

**LONGMONT
ASTRONOMICAL
SOCIETY**

OCTOBER 2020

VOLUME 35, No 10, Oct. 2020

ISSN 2641-8886 (WEB)

ISSN 2641-8908 (PRINT)

M31 ANDROMEDA GALAXY BY ROLONDO GARCIA

LAS Virtual Meeting October 15 from 7 to 9 pm

“You can almost touch the stars” by Tom Field

Even if you wanted to touch a star, they’re all impossibly distant. Despite these great distances, astronomers have learned an enormous amount about stars. How? The most common method to study the stars is called spectroscopy, which is the science of analyzing the colorful rainbow spectrum produced by a prism-like device.

Until recently, spectroscopy was too expensive and too complicated for all but a handful of amateurs. Today, though, new tools make spectroscopy accessible to almost all of us. You no longer need a PhD, dark skies, long exposures, enormous aperture ... or a big budget! With your current telescope and FITS camera (or a simple web cam or even a DSLR without a telescope) you can now easily study the stars yourself. Wouldn't you like to detect the atmosphere on Neptune or the red shift of a quasar right from your own backyard?!

This talk, with lots of interesting examples, will show you what it's all about and help you understand how spectroscopy is used in research. Even if you are an armchair astronomer, understanding this field will enhance your understanding of the things you read and the night sky. We'll do a live Q&A after Tom's 45-minute presentation.



Speaker Bio:

Tom Field has been a Contributing Editor at Sky & Telescope Magazine for the past 7 years. He is the author of the RSpec software (www.rspec-astro.com) which received the S&T “Hot Product” award in 2011. Tom is a popular speaker who has spoken to hundreds of clubs via the web and in-person at many conferences, including NEAF, the NEAF Imaging Conference, the Winter Star Party, the Advanced Imaging Conference, and others.

by Stephen Garretson, LAS Vice President

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
- Stephen Garretson, Vice President
- Michelle Blom, Secretary
- Bruce Lamoreaux, Treasurer

Board Members:
Mike Hotka, Gary Garzone,
Brian Kimball, Vern Raben

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Solar System Highlights for October 2020



Image Credit: Brian Kimball

Full Moon: Oct. 1 at 3:06 pm

Third Quarter: Oct. 9 at 6:41 pm

New Moon: Oct. 16 at 1:32 pm

First Quarter: Oct. 23 at 7:24 am

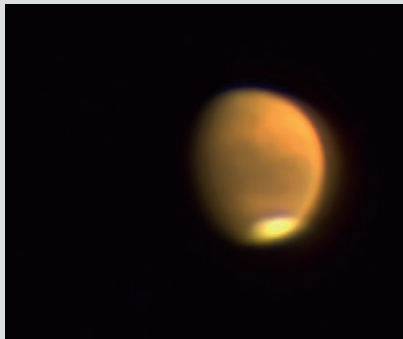
Mercury

Mercury is not visible this month.

Venus

Venus is visible in the morning sky in the constellation Leo and moves into Virgo on Oct. 22nd. It is around magnitude -4.1 in brightness and decreases in apparent size from 16 arc sec to 13 arc sec in diameter this month.

Mars



Mars on July 19 by Gary Garzone

Mars is nearest the Earth on Oct. 6 and is at opposition on Oct. 13 at 7:55 pm. It reaches a maximum brightness of -2.6 and 23 arc sec across.

Jupiter



Jupiter on July 6 by Gary Garzone

The Great Red Spot mid transit times this month are:

Oct. 1 at 9:52 pm at altitude 21°

Oct. 4 at 7:22 pm at altitude 29°

Oct. 6 at 9:01 pm at altitude 24°

Oct. 11 at 8:11 pm at altitude 27°

Oct. 16 at 7:21 pm at altitude 28°

Oct. 18 at 9:00 pm at altitude 20°

Oct. 23 at 8:10 pm at altitude 24°

Oct. 28 at 7:20 pm at altitude 26°

Saturn



Saturn on July 4 by Gary Garzone

Saturn is visible in the evening sky in constellation Sagittarius. Brightness is around magnitude 0.5 and apparent size of the disk is 17 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 evening sky in constellation Aquarius. It is magnitude 7.8 in brightness and the disk is 2.3 arc sec across. Neptune was at opposition on Sept. 11th.

Meteor Showers

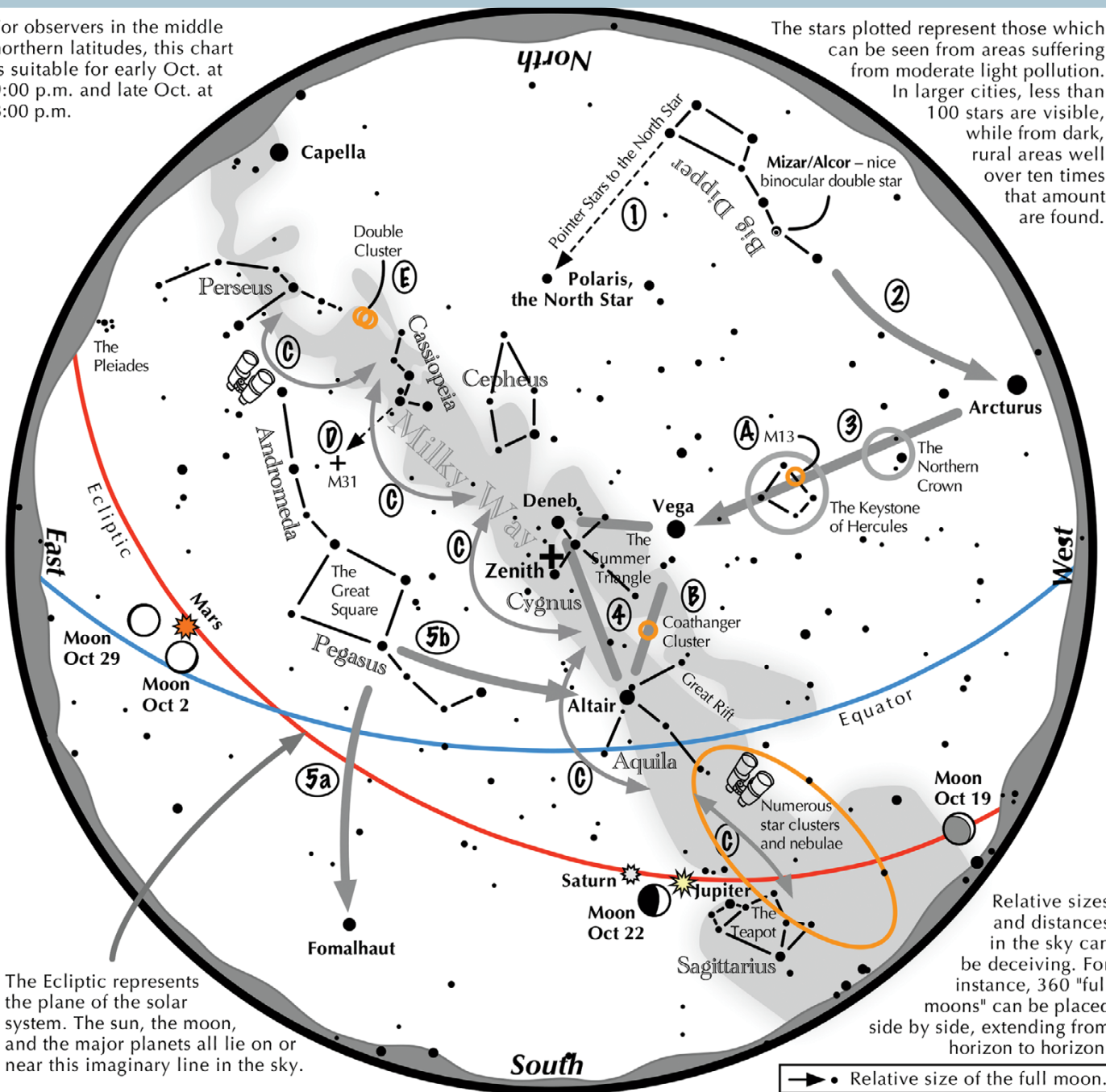
Draconids Meteor shower peaks the evening of Oct 7-8. Only a few faint meteors per hour may be seen; moon rise is at 10:00 pm. Observing conditions are poor for this one.

Orionids Meteor shower peaks the evening Oct 20-21. Moon sets at 9:23 pm; observing conditions should be quite good. An average of 10 to 20 meteors per hour may be observed from a dark location.

Navigating the mid October Night Sky by John Goss

For observers in the middle northern latitudes, this chart is suitable for early Oct. at 9:00 p.m. and late Oct. at 8:00 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 October 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 early October evening sky.
- 3 To the northeast of Arcturus shines another star of the same brightness, 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 Nearly overhead lie the summer triangle stars of Vega, Altair, and Deneb.
- 5 High in the east are the four moderately bright stars of the Great Square. Its two southern stars point west to Altair. Its two western stars point south to Fomalhaut.

Binocular Highlights

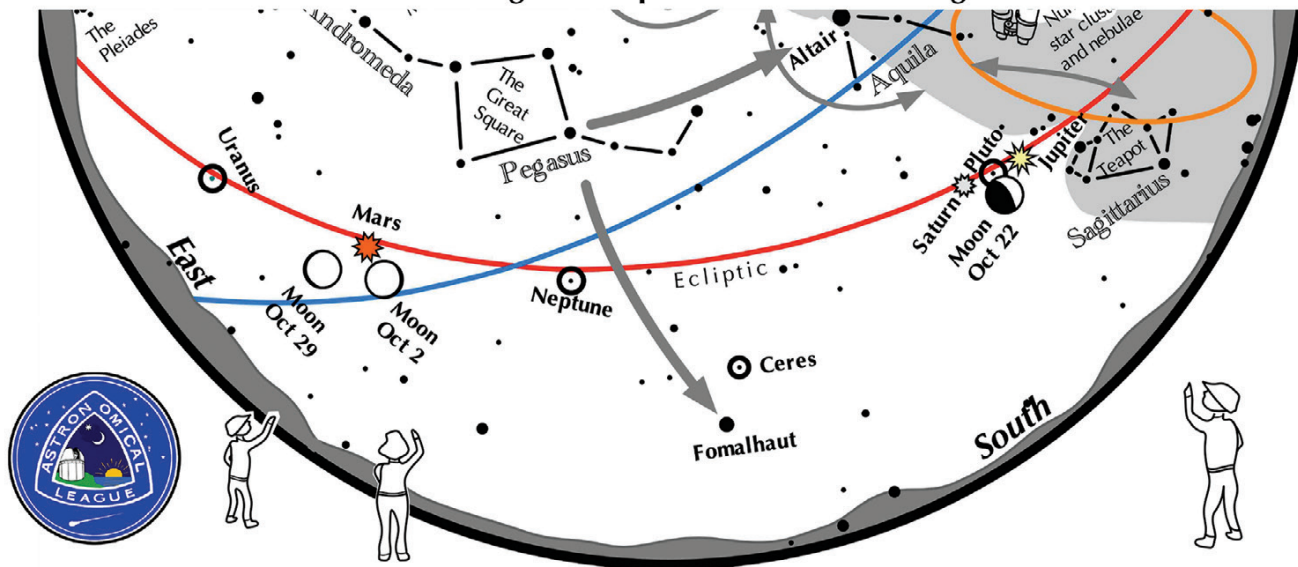
A: On the western side of the Keystone glows the Great Hercules Cluster, a ball of 500,000 stars. **B:** 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger. **C:** Sweep along the Milky Way for an astounding number of fuzzy star clusters and nebulae amid many faint glows and dark bays, including the Great Rift. **D:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **E:** Between the "W" of Cassiopeia and Perseus lies the Double Cluster.



Astronomical League 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:

See all three bright outer planets and a not-so-bright one



75 minutes after sunset, scan from the southwest to the south, then to the east: the Seen and the Unseen...

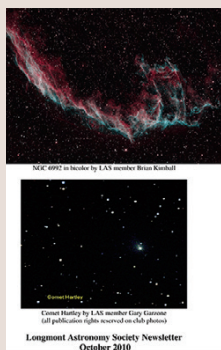
Find bright Jupiter and Saturn in the south-southwest, then locate Mars in the east.

- On the night of October 2, climbing in the east, brightly shines ruddy Mars with the near full moon glowing to its right.
- On the night of October 22, the near-first quarter moon is positioned between bright Jupiter and Saturn. Unseen Pluto lies immediately above the moon.
- On the night of October 29, the near-full moon hovers to Mars' lower left.
- Unseen Neptune lies one-third of the distance across the sky from Mars to easily seen Saturn.
- Difficult-to-see Uranus, which can be spotted by the keen-eye observer under dark skies, is found an equal distance that Mars lies from Neptune but on the other side of Mars. Binoculars will definitely help.
- The dwarf planet Ceres lies unseen just north of Fomalhaut shining low in the south-southeast.

A curious fact: all these bodies of the solar system currently are placed just below the plane of the ecliptic.

Newsletter Archives

10 Years Ago - Oct. 2010



Next meeting is open forum meeting -- IE no scheduled speaker. There will be an update on the "all sky" camera project which is now in place atop a NOAA

tower on Niwot Ridge. There will be discussion about the Astronomical League conference at Bryce Canyon in late June. Mike Fellows will present the monthly treasurer report. We'll also discuss the "beginning astronomy" class which will begin in late February.

20 Years Ago - Oct. 2000



Welcome new member Dick Mallot!

Scott Kindt put up a nice display of his astrophotography work.

Brian Kimball was elected interim vice president.

Nancy Clanton, an illumination engineer from the Dark Sky Association, gave a very informative talk describing the particulars of the fight to reduce the incidence of inefficient and wasteful lighting practices.

30 Years Ago - Oct. 1990

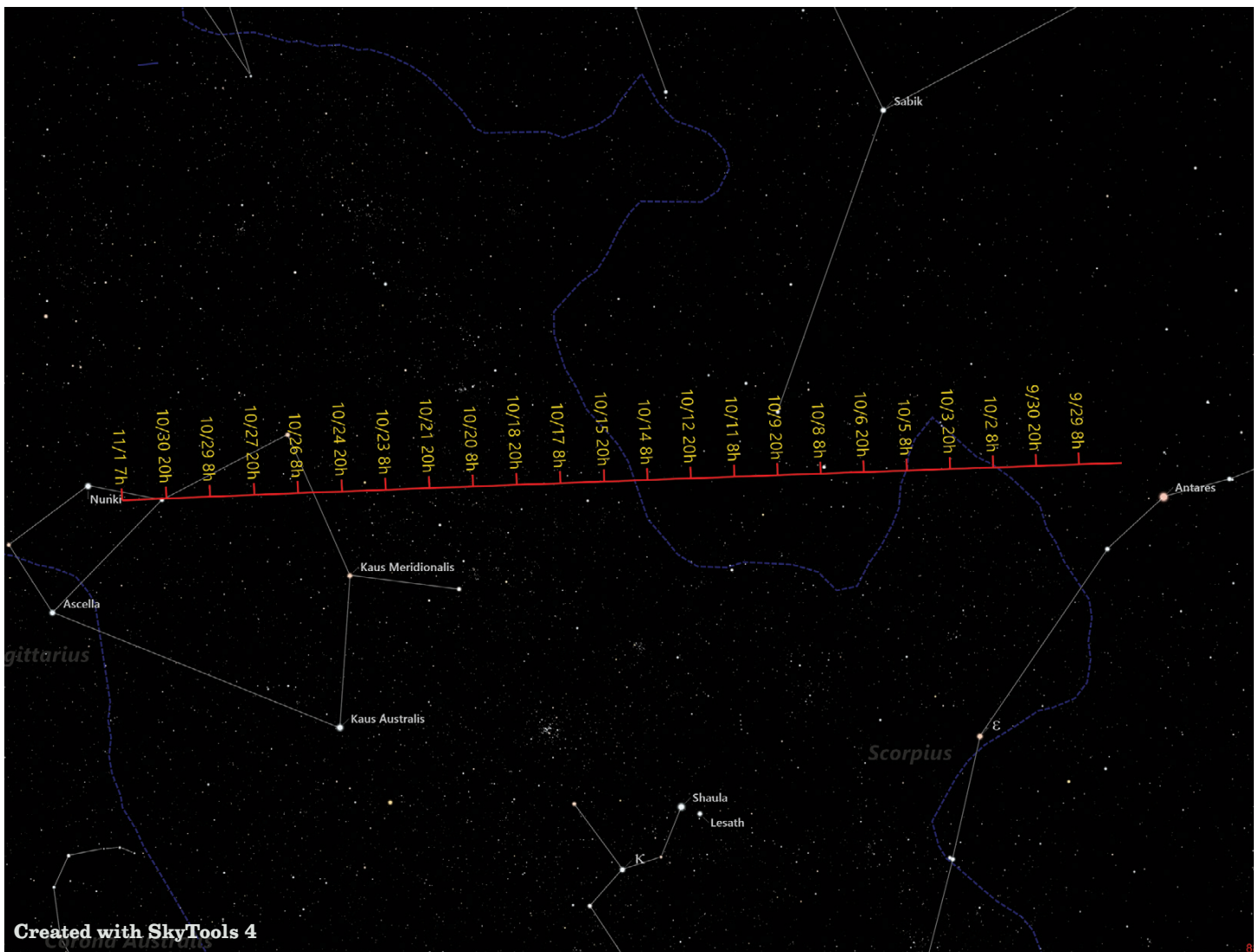


President, Bob Spohn, announced that LAS would be holding a raffle to bolster our meager treasury of \$20. Kevin Clowers

presentation was about solar radiation and eye protection. He talked about how the eye works and how solar radiation, especially blue light, affects the tissues in the eye. Astronomers can improve dark adaptation by using eye protection filtering in afternoon before observing.

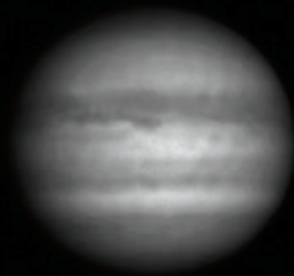
Comets in October

Comet 88P (Howell)

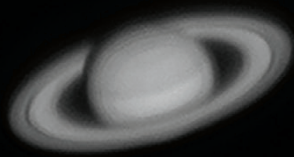


Comet 88P (Howell) was discovered on August 29, 1981 by Ellen Howell using photographic plates obtained by .46 meter Schmidt telescope at Palomar Observatory

Date	Optimal time	RA	Dec	Brightness	Size (arc min)	Constellation
Oct. 1	7:57 pm	16h51m57.3s	-26°10'32"	9.5	3.8	Scorpio
Oct. 8	7:46 pm	17h18m58.9s	-26°52'27"	9.6	3.7	Ophiuchus
Oct. 15	7:37 pm	17h46m36.0s	-27°15'18"	9.7	3.6	Sagittarius
Oct. 22	7:29 pm	18h14m30.0s	-27°18'06"	9.8	3.5	Sagittarius
Oct. 30	7:20 pm	18h46m16.6s	-26°56'39"	10.0	3.4	Sagittarius



Jupiter on Sept. 13 by Brian Kimball



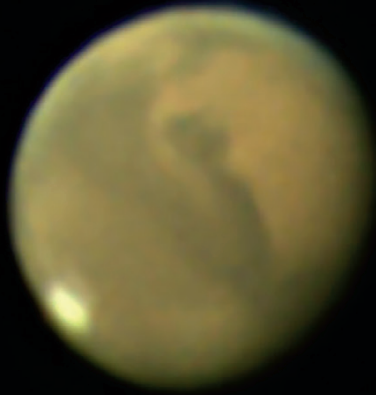
Saturn on Sept. 13 by Brian Kimball



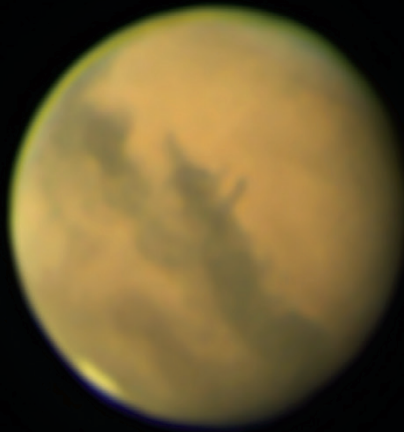
Mars on Sept. 22 by Gary Garzone



Saturn on Sept. 22 by Gary Garzone



Mars on Sept 2 by Vern Raben



Mars on Sept 13 by Vern Raben

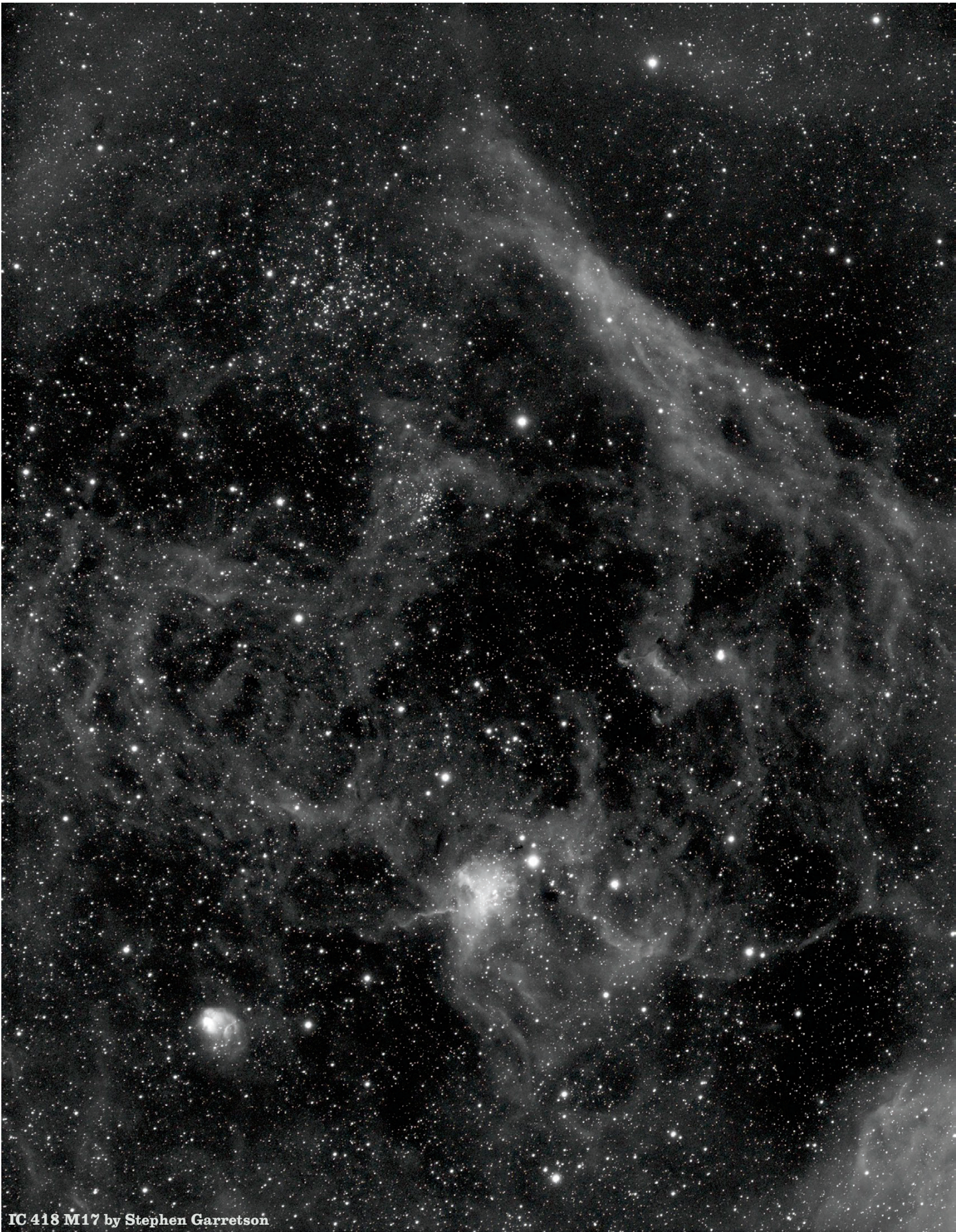


Sharpless 2-158 by Tally O'Donnell



"Smoke from Colorado Fire" by Bill Ferreira (Sept. 8)





IC 418 M17 by Stephen Garretson



Sharpless 2-202 by Stephen Garretson



Sharpless 2-140 by Stephen Garretson



Eagle Nebula by Jim Pollock



Iris Nebula by Jim Pollock



Horsehead Nebula by Jim Pollock



Smoke from Fire Smoke on Sept 8 by Bryan Wilburn



M8 East by M. J. Post



Helix Nebula by Eddie Hunnell



M33 by Eddie Hunnell



Owl Hollow Star Party on Sept. 12 by Jake Hout



NGC 6946 Fireworks Nebula by Eddie Hunnell

Summary of Sept. 17, 2020 Meeting

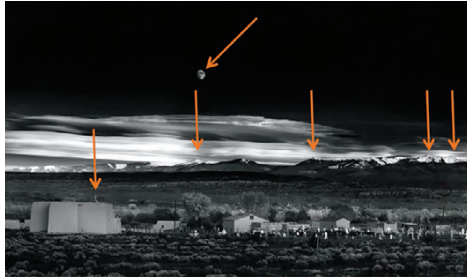
The meeting was called to order at 7 pm by vice president Stephen Garetson. He introduced the speaker, David Elmore, Astronomer Emeritus, National Solar Observatory.

David's presentation was about using astrometry to date the photograph, "Moonrise Hernandez New Mexico" taken by Ansel Adams. The photograph is the most expensive print ever sold, \$609K. Adams had a contract with the US Government to take photographs for a government building in DC. He took three trips New Mexico to obtain images for the project in 1941, 42, and 43. He kept copious notes about the settings and techniques he used to produce the photograph but didn't know which trip. Beaumont Newhall wrote a book, "History of Photography", and was interested in knowing when Ansel Adams actually took the photograph. In 1980 he wrote letters to observatories across the United States. One of the letters went to one of David's friends, Dick Fowler, who was at the Sac Peak Observatory in Sunspot NM. Fowler sent the letter along to David. In the letter, Newhall inquired whether the phase and position of the moon in the photo could be used to determine the date it was taken. David contacted Newhall and visited the church and graveyard in Hernandez NM to see whether dates on the graves could determine the year. That didn't work out.

To calculate the date of the photo he had to determine the azimuth and altitude of features in the photograph and then compute the azimuth and altitude of objects in the sky for various dates to find a match.

First problem was to determine where

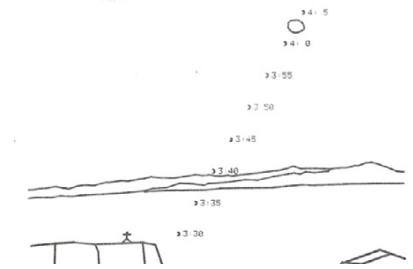
Adams was located when he took the photo. With a compass David shot alignments of various objects in the landscape. When he got everything to align he was standing in the south bound lane of the 1980s two lane highway through Hernandez. When



he got back to Sunspot, NM he used a topographic map of the area and plotted the angles of various peaks in the Sangre de Cristo mountains visible in Adam's photo and compared them with azimuths he had shot when in Hernandez. Since the peaks were at different distances he calculated curvature of earth for each to get a corrected altitude. This enabled him to improve the azimuths he had taken in Hernandez.

Next step was to calculate the position of the moon for a series of dates. Back in 1980 astronomy apps such as Sky Safari did not exist. There was a computer programmer working at Sac Peak who was also an astrologer. Astrologers need to know where the moon and planets are so the programmer had written a Fortran program that calculated position of celestial objects for any date and time. David copied the program from the card deck onto magnetic tape and stored it on his computer. He traced features in the Ansel Adams photo with a Tektronix 4010 graphics terminal. He then wrote a wrapper around the astrology program so he could plot positions of the moon for various dates starting in 1944 and worked his way back. When

it got to Halloween in 1941 he found a nice match at 4:03 pm. He notified Beaumont Newhall so he could document the date in his various texts. Newhall notified Ansel Adams who sent David a post card on the back of




a "Moonrise Hernandez New Mexico" image.

The 50th anniversary of the Hernandez photograph was in 1991. That year was also the 50th anniversary of Sky & Telescope Magazine. Dennis di Cicco decided that the phase of the moon didn't look quite right and thought the image was taken the next day. He contacted David thinking there was probably an error. David reviewed his notes and calculations and realized he had misplaced the elevation of the horizon. The new official date is now 4:41 pm Nov 1, 1941.

During the business meeting Bruce Lamoreaux, Treasurer, talked about membership payments the past month. Total assets remain around \$16.5K and we have 82 members.

Vern Raben talked about the 2021 club calendar. The goal is to have the calendar available for distribution for the Nov. 19 meeting. This means that images must be sent to him by Fri. Oct. 23. The calendar committee will select images to be in the calendar on Sat. Oct 24. It should cost approximately \$4 to print the calendars and \$2 to mail. Final price of the calendars has not yet been set.



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TULIP NEBULA BY M. J. POST