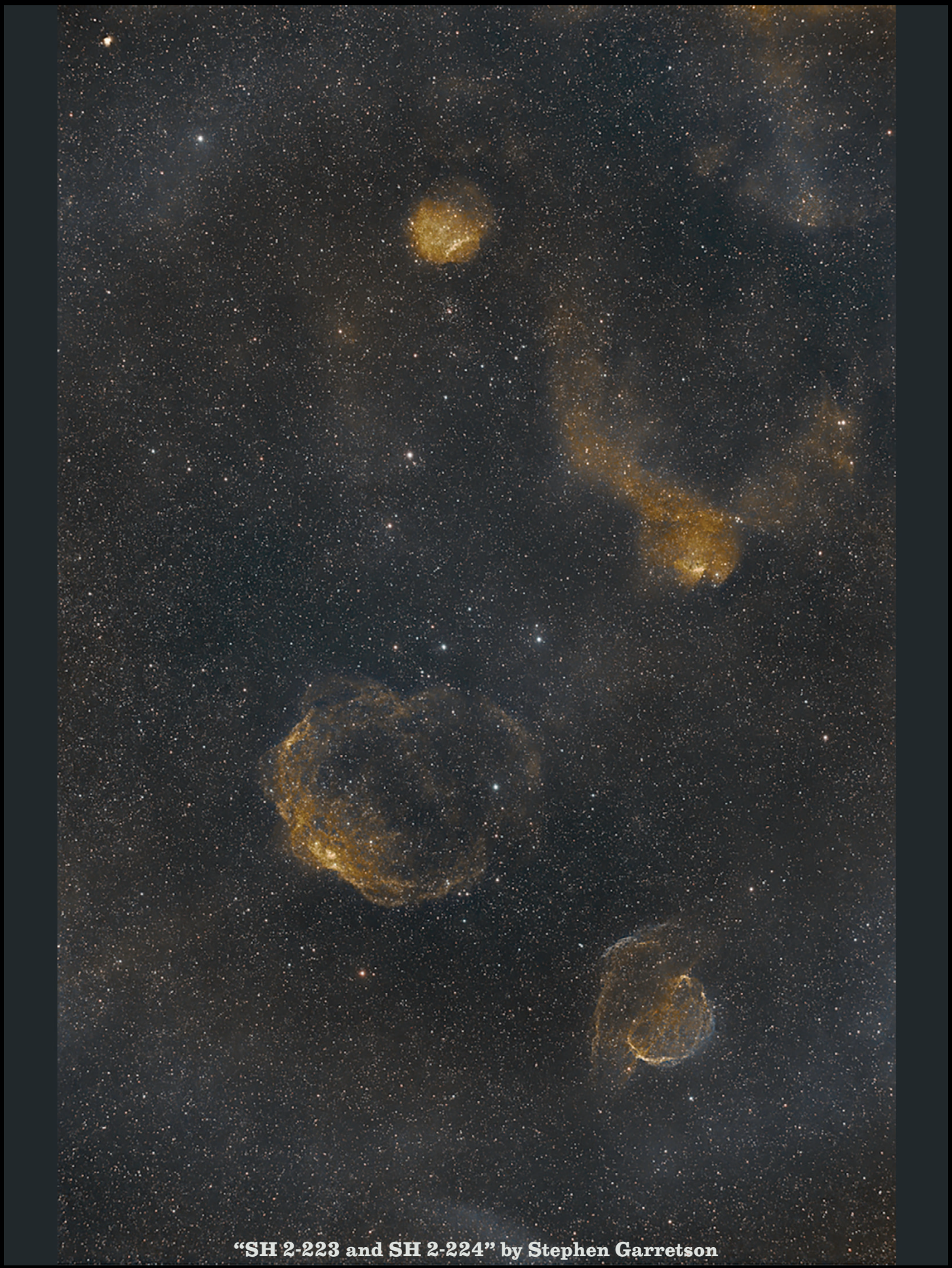
**A and B:** Examine the stars of the Pleiades and Hyades, two naked eye star clusters.
**C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.
**D:** Sweep along the Milky Way from Altair, past Deneb, through Cepheus, Cassiopeia and Perseus, then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

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



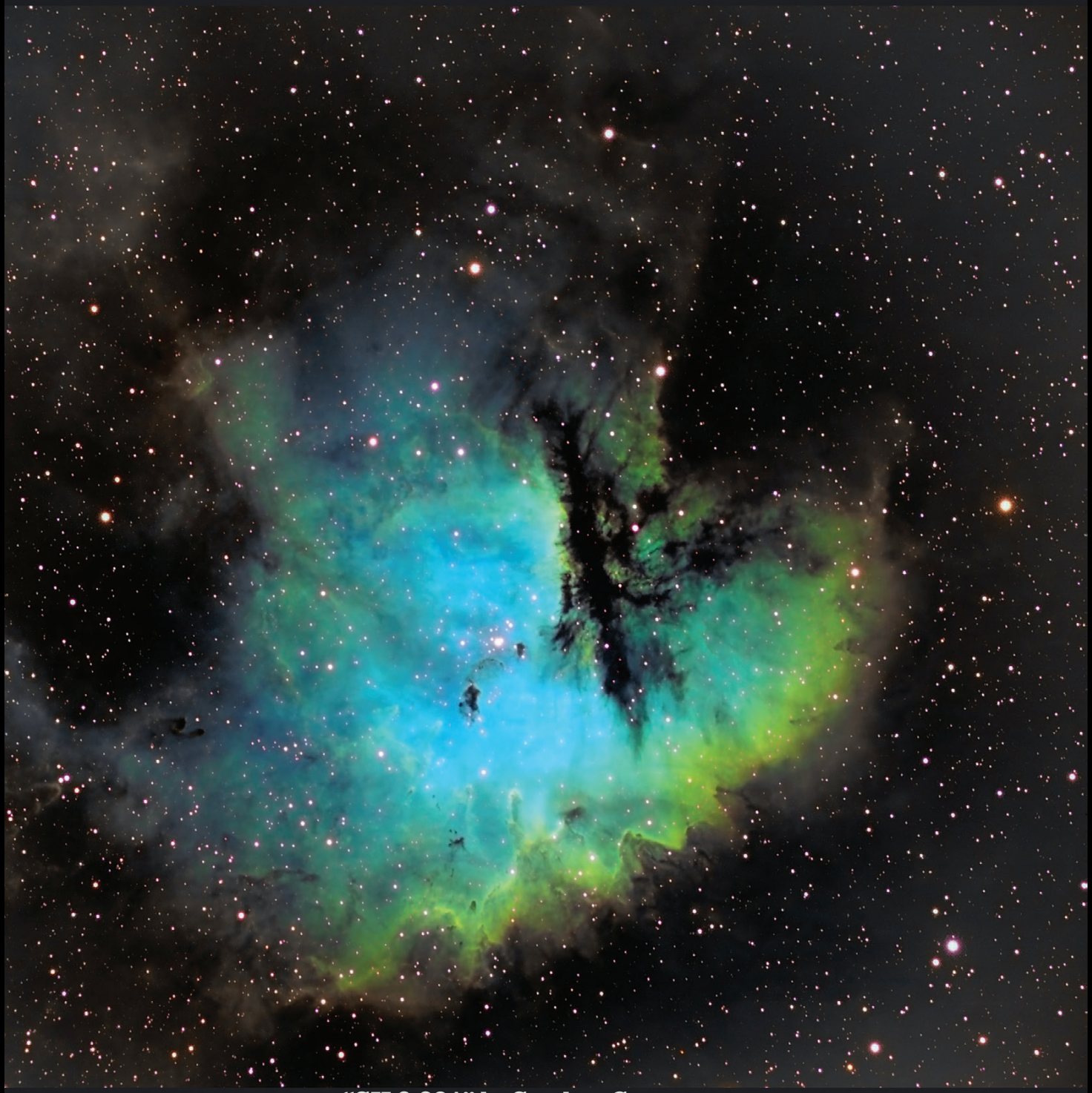
**“Gamma Cygni, Crescent” by Stephen Garretson**



**“SH 2-223 and SH 2-224” by Stephen Garretson**

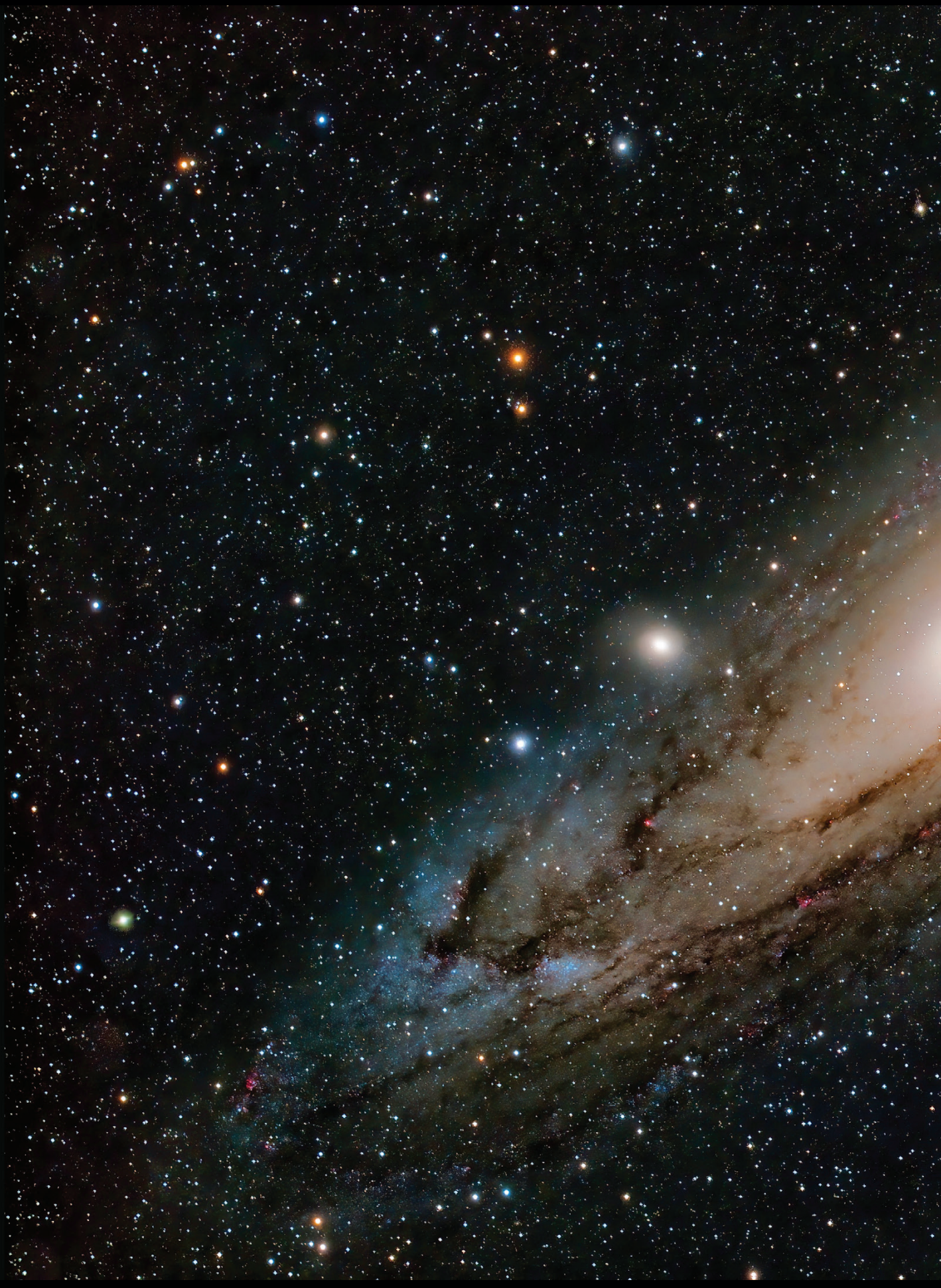
 

**“Propeller Nebula” by Stephen Garretson**



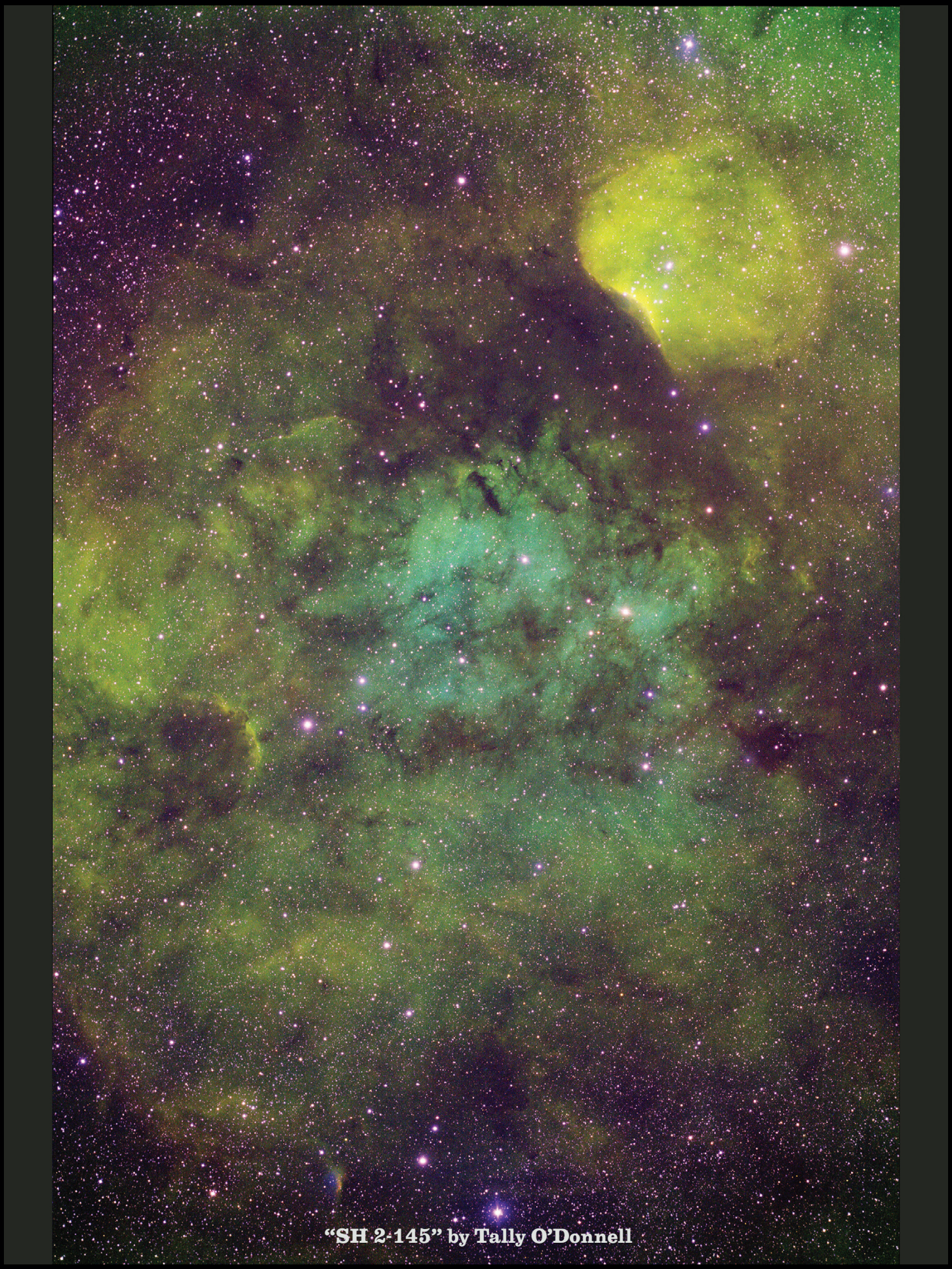
**“SH 2-281” by Stephen Garretson**



**“M31, Andromeda Galaxy” by Rolando Garcia**

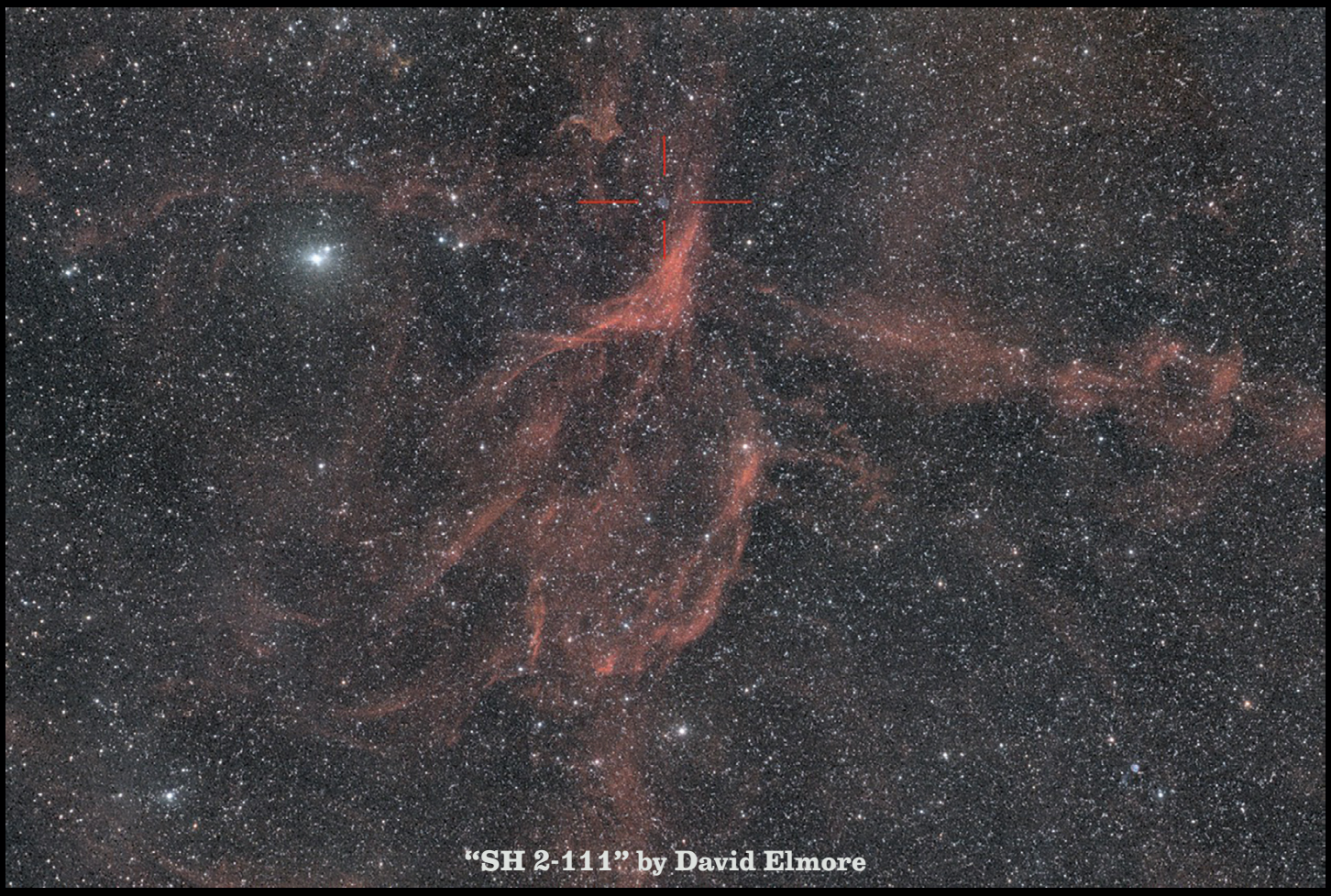


**“SH 2-145” by Tally O’Donnell**

**“M81” by Eddie Hunnell**

**“SH 2-223, 2-224, & 2-225” by David Elmore**



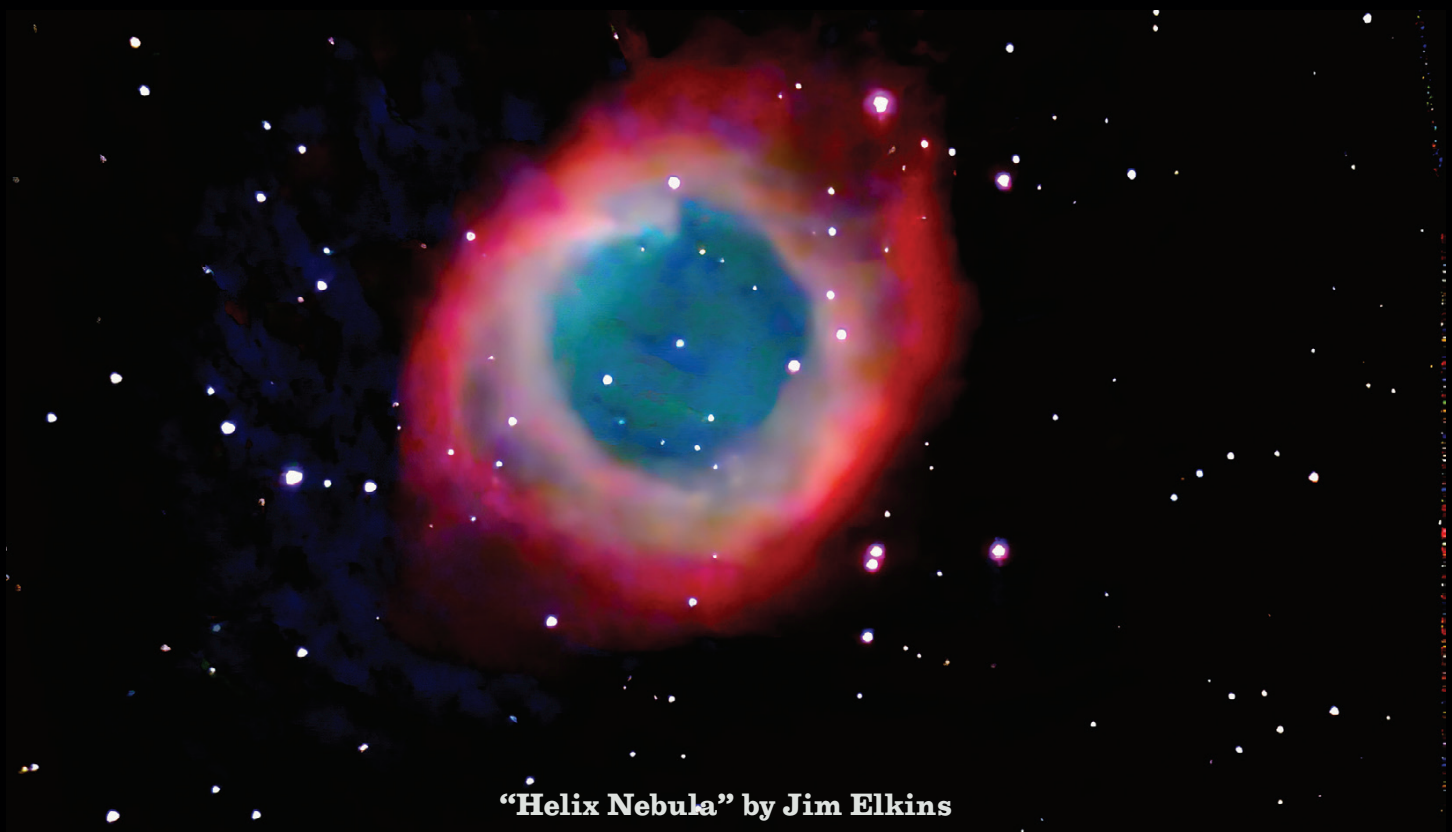
**"SH 2-111" by David Elmore**

**"Planetary Nebula El-1" by David Elmore**

In the image of SH 2-111 above is a small teal colored circular object. David sent the OIII image to planetary-nebulae.net. The object is a new previously unidentified object that will be registered as Planetary Nebula El-1. This is the second new planetary nebulae in the Milky Way revealed by David's 4-inch aperture telescope! He and a colleague, Dana Paechick, discovered another planetary nebula, PaEl-1, in one of David's images.

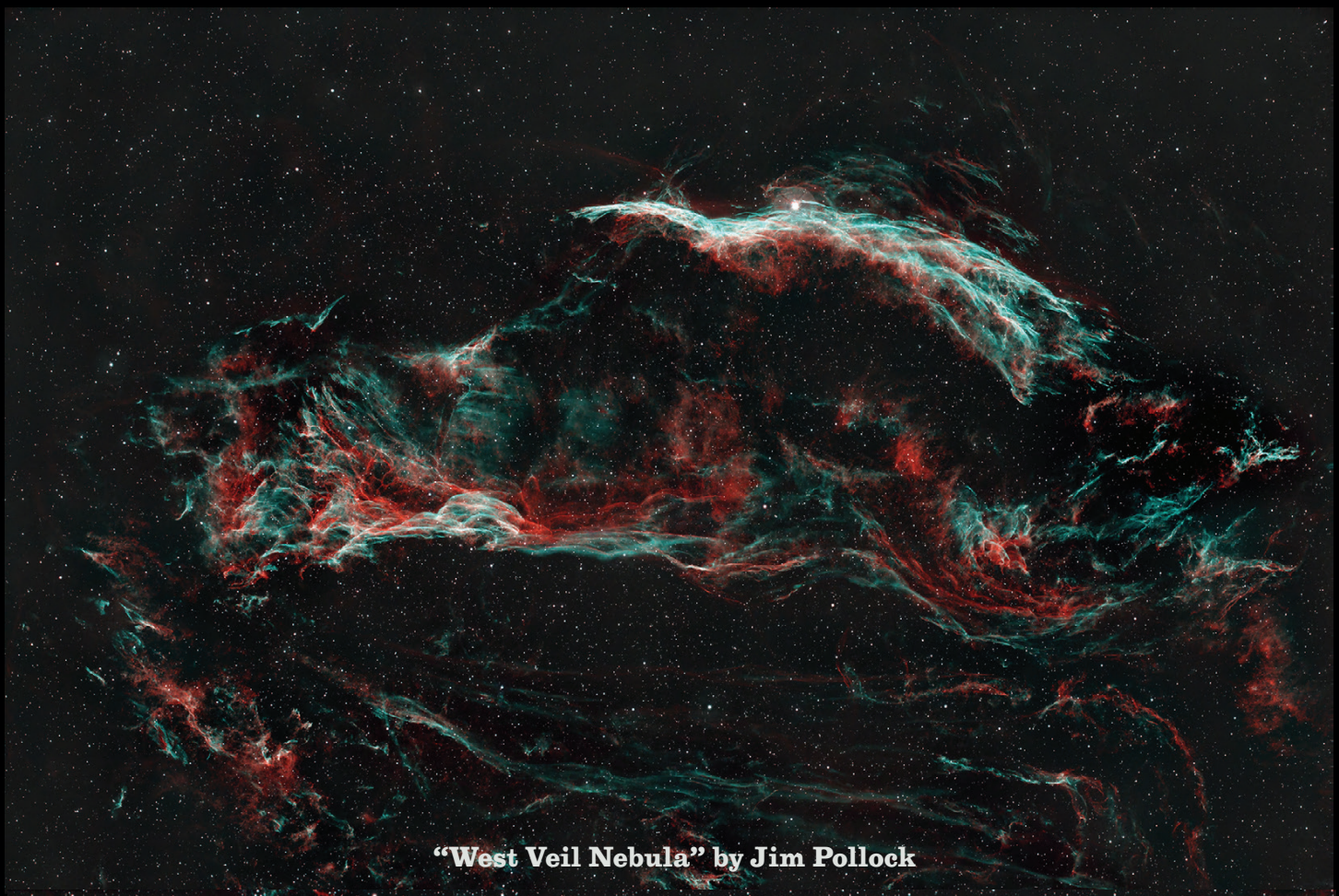
**“Total Lunar Eclipse at Maximum” by Jim Elkins**



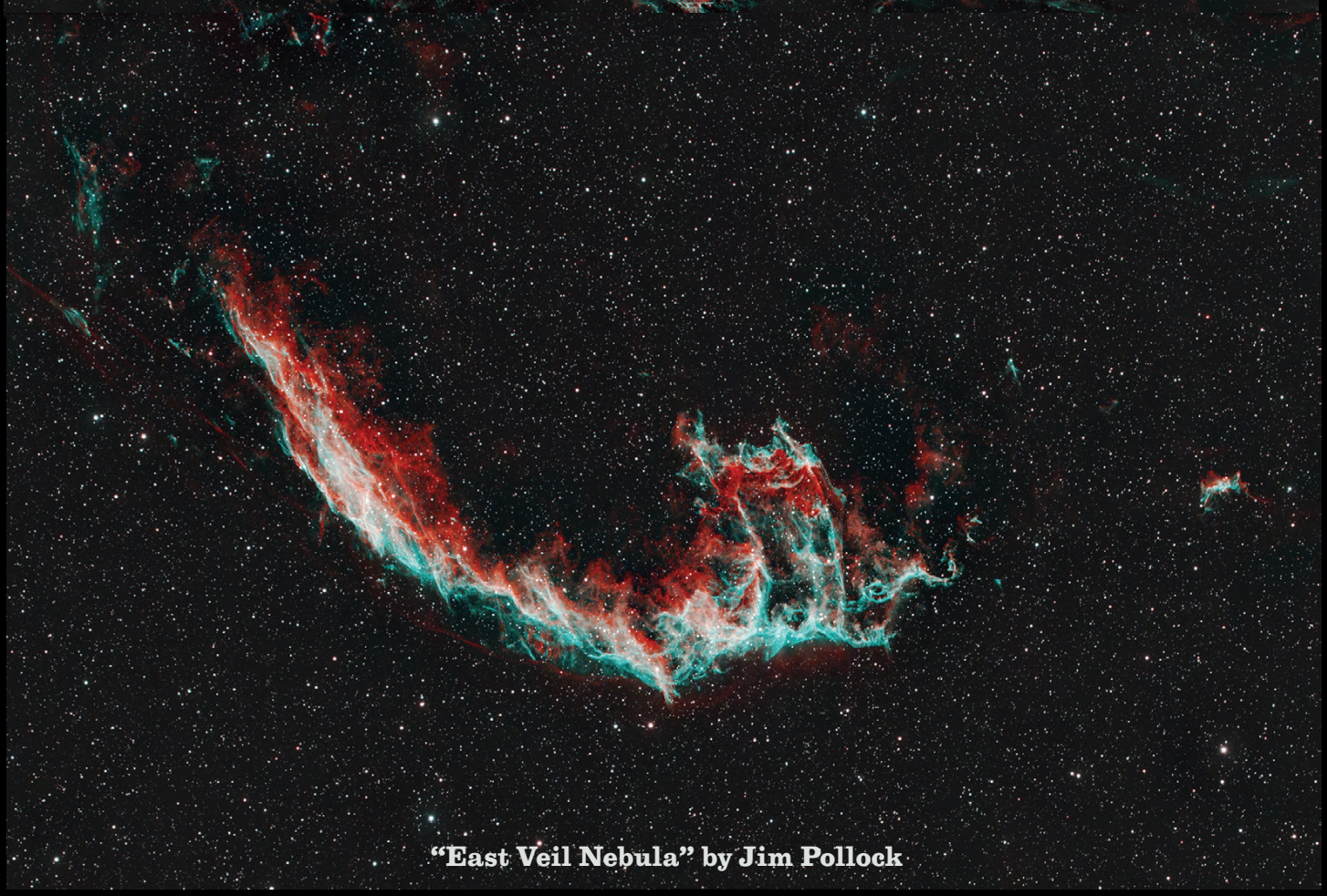
**"Helix Nebula" by Jim Elkins**

**"Pickering's Triangle" by Jim Elkins**



**“West Veil Nebula” by Jim Pollock**



**“East Veil Nebula” by Jim Pollock**

**“Horse Head and Flame” by Jim Pollock**

**“Jupiter on Nov 21” by Gary Garzone**

**“Mars on Nov 21” by Gary Garzone**

**“Saturn on Nov 21” by Gary Garzone**

**“Total Lunar Eclipse Sequence” by Gary Garzone**

**“Cave Nebula” by Martin Butley**

## Notes for Thurs. Nov. 17 meeting by Vern Raben, Secretary

### I. Introduction

LAS President, Stephen Garretson, opened the meeting and introduced the officers. (Eighteen people attended).

### II. Main Presentation - "Meteorites: A Collector's Perspective" by Ron Hranac

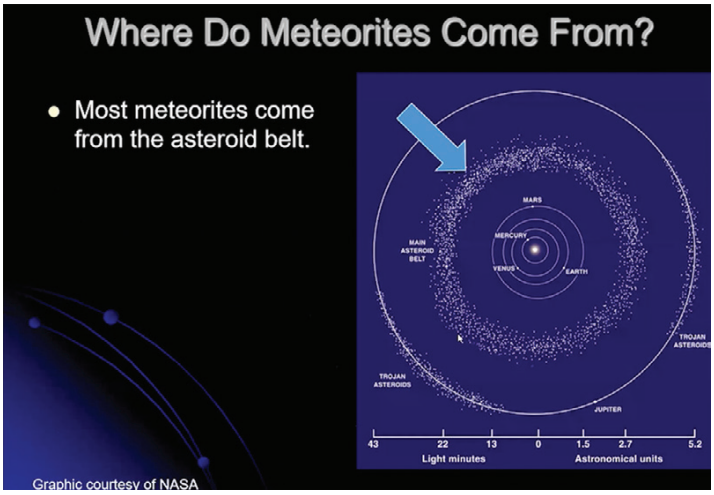
Ron Hranac is a past president of the Denver Astronomical Society and currently a member of the board of directors. He has been an amateur astronomer for many years. Collecting meteorites is just one aspect of it that he has enjoyed.

### What are meteorites?

He emphasized some of the terminology he will use during his talk:

- Meteoroid - A small to moderate sized rock zipping through space at 20 thousand to 150 thousand miles per hour. It can be stony, metallic, or some combination stony-metallic, or sometimes icy.
- Meteor - is a streak of light produced when a meteoroid enters the Earth's atmosphere when they are 50 to 75 miles about the surface. Most of the meteors we see are produced by a meteoroid that is the size of grain of sand to size of a pea.
- Meteorite - a meteoroid that survives the fall to earth is called a meteorite.

In the 1500s all atmospheric phenomena -- rain, hail, rainbows -- were all called meteors. Even now a weather forecaster who studies atmospheric phenomena is called a meteorologist. A scientist who studies meteorites is a meteoriticist.



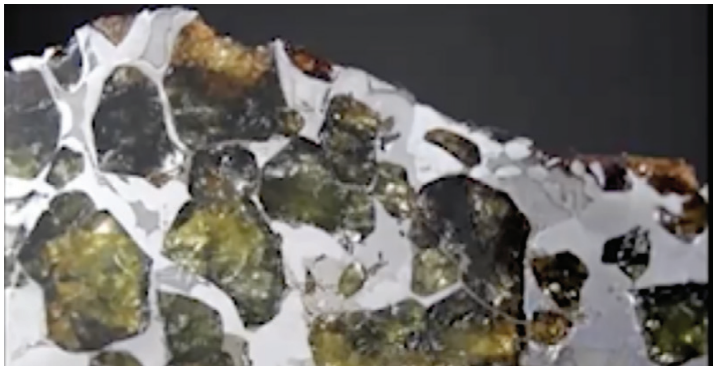

Most meteorites come from the asteroid belt between Mars and Jupiter. There are a few exceptions which come from the Earth's moon and from Mars.

Meteorites are grouped into three main categories:

- Stony meteorites
- Iron meteorites
- Stony-iron meteorites

Stony meteorites come from an undifferentiated asteroid. An undifferentiated asteroid was small enough when it was formed and still molten that it didn't have enough gravity to separate the heavier stuff to the center and the lighter stuff to the crust.

An iron meteorite comes from the core of a differentiated asteroid.



Stony-iron meteorites come from the core - mantel boundary. (Photos above courtesy Aerolite Meteorites (c) Geoff Notkin))

## What is inside a Meteorite?

The Campo del Cielo iron meteor from Argentina is composed of 92.6% iron, 6.7% nickel, 0.4% cobalt, 0.25% phosphorous and traces (in parts per million) of gallium, germanium and iridium.

## Evidence of Impacts

- Moon, Mercury, Mars, and other solar system bodies are heavily cratered suggesting impacts by meteorites and other objects
- What about Earth? Hasn't our planet been whacked by space rocks?
  - There is indeed evidence of meteorite impacts on Earth, but what and where?
  - Why don't we see more craters on Earth? Plate tectonics, volcanism, erosion and weathering have destroyed or hidden most of them.
  - There are about 200 known impact craters on Earth. The most famous is Meteor Crater near Winslow, Arizona

*Meteor crater panorama by Ron Hranac*

Meteor crater is about 3/4 mile wide and 700 feet deep. It was formed about 50,000 years by a 150 foot wide impactor that was vaporized on impact. All that was left was BB sized spherules. If you have not been there, Ron encourages you to pay it a visit.

- Impactites
  - Small, often glassy objects of terrestrial origin which formed from the heat of a meteorite impact

**Libyan desert glass**
**Credit: Aerolite Meteorites, (c) Geoff Notkin**

- Shutter cones - Cone shaped fragments of rock formed by the pressure and shock of an impact. They range in size from an inch or so to 10 feet tall.

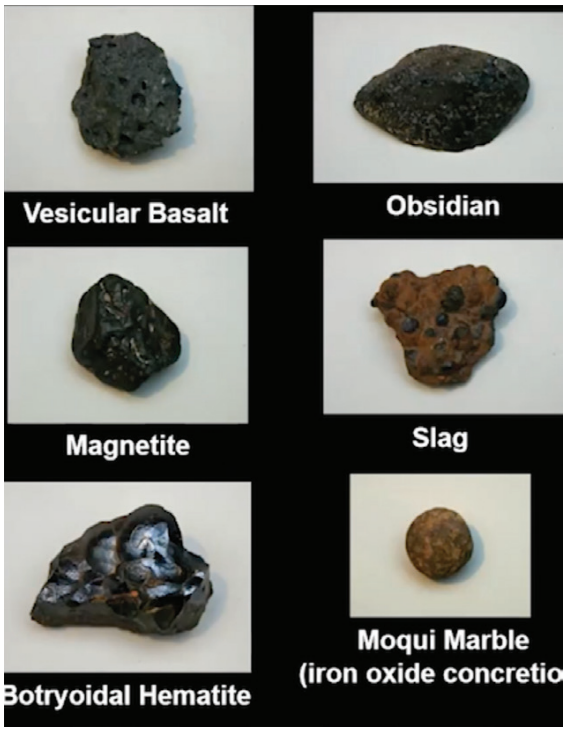
**Credit: NASA**

- Microscopic evidence
  - Shock-produced forms of quartz such as stishovite and coesite; known to be formed at the site of an atomic blast but also at the site of a meteorite impact.
  - Micotektites (melted beads of glass)

## Meteor Wrongs

- "Meteor Wrong" is the name given to rocks, minerals, and some man-made objects that are often mistaken for meteorites.

Examples include hematite and magnetite, and non-rocks such as slag. Slag is produced as by-product of industrial smelting processes. Commonly used in bedding for railroads and gravel roads.




Examples of "Meteor-Wrongs" by Ron Hranac

## Chelyabinsk Event

- On Thursday, February 14, 2013 at 8:20 pm MST (9:20 am local time February 15 in Russia), a 65 foot diameter, 10,000 ton meteoroid entered the Earth's atmosphere at ~40,000 mph (18 km/s) T
- The meteoroid exploded about 15 miles above the ground, and the resulting shock wave released energy equivalent to nearly 500 kilotons of TNT, or about 30x the Hiroshima atomic bomb
- Thousands of buildings were damaged and more than 1,000 people were injured (mostly from flying glass)
- Most of the meteoroid was vaporized but there were meteorite fragments of a strewn-field estimated to be several dozen or more square miles. Fragments ranged from pea-size to grapefruit size Now officially known as Chelyabinsk - the meteorites have been classified as a stony meteorite - a LL5 chondrite. The LLl5 designation is related to the relatively low iron content and the average chondrule size.
- To date, more than 1 ton of fragments have been recored ranging from pea-sized to about 1 meter wide. They are widely available on the collector market.

## Collecting Meteorites

- First step: Learn about meteorites. Some good resources are:
  - International Meteorite Collectors Association (http://www.imca.cc)
  - The Meteoritical Society (http:www.meteoriticalsociety.org) (the heavy duty science part)
  - Books such as "What is so Mysterious about Meteorites?", and "Rocks from Space, 2nd Edition" both by Richard Norton.
- What kind of collection?
  - Starter collection: this might consist of stony, iron, or maybe stony-iron. Prepackaged collections such as one from Aerolite Meteorites (https://aerolite.org) are available
  - More serious collection: different sub-categories, locations, falls (one that was witnessed) versus finds (randomly found), hammer stones (those that hit something building, car, etc), thin sections, impactites, meteor-wrongs
- Where to get them?
  - Rock shops (tend to pricey)
  - On-line auction sites - be careful - stick with IMCA members
  - On-line dealers such as Aerolite Meteorites (https://https://aerolite/org) , Impactika (https://impactika.com), Mile High Meteorites (https://mhmeteorites.com)
- Rock and Mineral shows
  - RMGM Colorado Mineral and Fossil Spring Show on April 7-9 (https://www.coloradomineralandfossilshows.com)
  - Denver Gem & Mineral Shows, Sept 8-16 2023 (https://denver.show)

## Common Questions

- How big are meteorites? Intact meteorites range in size from smaller than a pea to larger than a car. The largest known intact meteorite is the Hoba meteorite in Nambia. It weighs an estimated 60 tons, and its size is about 3 meters x 3 meters x 1 meter (9 ft x 9 ft x3 ft).
- Are meteorites radioactive? No more than your hand is.
- How old are meteorites? Older than anything on Earth; most meteorites are between 4.5 and 4.6 billion years old.
- Has anyone ever been hit by a meteorite? Yes. The only documented instance of a person being hit by a meteorite happened in November, 1954 in Sylacauga, Alabama. Ann Hodges was napping on the couch when a softball-size meteorite crashed through the ceiling, bounced off a radio, and hit her in the thigh.
- Do meteorites contain any mysterious or unknown ingredients? Stony meteorites are made mostly of common silicates (rock) and iron meteorites are mostly iron and nickel. Meteorites may contain traces of elements uncommon on earth (such as iridium) and in some cases may contain previously unknown or rare minerals (good example is wassonite discovered in 2011).
- How do scientists know that lunar and martian meteorites are from the Moon and Mars?
  - Lunar and martian meteoroids were blasted into space by asteroid impacts, and some of those crustal fragments made their way to Earth as meteorites.
  - Lunar meteorites have compositions similar to those brought back by Apollo missions.
  - Some martian meteorites contain microscopic bubbles of trapped gases that match atmospheric analysis of Mars' atmosphere by probes we have sent to that planet.
  - NASA landers have found that martian rocks have the same ratio of O-18 and O-16 isotopes as terrestrial rocks but have a slightly higher ratio of O-17 to O-16.

That same isotopic relationship is seen in martian meteorites.

- How many meteorites hit the Earth every year? An estimated 60,000 tons of meteorites whack the Earth every year; an estimated 18,000 to 84,000 meteorites. Keep in mind that approximately 70% of the Earth is covered by oceans, so most meteorites wind up under water.
- How much do meteorites cost? Meteorites are priced by the gram, and can range in value from about 10 cents to 20 cents per gram for unclassified northwest Africa fragments to several dollars per gram for very rare meteorites. Many decent meteorites can be purchased for $1 to about $10 per gram.
- Do meteorites come from meteor showers? Meteor showers occur when the Earth passes through a trail debris left by comets. Meteorites originate in the asteroid belt.

**III. Financial Report – Bruce Lamoreaux**

Main Checking Account ~ $8,770
2-Year Savings Account - $8,120
Telescope Fund - $1,100
Petty Cash - $50
Total Assets - $18,040
Regular members: 110
Student Members: 4
Total: 114

**IV. New Business**

No meeting in December. At the January meeting will be officer elections for 2023. Stephen will not run for re-election. M. J. is stepping down as vice president as well. Please consider volunteering to be a club officer. If someone has an interest Stephen would like to hear from them; they may also just attend the next meeting.

Kirsten at Sandstone Ranch is still looking for presentation in early spring. If anyone has a presentation please get in touch.

Calendar has been sent to press and should be available for sale in a week or so. Price should be about $10 each.

M. J. is doing a presentation on Tuesday, December 6 at 7 pm on processing of one-shot color images

Vern is doing a presentation on planetary imaging on Thursday, December 15 at 8 pm

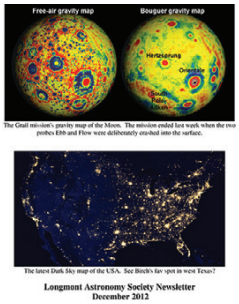
## Newsletter Archive

**Dec. 1992 - no newsletter was published**

**Dec. 2002 Newsletter**


It has been a wonderful time for star gazers. Jupiter and Saturn have been great as the seeing has been excellent this past month. Brian Kimball gave a talk on astrophotography; thanks to him many of us have been motivated to take some astrophotos. Some great images were sent in for the newsletter: Jupiter and Saturn from Martin Butley; Lagoon Nebula from Jim Sapp; Moon from Phillipe Bridenne; Jupiter and Saturn by Gary Garzone; Earth-shine on the Moon with Venus and Mars by David Larsen. Karen Mendenhall reported that they were clouded out for the total solar eclipse in Africa. LAS Star Member this month is Jim Sapp for his many years service to the club. He is a die hard observer showing up in dark places to observe faint fuzzy little objects. He is also a master telescope builder and has his own web-page about telescope building.

**Dec. 2012 Newsletter**




No meeting this month as Front Range Community College is closed . The January meeting will probably be on Sunday, January 20th; location has not yet been set. There will be elections for the 2013 LAS officers. Please consider volunteering a bit of your time to support LAS in the coming year.

Longmont Astronomical Society
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https://www.longmontastro.org

"Sh 2-132" by Tally O'Donnell