Reflections

The Newsletter of the Popular Astronomy Club

ESTABLISHED 1936

Affiliated with

November 2020

President's Corner November 2020

Alan Sheidler

Welcome to another edition of the Popular Astronomy Club's monthly newsletter. November marks the start of a new fiscal year for PAC. I'm sure you will agree 2020 has been quite a year. The Covid-19 pandemic has been and continues to be one of the biggest news items. With the virus forcing closures and lock downs all over the world, everyone has had to adjust. Schools and restaurants have been closed and many of us have been working remotely from home. PAC has had to cancel public outreach and monthly in-person club meetings. This has been a huge disappointment to many of us who enjoy conducting public observing sessions and doing presentations about the science of astronomy. The pandemic has forced all of us to adjust how we conduct business, go to school, teach, work, play and indulge our hobbies. For PAC, the cancellation of public outreach, though disappointing, has meant that many of us had more time on our hands to do astronomy related activities. I may be wrong (usually am), but I think this last year has had more club (private) observing sessions than any

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previous year. These club sessions have been perhaps a bit more focused and have allowed some of us to play with new cameras and imaging equipment. We also developed video astronomy capability which (I hope) we will eventually be able to use for public observing sessions once the pandemic subsides.

The other big thing we did together as a club this year was to totally refurbish the Paul Castle Observatory. I'm still amazed we started disassembly in May and by August had completely rebuilt the observatory and installed a new telescope. This project has been an unqualified success. We probably would not have been able to complete this as quickly as we did were it not for the virus. But virus or not, this confirms the enthusiasm of club members and the indomitable nature of amateur astronomers!

The additional free time also allowed many of us to redouble our observing programs and successfully earn awards for doing NCRAL Messier Seasonal Marathons. I am also amazed that PAC did not miss any regular club meetings. The last in-person meeting at the Butterworth Center was in March. It seems like a long time ago now, but remember the April meeting? Rather than cancelling the April meeting (as many other organiza-

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tions did as the virus threatened), we decided to try using Zoom videoconferencing to have a joint meeting with the Firebaugh Observatory—and it worked! With that early success behind us, we have continued using Zoom to conduct club meetings, and have not missed any of our regular club meetings. Last month's October PAC Banquet was no exception. Can you believe it? We had a "virtual" banquet! This 84th annual PAC banquet featured "food for thought rather than for the stomach". You can read about the banquet here in this newsletter, but it was a great one. Our featured speaker was Lisa Wells, remote observer for the Canada-France-Hawaii Telescope on Mauna Kea. She spoke for over an hour from her office on the Big Island of Hawaii and even took us on a virtual tour of observatory. Mahalo Lisa Wells for a great talk. November 9th's PAC meeting will feature a presentation about Pluto's geology and internal structure by Adeene Denton, PhD student from Purdue University. You won't want to miss this one. Because videoconferencing is enabling us to reach well beyond the local community for exciting speakers and interesting talks, I think it likely videoconferencing will be a component of all future meetings, in person or not. Keep looking up!

Al Sheidler

ANNOUNCEMENTS / INFO

NCRAL Seasonal Messier Marathon Program

NCRAL's Seasonal Messier Marathon observing program is NOT designed to qualify observers for the Astronomical League's Messier Observing program; the two programs are unrelated and observing requirements are quite different. In the NCRAL program, the main requirement is to quickly observe and essentially check off items from one of four seasonal lists of Messier objects as noted in the section to follow.

NCRAL recognition will consist a suitable printed certificate and a 3⁄4-inch enameled star pin (a different color for each season). There will be no direct cost to the membership for participating in the award program; the cost of the program (pins, certificates, mailers, postage) will be borne by the Region as a benefit of affiliation. Relevant program documents are linked below

NCRAL Seasonal Messier Marathon Program Rules

NCRAL WINTER Seasonal Messier List

NCRAL SPRING Seasonal Messier List

NCRAL SUMMER Seasonal Messier List

NCRAL AUTUMN Seasonal Messier List

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ANNOUNCEMENTS / INFO

Longtime PAC member Roberta Wright and her husband Lanny were involved in a serious car wreck on October 8 in Moline. Lanny is home recuperating and Roberta remains in the hospital due to her injuries. She is receiving Occupational, Physical, and Speech Therapy and anticipates being hospitalized for at least another week. Roberta would enjoy receiving cards as she continues the road to recovery.

Thanks, Al

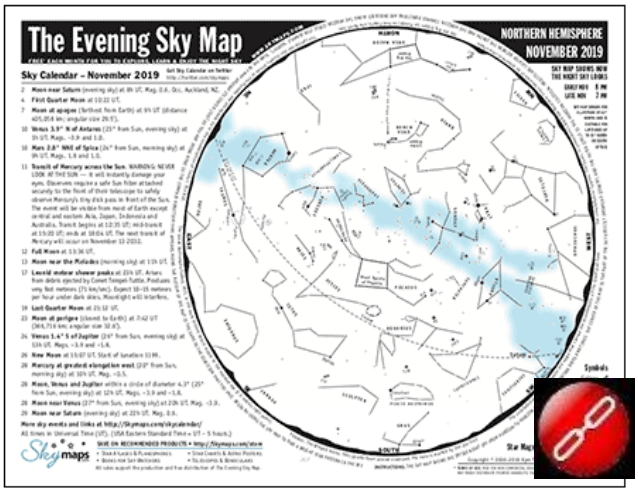
(Editors Note: If you need Roberta's address, please check membership list or email me (t_dufek@msn.com)

Astronomical League Observing Programs

The Astronomical League provides many different Observing Programs. These Observing Programs are designed to provide a direction for your observations and to provide a goal. The Observing Programs have certificates and pins to recognize the observers' accomplishments and for demonstrating their observing skills with a variety of instruments and objects

Thank you for Renewing Your Membership!

Wayland and Anne Bauer
Nancy Boelens
Rusty Case
Byron Davies
Terry Dufek
Dale and Joanne Hachtel
Paul Levesque
Gerald Pearson
John Schaub
Alan, Sara, and Eric Sheidler
Mark Schroeder
Stephen Sinksen
Roberta and Lanny Wright



Check out the North Central Region of the Astronomical League (NCRAL) online

PASSING

We are saddened to announce the passing of Popular Astronomy Club member ***Don Anderson*** *on July 23, 2020. He had 30 years with the club.*

He was 86 years old and living in Bettendorf at the time.

Don was born on April 20, 1934, in Vermont, Illinois, the son of Lyle and Manda (Heller) Anderson. He received his Bachelor of Science Degree from Western Illinois

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University in 1956 and a year later received his Master of Science Degree from Western Illinois University. He furthered his education with courses at Knox College and Southern Illinois University, to name a few. He married Norma Rae Longlett on June 27, 1959, in Liberty, Illinois.

Don began his career in education teaching science and mathematics at ROWVA High School. He later became Professor of Physics and Engineering at Black Hawk College, where he served as Department Chairman, Division Chairman, and Academic Advisor. He was a laboratory and teaching assistant at Western Illinois University. Don was an active member of Doric Lodge No. 319 and Scottish Rite and coordinate bodies. He was a member of Riverside United Methodist Church in Moline, where he was a teacher, part of the Church Council, as well as a Property Chairman. He enjoyed tending to his garden and reading. He also had a keen interest in astronomy, taking astronomy courses at the University of Tennessee. Above all, Don cherished his time with his grandchildren.

Below is a link to his page at Esterdahl Mortuary and Crematory.

Thank You Note!

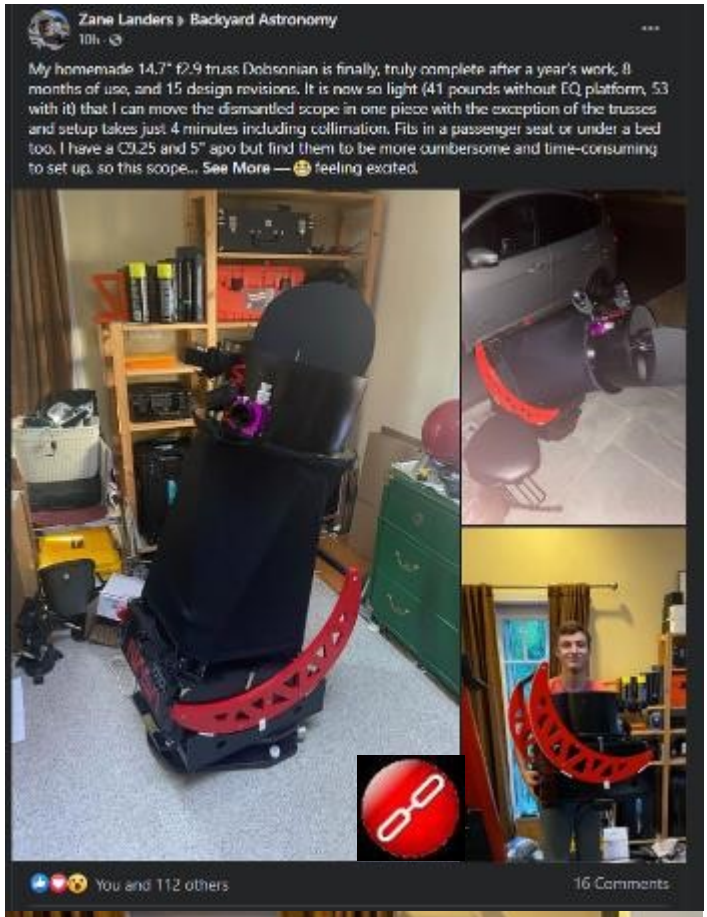
Oct 2, 2020

Al,

Thank you so much for showing me and my daughters all around the re-modeled Castle Observatory. The $1,000.00 enclosed is to go toward the upkeep of the Observatory — past or future! Please express my gratitude to everyone who had a hand in taking apart & re-assembling this special legacy of Paul's. I know it will continue to serve as a great resource for the Club.

God Bless,
Marietta

CONTRIBUTIONS



My homemade 14.7” f2.9 truss Dobsonian is finally, truly complete after a year's work, 8 months of use, and 15 design revisions. It is now so light (41 pounds without EQ platform, 53 with it) that I can move the dismantled scope in one piece with the exception of the trusses and setup takes just 4 minutes including collimation. Fits in a passenger seat or under a bed too. I have a C9.25 and 5" apo but find them to be more cumbersome and time-consuming to set up, so this scope is effectively my "grab n' go". My serious observing instrument is to be a 24" Dobsonian which I'm currently working on.

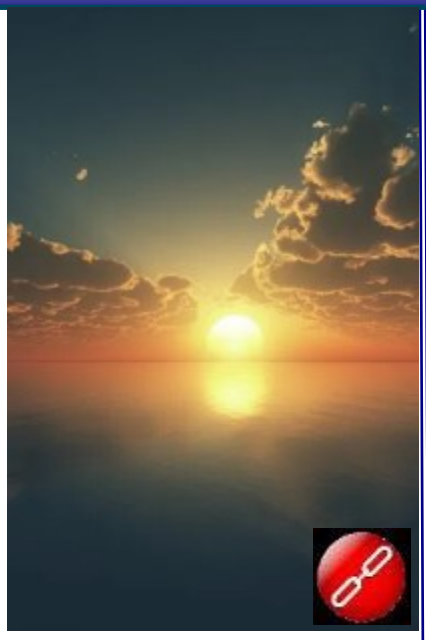
For those saying it’s too fast to be useful, I’ve seen the Heart Nebula and Galileo Regio on Ganymede visually and split 0.5-arcsec doubles with it. It is one of only a handful of scopes I’ve used or owned that can do the latter two and this is the only scope which with I’ve seen the former with. I have owned everything from Takahashi to Questar and this scope is "up there" in terms of image quality. I use a Tele-Vue Paracorr II for coma correction - coma is equivalent to an f12 instrument with the P2, aka zero. This should put any doubts about the image quality of a super fast scope to bed.

The mirror is 0.8" thick quartz and made by Nova Optical. The mirror cell is a modified Aurora Precision AZ-14.5 with roller bearing edge supports. The spider is a Destiny unit with a 3.5" Antares secondary and Kendrick dew heater attached; the focuser is a Moonlite dual speed with a 3D-printed curved base made by my friend Aaron Tragle. The upper tube assembly is a drum shell epoxied to a grooved ring based on the designs by Albert Highe, with homemade upper truss pole connectors and Moonlite-style lower truss connectors. The altitude bearings are 3/4" thick 26" diameter crescents made on a CNC machine by AstroCNC, with a cross bar in between them to prevent flexure. The mirror box is 3/4" plywood which is probably overkill but I find it easier to make 3/4" plywood boxes square and can use biscuits to aid in doing so. I sewed the shroud myself.

Today I just finished painting and assembling the EQ platform which the scope will be semi-permanently attached to most of the time. It is an Ed Jones unit that I bought unfinished and slightly tweaked/painted. It works great! — feeling excited.

CONTRIBUTIONS

BRITISH ASTROPHYSICISTS : “MINI ICE AGE IS ACCELERATING – NEW ‘MAUNDER MINIMUM’ HAS BEGUN” + THE BEAUFORT GYRE



(above) contributed by Al Sheidler

CONTRIBUTIONS

*Some **You Tube** videos for you to view while being home bound*

How We Nearly Lost A Third Shuttle | The Story Of Space Shuttle Atlantis | STS-27

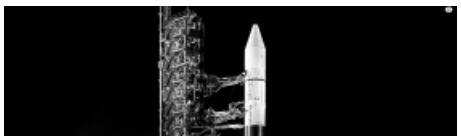
First Light - LMC & Vela Supernova Remnant

Tips for Photographing Planets like a PRO with Firecapture

I Designed my Ultimate Astrophotography Telescope

A Journey to the End of the Universe

What Did Mariner 10 See During Its Historic Journey To Venus and Mercury?



The Oort Cloud - The Solar System's Shell

Using an Atmospheric Dispersion Corrector to get a better view of the planets

The Brightest Stars In the Universe

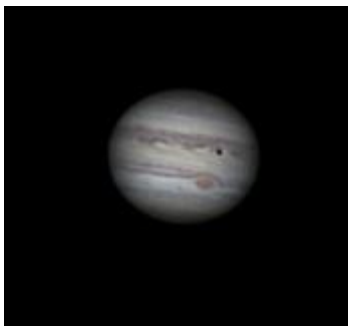
ASTRONOMY IN PRINT

Galileo's discovery of the moons of Jupiter disrupted conventional wisdom

By Paul Levesque

It was a warm night in August, and I had gathered with other members of the Popular Astronomy Club at the recently renovated Paul Castle Observatory in Milan for an observing session.

Soon after sunset, club president Alan Sheidler had the observatory's telescope trained on Jupiter. Minutes later, he announced that Jupiter's moon Io had just emerged, orbiting into view out of the shadow of largest planet in the solar system.



Jupiter's moon Io – one of the four "Galilean moons – appears as a black dot on the planet in this photo taken by Terry Dufek of the Popular Astronomy Club.

I looked through the telescope, and could distinctly see four points of light lined up on either side of Jupiter. These tiny dots were the four Galilean moons – Callisto, Europa, Ganymede and Io, the latter now seen just to the right of Jupiter from our terrestrial perspective.

They're called the Galilean moons because their discovery is credited to the great Galileo Galilea, an Italian born in 1564 who could fairly be described as the ultimate Renaissance man and who's proclaimed by some as both the "Father of Modern Astronomy" and the "Father of Modern Science."

The first telescope was patented in 1608, and within a year Galileo began designing and building better telescopes with increased magnification. He turned one of his telescopes to the night sky and recorded his observations.

In January 1610, Galileo observed what he first thought were three fixed stars near Jupiter. He later

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saw a fourth – coming into view just as Io did on that night in August - and his observations over the next several weeks showed that these four "stars" seemed to move around Jupiter.

Galileo realized that the objects weren't stars at all, but in fact were natural satellites orbiting Jupiter. This directly contradicted the geocentric theory which dated back to ancient astronomy, and which held that the sun, moon, planets, stars and all other celestial objects rotated around Earth, fixed at the very center of the universe.

Geocentrism is alluded to several times in the Old Testament and so was deeply rooted in the theology of the Roman Catholic Church. Galileo, a practicing Catholic who once considered joining the priesthood and who was acquainted with priests and bishops, knew that his work would bring him into conflict with the then all-powerful church, but still went ahead and published his observations.

Nearly a century before Galileo, the Polish mathematician and astronomer Copernicus postulated that the sun, not Earth, was at the center of the universe, basing this theory on his own pre-telescopic observations and calculations. Galileo's observations of the moons of Jupiter provided physical proof of Copernicus' heliocentric theory, which had previously been seen by the church and others as merely a mathematical hypothesis.

In 1616, a commission formed by the Catholic Inquisition proclaimed heliocentrism to be "foolish and absurd… since it contradicts… the sense of Holy Scripture." Galileo was ordered to "abandon completely… the opinion that the sun stands still at the center of the (universe)."

Though he didn't really change his mind, Galileo laid low for the next several years. Then, a bishop who was a friend and admirer of Galileo became Pope Urban VIII. This emboldened Galileo, who in 1632 published a book titled "Dialogue Concerning

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the Two Chief World Systems."

The book was formatted as a debate between two individuals advocating the geocentric and heliocentric theories. The geocentric argument was made by Simplicio, a name that could be translated as "Simpleton." This fictional character came across as a fool and was seen by some as a stand-in for a church official, perhaps even the pope himself.

This was simply more than the church hierarchy could bear, so Galileo was charged with heresy and called to Rome to be tried by the Inquisition. In June 1633, the inquisitors sentenced Galileo to house arrest, banned his publications, and directed him to recant the theory of the sun-centered universe.

Legend has it that, as he departed his trial, Galileo muttered, "And yet it moves." Though he probably never said those words, he continued his groundbreaking scientific work under house arrest until his death in 1642.

In October of 2018, I visited the Museo Galileo in Florence, Italy. The items on display at the museum include originals and replicas of some of the telescopes used by Galileo, as well as the middle finger of Galileo's right hand, encased in glass.

I don't know if this display is intended as a symbol of defiance, but I do know that Galileo boldly defied conventional wisdom, and that his theory of the universe is no longer considered heretical. In the centuries that have passed since Galileo turned his telescope toward Jupiter, we've learned that our solar system is nowhere near the center of the universe, and that our sun is merely one of countless stars that far outnumber the grains of sand on all the world's beaches.

As an atonement for trying Galileo, the Vatican now maintains its own observatory near Rome and also operates a telescope at an international observatory in Arizona. The astronomers working at these places are keeping the spirit of Galileo alive, pursuing

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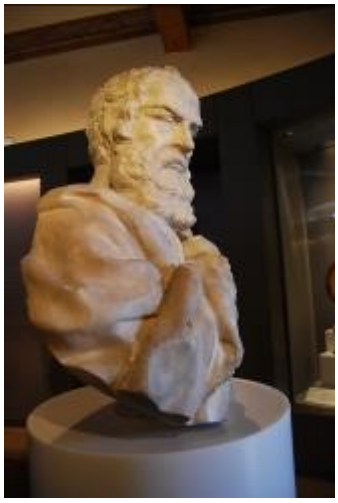
knowledge that could someday disrupt present-day theories of our place in the universe.

Paul Levesque is a member of the Popular Astronomy Club. The club has suspended its monthly public observing sessions at Niabi Zoo and other public events due to the coronavirus pandemic but will resume them as soon as it is safe to do so. Visit the PAC website at www.popularastronomyclub.org for more information.



(above) The artifacts on display at the Museo Galileo in Florence, Italy, include a bust of Galileo; his preserved middle finger; and a replica of the telescope he used to view Jupiter's moons and other objects. (Photos by Paul Levesque)

October 2020

The long summer of 2020

By David H. Levy

When Earth crossed the summer solstice on June 21, 2020, we were all mired in the midst of the most serious pandemic in more than a century. Summer is the most important season for me for one reason: it was many years ago, during the Summer of 1960, that I fell in love with the night sky. This summer just concluded had a start filled with disappointment.

On June 21, 1960, I was riding my bicycle to school when its front wheel struck a curb and broke my arm. My cousin, Roy Kaufman, gave me a book about the planets as a get-well present. I read and reread that book all summer, and by September I was enjoying my first look through a telescope, at the planet Jupiter. The view of the planet with its bands of color, combined with its four big moons, was one I have never forgotten. To this day Jupiter remains my favorite planet. As I never tire of looking at this world, I was able to view Jupiter this summer also.

The summer of 2020 began with a huge handicap, but something appeared in the sky that quickly altered my perception. That something was Comet Neowise. Not since Comet McNaught in 2007 has such a bright comet graced our sky. I first saw Neowise on the morning of July 5. The full Moon was setting in the west, and the sky was brightening rapidly in the east. With a pair of good binoculars I found Capella, then carefully moved them toward the eastern horizon. Suddenly, the beautiful comet made its appearance with a bright glowing head and a brilliant tail. As the comet faded slightly over the next few days its tail grew longer.

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Comet Neowise might have been a highlight of this Summer season, but there were other highpoints. Over the course of the summer I enjoyed sixteen "AN" or all night observing sessions, nights under the sky that went on from dusk to dawn. Most of these were interrupted by lengthy periods of rest during which I would watch some television, but the final one was not. Session 21755AN2 began when my friend David Rossetter and I observed for several hours at the dark site run by the Tucson Amateur Astronomers Association. One back home, I enjoyed more hours searching for comets until dawn spelled an end.

Searching for comets is something I have enjoyed for many years. It is an activity of which I never tire, even though I have not found a new comet since October 2006. After all, the search is what is so important to me. It is refreshing, it is fun, and it recharges my soul and my spirit.

UPCOMING EVENTS

Date: November 9th, 2020

Event: PAC Regular Meeting
Location: Zoom (*details to follow*)
Program Speaker: Adeene Denton *(see bio this page)*

All these dates and times are Tentative due to conditions! Please check your emails for any updates as to whether the Event will Occur!

- **November 21st, 2020** Niabi Outreach at sunset **(CANCELLED)**
- **December 14th, 2020 PAC** Business meeting at Butterworth Center at 7:00 PM. Program: Year in Review with Roy Gustafson
- **January 11th, 2021** PAC regular meeting at Butterworth Center at 7:00 PM. Presentation: Cosmic Horizons - Chuck Allen, Vice President, Astronomical League - See bio in December Newsletter
- **February 8th, 2021** PAC regular meeting at Butterworth Center at 7:00 PM. Presentation: "The Year In Space" program by Larry Boyle, Chicago Society for Space Studies, via Zoom.
- **March 8th,2021** PAC Business Meeting 7:00 PM Presentation: Smorgasbord
- **April 12th,2021** PAC Regular Meeting 7:00 PM Presentation: "Skies and Skywatchers of Ancient North America" Bill Iseminger, Cahokia Mounds State Historic Site
- **May 10th, 2020** PAC Regular Meeting at Butterworth Center at 7:00 PM. Presentation: "NASA Solar Missions", program by Dr. Therese Kucera, NASA Goddard, via Zoom

Mark your calendars and watch upcoming e-mails for more information!

The Binocular Sky

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"Exploring Pluto after New Horizons: Oceans, Volcanism, and Habitability at the Edge of the Solar System"

Adeene Denton is a scientist and historian approaching future planetary exploration from a humanistic perspective. She is a Ph.D. student in planetary geology at Purdue University. She holds undergraduate degrees in geophysics and history from Rice University and a Masters in planetary geology from Brown University. Her thesis work focuses on understanding Pluto's most massive impact basin, Sputnik Planitia, and what it reveals about the dwarf planet's hidden interior. She is an avid writer, dancer, and choreographer, creating work focused on the socio-political implications of space exploration. She can be found on Twitter @spacewhalerider and at adeenedenton.com.

Here's an abstract of the talk: Prior to the New Horizons flyby in 2015, knowledge regarding the surface geology and interior structure of Pluto, the Kuiper Belt's foremost representative, was limited to rudimentary density and surficial composition estimates. The surface of Pluto that emerged following the flyby is complex, covered in globe-spanning canyon systems, extensive glaciation by nitrogen and methane ices, and dominated by the massive Sputnik Planitia basin, and leaves us with more questions than answers. Could Pluto have hosted an ocean beneath its thick, cold ice shell? Could conditions hospitable to life persist over 5 billion kilometers from the Sun?

SIGN UP REPORT

MONTH	NEWSPAPER ARTICLES	CONSTELLATION REPORT	PROGRAM
AUG 2020	Al Sheidler	None Scheduled	PICNIC
SEPT 2020	Ian Spangenberg	None Scheduled	Mr. Zach Luppen, University of Iowa, Zach will discuss the upcoming JUICE and Europa Clipper Missions)
OCT 2020	Paul Levesque	None Scheduled	Virtual Banquet
NOV 2020	Dale Hachtel	None Scheduled	Presentation by Adeene Denton "Exploring Pluto after New Horizons: Oceans, Volcanism, and Habitability at the Edge of the Solar System" via Zoom (see Nov. Newsletter)
DEC 2020	Terry Dufek		Roy Gustafson (Year n Review)
JAN 2021		None Scheduled	Presentation: Cosmic Horizons - Chuck Allen, Vice President, Astronomical League via Zoom See bio in December Newsletter
FEB 2021		None Scheduled	"The Year In Space" program by Larry Boyle, Chicago Society for Space Studies, via Zoom.
MAR 2021			SMORGASBORD (SEE BELOW)
APR 2021		None Scheduled	Presentation: "Skies and Skywatchers of Ancient North America" Bill Iseminger, Cahokia Mounds State Historic Site via Zoom
MAY 2021		None Scheduled	"NASA Solar Missions", program by Dr. Therese Kucera, NASA Goddard, via Zoom
JUN 2021		None Scheduled	"Association of Lunar and Planetary Observers", program by Matthew Will, Secretary & Treasurer ALPO, via Zoom
JUL 2021		None Scheduled	Green Bank Observatory - Virtual Tour and Current Projects

Editors Note: *If you are interested in contributing/ participating in the above programs, sign ups are available at the monthly meeting or please let The Vice President and Editor know what you are good to go with.. Any corrections please send to Vice President and Editor. This will be updated every issue.*
Thank you

All these dates and times are Tentative due to conditions! Please check your emails for any updates as to whether the Event will Occur!

SMORGASBORD

MARCH

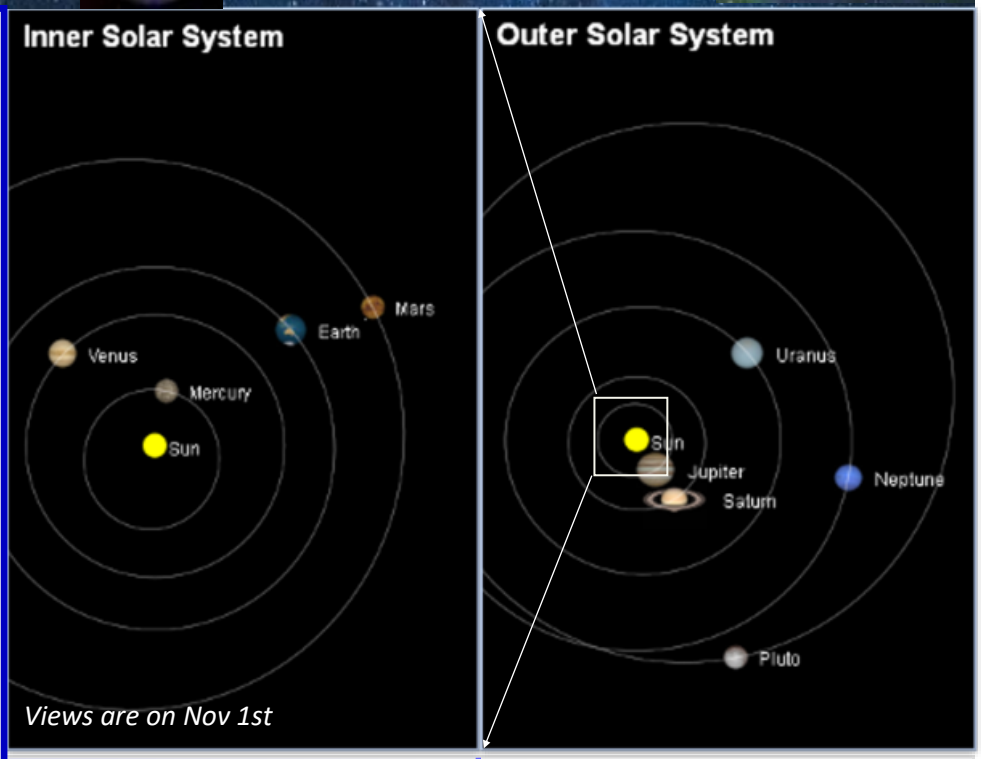
JUNE

SEPTEMBER

ASTRONOMICAL CALENDAR OF EVENTS

THE PLANETS November 2020

Nov 01 02:00 **Daylight Savings Time ends**
Nov 01 21:00 **Mercury at Perihelion**
Nov 03 00:58 Aldebaran 4.6°S of Moon
Nov 03 20:39 Moon at Ascending Node
Nov 05 00:00 S Taurid Meteor Shower
Nov 06 13:52 Pollux 3.9°N of Moon
Nov 07 13:34 Beehive 2.3°S of Moon
Nov 08 07:46 **LAST QUARTER MOON**
Nov 09 04:20 Regulus 4.7°S of Moon
Nov 10 11:00 **Mercury at Greatest Elong: 19.1°W**
Nov 11 23:00 N Taurid Meteor Shower
Nov 12 15:30 Venus 3.1°S of Moon
Nov 13 14:45 Mercury 1.7°S of Moon
Nov 14 05:48 **Moon at Perigee: 357839 km**
Nov 14 23:07 **NEW MOON**
Nov 16 07:27 Venus 3.6°N of Spica
Nov 16 18:07 Moon at Descending Node
Nov 17 05:00 Leonid Meteor Shower
Nov 19 02:54 Jupiter 2.5°N of Moon
Nov 19 08:57 Saturn 2.9°N of Moon
Nov 21 22:45 **FIRST QUARTER MOON**
Nov 25 13:45 Mars 4.9°N of Moon
Nov 26 18:29 **Moon at Apogee: 405891 km**
Nov 30 03:30 **FULL MOON**
Nov 30 03:43 Pen. Lunar Eclipse; mag=0.829
Nov 30 07:07 Aldebaran 4.6°S of Moon



The Sun is in Libra on November 1st. It moves into Scorpio on November 22nd and Ophiuchus on November 29th.

Mercury is in Virgo on Nov 1st (mag: 1.19, dia: 8.82", illuminated: 17.2%). It is 13 1/2º west of the Sun in the early morning sky. It is 5 3/4º off the E-SE horizon at 6AM. It gains altitude until the 8th (9 1/2º) and then plunges back toward the Sun. The 27.6-day old Moon is about 4º above it on the 13th to help you guide toward it. By the 30th, Mercury is mag -.75 and 10 ¾ º west of the Sun but hard to see at 4 ¾ º off the SE-E horizon at 6:45AM.

Venus is in Virgo on November 1st (mag: -3.97, dia: 13.10", illuminated: 81.5%). It is 14 ½ º above the E-SE horizon at 5 AM. On the 13th, the 27.6-day old Moon is 7 ¾ º to the lower left of Venus at 5 AM. It stays about the same size and brightness throughout the month.

Mars is in Pieces on November 1st (mag -2.11, dia 19.89"). It is past opposition but still is good for observing. It is in the Evening sky, 22º above E-SE horizon at 6 PM. On the 25th, the Moon, 10.9 days old, passes 4 ¾ º south of the red planet. On the 12th, it begins retrograde motion. By the 30th, the magnitude has dimmed to -1.14 with the diameter shrunk to 14.60".

Jupiter is in Sagittarius on November 1st (mag: -2.16, dia: 36.85"). It is low in the S-SW sky at 6PM. Jupiter is 24º off the horizon at that time. Saturn is 4 ½ º to the east and growing closer to its grand conjunction next month. On the 18th, the 4-day old Moo is 6º to the lower right of Jupiter. By the 30th, Saturn is just 2 º away from the giant planet. Jupiter is just 16º off the SW horizon at that time.

Saturn is in Sagittarius on November 1st (mag: .59, dia: 16.32", rings: 38.01"). Jupiter is 4 ½ º to the west and grows closer to less than 2º at month end. M75 is 1 ½ º to the east on the 30th.

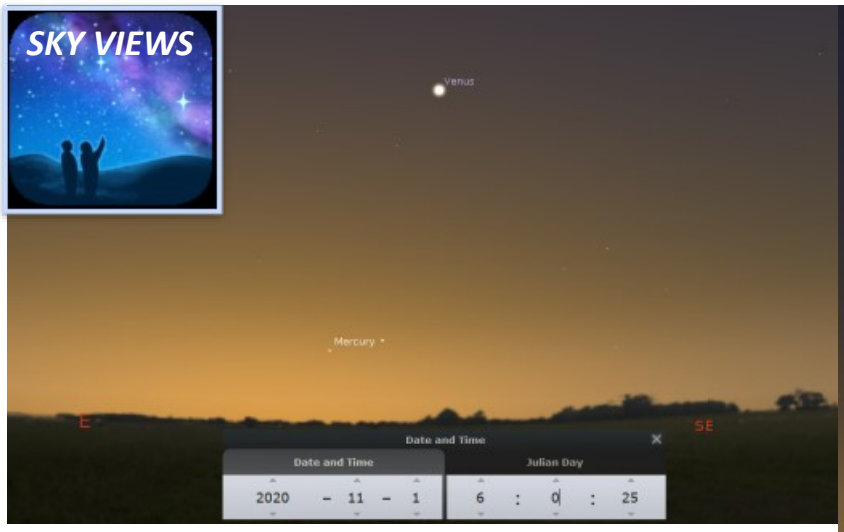
Uranus is in Aries on November 1st (mag 5.66, dia: 3.75". It 45 ¾ º above the E-SE horizon at 9:00 PM. It is about equidistant between the ¾ Moon and Mars.

Neptune is in Aquarius on November 1st (mag: 7.85, dia: 2.33"). It is 42 ½ º above the southern horizon at 9:00 pm.

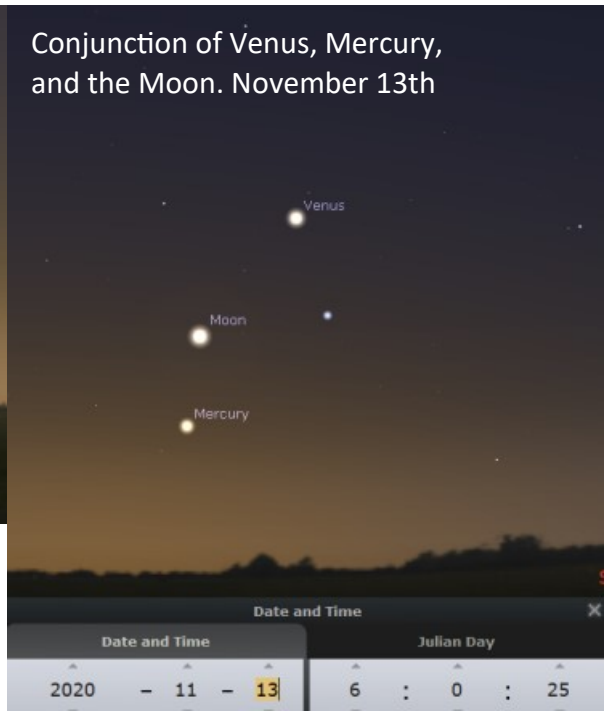
Pluto is in Sagittarius on November 1st. (mag: 14.34, dia: .10"). It lies between Jupiter and Saturn.

Ceres is in southern Aquarius on November 1st (mag 8.7). It is on the southern meridian at 7:19 pm and 25º above the horizon

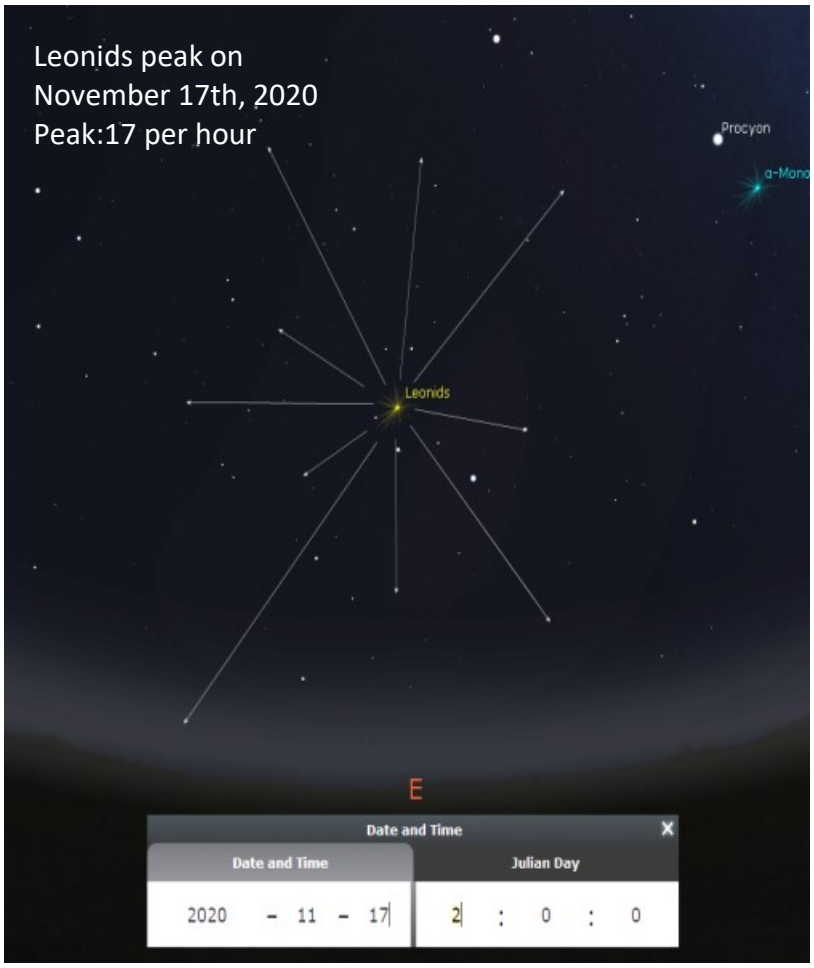
SKY VIEWS



Conjunction of Venus, Mercury, and the Moon. November 13th



Leonids peak on November 17th, 2020
Peak:17 per hour



Conjunction of Jupiter, Saturn and the Moon. November 19th

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Planetary Alignments in November 2020

Phenomenon	Date and Time	Object 1	Object 2	Separation
Occultation	2020-11-10 12:48:20	Jupiter	Io (JI)	—
Occultation	2020-11-11 09:22:53	Jupiter	Callisto (JIV)	—
Occultation	2020-11-11 09:22:53	Jupiter	Callisto (JIV)	—
Occultation	2020-11-12 07:46:33	Jupiter	Ganymede (JIII)	—
Conjunction	2020-11-12 15:11:16	Jupiter	Pluto	+0°41'06.7"
Occultation	2020-11-16 11:17:24	Jupiter	Europa (JII)	—
Conjunction	2020-11-19 03:29:38	Jupiter	Moon	+2°44'46.9"
Transit	2020-11-19 17:28:38	Jupiter	Callisto (JIV)	—
Transit	2020-11-20 06:38:28	Jupiter	Io (JI)	—
Conjunction	2020-11-13 16:37:08	Mercury	Moon	+0°40'10.0"
Conjunction	2020-11-14 23:09:29	Moon	Sun	+1°54'53.1"
Conjunction	2020-11-23 08:24:57	Neptune	Moon	+4°42'36.4"
Conjunction	2020-11-19 07:49:48	Saturn	Moon	+3°20'39.5"
Conjunction	2020-11-27 12:52:08	Uranus	Moon	+3°52'52.1"
Conjunction	2020-11-12 18:01:31	Venus	Moon	+1°56'38.7"

From stellarium

From in the sky. org

Double Stars in November

Object	RA	Declination	Magnitude	Separation	PA	Year
Eta Cassiopeiae	$00^h 49^m.1$	+57° 49'	3.5, 7.4	13.2"	323°	2012
65 Piscium	$00^h 49^m.9$	+27° 43'	6.3, 6.3	4.3"	115°	2013
Psi 1 Piscium	$01^h 05^m.6$	+21° 28'	5.3, 5.4	29.7"	159°	2012
Zeta Piscium	$01^h 13^m.7$	+07° 35'	5.2, 6.3	22.8"	63°	2012
Gamma Arietis	$01^h 53^m.5$	+19° 18'	4.5, 4.6	7.2"	2°	2013
Lambda Arietis	$01^h 57^m.9$	+23° 36'	4.8, 6.6	37.1"	48°	2012
Alpha Piscium	$02^h 02^m.0$	+02° 46'	4.1, 5.2	1.7"	266°	2012
Gamma Andromedae	$02^h 03^m.9$	+42° 20'	2.3, 5.0	9.4"	63°	2013
Iota Trianguli	$02^h 12^m.4$	+30° 18'	5.3, 6.7	3.8"	69°	2012
Alpha Ursa Minoris	$02^h 31^m.8$	+89° 16'	2.1, 9.1	18.1"	233°	2013
Gamma Ceti	$02^h 43^m.3$	+03° 14'	3.5, 6.2	2.1"	298°	2012
Eta Persei	$02^h 50^m.7$	+55° 54'	3.8, 8.5	31.4"	295°	2012
Struve 331	$03^h 00^m.9$	+52° 21'	5.2, 6.2	11.9"	85°	2012
32 Eridani	$03^h 54^m.3$	-02° 57'	4.8, 5.9	6.9"	348°	2013
61 Cygni	$21^h 06^m.9$	+38° 45'	5.2, 6.1	31.5"	152°	2013
Beta Cephei	$21^h 28^m.7$	+70° 34'	3.2, 8.6	14.1"	248°	2013
Struve 2816	$21^h 39^m.0$	+57° 29'	5.7, 7.5, 7.5	11.8", 19.8"	120°, 338°	2012
Epsilon Pegasi	$21^h 44^m.2$	+09° 52'	2.5, 8.7	145.4"	318°	2013
Xi Cephei	$22^h 03^m.8$	+64° 38'	4.5, 6.4	8.1"	268°	2013
Zeta Aquarii	$22^h 28^m.8$	-00° 01'	4.3, 4.5	2.3"	165°	2013
Delta Cephei	$22^h 29^m.2$	+58° 25'	4.2, 6.1	40.9"	191°	2013
8 Lacerta	$22^h 35^m.9$	+39° 38'	5.7, 6.3	22.4"	186°	2012
94 Aquarii	$23^h 19^m.1$	-13° 28'	5.3, 7.0	12.6"	349°	2012
Sigma Cassiopeiae	$23^h 59^m.0$	+55° 45'	5.0, 7.2	3"	326°	2012

From the Astronomical League

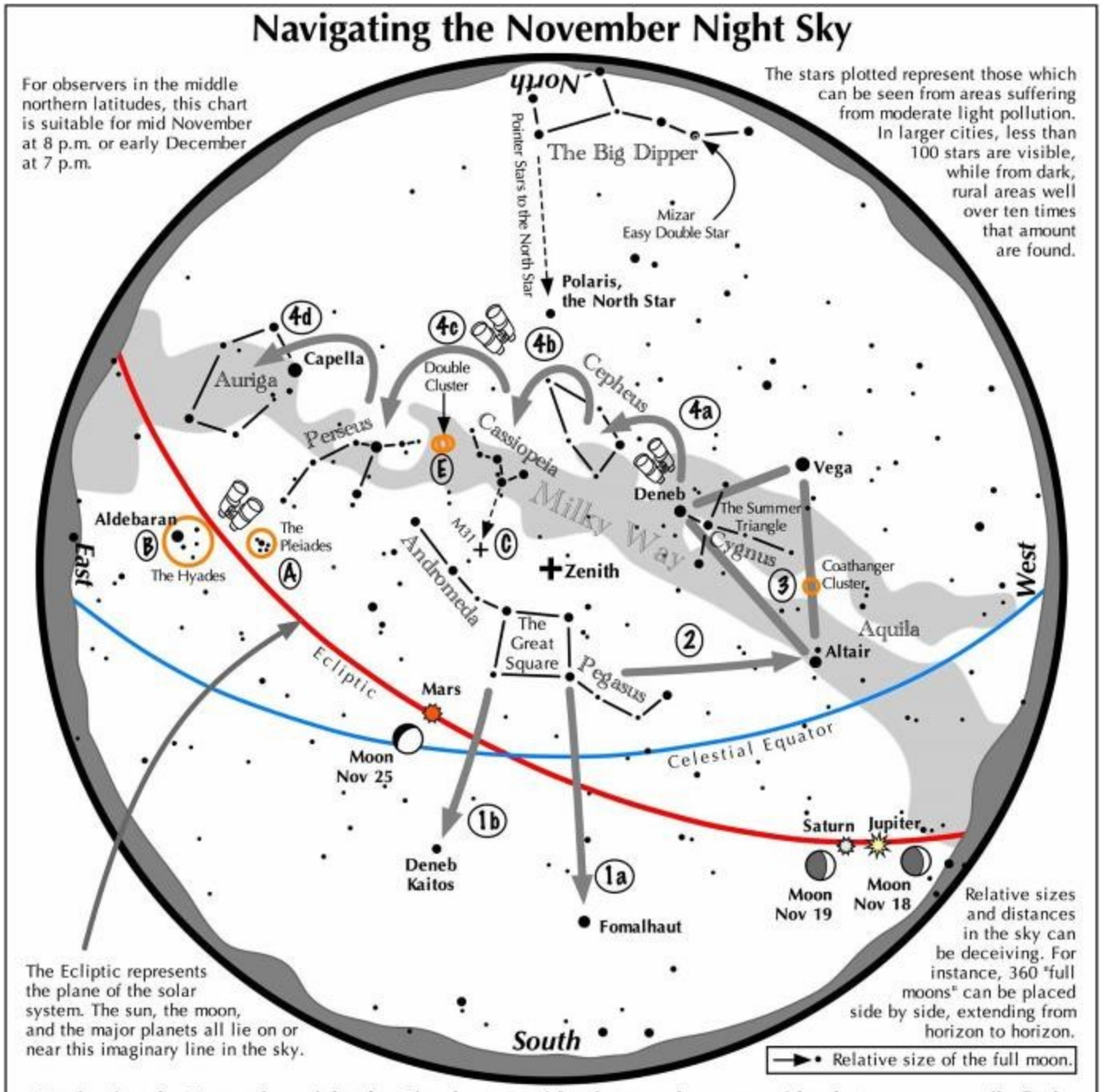
DEEP SKY WONDERS

For November Evening Skies

Name	RA (J2000)	Dec (J2000)	Mag.	A.S., '	Transit	Type
IC 10 (Starburst Galaxy)	0h20m23.2s	+59°17'34.7"	9.66	10.000	21h39m	galaxy
IC 127	1h29m47.6s	-6°58'48.2"	9.44	1.955	22h48m	galaxy
IC 1590	0h52m49.0s	+56°37'40.8"	7.55	25.000	22h11m	open star cluster
IC 1613	1h04m47.8s	+2°07'04.0"	9.42	30.700	22h23m	galaxy
IC 1805 (Heart Nebula)	2h32m42.0s	+61°27'00.0"	6.64	120.000	23h52m	cluster associated with nebulosity
IC 1848 (Soul Nebula)	2h51m06.5s	+60°24'36.0"	6.64	50.000	0h10m	open star cluster
M 103	1h33m23.0s	+60°39'00.0"	7.55	6.000	22h52m	open star cluster
M 110	0h40m22.1s	+41°41'07.1"	8.23	32.900	21h59m	galaxy
M 31 (Andromeda Galaxy)	0h42m44.3s	+41°16'07.5"	3.59	250.800	22h01m	galaxy
M 32	0h42m41.8s	+40°51'54.6"	8.24	15.000	22h01m	galaxy
M 33 (Triangulum Galaxy)	1h33m50.9s	+30°39'35.8"	5.87	110.300	22h52m	galaxy
M 34 (Spiral Cluster)	2h42m05.0s	+42°45'43.2"	5.33	25.000	0h01m	open star cluster
M 52 (Cassiopeia Salt-and-Pepper Cluster)	23h24m48.0s	+61°35'34.8"	7.08	16.000	20h43m	open star cluster
M 74 (Phantom Galaxy)	1h36m41.8s	+15°47'00.5"	9.55	20.000	22h55m	galaxy
M 77 (Cetus A)	2h42m40.8s	-0°00'47.8"	9.05	13.100	0h01m	galaxy
NGC 1023 (Perseus Lenticular Galaxy)	2h40m24.0s	+39°03'47.7"	9.48	7.963	23h59m	interacting galaxy
NGC 1027	2h42m43.0s	+61°37'58.8"	6.84	18.000	0h02m	open star cluster
NGC 129	0h30m00.0s	+60°13'04.8"	6.66	21.000	21h48m	open star cluster
NGC 147	0h33m12.1s	+48°30'31.5"	9.66	21.000	21h52m	galaxy
NGC 185	0h38m58.0s	+48°20'14.6"	9.35	21.700	21h57m	galaxy
NGC 188 (Polarissima Cluster)	0h48m25.9s	+85°15'18.0"	8.28	15.000	22h08m	open star cluster
NGC 225 (Sailboat Cluster)	0h43m39.1s	+61°46'30.0"	7.16	12.000	22h02m	open star cluster
NGC 247 (Burbidge Chain)	0h47m08.6s	-20°45'37.4"	9.58	28.300	22h05m	active galaxy
NGC 457 (Dragonfly Cluster)	1h19m35.0s	+58°17'13.2"	6.55	20.000	22h38m	open star cluster
NGC 654 (Fuzzy Butterfly Cluster)	1h44m00.0s	+61°53'06.0"	6.65	5.000	23h03m	open star cluster
NGC 659 (Yin-Yang Cluster)	1h44m24.0s	+60°40'12.0"	8.04	5.000	23h03m	open star cluster
NGC 663 (Lawnmower Cluster)	1h46m08.9s	+61°14'06.0"	7.24	15.000	23h05m	open star cluster
NGC 7209 (Star Lizard Cluster)	22h05m07.0s	+46°28'58.8"	7.94	20.000	19h23m	open star cluster
NGC 7235	22h12m25.0s	+57°16'12.0"	7.91	4.000	19h30m	open star cluster
NGC 7243	22h15m07.9s	+49°53'52.8"	6.62	30.000	19h33m	open star cluster
NGC 7331 (Deer Lick Group)	22h37m04.1s	+34°24'57.3"	9.73	14.200	19h55m	galaxy
NGC 7380 (The Wizard Nebula)	22h47m20.9s	+58°07'55.2"	7.39	45.000	20h05m	cluster associated with nebulosity
NGC 7510 (The Dormouse Cluster)	23h11m00.0s	+60°34'12.0"	8.08	7.000	20h29m	open star cluster
NGC 752	1h57m41.0s	+37°47'06.0"	5.84	75.000	23h16m	open star cluster
NGC 7662 (Blue Snowball)	23h25m53.6s	+42°32'06.0"	8.49	0.877	20h44m	planetary nebula
NGC 7686	23h29m41.3s	+49°10'12.0"	5.78	14.000	20h48m	open star cluster
NGC 7789 (Caroline's Rose Cluster)	23h57m24.0s	+56°42'28.8"	6.87	30.000	21h16m	open star cluster
NGC 7790 (The Widow's Web Cluster)	23h58m24.0s	+61°12'28.8"	8.67	5.000	21h17m	open star cluster
NGC 869 (Double Cluster)	2h19m00.0s	+57°07'40.8"	3.94	30.000	23h38m	open star cluster
NGC 884 (Double Cluster)	2h22m23.0s	+57°07'30.0"	3.94	30.000	23h41m	open star cluster
NGC 957	2h33m21.1s	+57°33'36.0"	7.74	11.000	23h52m	open star cluster

** Data from Stellarium*

Navigating the November Night Sky



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

1. Face south. Almost overhead lies the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend a line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the south. A line extending southward from the two easternmost stars, passes Deneb Kaitos, the second brighest star in the south.
2. Draw a line westward following the southern edge of the Square until 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, then to Perseus, and finally to Auriga with its bright star Capella.

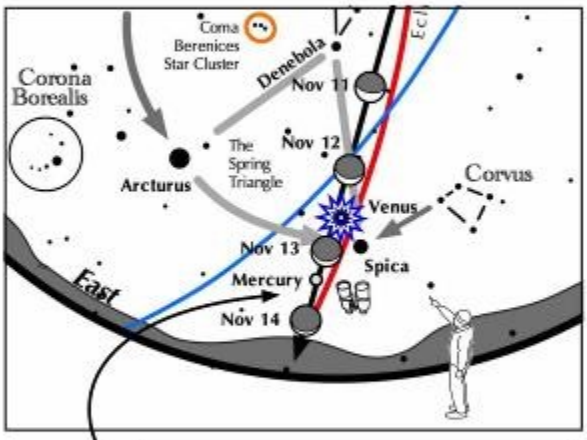
Binocular Highlights

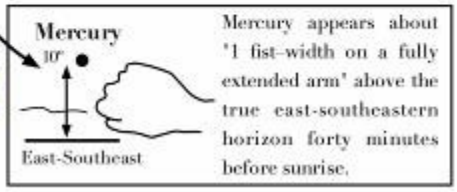
A and B: Examine the stars of the Pleiades and Hyades, two naked eye star clusters. **C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **D:** Sweep along the Milky Way from Altair, past Deneb, through Cepheus, Cassiopeia and Perseus, then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

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

Mercury, Venus, Spica, and the crescent Moon in the morning twilight

Have you ever spotted Mercury? Many stargazers have not. November 4 through November 22 presents a good opportunity to catch the elusive little planet in the morning sky.





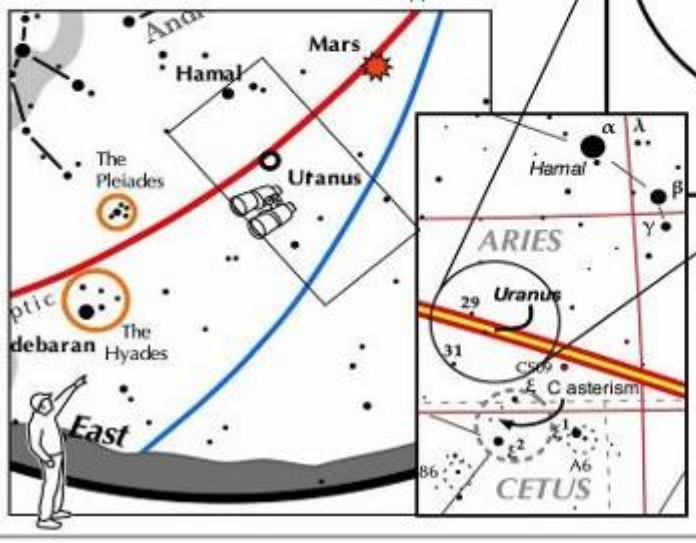
Mercury appears about '1 fist-width on a fully extended arm' above the true east-southeastern horizon forty minutes before sunrise.

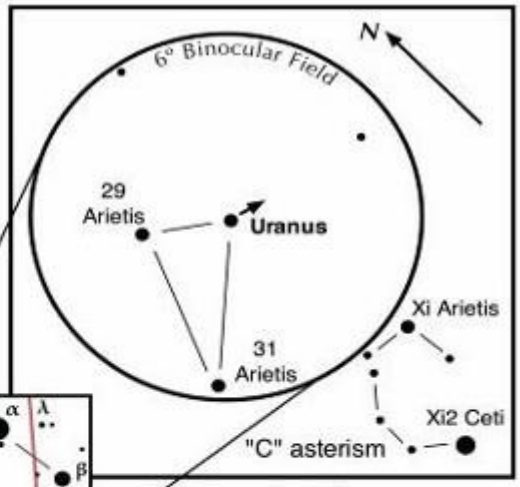
- Look low into the east-southeastern twilight **forty minutes before sunrise.**
- Mercury will be placed 1 fist width above the horizon on Nov. 6 – 15. Directly to its right, twinkles Spica on Nov. 2–7.
- Bright Venus is about twice the distance from the horizon as the dimmer Mercury.
- **The waning crescent Moon glows just above Venus on November 12; and between Venus and Mercury on November 13. Spica lies just to the right of the Moon.**
- Venus slides past Spica on November 17.

Have you ever seen Uranus, seventh planet from the Sun?

Uranus is difficult to spot with the unaided eye as it is about 5.6 magnitude.

1. Look to the east-southeast 10 – 11 pm on a moonless night in October.
2. Find the Pleiades star cluster in the east and bright Mars in the southeast.
3. Point binoculars half-way between the Pleiades and Mars.
4. Scan the area for a "C" shaped asterism of stars.
5. Uranus lies in the next binocular field to the upper left.





Binocular View

6. Binoculars should reveal a triangle of "stars" that are equally bright.
7. Uranus is the upper right object and may show a greenish cast. The other two are 29 and 31 Arietis.
8. Being so far from the Sun (and Earth – 1.8 billion miles), Uranus moves very little during the month.
9. A telescope at >100 power will show the planet's tiny 4 arc second disk.

Spotlight: NGC7027: Pink Pillow Nebula

.NGC 7027 is a very young and dense planetary nebula[located around 3,000 light years from Earth in the constellation Cygnus.
Discovered in 1878 by Édouard Stephan
NGC 7027 is one of the visually brightest planetary nebulae. It is about 600 years old
It is unusually small, measuring only 0.2 by 0.1 light-years, whereas the typical size for a planetary nebula is 1 light-year.
It has a complex shape, consisting of an elliptical region of ionized gas within a massive neutral cloud. The inner structure is surrounded by a translucent shroud of gas and dust. The nebula is shaped like a "clover leaf". NGC 7027 and is expanding at 17 kilometers per second. The central regions of NGC 7027 have been found to emit X-rays, indicating extremely high temperatures.
It is possible that the central white dwarf of NGC 7027 has an accretion disk that acts as a source of high temperatures. The white dwarf is believed to have a mass approximately 0.7 times the mass of the Sun and is radiating at 7,700 times the Sun's luminosity.
The expanding halo of NGC 7027 has a mass of about three times the mass of the Sun and is about 100 times more massive than the ionized central region. This mass loss in NGC 7027 provided important evidence that stars a few times more massive than the Sun can avoid being destroyed in supernova explosions.
NGC 7027 has a rich and highly ionized spectrum caused by its hot central star. The nebula is rich in carbon and is an interesting object for the study of carbon chemistry in dense molecular material exposed to strong ultraviolet radiation. The spectrum of NGC 7027 contains fewer spectral lines from neutral molecules than is usual for planetary nebulae. This is due to the destruction of neutral molecules by intense UV radiation. The nebula contains ions of extremely high ionization potential. The helium hy-

(continued in next column)

dride ion, thought to be the earliest molecule to have been formed in the Universe (about 100,000 years after the Big Bang), was detected in 2019 for the first time in NGC 7027. There is also evidence for the presence of nanodiamond in NGC 7027.
It has been photographed multiple times by the Hubble Space Telescope since its launch in 1990. Prior to these observations, NGC 7027 was thought to be a protoplanetary nebula with the central star too cool to ionize any of the gas, but it is now known to be a planetary nebula in the earliest stage of its development The progenitor star is believed to have been about 3 to 4 times the mass of the Sun before the nebula was formed.
In 1977 at Yerkes Observatory, a small Schmidt telescope was used to derive an accurate optical position for the planetary nebula NGC 7027 to allow comparison between photographs and radio maps of the object.
In a 6" telescope at around 50× it appears as a relatively bright bluish star. It is best viewed with the highest magnification possible.

This article is distributed by NASA Night Sky Network
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The International Space Station: 20 Continuously Crewed Years of Operation

David Prosper

Did you know that humans have been living in the International Space Station, uninterrupted, for twenty years? Ever since the first crew members docked with the International Space Station (ISS) in November 2000, more than 240 people have visited this outpost, representing 19 countries working together. They have been busy building, upgrading, and maintaining the space station - while simultaneously engaging in cutting-edge scientific research.

A complete view of the ISS as of October 4, 2018, taken from the Soyuz capsule of the departing crew of Expedition 56 from their Soyuz capsule. This structure was built by materials launched into orbit by 37 United States Space Shuttle missions and 5 Russian Proton and Soyuz rockets, and assembled and maintained by 230 spacewalks, with more to come! Credit: NASA/Roscosmos More info: bit.ly/issbasics

The first modules that would later make up the ISS were launched into orbit in 1998: the Russian Zarya launched via a Proton-K rocket, and the US-built Unity module launched about a week and a half later by the Space Shuttle Endeavour. Subsequent missions added vital elements and modules to the Space Station before it was ready to be inhabited. And at last, on November 2, 2000, Expedition-1

(continued in next column)

The ISS photobombs the Sun in this amazing image taken during the eclipse of August 21, 2017 from Banner, Wyoming. Photo credit: NASA/Joel Kowsky More info: bit.ly/eclipseiss

brought the first three permanent crew members to the station in a Russian Soyuz capsule: NASA astronaut William M. Shepherd and Russian cosmonauts Sergei Krikalev and Yuri Gidzenk. Since then, an entire generation has been born into a world where humans continually live and work in space! The pressurized space inside this modern engineering marvel is roughly equal to the volume of a Boeing 747, and is sometimes briefly shared

(continued on next page)

Observe the Skies Near Mars

David Prosper *(continued from previous page)*

by up to 13 individuals, though the average number of crew members is 6. The unique microgravity environment of the ISS means that long-term studies can be performed on the space station that can't be performed anywhere on Earth in many fields including space medicine, fluid dynamics, biology, meteorology and environmental monitoring, particle physics, and astrophysics. Of course, one of the biggest and longest experiments on board is research into the effects of microgravity on the human body itself, absolutely vital knowledge for future crewed exploration into deep space.

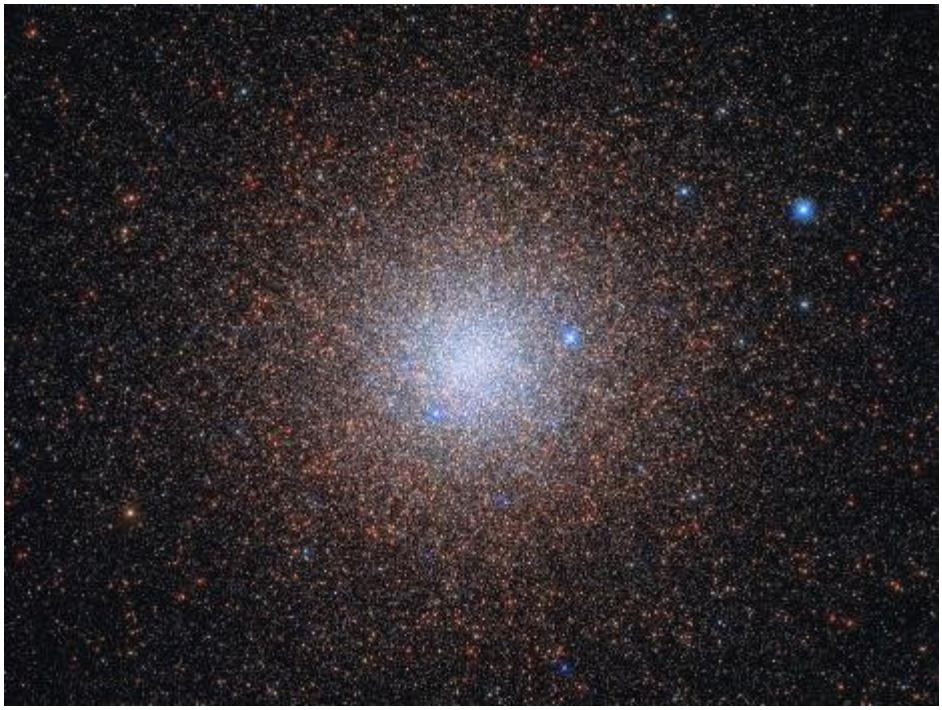
Stargazers have also enjoyed the presence of the ISS as it graces our skies with bright passes overhead. This space station is the largest object humans have yet put into orbit at 357 feet long, almost the length of an American football field (if end zones are included). The large solar arrays – 240 feet wide - reflect quite a bit of sunlight, at times making the ISS brighter than Venus to observers on the ground! Its morning and evening passes can be a treat for stargazers and can even be observed from brightly-lit cities. People all over the world can spot the ISS, and with an orbit only 90 minutes long, sometimes you can spot the station multiple times a night. You can find the next ISS pass near you and receive alerts at sites like NASA's Spot the Station website (spotthestation.nasa.gov) and stargazing and satellite tracking apps.

(continued in next column)

Hundreds of astronauts from all over the world have crewed the International Space Station over the last two decades, and their work has inspired countless people to look up and ponder humanity's presence and future in space. You can find out more about the International Space Station and how living and working on board this amazing outpost has helped prepare us to return to the Moon - and beyond! - at nasa.gov.

(right) Almost like snowflakes, the stars of the globular cluster NGC 6441 sparkle peacefully in the night sky, about 13,000 light-years from the Milky Way's galactic center. Like snowflakes, the exact number of stars in such a cluster is difficult to discern. It is estimated that together the stars have 1.6 million times the mass of the Sun, making NGC 6441 one of the most massive and luminous globular clusters in the Milky Way.

NGC 6441 is host to four pulsars that each complete a single rotation in a few milliseconds. Also hidden within this cluster is JaFu 2, a planetary nebula. Despite their name, planetary nebulas have little to do with planets. A phase in the evolution of intermediate-mass stars, planetary nebulas last for only a few tens of thousands of years, the blink of an eye on astronomical timescales. (photo Hubble)



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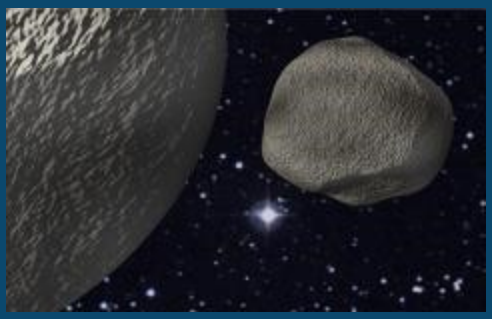

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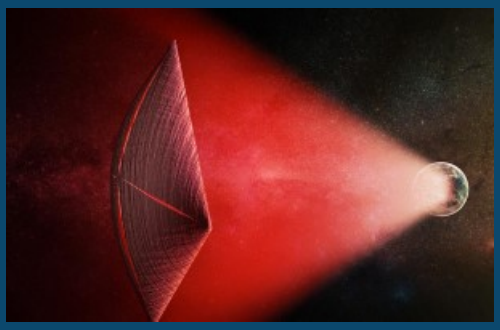
A Supernova Exploded Dangerously Close to Earth 2.5 Million Years Ago

October 2nd, 2020

What's the Best Way to Communicate With an Interstellar Probe When it's Light-Years Away From Earth?

September 23rd, 2020



Perseverance Will be Scanning Inside Rocks for Fossils on Mars

September 24th, 2020

An Exoplanet So Hot There Are 7 Different Kinds of Gaseous Metals in its Atmosphere

October 13th, 2020

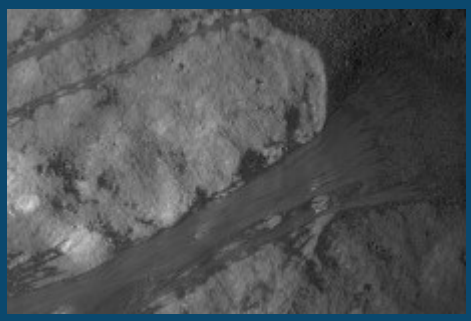
NEWS LINKS

Astronomers Watch a Star Get Spaghettified by a Black Hole

October 13th, 2020

This is a Landslide… on the Moon

October 13th, 2020



We're Made of Star stuff. Especially From Extremely Massive Stars

October 14th, 2020

BepiColombo Mercury Mission to Make First Venus Flyby Tonight

October 14th, 2020

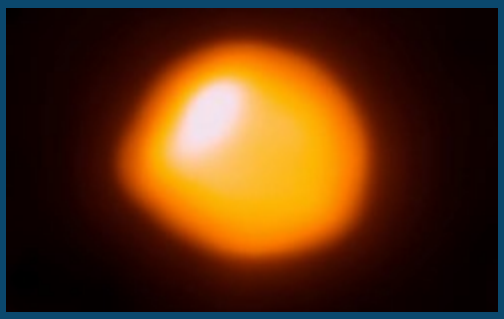
NEWS LINKS

Astronomers Find Shell Structures in Milky Way Galaxy for First Time

October 20th, 2020

Betelgeuse is Smaller and Closer to Earth than Previously Thought

October 16th, 2020



Astronomers Find Extremely Metal-Deficient Globular Cluster in Andromeda Galaxy

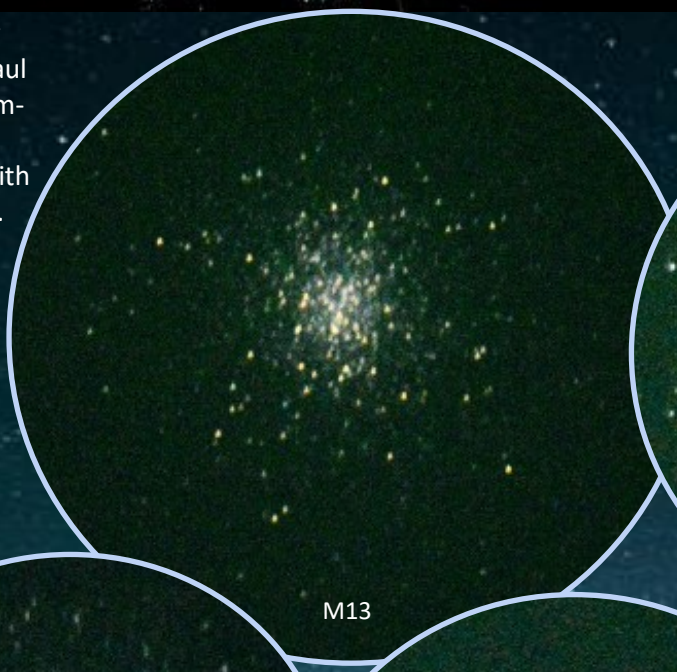
October 16th, 2020

Success! OSIRIS-REx Touches Asteroid Ben-nu to Collect Samples

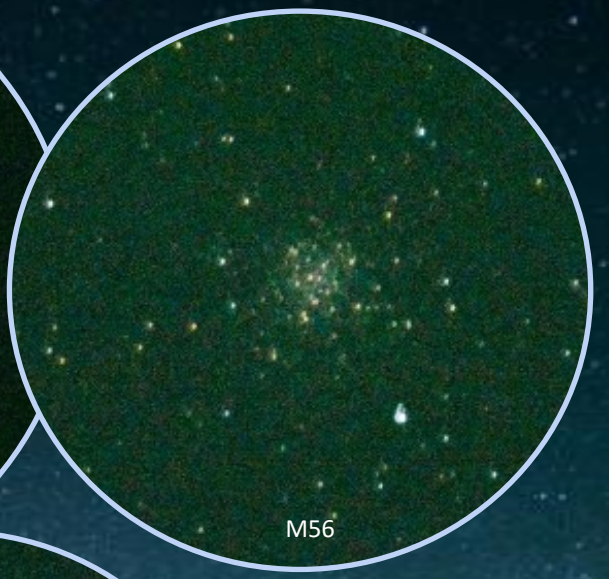
October 20th, 2020

MEMBER OBSERVATIONS

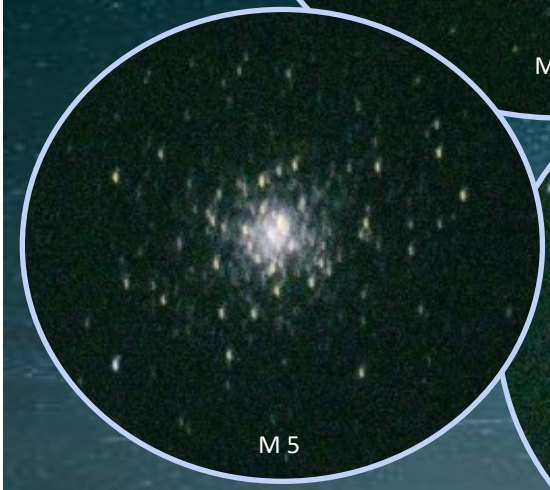
Photos by **Rusty Case** taken at Paul Castle on September 25th. Skies were covered with high thin clouds. Smoke from the south moved in to add a reddish glow to the Moon.



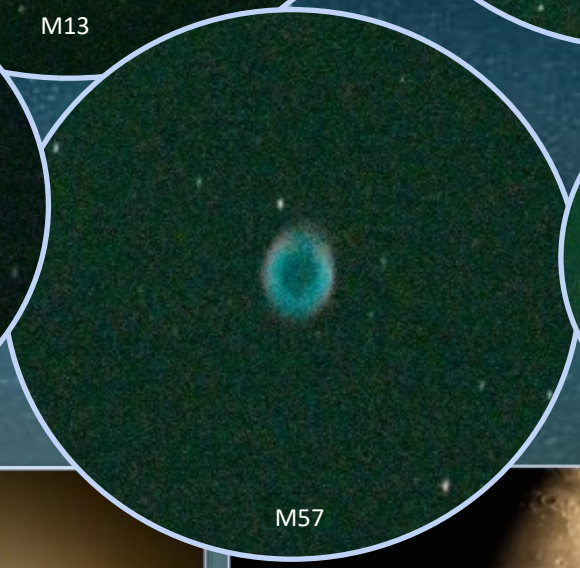
M13



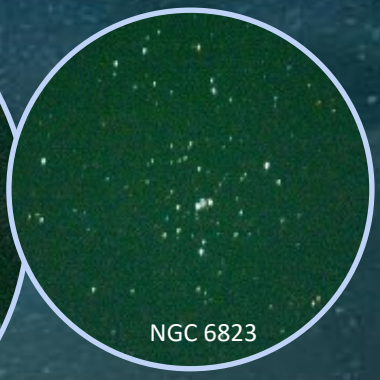
M56



M 5



M57



NGC 6823

MEMBER OBSERVATIONS

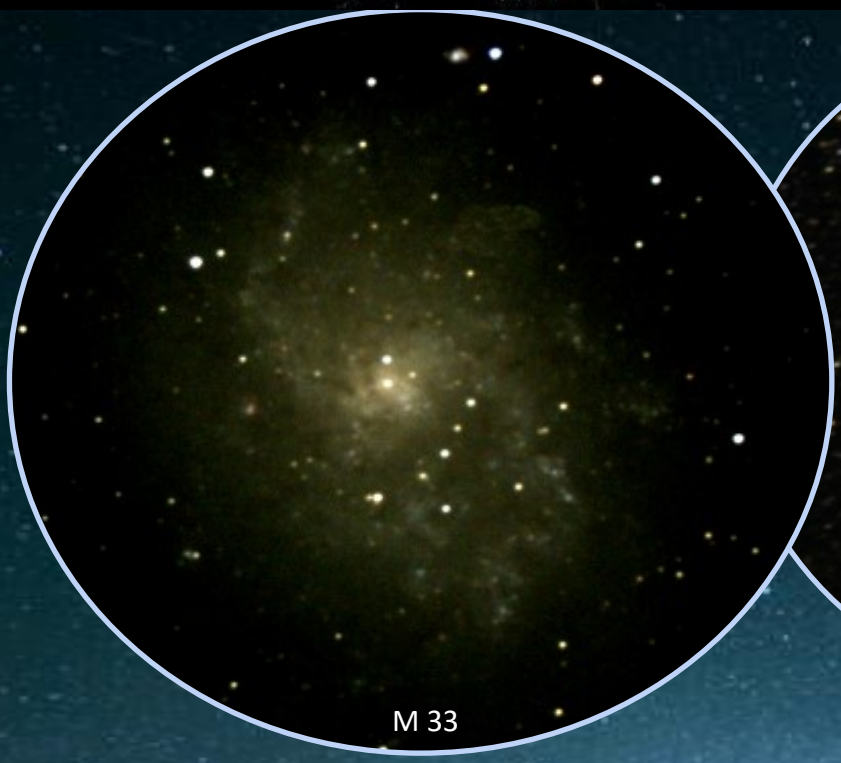
Photos by **Byron Davies** of Snowball nebula, Saturn nebula, NGC1501, and two galaxies. Taken on October 7th, 2020

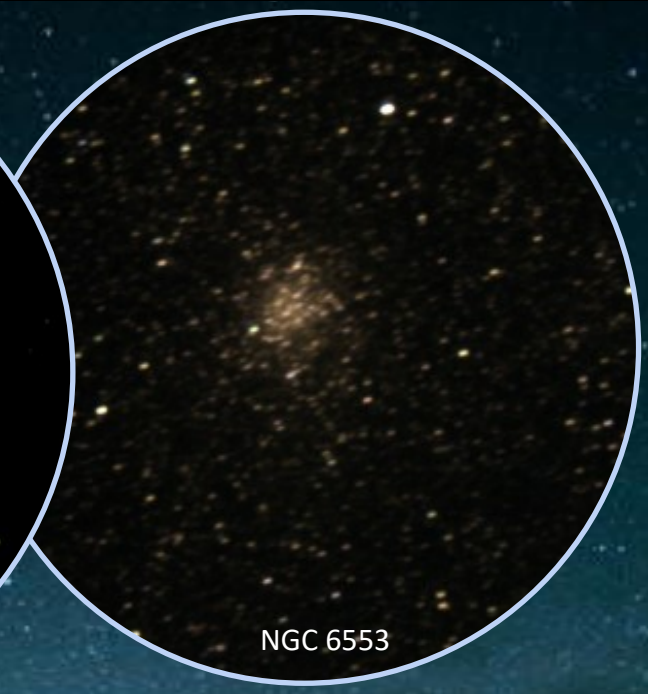
Saturn Nebula

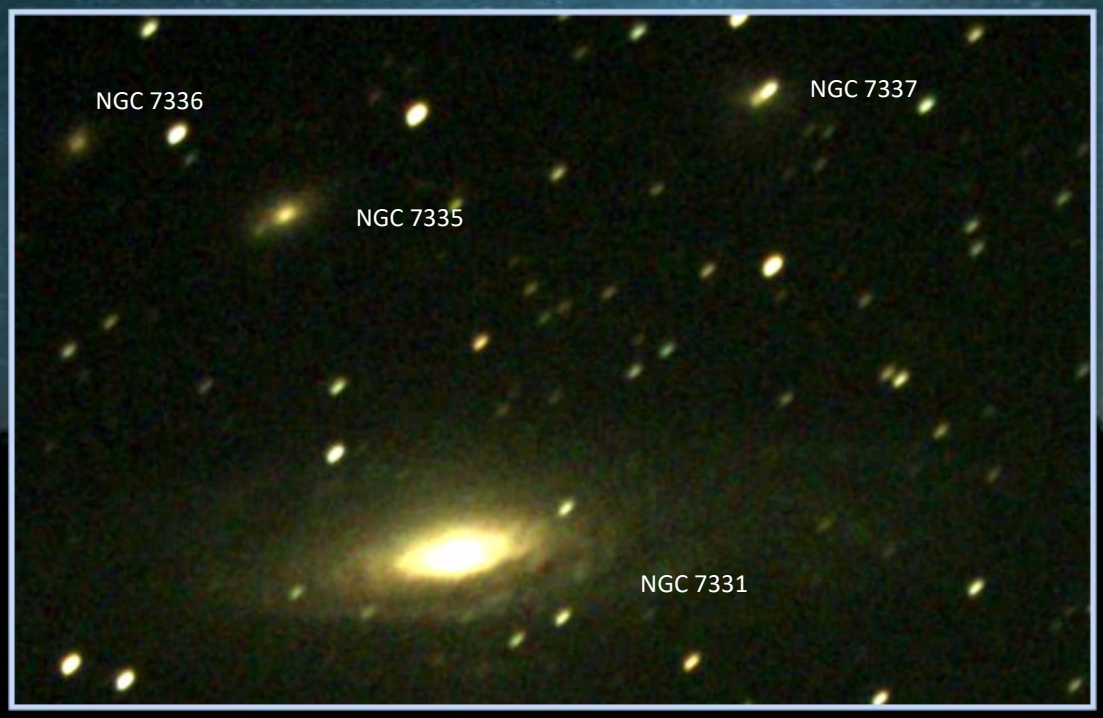
Snowball Nebula

The Oyster Nebula
NGC 1501

MEMBER OBSERVATIONS

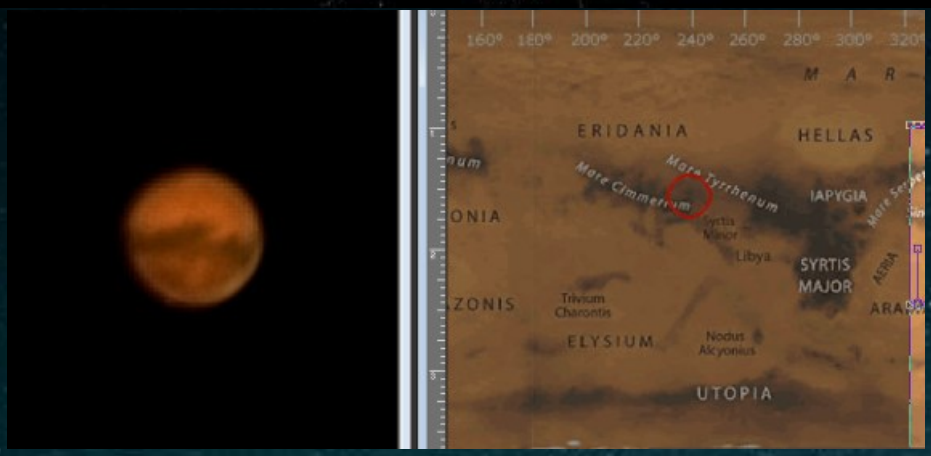






Photos taken October 7, 2020 (right) part of the Deerlick group of Galaxies in Pegasus. (left) ngc 6553 , a faint 9th magnitude metal rich globular in Sagittarius. (above left) the Triangulum Galaxy– M33. Photos taken with a Celestron 8 inch and a ZWO ASI294 camera. Photos by **Terry Dufek**

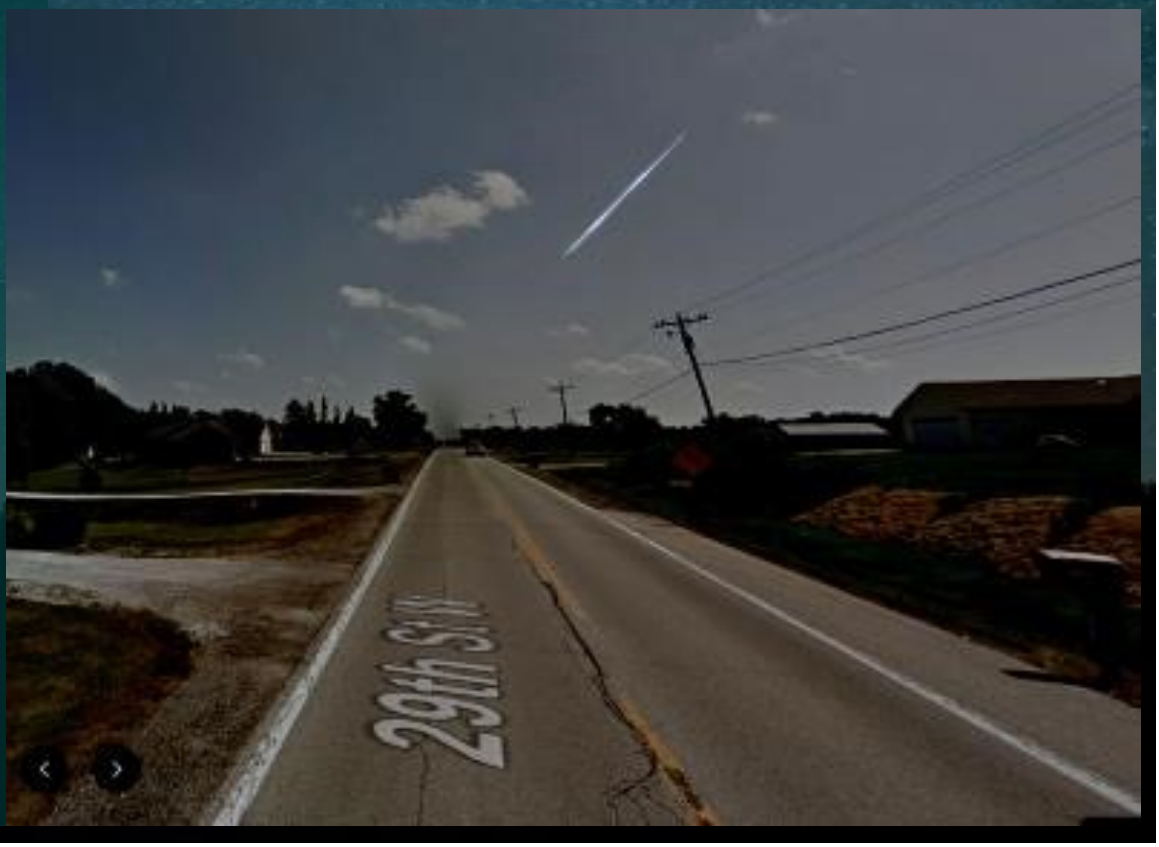
MEMBER OBSERVATIONS



(left) Mars on the evening of October 11, 2020. Photo was taken in very windy conditions
Terry Dufek

(right) Mars at opposition , October 13th, 2002 . Taken with a C8 and a ZWO ASI camera. 90 sec exposure. Some light clouds. Polar cap still just barely visible at bottom. **Terry Dufek**

(right) ***Recreation*** of incoming meteor seen while on my way to the Paul Castle observatory on the evening of October 13th, 2020. The incident was just minutes after sunset and I was just north of the observatory. The meteor was very bright and there was a green flash at the end of the trail. It was almost as bright as Venus.
Terry Dufek



MEMBER OBSERVATIONS

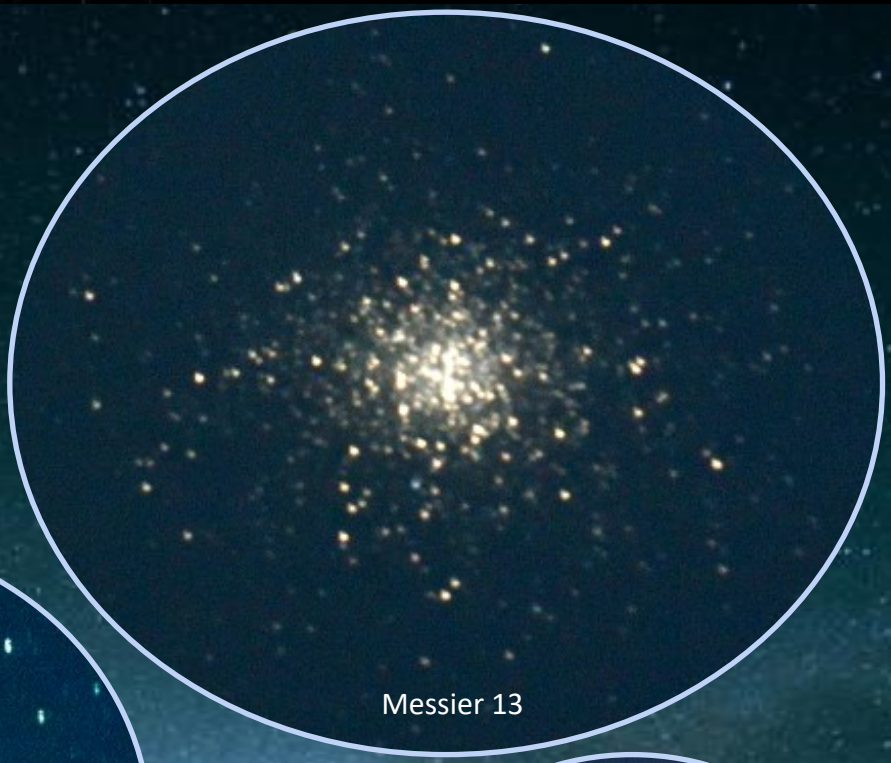
(above) Veil Nebula by Paul Saeger

This is my first image using the calibration frames I learned in the Astro Pixel Processor workshop. 26 5 minute light frames. 10 dark frames , 100 flat frames, 100 dark flat frames

(left) IC 1284, a star cluster within a nebula, is located in the constellation Sagittarius, just below the bright M24 nebula
Photo with C8 Telescope (no focal reducer) and a ZWO ASI 294 camera
Terry Dufek

MEMBER OBSERVATIONS

Eta Cassiopeia



Messier 13

Messier 57

Messier 57

Polaris

All photos this page are by Al Sheidler at Paul Castle on October 30th, 2020

Paul Castle Observing Sessions

Paul Castle Observing Session

October 6th, 2020

Last evening, a group of us met at the Paul Castle Observatory to take advantage of clear skies and warm temperatures. We started out by grilling brats and having a picnic dinner while folks set up their scopes. Since Mars was at its closest, it was a fantastic visual object. Surface features were easily discernible. Some of the group worked on completing the NCRAL Autumn Seasonal Messier Mini Marathon. Everyone making an attempt to do this

(continued in next column)

got through the list before moon rise which was around 10:00PM. This was a highly successful observing session and enjoyable. By my count, there were seven telescopes in use last night. In the photograph are Al Sheidler, Dale Hachtel, Terry Dufek, Alex Holt, Byron Davies, Hugh Holt, Tim Holt, Mary Holt, and Rusty Case. Mike Dannenfeldt was also there but arrived to set up his scope after the photo was taken. The weather forecast is for clear skies this week, so get out, do some observing and keep looking up!

Al Sheidler

Paul Castle Observing Sessions

Paul Castle Observing Sessions

October 7th, 2020

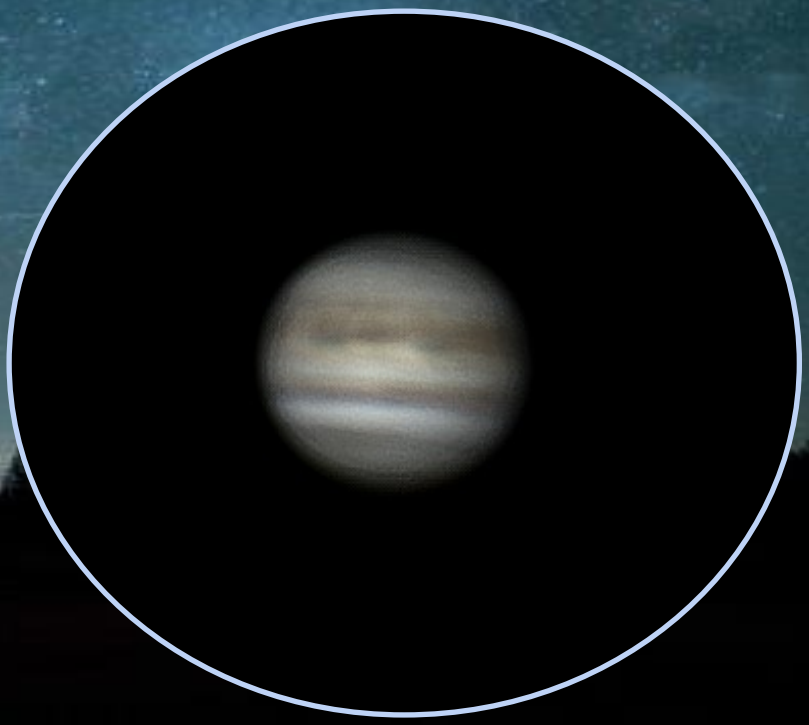
The air was a lot more stable than the night before. Rusty and Byron did some imaging. Steve had some excellent views of Mars (the best I have seen through a telescope) with the detail being outstanding. He used a neutral density filter to reduce the glare. The detail was fantastic and was very clear. It was colder than the night before (colder than forecast) and was about 48 degrees when we left.

Terry Dufek

Paul Castle Observing Sessions

October 10, 2020

Rusty Case, Wayland Bauer , Terry Dufek and John Douglas gathered at the observatory to do some observing but it clouded over 1/2 hour after what looked to be a very promising evening. Terry got a couple shots of Jupiter from the observatory before the sky got overcast. Wayland was going to practice Precision Go To with his scope. Rusty was going to do some imaging. All left by 9 pm. Interesting note is that when Terry got home to northwest Davenport , the skies had totally cleared out. The photo of Jupiter was taken with the Paul Castle Telescope



Paul Castle
Observing Sessions
October 13, 2020

Last night a group of us met to take advantage of relative warmth and partially clear skies. In the group photo are Byron Davies, Wayland Bauer, Rusty Case, Al Sheidler, Terry Dufek, and Dale Hachtel. Mike Dannenfeldt was also present but arrived after the group photograph was taken. In addition to the observatory, five other scopes were set up including those by Terry, Byron, Al, Wayland and Dale. We battled hazy clouds until around 10:00pm when it got too cloudy to observe any objects less bright than Mars--which loomed large in the eyepiece and easily revealed surface markings and a diminutive polar cap. Jupiter and Saturn also put on a grand show as well. Between the clouds I was able to image some other objects, photos of which are attached here. All of these were shot with my Nikon D7500 camera attached to a 10" Meade LX200 telescope at FL=2500mm. Camera Settings:

Gamma Delphini--> 1 sec exposure at ISO 800
M27 --> 58 sec exposure at ISO 16,000
NGC6905 --> 20 sec exposure at ISO 12,800
NGC6891 --> 25 sec exposure at ISO 10,000

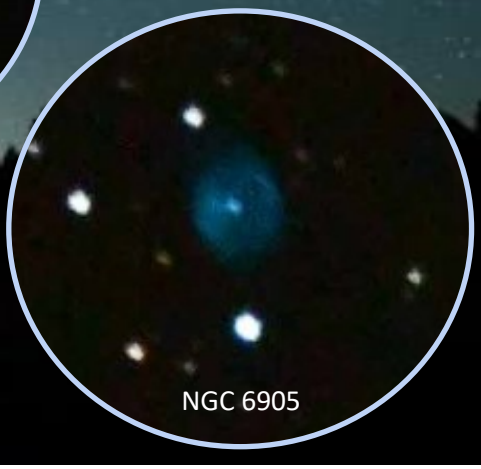
Gamma Delphini is a splendid double star consisting of yellow and greenish-blue stars separated by 9.6 arcseconds. Also to be found in Delphinus are two very nice planetary nebulae: NGC6905 (The Blue Flash Nebula) and NGC6891. M27 is the incomparable Dumbbell nebula, a planetary nebula in the constellation Vulpecula

Al Sheidler


Gamma Delphini


M27


NGC 6891


NGC 6905

Paul Castle Observing Sessions

October 30, 2020

Last evening we met at the Paul Castle Memorial Observatory to enjoy clear skies and fellowship. While waiting for it to get dark enough to observe, we had a picnic dinner and handed out awards to deserving club members. The Carl H. Gamble Award was given to Gary and Chris Nordick in recognition for their help in refurbishing the observatory and for being our host family. Rusty Case received his Member of the Year Award for his able leadership in the observatory refurbishment project. In the group photo are Al Sheidler, Steve Sinksen, Terry Dufek, Dale Hachtel, guest Clint Bostick, and Rusty Case. Wayland Bauer and his guest , Duane Dawson arrived after the group photo was taken.

(Left) Al Sheidler presenting the 2020 Carl Gamble award to Gary and Chris Nordick for their support of the Popular Astronomy club.

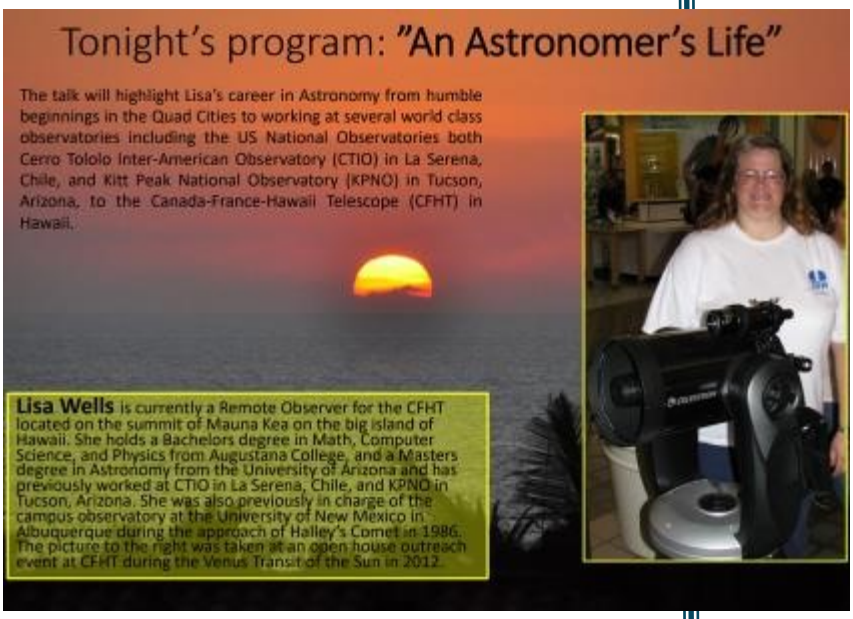
We were able to observe a number of objects including the Moon, Mars, Saturn, Jupiter, Uranus, Neptune, M13 (the Hercules Cluster), M57 (the Ring Nebula), M27 (the Dumbbell Nebula), double stars Polaris and Eta Cassiopeia (*photos on page 33*) and various open clusters. The sky glow from the "Blue Moon" made it difficult to observe many of the deep sky objects, but fun was had by all. Keep looking up!

Al Sheidler

(Right) Al Sheidler presenting the 2020 Member of the Year award to Rusty Case at the Paul Castle Observatory

84th ANNUAL PAC BANQUET

The **84 PAC Banquet** was held on October 24th at 7:00 pm via Zoom. Attending were 28 PAC Members and 10 guests including Lisa Wells, guest speaker.



President Al Sheidler began by introducing our speaker Lisa Wells, an astronomer, currently working from the C-F-H-T which is the Canada France Hawaii Telescope . More information about the C-F-H-T can be found at this link:

She talked about her career and her love of galaxies and supernovas and what is occurring in them. She spoke of working from the Chilean observatories and her progression up the astronomy career ladder. She took a few questions at the end and Al Sheidler thanked her for her presentation.

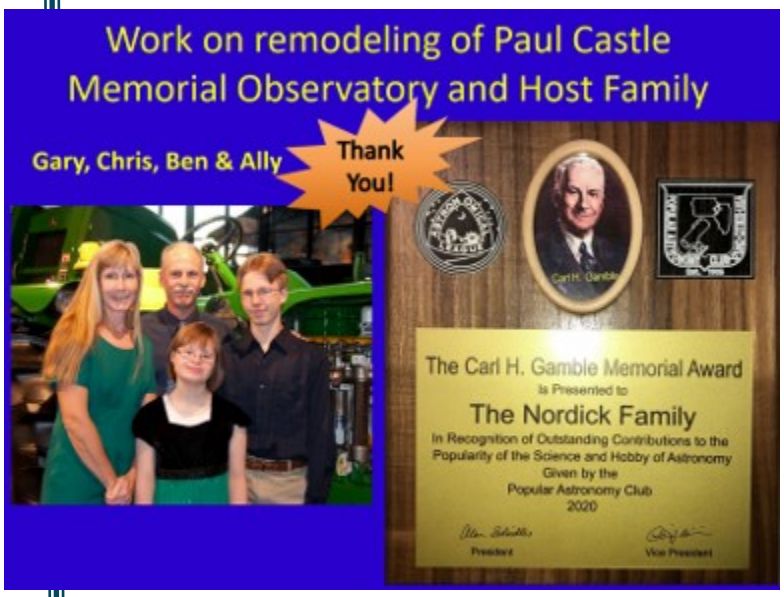
Next was **the Attendance Award** (based on attending PAC meetings). The winner from a drawing was Dino Milani and he will receive a $25 Applebee gift card.

Al then covered the **NCRAL Messier Awards** that members have achieved this year (see later in this issue). Carl Wenning was present and commented on our club's participation in this program.

Al then reviewed our **member achievements in Astronomical League programs** this year by Ken Boquist and Al Sheidler (see later in this issue).

A review and thank you was made to the PAC officers for 2020.

The **Carl Gamble award** was made to the Nordick family for their contributions to the PAC and help on the rebuilding of the observatory this year.



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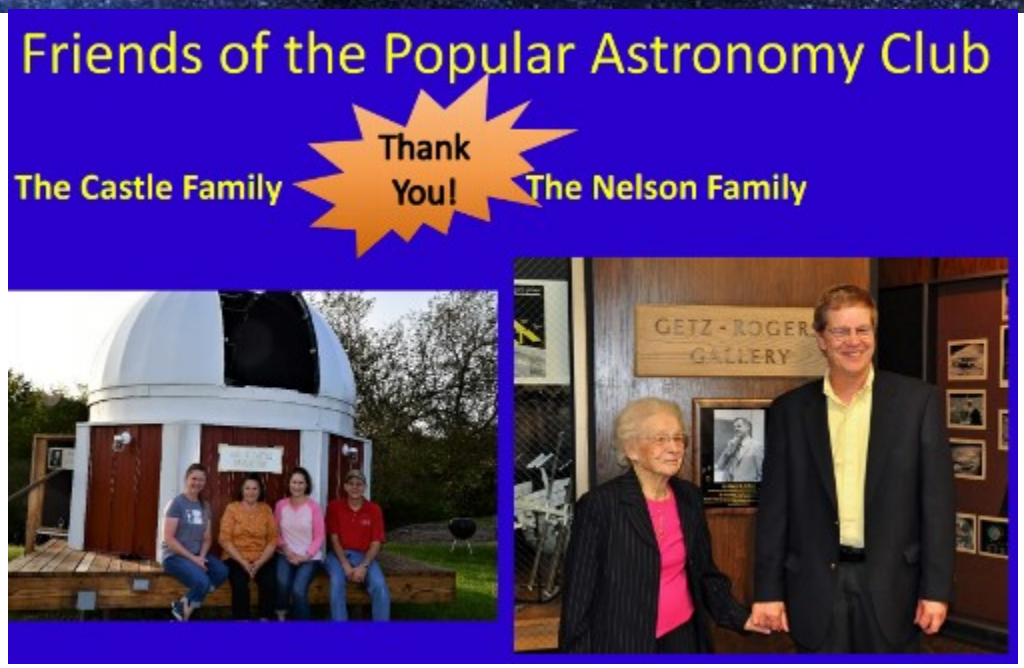
84th ANNUAL PAC BANQUET

An **acknowledgement and thank you** was made to the Friends of PAC (***The Castle and Nelson families***) for their contributions that made the observatory rebuild possible .



A **big thank you** was made to all members that helped in rebuilding the PC observatory. (A collage of photos featuring the rebuild and members participating was shown - list of individual member contributions are later in this issue).

(continued next page)

84th ANNUAL PAC BANQUET

A **thank you** was made to all PAC members that did presentations/ reports at meetings (the list is later in this issue).

A **thank you** was made to all PAC members that did constellation reports at meetings this year (the list is later in this issue).

A **thank you** was made to all PAC members that wrote newspaper articles this year (the list is later in this issue).

A **thank you** was made to all PAC members that contributed material/ ideas to the Reflection newsletter this year (the list is later in this issue).

An **acknowledgement and thank you** went out to PAC members and their years of membership (the list is later in this issue).

The next award was for **Member of the Year**. After going through the member's list of accomplishments and how he had contributed to the clubs improvement. Al announced that the Member of the Year for 2020 was Rusty Case. Al has a certificate and $25 Panera gift card to award him at the next opportunity.

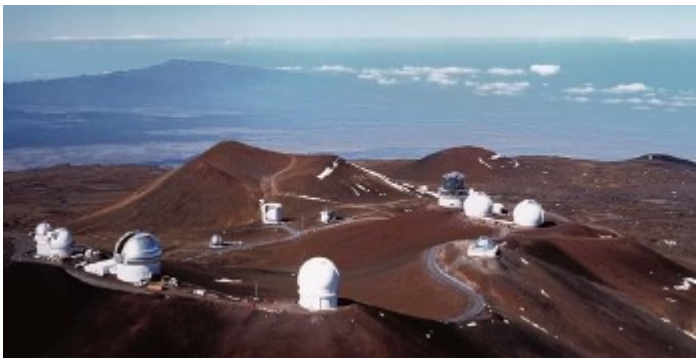
20 Member of the Year

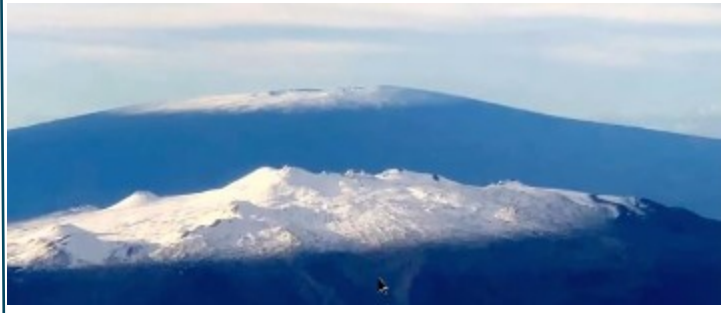
A review was made of upcoming programs and events and the meeting was adjourned!

(continued in next column)

84th ANNUAL PAC BANQUET

Some photos from Lisa Wells presentation





CONGRATULATIONS!

Member Years of Service

PAC MEMBER	YEARS
Mark Schroeder	40
Joel Carter	39
John Douglas	36
Roberta Wright	36
Lanny Wright	36
Frank Stonestreet	34
Al Sheidler	32
Don Anderson	30
25-29 years	
John Weber	29
Liz Robinson	29
Brad Smith	28
Roy Gustafson	27
Gerry Pearson	27
Lee Farrar	26
Sara Sheidler	25
20-24 years	
Jan Gustafson	20
15-19 years	
Anne Bauer	19
Wayland Bauer	19
Gail Sederquist,	16
10-14 years	
Ken Boquist	14
Rusty Case,	11
Eric Sheidler	11
Mike & Helen Haney	11
Dino Milani	10
Mitchell Milani	10
Ellen Milani (Tsagaris)	10
Gary Nordick	10
Christina Nordick	10
Ben Nordick	10
Ally Nordick	10

PAC MEMBER	YEARS
5-9 years	
Bryan Raser	8
Thom Sederquist	8
Nancy Boelens,	6
Katie Melbourne	6
Terry Dufek	5
Jeff Struve	5
Joan Struve	5
Ian Spangenberg	5
0-4 years	
Mike Gacioch	4
Wanda Gacioch	4
Dale & Joanne Hachtel	4
Dr. Lee Carkner	3
Holt Family, Tim, Mary, Alex, Hugh	3
Mark Pershing	3
Paul Levesque	3
Mike Dannenfeldt	2
Dave Smith	2
Stephen Sinksen	1
Stephan Saber	1
Rachel Spangenberg	1
John Schaub	1
Jim Rutenbeck	1
Paul Saeger	1
Byron Davies	1
Matt Neilssen	1

THANK YOU !

AWARDS!

Messier Award- Fall
Al Sheidler
Terry Dufek
Wayland Bauer
Rusty Case

Messier Award- Winter
Rusty Case
Terry Dufek
Wayland Bauer
Al Sheidler
Alex Holt
Dale Hachtel

Messier Award- Spring
Alan Sheidler
Eric Sheidler
Rusty Case
Dale Hachtel
Wayland Bauer

Messier Award- Summer
Terry Dufek
Rusty Case
Dale Hachtel
Wayland Bauer
Alex Holt

AL Asterism Observing Program
Ken Boquist

the 2019 Astronomical League Mercury Transit Specialty Observing Award
Al Sheidler

CONTRIBUTIONS!

Paul Castle Observatory Rebuild and PACMO

planning of remodeling of Paul Castle observatory Nov 2nd:
Wayland Bauer, Ken Boquist, Rusty Case, Terry Dufek, Dale Hachtel, Holt Family, Nordick Family, Bryan Raser and Al Sheidler.

covering of PACMO Dec 10th:
Rusty Case, Terry Dufek

uncovering of PACMO Mar 6th, 2020:
Rusty Case, Terry Dufek

the planning of the observatory renewal project Nov 17th
Al, and Sara Sheidler, Ken Boquist, Bryan Raser, Rusty Case, Wayland Bauer, the Nordick family, the Holt family, Dale Hachtel and Terry Dufek

examination/ cleaning of PC Telescope Dec 14th:
Steve Sinksen, Rusty Case, Jeff Struve and Al Sheidler

Observatory Dismantling May 22nd
Rusty Case, John Douglas, Terry Dufek, Dale Hachtel, Alex Holt, Hugh Holt, Mary Holt, Dino Milani, Gary Nordick, Eric Sheidler, Al Sheidler, and Steve Sinksen. Allie Nordick and Chris Nordick

Repair Day (walls) at Paul Castle May 30th
Al and Eric Sheidler, the Nordicks, Rusty Case, Ken Boquist, Mike Gacioch , John Douglas, Dale Hachtel, and Terry Dufek

Pier Construction at Paul Castle June 6th
Gary, Chris, and Ally Nordick, Mike Gacioch, Terry Dufek, Dale Hachtel, Rusty Case, Eric & Al Sheidler.

Pier Construction / Deck Restoration June 13th
Ken Boquist, Rusty Case, Steven Case, Byron Davies, John Douglas, Terry Dufek, Dale Hachtel, Alex Holt, Hugh Holt, Mary Holt, Alan Sheidler and Eric Sheidler

Walls Reassembled June 15th
Terry Dufek, Al Sheidler, John Douglas, Gary Nordick, Wayland Bauer, Rusty Case and Dale Hachtel; standing on the observatory, Hugh, Tim, Alex and Mary Holt

Dome Reassembled July 20th
Anne Bauer, Wayland Bauer, Rusty Case, Mike Dannenfeldt, John Douglas, Terry Dufek, Dale Hachtel, Alex Holt, Hugh Holt, Mary Holt, Tim Holt, Dino Milani, Ally Nordick, Ben Nordick, Chris Nordick, Gary Nordick, Al Sheidler, and John Weber.

Dome Closer Installed July 24th
Al Sheidler, Rusty Case, Terry Dufek, Dale Hachtel

More installations July 26th
Rusty Case

Telescope Installed August 1st
Al Sheidler, Rusty Case, Terry Dufek, Dale Hachtel

CONTRIBUTIONS!

Constellation Reports

Roberta Wright November 2019 Auriga
Dale Hachtel December 2019 Aries
Terry dufek Jan 2020 Eridance
Paul Levesque February 2020 Monoceros
Jan Gustafson March 2020 Quadrans Muralis
Frank Stonestreet April 2020 Draco
Byron Davies May 2020 Sagitta

Jan Gustafson
- smorgasbord 03/09 " Spacey Fashion Show

Roy Gustafson
- year in review 2019

Dino Milani
- smorgasbord 03/09 "Satellite Problem" '

Roberta Wright
- smorgasbord 03/09 " Apollo 11 and Moondust"

Presentation Reports

Wayland Bauer :
- "Seasons" Jan 2020
- smorgasbord 03/09 " Bedtime story: Twisted Sister"

Terry Dufek:
- globular clusters 2/2020
- smorgasbord 03/09 "PAC and Facebook"

Ian Spangenberg:
- Ganymede 11/19
- Fermilab and Particle Physics 5/20

Anne Bauer
- smorgasbord 03/09 " Spacey Fashion Show"

(continued in next column)

THANK YOU !

CONTRIBUTIONS!

Contributions to Reflections Newsletter

Byron Davies:
contributions Reflections (photos) Apr 2020
contributions Reflections (photos) Jun 2020
contribution Reflections (photos) June 2020
contribution Reflections (photos) Aug 2020
contributions Reflections (photo) Aug 2020
contributions Reflections (photos) Sept 2020
contributions Reflections (photos) Oct 2020
contributions Reflections (photos) Oct 2020
contributions (deep sky chart degree of difficulty viewing)to reflections newsletter Oct 2020
contributions Reflections (photos) Oct 2020

Alan Sheidler:
contributions to reflections newsletter Oct 2020
contributions to reflections newsletter Jan 2020
contributions to reflections newsletter Mar 2020
contributions to reflections newsletter Apr 2020
contributions to reflections newsletter May 2020
photos of comet Hale Bopp
contributions to reflections newsletter July 2020
contributions to reflections newsletter Aug 2020
photos of comet Neowise
contributions to reflections newsletter Aug 2020
photos of comet Neowise
contributions to reflections newsletter Sept 2020

Ken Boquist
contribution Reflections (photos) Dec 2019
contribution Link Reflections 12/2019
contribution Reflections (photos) Jan 2020
contribution Reflections (notes/photo) Feb 2020
contribution Reflections newsletter May 2020
(photos of comet Atlas
contributions to reflections newsletter Aug 2020
(photos of comet Neowise
contributions to reflections newsletter Sept 2020

Rusty Case
contribution Reflections (photos) June 2020
contribution Reflections (photos) August 2020
contributions to reflections (photos) Sept 2020
contributions to reflections newsletter Sept 2020

Roy Gustafson
contribution Reflections Nov 2019
contribution Reflections Dec 2019
contribution Reflections Jan 2020
contribution Reflections Dec 2019
contribution Reflections Mar 2020
contribution Reflections June 2020
contribution Reflections Aug 2020 (photos of comet Neowise

Dale Hachtel
contributions to reflections newsletter Aug 2020
(photos of Jupiter
contributions to reflections newsletter Sept 2020
photos

(continued in next column)

(continued on next page)

CONTRIBUTIONS!

Contributions to Reflections Newsletter

Sara Sheidler
contributions to Reflections: write up- Geneseo Outreach- Nov 2019
contribution to Reflections: Popular Astronomy Club History column Oct 2019
contribution to Reflections: Popular Astronomy Club History column Nov 2019
contribution to Reflections: AL Reflector NCRAL Write up Oct 2019
contribution to Reflections: link to news article- dec 2019
contribution to Reflections: Argus Newspaper Article Feb 2020

Wayland Bauer
contribution to Reflections (photo) Apr 2020
contributions to Reflections newsletter Aug 2020 (photos of comet Neowise)
contributions to reflections newsletter Sept 2020

Matt Neilssen
contribution to Reflections June 2020
contributions to reflections newsletter Aug 2020 (photos of comet Neowise)

Terry Dufek
contributions to reflections newsletter Sept 2020

Stephen Sinksen
contributions to Reflections: update on the PC refurb telescope May 2020
contributions to Reflections: use of refurbished Paul Castle telescope at Menke June 2020

Paul Saeger
contributions to reflections newsletter Aug 2020

(continued in next column)

Elizabeth Robinson
contributions to reflections newsletter May 2020

Brad Smith
contributions to reflections newsletter May 2020

Newspaper Articles

Dale and JoAnne Hachtel
Amateur Astronomy in the Winter Sky -Jan 2020
Astronomy Club Starts Public Viewing Season - Mar 2020

Terry Dufek
Mercury Transit—Nov 2019
June Skies and a Strawberry Moon- June 2020

Paul Levesque
Large numbers make it hard to conceptualize time and space- Oct 2019

Dino Milani
See more than usual in the sky - May 2020

Ian Spangenberg
taking a closer look at astronomical distances- Sept 2020

Jeff Struve
What did the Wise Men follow? - Dec 2019
It's a bird, it's a plane, it's a… - July 2020

Al Sheidler
Three bright stars lead to other discoveries—Aug 2020

Paul Castle Visits!

Member	Number of Visits
Terry L Dufek	25
Alan Sheidler	23
Rusty Case	20
Dale Hachtel	14
Wayland Bauer	8
Stephen Sinksen	8
Byron Davies	6
Ken Boquist	5
Hugh Holt	5
Alex Holt	5
Mary Holt	5
Eric Sheidler	5
John Douglas	4
Tim Holt	4
Mike Dannendfeldt	3
Paul Saeger	2
Jim Rutenbeck	2
Dave Smith	2
Matt Neilssen	1
Joanne Hachtel	1
Paul Levesque	1
Dino Milani	1
Ally Nordick	1
Chris Nordick	1
Gary Nordick	1
Mark Pershing	1
Ian Spangenberg	1

POPULAR ASTRONOMY CLUB

Thank you for your interest in the Popular Astronomy Club. To renew your membership or to apply as a new member, please fill in the information and either mail this form to the address below, or bring it to a PAC event. The membership year runs from October 1st through September 30th. There is a pro-rated amount if you join anytime during the year (see below). Our club newsletter, REFLECTIONS, will be e-mailed to you and it will be posted on the club website.

Submission of this application and payment confirms the applicant's agreement to abide by the policies and procedures detailed in the PAC Policy & Procedures Document available at our website: www.popularastronomyclub.org.

Membership pro-rated (for new members) amount by month:
Oct-$30.00, Nov-$27.50, Dec-$25.00, Jan-$22.50, Feb-$20.00, Mar-$17.50, Apr-$15.00, May-$12.50, Jun-$10.00, Jul-$7.50, Aug-$5.00, Sep-$2.50

PAC renew or new member:

(a) Regular Membership	$30.00	$_____
(b) Additional family member ($7.50 each) x (#) _____		$_____

Or you can elect c, d, or e (this includes the $30.00 membership, with the balance a tax deductible gift to PAC):

(c) Supporting Member	$40.00	$_____
(d) Sustaining Member	$60.00	$_____
(e) Patron Member	$80.00	$_____
(f) Student Member	$10.00	$_____
	Grand Total	$_____

Your Name: _____

Address: _____

City _____ State _____ Zip _____

E-Mail _____

Home Phone: _____ Cell Phone _____

Please enter name (s) of ADDITIONAL FAMILY MEMBERS:

_____ _____ _____ _____

Emergency Contact: _____ phone # _____

THANK YOU!! Welcome to the Popular Astronomy Club!!

Make your check payable to the **Popular Astronomy Club, Inc.** Mail or present at a PAC meeting to:

Dale Hachtel (treasurer)
1617 Elm Shore Drive
Port Byron, Illinois 61275
cell # 614-935-5748