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**MESSIER 8 AND MESSIER 20  
BY ROLANDO GARCIA**

# Forensic Astronomy and the Dating of Ansel Adam's *Moonrise Hernandez New Mexico*

David Elmore  
Astronomer Emeritus National Solar  
Observatory

17 September 2020  
Longmont Astronomical Society

Astrometry has been used to date famous images including Moonrise Hernandez New Mexico by Ansel Adams. This talk follows the twists and turns of dating this image using equipment available in 1980 and goes on to discuss dating of some other well-known images.

## **About David Elmore**

David Elmore worked for the High Altitude Observatory of the National Center for Atmospheric Research starting as an undergraduate in 1968 and ending as Manager of the Instrumentation Development Group in 2008. During that time he operated, then developed solar physics research instrumentation that was deployed at solar observatories around the world, flown in the stratosphere, and launched into orbit. He ended his career working for the National Solar Observatory as Instrument Scientist for the Daniel K. Inouye Solar Telescope, now in commissioning, and is now an Astronomer Emeritus for the NSO.



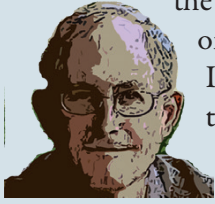
by **Stephen Garretson, LAS Vice President**

## Contents

Front Cover	Messier 8 and Messier 20 by Rolando Garcia
2	LAS Virtual Meeting September 17 from 7 to 9 pm “Forensic Astronomy and the Dating of Ansel Adam’s Moonrise Hernandex New Mexido by David Elmore, Astronomer Emeritus, Nation Solar Observatory
3	Contents About LAS
4	Notes from the President by Bill Tschumy Newsletter Archives from September 2010, September 2000, and September 1990
5	Solar System Highlights for September by Vern Raben
6	“Navigating the August Night Sky” by John Goss
7	“If You Could Observe Only One Object this Month - Moon, Venus, and a Hive of Stellar Bees” by John Goss
8 - 11	Comets for September - 88P, C/2020 F3, C/2019 U6, and C/2017 T2
12 - 24	LAS Member Images in August 2020
12 - 13	Pelican in H-Alpha by Tally O’Donnell on Aug 19
14	Comets C/2020 F3 NEOWISE, C/2017 T2, and C/2019 U6 on Aug 9 by Paul Robinson Comet C/2020 F3 NEOWISE by Gary Garzone on Aug 1
15	“Not a sunspot - its Smoke” by Bill_Ferreira on Aug. 18 “Active Region in H-Alpha” by Brian Kimball on Aug. 16
16	Moon & Venus by Bryan Wilburn Rainbow, Mars, Jupiter, & Saturn by Gary Garzone; First Scope by Jake Haut
17	IC 1848 in H-Alpha by Stephen Garretson on Aug 28
18 - 19	M19 - M24 by Rolando Garcia on Aug 14
20	Sharpless 2-132 by Stephen Garretson on Aug 28
21	M20 - Triffid Nebula Monochrome by Tally O’Donnell on Aug 26
22	Sharpless 2-132 by Tally O’Donnell on Aug 31
23	Summary of August 20 Meeting by Vern Raben
Back Cover	Bubble Nebula by Martin Butley

## Notes from the President - Bill Tschumy

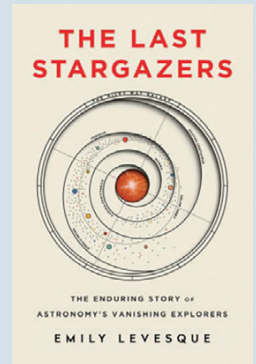
I hope this September finds everyone healthy and whole. It has been a challenging summer for astronomy with the coronavirus and the smoky skies. The majority of my observing is either at regional star parties or public observing events. Because of the virus, those opportunities have been mostly shut down. If it wasn't for comet NEOWISE, I would have hardly gotten out at all this summer. I'm going to put a club star party at Owl Hollow on the schedule for next new moon weekend (Sept 12th-13th). We will still have to be careful about social distancing, but at least we can be within earshot of each other as we observe.



I also want to mention a fantastic book I've been reading. It is "The Last Stargazers" by Emily Levesque. Dr. Levesque is an astronomy professor at the University of Washington (Ph.D. in 2010). The book is primarily composed of anecdotes about professional astronomy and how it is carried out. Lots of stories of observing runs at various observatories and the things that can happen during them. There is also a smattering of good science thrown in as well.

I think almost all of you would really enjoy the book. I know I have.

**Bill**



Some of you may recall that Emily Levesque gave a presentation "Weirdest Stars in the Universe" at our May 21, 2015 meeting at IHop. See [https://longmontastro.org/resources/Documents/Newsletters/2015/2015\\_05\\_Newsletter.pdf](https://longmontastro.org/resources/Documents/Newsletters/2015/2015_05_Newsletter.pdf)

If you missed that meeting you may view a video of her presenting this same topic at <https://youtu.be/xCW0gxkvy-s?t=693>. As of today Aug 31, I'm on Chapter 5 of her book and I agree with Bill, it is an entertaining and interesting book -- highly recommended!



**Vern**

## 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>. The Longmont Astronomical Society is a 501 c(3), non-profit corporation which was established in 1987. Our main goal is to promote local amateur astronomy. This is accomplished through regular monthly meetings, star parties and public observing sessions. Regular meetings are held every month (except December) on the third Thursday.

A broad spectrum of topics are covered at the meetings and include such things as deep sky observing, planetary imaging, narrow band imaging, equipment discussions and demonstrations just to name a few. These subjects are presented by both club members as well as special guests who are professional astronomers or experts in a particular field.



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.



### LAS Officers and Board Members in 2020

- |                                     |                           |
|-------------------------------------|---------------------------|
| • Bill Tschumy, President           | Board Members:            |
| • Stephen Garretson, Vice President | Mike Hotka, Gary Garzone, |
| • Michelle Blom, Secretary          | Brian Kimball, Vern Raben |
| • Bruce Lamoreaux, Treasurer        |                           |

## Solar System Highlights for September 2020



Image Credit: Brian Kimball

Full Moon: Sept. 1 at 11:23 pm

Third Quarter: Sept. 10 at 3:27 am

New Moon: Sept. 17 at 5:01 am

First Quarter: Sept. 23 at 7:56 am

### Mercury

Mercury is not visible this month.

### Venus

Venus is in morning sky in constellation Gemini; it moves to Cancer on Sept. 3; and then to Leo on Sept. 22. Its brightness is magnitude -4.1 most of the month. It decreases in apparent size from 20 arc sec to 16 arc sec.

### Mars



Mars on July 19 by Gary Garzone

Mars is visible in the evenings in constellation Pisces. It increases in brightness this month from -1.8 to -2.5 magnitude. It increases in apparent size from 19 arc sec across to 24 arc sec.

Oct. 13 at 7:55 pm.

### Jupiter



Jupiter on July 6 by Gary Garzone

Jupiter is in constellation Sagittarius. It is around -2.6 magnitude in brightness and the disk is 43 arc sec across.

The Great Red Spot mid transit times this month are:

Sept. 2 at 10:48 pm at altitude 26°

Sept. 5 at 8:19 pm at altitude 27°

Sept. 7 at 9:57 pm at altitude 28°

Sept. 12 at 9:06 pm at altitude 29°

Sept. 14 at 10:45 pm at altitude 22°

Sept. 17 at 8:15 pm at altitude 29°

Sept. 19 at 9:54 pm at altitude 25°

Sept. 24 at 9:03 pm at altitude 27°

Sept. 29 at 8:13 pm at altitude 28°

### Saturn



Saturn on July 4 by Gary Garzone

Saturn is visible in the evening sky in constellation Sagittarius. Brightness is around magnitude 0.4 and apparent size of the disk is 18 arc sec across.

### Uranus

Uranus is best seen in the morning sky in constellation Aries. It is magnitude +5.7 in brightness and its disk is 3.7 arc sec across. It will be at opposition on Oct. 31st.

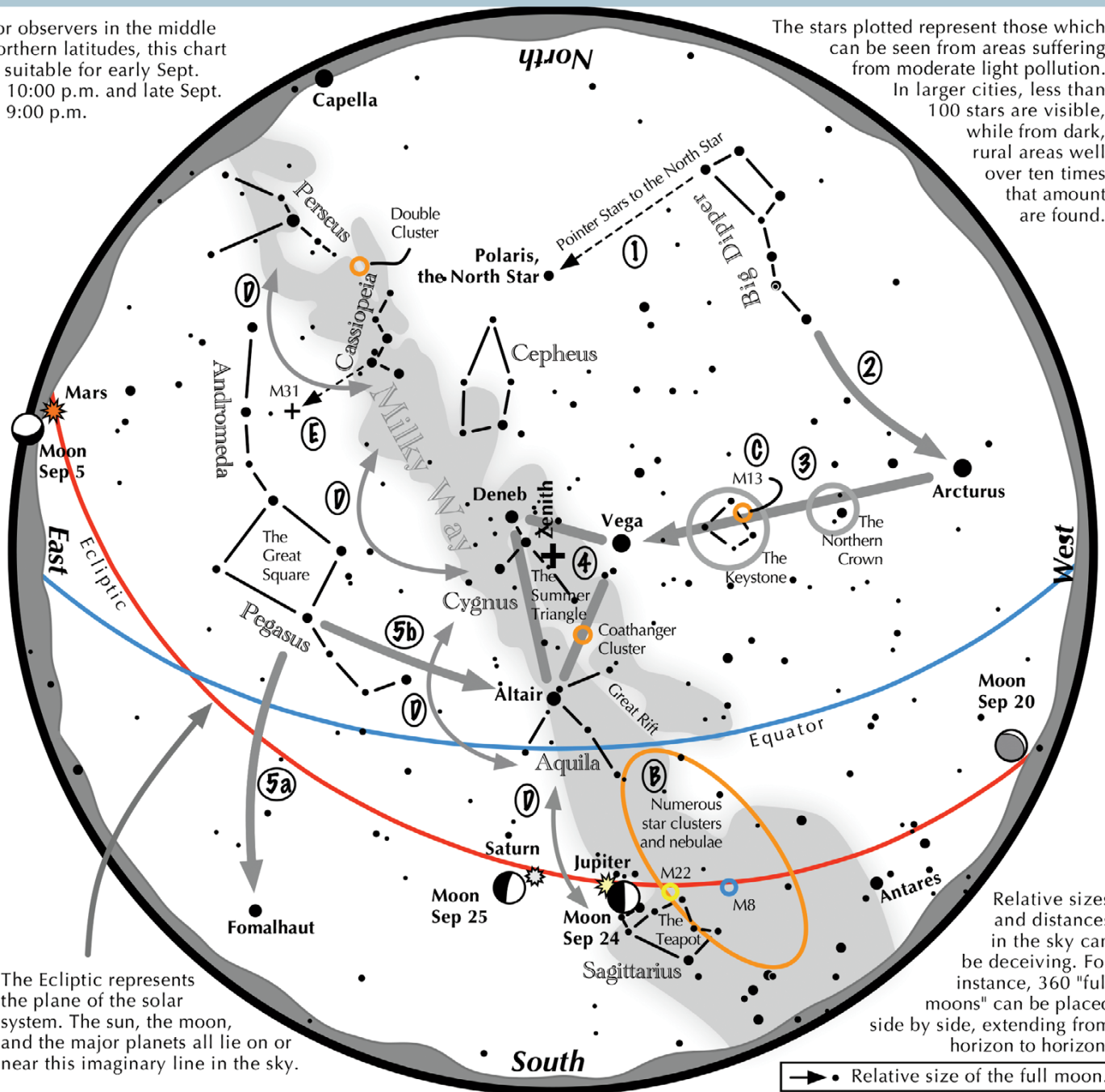
### Neptune

Neptune is visible in the morning sky in constellation Aquarius. It is magnitude 7.9 in brightness and the disk is 2.3 arc sec across. Neptune is at opposition on Sept. 11th.

# Navigating the mid September Night Sky by John Goss

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

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



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

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

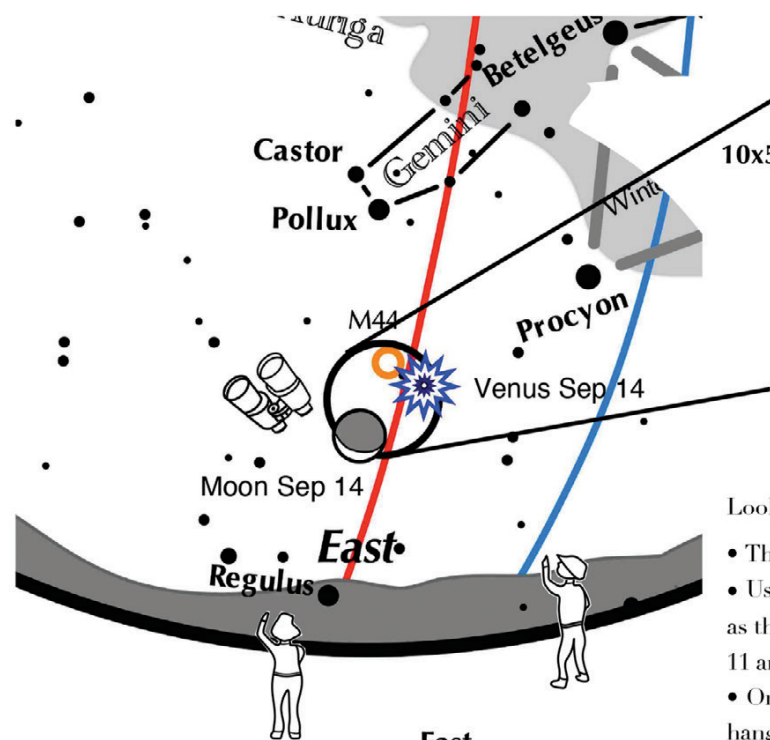
### Binocular Highlights

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



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

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



View through 10x50 binoculars



**Crescent Moon, brilliant Venus, and a Hive of Stellar Bees**

Look to the east 90 minutes before sunrise on September 11–16.

- The brilliant star-like object is Venus.
- Use binoculars to spot the faint star cluster M44, also known as the Beehive. It glows in the field to the left of Venus on Sept. 11 and 12, in the upper right on Sep. 13, and above on Sept. 14.
- On Sep. 14, the crescent Moon, seemingly full of Earthshine, hangs low above the eastern horizon, to the left of Venus. On the 15th, the even thinner crescent Moon glows far to the lower left of Venus.
- Venus appears in the morning sky of August 13 every 8 years. It was this close to the Beehive on September 13, 2012 and it will be again on September 13, 2028.



**East  
90 minutes  
before sunrise  
September 14**

**Newsletter Archives**

**10 Years Ago - Sept. 2010**



The speaker at our August 2010 meeting will be Bill Tschumy. Bill will talk about “Escape from Plato’s Cave: The Wilky Way

and the Galactic Coordinate System”. LAS will be a contractor for the City of Longmont Recreation Center to teach a course in “Begining Astronomy”.

**20 Years Ago - Sept. 2000**



Stephanie Fawcett gave the club a nice thank you for encouraging her to pursue the Astronomical League’s National Young

Astronomer Award and other projects. Very nice; well deserved.

Members are invited to participate in Astronomy Magazine’s “Sky Show” at Aurora Reservoir. We are looking for volunteers to operate “observing stations”.

**30 Years Ago - Sept. 1990**

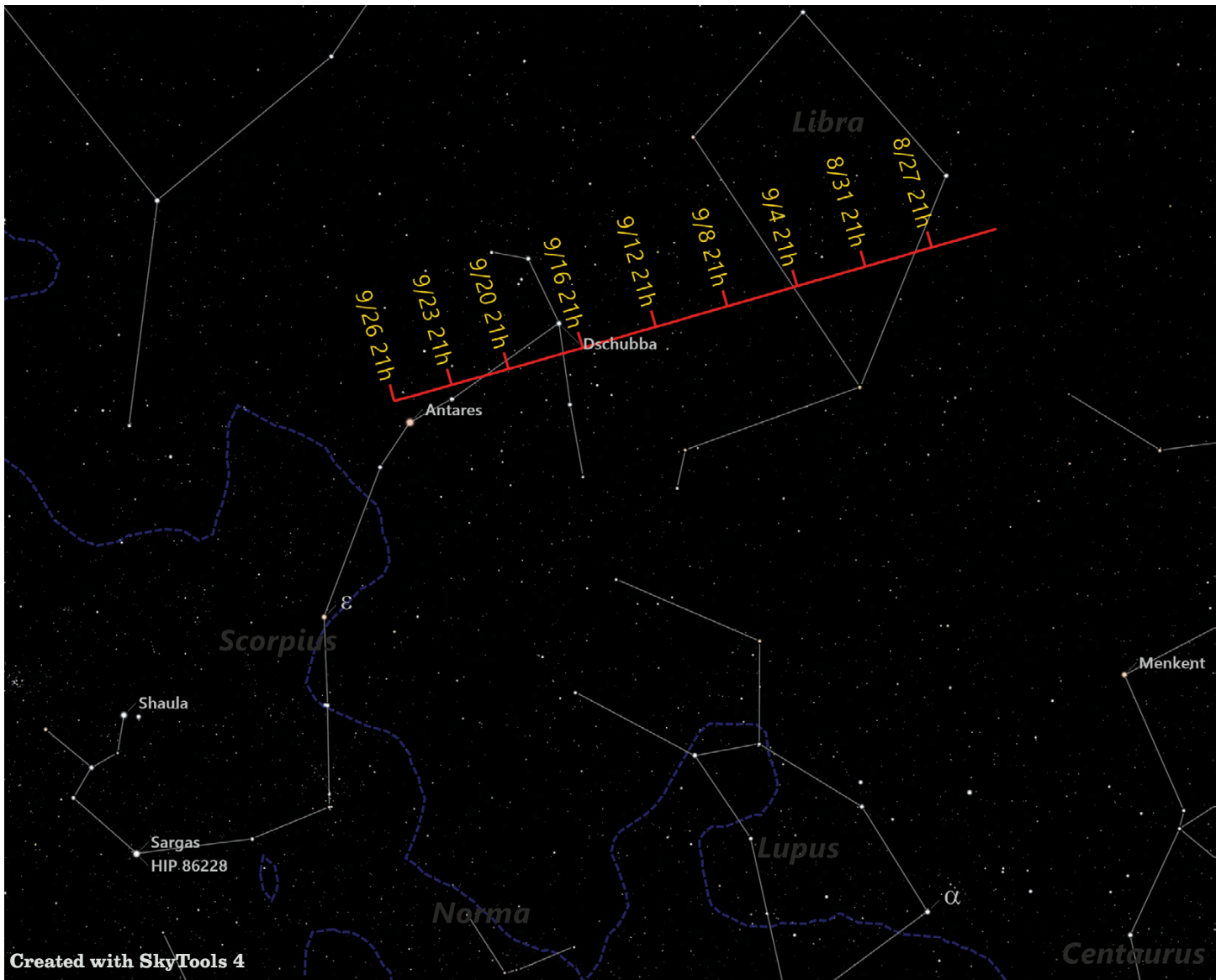


For our August meeting we met at Russ Mellon’s home off Magnolia Road high above Boulder. Russ is an avid telescope maker and astropho-

tographer. We did some quick observing between raindrops, glimpsed Saturn and spotted Comet Levy. The rain would not give up though so everyone headed home about 12:30 am. LAS wishes to thank the Mellon’s for opening their home to us and Russ for showing his projects.

# Comets in September

## Comet 88P (Howell)

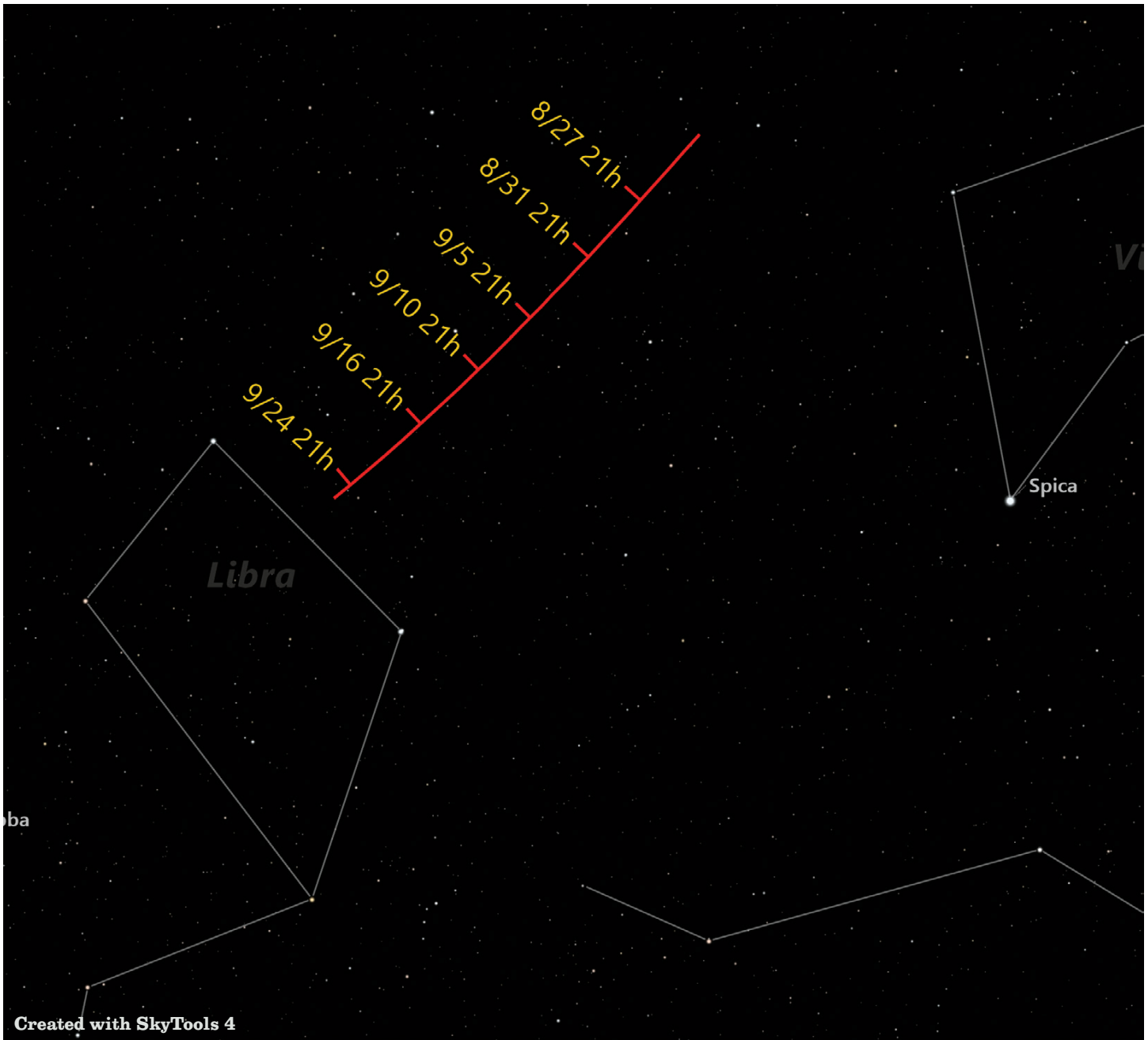


Comet 88P (Howell) was discovered on August 29, 1981 by Ellen Howell using photographic plates obtained by .46 meter Schmidt telescope at Palomar Observatory

Date	Optimal time	RA	Dec	Brightness	Size (arc min)	Constellation
Sept. 1	8:47 pm	15h08m27.5s	-20°26'25"	9.6	3.3	Libra
Sept. 8	8:35 pm	15h30m25.9s	-22°04'15"	9.6	3.3	Libra
Sept. 15	8:23 pm	15h53m48.8s	-23°33'33"	9.5	3.2	Scorpio
Sept. 22	8:11 pm	16h18m31.0s	-24°51'30"	9.5	3.2	Scorpio
Sept. 30	7:58 pm	16h48m09.5s	-26°03'05"	9.6	3.1	Scorpio



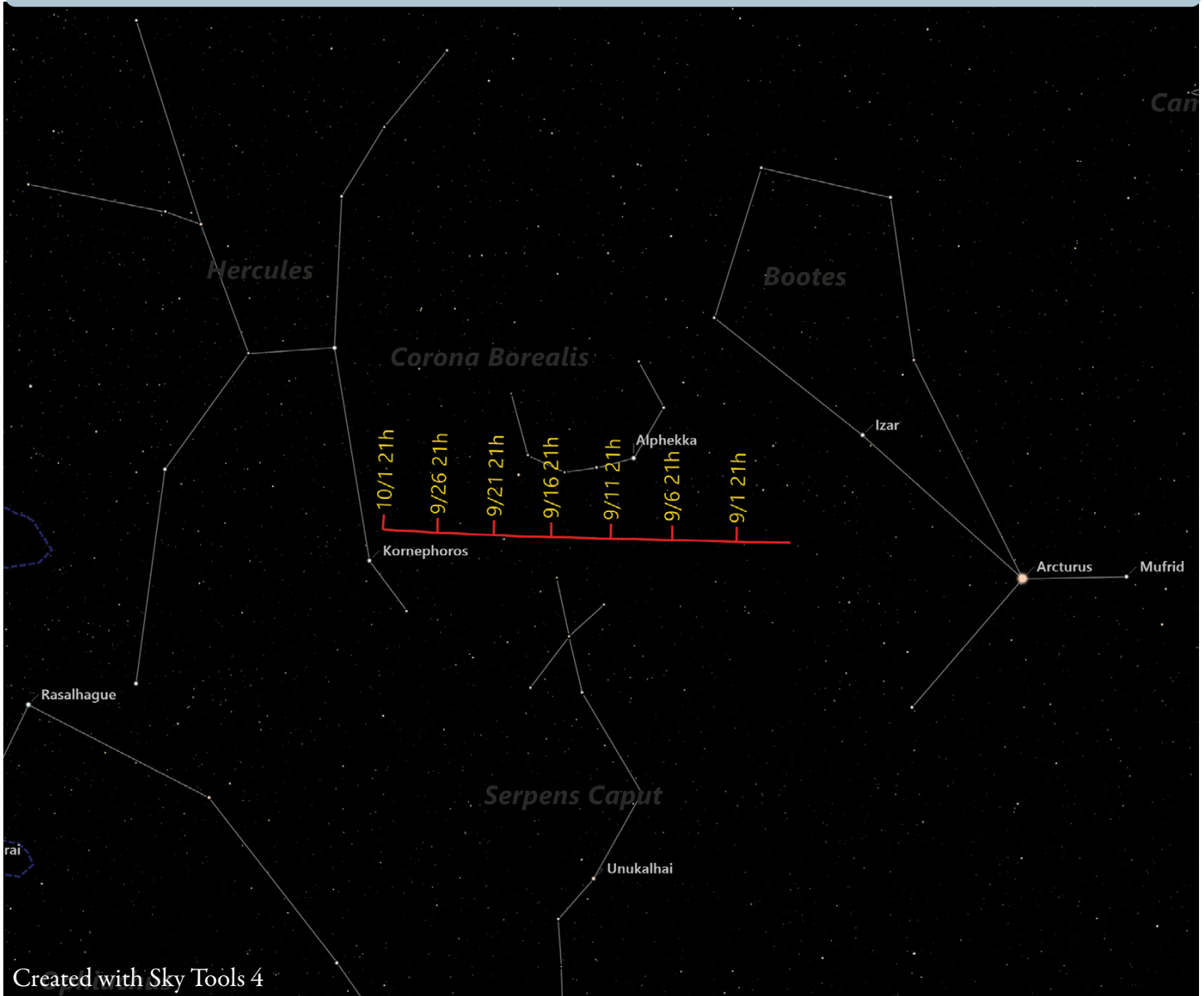
## Comet C/2020 F3 (NEOWISE)



Comet C/2020 F3 (NEOWISE) is the brightest comet visible in the northern hemisphere since Hale-Bopp in 1997. It brightened to magnitude 1 last month. It fades rapidly this month from about magnitude 10 to 12.

Date	Optimal time	RA	Dec	Brightness	Size (arc min )	Constellation
Sept. 1	8:51 pm	14h25m48.0s	-03°10'39"	9.8	2.2	Virgo
Sept. 8	8:37 pm	14h38m11.9s	-06°23'54"	10.6	1.9	Virgo
Sept. 15	8:23 pm	14h47m45.4s	-08°39'07"	11.2	1.7	Libra
Sept. 20	8:14 pm	14h54m05.8s	-10°01'48"	11.6	1.7	Libra

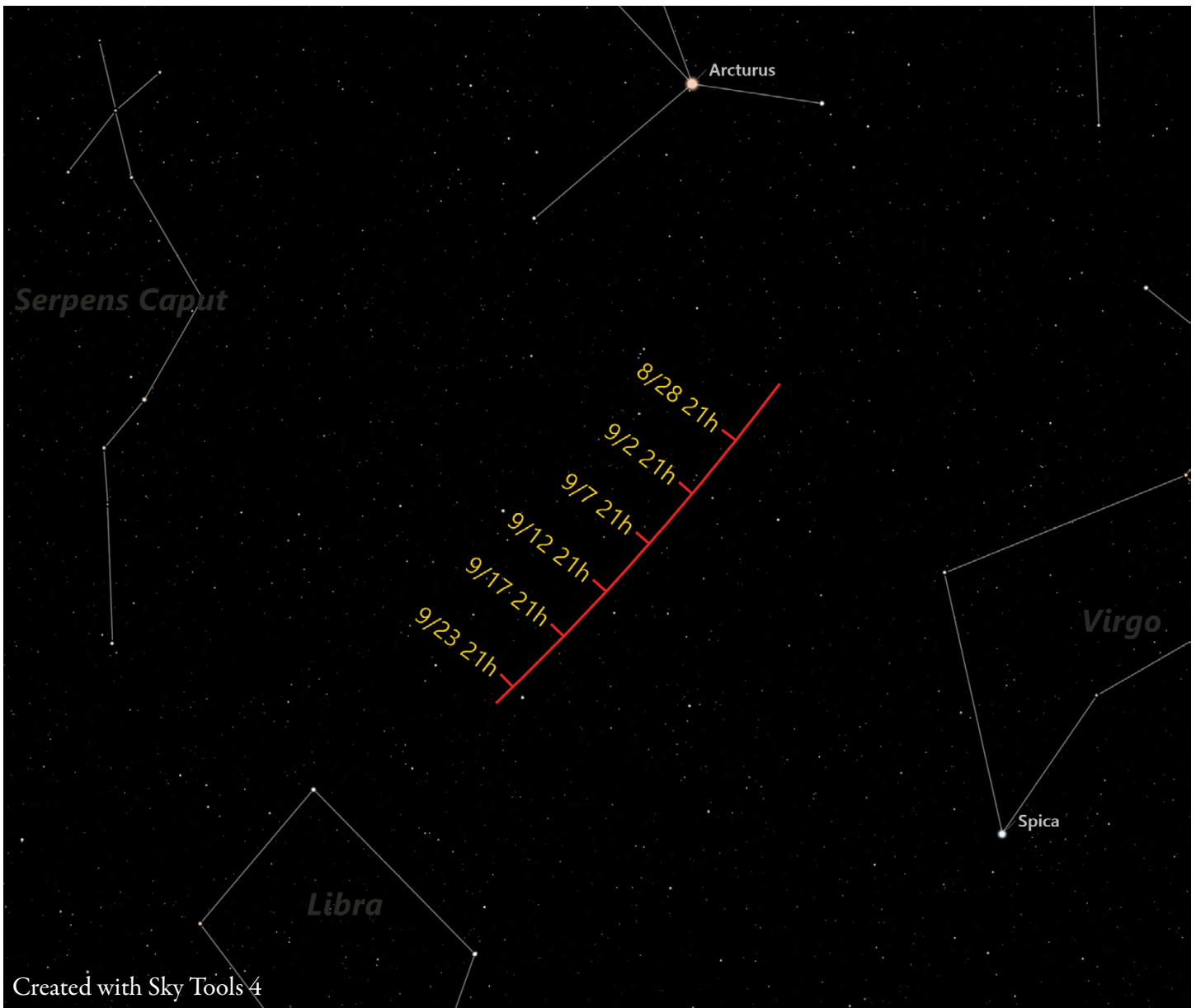
## Comet C/2019 U6 (LEMMON)



Comet C/2019 U6 (LEMMON) was discovered by the Mount Lemmon Sky Survey on Oct. 31, 2019. It was at perihelion in mid-June; it is now about magnitude 11 in constellation Serpens.

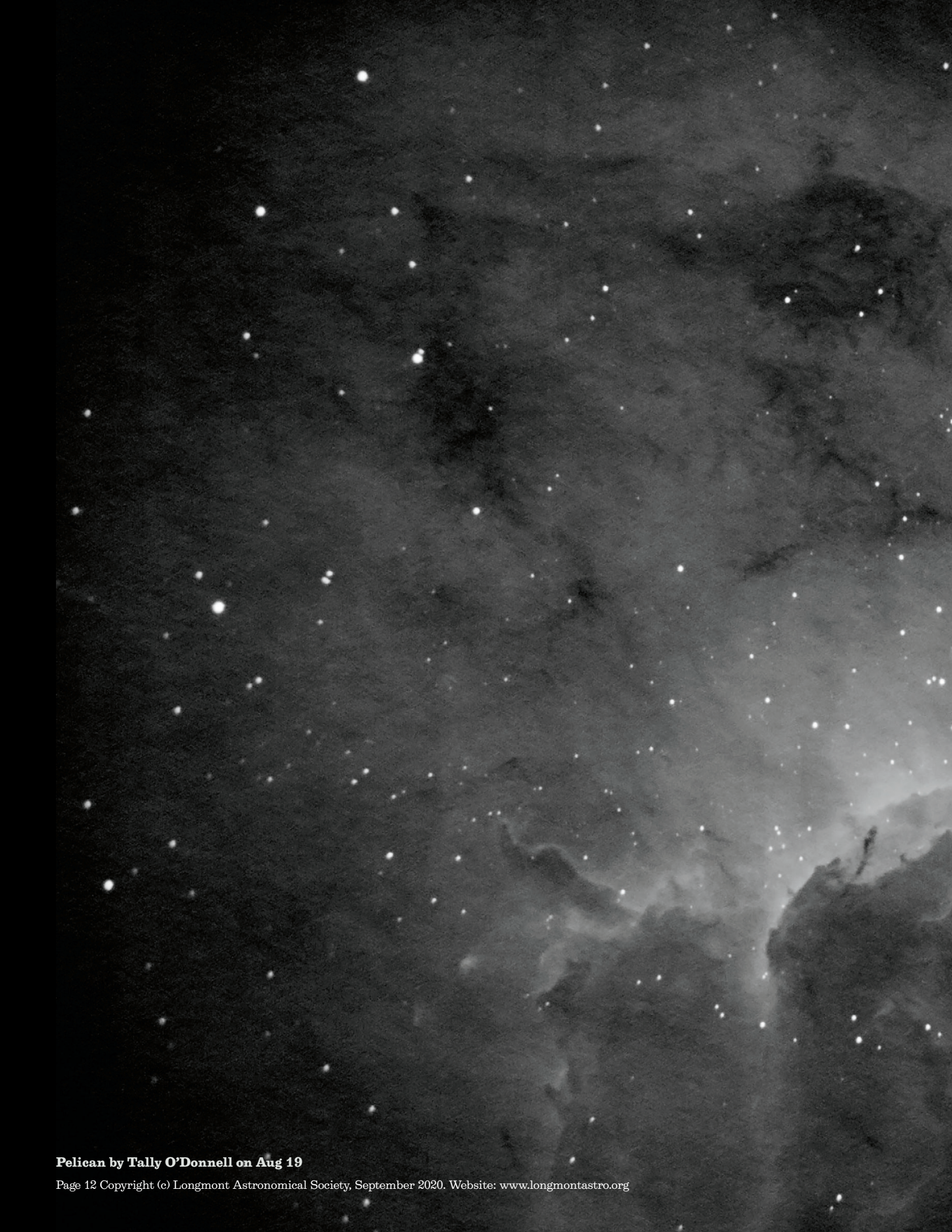
Date	Optimal time	RA	Dec	Brightness	Size (arc min)	Constellation
Sept. 1	8:57 pm	15h14m32.4s	+22°23'27"	11.3	1.4	Serpens
Sept. 8	8:49 pm	15h33m10.1s	+22°41'39"	11.7	1.3	Serpens
Sept. 15	8:37 pm	15h50m50.8s	+22°51'52"	12.0	1.2	Serpens
Sept. 22	8:24 pm	16h07m46.9s	+22°56'54"	12.4	1.1	Serpens
Sept. 30	8:08 pm	16h26m24.1s	+22°59'07"	12.7	1.1	Hercules

## Comet C/2017 T2 (PANSTARRS)



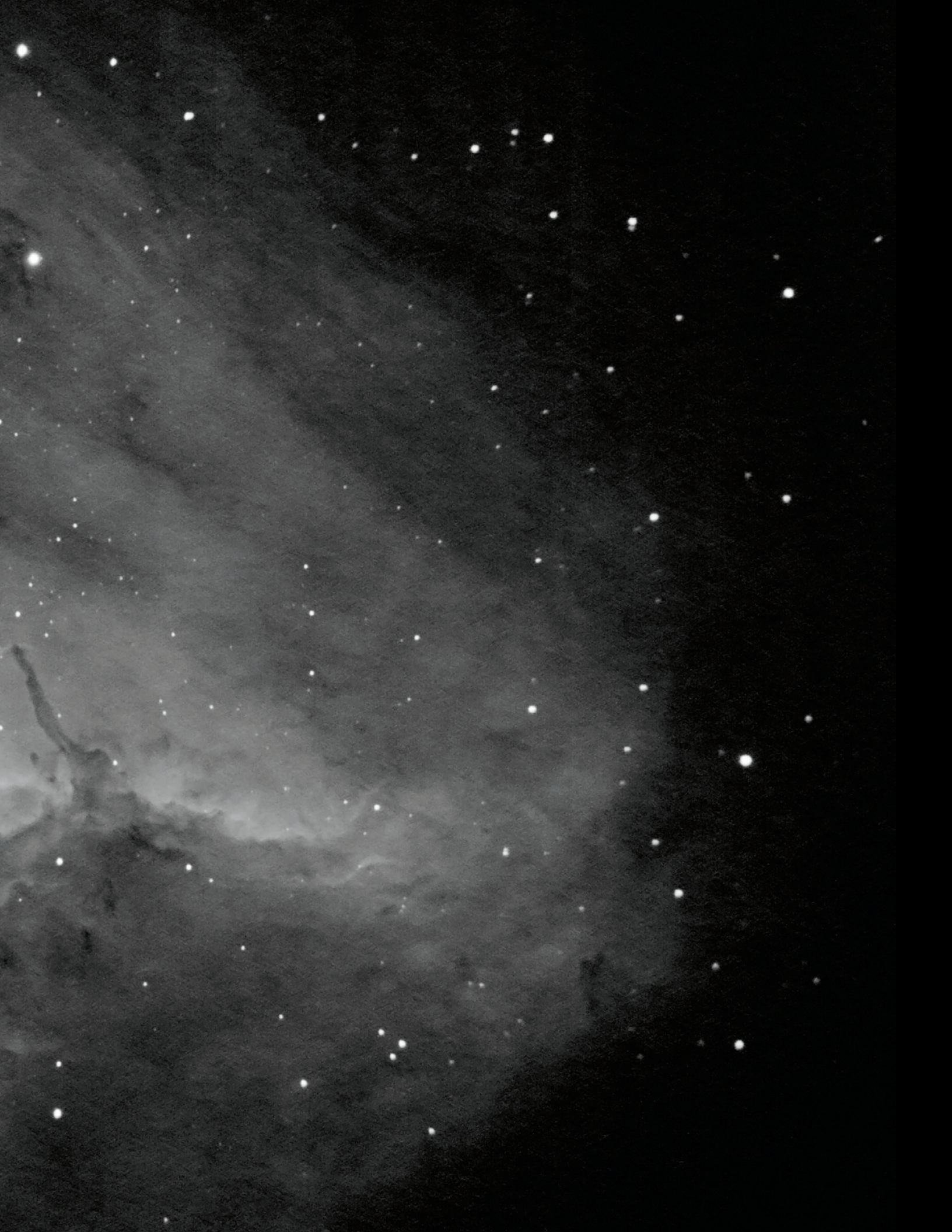
Comet C/2017 T2 (PANSTARRS) is currently moving through constellation Coma Berenices. It is magnitude 10.7 in brightness. It was discovered by the two 1.8 meter PANSTARRS telescopes located at the Haleakala Observatory in Hawaii.

Date	Optimal time	RA	Dec	Brightness	Size (arc sec)	Constellation
Sept. 1	8:52 pm	14h15m12.3s	+02°55'01"	11.1	49	Virgo
Sept. 8	8:39 pm	14h24m59.7s	+00°04'17"	11.3	46	Virgo
Sept. 15	8:26 pm	14h34m41.7s	-02°33'12"	11.5	44	Virgo
Sept. 21	9:13 pm	14h42m57.1s	-04°38'36"	11.7	43	Virgo



**Pelican by Tally O'Donnell on Aug 19**

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**Lemmon (2019 U6)**

**PanSTARRS 2017 T2**



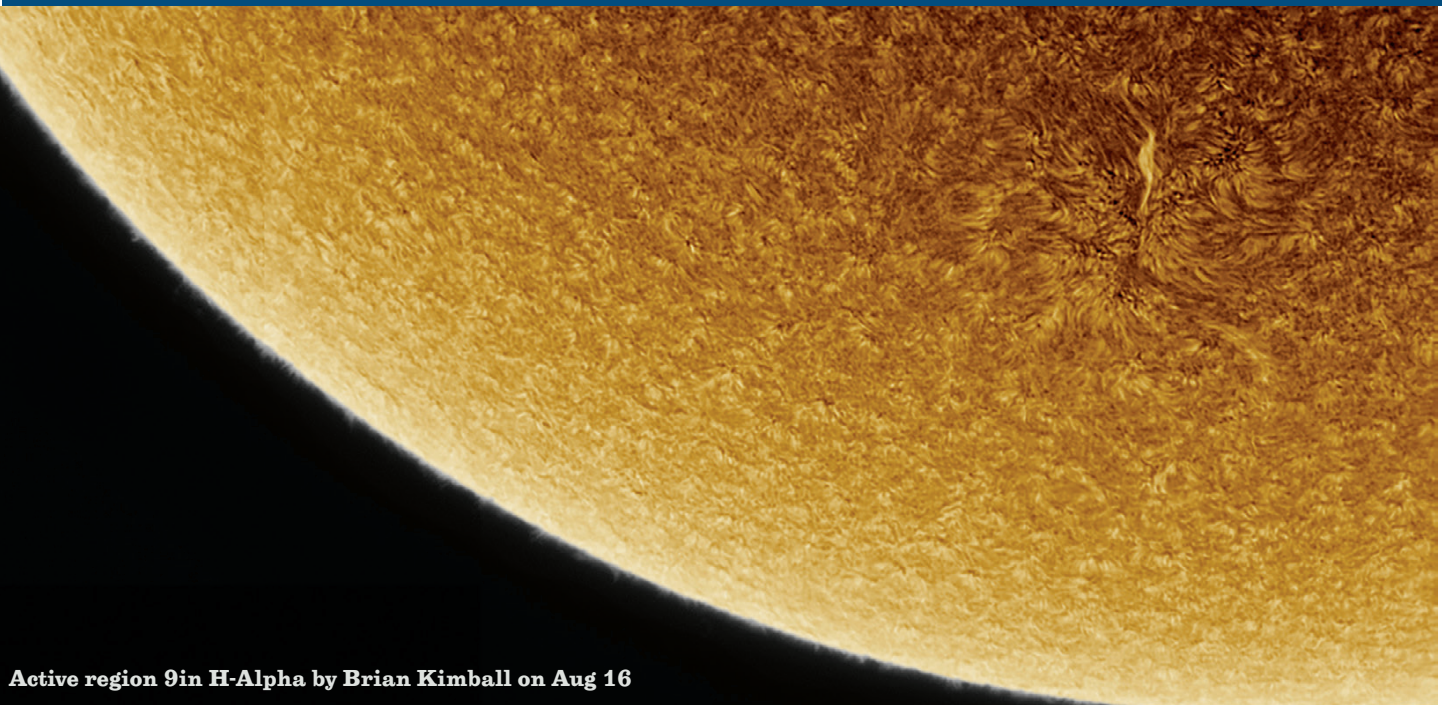
Comets C/2020 NEOWISE, C/2017 T2 (PANNSTARRS), and C/2019 U6 (LEMMON) on Aug 9 by Paul Robinson

**C/2020 F3 (NEOWISE) by Gary Garzoneon Aug 1**



**“Not a sunspot” its Smoke by Bill\_Ferreira on Aug. 18**

It has been a difficult month to observe or photograph astronomical objects. Smoke from fires in Colorado and Wyoming, and multiple huge fires in California have filtered our views dramatically as can be seen in Bill’s shot above of the sun at 12:41 in the afternoon.



**Active region 9 in H-Alpha by Brian Kimball on Aug 16**



**Moon and Venus by Bryan Wilburn on Aug. 15**



**Saturn by Gary Garzone on Aug 14**



**Mars by Gary Garzone on Aug 24**



**Rainbow over Dome  
by Gary Garzone on Aug 1**

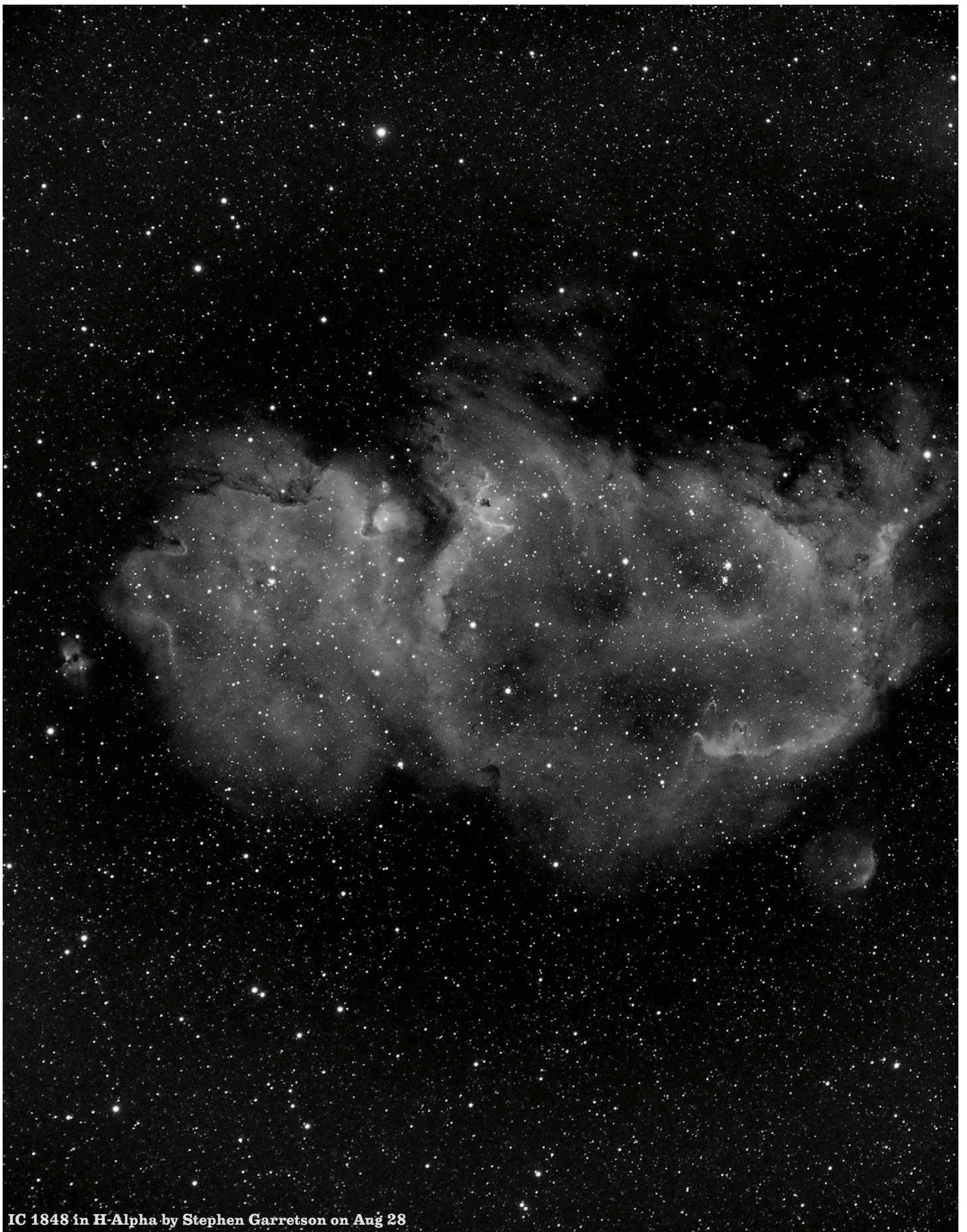


**"First Scope" Jake Hout on Aug 19**

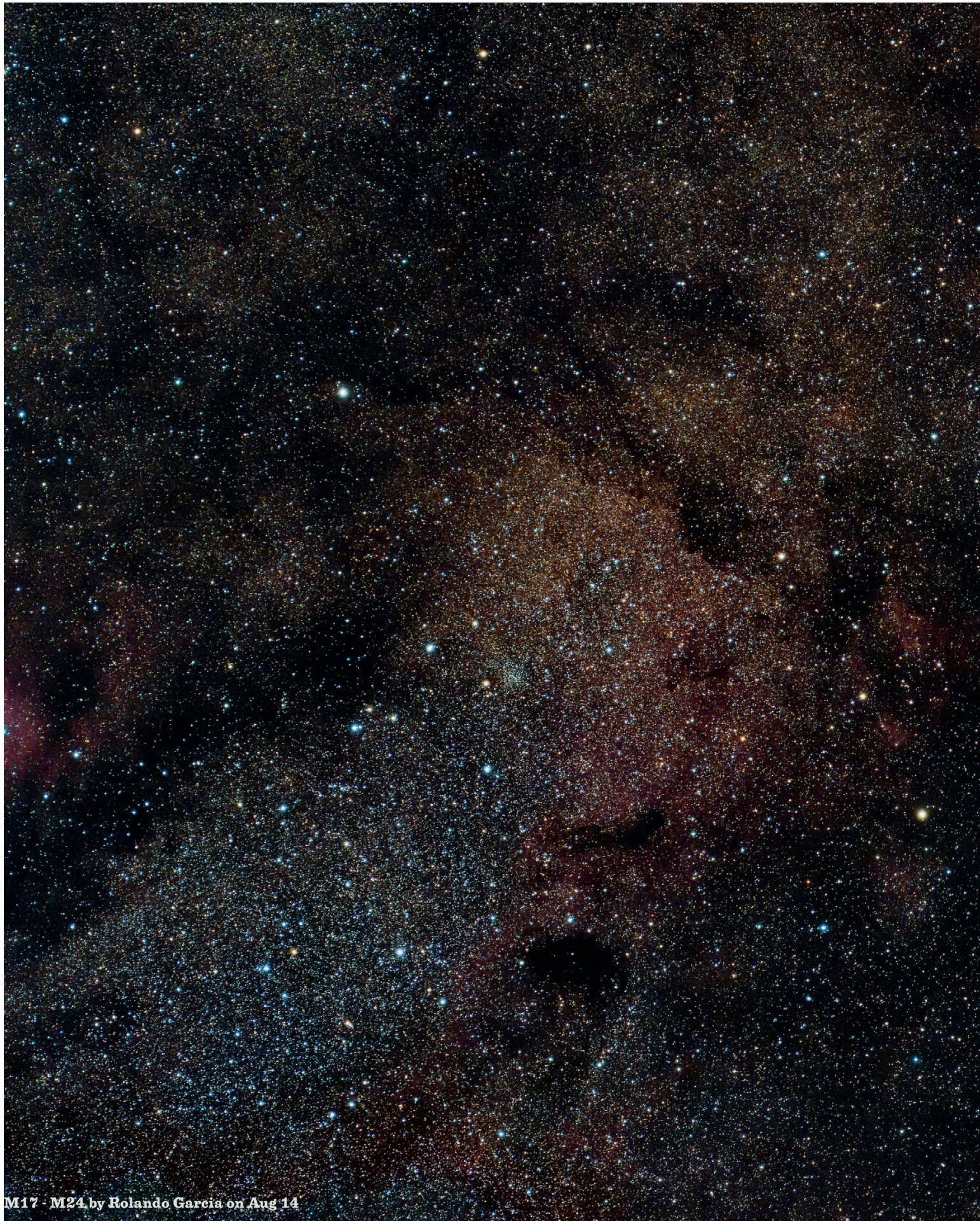


**Jupiter by Gary Garzone on Aug 24**





**IC 1848 in H-Alpha by Stephen Garretson on Aug 28**



**M17 - M24 by Rolando Garcia on Aug 14**

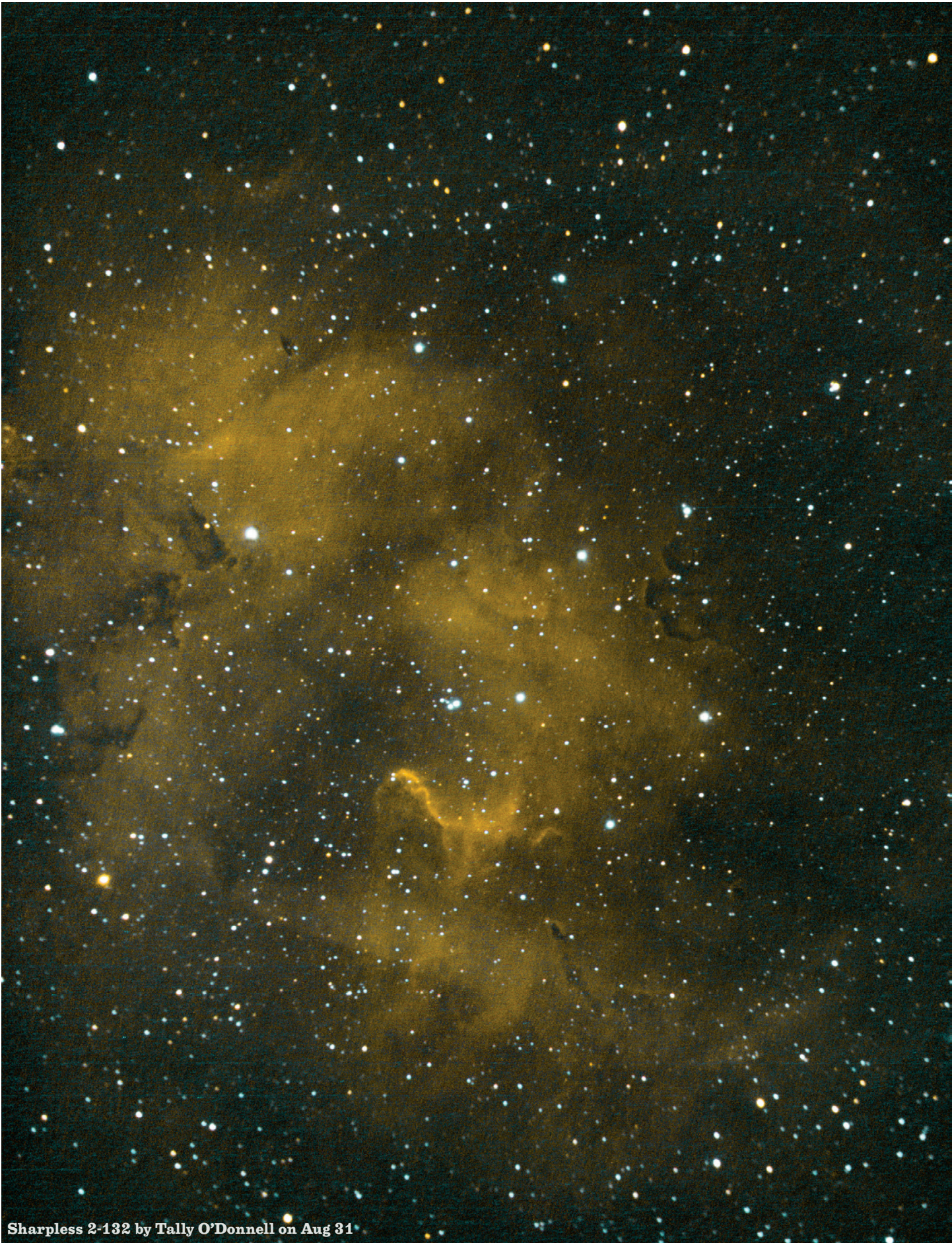




Sharpless 2-132 by Stephen Garretson on Aug 28



**M20 - Triffid Nebula Monochrome by Tally O'Donnell on Aug 26**



Sharpless 2-132 by Tally O'Donnell on Aug 31

# Summary of August 20, 2020 Meeting

Bill Tschumy opened the meeting with 22 people attending. He welcomed new member Jake Hout.

## Current Events:

- Perseverance Mission to Mars launched on July 30
- Briefly mentioned the Perseid meteor shower from last week
- Comet C/2020F3 NEOWISE is still impressive is fading rapidly
- New comet C2020P1 NEOWISE is coming. By mid Oct. should be 8.5 magnitude. Becomes visible in northern hemisphere in late Oct.
- No upcoming public events - all events are on hold due to corona virus.

## Officer Reports

Bruce Lamoreaux gave the treasurer report. Total assets remain at about \$16.5K; we have 78 regular members and 2 student members.

## Presentation: "Dark Skies Matter" by Rebecca Dickson

Rebecca Dickson is chair of the Sierra Club Indian Peaks Group in Colorado. Recently she has been giving presentations informing the public at the Fiske Planetarium in Boulder about effects of light pollution. She has worked with Deborah Price (Boulder County Parks and Open Space), Richard O'Bryan, (Colorado IDA) and John Keller (University of Colorado Planetarium Director).

She recommends Marc Reisner's book, "Cadillac Desert", which is about the history of water in the West. Reason that the western part of the United States is darker than the east is because it is drier (which makes water more expensive and so can support fewer

people and less industry).

The National Park Service has had some successful efforts to reduce light pollution such as at the Grand Canyon National Park.

Artificial light is another form of habitat loss. 62% of all species are nocturnal so loss of darkness has an effect on their habitat. Some birds such as the lark bunting navigate by the stars. Birds tend to fly towards light; 300 million to a billion birds are killed as a result of hitting tall buildings at night. Hatching sea turtles would naturally head towards the sea as they normally would be attracted by star light shimmering off ocean waves. Lights from cities confuse them and attract them to places ought not be and many get munched by cars.

Plants may be disrupted by artificial light as well. Note in this picture the leaves of the tree have fall colors except under the street light where it is still green. That part of the tree still thinks it is summer.



Human health is affected by light pollution. Melatonin is a naturally produced hormone which our bod-

ies produce in absence of light. It is involved in our circadian rhythm (internal body clock) which regulates our sleep cycles. Light pollution is associated with insomnia, depression, heart disease, obesity, stress, and some cancers. Blue light affects us more than red light.

If the United States were to adopt the International Dark Sky guidelines we could keep 44 million metric tons of carbon dioxide out of our atmosphere per year. This is a unnecessary waste of money, about \$10 billion per year.

A starry night sky speaks to the imagination. If you look at the night sky from Boulder you might see dozen of stars. It is ho-hum. Night sky has an effect on human imagination. Diminishing our imaginations may be the worst effect of light pollution.

Some people think they are safe in bright light. However, bright glaring lights may in fact blind you and hide the bad guy/girl.

Color temperature - LED color temperature range from 2700 to 6500 Kelvin. Color of the sun is about 5800 Kelvin. The bluer the light the higher the Kelvin number.

Boulder County measures darkness at various parks using a Sky Quality meter. 22 is a remote perfectly dark moonless night ; 17 is light at night in a major city. Trail ridge road is 21.6. Boulder mall has readings near 17.

Notes by Vern Raben

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**BUBBLE NEBULA**  
**BY MARFTIN BUTLEY**