POPULAR ASTR

The Newsletter of the Popular Astronomy Club ESTABLISHED 1936

President's Corner September 2020



Welcome to another edition of "Reflections", the universe's best amateur astronomy newsletter. This edition covers noteworthy astronomical occurrences coming up in the month of Sep-

tember as well as recounting club activities during August, of which there have been many. Particularly noteworthy is the completion of the refurbishing of the Paul Castle Memorial Observatory. This remodeling project was discussed and planned for many months, but actually got underway in May. It's hard to believe we were able to completely disassemble the observatory, repaint the dome, make needed repairs to the wall sections, reassemble the deck, sand the deck, stain the deck, fabricate a massive steel pier and concrete foundation, reassemble the walls, hoist and reassemble the dome, install new siding on the outside, install and debug the shutter door opener system, rewire the observatory, and install a brand new telescope in such a short time span. Admittedly, the cancellation of summer public outreach activities due to the Covid-19 pandemic freed up club members to focus on the rebuild, but by any measure, the rapid progression of the project was amazing by any measure. I take special pride in the "new" observatory, not only because it is beautiful and new, but because it represents the commitment, ingenuity, and devotion of so many club members. A great big special "thanks"

to all who pitched in on the work. Now that the observatory is finished and ready for club member's use, I would like to encourage PAC members to get trained in the use and operation of the observatory and begin using the new telescope. Rusty Case, Terry Dufek, Dale Hachtel and I have been busy training each other in the use of the new observatory. The four of us are ready now to provide training to PAC members. During the month of September, the planet Mars will be nearing opposition and promises to be a fantastic solar system target for the new observatory. Therefore, I would like to suggest we have "Mars Mania" observing sessions during the months of September and October. Let's make Mars our primary target for club observing this month. On September 1st, the Red Planet rises at 9:40pm, but by the end of September, Mars emerges at 7:30pm, making it visible nearly all night long. This fall, Mars' opposition brings the Red Planet to within a scant 62 million kilometers of Earth which means it will loom very large in amateur telescopes. This is your opportunity to observe the Red Planet up close and personally using the Paul Castle Memorial Observatory. Please watch for email invitations for observing sessions or contact Rusty, Dale, Terry or I about getting trained and using the observatory. There is no time like the month of September to learn some new skills and make fascinating observations most people don't even realize are so easily within PAC member's grasp at the Paul Castle Memorial Observatory. Keel looking up!

Al Sheidler

September 2020

4	不	Contents
	Page	Торіс
e	1-2	Presidents
	2-3	Corner Announcements
	4-7 7	Contributions
	7 8-10	The Paul Castle
	11-12	Renewal Project Astronomy in
	13	Print Skyward
	14	Upcoming Evonts
	15	Info for Zach
า	16	Luppen (speaker) Signup Report
	17	Astronomical
		Events/ The
	18	Planets Sky Views
	19	Planetary
r		Sept.2020 / Sept.
	20	Double Stars
	20	Wonders Sept.
5	21-22	Astronomical
-	23	Spotlight: NGC
,		Nebula
	24	NASA Space
:	25-28	News Links
р	29-38	Member Observations
	39-43	Paul Castle
		Sessions
	44	2020 PAC Picnic

(Continued in next column)









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

LOOKING FOR OLDER ISSUES OF REFLECTIONS NEWSLETTER?



HISTORY OF PAC?



Popular Astronomy Club on Facebook?



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 varie-

ty of instruments and objects



Welcome New Member Jim Rutenbeck

SUBMISSIONS

If you have an article or photos to submit or items of interest, we encourage you to send them in by the 25th of the month. Links to stories are welcome also. **Thank you!**



Check out the Astronomical League **ONLINE**!



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





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

CONTRIBUTIONS

Milky Way Photography Camping Trip

July 29th, 2020

When Did Mars' Dynamo Shut Off? And More...

July 30st, 2020

NASA is Considering the Trident Mission. Going Back to Neptune and Triton

June 30th, 2020

Lunar Rovers. From Apollo to Artemis

July 21st, 2020

BBC The Sky at Night Mars Planet of Dreams

August 10th, 2020





















CONTRIBUTIONS



Why do we feel the need to stargaze in times like these?

People have gazed into the starry realm since time immemorial. What drives them to head outside when they could readily be doing something else?

1. Quietly gazing skywards is a personal activity, often giving one comfort in the seemingly immutable nature of the heavens. The stars of this year are the same stars of last year – and of many year's past. Knowing that they still shine in the proper places in the sky strongly validates that all is right with the universe, even if all is in complete disarray on Earth. So, just by looking up, a sense of steadiness is brought into our lives.

2. Looking skyward also gives us a way of seeing into our past, evoking pleasant memories from our youth: Enjoying a late night session counting Perseids, gasping at the sight of the Orion Nebula swinging into the eyepiece on a chilly evening, and, of course, exclaiming the inevitable "Wow!" when first seeing Saturn through a telescope. Those are personal astronomical experiences that skywatchers remember as long as they live. Unforgettable.

3. People like making seasonal friends in the sky, ones that return year after year, with some being ones that aren't readily recognied by many casual stargazers: The four quadrangle stars plus a dangling luminary marking Corvus in spring; the five or six leaping lights of Delphinus just trailing the Milky Way in summer; the two single and the one tight trio of stars outlining the heavenly tubular bell of Triangulum (Borealis) in autumn, and the eight muted points of light of Lepus nestled below the domineering



Orion in winter. Once these patterns and sky locations are committed to memory, they will gladly greet any stargazer on the same dates, year after year. They will be true friends. Always.

4. Other people want to feel more in tune with the cosmos. After they learn about a particular heavenly wonder, they seek to discover it first hand, desiring to gain a deeper appreciation of their place in the universe. They not only want an understanding of the astrophysical nature of a celestial entity, such as the globuar custer NGC 6522, or the mysterious and elusive dark nebular B289, or the globuly wisp of galaxy NGC 4565, they want to see it for themselves. They want to "take it in."

The Astronomical League gets it. Celestial sessions like these give people what they want: the Authentic Observing Experience. They want to be under the stars with telescope or binoculars at hand. They want to be intellectually challenged and comforted by what they witness with their own eyes and through the eyepiece. They want to be part of Observer, Telescope, and Sky.

... by John Jardine Goss, excerpts from the 2020 Observers' Handbook of the Royal Astronomical Society of Canada (RASC), page 82, with permission.



CONTRIBUTIONS



You can see by this satellite image the smoke from the forest fires have reached eastern Iowa. It has definitely have an effect on the transparency during observing evenings. It also has an effect on increasing city light pollution.



Streaks of StarLink satellites over Cerro Tololo, Chile. 30,000+ more satellites to come. What beautiful night skies we will have with these, but we will all have the internet!! Contribution by Roy Gustafson Popular Astronomy Club, Inc. - Quad Cities Published by Terry Dufek 171-33m · @



Matt Ingles > Backyard Astronomy

12h

Projector, Nikon D3500, vinyl black screen, and the moon. Oh and almost forgot haha, nexstar 8i

24 People Reached	7 Engagements	Boost Unavailable	
02		1 Commo	



CONTRIBUTIONS



The Sky At Night

What to see in the night sky: September 2020



Popular Astronomy Club, Inc. - Quad Cities Published by Terry Dufek [7] - 18m - 🚱



ZWO Astronomy Cameras 10h · 📀

Like Page

Two Comets, One Field.

Cornet C/2020 F3 #NEOWISE and C/2017 #PanSTARRS. Still captured by Dan with his #ASI071MC Pro camera.



At Home Outreach August 13th, 2020

Last night we had 10 neighbors/friends in our driveway observing Jupiter and its moons, Saturn and Titan, and strained our eyes looking at M-22. We observed from 9:00 to 10:30 pm. We maintained safe social distance and I used sanitation wipes after each viewer. Anne was also present and viewing. One at least was interested in joining club.

Wayland Bauer



Steve Fearn is at Low Force Waterfalls. 1d Barnard Castle, United Kingdom

Low Force, River Tees.

136	12	
People Reached	Engagements	Boost Unavailable

8 800



THE PAUL CASTLE OBSERVATORY RENEWAL PROJECT

Telescope Installed August 1st, 2020

Last evening, Rusty, Terry, Dale and I met at the observatory to install and test the scope in its new home. The conditions were not ideal due to some high clouds and a bright moon. But we did try the scope on Jupiter and Saturn. Attached are some pictures. The viewing of Saturn proves the quality of the optics are very good as we were seeing 4-5 of the fainter moons.

There are still some minor tasks left to perform, but it looks like everything is working well with the new scope.

Al Sheidler



THE PAUL CASTLE OBSERVATORY RENEWAL PROJECT

fguarius







9



Observatory Completion August 15th, 2020

As of this date, the observatory is completed. Al Sheidler is putting the final touches on the user guide for the observatory and its opening/ closing procedures. The equipment is all working good and the whole observatory had its wind tunnel test on August 10th, 2020 (It passed!)

The user guide, when completed, will be posted on the web site (pdf), in the observatory and a copy can be emailed to you. It will contain the step by step procedures to opening (and closing) the observatory. Someone from the setup team (AI, Rusty, Terry and Dale or others) will come out to assist you until you get used to it.



Introduction to the Observatory User Guide

The Paul R. Castle Memorial Observatory was originally dedicated and opened for use by club members on May 22nd, 2010. The observatory site is located at the home of Gary Nordick and family, who are gracious hosts to a very fine, dark sky astronomical site. This observatory and the adjoining grassy field site is the centerpiece of the Popular Astronomy Club's observing activities. The observatory, named in honor of its original owner and former club president, Paul R. Castle, originally featured an Astro-Physics 6" f12 Super Planetary Refractor telescope attached to an equatorial mount secured to a massive wooden pier and housed inside a moveable 10' diameter dome. Years of exposure to the elements and use by the club payed a heavy toll on the observatory and in 2020, the club engaged in a project to renew and improve this cherished observatory. Under the able leadership of PAC's observatory director, Rusty Case, club members disassembled the observatory, made repairs and completely rebuilt the observatory. The dome was repainted and the wooden pier was replaced with a fabricated steel pier bolted to a massive concrete foundation. The Nordick family donated surplus metal siding which was used to spruce up the lower portion of the dome support structure. With the help of donations from the family of Dr. Harry Nelson, former PAC president and professor of Astronomy at Augustana College, a new computerized telescope was purchased to replace the AP refractor which found a new home with PAC member Steve Sinksen. The new telescope is a Celestron CPC 1100 HD, Schmidt Cassegrain. Construction, maintenance and refurbishing of the observatory represents the tireless efforts and dedication by PAC members who donated both time and money to keep the observatory functional, useful and attractive. The observatory is the culmination of hundreds of hours of labor and donations by the Castle family, the Nelson family, the Nordick family and PAC club members. The result is, without a doubt, one of the finest astronomical observatories in the Quad Cities area. It is the intent of this document to provide rules of use and instruction in the operation of the observatory in the hope that it can be maintained and enjoyed by club members for many years to come.



Three bright stars lead to other discoveries By Al Sheidler

This summer there are many interesting objects in the night sky that can be viewed for their beauty and targeted for closer examination in telescopes. Particularly interesting this summer has been a relatively bright comet (Comet C/2020-F3 NEOWISE) and the planets Jupiter and Saturn. These objects are all members of the solar system and are neighbors to Earth. This means they are nearby and continually in motion as they orbit the sun. Jupiter and Saturn appear very near each other in the southern sky this summer. Both appear to be bright stars, with Jupiter being the brighter of the two. Both planets can be seen without any optical aid even from light polluted urban environments. As I write this article (mid-July), Comet NEOWISE is putting on a splendid show in the early evening sky, but as with all comets, one must seek dark county skies to be able to see it well. By the time this article appears, the comet will have receded a bit from the sun and possibly faded from view. Only time will tell. In any event, comets and planets move relative to earth and change their position in our sky from night to night. Their movement and changeability makes them interesting. Of course all objects (including the sun and moon) move in the sky due to the earth's daily rotation on its axis and yearly revolution around the sun in its orbit. Everything we see in the sky moves together in response to earth's motion. However objects like stars are so far from us, we do not perceive them shifting position compared to each other in the sky. They are, indeed moving, but the distances involved are so great, we don't see them moving around compared to each other (unlike nearby objects in our solar system). This is why the Big Dipper and the other constellations still look the same year after year after vear. Constellations move around due the Earth's motion but the individual stars never appear to move compared to each other. The movement of the earth in its orbit causes different constellations to be visible at different times of the year. Every summer there is a grouping of three very bright stars which form an easily recognizable triangle high in the sky. The stars forming the vertices of this great tri-

(Continued in next column)

angle in the sky, called The Summer Triangle, are Vega, Altair and Deneb. These stars are so bright, they can be seen even from an urban environment. During the late summer months, take an opportunity to view these stars about an hour after sunset. Once the sky darkens, The Summer Triangle will be directly overhead.

To identify the main stars of the Summer Triangle, depending on how much light pollution you have, you will see Deneb and four or more slightly dimmer stars forming what is known as The Northern Cross. Deneb is the brightest of these stars which reside in the constellation Cygnus. You will also notice the very bright stars Vega and Altair. Vega is the brightest and Deneb is the dimmest of the three stars forming the Summer Triangle, but all three should be visible even with a bit of light pollution.

Vega resides in the constellation of Lyra and is one of the most luminous stars in the Sun's neighborhood. It radiates about 60 times as much energy as the Sun does. At a distance of 25 lightyears from earth, Vega is "relatively" close. Realize at this distance, the light from Vega has been en route to your eyes for 25 years. Vega is a very hot, bluish-white star, is three times the size and more than twice as massive as the sun.



(Continued on next page)



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Altair is the brightest star in the constellation of Aquila and is the twelfth brightest star in our sky. At a distance of 16.7 light-years from Earth, Altair is one of the closest stars visible to the naked eye. Altair is also a large star weighing in at 1.8 times the mass of our Sun and 11 times as luminous. Altair is one of the fastest rotating stars clocking in at only 9 hours to spin once on its axis. For comparison, the Earth requires 24 hours and the sun nearly a month to make one rotation. This means Altair's spin speed at its equator is roughly 600,000 miles per hour! As a result, Altair is squished way down by centrifugal force and would appear very oval shaped if viewed from a nearby planet. **Deneb.** the brightest star in the constellation Cvg-

nus, the swan, and the 19th brightest star in our sky is a very large, blue-white supergiant star. Deneb is probably the most distant star visible to the unaided eye. In fact, Deneb is so far away from us that it is difficult with existing technology to accurately measure its distance. It may be as much as 3000 lightyears or more distant from Earth and if so, it would have to be one of the largest and most luminous stars in the Milky Way Galaxy. If so, Deneb would be roughly 300,000 times as luminous as our Sun! To have this much radiative power. Deneb must be a stupendous leviathan so large that were it to be substituted for the Sun in our solar system, the Earth would be engulfed within it! Within the boundaries of the Summer Triangle, formed by these amazing stars (Vega, Altair and Deneb), there are a number of other fascinating objects. About a third of the way between Altair and Vega is a small cluster of stars known as The Coathanger. Using a pair of binoculars should reveal this grouping of stars, which most people agree does indeed look like a coat hanger. Give it a try and see what you see!

If you have access to a small telescope, use it to target Albireo, the bottom star in the Northern Cross. This star, which is visible to the unaided eye in a dark sky, is actually a splendid blue and gold colored double star. In my opinion, this is the most beautiful double star in the sky and one you won't want to miss as you search the wonders of the sky this summer. Another double star located very near Vega is the Double Double, which is in fact, a quadruple star. Any small telescope reveals the double, but if you have access to a good quality scope and high magnification, you will notice that each of the doubles is in fact a double—a quadruple star! If you have access to a good telescope, use it to

seek out two other very interesting residents of the Summer Triangle known as planetary nebulas. A planetary nebula actually has nothing to do with a planet at all. In fact a planetary nebula is formed when an average sized star (like the Sun) runs out of nuclear fuel. When this happens, the star "burps" off stellar material in the form of wispy shells of gas which expand out into space. The Summer Triangle has two very fine examples of planetary nebulas: M27 (The Dumbbell Nebula), and M57 (The Ring Nebula). The Ring Nebula is just a little south of Vega and in a good telescope looks like a little gossamer bubble or ring floating in space. The Dumbbell is somewhat larger and depending on how active your imagination is, it may appear like a two -lobed, fuzzy patch of light (hence dumbbell). Another name for the Dumbbell is the Apple Core-some people with active imaginations see an apple core, others a dumbbell shape. What do you see?

Using your telescope again, there are three noteworthy star clusters within the Summer Triangle. One of them, M29 is an open cluster also known as The Cooling Tower because it sort of resembles the parabolic contours of a power plant cooling tower. It should be obvious by now that astronomers have active imaginations and love to name objects according to what they think they see in the sky. In any event, the other two clusters in the vicinity are M56 and M71. These are classified as globular clusters, and in fact, they look like tight, little, globe-like groupings of stars. These globular clusters are mini satellite galaxies of the Milky Way. Typically they are on the order of a hundred light years in diameter but consist of thousands of stars all gravitationally involved with each other. In a globular cluster, there are so many stars so tightly packed together, that on a planet orbiting one of the component stars, it would never be dark-there would be so many bright stars in the sky that it would never be night! By the way. M71 is also known as the Angelfish Cluster—I guess because some astronomer with an over active imagination saw an angelfish? As far as I know, M56 does not have a moniker, so here's an opportunity for you to observe an object and give it a name. Who knows, it might just be adopted by the astronomical community!

When the Covid-19 pandemic subsides enough to again permit public gatherings, I invite you to join the Popular Astronomy Club in the parking lot of Niabi Zoo on the third Saturday of every month from March to November. We can show you these and many other spectacular objects. Watch our club calendar (www.popularastronomyclub.org) and Facebook for information about public observing sessions.

(Continued in next column)12



August 2020

Of A Comet, A Cosmic Beacon, And The Possibility of Extraterrestrial Life

A few months ago I wrote in this space about Comet Atlas (C/2019 Y4), a comet that at the time showed signs of becoming a bright comet visible without a telescope or binoculars with just one's eyes. I also repeated my maxim that "Comets are like cats; they both have tails, and they both do precisely what they want." This comet indeed did not live up to its billing, and neither did the next one, comet Swan (C/2020 F8).



The third Comet, however, did! Comet NE-OWISE (C/2020 F3) put on a beautiful performance in the morning sky at the start of the Summer of 2020. (First picture.) It was a shining cosmic beacon amidst the terrible time we are all having this year. Over the course of July, this comet faded slightly as it moved into the evening sky, but it moved so far north that for a time it was visible in the night sky all night long. (Second picture.)

When I look at a comet, my thoughts often dwell on the role that comets have played in the origins of life, and in particular why and how I am here looking up at the sky to ask. For a long time we have suspected that when a comet strikes a planet, it leaves behind four of its substances—carbon, hydrogen, oxygen, and nitrogen—CHON particles, the simple alphabet of life. For impacts in the oceans, longlasting hydrothermal vents might have helped form prebiotic molecules which began to replicate themselves before evolving into proteins, amino acids, then RNA, and finally DNA.



Gene Shoemaker, the famous geologist, loved to say the "we are the progeny of comets." Comet NEOWISE itself had nothing to do with it. This comet was formed when the solar system was very young, and trillions of other comets formed at the same time. Some of these other comets might have. Certainly at least one of them did collide with the Earth well over three billion years ago. If the impact were in an ocean, it could have led to the start of one of those hydrothermal vents at the ocean bottom. So much time has elapsed, and we are still here somehow. We also have the opportunity to look at the sky and witness a cosmic cousin of the comet that did collide, that cousin being comet NE-OWISE. In all its magnificence, this comet is visiting, to tell us its story, and ours.

(Continued in next column)



NAME OF CASE O

Date: September 14th, 2020

Event: PAC Meeting (Business) Presentation: Mr. Zach Luppen, University of Iowa, Zach will discuss the upcoming JUICE and Europa Clipper Missions (see next page for information) Location: Online (Zoom) 7:00 PM

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

- September 19th, 2020 Niabi Outreach at sunset
- October 17th, 2020 Niabi Outreach at sunset
- October 24th, 2020 PAC Annual Banquet (Virtual Program)
- November 9th, 2020 PAC regular meeting at Butterworth Center at 7:00 PM
- November 21st, 2020 Niabi Outreach at sunset
- December 14th, 2020 PAC Business meeting at Butterworth Center at 7:00 PM.
- January 11th 2021 PAC regular meeting at Butterworth Center at 7:00 PM
- February 8th, 2021 PAC regular meeting at Butterworth Center at 7:00 PM
- March 8th, 2021 PAC business meeting at Butterworth Center at 7:00 PM
- April 12th, 2021 PAC regular meeting at Butterworth Center at 7:00 PM
- May 10th, 2021 PAC regular meeting at Butterworth Center at 7:00 PM
 Mark your calendars and watch upcoming e-mails for more information!





40

3 Comments



The Europa Clipper and JUICE Spacecraft: Our Next Missions to the Jovian System

Presentation by Zachary Luppen

Topic Description: Since the Galileo spacecraft's 13 years at Jupiter, the planet's icy moons have received little attention. Decades of study have revealed the likely existence of oceans below the surfaces of three Jovian moons: Callisto, Gany-mede, and Europa. As we move into the 2020s, two flagship spacecraft missions of NASA and ESA will launch from Earth and visit these moons to help us understand the environments they possess. I will discuss the science objectives of these missions, their current design and fabrication statuses, and my involvement in the projects at both the University of Iowa and the NASA Jet Propulsion Laboratory.



Biographical Sketch: I'm from Fort Dodge, Iowa, though I spent my childhood in Omaha, Nebraska. I'm currently a graduate student at Iowa State University, pursuing my MS and PhD in aerospace engineering with a focus on the formal specification and design of cube satellites. I previously received my BS degrees in astronomy and physics from the University of Iowa in December 2018. In

(Continued in next column)



Zach Luppen (left), standing next to NASA Administrator Jim Bridenstine

addition to my professional work, I also try to advocate for space-related topics as often as I can. In regards to my topic, I have been involved on the JUICE and Europa Clipper missions since May 2017 at the University of Iowa and have now completed three internships at the NASA Jet Propulsion Laboratory working on them. Aside from work, I'm currently working on my private pilot's license as well as getting my skydiving certification.

Editors note: Zachary will make his presentation at the September 14th, 2020 monthly meeting via Zoom.

SIGN UP REPORT

MONTH	NEWSPAPER ARTICLES	CONSTELLATION REPORT	PROGRAM		
APR 2020	Jeff Struve	Frank Stonestreet	Mr. Jim Dole & Mr. Tom Dunmore, Firebaugh Observatory		
MAY 2020	Dino Milani	Byron Davies	lan Spangenberg		
JUNE 2020	Terry Dufek	Anne Bauer	SMORGASBORD (SEE BELOW)		
JULY 2020	Jeff Struve	None Scheduled	Mr. Dick Koos, "Go For Landing"		
AUG 2020	Al Sheidler	PICNIC	PICNIC		
SEPT 2020	lan Spangenberg	none	Mr. Zach Luppen, University of Iowa, Zach will discuss the upcoming JUICE and Europa Clipper Missions)		
OCT 2020	Paul Levesque	BANQUET	BANQUET		
NOV 2020			Ian Spangenberg		
DEC 2020	Terry Dufek		Roy Gustafson (Year n Review)		
JAN 2021					
FEB 2021					
MAR 2021			SMORGASBORD (SEE BELOW)		

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							
JU	NE						
SEPTEMBER							

ASTRONOMICAL CALENDAR OF EVENTS

Sep 02 00:22 FULL MOON Sep 05 23:42 Mars 0.0°S of Moon: Occultation Sep 06 01:31 Moon at Apogee: 405606 km Sep 09 13:12 Aldebaran 4.2°S of Moon Sep 10 04:26 LAST QUARTER MOON Sep 10 18:05 Moon at Ascending Node Sep 11 14:00 Neptune at Opposition Sep 12 19:10 Venus 2.5°S of Beehive Sep 12 23:50 Pollux 4.3°N of Moon Sep 13 22:19 Beehive 1.8°S of Moon Sep 13 23:43 Venus 4.5°S of Moon Sep 15 10:51 Regulus 4.3°S of Moon Sep 17 06:00 NEW MOON Sep 18 08:44 Moon at Perigee: 359081 km

Sep 18 22:00 **Mercury at Aphelion** Sep 22 01:06 Mercury 0.3°N of Spica Sep 22 05:27 Antares 6.0°S of Moon Sep 22 08:31 **Autumnal Equinox** Sep 23 07:33 Moon at Descending Node

Sep 23 20:55 **FIRST QUARTER MOON** Sep 25 01:46 Jupiter 1.6°N of Moon Sep 25 15:46 Saturn 2.3°N of Moon

The Sun starts of in Leo on the 1st. It moves into Virgo on the 16th. The fall Equinox occurs on September 22nd at 8:30am.

Mercury is in Leo on the 1st (mag: -.59, dia: 5.04", Illum: 91.6%). It is 13^a east of the Sun. It increases the distance to 25^a. At Sunset it is 10^a off the western horizon at sunset. Throughout the month, it remains about the same altitude, at sunset, slowly moving south along the horizon throughout the month. On September 22-23rd, Mercury is about 3/4^a from Spica. Its just not a good month for viewing this planet.

Venus is in Gemini on the 1st of the month (mag: -4.28, dia: 19.46", Illum: 77%). The planet is 23^o off the eastern horizon at 5:00am. It is about 44^o west of the Sun closing to 40^o by month end. Venus



reaches highest point in the sky on September 7th. On September 14th, the 26day old moon is 3° 37' from the planet. Messier 44 (the Beehive) is nearby. (see Sky View)

Mars is in Pisces on the 1st of the month (mag: -1.83, dia: 19.07", Illum: 92.1%). It rises at 9:37pm on the 1st. By month end it is mag: -2.49 and has a diameter of 22.45". On September 5th, there is an occultation of the planet by the Moon but is not visible from the United States so we will have a close approach of 44'. Another close approach occurs in October. Mars reach opposition on October 13th.

Jupiter is in Sagittarius on September 1st (mag: -2.55, dia: 44.20"). It is 24^o off the southern horizon at 8:30pm. Saturn is 8^o to the east. It has a conjunction with the Moon (2^o) on the 23rd. Highest altitude for evening viewing this fall.

Saturn is in Sagittarius on September 1st (mag: .31, Dia: 17.95", rings: 41.82"). 25^o 22' off the southern horizon at 9:00pm and 8^o east of Jupiter. It has a conjunction with the Moon on September 25th (2^o 57'). With Mars to the east, you have a nice arrangement of planets for evening viewing.

Uranus is in Aries on September 1st (mag:5.72, dia: 13.98"). It rises at 9:52pm on the 1st. The planet has a conjunction with the Moon on September 6^{th} with a separation of 3° 47'.

Neptune is in Aquarius on September 1st (mag:7.82, dia: 6"). It is low off the SE horizon at 10pm (21^o). Neptune reaches opposition on September 11h. It has a conjunction with the Moon on september2nd (separation 4^o 37'). It is the 1st of two lunar conjunctions. The second is on September 29 and the separation is 4^o 22'.

Ceres, the dwarf planet, is also in Aquarius on September 1st. It is in the southern edge of the constellation and is brighter than Neptune at magnitude 7.7. It is low in the SE at 11:00p.

Pallas (asteroid #2), is in Hercules. It is high overhead and at magnitude 10, it can be a challenge to look for.



Conjunction of the Moon, Venus and the Beehive on the morning of September 14th, 2020



Near approach of Mars and the Moon on September 5th, 2020



Mercury and Spica, September 22, 2020, low on the western horizon.

Vesta, mag 8.4, on September 23rd is a little over 2^o above and to the left of Venus in the morning sky.

Planetary Alignments in September 2020

Phenomenon	Date and Time	Object 1	Object 2	Separation	Solar Elongation
Conjunction	2020-09-02 17:31:31	Moon	Neptune	+4°36'06.7"	+169°52'55.7"
Conjunction	2020-09-05 23:09:01	Moon	Mars	+0°44'50.2"	+135°40'10.1"
Conjunction	2020-09-07 02:35:44	Moon	Uranus	+3°42'30.3"	+123°36'06.1"
Conjunction	2020-09-13 23:54:01	Moon	Venus	+3°37'19.6"	+43°44'58.9"
Conjunction	2020-09-18 21:39:01	Moon	Mercury	+4°59'34.8"	+23°14'05.8"
Conjunction	2020-09-25 03:36:12	Moon	Jupiter	+2°01'29.7"	+104°57'05.0"
Conjunction	2020-09-25 14:10:25	Moon	Saturn	+2°57'23.4"	+111°30'59.3"
Conjunction	2020-09-30 02:49:48	Moon	Neptune	+4°22'34.5"	+161°22'35.2"
Transit	9/06/2020 22:11:45 PM	Jupiter	Io (JI) (Tranist starts)		
Transit	9/08/2020 19:42:00 PM	Jupiter	Io (JI) (Shadow leaving)		
Transit	9/11/2020 19:40:45 PM	Jupiter	Europa (JII) (shadow mid transit)		
Transit	9/15/2020 19:43:45 PM	Jupiter	Io (JI) (mid transit)		
Transit	9/18/2020 21:04:45 PM	Jupiter	Europa (JII) (shadow begins transit)		
Transit	9/19/2020 19:24:45 PM	Jupiter	Ganymede (shadow mid transit)		
Transit	9/22/2020 21:41:00 PM	Jupiter	Io (JI) (Shadow starts)		
Transit	9/26/2020 21:37:45 PM	Jupiter	Ganymede (shadow starts)		
Transit	9/29/2020 23:39:00 PM	Jupiter	Io (JI) (Shadow starts)		From stellarium



SEPTEMBER DOUBLE STARS							
Object	Right Ascension	Declination	Magnitude	Separation	Position Angle	Year	
9.5	18 ^h 00 ^m .2	+80° 00'	5.7, 6.0	18.7"	231°	2013	
95 Herculis	18 ^h 01 ^m .5	+21° 36'	4.9, 5.2	6.2"	257°	2013	
70 Ophiuchi	18 ^h 05 ^m .5	+02° 30'	4.2, 6.2	5.9"	130°	2013	
Epsilon Lyrae	18 ^h 44 ^m .3	+39° 40'	5.2, 6.1, 5.4, 5.4	2.3", 208.7", 2.4"	346°, 172°, 78°	2013	
Zeta Lyrae	18 ^h 44 ^m .8	+37° 36'	4.3, 5.6	43.7"	150°	2013	
Beta Lyrae	18 ^h 50 ^m .1	+33° 22'	3.6, 6.7	44.8"	147°	2012	
Struve 2404	18 ^h 50 ^m .8	+10° 59'	6.9, 7.8	3.4"	181°	2013	
Otto Struve 525	18 ^h 54 ^m .9	+33° 58'	6.1, 7.6	45.2"	350°	2012	
Theta Serpentis	18 ^h 56 ^m .2	+04° 12'	4.6, 4.9	22.3"	104°	2013	
Beta Cygni	19 ^h 30 ^m .7	+27° 58'	3.2, 4.7	34.7"	55°	2012	
57 Aquilae	19 ^h 54 ^m .6	-08° 14'	5.7, 6.4	35.6"	171°	2013	
31 Cygni	20 ^h 13 ^m .6	+46° 44'	3.9, 7.0, 4.8	111", 333.8"	174°, 325°	2011	
Alpha Capricornus	20 ^h 18 ^m .1	-12° 33'	3.7, 4.3	381.2"	290°	2012	
Beta Capricornus	20 ^h 21 ^m .0	-14° 47'	3.2, 6.1	205.4"	267°	2012	
Gamma Delphinus	20 ^h 46 ^m .7	+16° 07'	4.4, 5.0	9.0"	266°	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	

From the Astronomical League

DEEP SKY WONDERS

For September Evening Skies

Name	RA (J2000)	Dec (J2000)	Mag.	Transit	Туре
M 13 (Great Star Cluster in Hercules)	16h41m41.6s	+36°27'40.7"	6.04	19h00m	globular star cluster
M 12	16h47m14.2s	-1°56'54.7"	8.34	19h06m	globular star cluster
M 10	16h57m09.1s	-4°06'01.1"	7.04	19h16m	globular star cluster
M 92	17h17m07.4s	+43°08'09.4"	6.59	19h36m	globular star cluster
M 14	17h37m36.2s	-3°14'45.3"	8.71	19h57m	globular star cluster
IC 4665 (Summer Beehive Cluster)	17h46m18.0s	+5°43'01.2"	4.49	20h05m	open star cluster
M 23	17h57m04.1s	-18°59'06.0"	6.19	20h16m	open star cluster
NGC 6543 (Cat's Eye Nebula)	17h58m33.4s	+66°37'59.5"	8.27	20h16m	planetary nebula
M 20 (Trifid Nebula)	18h02m42.0s	-22°58'19.2"	7.17	20h22m	cluster associated with nebulosity
M 8 (Lagoon Nebula)	18h03m37.0s	-24°22'40.8"	6.97	20h23m	HII region
M 21 (Webb's Cross)	18h04m13.0s	-22°29'24.0"	6.71	20h23m	open star cluster
M 24 (Small Sagittarius Star Cloud)	18h16m48.0s	-18°33'00.0"	5.14	20h36m	star cluster
M 16 (Eagle Nebula)	18h18m48.0s	-13°48'25.2"	6.42	20h38m	cluster associated with nebulosity
M 18 (Black Swan Cluster)	18h19m58.1s	-17°06'07.2"	7.39	20h39m	open star cluster
M 17 (Omega Nebula)	18h20m47.1s	-16°10'19.2"	6.46	20h40m	cluster associated with nebulosity
M 28	18h24m32.9s	-24°52'11.4"	8.41	20h44m	globular star cluster
NGC 6633 (Tweedledum Cluster)	18h27m31.2s	+6°34'12.0"	4.83	20h47m	open star cluster
M 25	18h31m47.1s	-19°07'01.2"	5.09	20h51m	open star cluster
IC 4756 (Graff's Cluster)	18h38m31.2s	+5°29'24.0"	4.82	20h58m	open star cluster
M 26	18h45m18.0s	-9°22'58.8"	8.30	21h04m	open star cluster
M 11 (Wild Duck Cluster)	18h51m05.0s	-6°16'12.0"	6.57	21h10m	open star cluster
NGC 6709 (Flying Unicorn Cluster)	18h51m18.0s	+10°19'04.8"	6.90	21h10m	open star cluster
M 57 (Ring Nebula)	18h53m35.1s	+33°01'45.0"	8.96	21h12m	planetary nebula
M 54	18h55m03.3s	-30°28'47.5"	8.53	21h14m	globular star cluster
NGC 6755 (Possible Binary Cluster)	19h07m49.0s	+4°16'01.2"	7.70	21h27m	open star cluster
M 56	19h16m35.6s	+30°11'00.5"	8.55	21h36m	globular star cluster
NGC 6802	19h30m36.0s	+20°15'33.8"	8.96	21h50m	open star cluster
NGC 6811 (Hole in a Cluster)	19h37m17.0s	+46°23'16.8"	6.94	21h56m	open star cluster
M 55 (Specter Cluster)	19h39m59.7s	-30°57'53.1"	8.01	22h00m	globular star cluster
NGC 6819 (The Foxhead Cluster)	19h41m18.0s	+40°11'13.2"	7.44	22h00m	open star cluster
NGC 6826 (Blinking Planetary Nebula)	19h44m48.2s	+50°31'30.3"	8.94	22h04m	planetary nebula
NGC 6822 (Barnard's Galaxy)	19h44m56.2s	-14°47'51.3"	8.38	22h04m	galaxy
NGC 6830 (Poodle Cluster)	19h50m59.0s	+23°06'00.0"	8.05	22h10m	open star cluster
M 71 (Angelfish Cluster)	19h53m46.5s	+18°46'45.1"	6.25	22h13m	globular star cluster
M 27 (Dumbbell Nebula)	19h59m36.4s	+22°43'15.8"	7.55	22h19m	planetary nebula
NGC 6866 (Kite Cluster)	20h03m55.0s	+44°09'28.8"	7.74	22h23m	open star cluster
NGC 6885 (20 Vulpeculae Cluster)	20h12m01.0s	+26°28'40.8"	8.24	22h31m	open star cluster
NGC 6888 (Crescent Nebula)	20h12m07.0s	+38°21'18.0"	7.54	22h31m	emission nebula
IC 4996 (P Cyg Cluster)	20h16m30.0s	+37°37'58.8"	7.44	22h36m	open star cluster
NGC 6910 (The Inchworm Cluster)	20h23m07.9s	+40°46'30.0"	7.53	22h42m	open star cluster
M 29 (Cooling Tower)	20h23m55.9s	+38°31'22.8"	6.73	22h43m	open star cluster
NGC 6939 (Ghost Bush Cluster)	20h31m30.0s	+60°39'43.2"	7.94	22h50m	open star cluster
NGC 6940 (Mothra Cluster)	20h34m25.9s	+28°16'58.8"	6.44	22h54m	open star cluster
NGC 6992 (East Veil Nebula)	20h56m19.0s	+31°44'34.8"	7.13	23h16m	supernova remnant
NGC 7000 (North America Nebula)	20h58m47.1s	+44°19'48.0"	4.13	23h18m	HII region

* Data from Stellarium







On the evening September 15th, you can witness Io and Ganymede pass each other. Io is completing its transit of Jupiter and a while later Ganymede will pass behind Jupiter itself. 22



On September 30th, witness the rare shadow of Callisto start to cross Jupiter at 9:04pm.

Spotlight: NGC 6818 Little Gem Nebula

NGC 6818 is a planetary nebula that lives up to its popular name: Little Gem Nebula.

It was discovered by William Herschel in 1787

This cloud of gas formed some 3500 years ago when a star like the Sun reached the end of its life and ejected its outer layers into space. As the layers of stellar material spread out from the nucleus – the white stellar remnant at the center of the image – they ended up acquiring unusual shapes.

NGC 6818 features pinkish knotty filaments and two distinct turquoise layers: a bright, oval inner region and, draped over it like sheer fabric, a spherical outer region.

The central star has a faint stellar companion 150 astronomical units away, or five times the distance between the Sun and Neptune. You can just about make this out: if you zoom in to the center, you'll notice the white dot in the middle is not perfectly round, but rather two dots very close together.

With a diameter of just over half a light-year, the planetary nebula itself is about 250 times larger than the binary system. But the nebula material is still close enough to its parent star for the ultraviolet radiation the star releases to ionize the dusty gas and make it glow.

Scientists believe the star also releases a highspeed flow of particles – a stellar wind – that is responsible for the oval shape of the inner region of the nebula. The fast wind sweeps away the slowly moving dusty gas, piercing its inner bubble at the oval ends, seen at the lower left and top right corners of the image.

NGC 6818 is located in the constellation of Sagittarius and is about 6000 light-years from Earth.





This article is distributed by NASA Night Sky Network

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Summer Triangle Corner: Altair David Prosper

Altair is the final stop on our trip around the Summer Triangle! The last star in the asterism to rise for Northern Hemisphere observers before summer begins, brilliant Altair is high overhead at sunset at the end of the season in September. Altair might be the most unusual of the three stars of the Triangle, due to its great speed: this star spins so rapidly that it appears "squished."

A very bright star, Altair has its own notable place in the mythologies of cultures around the world. As discussed in our previous edition, Altair represents the cowherd Niulang in the ancient Chinese tale of the "Cowherd and the Weaver Girl." Altair is the brightest star in the constellation of Aquila the Eagle; while described as part of an eagle by ancient peoples around the Mediterranean, it was also seen as part of an eagle by the Koori people in Australia! They saw the star itself as representing a wedgetailed eagle, and two nearby stars as his wives, a pair of black swans. More recently one of the first home computers was named after the star: the Altair 8800. Altair's rapid spinning was first detected in the 1960s. The close observations that followed tested the limits of technology available to astronomers, eventually resulting in direct images of the star's shape and surface by using a technique called interferometry, which combines the light from two or more instruments to produce a single image. Predictions about how the surface of a rapidly spinning massive star would appear held true to the observations; models predicted a squashed, almost



The image on the right was created using optical interferometry: the light from four telescopes was combined to produce this image of Altair's surface. Image credit: Ming Zhao. More info:<u>bit.ly/altairvsmodel</u>

(continued in next column) 24

"pumpkin-like" shape instead of a round sphere, along with a dimming effect along the widened equator, and the observations confirmed this! This equatorial dimming is due to a phenomenon called gravity darkening. Altair is wider at the equator than it is at the poles due to centrifugal force, resulting in the star's mass bulging outwards at the equator. This results in the denser poles of the star being hotter and brighter, and the less dense equator being cooler and therefore dimmer. This doesn't mean that the equator of Altair or other rapidly spinning stars are actually dark, but rather that the equator is dark in comparison to the poles; this is similar in a sense to sunspots. If you were to observe a sunspot on its own, it would appear blindingly bright, but it is cooler than the surrounding plasma in the Sun and so appears dark in contrast.

As summer winds down, you can still take a Trip Around the Summer Triangle with this activity from the Night Sky Network. Mark some of the sights in and around the Summer Triangle at: <u>bit.ly/TriangleTrip</u>. You can discover more about NASA's observations of Altair and other fast and furious stars at<u>nasa.gov</u>.



Picture captionAltair is up high in the early evening in September. Note Altair's two bright "companions" on either side of the star. Can you imagine them as a formation of an eagle and two swans, like the Koori?

NEWS&LINKS

Mini-Neptunes could be super-Earths with bloated atmospheres of water

July 27th, 2020



New cosmic magnetic field structures discovered in galaxy NGC 4217

July 21st, 2020



July 21st, 2020





NASA's Juno Spacecraft Takes First Images of Jupiter Moon Ganymede's North Pole

July 26th, 2020



NEWS&LINKS

A weird long cloud on Mars has returned. It's right on schedule, scientists

July 31st, 2020



It's Starting to Look Like Ceres is an Ocean World, Too

August 12th, 2020

Mira-type variable stars are constantly throwing the key chemicals for life out into space

August 8th, 2020

Newly forming star has spiral arms like a tiny galaxy

August 8th, 2020





NEWS&LINKS

A Globular Cluster was Completely Dismantled and Turned Into a Ring Around the Milky Way

August 8,2020

The Martian Sky Pulses in Ultraviolet Every Night

August 11th, 2020

Did Snowball Earth Happen Because of a Sudden Drop in Sunlight?

August 14th, 2029

Fastest Star Ever Seen is Moving at 8% the Speed of Light

August 13th, 2020



A Huge Ring-Like Structure on Ganymede Might be the Result of an Enormous Impact

August 13th, 2020



August 12th, 2020

Is Eta Corvi a window into our past?

July 20th, 2020

Jupiter weather forecast: Lightning with a chance of mushballs

August 14th, 2020









On Saturday evening , August 1st 2020, 4 members of PAC (Al Sheidler, Rusty Case, Dale, Hachtel, Terry Dufek), while out at Paul Castle, got to view the ISS cross the sky from northwest to southeast. ISS was mag. –4 and was following the Crew Dragon Demo-2, a crewed test flight of the Crew Dragon spacecraft, which launched on 30 May 2020. Crew Dragon had just undocked from the ISS at 6:34pm. Dragon was about 423Km in altitude and ISS was about 424 km. They were separated by 42 km at our time of viewing. took these cell phone pictures with the new observatory scope on Saturday night (August 1st, 2020) of Jupiter and its brightest moon, and of Saturn and Titan. It was much easier to align the cell phone camera, and the picture is much better, than it was using the club 7" Meade previously. I will also experiment with my smart phone camera settings to see if I can improve on this capability. Although many cell phone cameras may not be as compatible, this capability could encourage more members who don't have more professional cameras to use the observatory, particularly for planets and the moon **Dale Hachtel**



Above string of photos were of the tail end of the transit of lo across the face of Jupiter. As Io leaves Jupiter, you can see the disk of Io itself. The other two photos are of the best of Jupiter and Saturn that evening. I am happy with these as they are the best I haven taken since 2 years ago. They were taken on a fairly windy evening at Paul Castle with intermittent clouds. **Terry Dufek**





(above) Photos were taken on August 8th—9th. Mars was caught just rising at 15 degrees above the horizon. The exposure was very shot (about 40 sec) because of atmospheric instability. Jupiter and Saturn were caught almost at the peak of altitude and were 90 sec exposures. Camera was ZWO ASI120 and telescope was Celestron 8. Terry Dufek



Messier 22 taken with Celestron 8 in and ZWO ASI294 camera by Terry Dufek



Messier 18, Trifid Nebula taken with Celestron 8 in and ZWO ASI294 camera by Terry Dufek





M16 (Eagle Nebula) by Terry Dufek 4– 60 sec exposures stack with Celestron 8 and a ZWO ASI 294 camera

M33 (Triangulum Galaxy) by Terry Dufek 46– 10 sec exposures with Celestron 8 and a ZWO ASI 294 camera



M32 (Andromeda Nebula along with M110) by Terry Dufek 7-30 sec exposures stack with Celestron 8 and a ZWO ASI 294 camera



(left) M 11 Wild Duck Cluster, taken by Canon Rebel T5i, ISO 25,600, 6.0 sec. on Celestron SE6 (right) M17 Omega Nebula, Taken by Canon Rebel T5i, ISO, 2.5 sec. on Celestron SE6. Photos by Wayland Bauer



Photos on this page were taken on August 18th, 2020 at Paul Castle . Photos below were taken by Byron Davies . From left, clockwise, M 16 Eagle Nebula, M32 Andromeda Galaxy, M6 The Butterfly Cluster and NGC 7293 Helix Nebula



Mars, on August 19th at about 1:00am. Photo was taken with a Celestron 8 in and ZWO ASI 120 camera. Exposure was 90 sec using Firecapture. Photo by Terry Dufek

Saturn on August 18th, 2018 at about 10:30 pm. Photo was taken with a Celestron 8 in and a ZWO ASI 120 camera. Exposure was 90 sec using Firecapture. Photo by Terry Dufek

The sun is still generally pretty quiet in h-alpha light, but every now and then some interesting views can be had. The full disk shot was taken on August 5th, and shows a band of three active areas running in a row across the north half of the sun. A few filaments (the dark snake-like features) can also be seen. The prominences have really been rather subdued and extremely faint, but a few good ones have appeared every now and then as can be seen on the July 3rd and August 4th pictures. The amount of exposure necessary to even capture these prominences results in the sun's disk being greatly overexposed. The light and dark banding seen in these pictures are "Newton's Rings". They always appear when a barlow lens is used, and it has something to do with the camera using a CMOS detector instead of a CCD detector. I have not been able to find a way to eliminate them. Ken Boquist

Solar Photos by Ken Boquist



Jupiter (August 15th): <left> Shot with a 9.25" Schmidt-Cassegrain operating at f15.75. The Great Red Spot is clearly visible. A fairly rare double satellite shadow transit was also visible. The shadow below the Great Red Spot is Ganymede's shadow. The shadow near the right edge is lo's shadow. South is up, and rotation is to the left.

Jupiter (August 20th): <right> Shot with a 5.1" operating at f20. The Great Red Spot is clearly visible. The North Equatorial Belt (the lower of the two brownish bands) and the equatorial region are considerably disturbed. South is up and rotation is to the left. **Ken Boquist**



B 86 (Ink Spot Nebula): <left> Shot from my backyard in Rock Island with a 5.1" f8 refractor. The hat shaped nebula just right of center is a cloud of gas and dust that is seen only by it being silhouetted by the background stars. The knot of stars to the nebula's left is the open cluster NGC 6520. The designation B 86 means that it is the 86th entry in Edward Emerson Barnard's famous catalog of dark nebula that was published in the early 1900s.

Ken Boquist



M 16 (Eagle Nebula): <above> Shot with a 9.25" f10 Schmidt-Cassegrain from my backyard in Rock Island.

M16 and M17 (Eagle and Omega Nebulas): <above-right> Shot from my backyard with an 80mm f.6.8 refractor. M16 (Eagle Nebula) is at the upper right, while M 17 (Omega Nebula) is at lower left.

M 17 (Omega Nebula): <below-left> Shot with a 9.25" f10 Schmidt-Cassegrain from my backyard in Rock Island.

Simeis 57 (Propeller Nebula): <below-right> Shot with an 80mm f6.8 refractor from my backyard in Rock Island. This nebula is located in the constellation Cygnus.

Ken Boquist









Photos *(left and right)* by Rusty Case taken on August 25, 2020. The sky was very hazy and transparency was poor so getting some great photos was a challenge but Rusty did it!



Planetary photos taken on August 25th, 2020. Because of hazing conditions, they could not be sharpened up with wavelets in registax. It just made the soft focus of the photos much worse. Terry Dufek

Paul Castle Observing Session

August 7th, 2020 Last night, Ian Spangenberg, Rusty Case, Al Sheidler, Terry Dufek, and Mark Pershing met at the newly renovated Paul Castle Observatory to do some debugging and observing using the new scope. Terry set up to do imaging of Jupiter and Saturn and got some phenomenal stacking images showing the transit of lo and the fabulous rings of Saturn. In the observatory, we did visual viewing of Jupiter, Saturn, M82, M17, M3, M22, Albireo and Comet NEOWISE (which actually is still a good telescopic object). **Al Sheidler**

The observatory is about ready to go. Rusty and Al worked on some finishing touches today



Ian Spangenberg and Mark Pershing got a tour of the observatory and got to see it

The Observing group stands against a wonderful background of the Milky Way, Jupiter and Saturn.

Paul Castle Observing Session August 13th, 2020

Last evening, Rusty Case and I met at the Paul Castle Observatory to try out the equipment and try imaging with the telescope. Rusty used an R2 video camera to image M22 (Sagittarius Cluster), M17 (Swan Nebula) and M16 (Eagle Nebula). I also shot an image of the Eagle Nebula using my Nikon D7500 camera attached here Al Sheidler



An observing session was held at Paul Castle on Saturday evening. Attending were Rusty Case, Dale Hachtel, Al Sheidler, and Terry Dufek. The sky was clear and it got very cool. Al and Dale worked inside the observatory while Terry and Rusty did deep sky imaging. Terry tried planetary imaging but the sky was not conducive to a very steady mage.



Paul Castle Observing Session

August 18th, 2020 An observing session was held at Paul Castle on Tuesday evening. Attending were Wayland Bauer, Rusty Case, Dale Hachtel, Al Sheidler, Byron Davies, Mike Dannenfeldt (not in photo) and Terry Dufek. The sky was very clear and it got very cool. Al and Dale worked inside the observatory . Wayland worked on the Summer Messier list. A very bright greenish and white meteor, with several flashes, travelled fairly slowly across the southern skies. It traversed Sagittarius and Scorpio and was viewed by all. Byron, Terry and Rusty did deep sky imaging. Terry photographed Mars, Saturn and Jupiter. Mars is really starting to look really impressive !

Paul Castle Observing Session

August 23rd, 2020

An observing session was held at Paul Castle on Saturday evening. Attending were Rusty Case, Dale Hachtel, Al Sheidler, and Terry Dufek. The sky was very clear but it was hot and humid. Al did imaging while the rest did visual observing of deep sky objects and the planets. A transit of lo was occurring when Jupiter was first observed. Terry saw a short meteor traveling from north to south right by Arcturus. Mars was spectacular when viewed in the observatory telescope. A lot of detail could be seen.

> Photo of Jupiter and Io's shadow taken by Al Sheidler

Paul Castle Observing Session

August 25th, 2020

An observing session was held at Paul Castle on Tues evening. Attending were Rusty Case, Dale Hachtel, Byron Davies, Mike Dannefeldt, Al Sheidler, and Terry Dufek. A guest, Jim Rutenbeck also attended. The sky was clear but seeing was greatly reduced due to haze generated by the wildfires out west. The 1st quarter Moon's brightness was reduced greatly and a slight orangish glow was seen around the Moon. 2nd magnitude stars could barely be seen. Still, most worked at some imaging while Dale was doing visual work in the observatory.



Here are pictures from last evening's (August 8th) PAC Picnic and observing. In attendance at the picnic were Ken Boquist, Dale & Joanne Hachtel, Rusty Case, Terry Dufek, Ally Nordick, Chris Nordick, Gary Nordick, Al Sheidler, Mary Holt, Tim Holt, Hugh Holt and Alex Holt. Paul Levesque came a bit later to do some observing. Alex, Hugh, Dale, Terry, Ken and Rusty set up telescopes to do both visual observing and imaging. I spent time working with the new scope in the observatory and learning how to align the new scope and operate the controls. Alex used the observatory scope to do the NCRAL Summer Messier Observing List. We also saw a number of meteors. A very nice observing session. **Al Sheidler**





